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FEDERAL AVIATION ADMINISTRATION AIRCRAFT CERTIFICATION: ALLEGED REGULATORY LAPSES IN THE CERTIFICATION AND MANUFACTURE OF THE ECLIPSE EA-500

(110–169)

HEARING

BEFORE THE

SUBCOMMITTEE ON
AVIATION

OF THE

COMMITTEE ON
TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

SEPTEMBER 17, 2008

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U.S. House of Representatives
Committee on Transportation and Infrastructure
Washington, DC 20515

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September 16, 2008

SUMMARY OF SUBJECT MATTER

TO: Members of the Subcommittee on Aviation

FROM: Committee on Transportation and Infrastructure, Oversight and Investigations Majority Staff

SUBJECT: FAA Aircraft Certification: Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EA-500

PURPOSE OF HEARING

The Subcommittee on Aviation of the Committee on Transportation and Infrastructure will meet on Wednesday, September 17, 2008 at 10:00 a.m. in 2167 Rayburn House Office Building to review an oversight investigation. This investigation concerned allegations that the Federal Aviation Administration (FAA) rushed to approve both the type (TC) and production certifications (PC)[1] of a new aircraft, the Eclipse EA-500, despite safety concerns with the design and manufacturing of the aircraft raised by a number of FAA certification engineers and aviation safety inspectors.

BACKGROUND

FAA AIRCRAFT CERTIFICATION SERVICE

The FAA maintains oversight of manufacturers through its Aircraft Certification Service (AIR). AIR is the FAA organization responsible for: 1) administering safety standards governing the design, production, and airworthiness of civil aeronautical products; 2) overseeing design, production, and airworthiness certification programs to ensure compliance with prescribed safety standards; 3) providing a safety performance management system to ensure continued operational safety of aircraft; and 4) working with aviation authorities, manufacturers, and other stakeholders to help them successfully improve the safety of the international air transportation system.[2]

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[1] The FAA must issue both a type certificate and a production certificate for every new type of aircraft. The procedures for approval are covered in detail in FAA Order 8110.4c, which was last revised March 28, 2007.
[2] From the FAA website, http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/air/

AIR is organized into the Office of the Director and four divisions located at the Washington, DC Headquarters, and four geographic directorates. The Aircraft Certification Service headquarters offices and the directorates share responsibility for the design and production approval, airworthiness certification, and continued airworthiness programs of all U.S. civil aviation products.

FAA Approval of a New Aircraft

When a manufacturer initiates plans to develop and build a new aircraft, it must receive two separate approvals from the FAA before the new aircraft can enter service. First, the design of the aircraft must be proven to meet all applicable safety regulations pertaining to aircraft design. This is commonly referred to as Type Certification (TC), and to obtain approval of a TC, a manufacturer must demonstrate that the aircraft can be operated safely, there are no known significant design defects, and that all likely modes of systems malfunction can be overcome in a way that the aircraft can be landed safely in an emergency situation. Second, the manufacturer must demonstrate the capability to reliably replicate and produce the design successfully in the manufacturing process, and this is demonstrated with FAA's approval of a Production Certificate (PC). FAA issued the TC for the EA-500 on September 30, 2006, and it issued the PC on April 26, 2007.

A TC is a design approval issued by FAA when the applicant demonstrates that a product complies with the applicable regulations, which are described in FAA Order 8110.4C[3]. As defined by 14 CFR § 21.41, the TC includes the type design, the operating limitations of the aircraft, applicable regulations, and other conditions or limitations prescribed by the Administrator. The TC is the foundation for other FAA approvals, including the production certificate (PC) and airworthiness approvals.

A PC is an approval by the FAA to manufacture or alter a product after having shown compliance with an approved type design. The FAA issues a PC to a TC holder, or a licensee of a TC holder, who meets the requirements of 14 CFR § 21.135, 21.139, and 21.143.

Eclipse Aviation and Very Light Jets

An emerging trend over the last several years has been an initiative by multiple manufacturers to design an entirely new class of aircraft commonly referred to as very light jets (VLJs). VLJs have been heavily promoted by FAA as a potential solution to congestion around larger airports, and as a means to bring a convenient, fast transportation alternative to smaller communities that cannot support network commercial air service. Forecasters have predicted that literally thousands of VLJs could enter the National Airspace System (NAS) over the next two decades, and these aircraft will operate in the same high altitude airspace as the current fleet of large commercial aircraft.

As the new influx of VLJs enters the system with a new mix of pilot experience and technology, the FAA must be vigilant in monitoring the impact on the existing NAS and on ensuring rigorous safety oversight. In 2006, FAA certified the first VLJs, the Cessna Mustang, and Eclipse EA-500.

[3] Federal Aviation Administration, Order 8110.4C, revised March 28, 2007.

Eclipse Aviation was formed in 1998 for the sole purpose of building a radically different, high technology, new VLJ. In late 2006, Eclipse unveiled a six-passenger aircraft, which featured advanced avionics and a high level of fuel efficiency. Eclipse Aviation issued a press release on January 1, 2008 claiming that it had set a new record by completing and certifying 104 aircraft in only 12 months, surpassing a previous record by Cessna, which certified 100 Citation 500 aircraft in 18 months.[4] Approximately 200 EA-500 have been manufactured to date out of about 2,700 aircraft ordered.

ALLEGATIONS OF A RUSH TO CERTIFICATION

A few weeks prior to the April 3, 2008 Full Committee hearing on "Critical Lapses in FAA Safety Oversight of Airlines: Abuses of Regulatory 'Partnership Programs,'" O&I Committee staff were contacted by engineers and safety inspectors in the FAA's Aircraft Certification Service (AIR) and received documentation alleging that FAA had inappropriately certified the EA-500 VLJ. The allegations suggest that serious design problems with the EA-500 were identified during the certification process, and that these deficiencies should have delayed the issuance of the aircraft's TC and PC. FAA certification engineers and inspectors who insisted on correction of these design deficiencies before certification were allegedly relieved of their former duties with the Eclipse program by senior FAA management and replaced by those more amenable to management's desire to certify the aircraft by its self-imposed deadline of September 30, 2006. These rumors were further fueled by the fact that in the days leading up to September 30, many engineers involved in the program felt that they had made the case that the aircraft was not ready for certification, and they were surprised when the TC was signed on September 30, a Saturday.

It was further alleged by various informants that Eclipse founder and Chief Executive Officer, Vern Raburn,[5] was very assertive at FAA Headquarters and seemed to have a great deal of influence with senior FAA management. The Director of Aircraft Certification, John Hickey, was personally involved in pushing the Eclipse certification program and replaced personnel who created delays in the process. These allegations raised additional questions about whether the FAA's culture has migrated over time toward overly collaborative relationships with industry. These concerns are similar to those aired during the April 3, 2008 Full Committee hearing.

Concerns about the EA-500 were intensified on June 5, 2008, when an EA-500 jet made an emergency landing at Chicago Midway International Airport. On approach to the airport, the flying pilot pushed the throttles (fly-by-wire) forward and both engines "froze" at full power and were completely unresponsive to throttle inputs. The crew quickly shut down one engine by closing the fuel supply lever to that engine, and the other engine retarded to idle thrust shortly thereafter, but the other engine continued to be unresponsive to throttle inputs. The pilots declared an emergency, were cleared to land on any runway, and were able to land the plane without injury to the two pilots or two passengers. The airplane had accumulated only 238 hours and 192 cycles at the time of the incident. This situation could easily have been a fatal accident. The crew was fortunate that shutting down one engine caused the second engine to suddenly roll back to idle thrust. Ironically, that incident revealed a software defect indicating non-compliance with certification requirements that each power plant control must be completely independent of the others.

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[4] Eclipse Aviation Press Release, January 1, 2008, www.eclipseaviation.com/company/news/.

[5] Mr. Raburn was released as CEO by the Eclipse Aviation Corporation Board of Directors in late July 2008 and subsequently left the company.

Following the incident, the NTSB issued urgent recommendations to the FAA. They advised that mandatory inspections be required on all EA-500 airplane throttle quadrants to ensure that pushing the throttle levers against the maximum power stops will not result in an engine control failure, that all units failing inspection should be replaced, and that the replacement parts must be similarly inspected. NTSB also recommended that FAA issue an airworthiness directive (AD) which would require Eclipse Aviation to immediately develop an emergency procedure for the dual engine control failure that occurred and incorporate the procedure into the airplane flight manual and quick reference handbook. NTSB also raised a theory that the problem could be due to flaws in the avionics software logic[6], and both FAA and Eclipse later confirmed these software flaws.

On June 12, the FAA heeded the NTSB's recommendations and issued an emergency AD, which effectively grounded 200 jets until they could be inspected. AD 2008-13-51 requires a pilot inspection of the thrust quadrant assembly (TQA) on each plane in advance of the aircraft's next flight. The NTSB final analysis of this software failure mode has not been completed, but it is of concern in light of the questions surrounding the "non-standard" software certification of the EA-500.

As a result of this incident, FAA re-examined its certification of the software that controls the engines and discovered software logic flaws that should have been resolved before approving the design with issuance of the TC and PC. On June 26, 2008, FAA official Michele M. Owsley sent a letter to Eclipse Aviation informing the company that "our review of the design information thus far indicates several design regulatory non-compliances" [with certification requirements].[7] Ms. Owsley is the FAA official who also signed the original TC. This letter advised Eclipse to develop an approach to bring the aircraft design into certification compliance.

In a July 16, 2007 memorandum obtained by OIG investigators, Ms. Owsley stated the following:

> During the TC, we accepted a lesser level of validation and consequently the FAA ended up doing a great deal of developmental flying with Eclipse, a task that the company should accomplish prior to FAA TIA [preliminary aircraft] testing. In conducting a lessons learned review after the initial TC, we identified the level of software certification as an issue we would treat differently on subsequent certifications.[8]

On August 20, 2008, the FAA announced that it had begun, on August 11, 2008, an unusual "Special Certification Review" led by a former Boeing safety expert, which would be concluded in 30 days. The FAA said that special reviews are "used regularly" by the FAA, and it cited 6 occurrences in the last 10 years.[9] This panel has concluded its work, and remains steadfast in maintaining the FAA position that the certification was conducted properly, despite the findings of

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[6] Safety Recommendation A-08-46 and -47, National Transportation Safety Board, June 12, 2008.

[7] FAA letter from Michele M. Owsley, Manager, Airplane Certification Office, Rotorcraft Directorate to Randy Griffith, Certification Manager, Eclipse Aviation, June 26, 2008.

[8] Written Testimony before the Subcommittee on Aviation, Committee on Transportation and Infrastructure, Calvin L. Scovel III, Inspector General, Department of Transportation, September 15, 2008.

[9] FAA Press Release, August 20, 2008.

the OIG.[10] Mr. Ronald Wojnar was a member of this "special review" team, and he was also in charge of the original Eclipse production certification process after the previous manager (David Downey) was reassigned (see "*Summary of Findings and Allegations*" below). In addition, the special review team focused exclusively on four issues related to issuance of the type certification. The FAA review did not examine any of the issues associated with the production certification, which is a major focus of the OIG investigation, as well as later reported problems with the aircraft.[11]

FAA CUSTOMER SERVICE INITIATIVE (CSI)

In previous Committee hearings, it has been noted that partnership programs, in which the airlines and aircraft manufacturers are treated more as the FAA's "customers" as opposed to regulated entities, have become firmly rooted in recent FAA culture. The FAA's website prominently features the FAA's one sentence statement entitled "Our Vision" which states, "Our vision is to improve the safety and efficiency of aviation, while being responsive to our customers and accountable to the public."[12]

In the April 3, 2008 Full Committee hearing, "Critical Lapses in FAA Safety Oversight of Airlines: Abuses in Regulatory 'Partnership Programs,'" the Customer Service Initiative (CSI) figured prominently in the questions addressed to the FAA by Members. It was suggested that FAA placed too much emphasis on airlines and manufacturers as the "customer" as opposed to the public being FAA's only customer, and that FAA appeared to place a continued emphasis upon promoting aviation as opposed to its only statutory mandate, safety. Moreover, FAA documents describing the CSI clearly suggest that the FAA views certificate holders (e.g. airlines, manufacturers, and other regulated entities) as the customer. Following the ValuJet accident in 1996, legislation was enacted that specifically removed the FAA's "promotion of aviation" mandate and required FAA to focus exclusively on safety as the highest priority.[13] Several Members noted that the CSI appeared to create conflicts with FAA's safety mandate, and that the traveling public should be the FAA's only customer.

The Aircraft Certification Service has its own version of the CSI.[14] As with the CSI procedures implemented in the Flight Standards Service, an applicant has the right to appeal any FAA certification decision to higher authorities. This document is replete with references to the certificate holder or applicant as the "customer" of the FAA. According to the DOT OIG, Eclipse made use of the CSI in filing at least one formal appeal of a certification decision, and may have made other informal appeals.[15]

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[10] Briefing of the FAA EA-500 Special Certification Review Team to Committee Staff, September 12, 2008.

[11] O&I Staff conversation with Megan Rosia, FAA Assistant Administrator for Government and Industry Affairs, September 15, 2008. As of September 16, 2008, O&I Staff have not been provided with a copy of the Special Certification Review Team report.

[12] Federal Aviation Administration, www.faa.gov/about/mission/.

[13] Federal Aviation Reauthorization Act of 1996, Public Law 104-264, Section 401, Enacted October 9, 1996.

[14] Aircraft Certification Service, Customer Service Initiative Customer Guide, Federal Aviation Administration, July 11, 2008.

[15] See note 8.

SUMMARY OF FINDINGS AND ALLEGATIONS

T&I Committee O&I staff immediately requested assistance from the Department of Transportation (DOT), Office of Inspector General (OIG) to verify the allegations of the various FAA employees previously associated with the Eclipse certification program. The OIG investigation confirmed many of the allegations and raised numerous significant concerns and regulatory policy questions.

FAA PERMITTED EXCEPTIONS TO ITS USUAL DESIGN CERTIFICATION PROCESS

According to OIG investigators and FAA personnel who have been interviewed by Committee investigators, the FAA deviated from the normal certification process in various ways and before significant design problems were resolved. OIG found that many of these design problems continue today. These include problems with the avionics software, as well as airspeed and altitude indicator problems. More importantly, recent events reported by Eclipse operators indicate that many problems identified during the design certification have still not been resolved, including erroneous stall warnings, cockpit display distortions, and flap movement failures.

Avionics Software Issues

The OIG testimony states that given the EA-500's dependence on software, it would have expected FAA to perform rigorous analysis and testing prior to issuance of the TC. They found, however, that before issuing the TC, FAA did not require this software to be approved to the accepted industry standard (DO-178B). Instead, FAA accepted what the OIG characterizes as an "IOU" from Eclipse, which stated that the aircraft would meet the accepted standard at a later date. While those actions were not a violation of Federal Aviation Regulations (FARs) and are not unprecedented, OIG was concerned because the EA-500 was a brand new company attempting to certify a brand new aircraft. Nonetheless, they were allowed to deviate from the accepted industry standard, and the OIG was particularly concerned that the FAA applied a "less stringent" standard to the avionics software design, which the aircraft relies heavily upon for operation. Users have since reported problems directly related to the EA-500 software such as cockpit display failures. When the TC was issued, Eclipse had only completed 23 of the 65 tests needed to meet the approved industry standard for software certification. [16] As discussed above (see "*Allegations of a Rush to Certification*), the FAA manager who approved the Eclipse TC has since expressed concerns over the process used for certifying the avionics software.

Airspeed and Altitude Indicator Problems (Pitot Static System)

The EA-500 design for the pitot static system (which provides airspeed, altitude, and rate of climb information), did not include a drainage system for excess moisture, contrary to the normal design standard for this system. A moisture and ice contaminated pitot static system was a major causal factor in the Air Florida accident in 1982 where a B-737 crashed into the 14th Street Bridge in Washington, D.C. shortly after takeoff.[17] FAA can and did approve an "Equivalent Level of Safety" (ELOS) exemption for the EA-500 pitot static system. The Fort Worth certification team was not

[16] See note 8.

[17] National Transportation Safety Board Abstract, Air Florida, Inc., Boeing 737-222, N62AF, Collision with 14th Street Bridge near Washington National Airport, Washington, DC, January 13, 1982

satisfied with the proposed design and did not want to approve it. As a result, approval authority was transferred to a different FAA office, which did approve an ELOS exemption for the original design of the pitot static system.[18]

The system was initially tested in the dry climate of New Mexico and experienced no significant early problems. Once the aircraft began operations in more humid climates, problems began occurring with moisture contamination, causing altitude and airspeed deviations. Subsequently, FAA has issued several Airworthiness Directives (ADs), the latest on September 9, 2008, requiring correction of this problem, even though it was noted by the team prior to certification.[19]

Intermittent Erroneous Stall Warnings

The EA-500 experienced problems with the stall warning system both before and after the issuance of the TC and PC. FAA regulations state that ". . . the stall warning must not occur during takeoff with all engines operating, a takeoff with one engine inoperative, or during approach to landing." According to FAA pilots who spoke with both OIG and Committee investigators, these inappropriate warnings can be extremely dangerous particularly when landing because it has a high probability of causing pilots to take urgent actions based upon a belief that they are entering a stall.

FAA management disputes that there is a real problem and attributes the warnings to flying the aircraft at inappropriate speeds. However, these warnings still occur today, and pilots operating the aircraft dispute that the incidents of stall warnings are entirely due to speed control problems in operation. This issue is still under investigation.[20]

Cockpit Display Failures

The EA-500 experienced numerous incidents of screen blanking or freezing both before and after the issuance of the TC. In order to award the design certificate, Eclipse agreed to fix the software "bug" causing these failures after receiving the TC. Eclipse reported to FAA that it had fixed the problem nearly 4 months after issuance of the TC, and FAA also required Eclipse to develop an emergency procedure for screen blanking in the aircraft flight manual. However, a number of additional incidents have been filed in service difficulty reports (SDRs) between August 2007 and May 2008.[21]

Flap Movement Failures

FAA regulations require that the main wing flaps must be designed so that the occurrence of flap failure is "extremely improbable." However, both before and after issuance of the TC, the aircraft had problems with flaps sticking in position. After issuance of the TC, but before issuance of the PC, the FAA's Flight Standardization Board (FAA test pilots), recommended that it be restricted to two-pilot operation stating in part:

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[18] See note 8.

[19] Federal Aviation Administration, Airworthiness Directives; Harco Labs, Inc. Pitot/AOA Probes (Part Numbers 100435-39, 100435-39-001, 100435-40, and 100435-40-001), September 9, 2008.

[20] See note 8.

[21] Ibid.

> The immediate issue that caused the Board to reach this conclusion is the repeated flap failures that have been occurring during recent flights. These failures are now approaching one flap failure for every 10 attempts to operate the flaps. The flight control problem affects safety of flight and acceptable operational reliability.[22]

FAA Headquarters officials overruled the Board's recommendation and approved the EA-500 for single-pilot operations after receiving a CSI complaint from Eclipse.[23]

Service Difficulty Reports

The EA-500 has logged a large number of Service Difficulty Reports (SDRs)[24] during its relatively short period of time in service. Information obtained by DOT OIG investigators indicated 81 SDRs submitted for 28 Eclipse aircraft in service between August 2007 and May 2008.

According to the FAA, none of the current problems were identified during the design certification, but this is contrary to what is reported by certification engineers and inspectors, who were associated with the certification program and FAA records obtained by OIG. For example, in the two weeks immediately prior to the issuance of the TC on September 30, 2006, Eclipse test flew the aircraft for 100 hours as a pre-condition for receiving certification. During those flights the pilots experienced: 1) at least 4 inappropriate stall warnings during landing; 2) 10 instances of screen freezing or blanking; and 3) 18 cases of either actual flap failure or flap failure messages on the cockpit display. As a result, the OIG has concluded that FAA had sufficient reason to know about the problems still occurring with the aircraft today.[25]

The European Aviation Safety Agency (EASA) Has Declined to Certify the EA-500

It is also significant that the European Aviation Safety Agency (EASA) has not granted a TC to the EA-500 due to many of the defects that were originally reported by FAA engineers and inspectors. FAA and EASA have "harmonized" certification procedures such that an FAA TC or PC is usually automatically recognized by EASA (and vice versa). EASA has concerns that the EA-500 does not meet the FAA/EASA harmonized certification standards to the extent that the agency will not recognize FAA's certification without further testing and review.

FAA AWARDED ECLIPSE A PRODUCTION CERTIFICATE EVEN THOUGH THE COMPANY FAILED TO DEMONSTRATE THE ABILITY TO REPLICATE THE APPROVED DESIGN

FAA granted Eclipse a PC on April 26, 2007. Prior to receipt of this certification, every aircraft manufactured by Eclipse was required to receive an FAA inspection and certificate of airworthiness. However, once Eclipse received the PC, it could mass-produce its aircraft without a required FAA inspection.

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[22] Ibid.
[23] Ibid.
[24] SDRs are reports submitted by operators when a failure or defect occurs in aircraft structure or is detected if that failure or defect has endangered or may endanger the safe operation of an aircraft.
[25] See note 8.

Manufacturers are required to undergo an evaluation by an FAA Production Certification Board (PCB) before receiving approval for a PC. The primary task of the PCB is to ensure that corrective actions for any area of design non-compliance are accomplished prior to PC approval. The OIG found that FAA issued the PC without resolving a number of deficiencies identified by the PCB, which completed its review on April 12, 2007, approximately 2 weeks prior to PC approval. The PCB also found significant problems with Eclipse suppliers. The PC was awarded with 13 known production problems that had not been addressed, and the PCB did not close those open items until almost a year later, in February 2008.

Eclipse encountered numerous problems replicating its own aircraft design on the assembly floor both before and after receiving its certificate. OIG found that manufacturing deficiencies were missed by Eclipse inspectors serving as FAA "designees" (see ODAR discussion below). For example, in one instance Eclipse presented an aircraft to FAA for airworthiness certification with approximately 20 airworthiness deficiencies, even though it had been signed off with no non-conformities by an Eclipse FAA designee. The OIG investigation found production problems associated with previously identified design problems. In addition, OIG found: 1) Eclipse supplier quality control issues; 2) significant problems that were not identified by Eclipse inspectors; and 3) deficiencies in the manufacturing quality assurance program.[26]

Committee investigators also interviewed a number of FAA certification engineers and inspectors who confirmed these problems. A number of former Eclipse manufacturing employees also contacted the committee with reports of serious problems in the production process.

SENIOR FAA MANAGEMENT IDENTIFIED ECLIPSE AS A PRIORITY CERTIFICATION AND APPEARED TO BE LENIENT WITH THE MANUFACTURER

Because Eclipse was identified, at top management levels, as a priority for certification, OIG concluded there was reason to believe that the FAA may have been excessively lenient with the manufacturer. At minimum, this finding raises the concern that FAA may have been more intent on promoting aviation and new technology than it was with its safety oversight mandate. A specific certification date was included in the FY 2006 Aircraft Certification Performance Plan.[27]

The OIG found that Eclipse complained "they were not getting the service they needed." FAA's Director of Aircraft Certification Service, John Hickey, was personally involved in the Eclipse certification and assigned his former deputy to oversee the project. In March 2007, he removed David Downey, Rotorcraft Directorate Manager before issuance of the PC for "not actively managing the manufacturing process well," apparently because Mr. Downey refused to sign-off on the PC because he believed Eclipse had not met the requirements. In a seven-page letter of reprimand sent to Mr. Downey, FAA officials stated that he failed to meet expectations associated with meeting its customer service initiatives such as "building relationships with our customers to achieve operational results." In fact, FAA Headquarters officials required that Mr. Downey undergo a peer appraisal, and directed that the Chief Operating Officer of Eclipse would be one of the individuals appraising his performance in certifying the EA-500.[28] It would appear that this was an

[26] Ibid.
[27] Annual Performance Plan, Fiscal Year 2006, FAA Aircraft Certification Service, 2005.
[28] See note 8.

obvious conflict-of-interest position for an FAA manager charged with evaluating the safety of a new aircraft type, and it is yet another example of the Committee's previous concerns with the CSI.

FAA engineers and inspectors initially involved in the Eclipse project were reassigned after raising problems with the aircraft's design and production. According to the FAA, the reassignments were related to "performance issues." Furthermore, FAA officials allegedly pressured Mr. Ford Lauer, the San Antonio Manufacturing Inspection District Office (MIDO) manager, to sign a document that prohibited FAA inspectors from conducting detailed inspections, and to specifically prevent them from looking under the floorboards and removing interiors of the aircraft. Due to his concerns about the implications of this action, the MIDO Manager purchased professional liability insurance. An FAA audit team evaluating the Eclipse for production certification was allegedly told to "look no more than one inch deep" by the newly appointed manager.[29] The activities of the FAA manufacturing audit team were significantly curtailed by the newly-appointed manager, Mr. Wojnar. Specifically, Mr. Wojnar's newly-implemented production certification plan did not require Eclipse employees to remove floorboards or interior panels for FAA inspectors. Prior to the establishment of this new plan by the new manager, FAA inspectors had been routinely finding numerous deficiencies on aircraft that had already been inspected and "certified" by Eclipse "designated inspectors" (see discussion of "*Organizational Designated Airworthiness Representative (ODAR)*" below).[30]

After multiple occurrences of aircraft being presented to FAA for airworthiness certifications with numerous design and production deficiencies, the manager of the FAA Manufacturing Inspection Office (MIO) sent an e-mail in February 2007 to Eclipse detailing all of the steps that Eclipse needed to accomplish to comply with FAA requirements of gaining an airworthiness certificate. In March 2007, this manager was also removed from the project. The senior FAA official in charge of certification, Mr. Hickey, told Committee staff on September 5, 2008 that he thought the requirements imposed in the e-mail to Eclipse were "excessive" and "very inappropriate," and that this was the reason for his decision to remove this manager. However, other FAA managers, including the supervisor of the removed manager, stated they believed the e-mails were entirely appropriate because FAA is ultimately responsible for certifying the airworthiness of each new aircraft. This is defined in FAA Order 8130F.[31]

Organizational Designated Airworthiness Representative (ODAR)

The FAA approved an Eclipse Aviation request to be authorized as an Organizational Designated Airworthiness Representative (ODAR) to perform approved functions on behalf of FAA. FAA granted Eclipse Aviation the authority to certify its own aircraft far earlier than other manufacturers, specifically 4 years prior to Eclipse obtaining the TC.[32]

An ODAR is an organization that collectively meets the experience and technical requirements of an individual Manufacturing Designated Airworthiness Representative (DAR), and

[29] Written Testimony of Maryetta J. Broyles, Technical Program Specialist, Aircraft Certification Service, FAA.
[30] See note 8.
[31] Ibid.
[32] Ibid.

essentially allows a manufacturer to approve its own processes without FAA oversight.[33] To obtain DAR authorization, the manufacturer is required to have sufficient and relevant experience, as an organization, to perform the functions for which the authorization was requested. Since Eclipse is a new manufacturer and had never before designed or manufactured an airplane, it is difficult to understand how Eclipse could have the appropriate level of experience required as an organization to qualify for ODAR status. However, it is interesting to note the Eclipse manager of certification had recently left FAA to take that position with Eclipse in 2001, with no "cooling off period." Eclipse received ODAR status in September 2002, 4 years before receiving TC approval in 2006.[34]

Single Pilot Aircraft Certification

FAA also granted single-pilot operation certification for the EA-500, even though the FAA Flight Standardization Board (FSB) had significant concerns about the ability to safely operate the aircraft with one pilot and recommended against single-pilot certification. Many EA-500 pilots interviewed by the OIG have testified that they do not believe the aircraft can be safely operated by a single-pilot, given its complexity, which is essentially equivalent to that of larger, transport category aircraft, which can only be operated by 2 or more pilots. It is significant that the largest operator of the EA-500 only allows two-pilot operations with the aircraft. The CEO of Eclipse at the time, Mr. Raburn, filed a CSI complaint about the FSB recommendation to reject the aircraft for single-pilot certification, and the FSB recommendation was reversed by senior FAA management.[35]

Other Issues

It was also found that FAA devoted a disproportionate share of resources to the project in order to rapidly certify the aircraft. Some personnel worked 80 hour weeks for months; and they were redirected from other certificates to work on the Eclipse. According to FAA documents obtained by the OIG, the FAA's cost for the Eclipse certification was almost $3 million and the total hours logged was over double that of a comparable certification project.[36]

The DOT OIG is continuing to investigate this case and will attempt to determine if problems identified during the certification and manufacturing process have been corrected. They are also evaluating the current manufacturing process to determine the effectiveness of the Eclipse quality assurance system, the adequacy of training for production personnel, and the competence of the FAA designees.

SUMMARY

The FAA remains steadfast in its assertion that no Federal regulations were violated. However, when the findings and assertions uncovered in this investigation are viewed in total, there is a disturbing suggestion that there was a "cozy relationship" and reduced level of vigilance on the FAA's part during both the TC and the PC approval process of the EA-500. Based upon the results of the OIG investigation, to date, and the conclusions of the FAA's "lessons learned review, and—

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[33] Organizational Designation Authorization Procedures, FAA Order 8100.15, Department of Transportation, Federal Aviation Administration, August 18, 2006.
[34] See note 8.
[35] Ibid.
[33] Ibid.

most importantly—the problems that continue to impact pilots, the OIG believes that FAA should have exercised greater diligence in certifying the EA-500 design.[37]

With the significant risks posed by a new aircraft, powered by new technology, and produced by a new manufacturer, it seems logical to have expected the FAA to exercise much greater scrutiny than in the average certification program with an established manufacturer such as Airbus, Boeing, Cessna, etc. Moreover, the EA-500 represented a whole new class of aircraft, and it did not easily fit into the FAA's normal certification regime because the EA-500 has advanced avionics and turbine engine technology more characteristic of a large transport aircraft. Its only commonality with a typical general aviation aircraft is its light weight and small passenger capacity. However, the FAA chose to use certification requirements for general aviation aircraft rather than the more rigorous requirements that should be required of aircraft with that degree of complexity.

Instead, FAA seems to have been unusually lenient given the priority it assigned and the collaborative relationship that was developed with Eclipse management. It seems entirely illogical and inappropriate for senior FAA management to assign itself a date by which an aircraft is to be ready for certification approval and then to find reason to actually meet that date, when just days prior, numerous FAA personnel were opposed to issuance of the TC. On the contrary, it would appear that the burden of when an aircraft is ready to be certified should fall entirely upon the manufacturer, and it should be none of FAA's concern as a matter of policy. It is clearly not the FAA's responsibility to meet a manufacturer's certification deadline, which is used to satisfy potential customers and company investors. The FAA's only responsibility should be to respond in a timely fashion to an applicant's approval documentation and to provide a "yes" or "no" decision on whether an aircraft is ready for safe certification or not.

It is also interesting to note that the FAA Rotorcraft Certification Directorate in Ft. Worth, Texas, which was assigned primary responsibility for evaluating the EA-500, appears to have been very diligent in its attempt to adhere to established certification regulations and appears to have performed admirably. However, their decisions and recommendations were routinely overruled by higher-level FAA management, with "customer service" to Eclipse looming as a strong influence.

The Congress removed the FAA's "promotion of aviation" mandate in 1996.[38] The FAA's CSI and recent behavior in other areas suggest that the promotion of aviation is still an integral part of FAA's culture.

In the Eclipse case, it appears that when design deficiencies were identified that appeared to be non-compliant with FAA certification requirements, senior FAA management became personally involved, overruled lower-level engineers and inspectors, worked diligently to find "work-arounds," to find "alternative approval rationales and techniques," and accepted "IOUs" for later compliance. In many ways, the certification process in this case was conducted "backwards" from the clear intent and requirements of FAA certification regulations. Instead of certifying on the basis of safety alone, FAA senior management appeared to be highly motivated to find ways to explain why design deficiencies identified by FAA engineers and inspectors as "unsafe" were indeed "flawed," but they were still "acceptable for certification" by simply changing the approval criteria. Indeed, one broad policy issue that needs further examination relates to the many "loopholes" FAA has at its disposal

[37] Ibid.
[38] See note 12.

to find "alternative means of compliance" or "equivalent levels of safety" for certification regulations. Thus, the allegations and findings in this case are cause for concern and suggest the immediate need for a broad policy review of FAA certification practices.

WITNESSES

PANEL 1

The Honorable Calvin L. Scovel, III
Inspector General
U.S. Department of Transportation

PANEL II

Mr. Tomaso DiPaolo
Aircraft Certification National Representative
National Air Traffic Controllers Association

Mr. David Downey
Vice President, Flight Safety
Bell Helicopter Textron
(Former Rotorcraft Directorate Manager
Aircraft Certification Service
Federal Aviation Administration)

Mr. Dennis Wallace
Software Engineer
Rotorcraft Directorate, Aircraft Certification Service
Federal Aviation Administration

Mr. Ford Lauer
Manager, San Antonio Manufacturing Inspection District Office
Federal Aviation Administration

Ms. Maryetta Broyles
Technical Program Management Specialist
Manufacturing Inspection Office
Federal Aviation Administration

PANEL III

Mr. Nicholas A. Sabatini
Associate Administrator for Aviation Safety
Federal Aviation Administration

Mr. John J. Hickey
Director, Aircraft Certification Service
Federal Aviation Administration

Mr. Ronald Wojnar
Senior Advisor, Aircraft Maintenance Division
Aircraft Certification Service
Federal Aviation Administration

Mr. Tom Haueter
Director, Office of Aviation Safety
National Transportation Safety Board

PANEL IV

Ms. Peg Billson
President and General Manager, Manufacturing Division
Eclipse Aviation Corporation

Accompanied by
Mr. Roel Pieper
Chief Executive Officer
Eclipse Aviation Corporation

Mr. Clyde Kizer
Retired Aerospace Executive

HEARING ON FAA AIRCRAFT CERTIFICATION: ALLEGED REGULATORY LAPSES IN THE CERTIFICATION AND MANUFACTURE OF THE ECLIPSE EA-500

Wednesday, September 17, 2008,

HOUSE OF REPRESENTATIVES,
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,
SUBCOMMITTEE ON AVIATION,
Washington, DC.

The Subcommittee met, pursuant to call, at 10:00 a.m., in Room 2167, Rayburn House Office Building, the Honorable Jerry F. Costello [Chairman of the Subcommittee] presiding.

Mr. COSTELLO. The Subcommittee will come to order.

The Chair will ask all Members, staff and everyone to turn electronic devices off or on vibrate.

The Subcommittee is meeting today to hear testimony on FAA Aircraft Certification: Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EA-500. The Chair will give an opening statement, recognize the Ranking Member for an opening statement, and as you will note from the witness list, we have a number of witnesses. So what we intend to do is give opening statements from the Chair and Ranking Member and go directly to the witnesses. After my statement, I will, as I said, recognize the Ranking Member.

I welcome everyone to our Subcommittee hearing on FAA Aircraft Certification: Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EA-500.

For the past few years, I have asked the question, does the FAA have adequate resources to accomplish its mission, and in turn, are they relying too heavily on its safety record in order to demonstrate its ability to keep a safe system? Over these past two years, our hearings in the Aviation Subcommittee and the Full Committee have demonstrated an agency that is short on resources, low on morale and has major problems overseeing its critical safety programs.

Today, the Department of Transportation Inspector General reports that he will detail alarming problems within the FAA. I am extremely disappointed that the FAA, again, lacks the ability to oversee its programs, in this case, its certification programs. Unfortunately, this hearing will show an agency that is as interested in promoting aviation and befriending manufacturers as it is in carrying out its number one responsibility of protecting the safety of the flying public.

It is inexcusable and unacceptable to ignore rules, regulations and standard practices to accommodate those you have a responsibility to regulate, especially when you have peoples' lives in your hands. This Subcommittee and the Congress and the American people entrust the FAA to uphold the highest level of safety. Unfortunately, the FAA's conduct regarding the certification of the EA-500 makes one lose confidence in the agency.

The aircraft certification and production process is complicated, requiring very technical expertise and understanding. When trying to do so on an emerging new class of very light jets, like the Eclipse EA-500, one would expect the FAA to provide an appropriate amount of time and resources to make sure we get it right. However, questions have been raised by the IG and by current and former FAA employees that corners were cut during the certification and manufacturing process, deficiencies were overlooked and this new type of aircraft was pushed through the process in order to meet internal agency goals.

As a result, the hearing today focuses on two central questions. One, did the FAA follow its regulations when certifying the Eclipse EA-500 and in the production of this aircraft? And two, was safety compromised? The IG, Mr. Calvin Scovel, will provide testimony which details very serious issues with the FAA's certification and manufacturing of the Eclipse EA-500.

One of the most disturbing findings to me in the IG's report is that instead of mandating that problems be resolved, the FAA accepted IOUs from Eclipse to resolve the problems at a later date. In this case, an IOU was allowed on the avionics system that ran the plane. I question the practice of using IOUs in any instance. However, to use an IOU on the avionics system that is used to run the EA-500, which I understand has no standby instruments or backup systems, from a new manufacturer, who has no prior experience, and on a system so critical to the aircraft, is puzzling.

Worse, according to the FAA's own testimony on pages 10 and 11, Eclipse delivered 11 of their EA-500 aircraft to customers prior to the completion of the IOU on this critical avionics system. In an exchange of letters which I will submit for the record, Eclipse was to ″retain control of the aircraft″ until the issue was closed. Clearly, that didn't happen.

The IG will also testify that 13 known deficiencies were unresolved when the FAA approved the production certificate. This is unprecedented and a direct violation of regulations and yet, the FAA allowed it. Eclipse repeatedly demonstrated an inability to replicate its approved aircraft design on the production process and the FAA let them get by with it.

Further, we will hear testimony to suggest that the FAA developed an inappropriate relationship with Eclipse, forcing FAA employees to expedite the Eclipse EA-500 aircraft through the certification and production approval process, even though serious concerns were raised. I have said time and again, safety cannot be compromised. In this case, the FAA is treating manufacturers like customers, instructing its employees to ″build relationships with our customers″ instead of acting as regulators. For example, the FAA's own test pilots said the EA-500 should not be certified as a single pilot plane because of in-flight concerns such as complexities

of the new software and a minimally effective autopilot system. And the FAA agreed.

Eclipse filed a customer service complaint. The FAA and the agency immediately reversed course and certified the plane as a single pilot aircraft. In addition, the European Aviation Safety Agency refused to certify the EA-500 for operations. The FAA should be vigilant in ensuring the highest level of safety and be willing to slow down the certification process, and shut down production of such action as warranted to protect the flying public. Deadlines and goals should have been adjusted once deficiencies were found.

Finally, we have seen a pattern at the FAA of an agency that is reactive, not proactive. Only after getting briefed by the IG on the Eclipse certification issue and on the IG's recommendation did the Acting Administrator convene a review team to do an audit of the certification programs. The FAA seems to be on autopilot until pushed into action, either by this Subcommittee, the IG or the news media. It is not enough to have safety regulations in place. The FAA must enforce those regulations. This Subcommittee has made safety a top priority and the FAA and manufacturers must do the same. We cannot have the agency responsible for aviation safety rely on the past or overlook problems by rushing certification in an effort to meet self-imposed goals. We expect, and we deserve more.

With that, I want to welcome all of our witnesses here today and I look forward to hearing their testimony. Before I recognize the Ranking Member, Mr. Petri, for his opening statement, I ask unanimous consent to allow two weeks for all Members to revise and extend their remarks and to permit submission of additional statements and materials by Members and witnesses. Without objection, so ordered.

The Chair at this time recognizes the distinguished Ranking Member, Mr. Petri, for his remarks or opening statement.

Mr. PETRI. Thank you very much, Mr. Chairman. Thank you for calling this important hearing on the certification of the Eclipse 500 very light jet.

If I may just comment on the question of safety, while expressing concern, always trying to do better, we should note that this is the era of maximum safety in commercial and general aviation in the history of the world, really, and certainly in the history of the United States. So it is a time to celebrate as well as to try to do better. I think we should put this whole subject in that context.

If we were confronted with catastrophes resulting from poor design and planes collapsing and people falling from the sky, that would be one thing. But the truth is, what we have been doing has been effective and American aviation is reasserting its leadership role in the world on many fronts.

Perhaps because the Eclipse 500 is the first general aviation innovation to be manufactured in the United States in a long time, and other planes like it, the very light jets have generated a lot of excitement in the aviation industry. They offer accessibility into the jet class for some, should make economically feasible new air taxi services to connect tertiary airports, making good use of excess

airport capacity and further expanding the connectivity of our national aviation system.

The Eclipse 500 is one model of a very light jet and it boasts a more fuel efficient design with the first integrated avionics system for this type of small jet aircraft. Because of these innovations, Eclipse garnered the attention of the media, industry, FAA and now us here in Congress. As we all know, aircraft certification is a very complex and difficult process, where deadlines and pressures are facts of life, much like the deadlines and pressures Members of Congress deal with when working on a reauthorization or appropriation bill.

Because very light jets are a new innovation and Eclipse in particular incorporates cutting edge technology, the focus today should be on the FAA's certification methods and procedures. We must ensure that the Federal aviation regulations are keeping up with innovations in the industry. Innovation is at the heart of innovation. As the Wright brothers well understood, acceptable risk is a central part of discovery and development. As we strive to make aircraft more fuel efficient, cost efficient and more technologically advanced, we must also maintain our historic safety record. Likewise, we must be careful not to erect unnecessary barriers to innovation.

Minimum safety standards and alternative means of compliance provided for in Federal aviation regulations allow for innovative aircraft designs to be certified. The minimum safety standards provide the benchmarks for manufacturers to design around and alternative means of compliance allow the FAA and manufacturers to address an ever-evolving technological and manufacturing environment. FAA's certification policies, widely recognized as the gold standard for safety worldwide, provide for appropriate safety oversight where written regulations cannot keep up with technological innovation.

Today the Department of Aviation Inspector General will testify about irregularities in the certification of the Eclipse plane. The Inspector General will also testify that he is not drawing any conclusion about the safety of the Eclipse aircraft.

While it is important for this Committee to hear about certification irregularities and FAA's lessons learned analysis of the Eclipse certification process, we must be careful not to jump to any conclusions that these irregularities exist outside of this certification project. There is no evidence to suggest an industry-wide certification issue. In fact, the historic safety record stands to refute such a claim.

The certification process in place today has contributed to the safest period in the history of manned flight. The safety record the system is enjoying today is the result of the hard work of many Government and industry partners and we must build on that success as we go forward.

While the FAA must remain focused on its role as a regulator, we have to be careful not to turn the agency into a hammer looking for a nail. Much has been gained from the industry's willingness to share mistakes with the Government regulators, and that professional give and take must continue to exist to ensure our very safe system stays that way.

While it is possible that some of the Federal aviation regulations for aircraft certification may need to be reviewed, and perhaps altered to accommodate new kinds of aircraft technology, it is important to remember that the foundation of that certification, based on collaboration, coordination and information sharing, has proved successful and should not be changed or stifled.

With that, I yield back. Thank you.

Mr. COSTELLO. The Chair thanks the Ranking Member and now recognizes the distinguished Chairman of the Full Committee, Chairman Oberstar.

Mr. OBERSTAR. Thank you, Mr. Chairman. Thank you, and I want to thank our vigilant staff for doing superb work over many months on the issues that we will hear about today. Your constancy and oversight of safety in aviation is exemplary and I am delighted that you are taking up the challenge.

Safety in aviation is always only one accident, one fatal accident away from unsafe. Vigilance and redundancy in every phase of aviation are vital to the essential element of safety.

The issue here is not innovation versus safety, but the process by which we achieve safety, by which FAA carries out its responsibility, by which it establishes and sustains what I called years ago the gold standard in aviation safety worldwide. But as Chaucer wrote, if gold rusts, then what of iron?

We are going to hear today how the FAA's customer service initiative mistakenly treats those who are the subject of regulation as the customer of FAA. FAA has, if there is a customer, as we said in a previous hearing, it is the flying public. It is not the airlines. And in this case, it is not the manufacturer. I am very concerned. We have another example here that complacency has crept into the highest levels of FAA management, a pendulum swing away from rigorous enforcement of safety, rigorous enforcement of compliance to now a manufacturer. Previously we had an airline favorable, cozy relationship.

There are significant risks posed by new aircraft and new technology. The 777, which is designed entirely by computer and whose first article was put in place without doing a prototype, but with all the computer technology being right on, and the FAA was very concerned that this would, could result in some slippage, was on the scene day after day, watching over Boeing's technology when that first side of the hull was swung in place and came within a millimeter of exactitude. That is the kind of vigilance that we expect of FAA and of the manufacturer, of Airbus, of Boeing, of Cessna, of all the others. In this case, the EA-500, with advanced avionics, turbine engine technology, characteristics more akin to large transport aircraft, it was incumbent upon FAA to establish a very high level of vigilance.

And yet they had the audacity to put in their performance plan that the Eclipse would be certified by September 30th, 2006. The FAA shouldn't be setting a date by which it will compete a certification. The date by which you complete a certification is when it is ready, when it meets the standards, when FAA can say yes or no, not when the manufacturer wants it and not when some higher-up in the agency says it should be done.

I reviewed the documents and I looked at the type certificate signing exactly on September 30th, 2006, a Saturday. The end of fiscal year 2006, coincidentally. How could FAA possibly know that the aircraft was going to be ready for certification at that point? I have never heard of the agency assigning itself a date by which an aircraft is to be ready for certification.

The burden of when an aircraft is ready to be certified falls upon the manufacturer, not upon the professionals in the FAA. They have to meet the standards set by the FAA, not the other way around. FAA should respond in a timely fashion. They should not set up impossible paper trails, they should not set up red tape obstacles. But they should not sign off until the aircraft is ready, not until a date is met.

Now, as I further looked at the documentation, I saw the FAA Rotorcraft Certification Directorate in Fort Worth, Texas, which had the primary responsibility for certifying the EA-500, was, in my judgment, very diligent in adhering to established regulations for certification. And they, at least on the face of it, seem to have performed very well. But their decisions and their recommendations were routinely overruled by higher up FAA management, under the customer service rubric.

So we are going to, in the course of this hearing, dig into the causes that led up to this system. The European Safety Agency has not signed off. And in May, when I addressed the ministers of transport of the European Union at their annual meeting, I was asked time and again, one after another, the 27 ministers, what is happening within your FAA? We are patterning our European Safety Agency after FAA, want to partner with FAA, we are now having second thoughts. They were aware of the Eclipse problem, they were aware of the customer service initiative. They were concerned, very deeply concerned.

Let's not just take the attitude, well, we haven't had a fatal accident. That is what in the past what was characterized as graveyard mentality. FAA is above that and has to remain above that. The purpose of this hearing is to see that they do in the future.

Thank you, Mr. Chairman.

Mr. COSTELLO. The Chair thanks you, Chairman Oberstar.

The Chair announced that myself and Mr. Petri had an agreement that we would go directly to the first panel, but I would ask Members to keep in mind the number of witnesses that we have, and keep that in consideration and enter your statements into the record. However, Mr. Hayes has indicated that he would like to comment. So at this time, I will recognize my friend from North Carolina.

Mr. HAYES. I thank the Chairman, and I appreciate what he is trying to do. Passion runs high on this subject. I am sitting down here listening, I am getting ready to hit the eject button. Because my take on this is almost 180 degrees out of phase with my Chairman and my full Chairman. They are great people and I respect them tremendously.

A couple of things. I am not a lawyer, but I heard a lawyer one time say, we are going to stipulate that safety is our primary concern. So let's write that on the wall and not refer back to it, because everybody here is concerned about safety. No question.

The Government, Transportation, FAA has a function. It is to create an environment in which our citizens, our industry, our economy can function, under the safety banner at the highest possible level. Folks, the future of the aerospace industry is to some degree, a great degree at risk and in play here. Staff has been vigilant. I agree, but the conclusions, and I don't know who they are that staff has reached, are simply wrong. The FAA is not perfect any more than this Committee, but they were diligent throughout this process. I am not here representing Eclipse, I am trying to represent the American aerospace industry. We are in competition with the whole world for innovation.

I have been flying for 40 years. Everything is different now. When I walk out the door every morning, should I have a rain coat, a top coat, a short sleeved shirt, we are talking, at the risk of oversimplification, in the same thing here. Mr. Scovel is going to bring us a report, and he is a very thorough, good guy. But the issue is, how do we keep the American aerospace industry and our economy moving forward with the new technology, which by the way, is crucial for American jobs in America, fuel efficiency, saving energy and everything else, how do we translate that into the traditional role of the FAA, putting the safest product on the market?

I say to you, this Committee can do a tremendous amount of damage with our European counterparts by coming out here and saying the FAA is not doing their job. The folks who were in Fort Worth, they were doing their job. I am not questioning them. But when I got, and Leonard is with me, remember our conversation on the 430, Leonard? I got a G1000 now. I had to get somebody to come in and help me, because I didn't understand all the new innovations of the technology that was available.

Well, what does the technology do? It makes a cipher, it gives you situational awareness, does all kinds of things. But it does not take away the need to fly the airplane and the basics were there. This is a good, solid airplane that can fly and help America and move us in the right direction.

So to say that it is not safe I think is incorrect. I have looked at it very closely. There are three systems, we talked a little bit about this, that back up everything. They are all electronic. That is okay. Mechanical is not needed, one, two, three, there has never been a failure. Thirty-two thousand hours now in service without a problem. Five thousand hours of flight testing, 32,000 hours in service? Folks, we need to really be careful what we are doing here.

In 2001, the process started. In 2006, we certified it. That is not rushing. How do we get our job done and stay safe? Please, everybody, take a deep breath, realize what is at stake here and don't go down the wrong path of saying the FAA did it wrong. They didn't do it wrong. Did they do it perfect? No. We're not going to handle this hearing perfectly, but please focus on the fact that aerospace is important. We have a great system. I think it worked. I think there are issues that we can deal with, 13 deficiencies out of how many thousand? You can cover that, Mr. Scovel.

Mr. Chairman, thank you for indulging me. I have spent hours on this. I see it every day when I crank up. Thank you. Let's get her done.

Mr. COSTELLO. I thank the gentleman for his comments. Let me, if I can, comment, because you and I have had conversations yesterday, and we have been talking about this subject. Is the purpose of the hearing to find out, one, did the FAA follow the regulations when certifying the EA-500, and two, throughout the whole production and the process? I think we are going to hear testimony today, at least testimony that I have read from the Inspector General and from other witnesses here that brings those questions into play.

Secondly, I spent, not to get off on another subject, I am trying to get to Members too, so we can go to our witnesses, this past Saturday I spent half my day, four hours, with my senior Senator and my colleague John Shimkus in Marion, Illinois, in a VA hospital in my Congressional district, where employees two to three years ago complained to the administrator at the facility that there were things going on at the hospital that just didn't seem right. Deaths were occurring.

Long story short, because of oversight, because Congress stepped in and insisted that the Inspector General come in, it was determined that nine people died in that facility as a result of substandard care.

Why do I bring that up? Our responsibility is to ask the tough questions. And I certainly understand that there is a balance you have to consider. The industry, you have to consider a number of factors. But our responsibility is to do a number of things. One of those things is oversight, and to ask the tough questions. That is why we are here today.

If the administrator at the hospital in Marion would have listened to the employees who were complaining to him two and a half or three years ago, peoples' lives may have been saved. But he didn't listen. He said, we know how to handle it, we are handling it perfectly, until others stepped in, the Inspector General and others got involved. It is documented now, nine people died because of substandard care on the part of one surgeon and some others involved.

So I feel very strongly, you have heard me say it many times, that we have a responsibility to provide oversight. That is exactly what we are doing today. We are looking for the facts, we are looking to find out what was done right, what was done wrong, and if we can improve upon this in the future.

With that——

Mr. OBERSTAR. Would the gentleman yield?

Mr. COSTELLO. I would be happy to yield to Chairman Oberstar.

Mr. OBERSTAR. I respect the gentleman from North Carolina, he is a long-time aviator, with his heart in the right place. But he would not be flying safely if FAA had not done its vigilance in years past. Our purpose here is to find out what they slipped up on, where did they come up short, and be sure that they fix it for the future. That is the purpose of this hearing. If you listen to the facts and read the record, you will see that there are shortcomings that are system shortcomings that we have to assure that FAA fixes for the future. That is the purpose of this hearing.

It is not to condemn any aircraft, any manufacturer, it is to find out how FAA has come up short and how we can fix things for the future.

Mr. HAYES. Would the gentleman yield? I agree with you. I agree with you. My real concern was the way the issue was framed initially, the FAA is not wrong, the folks in Fort Worth weren't wrong, Eclipse wasn't wrong, but we can do it better and you are absolutely right, it is what we are here for.

Mr. COSTELLO. I appreciate the gentleman's comments. I don't agree with you that the FAA was not wrong, I think that they were wrong, and I think that some testimony here will document that, but that is the reason we are here, is to find that out.

We have a vote going on on the Floor, but before we do, I am going to recognize the final Member of the Subcommittee. We will then go to the Floor. We have, I understand, one vote, and then will not be interrupted for some time. We have three votes now I am told, but I am also told that we will not have votes for a few hours. But you never know around here.

With that, I will recognize the gentleman from Iowa, Mr. Boswell.

Mr. BOSWELL. Thank you, Mr. Chairman. I will be short.

I champion what you are doing and what Mr. Oberstar is doing in regard to oversight. I think we have not done as well as we could have done. I know, as I know the two of you, we are going to do better.

At the same time, I feel, because I have cracked the throttle, as some of the rest of you in the room, on some pretty new stuff, fixed wing and rotor and so on. I had a lot of confidence that the checks were made. For example, Mohawk, Caribou and a couple of different helicopter series.

So anyway, I think somebody said, I don't know who said it in the earlier remarks, that around the world, we do have the gold standard. Now, that doesn't mean we can't make mistakes. I think the fact that we take the opportunity to review and do oversight is good. I also want us to remember that, as I think in terms, and I make no bones about it, I am an advocate for general aviation, and I want us to be very careful, and I will try to be here to remind us of that, that we do appreciate that we have done pretty darned good. But that doesn't mean we shouldn't check. I think that is what I heard from you, Mr. Chairman, and no one will ever object to that.

But I don't want us to think that we haven't had, through, many, many, we all know that a few years ago we just about did away with the prop-driven airplane because of, I don't know, I call them frivolous lawsuits in some cases. I don't want us to go back and get into something like that. I think it is a big industry in our economy, we are selling around the world. And people around the world that I still have some contact with have a great respect for the way we go about it.

But if we can make it better, there is nothing wrong with that. And I do champion and I do appreciate the fact that we are willing to do oversight and ask the hard questions. But we have had a pretty good thing going and the record stands behind it. I just want us to keep that in mind.

Thank you for giving me this opportunity. I will stop. I have more to say but I will stop there. Thank you.

Mr. COSTELLO. The Chair thanks the gentleman, and we will announce that the Subcommittee will stand in recess. We will return. We would ask everyone in the room to return by 11:00 o'clock, 25 minutes from now. When we return, we will go directly to our first panel, to the Inspector General, Mr. Scovel. The Subcommittee stands in recess.

[Recess.]

Mr. COSTELLO. The Subcommittee will come to order.

The Chair now recognizes our first witness, the Honorable Inspector General of the Department of Transportation, at this time you are recognized, General Scovel.

TESTIMONY OF THE HONORABLE CALVIN L. SCOVEL, III, INSPECTOR GENERAL, UNITED STATES DEPARTMENT OF TRANSPORTATION

Mr. SCOVEL. Thank you, Mr. Chairman. With your permission, I would like to take about ten minutes for my oral statement.

Mr. COSTELLO. No problem.

Mr. SCOVEL. Thank you, sir.

Mr. Chairman, Ranking Member Petri and Members of the Subcommittee, we appreciate the opportunity to testify today regarding FAA's certification of the Eclipse EA-500 Very Light Jet. Over the past several years, multiple manufacturers have designed a new class of aircraft called Very Light Jets, or VLJs. VLJs are small aircraft with advanced technologies that cost less than other business jets but operate at similar speed and altitude. In 2006, FAA certified the first VLJs, one of which was the Eclipse EA-500, a six-seat jet aircraft that featured advanced avionics and better fuel efficiency.

Mr. Chairman, I would like to take a moment and establish from the outset what this case is about and what it isn't about. First, it isn't about an unsafe aircraft that must be grounded immediately. This case isn't about a certification process that is riddled with flaws and must be revamped from A to Z. My office has not examined the certification process at large.

This case isn't about the longstanding practice of FAA to recognize alternative means of compliance and equivalent levels of safety, a practice that is generally sound and makes sense. This case isn't about an FAA field office run amok. While their bedside manner in dealing with the manufacturer could have been better, local FAA officials acquitted themselves well and honorably in making difficult technical and safety-related decisions.

What this case is about is a strikingly accommodative approach to an effort by a new, untested manufacturer using new technology and a new business model to put a high-speed, high-altitude jet in the hands of relatively inexperienced private pilots. This case is also about an intensely calendar-driven, not event-driven, effort to certify an aircraft by a date that was selected a year before.

It is also about a certification process that has a long history of success involving FAA and the industry, but in this case was removed from local officials and controlled, indeed driven by, officials in FAA headquarters. Finally, this case does raise questions about whether FAA focused exclusively on safety as its highest priority, as mandated by law.

We now turn to the specifics of our investigation. In March 2007, we received FAA inspector complaints that the Eclipse jet was pushed through the certification process too quickly. A significant issue overshadowing FAA's certification of the EA-500 is that with the inherent risks associated with a new aircraft utilizing new technology, produced by a new manufacturer, and marketed with a new business model, FAA should reasonably have been expected to exercise heightened scrutiny in certifying this aircraft.

In addition, because the EA-500 has advanced avionics and turbine engine technology typical of large transport aircraft but also is light in weight like smaller private aircraft, it did not fit easily into FAA's existing certification framework. FAA chose to certify the EA-500 and other VLJs using certification requirements for general aviation aircraft, rather than the more rigorous certification requirements for larger transport aircraft.

However, in a post-design certification lessons-learned, internal review of the Eclipse project, which is included in our handout, FAA managers acknowledged at page eight that the general aviation certification requirements were ″inadequate to address the advanced concepts introduced on this aircraft.″

In certifying the EA-500, FAA asserts that it met all pertinent certification regulations. However, the results of our investigation to date show a combination of actions and inactions on the part of FAA indicating that it expedited the certification processes for the Eclipse EA-500. First, during the design certification of the EA-500, Eclipse applied for and FAA approved alternative means of compliance for the aircraft's avionics software and airspeed and altitude indicators.

While FAA guidance concerning this process allows for deviation from normal accepted practices, we are concerned about the level of review that FAA conducted in certifying the software. For example, FAA did not require the software to be approved to the accepted industry standard before certification. Instead, FAA accepted an IOU from Eclipse that stated the aircraft would meet the accepted industry standard at a later date. However, when FAA issued the design certificate, Eclipse's software supplier had only completed 23 of the 65 required tests.

The supplier subsequently completed all 65 tests by June 2007. However, EA-500 users continued to report problems with cockpit instrumentation as recently as May 2008.

A June 2008, incident involving the EA-500 heightened attention regarding the aircraft's design certification. The incident involved an EA-500 that was on approach to Chicago Midway Airport when it experienced throttle failure. After consulting the emergency procedures, the pilot shut down one of the engines. However, this action caused the second engine to roll back to idle power and be unresponsive to the throttle. The two pilots declared an emergency and were able to land the plane without injury to themselves or their two passengers.

During its investigation into the incident, NTSB expressed concern about the reliability of an assembly that failed after accumulating only 238 hours and 192 cycles. NTSB also raised concerns that the problem could be due to flaws in the design logic for the software that controls the engines. As a result of this incident, FAA

engineers reexamined the software that controls the engines and discovered software logic flaws that should have been resolved before design certification.

At the end of June 2008, the local FAA certification manager sent a memorandum to the manufacturer requiring Eclipse to develop an approach to bring the aircraft design into compliance for that system. Eclipse is currently addressing FAA's requirement.

Second, FAA awarded Eclipse a production certification, even though the Agency knew of deficiencies in the company's supplier and quality control systems. To receive a production certificate, manufacturers are required to undergo FAA quality control reviews and an FAA production certification award review to determine if they have complied with all regulations. FAA's quality control reviews, which began in July 2006, identified numerous deficiencies, with 42 serious deficiencies identified as late as February 2007.

The production certification board completed its review on April 2007, the same day the production certificate was granted, and identified two serious overarching deficiencies relating to Eclipse's supplier and quality control systems. Despite the impact these issues could have on the production process, FAA awarded the production certification to Eclipse with 13 known production problems.

Further, even after granting the production certificate, FAA audits of Eclipse supplier controls found significant deficiencies. In seven out of seven Eclipse suppliers audited, FAA investigators identified serious non-conformities involving issues such as non-conforming parts, uncalibrated tools, and supplier personnel using outdated manufacturing specifications. At the largest user of the EA-500, for example, mechanics found problems with Eclipse supplier-manufactured parts on 26 of the 28 EA-500 aircraft operated by that company.

Finally, results of our investigation indicate that FAA's desire to promote the use of VLJs may have contributed to its decision to accelerate the Eclipse certification process. A significant concern surrounding this issue, Mr. Chairman, is that FAA specifically designated the Eclipse VLJ as a priority project for certification. In its fiscal year 2006 performance plan, FAA's aircraft certification service identified Eclipse as a priority, stating flatly that it would certify an Eclipse small jet by September 2006. Our handout includes a copy of the cover sheets of those performance plans.

Although FAA met this deadline, this specific designation as a priority certification may have resulted in reduced vigilance on the Agency's part during the aircraft's design and production certification processes. We identified four other FAA actions that raise concern regarding the Agency's safety oversight focus in this matter. First, FAA granted Eclipse authority to certify its own aircraft for airworthiness far earlier than other new VLS manufacturers, specifically, 4 years before Eclipse obtained a design certificate for its aircraft. However, it is not clear why FAA determined that Eclipse met the qualifications to perform its own inspections, since Eclipse was a new manufacturer with no history of manufacturing an aircraft or shepherding a design through the design certification process.

In one instance, Eclipse presented an aircraft to FAA for airworthiness certification with approximately 20 airworthiness defi-

ciencies, even though an FAA-approved company inspector had previously inspected the aircraft for airworthiness and found no nonconformities. Second, in response to a customer service complaint launched by Eclipse, FAA granted single-pilot operation certification for the EA-500 despite FAA Flight Standardization Board concerns.

Third, FAA replaced the inspection team overseeing Eclipse and restricted the new team's inspection activities. In a six-page letter of reprimand, FAA officials stated that the manager failed to meet expectations associated with meeting its customer service initiatives. Fourth, a former FAA engineer assigned to the Eclipse project took a position as director of certification for Eclipse immediately after leaving FAA without a cooling-off period.

Mr. Chairman, at our recommendation, FAA established a special certification review team last month. The team completed its assessment last week and concluded that the design certification of the Eclipse was appropriate because it met FAA requirements for the focus areas reviewed. We received a copy of the team's report on Saturday and are reviewing its findings and recommendations.

However, based on the interim results of our own investigation, in which we have been assisted by independent contract aviation safety experts, we recommend that FAA take several immediate actions. Those include, one, verify that certification of the EA-500 for single-pilot use was appropriate; two, expedite its proposed rulemaking to clarify certification requirements for the expanding VLJ industry segment; and three, evaluate the propriety of granting new, inexperienced manufacturers authority to certify the airworthiness of their own aircraft prior to design certification.

That concludes my testimony, Mr. Chairman. I would now be happy to answer any questions you or other Members of the Subcommittee may have.

Mr. COSTELLO. Thank you, Mr. Scovel. I have a number of questions. On I think it is page 21 or 22 of your testimony, you indicate, actually page 20, the FAA granted Eclipse authority to certify its aircraft for airworthiness before proving the design far earlier than it has for other VLJ manufacturers. Then you state at the bottom of page 20, "Eclipse is the only operating VLJ manufacturer to receive its ODAR authorization before the aircraft design was approved by the FAA."

First, for the benefit of the record and those here, explain what the ODAR gives the authority of a manufacturer to do, and then I will have another question.

Mr. SCOVEL. Yes, sir, thank you, Mr. Chairman.

ODAR stands for Organizational Designated Airworthiness Representative. It is a system employed by the FAA as part of its overall designee program, which enables it to maximize its own resources, by tapping into expertise in the industry, residing either at manufacturing or at maintenance organizations. A manufacturing organization must show that specific individuals in its employ have the experience and expertise to inspect aircraft owned, repaired, or being manufactured by the organization to FAA's requirements. FAA will then grant that company an ODAR designation. The designated employees remain on the company's payroll,

but are in a special status, almost as a deputy for FAA's purposes in this regard.

Mr. COSTELLO. And the ODAR was issued on, according to the chart on page 21, on September 3rd, 2002. The design certificate was not issued until September 30th, 2006, is that correct?

Mr. SCOVEL. That is correct, sir. For the record, I want to make clear that our statement at the bottom of page 20, where we say Eclipse is the only operating manufacturer to receive its ODAR authorization before the aircraft design was approved, we are referring specifically to the VLJ manufacturers in table 3 at the top of page 21.

Mr. COSTELLO. As a new manufacturer, do you think that Eclipse could have possibly demonstrated this level of expertise to receive that designation four years prior to the design certification?

Mr. SCOVEL. In the experience of my staff and the aviation safety experts we are relying on, sir, it would be very difficult. Eclipse was founded in 1998. This particular aircraft that they were advancing at the time was their first production effort. For a brand new company like that to stand up, to find the expertise, to hire those employees, and then to successfully present that case to FAA would have been difficult, sir.

Mr. COSTELLO. So you question the certification of ODAR in this circumstance, is that correct?

Mr. SCOVEL. In this circumstance, and I do want to make that clear. My office has been familiar for a long time with the designee program, the ODAR practice specifically. Our questions concern how it was applied in this case.

Mr. COSTELLO. Another question concerning the IOUs. In other words, for the FAA to tell Eclipse that instead of meeting a particular standard for certification or satisfying a concern or a deficiency that you can just get back with us at a later date and tell us that this is addressed. I would like you to comment on the IOUs, because I know they have been used in the past. Is it commonplace in the certification program, and in this case, do you think it was appropriate?

Mr. SCOVEL. IOUs are used by FAA, as you mentioned, sir. The requirement to meet FAA certification standards can be met flatout by an applicant. FAA also has authority under its regulations to grant a waiver from certain requirements, if the applicant can show that those requirements will not apply specifically to the aircraft held out for certification. An applicant can also request an equivalent level of safety finding, which is, simply put, an effort by an applicant to show FAA that is has another way to skin the cat. In other words, there may have been a generally prevalent method in the industry for applicants to satisfy specific technical requirements—but this particular applicant may have another way.

In addition, a more informal practice has been the IOUs. It is not unusual for them to be granted. In our review here, both Boeing and Sino Swearingen have been afforded IOUs, but customarily, they are for non safety-related pieces of the airplane. This case, which involved the avionics software with a new model of aircraft that relies exclusively on the avionics for safe operation, calls into question the practice of an IOU.

Mr. COSTELLO. Does it disturb you, as I mentioned in my opening statement, the fact that the manufacturer, Eclipse in this case, was granted the authority to deliver 11 of the EA-500s to their customers before deficiencies were addressed and IOUs were given on those deficiencies, is that standard practice?

Mr. SCOVEL. It is not standard practice. That is frankly alarming to me, sir. Particularly since it appears that FAA attempted to limit the distribution of aircraft that may have been held subject to the IOU, that may have been a reasonable restriction at the time. However, it appears the company went beyond that.

Mr. COSTELLO. And they in fact did not retain control over those 11 aircraft. They in fact delivered them to customers.

Mr. SCOVEL. Yes, sir. My office is working to verify that information.

Mr. COSTELLO. With deficiencies remaining?

Mr. SCOVEL. Yes.

Mr. COSTELLO. You heard Chairman Oberstar comment on the control of the aircraft as certified, almost exclusively in the control of the manufacturer, not the FAA. Would you say that it is highly unusual for the FAA to say internally, we are going to certify this aircraft by September 30th of 2006, or a specific date, driven by, internally within the FAA as opposed to the manufacturer?

Mr. SCOVEL. It is unusual, and in this particular case, sir, it gave rise to our characterization of this certification process as a calendar-driven rather than an event-driven process. In our handout, which was made available to all the Members, there are copies of the pertinent pages from the business plans of the different FAA entities. The Members can follow the progression from an appropriately high-level statement of an initiative at the FAA Headquarters level through the aviation safety business plan, which states simply as a target to issue a type certificate for a new model aircraft by September 2006, and that characterization as a target may be appropriate.

However, by the time you get to the bottom of the page, and here we are talking about the aircraft certification service performance plan, there was a specific reference, not only to issuing a type certification by September 2006, but a specific statement that Eclipse Aviation will obtain type certification for a small jet powered by a Pratt and Whitney 610 engine and using extensive new technology avionics. It appears to us, sir, to indicate a predetermined outcome. This performance plan would have been drafted a year in advance, because it would have been published at the beginning of the fiscal year. It looks like a self-fulfilling prophecy, sir.

When our dedicated FAA employees read that, they know what their marching orders are, sir.

Mr. COSTELLO. So it was clear to you that they knew the certification date and they had to meet it?

Mr. SCOVEL. Yes. It is a statement of the priority on which management attached this particular project. It appears to be, as I mentioned, a self-fulfilling prophecy. Certainly, while dedicated, ethical employees would have raised objections, I am sure, it becomes a goal and something that people are going to work very, very hard for. That was clearly the case here.

Mr. COSTELLO. Two final questions and then we will have an opportunity to come back. You mentioned that you have had a chance to review the FAA's special certification review team's report. You mentioned some of your views of that report. Can you elaborate for us?

Mr. SCOVEL. Yes, sir. I mentioned that we had received the SCR report, the special certification report, over the weekend. We are currently reviewing it. We will be following up this testimony with a full audit report that we will discuss the SCR report in more detail.

Let me pick up on what I started my oral statement with, about what it is and what it isn't. Here is our initial take on the SCR report. It is a commendable response by the FAA to my agency's strong recommendation in July that it undertake a special review of the Eclipse certification.

The report is a comprehensive examination by a well-regarded team of aviation safety experts of several narrowly focused, highly technical questions that appear to be left open in the rush to issue a type certification, and I do emphasize type certification here, to Eclipse not later than September 30th, 2006.

It appears to us, however, that this report is not, we know it is not, the last word. We know that this Committee will continue its work, as will my office. We also know that this report is not a review of the process leading up to the decision to issue the production certificate. It was limited to the type certification only, and that is a good thing, because the SCR's objectivity on the production certification point could fairly be questioned. Mr. Ron Wojnar, who headed the final production certificate surge in March and April 2007 also served as a member of the SCR team.

Our testimony also makes clear that the PC decision itself is difficult to defend or explain. For the record, sir, I would like to say that I had a conversation this morning with Mr. Sturgell, the Acting Administrator of FAA. He indicated to me that in the near future, the Agency intends to mount a review effort that is similar to this SCR but focused on the production certification side.

One final remark, sir. The necessity for this review and its findings confirm for us that a "better late than never," or a "fill in the blanks later" process was employed, first to make the decision to issue the type certificate and then to shore it up after FAA's staff, with inside knowledge of the case, lodged complaints with my office and with this Committee. It is an outstanding report, but it should not be used as an ex post facto justification for the decision to issue the type certificate.

Mr. COSTELLO. Thank you, Mr. Scovel.

The Chair now recognizes the Ranking Member, Mr. Petri.

Mr. PETRI. Thank you very much. I am approaching this as a layman. I am not, like Mr. Hayes and some other colleagues, a licensed pilot. I use the services frequently, to keep this in context.

Our Chairman took us to Everett, Washington a couple of months ago and we got to see the new Dreamliner, which has a lot of new technology. It is a whole new step in aviation, the first time a plane will be able to fly non-stop from London to Sydney, Australia and so on and so forth. The people who are building it said this is 50 year old technology, it is B1 bomber technology now get-

ting its civilian iteration. There have been a lot of changes in military stuff in 50 years, so we will see an avalanche of new technology coming through to get the certification process going forward.

How long did this certification take from beginning to end, do you know?

Mr. SCOVEL. About 5 years, Mr. Petri. It began in 2001, as I understand it. It proceeded through, well, type certification September 2006, with ultimate production certification on April 26, 2007. So, about 5 and a half, to 6 years.

Mr. PETRI. If they hadn't done things like, I guess they call these IOUs or other ways of trying to do concurrent review, do you have any idea how long it would have taken if they had done it sequentially?

Mr. SCOVEL. Hard to say, and I don't want to speculate. I can say that with the grant of type certification in September 2006 and the IOU specifically on the avionics software question, that avionics software question was not fully closed out using the accepted industry standard until June 2007. So it is safe to say that perhaps it would have been at least June 2007, and, if FAA had identified other items that required further work, it might have been longer than that.

Mr. PETRI. Is any of this driven by personnel issues in the sense that they have a lot more new technology? We had 40 or 50 years because of liability issues and this sort of thing, when there was not that much real new innovation, new models, airplanes were not being domestically manufactured in the United States because of, I guess the liability crisis? Now we have solved that. Do you have any impression as to whether they could be overtaxed, or we should be doing more contracting out or trying to get more technical expertise into the certification process based on this particular thing? Or is everyone up to the job?

I get some since that people are used to doing it the old way, a little slower pace, comfortable technology. Now a lot of things are new, and I am not going to approve it until I understand it and I don't understand it and maybe some things I will never understand and yet the world goes on. We can't really demand that the world revolve around Government inspectors. We have to figure out some way of striking a balance and allowing technology to go forward, or the world will go forward without us.

Mr. SCOVEL. Most certainly, Mr. Petri, I couldn't agree with you more. FAA has known for some time that VLJs were on the way. In this case, again, focusing on this case and noting clearly for the record, I hope, that my office has not undertaken any review of the certification process at large, it appears to us to have been working well for FAA and the industry. However, in looking at this case, we can say that FAA was somewhat off the mark in, well, frankly, it should have developed certification standards in advance of the advent of VLJ's, so that it would have been prepared to inspect VLJs against the proper standard.

That is one of the observations of FAA itself in the lessons-learned slide presentation, the Power Point presentation that I provided to each Member. At page 8, under observations, and this was a lessons learned meeting that was convened in November 2006,

FAA acknowledges that Part 23 regulations, those are the general aviation certification regulations, are inadequate to address the advanced concepts introduced on this aircraft. The special certification review that concluded last week also stated that Part 23 regulations were ″not valid″ for use in certifying VLJs.

That is certainly one aspect of FAA operations that needs attention. Thankfully, the Agency itself recognizes that, and in our testimony we have urged the Agency to move as quickly as it can on this score.

Mr. PETRI. One last quick question. When do you expect your final report? We have heard about deadlines and things. Have you set yourself a deadline for the report? Or would that be improper?

Mr. SCOVEL. I have to be careful with deadlines, sir, especially in this setting. We are proceeding as fast as we can, and I regret that I can't give you a date certain at this point. If I can get back to you, sir, as soon as we have a firmer picture, I would be happy to.

Mr. PETRI. Thank you.

Mr. SCOVEL. You are welcome, sir.

Mr. COSTELLO. The Chair thanks the Ranking Member and now recognizes the distinguished Chairman of the Full Committee, Chairman Oberstar.

Mr. OBERSTAR. Thank you, Mr. Chairman.

Mr. Scovel, you have done a superb service to aviation with your report, your inquiry, the issues you have raised, the lessons learned that you have compiled and observations in the document you submitted to the Committee. When I look over the categories, if you will, avionics software issues, airspeed and altitude indicator problems, the pitot static systems problems, intermittent erroneous stall warnings, cockpit display failures, flap movement failures, service difficulty reports, there is a compendium of problems with this aircraft and with FAA's oversight of this aircraft. Didn't that trouble you as you went through, reviewed their process?

Mr. SCOVEL. It does trouble me, sir, and I would like to put that in context. I am looking specifically at the decision of FAA to grant type certification on September 30, 2006. At that time, it was clear that the avionics software didn't measure up. FAA chose to deal with it with an IOU.

Regarding the pitot static system, which indicates airspeed and altitude and rate of climb information to the pilot, that was handled through an equivalent level of safety finding. It is noted in our testimony, and you may hear about it from witnesses in subsequent panels, that the equivalent level of safety finding was first requested of the certification office immediately responsible for the Eclipse project. The inspectors declined, based on their technical expertise, to grant the equivalent level of safety finding. It was then referred to another certification office. They did a review and determined that they could satisfy it. But, there was at least one office that hadn't made this determination.

Regarding the other problems that you mentioned, sir, those should have been squarely in FAA's sights at the time. Because those had been highlighted during the function and reliability flight testing that was conducted over a span of about 2 weeks immediately before the September 30, 2006 decision.

In talking with my staff, I heard the well-known phrase, and you all remember it on this Committee, ''what did they know and when did they know it?'' Here, we are talking about FAA. What did FAA know and when did they know it? At September 30, 2006, they knew a lot. It strikes us, and it struck our contract safety experts, who are independent experts that a reasonable decision on September 30, 2006 might have been to defer the granting of the type certificate.

Mr. OBERSTAR. That is what occurred to me when I read through the documentation. I know I discussed the matter with Chairman Costello, whose career before Congress included long-time service as a police investigator, with fine attention to detail. I have not known of any certification process in which FAA issued an IOU and then said, you are certified but you can come back and fix this later. They always insisted on fixing first what needs to be fixed. Are you aware of any other case like that?

Mr. SCOVEL. I cannot answer that question, sir. We haven't examined other certification processes, individual cases, or the certification process at large. So I really have no basis on which to answer, sir.

Mr. OBERSTAR. One of the issues is that the test pilots at FAA were opposed to approving the aircraft for single pilot operation. Yet the FAA overruled their own pilots. What was their justification for overruling the pilots?

Mr. SCOVEL. This is an area that we intend to follow up on as we proceed with our advanced audit work. Because at this point, there certainly appears to have been a controversy.

Let me run through the chronology. It is clear that the company wanted single-pilot designation, so as to market to individual buyers. This was part of the business model.

The FAA's Flight Standardization Board pilots had concerns based on their test flights and determined that the aircraft that they were flying would have presented an undue burden on one pilot. Some of those concerns were cockpit displays freezing up, discrepancies with the airspeed and altitude indicators, and a minimally effective autopilot system. It has been pointed out to us that the aircraft that Eclipse offered to the FAA test pilots was ''a non-conforming aircraft.'' We need to run that to ground, frankly. It is puzzling why the company whose business model depends greatly on single-pilot operations would make a non-conforming aircraft available to FAA for this critical test pilot run. We would like more detail on that.

In any event, however, at the conclusion of its testing, on December 13, 2006, the Flight Standardization Board recommended a two-pilot crew. On December 15, 2006, the Chief Executive Officer of Eclipse initiated a customer service complaint. On December 21, the Director of the Flight Standards Service issued a letter back to Mr. Raburn, President and CEO of Eclipse, in which, and I apologize, if I may read into the record segments of the letter, and I can provide the complete letter for the record.

''Mr. Raburn, thank you for your letter dated December 15th. Specifically, Eclipse took exception to the FSB's preliminary determination that the Eclipse 500 required a two-pilot crew to operate safely. In an effort to be responsive to your concerns, a teleconfer-

ence took place on December 18th between FAA and your staff. Addressing your main point of concern, I agree with the assertion made by Eclipse that the 500, as evaluated by the Aircraft Certification Service, is certificated as a single-pilot IFR airplane. Flight Standards,'' and this is a separate office within FAA, ''Flight Standards asserts that the proposed Eclipse aviation training program, as reviewed by the Flight Standardization Board is inadequate in preparing an applicant to pass a single-pilot type certification check. The FAA would like to work with Eclipse to determine the proper level of training, checking and currency requirements needed to support safe single-pilot operations in the 500. I am confident,'' and I am jumping to a couple other sentences toward the bottom of the letter, ''I am confident that both FAA and Eclipse will be positioned to complete the 500 certification process. I want to assure you that Flight Standards will do everything possible to work with Eclipse Aviation in assuring a successful conclusion to our efforts.''

There is no mention of type non-conformity as one might expect in such a letter, if that were a fundamental source of disagreement between FAA and the applicant. We promise we will run that further to the ground. But it is clear, too, that what the company had done was come back to FAA strongly urging that this was a training program rather than a hardware program that a single pilot would find difficult to operate. And FAA was attempting to work that out.

The ultimate result was January 27, 2007, after further work by the Flight Standardization Board, the two-pilot recommendation was set aside and the Eclipse was certified for single pilot.

Mr. OBERSTAR. If that had been the case in the incident that you describe in your testimony that we discovered in our inquiry into this matter of the aircraft up at 41,000 feet, and trying to power down there and it didn't work, at that point, isn't a two-pilot situation safer?

Mr. SCOVEL. It strikes me that it would be. I will defer to the NTSB expert who will follow on a panel after me. The NTSB, of course, specifically investigated the incident over Midway. It is clear that having two pilots in that aircraft, and that aircraft was at the time being operated by two pilots, was instrumental to the safe outcome of that event. Also, the incident occurred over an airport, and they had some lucky breaks on that one, so it worked well.

The pilots on my own staff, if I may take just a moment, sir, on this two-pilot question, to point out—and they are recreational, kind of weekend warrior type pilots—if they were well-off enough to buy a VLJ and found themselves in an Eclipse 500, at night, at altitude, heavy weather, alone, and a cockpit display screen blanked out, they look to the other cockpit display screens, observe that altitude data differed between those two airscreens—and those are problems that had been identified with the avionics long before—they would consider themselves in a fine fix.

Mr. OBERSTAR. Well, safety in aviation should not depend on lucky breaks. And the expression, as we heard earlier, oh, FAA has done everything by the book, they haven't. They clearly haven't. They have made some major mistakes on this process.

One last one, for the moment, at any rate. FAA uses different standards for aircraft, certification for aircraft with fewer seats. Why should the number of seats be determinative? Why shouldn't complexity of the operation of the aircraft be determinative of the depth and extent of the review?

Mr. SCOVEL. Historically, the number of seats and the weight of the aircraft were useful measures for industry and FAA to determine which set of regulations an aircraft should be subject to. As a result of this case, and to its credit, FAA's own efforts along these lines, they have recognized that specifically with respect to VLJs, those measures are no longer valid, in the words of the SCR team that just reported out last week. FAA is working to develop regulations that will apply specifically to this new VLJ segment of the industry.

Mr. OBERSTAR. Do you think FAA has learned the lessons of this experience with Eclipse?

Mr. SCOVEL. Every lesson helps. We will see over time, sir.

Mr. OBERSTAR. We will see over time is right. We will follow them over time as well.

Thank you, Mr. Chairman.

Mr. COSTELLO. Thank you.

The Chair now recognizes the gentleman from North Carolina, Mr. Hayes.

Mr. HAYES. Thank you, Mr. Chairman.

For the edification of the audience, Mr. Costello and Chairman Oberstar had a wonderful conversation, as we always do, on the Floor after our last conversation here. Mr. Chairman, I might suggest, taking up on that conversation, Mr. Boswell was involved, too, really important questions here. Mr. Scovel is a great inspector general. But his answers to certain questions need to be put side by side with the FAA's answers on the same questions, and the aerospace industry answers to the same question. All of us have a perspective.

What you just said about the weekend warrior being at 41,000 feet in heavy weather, he is not going to be there. There is a firewall that nobody has mentioned here in this process. It is the insurance industry. Nobody is going to issue an insurance policy to someone that is totally unqualified.

Now, things happen. People who are beyond their capabilities get in trouble. Again, for clarification, autopilots, AHARs, all this stuff, are nice conveniences for pilots. But it doesn't change the basics of flying the airplane. So in the single-pilot thing, this airplane is so much simpler to fly than a typical piston twin, as a general statement, there is nothing wrong, there is everything right with this being a single-pilot program.

Not a criticism of Mr. Scovel, but simply, there are a lot of perspectives that have to be applied to this as we search for the right answer. Again, I don't think the FAA was wrong in all this. Type rating, you have to have a type rating if the airplane weighs more than 12,500 pounds. It weighs 6,000. So again, all these perspectives need to come into play.

The issue, and Mr. Scovel, I have seven good questions here, and I would like to submit them to you for the record to get answered. I would also like to submit them to the other panelists so we can

again, side by side, put that information together as we evaluate. The first question is the important one. Is the Eclipse a safe airplane to fly, from your perspective?

Mr. SCOVEL. Mr. Hayes, you are being gentle with me, I appreciate that.

[Laughter.]

Mr. SCOVEL. You have called me this Committee's hired skeptic before. I thought you were going to change that to the Dr. Kevorkian of the aircraft industry, and I am glad that is not going to happen.

Is the Eclipse 500 safe? My office has no evidence that it is unsafe, and I would like to put that——

Mr. HAYES. That is a very good way to answer the question. Because all of us have different levels to pug into this thing. I am trying to think, again, the redundancy here is remarkable. Back in the good old days, when Leonard and I were coming along, we didn't need redundancy, because there wasn't anything to fail. You had the needle ball and airspeed. That is still there, except now it is electronic. I got so many notes as we went along, issue of deadline. I think we should eliminate talking about deadlines. Everybody has a time line. Now, I am confident, it doesn't always happen, everybody involved here, if we had reached the time line, whatever the date happened to be, 2006 in this case, if this airplane were unsafe, somebody at the lowest level, medium or high level, could say, stop the parade, this is not going on the marketplace.

So again, I think it is important that that feature is there. Do we always apply it? If it weren't for time lines, in the case of Congress, you have to say deadline, how would we ever get a bill to the Floor? Regardless of who is in charge, there is a certain business function to having a time line so that we can organize our priorities.

So again, Mr. Chairman, your indulgence is much appreciated and your fine staff member, who I think the world of. As we look forward to ADS-B and next generation aircraft, as again, under the safety banner, we have to make sure that we as Congress and different departments have the ability to raise our sights and levels of expertise so that we can keep American industry ahead of foreign competitors, Japan, Brazil, Czechoslovakia and a number of other countries are working to beat us in this marketplace. We safely want to be out there ahead of them.

But again, one last thing, the anomaly that occurred with the throttle, if you had sat down with the design team, that would never have come up. Physically, the pilot pushed, because of a go-around situation—it wasn't 41,000 feet—the throttle, which is a piece of metal, into another piece of metal. If this metal had been harder than this metal, it wouldn't have happened. But it went through the stop and it created a situation, it told the computer, we need to go to 80 percent, we need to go all the way.

So you look back, and you are dealing with a situation that, I don't know how you would have anticipated it, but it did happen, so now we deal with it in retrospect. But it was so unusual, a one-pilot, two-pilot, the pilots did what they should have done. I have too much power, how am I going to get rid of it? Well, I have to shut one of them off. So again, it is not a remarkable situation,

they are trained pilots. If you are going to fly a light sport aircraft, and that is out there kind of competing with VLJs, you have to have the proper level of training. FAA is very much involved in a big part of that.

Counterforces, we want to have new innovation that makes it safer, easier to fly, lots of gee whiz things, over here, safety of flying is still the basics. Aviate, communicate, navigate, aviate first.

Mr. Chairman, thank you.

Mr. OBERSTAR. Would the gentleman yield? It wasn't a metal on metal problem. It was a software problem.

Mr. HAYES. The software problem occurred after the human problem happened.

Mr. OBERSTAR. No, there was a software problem and it was so admitted by FAA, so diagnosed by the Inspector General. That is the kind of thing that should have been fixed first before that aircraft went up.

And I appreciate what the gentleman says about deadlines, but when the aircraft is not ready, the deadline should come last, not first.

Mr. HAYES. I agree with the deadline last, not first. But reclaiming my time that I have, if a human being had not pushed a piece of metal through another piece of metal, the software would not have said what it said. He shouldn't have been able to do that. He did it. Nobody would have thought, who is going to jam the throttle through the stop?

Mr. OBERSTAR. Okay.

Mr. COSTELLO. The Chair thanks the gentleman and now recognizes the gentleman from Iowa, Mr. Boswell.

Mr. BOSWELL. I yield, Mr. Chairman.

Mr. COSTELLO. Mr. Hall.

Mr. HALL. Thank you, Mr. Chairman. Thank you for holding this hearing.

Mr. Scovel, thank you for your fine presentation, as usual. I am looking at one of your bullet points here about the FAA granting Eclipse authority to certify its own aircraft for airworthiness four years before obtaining a design certificate. That seems to me to be something that shouldn't happen. I just don't understand how that makes sense.

During the last few years we have had more and more information come out before this Committee about the failure of FAA to perform adequate oversight over the companies the agency is supposed to be regulating. Too many other occasions, we have seen a cozy relationship between the agency and the airlines putting the safety of the American public at risk, and now we are seeing evidence of the same disturbing relationships developing between the agency and the airplane manufacturers, which is no less inappropriate. I think I can speak for this entire body and say that my belief is the FAA's primary responsibility is and must always be to ensure the safety of the flying public.

I am not a pilot. I am, however, thanks to my dad who taught me when I was five years old, a sailor. I have been dependent on different kinds of instrumentation. I like the redundancy of having analog gauges as well as digital displays. I am a little nervous about having only—and I am not up in the air, I am talking about

being on a body of water. I am a little bit nervous in only having the digital that can freeze up, until such time as it is proven to have all the bugs out of it.

Let me ask you a couple of specific questions. We will hear testimony later on from an FAA manufacturing certification manager, who purchased professional liability insurance because of his concerns about his role in the certification program. Have you ever heard of a case of this occurring in the past?

Mr. SCOVEL. I am not aware of one. None has come to my attention, sir. Again, we haven't worked in that area. In my less than 2 years as Inspector General, it hasn't come to my attention before, sir.

Mr. HALL. It appears FAA laid out approved methods for compliance, and in the case of the Eclipse, used workarounds or alternative means of compliance and found reason for equivalent levels of safety, et cetera. So do you think that such phrases, such means to get around a problem by finding a workaround, are they potentially things that can be abused?

Mr. SCOVEL. Potentially; but I want to highly qualify that. Equivalent levels of safety have been used for a long time in the industry. I see them as a way to spark innovation. If FAA can determine that a new way to "skin the cat" will indeed get the job done, then why hold someone to what may have been the standard practice for a long time? Close scrutiny is required, however, and following just good common sense. But certainly it can be employed very successfully.

Mr. HALL. Another question. Allegations have been made by current and former FAA engineers and inspectors that the former CEO of Eclipse had an unusual amount of influence on senior FAA management. Did your investigators find any evidence that this was the case?

Mr. SCOVEL. We did not. I referred to the customer service initiative complaint regarding the single-pilot operation determination of FAA in December of 2006, January of 2007, and clearly there were communications at that point. There were communications from Eclipse to FAA headquarters immediately prior to the production certification decision, when FAA determined that the new team needed to be sent to Texas and New Mexico in order to accomplish production certification.

However, we haven't been aware of other aspects.

Mr. HALL. That is good. And one last question, sir. We understand that DayJet, the largest commercial operation utilizing the EA-500, refuses to operate the aircraft so far with a single pilot. Is this accurate and why do you think so?

Mr. SCOVEL. That is accurate, sir. DayJet, based in Florida, is the largest user of the EA-500. It does use two pilots. We understand that is part of their business model.

It also reflects a very cautious and conservative approach on the part of the company to the aircraft.

Mr. HALL. Okay, thank you so much. I yield back.

Mr. COSTELLO. The Chair thanks the gentleman and now recognizes the gentleman from Missouri, Mr. Graves.

Mr. GRAVES. Thank you, Mr. Chairman.

I am not going to belabor, we have a lot of panelists coming up and we have kind of gone through everything, Mr. Scovel. But I would like to say though, I would appreciate it in the future when you present things that you present your facts and your investigation. When you use statements and throw them into the record from your people underneath you who are ″weekend warriors,″ finding themselves in heavy weather at 40,000 feet, and they would be in a real, what was your term?

Mr. SCOVEL. In a fix, I think I said, sir.

Mr. GRAVES. The fact of the matter is, if you are IFR trained, you train for just such an occurrence, with minimal instrumentation. And you assume that the worst is going to happen, whether it is looking at the copilot's panel, looking at your own panel, doing whatever you have to do, stick and ball, as Mr. Hayes pointed out, and as I have been trained. I would appreciate that you didn't bring those into this, because that is pure opinion and conjecture, and I don't think it has any place in a Congressional hearing.

Mr. COSTELLO. The Chair now recognizes the gentleman from Iowa, Mr. Boswell.

Mr. BOSWELL. Thank you, Mr. Chairman.

I appreciate the discussion that you had earlier, Mr. Chairman, with Mr. Scovel about delegation does not mean self-certification. I think you have to depend on delegation to get work done, or the Administration does, and it works well. All good things, there his always a possibility there is an exception. But I just want to make the point that delegation is important and properly supervised, it works well. I would assume that you would agree with that.

Mr. SCOVEL. I would agree with that, sir.

Mr. BOSWELL. Okay. I also would kind of share some of the thoughts just made by the previous speaker, that the Very Light Jet is designed, the training of the pilots is for single-pilot operation. I don't want the public to get the idea this is a bad thing. Because they do have to go through some very stringent training, as you well know.

Mr. SCOVEL. I do.

Mr. BOSWELL. And they do practice for the worst case. At least that is what they did to me when I was going through, and I think that was a good thing.

Mr. SCOVEL. They do, and I will note that Eclipse has its own training program for pilots buying its aircraft, and the company is working hard in that regard.

Mr. BOSWELL. I appreciate that, and I don't argue the point that two is better than one. I suppose that would be a foolish thing to argue that point. But an aircraft designed, as you said earlier, because the weight and all these different factors, then simplified procedure, then the training that goes with it, I don't want the public to think that a single pilot can't do that, because they can. I firmly believe that and I think you do, too.

Mr. SCOVEL. I do.

Mr. BOSWELL. All right. Thank you, Mr. Chairman.

Mr. COSTELLO. The Chair thanks the gentleman.

Mr. Scovel, I only have a couple more questions at this time. You indicate, page 11 of your testimony, that Eclipse aircraft users continue to report other post-design certification problems with the

EA-500, including erroneous stall warnings, flap movement failures and a high rate of tire failure. I wonder if you would comment on that.

Mr. SCOVEL. These problems, at least the first two, were identified during the design certification phase, sir. They have been dealt with by the company and by FAA, largely satisfactorily, as the report of the special certification review team makes clear. However, in our review of the various safety reporting systems, to include the service difficulty reports, they have cropped up in months past. The tire failure question results from the intent of the company, the original intent at least, that the Eclipse 500 be used on grass runways, or at least non-paved runways. As it turns out, most of the aircraft are being used on paved runways, and because of the type of tire that is used—it is a softer tire—and also the angle at which it is placed on the landing gear, it is wearing unusually fast.

Mr. COSTELLO. The final question, on page 17, table 2, you have a table that says manufacturing deficiencies found by the FAA inspectors after Eclipse inspectors certified the aircraft. And there is a whole list of deficiencies. Then you indicate that during the audits, the FAA inspectors identified serious non-conformities associated with aircraft parts, materials or manufacturing processes used for the EA-500 by Eclipse suppliers. Then you go on to list, these include receiving or accepting non-conforming parts or tools, parts not properly stored or marked, failure to follow manual procedures, uncalibrated tools, revision of tools and procedures without approval from Eclipse. And there are a number of other things.

You say that additionally, at the largest user of the EA-500, FAA inspectors found problems with Eclipse supplier manufactured parts on 26 of the 28 EA-500 aircraft operated by the company. My question is, similar to my last question, have these issues been addressed by the FAA?

Mr. SCOVEL. We understand FAA is in the process of addressing them with the company, sir.

Mr. COSTELLO. There being no further questions, we would allow a second round if you have questions. Mr. Hayes or Mr. Boswell? Very good.

Mr. Scovel, we thank you for your testimony before the Subcommittee today. I expect that some time in the not too distant future, we will be sitting down with the FAA, the company and your staff to discuss the matter further. Thank you.

The Chair would ask the second panel of witnesses to come forward.

Mr. HAYES. Mr. Chairman, if I may, while they are coming forward, again, I didn't mean to be soft on Mr. Scovel.

[Laughter.]

Mr. HAYES. I just think it is important that we acknowledge the professionalism of all the folks that come in today. It occurs to me, as I am thinking about this, and this is really important, and I am glad you are doing it, but you have the facts. The facts are where, when, who, how. But then you have the truth. The truth is, the significance and meaning of the facts. What you just said about getting folks together beyond the process which occurs here so they can respond directly to the significant questions I think is a won-

derful idea. That gets us to the truth, to the best degree we can find it and understand it. So thank you very much.

Mr. COSTELLO. Actually, in my law enforcement days, I remember it is who, what, where and why.

I thank you for your comments, Mr. Hayes.

The Chair would ask the witnesses to come forward. I will introduce them as they are.

The first witness is Mr. Tomaso DiPaolo, with the National Air Traffic Controllers Association, Aircraft Certification National Representative. Mr. David Downey is the Vice President of Flight Safety at Bell Helicopter-Textron. You all have the full titles and the companies that they are with.

Mr. Dennis Wallace, who is a software engineer, Rotorcraft Directorate, Aircraft Certification Service, with the FAA. Mr. Ford Lauer, Manager, San Antonio Manufacturing Inspection District Office for the FAA. Ms. Maryetta Broyles, Technical Program Management Specialist, Manufacturing Inspection Office, for the FAA.

Gentlemen and lady, would you please stand? I would like to swear the witnesses on this panel in.

Please raise your right hand. Do you solemnly swear that the testimony you are about to give before this Subcommittee in the matters now under consideration will be the truth, the whole truth and nothing but the truth, so help you, God?

[Witnesses respond in the affirmative.]

Mr. COSTELLO. Please have the record indicate that each of the witnesses on this panel responded in the affirmative.

With that, the Chair will use the five-minute rule, as is customary for some of our witnesses with this panel. So I would ask you to try and summarize your testimony in five minutes, and that will give Members an opportunity to ask questions.

Mr. DiPaolo.

TESTIMONY OF TOMASO DIPAOLO, AIRCRAFT CERTIFICATION NATIONAL REPRESENTATIVE, NATIONAL AIR TRAFFIC CONTROLLERS ASSOCIATION; DAVID A. DOWNEY, VICE PRESIDENT, FLIGHT SAFETY, BELL HELICOPTER-TEXTRON; DENNIS WALLACE, SOFTWARE ENGINEER, ROTORCRAFT DIRECTORATE, AIRCRAFT CERTIFICATION SERVICE, FEDERAL AVIATION ADMINISTRATION; FORD J. LAUER, III, MANAGER, SAN ANTONIO MANUFACTURING INSPECTION DISTRICT OFFICE, FEDERAL AVIATION ADMINISTRATION; MARYETTA BROYLES, TECHNICAL PROGRAM MANAGEMENT SPECIALIST, AIRCRAFT CERTIFICATION SERVICE, SOUTHWEST REGION ROTORCRAFT DIRECTORATE, MANUFACTURING INSPECTION OFFICE, FEDERAL AVIATION ADMINISTRATION

Mr. DIPAOLO. Good morning, Chairman and distinguished Members of the Aviation Subcommittee. Thank you for the opportunity to testify before you today.

I was asked here because in addition to nearly 20 years of service as an FAA aerospace certification engineer, I also serve as the aircraft certification national representative for NATCA. We represent aviation safety professionals, including aerospace certification engineers, flight test pilots and technical and administrative personnel,

approximately 20 of whom were involved in the type certification, or TC process for the Eclipse EA-500 aircraft.

Since the summer of 2001, these employees witnessed the FAA acting in a way that was neglectful to their duty as industry regulators and irresponsible to the flying public. These employees were pressured to expedite the TC process, harassed by management and had their professional assessments ignored. As a result, an aircraft was allowed into the market without complying with Federal aircraft safety standards and regulations. NATCA filed a grievance over the FAA's inappropriate behavior, which is still in arbitration.

At the time of final certification, there were many outstanding problems that had been identified by the engineers and pilots. These problems included pitot tube drainage issues in the airspeed indicating system, which failed due to freezing condensation in service. Problems with the electronics suite caused a pilot's screen to blank out and engines to operate in an uncontrollable manner. In some cases, FAA management allowed these concerns to fall through the cracks, while at other times it literally chose to ignore the technical reports that identified these problems in order to grant the TC without significant limitations.

In the months following the TC issuance, the problems identified by the engineers manifested during aircraft operation, putting the public at risk. Why after front line engineers had been able to identify these problems did the FAA not act to ensure the concerns were addressed? The agency has faulty priorities that focus on the business goals of the private sector rather than protecting the safety of the flying public.

During a meeting between engineers and FAA management, John Hickey, AIR-1, told the group, ″We are here to save this company [Eclipse].'' When one engineer responded that his job was to make sure the aircraft complied with the safety regulations, he was rebuked by Mr. Hickey, who then went on to intimidate and verbally attack each individual on the team. His focus was codified in the FAA's 2006 business plan, which included the goal of certifying a Very Light Jet by the end of the fiscal year. The pay system work rules that were unilaterally imposed on the aircraft certification bargaining unit on July 10th of 2005 included a pay for performance system that rewarded managers for achieving goals outlined in the FAA's business plan. In other words, managers would be given bonuses for certifying the Eclipse 500 before September 30th, 2006.

By September 29th, 2006, the Eclipse 500 jet had not yet been approved. With the fiscal year about to end, bargaining unit engineers were harassed and pressured to sign off on the TC. That day, engineers responsible for each aspect of the aircraft refused to sign, due to outstanding technical safety concerns. The following day, a Saturday, September 30th, the last day of the fiscal year, FAA management ordered the Eclipse project manager into work and convinced her to sign off on a document that approved all remaining aspects of the jet. This enabled FAA management to grant the TC before the end of the fiscal year, qualifying them for pay increases.

This same compensation plan created avenues for management to penalize employees who refused to change their technical opinions in order to meet the business time line for certification.

Since filing the grievance, the union has been approached by employees who were prevented from receiving full raises as retribution for standing firm behind their safety findings during the Eclipse TC program. The FAA also relinquished its oversight responsibilities to the Eclipse program. As early as 2001, FAA committed to what they called optimal delegation, to the maximum extent practicable, meaning that whenever possible, individuals selected by the company would act as surrogates of the FAA to determine compliance to safety standards.

NATCA would like to offer three recommendations to this Committee. First, amend Title 49 to allow the union to negotiate fair and professional pay procedures that encourage and reward compliance to the safety mission of the agency. Second, the FAA's pay for performance system should only include goals that directly improve the safety of the flying public. And finally, delegation must be restricted to individuals who are reviewed and approved directly by the FAA. The core function of aircraft certification must remain an inherently governmental function, to be performed by Federal employees.

Thank you for this opportunity to testify.

Mr. COSTELLO. The Chair thanks you and now recognizes Mr. Downey.

Mr. DOWNEY. Good morning, Mr. Chairman, Members of the Committee.

My name is David Downey. I am the Vice President of Flight Safety for Bell Helicopter-Textron. I was the manager of the Rotorcraft Directorate in Fort Worth, Texas for seven years prior to assuming my new position at Bell Helicopter.

The events leading to the Eclipse 500 problems are complicated. Eclipse was a brand new company trying to make a big splash in the aviation industry. The CEO, Vern Raburn, created a very public and well-documented awareness.

This was a company that wanted to gain its type certificate, its production approval and start delivering aircraft all within 15 days. No amount of FAA coaching would dissuade Eclipse executives that this feat was not practical and overly ambitious. The FAA was concerned with the turnover in Eclipse technical personnel. There were also technical setbacks including having to reengine the airplane. Eclipse rarely met its commitments to the FAA or submitted a report on time.

On 14 September 2006, an FAA meeting was convened in an Albuquerque hotel. In attendance were FAA personnel and four FAA executives. Among the executives was the Service Director, Mr. Hickey. It was completely clear to all present that the current approach to the software certification was not going to meet the Eclipse calendar schedule or Mr. Hickey's direction. In this meeting, the software engineer, Mr. Wallace, tried to convey to Mr. Hickey that the Eclipse approach would not meet the agency's established and time-tested software certification procedures. Mr. Wallace was summarily subjected to a verbal barrage that conveyed that he was not able to think outside the box.

It was at this point I interjected myself between my employee and the Service Director. My taking up for him resulted in my dressing down and a humiliating verbal assault in front of my subordinates. In 35 years of public service as an Army officer and an FAA employee, I have never suffered an experience as denigrating or unwarranted. It was clear to those present that Mr. Hickey was passionately making the case for thinking outside the box.

However, the box must still be within the bounds of proven methodology and appropriate risk management. What some would portray as passion, I would characterize it as an assault on our professionalism and our character. We left that meeting knowing that it was our responsibility, the FAA, not Eclipse, to find a compliance solution to the software issue.

There are other issues that FAA personnel became aware of. The FAA became privy to a mis-sent email detailing an Eclipse strategy to use Mr. Hickey's influence in the software certification issue. This Eclipse e-mail stated that Mr. Hickey would have to force us to accept this alternate approach. It would be fair to note that no evidence exists this email was ever sent to Washington. However, it did serve notice that no Eclipse tactic was out of bounds. When you couple all this together, the pattern of misinformation, missed dates and a willingness to go straight to Washington, D.C., that left the field FAA personnel trapped between Eclipse and Mr. Hickey and we knew it.

Regarding the production program, Eclipse was trying to do too much with inadequate processes, poor controls and untrained personnel. In March, 2007, I received a phone call from Mr. Hickey. Vern Raburn had called to complain. An email had been sent from Mr. Lauer to Mr. Byars at Eclipse explaining expectations for the reinspection and records review of aircraft serial number 3. From that phone call, and I paraphrase, Vern wants to know why the FAA wants the blankety-blank sealant records? I told Mr. Hickey I would find out. It was on this telecon I was also informed that Mr. Ron Wojnar would assume oversight of the production and manufacturing issues and I was relieved.

Back to the sealant records, after consulting with the experts, I learned the sealant records have to be examined to ensure the shelf life has not been exceeded. This was a properly conducted FAA reinspection and records review. There was an Eclipse production certification report generated by Mr. Wojnar to Ms. Baker. It portrays a story that is accurate in some regards but also has a slant and factual inaccuracies that would make the inspectors look overbearing and zealous. It also contains misleading statements regarding myself and the Rotorcraft Directorate staff.

The issues detailed are but a few of the issues the employees dealt with. The bigger cultural issue was the demonstrated lack of confidence in field FAA employees by Mr. Hickey and others. You will hear a different story from your subsequent panel. In fact, I expect to be maligned, disparaged and at best displayed as incompetent. The record will speak for itself.

The bigger concern is the tarnished reputation of field FAA employees involved, particularly the ones who tried to raise concerns. There are 250 other companies that the Directorate oversees. Nothing else comes close to this situation.

Integrity is something I learned at the feet of my father, a 28-year career Army officer, and he is our patriarch. There are three generations of military service. One of my brothers is a serving inspector general. I clearly understand the implications of these proceedings.

My decision to leave the FAA was reached over a year ago. The Eclipse 500 program was the tipping point. It was clear to me that my value system and my leadership style were in conflict with senior leadership. It was time to close that chapter and move on. I have made mistakes in my career, but the handling of the Eclipse 500 program was not one of them.

Pending your questions, this completes my statement.

Mr. COSTELLO. Thank you, Mr. Downey.

The Chair now recognizes Mr. Wallace.

Mr. WALLACE. Good morning, Mr. Chairman and honorable Members of this Committee.

My name is Dennis Wallace. I am a software engineer employed by the FAA and I am currently assigned to the Rotorcraft Certification Office in Fort Worth, Texas, as the FAA's software technical specialist.

I have been employed by the FAA for the past 12 years. Prior to my employment with the FAA, I worked for the Department of Defense in various positions for 26 years. I am also a veteran of the United States Air Force, having served 4 years on active duty and 21 years on active reserve.

I am here before you today to give an account of my recollection of the events in the final days leading up to the issuance of an FAA type certificate for the Eclipse 500 Very Light Jet airplane. My specific role in this project was to provide typical FAA certification oversight of Eclipse and its supplier's development of airborne software for this aircraft to ensure that it satisfied the safety requirements defined in the applicable Federal aviation regulations. According to what the company submitted and FAA agreed to, Eclipse and its suppliers were to develop their software in accordance with the guidelines of RTCA DO-178B as a means to secure FAA approval for the digital computer software as a showing of compliance to 14 CFR 23.1301 and 14 CFR 23.1309. As there are no specific regulations that discuss how to certify software, these are the governing safety regulations and DO-178B is the standard, FAA-recommended approach for the certification aspects of airborne software.

DO-178B was published in 1992 and has become the universally accepted governing procedure for such software certification efforts. DO-178B uses layers of checks and balances in an attempt to prevent errors from manifesting in the code. These include a defined and structured development process, independent peer reviews, quality assurance, configuration management and the rigor of testing that must be accomplished.

On the morning of September 12th, 2006, while conducting a software review at one of Eclipse's suppliers, I received a telephone call informing me that I needed to attend a meeting at a hotel in Albuquerque on September 13th and that I should be prepared to give a status report for the software being developed by that particular supplier. When I arrived for that meeting, I was prepared

to report the facts that the supplier had not yet completed final design review, had not entered test readiness review, and that the company was aware that dead code still needed to be removed. Most importantly, I was also going to report that in my opinion, only approximately one-third of the required objectives of DO-178B had been satisfied.

Instead of support, what I received was a rather harsh line of questioning from the FAA AIR-1 and AIR-100 managers that basically questioned the validity and utility of the long-accepted DO-178B software certification procedure. They also hopped on the fact that there were no airworthiness rules specifically related to software certification. I tried to explain to them that Eclipse had signed up to comply with DO-178B for themselves and their suppliers. I went on to state to them that while it is true that there are no Part 23 rules that are unique to software approval, DO-178B is a traditionally and universally accepted means to secure FAA approval, which is applicable to all systems and equipment onboard the aircraft.

Also, DO-178B provides a level playing field for all aircraft software developers and as such, it contributed to a standardized approach to the software aspects and certification. I was told by the AIR-1 manager in what I perceived to be a very direct, animated and threatening manner that my position on this constituted antiquated thinking and that I had best start thinking outside the box. He further stated that we were here to save a company and then looking directly at the then-Rotorcraft Directorate manager, said he ″should have to come to Albuquerque to do his job.″ That was when I realized the supplier was not the problem, I was.

On the following morning, I attended a meeting at Eclipse, along with other FAA personnel. In that meeting, the company proposed a mitigation strategy that the company wanted the FAA to accept as an alternative to the supplier having to satisfy software objectives of DO-178B. It is my continued opinion to this day that FAA management was strongly encouraging the FAA team to accept its proposed company mitigation strategy.

The next week, I telephoned the supplier's designated engineering representative and asked him to submit an FAA form 8110-3 stating that the software satisfies DO-178B and complies with 23.1301 and 23.1309. I received the requested 8110-3 stating that it was to the extent demonstrated by partial compliance with DO-178B. This became part of the mitigation package which I was asked to sign off on. I did so on September 28th by stating only that I concurred that the software partially complies with DO-178B. The clear implication here is that neither the designated engineering representative nor I concurred that the software was completely compliant.

When I arrived at work on Monday October 2nd, I was surprised to hear that Eclipse had received its type certificate the previous Saturday, September 30th.

This concludes my opening remarks. Thank you, Mr. Chairman and honorable Members of this Committee.

Mr. COSTELLO. Thank you, Mr. Wallace.

The Chair now recognizes Mr. Lauer.

Mr. LAUER. Mr. Chairman, Members of the Committee, my personal involvement in the Eclipse project spanned the period from July 2006 to March 2007. In the July through December time frame, I made several trips to the Eclipse facility to assist the FAA program manager in various tasks. These tasks included inspecting the first production airplane.

The FAA program manager and I witnessed functional test procedures and inspected the airplane to verify it conformed to design drawings. The FAA program manager and I observed numerous instances where the airplane did not conform, yet had been signed off by Eclipse company inspectors and FAA designees as though it did conform. Eclipse company inspectors and FAA designees were repeatedly instructed by the FAA program manager that airplanes and functional test procedures should not be signed off and presented for FAA inspection unless everything conformed.

It was my perception that Eclipse employees were under constant pressure from their management to deliver airplanes. I observed that Eclipse management would not hesitate to complain to FAA management when they perceived FAA inspectors were interfering with Eclipse's ability to deliver airplanes. On numerous occasions when FAA inspectors told Eclipse personnel something they did not want to hear, the reply was to the effect that Eclipse could not live with that, and the issue would be elevated.

To support the airplane delivery schedule, Eclipse expected an FAA inspector presence virtually around the clock and made this known to FAA management. As a result, I and several of the FAA inspectors worked a great deal of overtime at Eclipse, including weekends and holidays.

In late January, Eclipse presented the second production airplane for FAA inspection and airworthiness certification. Eclipse had submitted signed FAA forms containing certifying statements that the airplane had been inspected by Eclipse, was found to be airworthy, conformed to its type certificate and was in condition for safe operation. The FAA inspector's inspection of the airplane indicated that Eclipse had neglected to adequately inspect the airplane before making application for an airworthiness certificate and thus possibly violated FAA regulations by making an apparent false statement on the FAA forms.

I consulted with the Rotorcraft Directorate Manufacturing Inspection office manager in Fort Worth and it was determined that an investigation should be initiated for a possible violation of Federal regulations. An investigation case was initiated in accordance with FAA policy. It should be noted here that FAA policy established that every apparent or alleged violation must be investigated and that the enforcement investigation report is the means for documenting an investigation.

In mid-March, the FAA aircraft certification service director assigned a senior advisor from outside the Rotorcraft Directorate to assume responsibility for the Eclipse project. FAA inspectors were notified that they would report to the assigned senior advisor for all Eclipse production and airworthiness activities.

I was informed by the Rotorcraft Directorate Manufacturing Inspection office manager that the senior advisor wanted the in-progress investigation suspended immediately and the case was to

be closed with no further action. The investigation was suspended and the case closed as directed.

In mid-March, the senior advisor implemented a working agreement between Eclipse and the FAA, known as a project-specific certification plan. Language within the project-specific certification plan established that the FAA would recognize and utilize Eclipse's FAA designees to the greatest extent possible in inspecting Eclipse airplanes. FAA inspector utilization of FAA designees has been a common FAA practice, but only after companies have been able to demonstrate that their inspectors and FAA designees were reliable.

In order to streamline FAA inspection of Eclipse airplanes, a flowchart within the project-specific certification plan established a set amount of time for FAA inspection of each airplane. Language within the project-specific certification plan also established that the FAA would not require removal of airplane interiors, floorboards, et cetera when FAA inspections were performed.

In mid to late March, I made the personal decision to obtain professional liability insurance. I want to emphasize that throughout the time of my involvement in the Eclipse project, management within the Rotorcraft Directorate never once pressured me to do anything that was contrary to FAA regulations. I have no personal reservations concerning any level of Rotorcraft Directorate management and consider them all to be high caliber people.

This concludes my statement and I await the Committee's questions.

Mr. COSTELLO. The Chair thanks you, Mr. Lauer, and recognizes Ms. Broyles.

Ms. BROYLES. Thank you, Mr. Chairman.

I am an aviation safety inspector in the Manufacturing Inspection Office of the FAA in Fort Worth, Texas. One of my duties as an ASI is to evaluate new and existing manufacturing companies that produce commercial aircraft and new replacement parts. I have worked for the FAA for 20 years, and during my tenure as an inspector, I have performed over 485 evaluations of aircraft manufacturing facilities and pride myself in being very thorough.

July 2006, I was a team member of the preliminary district office audit at Eclipse Aviation for the issuance of approved production inspection system. Fifteen non-compliances of the system were documented. In September 2006, we returned to Eclipse to review the corrective actions from the July audit. Corrective actions were not presented, so we continued with the ongoing district office audit. Twenty additional non-compliances were identified. From the July and September audits, a total of 35 non-compliances were documented.

In December 2006, I returned to Eclipse. Our management conveyed to us that we were to work on nothing but the airworthiness of the first production aircraft. Eclipse presented the aircraft to the FAA with a signed statement of conformity and we began conducting tests. Of the 28 tests performed, 11 passed. The official production certification district office audit was conducted February 2007. Forty-two non-compliances were documented. Three audits of Eclipse's quality system had been conducted. Seventy-seven non-compliances were documented. Thirty-five of those did not have verification of corrective action.

My impression was that Eclipse was controlling FAA's schedules and managing our resources. For instance, our managers denied the request for us to return to Fort Worth due to weather conditions, although most of the Eclipse employees were told to leave due to hazardous weather. In April, Eclipse was preparing an aircraft for certification and told the FAA inspectors to go back to the hotel, but be ready for their call, even though it may be midnight before the aircraft was ready.

March 2nd, 2007, an FAA aircraft certification director appointed an independent team to oversee airworthiness and the production certificate for Eclipse. The Rotorcraft Directorate manager, FAA principal inspector and the MIO, manufacturing inspection office inspector, were removed from the program. In April 2007, I was on the team for the production certification board. Sitting in the back of the room was the independent team appointed by Mr. John Hickey, which consisted of five managers. During the internal FAA in-brief, the independent team leader talked about how the company had improved since he had been appointed and stated that we should do a high level, or overview of the system because the company had already been audited numerous times. It was then stated, in other words, we need to only go an inch deep when conducting the audit.

I was shocked when I heard this statement. FAA Order 8120.2D provides guidance for the issuance of a production certificate and states that the production certificate board is responsible for making a thorough evaluation of the applicant's quality system and production facilities. Conducting an overview of the system when corrective actions were not verified and functional tests were failing was in conflict with our guidance.

I began my evaluation of the manufacturing system and found issues for the horizontal stabilizer assembly and requested the drawings to evaluate the condition further. One drawing led to another. My Eclipse escort said to me, ″Maryetta, you are going more than an inch deep. You are going too deep.″ I was surprised that my escort had heard that statement. I do not know how he received the same information that was briefed only to the FAA.

In all my years as an inspector for the FAA, I have never felt the pressure from FAA managers that I felt when Eclipse was trying to get their production certificate. We were being monitored on our performance and with the removal of managers and inspectors from the project, I was cautious about what I said and did. I have successfully approved several other companies for production and have never experienced this level of involvement or monitoring from Washington headquarters. We followed our guidance and regulations and spent enormous amounts of time coaching and providing assistance to Eclipse. Issues were identified to prevent safety problems. We were directed to get the job done and money and resources was no object.

I am proud to represent the FAA and be a part of a world class organization in advancing aircraft safety. Our actions during this trying time were honest.

One of the core values of AIR is to praise each other publicly and recognize and regard others for excellence. I feel the inspectors

were pressured and discredited when we were trying so hard to accomplish our job.

This concludes my statement. I await the Committee's questions.

Mr. COSTELLO. The Chair thanks you, Ms. Broyles.

Let me begin, Mr. Downey, with you. You indicated that there was a meeting on September 14th, which you attended, and a meeting called by Mr. Hickey, where Mr. Hickey made a comment at the meeting that ''we're here to save a company.'' What did that mean to you? Did it mean that whatever it takes, we are here to save the company?

Mr. DOWNEY. It would be my opinion, sir, that there was a balance trying to be struck here between a company that was going to go under because they had made financial commitments and meeting all the requirements as outlined in our policy and in our rules. We were made aware that there were financial implications to a TC date tied to the issuance of the engine type certificate as well as when the company got their type certificate.

Mr. COSTELLO. On page 6 of your testimony, you indicate that the FAA agreed to numerous IOUs, which of course we are aware of, from EAC, and that this is not uncommon, but the FAA personnel were under a great deal of pressure. From the testimony that we hear from everyone, let me draw a conclusion here, and if I am wrong, tell me that I am wrong, if anyone disagrees, is that you all believe that this whole process was driven by a calendar and a date of September, the end of September 2006. Is that correct?

Mr. DOWNEY. Yes, sir.

Mr. COSTELLO. Anyone disagree with that statement?

Mr. Downey, if you would, explain to the Members of the Subcommittee what the purpose was of the meeting that you attended and what happened at that meeting?

Mr. DOWNEY. The purpose of the meeting was a gathering of all the FAA inspectors, engineers, pilots and test pilots to basically determine where we were, since there was a meeting the following day, a ''program review'' called by Eclipse and Mr. Hickey. So it would be a precursor to a meeting on the following morning where we would basically walk through each of the major systems on the aircraft and the schedule for both production and for type certification.

Mr. COSTELLO. Did you find that it was unusual that as the chief executive of the FAA's certification organization that it was unusual for Mr. Hickey to take such a personal involvement, personal interest in the EA-500 certification program?

Mr. DOWNEY. Yes, sir.

Mr. COSTELLO. Can you either tell us why you believe that or speculate as to why you found it unusual?

Mr. DOWNEY. My speculation, sir, would be that there were several programs that were highly visible and that the VLJ market was a new toy, if you will, on the aviation scene. Mr. Raburn, through numerous articles, numerous events, including the previous roll-out at Oshkosh with their provisional type certificate, had created a public spectacle, and we were going to be part and party to that and we weren't going to miss that date.

Mr. COSTELLO. You mentioned in your testimony or suggest that the company intended to go straight to Washington, D.C. when they didn't like how things were going at the office. Elaborate on that if you will.

Mr. DOWNEY. The previous week to that September 14th meeting, we were attending, several of the executives were attending a meeting in Washington, and we were called in. That is when Mr. Hickey said, I want a program review, I want to know what is going on, I want to know why we are not going to make this. And it was completely out of left field for me to understand why we were going to be, the gain had been turned up on this to this level.

Mr. COSTELLO. You also mentioned in your testimony that there was an email that was apparently intended, on August 31st of 2006, an email from an Eclipse manager to senior Eclipse management, but it was accidentally sent to an FAA employee. Describe, if you will, what was in that email.

Mr. DOWNEY. The email basically said, we have to get the following, Hickey has to make sure that the following gets done. And among them was, they have to accept our approach to the software. And there were three or four other things in there, sir, and I have the references I can submit to the Committee if you would like.

But what it said to us is, if we don't figure out a way of doing this, there will be hell to pay. And it was mentioned on numerous occasions. Vern Raburn made no mistake about dropping the Administrator's name, Governor Richardson's name, the Senatorial staff. And we knew that there would be political pressure applied to us. That can be done in a number of ways.

Mr. COSTELLO. You also mentioned in your testimony that Eclipse was not qualified to receive a production certificate, in your opinion. Give us an explanation, if you would.

Mr. DOWNEY. Well, as the members of this panel elaborated, sir, the number of hours that our employees spent going through the quality system to ensure the various elements of it, the supplier control, receiving inspection, the actual hands-on inspection of the aircraft, and I was over there numerous times. I even went back through my travel vouchers to look at it. And in fact, I remember a specific incident with inspectors where they went out to look at the aircraft and the aircraft just flat did not pass the test procedures that were outlined. Screens went blank. Fuel lines were chafing. Wiring was chafing. And this was not stuff that was like hunt and peck to find it, it was blatant and people saw it.

So based on that, sir, and the fact that we in the directorate, to use a Texas phrase, this wasn't our first rodeo—we had been through this before. And our folks knew what they were doing. They were professional, they were competent. I was very, very comfortable that the leadership team in place had a very good idea of what they needed to do. I learned a long time as a leader, you train your people, you turn them loose and you let them go do their job. They had never failed me or my staff in that regard.

So I have no reason to believe that the issues that were being brought to bear at that point in time were malicious or inaccurate.

Mr. COSTELLO. Mr. Wallace, why do you believe that senior management perceived you to be the problem?

Mr. WALLACE. Because I wasn't going to approve the software. That is why I perceived that I was the problem.

Mr. COSTELLO. Do you still stand by your decision today that you would not have approved the software that was in the condition that you saw it in September of 2006 on the aircraft?

Mr. WALLACE. That is correct.

Mr. COSTELLO. I have some other questions. But at this time, the Chair now recognizes the Ranking Member of the Subcommittee for questions, Mr. Petri.

Mr. PETRI. I guess I am trying to figure out how to put this in context and what if anything we should be doing about it going forward to help the FAA do a good job of ensuring airworthiness for new, innovative craft. I know, I represent the EAA in Oshkosh, so I am very aware of how excited the aviation community, especially the general aviation community, has been about the new type of airplanes that Eclipse represented. I suspect there is a lot of pressure, not badly motivated, but people who wanted this thing to succeed.

And then now our issue is, people aren't saying the plane that is out there now is unsafe. They think it probably is airworthy. But there were a lot of steps along the way where things were not correctly managed or handled. There were personality conflicts as a result of that, in the effort to try to get this thing certified with a new manufacturer.

Were you involved, also there were two other planes, similar planes, I think a Swearingen and a Cessna that were of this general type that were also going through the certification process at about the same time?

Mr. DOWNEY. Yes, sir.

Mr. PETRI. They were certified before this one. If you were involved in both, could you describe, is it mainly that these were experienced manufacturers and teams that had regular relationships with the process and that this one with the Eclipse was a new team and they were having problems there? Is there some difference? Why were they able to go through this process without these, or were they able to go through this process without these problems? What would explain the Eclipse's, the bumps in the road, so to speak, in the Eclipse certification process? Does anyone have any comments on all that?

Mr. DOWNEY. Sir, I can speak to the Sino Swearingen SJ30, because that was a program under our responsibility as well. That company suffered from many of the same issues along the way. They suffered a very unfortunate fatal accident at Christmas time a couple of years prior to that, and I was intimately involved in that. And I can't speak to the Cessna Mustang, although Cessna is a longstanding manufacturer.

I would say the differences were, we did not provide the same level of resources to Sino. Sino suffered, like I said, from some of the same ills in terms of, they had problems with the fuel system along the way. They had problems with the conformal wing. They had other issues that were similar in terms of technical challenges. But we just didn't see the same level of help from Washington, if you will.

Mr. DIPAOLO. Congressman, I would like to build on that as well. In talking to the NATCA representatives that worked on those programs, the differences that I was made aware of was the fact that when those airplanes did get their approval, they were approved with limitations. And sometimes those limitations are pretty harsh on the aircraft, it doesn't allow the aircraft to do a lot. Maybe you can only fly in day time.

That wasn't the case with the Eclipse program. These IOUs were underhanded, to state it in one manner. If a limitation is necessary, as the engineers that is what we do. Sometimes at the end of the program there is a rush. We understand we don't have all the testing done, and we put a hard limit on that airplane. What that does is that is the incentive. Because that aircraft manufacturer does not want to live with that limitation. They come back and we agree to further testing to try to remove that limitation. But I have never heard of an IOU being issued.

Mr. PETRI. I have other questions, but I will wait submit them in writing.

Mr. COSTELLO. The Chair thanks the Ranking Member and now recognizes Mr. Boswell from Iowa.

Mr. BOSWELL. Thank you, Mr. Chairman. Anybody who wants to can answer, I guess I'm thinking of Mr. Downey. Strong criticism. Nobody can question that. I just wonder if I could ask, have you experienced other instances wherein this type of pressure to push or rush the process in your experience with FAA?

Mr. DOWNEY. None that I can recall first-hand, sir. I have to tell you, we were pretty well consumed by this one.

Mr. BOSWELL. I appreciate that. I was hoping you would say that. But I wanted to hear it from you because of things that you probably heard me say earlier, some couple of hours ago. So this is not what you would refer to, and I am not trying to put words in your mouth, this is not a normal circumstance in your experience with FAA?

Mr. DOWNEY. No, sir.

Mr. BOSWELL. Thank you. No more questions.

Mr. COSTELLO. The Chair thanks the gentleman and now recognizes the gentleman from North Carolina, Mr. Hayes.

Mr. HAYES. Thank you, Mr. Chairman and gentlemen and Ms. Boyles. Thank you for coming today. I know it is probably not something that you greatly looked forward to, so we appreciate your willingness to step up and give your view of the situation.

An observation, there is an ongoing rift between the FAA and NATCA over various and sundry issues. That is reflected in some of the comments, in my opinion, that you have made today, and they don't fit in this hearing. That is just an observation.

Mr. Downey, I don't know, unfortunately you have been called on to do a lot of talking. I want to spread out my questions to others, but several things that you said, and again, this is not in any way questioning your experience or loyalty or anything else. But looking at the process, there is management and those folks that work for management. I have been in the management position, I have had to terminate people and I have had to transfer people. I can't remember too many instances where that person thought it was a great idea. But there comes a time when one has to manage.

Now, as a general question, and anybody, I would welcome your answer, over a period of five years, 2001 through 2006, the pressures that are normal in something this complicated, something this important, is it possible that there was a level of, my word, tiredness that developed between the inspection team and the manufacturer? Did that occur? A level of frustration equally applied both ways? Does that affect anything here? Mr. DiPaolo?

Mr. DIPAOLO. Mr. Hayes, the program started, as you know, in 2001. It was a complex program, and the FAA granted an extension. Because usually these programs take about three years, according to the regulations. Eclipse was granted an extension in 2004. So they had until 2007 to complete the program, and if necessary, they could have applied and received another extension.

Mr. HAYES. Well, that is not my question. Had a level of tiredness between the inspection team and the manufacturing team developed?

Mr. DOWNEY. Sir, I will comment on that.

Mr. HAYES. All right.

Mr. DOWNEY. I don't believe so.

Mr. HAYES. Well, I definitely believe so, having heard from management, both on the manufacturer's side and the FAA's side. Neither right nor wrong, but at certain times, you are sick and you are in the hospital and you are not communicating with your team of doctors and you change teams. That is not necessarily a negative reflection. It is just time for a new look.

So again, to keep this in perspective, I think it is important that that be a part of this discussion.

Now, you mentioned, Mr. Downey, and I do take issue with this, the VLJ was a new toy on the aviation scene. Not a new toy. It is a new product, it is a new concept. As a salesman, nothing happens until somebody sells something. If you are going to the bank, whoever, and you have a business plan for some new device, whether it be a lawnmower or an airplane, you are going to have to tell the people loaning you the money, we expect to do this. So a lot of the things that you are pointing to, again from my perspective, critically, are part of doing business. And it is not a toy. It is an important concept in aviation.

Again, it is not your obligation to keep the U.S. competitive, but we are all a team here, Congress and everybody else. I am frustrated at this moment with some FAA folks for a constituent who just can't find the time to do what they need to do to conduct their business. So a lot of what we are talking about here is part of management, it is part of every day.

Now, given where we are, what would you like to see us do, since we are in this, to make sure that the process works, that the public is safe and the United States economy is kept moving forward and those jobs stay here and we use less fuel and all the above? Anybody want to touch that one?

Mr. DIPAOLO. I will take that one.

Mr. HAYES. Okay, and please feel free to contact me after this hearing. I would welcome the opportunity to talk to you individually or as a group. I am sorry we don't have much time, but go ahead.

Mr. DIPAOLO. Much appreciated, sir. We do have limited resources in aircraft certification. There is a limited number of people. You may hear the FAA say there is 1,100. But the actual number of engineers that are working these projects day in and day out is around 300 people. So to use those resources, we do need a little increase in the number of engineers. That would be helpful, and we know Congress has allowed us to do that in the past.

Mr. HAYES. Thanks for the comment. Mr. Costello and I were just talking about that, that the management of FAA says they have enough people. Well, obviously they don't. So you made your point, Mr. Chairman. Thank you. I will be back in a little bit.

Mr. COSTELLO. Thank you, Mr. Hayes, and you are correct. We have asked that question over and over again.

Before you leave, let me just point out, let me join Mr. Hayes in thanking you all for being here. We still have other questions. But I do think it is worth pointing out, and you correct me if I am wrong, Mr. Downey, all of your performance evaluations when you were with the FAA were either excellent, or did you ever receive a performance evaluation the entire time you were with the FAA that was substandard or below standards or critical of your work?

Mr. DOWNEY. During my entire 13 years, sir, all of my end of year performance appraisals were successful.

Mr. COSTELLO. And the day you left the FAA, and you did not leave, as you clarified in your testimony, you did not leave as a result of this project, you left for a number of other reasons, you went immediately and were hired as Vice President of Flight Safety for Bell Helicopter-Textron, is that correct?

Mr. DOWNEY. Yes, sir.

Mr. COSTELLO. I thank you. When Mr. Hayes comes back, I will make this point in his company. He makes a point about changing teams. And it may not be unusual to change teams if you are not getting the desired results or from time to time. We had a hearing of the Full Committee in April of this year where we found the same situation, where the FAA changed teams. So it is just not something that has happened in this instance. It is apparently part of a pattern at the FAA when they are not getting their desired results from their employees, they move a team out and put a team in place to achieve those results. So just for the record, I wanted to clarify that.

And now the Chair will recognize the distinguished Chairman of the Full Committee, Chairman Oberstar.

Mr. OBERSTAR. Mr. Chairman, I want to compliment this panel on their courage in coming forward and the professional integrity they have demonstrated in raising the concerns and the alarms that they have sounded for us, and for supplying the information that is important to understanding this process, the process of certification that is so troublesome. I thank each of you for your professional integrity and concern for safety and for a proper process of safety.

Mr. DiPaolo, notwithstanding what Mr. Hayes was trying to do to undercut your testimony, I think he is wrong. NATCA and FAA have had differences on a different matter, totally different subject matter. NATCA represents a certain class of FAA employees here,

and you are representing them in their concern for what happened within the agency, not what happened on another case.

Mr. DIPAOLO. Correct.

Mr. OBERSTAR. And I don't, I can't let the record go unchallenged; I can't let those statements go unchallenged. I think it is totally inappropriate to have made that comment.

Mr. DIPAOLO. I appreciate that, sir. I mean, we reached the tipping point during that program. I had never seen the level of harassment from FAA management, I had never seen the level of open safety concerns, and that all had come together. We used the only means we really had, which was a grievance, to protect our bargaining unit employees.

Mr. OBERSTAR. I have done oversight work for 40 years in the Congress, as a staff and as a Member. I know integrity when I see it, and honesty and courage, and you have all demonstrated that. Mr. Downey, you said the FAA set the September 30th, 2006 goal for issuance of the TC, you said that, or you suggest that was the same date that Eclipse was tied to for their financial, for additional financial backing, is that correct? Have I stated that right?

Mr. DOWNEY. I don't know the exact particulars, but what we shared with the team and what was shared with me was that there were financial implications and backing tied to 30 days from the date that the Pratt and Whitney engine type certificate was validated through the FAA for them to get their type certificate. I have never seen anything in writing, sir, but that is what was shared with the team through the company.

Mr. OBERSTAR. When did you learn all of this?

Mr. DOWNEY. It would have been some time around the beginning of September, because all of a sudden the dates started becoming hypercritical.

Mr. OBERSTAR. Have you had experience before in the certification process where a date was set by which you had to accomplish something, rather than meeting a goal?

Mr. DOWNEY. I would share with you, sir, that the marketing portions of most companies set dates, and we tend to put those in what we call jello. They are not going to be hard and fast, they are always a target. But sometimes you miss targets. There are certainly examples in the press today of a certain manufacturer that is going to miss it significantly.

So my attitude about that was, it is a date, it is a Power Point slide, but much beyond that, we will do it right.

Mr. OBERSTAR. You also said that your training in software approval informed you or guided you that approval of the software should be event-driven, not calendar-driven. What did you mean by that? Explain that.

Mr. DOWNEY. Well, sir, as I stated in my written submission, in the military I attended the Defense Department's program managers course. That is a course obviously designed to help you run major military programs, products and it was actually a lawyer that was teaching that portion of it. What he said is, software becomes movable to the next event once it completes all of the verification and validation. As Mr. Wallace said in his testimony, there are certain gates that you go through to make sure that the software meets a level of certitude. And if you see it, as I state in

my written submission, if you see a calendar schedule, run the other way. IN other words, there is not a firm grasp of what software implications are in terms of running a program.

Mr. OBERSTAR. Thank you.

Mr. Wallace, you are a software certification specialist for the certification service, correct?

Mr. WALLACE. Yes, sir.

Mr. OBERSTAR. And you teach the subject at the FAA Academy?

Mr. WALLACE. I do.

Mr. OBERSTAR. As you reviewed the Eclipse process, they had an alternative means of compliance for software certification. Was that adequate, inadequate? What was your judgment of it?

Mr. WALLACE. I believed it to be inadequate to be presented at the eleventh hour. Usually when a company wants to do an alternate means, it is presented at the beginning of the program, not at the very end of the program.

So in this particular case, there probably should have been an issue paper issued and processed and been reviewed by several people. But again, this came about at the very eleventh hour.

Mr. OBERSTAR. And did that software alternative approach have a connection with the software problem that occurred in the Eclipse aircraft at altitude?

Mr. WALLACE. I couldn't say for sure.

Mr. OBERSTAR. Is enough known about that software shortcoming, failure, glitch, as it has been variously described? Is enough known about that at the present time to make a judgment about whether there was a significant failure?

Mr. WALLACE. Well, again, I think I would have to go back to the point in time you are referring to, which I really don't know. Because there are different configurations of that software. If you are talking about at the time of the type certificate, there were a couple of software issues that it went into type certificate with that I was aware of. One of course was the, in my opinion, the incomplete development of the software from one particular supplier. The other one had to do with the AHARS, which was causing, there was a bug in the pit processor that was eventually causing the screen to freeze. They would have to reset through the watchdog timer.

So it was a combination of both the AHARS and the primary flight display that was causing a problem.

Mr. OBERSTAR. In fly-by-wire technology, it seems to me those issues should be worked out thoroughly before they are allowed to go forward in an aircraft and allow that aircraft to be operational.

Mr. WALLACE. Well, Congressman, this is not a fly-by-wire aircraft, but it is a highly automated aircraft. I would agree with you, yes.

Mr. OBERSTAR. You wouldn't call it completely fly-by-wire?

Mr. WALLACE. It is not fly-by-wire, no, sir.

Mr. OBERSTAR. But the software is essential to its operation?

Mr. WALLACE. Absolutely. Absolutely.

Mr. OBERSTAR. So at least that should have been fully vetted and fully tested. FAA is very good at that. They are often criticized in the air traffic control technology side by the industry, by users, oh, you took too much time to test this, your insistence on testing is

slowing down the process of modernization. And yet FAA has been very insistent, very good on that point of not putting something, not putting a piece of technology into operation until they are confident it is going to work 100 percent, the way they expect it to do.

Mr. WALLACE. Yes, sir.

Mr. OBERSTAR. And in this case, that didn't happen.

Mr. WALLACE. In my opinion, no.

Mr. OBERSTAR. Why was that?

Mr. WALLACE. Because the process wasn't allowed to work. We have an established process called DO-178B, and in this particular case, it wasn't allowed to come to fruition before I could approve that software.

Mr. OBERSTAR. Who didn't allow it to come to fruition?

Mr. WALLACE. Well, I can only speak for myself, Mr. Congressman. I signed off that mitigation strategy by saying I concur that the software only partially complies to DO-178B.

Mr. OBERSTAR. But then after it left your hands?

Mr. WALLACE. When it left my hands, sir, that was very shortly, within a few days, they received the TC. And I moved on to other projects. I had other projects, and as far as I was concerned, that was it for me, I was done on that particular project.

Mr. OBERSTAR. Well, you stand by your decision then not to sign off on it?

Mr. WALLACE. Yes, sir.

Mr. OBERSTAR. You referred to a book promoted by FAA management as a must read. You said, the bus had left the station, not only was I not on the bus, I felt I was being thrown under the bus. What does that mean?

Mr. WALLACE. There was a book that was promoted by FAA management on management techniques. At that particular meeting on the 13th of September, I realized two things, one, that the supplier was not the problem, I was the problem because I was not going to approve that software. Then I realized also that the bus had already left the station and not only was I not on the bus, I felt I was being thrown under the bus, in other words, I was being overridden by management for technical decisions that I thought I was in a better position to make an assessment of.

Mr. OBERSTAR. And you have had a lot of professional experience. Have you been overridden before in your field of expertise?

Mr. WALLACE. No, sir, I don't recall having been overridden before.

Mr. OBERSTAR. So Mr. Hayes' comment that oh, sometimes decisions have to be made, management decisions have to be made, people have to be moved, is irrelevant to this issue.

Mr. Lauer, you testified that in March 2007, you made the decision to purchase professional liability insurance. I have never heard of anyone doing that within the FAA. Why did you feel that was necessary?

Mr. LAUER. Principally because the project-specific certification plan I referenced in my oral summary, it limited our ability to inspect those airplanes, certain portions of it were off-limits. Timewise, we had roughly 12 hours to inspect those airplanes and no more.

Bottom line is, if I am not free to look at every part of the aircraft I need to, then I can't be confident that it truly conforms and is in a condition for safe operation. Yet I am expected to sign and issue an airworthiness certificate for that aircraft. Forward thinking, if something were to happen down the road, NTSB comes knocking on my door, I was just wasn't comfortable.

Mr. OBERSTAR. And you felt you needed some personal, professional protection?

Mr. LAUER. Yes, sir.

Mr. OBERSTAR. In the form of insurance?

Mr. LAUER. Yes, sir.

Mr. OBERSTAR. You also said, when Eclipse presented to FAA the second aircraft for airworthiness certification, you found that inspectors had not inspected a number of critical areas and may have violated Federal aviation regulations, with apparently false statements on the forms. Can you elaborate on that?

Mr. LAUER. Yes, sir. The application form for airworthiness certificate contains a certifying statement above where the applicant signs. In essence it says the airplane has been inspected, it conforms to its type certificate and it is in a condition for safe operation.

Mr. OBERSTAR. Well, and earlier you said that when FAA inspectors told Eclipse something they weren't particularly happy about hearing, their answer was, they can't live with it, the issue would be elevated to Washington. What did they mean about that?

Mr. LAUER. Yes, sir. The inspectors began to hear that quite often from the Eclipse, I suppose it is mid-management level people that were actually out on the floor, overseeing, trying to get these aircraft processed. They wouldn't hesitate to pull that card, if the inspectors were asking to see too much, requiring too much, documenting too many things wrong.

Mr. OBERSTAR. And that was probably said with an intimidating tone or with an implication that your judgment would be bypassed?

Mr. LAUER. Yes, sir.

Mr. OBERSTAR. That is not a safety-compliant attitude, in my judgment.

Mr. LAUER. No, sir. Like I said in my statement, I perceived there was heavy, heavy management pressure from Eclipse management to those people in the company to get those airplanes out the door.

Mr. OBERSTAR. And apparently, a relationship at some other level with Washington FAA personnel?

Mr. LAUER. I was never privy to what went on at higher levels, sir.

Mr. OBERSTAR. By Washington, you have to be in headquarters FAA.

Mr. LAUER. Yes, sir.

Mr. OBERSTAR. Well, Mr. Chairman, there are a number of these matters that we could pursue. I just want one more with Mr. DiPaolo. You said that you spoke to one of the certification engineers on September 29th, 2006 and you were told FAA was not going to sign off on the type certification of the Eclipse. Yet on a Saturday, that sign-off occurred. How did that happen?

Mr. DIPAOLO. You are asking me to interpret what the FAA managers were trying to do, and the only thing I can think of again was the pressure that they self-perceived about trying to get this airplane approved by the end of the fiscal year, that somehow that was linked to their performance plans. There is also another document called the partnership for safety plan that also tries to handcuff the engineers and force them to meet these time limits. These are documents that need to be reviewed by the Committee and possibly removed from the FAA's policy. They are not mandatory documents. They should not have a role in when we certify an airplane.

Mr. OBERSTAR. It seems to me this process was driven by something other than safety within the FAA.

Mr. DIPAOLO. I agree with you, sir.

Mr. OBERSTAR. We will continue to probe to get to the bottom of that. Thank you very much, Mr. Chairman.

Mr. COSTELLO. Thank you.

Ms. Broyles, you were present, your testimony indicates you were present when Mr. Wojnar told a team that in other words, ''we only need to go an inch deep when evaluating the quality system,'' is that correct?

Ms. BROYLES. Yes, sir.

Mr. COSTELLO. In your years of experience, have you ever been told such a thing before by a senior FAA manager?

Ms. BROYLES. Never.

Mr. COSTELLO. You also said that you consider yourself a very thorough auditor, and after you were told to look no more than an inch deep, you went back again and found numerous discrepancies that had already been signed off on by Eclipse FAA-designated inspectors, is that correct?

Ms. BROYLES. Yes, sir.

Mr. COSTELLO. And you were told by an employee of Eclipse, who I believe you say was your escort, that you were ''looking more than an inch deep''?

Ms. BROYLES. Yes, sir.

Mr. COSTELLO. How did you take that? How do you think the Eclipse employee knew what FAA employees were told in an earlier meeting?

Ms. BROYLES. I really don't know how they found out what was told to us in an FAA internal meeting. I don't know how they got that information. But I was surprised when he said that to me, because I do tend to go more than an inch deep. Quite a bit more.

Mr. COSTELLO. I have other questions that we will submit in writing to you, to members of the panel. I would ask if there are any other questions by the Ranking Member, Mr. Petri, at this time. Mr. Petri will have questions submitted in writing.

Mr. Boswell, do you have further questions at this time?

Mr. BOSWELL. No, thank you, Mr. Chairman.

Mr. COSTELLO. The Chair thanks you. And let me say, reiterate what Mr. Oberstar said, we thank you for not only your testimony today but for your courage in coming here to tell us things that we need to know about what is going on with the FAA. And I also want you to know this, those of you who are still employed at the FAA, that I want to hear from you if in fact there is any retaliation at all. If there is any indication from employees or management at

the FAA, any retribution from your testimony here, I personally want to know about it. There are protections in place where we should and can protect you.

It is a valuable tool for us in conducting our oversight. I don't know if you were in the room earlier when I said a situation that resulted in nine deaths in my Congressional district was only discovered and revealed when employees came forward. Management wouldn't listen to them. But once we got the inspector general involved and others, it was determined that it was substandard care on their part. But it originated with current employees at that facility. But for their courage in coming forward to give us the information that we needed, we would not have been able to do some of the things we have just done to put other management teams in place and to begin to try and deal with the families and to compensate them for their loss.

So again, we thank you for your courage. We thank you for your testimony, and at this time, this panel is dismissed. Thank you.

The Chair will now introduce panel three as they are coming forward. They will take their respective places. Mr. Nicholas Sabatini, who has testified before this Subcommittee several times, the Associate Administrator for Aviation Safety at the FAA. Mr. John J. Hickey, the Director of Aircraft Certification Service for the FAA. Mr. Ronald Wojnar, Senior Advisor, Aircraft Maintenance Division, Aircraft Certification Services at the FAA. And Mr. Tom Haueter, Director, Office of Aviation Safety, National Transportation Safety Board.

Mr. Sabatini, my understanding is that you will be offering testimony. Are there others from the FAA that will offer testimony or will they only be there to answer questions?

In fairness to you, we allowed the Inspector General additional time and waived the five minute rule for him. The last panel, we kept them to five minutes. But in fairness to you, I think the Inspector General took about ten minutes and we certainly will be considerate of your time. Please, if you feel you need more than five minutes, please feel free to take that time.

TESTIMONY OF NICHOLAS J. SABATINI, ASSOCIATE ADMINISTRATOR FOR SAFETY, FEDERAL AVIATION ADMINISTRATION, ACCOMPANIED BY JOHN J. HICKEY, DIRECTOR, AIRCRAFT CERTIFICATION SERVICE, AND RONALD WOJNAR, SENIOR ADVISOR, AIRCRAFT MAINTENANCE DIVISION, AIRCRAFT CERTIFICATION SERVICE; TOM HAUETER, DIRECTOR, OFFICE OF AVIATION SAFETY, NATIONAL TRANSPORTATION SAFETY BOARD

Mr. SABATINI. Thank you, Mr. Chairman. I do appreciate that. May I proceed?

Thank you. Chairman Costello, Chairman Petri, Members of the Subcommittee, thank you for the opportunity to appear before you today on behalf of the FAA to discuss the certification of the Eclipse EA-500. With me today is John Hickey, Director of Aircraft Certification Service, and Ron Wojnar, a Senior Advisor in the Flight Standards Service. We have one submitted written statement and I will be summarizing our remarks for all three of us this morning.

With any major projects like Eclipse, there are really two stories. One is the technical story and the other is the human story. My written statement goes into great detail on the technical story, so I will not take this time to restate those issues. Rather, I would like to focus my remarks on the human story, because peoples' perceptions are important, and they certainly played a role in what you have heard today.

To state the obvious, the certification of an aircraft is an extremely complex process. No aircraft obtains certification without a great deal of trial and error, and the Eclipse aircraft was certainly no different in that respect. We encountered many, many problems throughout the process. But we worked them through to achieve resolution. Was it a perfect, painless process? Absolutely not. There is no such thing.

But the bottom line is, I believe that the aircraft was properly certified. I believe that the aircraft meets FAA safety standards and I have the results from a special certification review team to back me up on that. What I want to address head-on are the allegations that we have heard here today that management at the FAA unduly pressured our regional certification teams. Was there undue or improper pressure? I would have to say no. Was there any kind of pressure at all? I would have to say yes. In every job, in every project, with every deadline, there is pressure. There is pressure to do the job safely, to do it right and to do it on time.

So what did happen? What kind of pressure was there? There was pressure to follow the laws and the regulations governing the FAA. There was pressure to meet our standards. There was pressure to follow our national guidelines and policies. There was pressure to meet an agreed-to time line. And when management at headquarters had reason to believe that these obligations were not being met, Mr. Hickey took the appropriate steps to determine the best way forward to meet our obligations.

This Committee has rightfully criticized FAA management for not intervening when it should have. This was not such a case. When the officials in charge of establishing and implementing national policy for engineering overruled a local office on how the aircraft could be type certified, were some people unhappy with that decision? When Mr. Wojnar was sent in with a team to refocus the efforts for Eclipse to obtain a production certificate, were some on the local team troubled? Were people genuinely upset and concerned at various points during this process?

Obviously, you have just heard from some of them. And I regret that they felt devalued, because I respect every employee working in aviation safety. I know that they are just as committed to safety as I am. But leadership is often about making difficult decisions when necessary. It is about protecting your people when you can and calling on them to do better when you must. Pressure to work harder or be more creative or more responsive is not a bad thing.

I truly regret if that pressure was interpreted as a direction to do anything other than follow applicable laws, regulations and established policies. I appreciate that the witnesses we have heard from believe that headquarters' involvement was inappropriate or resulted in a less than thorough process. But I also know there are

other individuals who would not agree with that assessment. They just weren't asked to testify today.

I am not going to defend every action and decision in the very long and complicated certification of the Eclipse aircraft and the subsequent issuance of the production certificate, because I know there could have been better communication and documentation with respect to some of the disputed issues. The SCR noted those deficiencies and made some recommendations. But their recommendations were not revelations to us. We know there is always room for improvement and we are already working on how we can use the lessons learned from the Eclipse certification to make the certification process better.

Mr. Chairman, we have heard a lot of things here today. We have heard a lot of allegations of undue pressure, of potential safety problems, of very human failures to communicate effectively. As I watched the testimony of the other witnesses in the other room, however, I am more convinced than ever that we have a dedicated workforce that only wants safety to improve. In that, we are in complete agreement.

Mr. Chairman, Congressman Petri, Members of the Subcommittee, thank you for your time and for inviting us here to testify. Mr. Hickey, Mr. Wojnar and I are happy to answer any of your questions.

Mr. COSTELLO. I do want you to know, Mr. Sabatini, that I did hear your testimony in the adjoining room.

Mr. SABATINI. Thank you, sir.

Mr. COSTELLO. I have a number of questions to ask, obviously, but let me give you an opportunity to expand on your testimony. You submitted your written testimony in advance, before you heard——

Mr. PETRI. Is Mr. Haueter going to give an opening statement?

Mr. COSTELLO. No other opening statements, is that correct?

Mr. SABATINI. No, sir.

Mr. COSTELLO. Mr. Haueter, do you have testimony to present? I am sorry. Mr. Haueter is now recognized, and we will come back to you in a few minutes, Nick.

Mr. HAUETER. Thank you, sir.

Chairman Costello, Ranking Member Petri and Members of the Committee, thank you for allowing me the opportunity to present testimony on behalf of the National Transportation Safety Board regarding the Eclipse 500 airplane. It is a privilege to represent an agency that is dedicated to safety of the traveling public.

Although the Safety Board is not involved in aircraft certification and manufacturing processes, the Board strives to improve aviation safety through detailed investigations and subsequent recommendations. To date, the Board has conducted investigations of two accidents and three incidents involving Eclipse 500 airplanes. Four of these events occurred since April 2008 and are still ongoing investigations.

As a result of an event on June 5th, 2008, at Chicago Midway Airport, the Safety Board issued two urgent safety recommendations to the Federal Aviation Administration regarding the Eclipse 500. In that event, the pilot reported that when crossing the runway threshold for landing the airplane encountered a wind shear

and developed a high sink rate. The pilot arrested the sink rate by moving both thrust levers to the maximum power position. After touchdown, the pilot found that the airplane was accelerating, although the thrust levers were at idle. Because the airplane was rapidly approaching the end of the runway and could not be slowed, the pilot decided to abort the landing.

During the climb-out, the pilots found that the thrust lever positions had no effect on engine thrust, and noted that the airplane's crew alerting system displayed that both the left and right engine full authority digital electronic controls, or FADECs, had failed. The pilots referenced the airplane's quick reference handbook on emergency procedures for engine control failure, which contained instructions for a single engine control failure, but not for a dual engine control failure.

The procedures advised that when one engine control failed, its respective engine should be shut down. In order to reduce the airspeed, the pilots shut down the right engine. However, shortly thereafter, they noted the left engine was idle and would not respond to thrust lever commands. Fortunately, the airplane had sufficient altitude to reach the runway for a successful landing. Without the resourcefulness of the pilots, the visual meteorological conditions that prevailed at the time, and the airplane's proximity to the airport, the successful completion of this flight would have been unlikely.

The findings of the investigation indicate that when the pilot advanced the thrust levers to the maximum power stops, it is likely that the thrust levers exceeded the normal maximum position which resulted in a dual channel failure in both thrust lever systems. Then because of program illogic in the FADEC software, the engines maintained the thrust level of the last valid thrust lever position. In this case, that position was or nearly at maximum power.

When the flight crew shut down the right engine, the fault code for the engine cleared. However, because FADECs software was programmed so that the left engine would mirror the thrust lever position of the no-fault right engine, which was positioned at idle after shut-down, power in the left engine was reduced to idle. Thus, the pilots were flying with one engine that was shut down and another engine that would not advance past idle.

On June 12th, one week after the incident, the Safety Board issued two urgent safety recommendations to the FAA. The first safety recommendation asked the FAA to require an immediate inspection of all Eclipse 500 airplane throttle quadrants to ensure that pushing the throttle levers against the maximum power stops would not result in an engine control failure and to require that any engines that failed the inspection be replaced.

On the same day, the FAA issued an airworthiness directive to require Eclipse pilots to evaluate the throttle quadrants to see if a throttle fault could occur. The Eclipse has since developed an FAA-approved test procedure and issued an alert service bulletin that provided standardized procedures for testing the thrust levers. On August 2008, the FAA superseded its original airworthiness directive to mandate the Eclipse alert service bulletin which was to

be accomplished by a person who was authorized to perform maintenance.

The Safety Board's second urgent safety recommendation asked the FAA to require Eclipse to immediately develop an emergency procedure for dual engine control failure and to incorporate the procedure into the airplane flight manual and quick reference handbook. Eclipse developed the emergency procedures for dual engine control failure and the FAA issued an airworthiness directive to incorporate these procedures into the flight manual and a quick reference handbook.

Additionally, Eclipse reprogrammed the FADEC logic to limit the thrust lever out of range angle and not make it a hard fault, so that when the thrust levers retarded below the angled range, the FADECs would resume reading the thrust lever position.

This concludes my prepared statement and I am happy to answer any questions.

Mr. COSTELLO. Thank you, Mr. Haueter.

Mr. Sabatini, you submitted your written testimony prior to your appearance here. You heard the witnesses testify on the previous panels, the IG and the former FAA employee and current employees. I wonder, is there anything that you want to add to the testimony that you submitted to the Committee based upon what you have heard? I have specific questions, but I want to give you the opportunity. These are some very serious allegations that have been made about a date and a calendar driving the project. You have heard the testimony. I don't need to go over it, but I will get into specifics. Any statement you would like to make?

Mr. SABATINI. Well, let me begin by saying that the office manager who issued the type certificate stands by her decision back then that the aircraft met all applicable Federal aviation regulations. Secondly, we had a special certification review team that followed up, and these are people who are world renowned, respected in their own right, competent and qualified to make their own decisions, who have reviewed the data that was submitted for type certification, laboratory work, et cetera, and have determined independently that this aircraft is safe and has met the applicable Federal aviation regulations to be issued type certificates.

I would also add, as I mentioned in my oral statement, there is much to be learned here in terms of the process. We are going to continue to improve that process. We take the recommendations that have been made by the IG and the special certification review team. A number of those recommendations were already underway. And we take it very seriously. I want to emphasize once again, there is no question in my mind or in the question of anyone in my organization or in the FAA that we work for the public. What we do is on behalf of the public. What we do is assure the safest possible system. And the safety data that we have today shows that we are living in unprecedented times. We are at the safest period ever with respect to both commercial aviation and general aviation.

Mr. COSTELLO. We are indeed, and that is where we want to remain. That is one of the reasons why we take our oversight responsibilities very seriously with this Subcommittee.

You said there are things that we have learned here, meaning that the FAA has learned in the process, is that correct?

Mr. SABATINI. Yes, sir.

Mr. COSTELLO. What are some of the things that you have learned and that you would do differently in the future?

Mr. SABATINI. Well, as the Inspector General mentioned, while FAR Part 23 is the appropriate regulation to apply to airplanes of this nature, given the advancing technology, we recognize that we want to improve that regulation to put specific requirements in there for airplanes like the VLJ.

I would also add that in the circumstances we have today, where the regulation has not yet been promulgated, there are tools that we can use and have used which are called special conditions. They call for special requirements that particular product, that particular technology must meet before we allow it to be certified.

Again, we are looking at the structure of the Aircraft Certification Organization, determining whether or not that structure is proper for today's environment and making certain that we provide the appropriate resources when faced with new technology such as the Eclipse.

Mr. COSTELLO. As you heard the testimony and you are very much aware that the production certification was approved with 13 outstanding deficiencies as was identified by the Inspector General, and it took a better part of the year after the approval was given to get these corrected. In retrospect, in the future, would you do that differently?

Would you issue the production certification with these outstanding issues to be addressed with an IOU to say we are giving you a production certification and we will let you go forward and, at a later date, correct these or address these issues?

Mr. SABATINI. Well, certainly we always learn from past experiences, for one.

Mr. COSTELLO. Have we learned from this experience?

Mr. SABATINI. We certainly have, sir. The production certificate regulation is very broad in nature, and what was done was within the confines of what the particular rules allow.

I would like to ask Mr. Ron Wojnar to further elaborate on those 13 issues because it is—I wouldn't say misrepresented—but there needs to be better understanding of what is being said here about 13 outstanding. Those issues were already identified and were in various stages of revision, which is not uncommon.

So I would like to ask Mr. Wojnar, with your permission, to continue and expand on that.

Mr. COSTELLO. Let me ask Mr. Wojnar the question then before he explains.

Knowing what you know now, would you go forward with the production certification with those 13 outstanding deficiencies pending, knowing that it took up to a year and in some cases over a year to address those deficiencies?

Mr. WOJNAR. Mr. Chairman, I think we have learned from the increased scrutiny that we need to reconsider how we do that.

Mr. COSTELLO. Is that a yes, that you have learned from that and that you would not allow certification with these 13 deficiencies in the future?

Mr. WOJNAR. Well, it depends. We don't really look at them as deficiencies. The basic regulations were met. The production certification Board determined that the basic requirements were met.

Mr. COSTELLO. So same case scenario happens a month from now or six months from now, the same 13 items are identified that need to be addressed, you would still go forward with the production certification?

Mr. WOJNAR. I think we would improve our internal communications and decision-making.

Mr. COSTELLO. Is it a yes or a no?

Mr. WOJNAR. Yes.

Mr. COSTELLO. I mean we can dance around all day, but there are answers that we need to have.

Mr. WOJNAR. Yes.

Mr. COSTELLO. Either it is a yes or a no.

Mr. WOJNAR. Mr. Chairman, it is yes.

Mr. COSTELLO. So you would give the production certificate in the future with these types of deficiencies.

Let me ask another question. There were 11 of these planes that Eclipse was permitted to go forward and deliver to their customers with deficiencies and IOUs outstanding.

Mr. WOJNAR. No, sir.

Mr. COSTELLO. There were not, okay.

The IG in his testimony indicates that 11 planes were delivered to their customers, and we have letters in exchange between the FAA and Eclipse on this issue, and you are saying that that is not true?

Mr. WOJNAR. The 11 aircraft that were delivered prior to production certification conformed to all the FAA-approved data. The FAA inspectors ensured that they did. While I believe there maybe were some software revisions that were incorporated after the airworthiness certification, at the time of the airworthiness certification of all of those 11 airplanes, they definitely conformed to all the FAA-approved design data.

Mr. COSTELLO. Well, I would just refer you to the IG's testimony.

Mr. Sabatini, you have a comment?

Mr. SABATINI. Yes, sir, Mr. Chairman. What we know to be factual is that the office manager of the Fort Worth office that issued the type certificate issued it on the basis that that aircraft met the applicable regulations at that point in time.

We also know that the special certification review team reviewed the data, competent in their own right to do that, well qualified to do that, and made the same determination.

This IOU that exists is not cogent to the issue. It has no bearing on having issued the TC. That is an important distinction. It was an agreement that had no bearing on the issuance of the type certificate that was validated by the special certification review team.

Mr. COSTELLO. And the issue of the avionics not being certified at that time on the 11 aircraft, address that if you will.

Mr. SABATINI. Well, those 11 aircraft were evaluated against the type certificate that was issued. That is the position of the office manager as well as the special certification review team. The aircraft met the requirements and the applicable regulations.

And, sir, there is an area of confusion that I would like to address if I may. The regulation that addresses the certification of an aircraft is FAR Part 21.305, and it provides options for certification, not alternate means or equivalent levels of safety.

It provides options of how you may proceed with the certification of that product, one of which is type certification, which is very widely used and very common. Another alternative is a TSO. Another is under a parts manufacturing approval basis or any other means approved by the Administrator.

The certification process began for the avionics under a TSO. It is perfectly fine and within the regulations to finalize certification using the type certificate option. It is already in the law and should not to be construed as an alternate means. It is a means that a manufacturer can choose to opt for.

Mr. COSTELLO. You heard the Inspector General's testimony, and again there are several other questions we are going to get to, about the IOUs. You are saying that is common practice, and it is really no big deal.

Mr. SABATINI. Well, let me say that for this particular project, the agreement that was made had no bearing on whether or not the type certificate was ready to be issued. The team that reviewed what we did determined that the aircraft was ready for type certification, that agreement notwithstanding.

The office manager who signed that agreement will also tell you, which interestingly enough she has not been called to testify, will tell you that she made her decision on type certificate issuance on the basis of having met all applicable regulations.

Mr. COSTELLO. You heard the previous testimony by the prior panel, and I just wonder what your comments are concerning Ms. Broyles where she says, Mr. Wojnar, that you told a team of people that were called into a meeting that, in other words, we only need to go an inch deep when evaluating the quality system. Is that a true statement by Ms. Broyles?

Mr. WOJNAR. I don't believe it is a true statement, Mr. Chairman. I don't believe I have ever said that. I don't. I know it doesn't match FAA policy. It doesn't match my own philosophy.

I even checked in with some of the other people who were present in the room that day, and they assured me that I never said that.

Mr. COSTELLO. So where do you think she got this impression that she said you should only look an inch deep and later that her Eclipse escort said "you are looking more than an inch deep?"

Mr. WOJNAR. That is a mystery to me, Mr. Chairman.

I do remember talking about the context of the production certification Board audit. I am sure I did mention that we had to make a decision. The company had been audited numerous times, and this was an audit to make a decision and to draw a conclusion. I said that we were going to do a comprehensive audit and spot check to make decisions that week.

So there may have been some misunderstanding.

Mr. COSTELLO. It is a major misunderstanding, I would say, if she had the impression that you told her to only look an inch deep, and then an employee of Eclipse who escorted her said "you are looking more than an inch deep."

That is your testimony for the record, is that right?

Mr. WOJNAR. That is correct, Mr. Chairman, and that makes me think maybe that came from somewhere else other than me because Eclipse was not with us at that meeting.

Mr. COSTELLO. Well, she didn't testify that they were with you at the meeting. That was a mystery to her. That was her testimony.

She said that at the meeting you made the statement, you should only look an inch deep. Later, the Eclipse escort told her that she was looking ″more than inch deep.″

But that is your testimony for the record?

Mr. WOJNAR. Yes, sir.

Mr. COSTELLO. I have other questions, but at this time the Chair will recognize the Ranking Member, Mr. Petri.

Mr. PETRI. Thank you very much, Mr. Chairman.

I feel a small obligation to ask Mr. Hickey. Your name has been mentioned a number of times, and you clearly have a lot of responsibility and are key player in this whole process. If you could just give us your view of the Eclipse certification, the kind of pressures or deadlines or how you managed this process from your point of view.

Mr. HICKEY. I would be happy to do that, Mr. Petri.

The Eclipse program was one of very high visibility. It , but not unlike what we see in other areas outside of Fort Worth. Boeing programs are always highly visible. Engine programs like the Genex that serve on Boeing airplanes are also high visibility.

What was unique about this was that it was a highly visible program for an office that was unaccustomed to high visibility programs.

The program had worked its way through the process. It was certainly a long program. As we said earlier, it lasted five years, two years longer than a normal program of that size.

At the tail end of the program, when the process that had previously been set where the avionics company was seeking one approval, its TSO approval for its avionics software, it was learned by the company, the airplane company, Eclipse, that the avionics would not get a TSO approval in time. Eclipse made a decision to invoke a regulatory provision in Part 21 to approve the software in a different way.

It is incorrect to make statements that FAA suddenly allowed the approval of the software that was different from the industry standard. That is an incorrect statement.

The industry standard, D0-178B, is not required to be met in its entirety if the product is certified and approved under the type certificate.

In mid-September, Eclipse offered a proposal of how to approve the software to the FAA team. The FAA team disagreed with that approach and, because the deadline or the milestones set for certification were September 30th, I was asked to get involved.

At this point, I think it is very important to stress that the date of September 30th was not a date set by the FAA. The date of September 30th was a date set by the company.

In almost every program I have ever been involved in, all dates are set by the company, not by the FAA. They propose the dates.

The FAA reviews the schedules and the things that lead up to that date and make determinations about whether or not they can meet the dates. In many, many cases, the date is never met.

In fact, a previous goal was, in fact, September 22nd. The goal of September 22nd was not met.

When I went down to Albuquerque, I brought with me the division manager with responsibility for the national policy for the applicable requirements for avionics software. During the meeting that we attended, it was decided that D0-178B was not required for certification.

A different set of requirements was set. It was agreed to by the team, including one of the members of the previous panel. The company proceeded to go ahead and show compliance to those requirements.

On the date of September 30th, the FAA team made two determinations. They determined the Eclipse 500 had complied with all the appropriate regulations and that it was in a condition for safe operation. In accordance with Part 21, when those two provisions are shown, the applicant is entitled to a type certificate.

As a consequence, the manager of the office signed the TC and issued it to the company.

Mr. PETRI. My time is expired, but I just have one follow-up after you have gone through this. There was an independent Special Certificate Review Team appointed. Was that because questions were raised about this internally and externally or why was it?

You don't have a review of every certification. So could you explain why you did that and what the conclusions, who was on that and what their conclusions were after reviewing? I assume they were professional, qualified people who had the vision of hindsight and of the criticism and reviewed what you did.

Could you discuss the briefly?

Mr. HICKEY. Yes, Mr. Petri.

First of all, we do have a provision in the certification processes that do allow for what we call a Special Certification Review. We invoke it from time to time. If I were to guess, I would say we use an SCR maybe every five years. We do it when the compliance of a certain aspect of the airplane comes into question.

Most recently, I think an SLR looked at the MU-2. We did a Special Certification Review of that.

We did several Special Certification Reviews of the 737 airplane back in the nineties when we were experiencing rudder issues associated with 2 accidents.

So it is clearly a provision I have at my disposal, and I can invoke it when necessary.

As a result of the allegations associated with the Eclipse, we decided it was best to call together a Special Certification Review to evaluate the specific areas being alleged by the witnesses that were alleged to be non-compliant at the time of the type certificate.

Because of my involvement as director, I stepped out of that process. Mr. Sabatini, Associate Administrator, took responsibility for setting up the team. They created a team of some of the best and brightest specialists in my service. I can't emphasize enough that these people are the best. They also share that they had nothing to do with the original Eclipse type certification.

They decided to head the team by someone outside the FAA, and they tapped a person named Jerry Mack who was a well-respected safety expert. He has been in the business for many, many years, and worked at Boeing. So, he came in with the team and conducted a 30-day review in the areas of the allegations.

That team made two findings, that the airplane in the areas of the allegation were, in fact, compliant at the time of the issuance of the type certificate, and that the airplane is currently safe.

Mr. COSTELLO. Let me clarify a couple of points here. Your testimony is that the manufacturer set the date of September, 2006, is that correct?

Mr. HICKEY. That is correct.

Mr. COSTELLO. The date was not a date that was established by the FAA, that is correct?

Mr. HICKEY. That is correct.

Mr. COSTELLO. Your Annual Performance Plan shows the date of September, 2006 in the FAA's Annual Performance Plan, is that correct?

Mr. HICKEY. That is correct.

Mr. COSTELLO. This is customary practice, the manufacturer tells the FAA, this is when we are going to have you certify either the design or the production, and you put in your plan to work off of what the manufacturer desires?

Mr. HICKEY. Well, to be honest with you, Mr. Chairman, the fact that my performance plan called for September 30th was irrelevant to the fact that Eclipse had ultimately set September 30th, and I will explain why.

When we set our business goals for, in this case, fiscal year 2006, they are set very early, well before fiscal year 2006. We knew we had three programs that were in the running for certification as a VLJ. In my business plan, I was going to select one VLJ and use that as my goal and my objective to satisfy my boss. That that was what I was going to accomplish that year.

I typically set the end of the fiscal year to give me enough flexibility because I don't control the certification of these programs.

Mr. COSTELLO. I understand the point.

Let me ask you then, so it is your testimony and Mr. Sabatini's testimony and Mr. Wojnar's testimony that the calendar did not drive this project at all.

Mr. HICKEY. No, I don't think I am saying that.

The calendar was set by the company. The FAA agreed to that date. That is a normal process.

Mr. COSTELLO. You heard the testimony of some of the current FAA employees who worked on the project, and their testimony is that corners were cut and things were overlooked in order to meet the deadline of certification of September, 2006. You heard that testimony.

Mr. HICKEY. I did, sir, and I think I understand how you can draw that conclusion. But I think if you also looked at a previous deadline of September 22nd, corners were not cut to meet September 22nd.

Mr. COSTELLO. How many times has the FAA issued a certification on a Saturday afternoon?

Mr. HICKEY. I don't have that figure, but I will tell you it has happened before.

Mr. COSTELLO. It has happened before?

Mr. HICKEY. Yes, it has.

Mr. COSTELLO. I would like to have that information given to the Subcommittee.

Mr. HICKEY. I will provide that for the record.

Mr. COSTELLO. Mr. Hickey, since we are on a line of questioning here, let me ask you, you have heard from two different witnesses who sat at the same table, who testified under oath that you convened a meeting a few weeks before the TC was approved and that you made the statement: we are here to save a company.

Is that an accurate statement? Did you make that statement in the meeting with these employees that they attended?

Mr. HICKEY. No, Mr. Chairman, I did not make that statement.

Mr. COSTELLO. You didn't. So they just pulled this out of the thin air?

Mr. HICKEY. I can't tell you where they got that, sir.

Mr. COSTELLO. Okay. You also heard testimony from employees of the FAA under oath who said that they were reassigned. I would like you to address that, why you took the management team out, put a new team in and a new manager in.

Mr. HICKEY. Yes, sir. First of all, I only removed one person in the whole process. I removed no one during the type certification process.

It was during the production certification process when I became aware of behavior, procedures and practices that some of my inspectors were following that felt very strongly were inappropriate for the conduct of FAA people that individuals were removed.

As a result of that and as a result of the previous issues I had with the directorate manager during the type certification process, I concluded to myself that I had lost confidence in the senior executive management of that office. And when I lost confidence, I couldn't accept the continuation of that program in that office until I had some level of confidence in the executive leadership.

Mr. COSTELLO. Explain what led you to lose confidence in the executive leadership.

Mr. HICKEY. During the type certification process, sir, I saw a number of cases, including the software case in mid-September, where I found the directorate manager insufficiently engaged in the program, so that when issues would arise like the software issue, I found that person very much in tune with his own office's position. He but had virtually no contact with the applicant's position to understand and evaluate what was the right resolution on an issue.

I am a firm believer that when we engage in certification, it is very important to understand both sides of a technical issue. I didn't find him adequately involved in doing that.

Mr. COSTELLO. Let me ask, this is the Inspector General's testimony. He says: "FAA Headquarters officials also removed the Directorate Manager in charge of both the manufacturing inspection and design certification offices from the Eclipse project."

That was a decision that you made?

Mr. HICKEY. Can I ask you to repeat that, sir?

Mr. COSTELLO. It says: "FAA Headquarters officials also removed the Directorate Manager in charge of both the manufacturing inspection and design certification offices from the Eclipse project."

Mr. HICKEY. That is not totally correct.

Mr. COSTELLO. It is not?

Mr. HICKEY. It is not.

Mr. COSTELLO. It goes on to say: "In a six-page letter of reprimand, FAA officials stated that the Directorate Manager failed to meet expectations associated with meeting its 'customer service initiatives.'"

Specifically, the letter stated that he needed to "build relationships with our customers to achieve operational results."

The letter further stated, "Your personal relationship with the Eclipse executives is deficient. As Eclipse is one of your major customers, we expect you to work to improve the relationship."

You are not aware of the reprimand or any reference to telling the manager to develop this relationship with management at Eclipse?

Mr. HICKEY. I am well aware of the six-page document.

Mr. COSTELLO. You did say that, "meet expectations associated with meeting its customer service initiatives," and you also said that "your personal relationship with the Eclipse executives is deficient?"

Mr. HICKEY. The nature of the six-page performance conversation, sir, is tied and correlates with the six qualities and skills that we have as an executive manager in the FAA. They are items like business acumen, and unfortunately today I guess customer is a bad name, but it was a terminology that we used at the time.

If I might add, as an executive, it is important for an executive to understand technical issues which happen a lot in certification. There are disagreements. It is very important for an executive manager to understand the issues that the office has as well as the issues that are raised by the applicant.

Mr. COSTELLO. I have further questions, but I have taken more time than I should.

The Chair will now recognize the gentleman from North Carolina, Mr. Hayes.

Mr. HAYES. [Remarks off microphone.]

Mr. COSTELLO. Very good. The Chair would recognize the distinguished Chairman of the Full Committee, Chairman Oberstar.

Mr. OBERSTAR. I have been following your line of questioning while I was on Corps of Engineers business for the Committee in another room, meeting on other matters, and I think you have been pursuing a very appropriate and important line of inquiry.

I want to come back to a few things and thank the witnesses for being here.

The Inspector General testified—and you responded to this, but I want to hear it a little further—that the production certification was approved with 13 outstanding items identified as deficient. It took almost a year to get those corrected, and all that time the aircraft was being built and put into service. How can that be?

Mr. Sabatini, how can that be?

Mr. SABATINI. Well, as we said earlier, Chairman Oberstar, those deficiencies were identified early on.

A type certificate is issued once there is a demonstration of meeting the regulations. This is unlike a production certificate, which, when issued, goes into what we call continuous oversight or certificate management. Our inspectors were engaged on an ongoing basis with assuring that progress was being made against those 13 identified deficiencies. There were continuous checks on revisions that had to be made and other such things.

So our folks, our inspectors, dedicated safety professionals were fully engaged with that manufacturer.

Mr. OBERSTAR. Before the aircraft was put into service, were they cleaned up? Our information says that aircraft were put into services with those deficiencies in place.

Mr. SABATINI. So the production certificate, the quality control system, the infrastructure, the people, the 13 issues that had been identified are against that particular issue as opposed to the airframe itself.

Those airplanes were being delivered in full compliance with the TC, and that was reaffirmed by the Special Review Team who concluded that the airplane met all applicable regulations and it was in condition for safe operation, sir.

Mr. OBERSTAR. You maintain then that those 13 items identified as deficient were not safety of flight issues?

Mr. SABATINI. Well, those were production certificate.

Mr. OBERSTAR. The production certificate, not safety of flight issues.

Mr. SABATINI. Right, and they didn't relate specifically and directly to the airplane.

Mr. OBERSTAR. So in the production process, you are saying that the manufacturer was adjusting, was complying with those, correcting those deficiencies?

Mr. SABATINI. It is my understanding that they were, and I would like to ask Mr. Ron Wojnar, who is an expert in that area, as to the progress that was being made on those 13.

Mr. OBERSTAR. Yes, go ahead.

Mr. WOJNAR. If I may, Mr. Chairman, thank you.

The production certification Board that convened to examine the company for its production certificate found that it met the two basic requirements in the rules: first of all, that Eclipse had established a quality system and, second, that it could maintain that quality control system.

The 13 items, as Mr. Sabatini said, were identified in the course of final audit and earlier as items that we wanted to focus on. I would like to clarify that some of those 13 action items were not for the company or the company's quality system.

A couple were for FAA follow-up. For example, we would expect the company to schedule for FAA to review its procedures in certain areas, or check on revisions of existing procedures to improve them based on what FAA had seen in our previous evaluation. There would be an FAA follow up.

The very last one of the thirteen items, was for the FAA to schedule a complete evaluation, periodic evaluation of the Eclipse quality system. That happens every 18 months or so.

So those weren't really all quality control system deficiencies. They were action items that we wanted to preserve and manage as

we moved from the certificate issuance into the certificate management phase. Some were long-term, acceptable long-term actions.

Mr. OBERSTAR. Well, the production certification is related to the ability to replicate the production of the article itself, the aircraft itself, and to assure that it can be replicated as they go through the production process.

You are saying that you had no problems with their ability to replicate the production process, that these 13 items were not essential to that process.

Mr. WOJNAR. That is correct. They were items we wanted to manage with the company, but we were assured that the airplanes that were being produced conformed to the approved design and were safe, and that is a separate process.

The 13 actions were for the overall quality system and the FAA follow-up.

Mr. OBERSTAR. How do you rate that system today?

Mr. WOJNAR. Sir, I don't have that information. I haven't been involved with Eclipse since April 26 of 2007. So I have not been involved in the ongoing oversight.

Mr. OBERSTAR. Mr. Sabatini, how do you rate the system today, the production?

Mr. SABATINI. I would have to get back to you on that, Mr. Chairman, since I don't have that information readily at hand. We have the local office that is responsible for that certificate.

I am certain, given the attention that has been given to Eclipse, had there been issues, if Eclipse is not making progress, I certainly would like to have been informed. So, at this point in time, I will say I would like to get back to you.

Mr. OBERSTAR. Well, we would like to have that information.

Now, in April at our earlier hearing, we recommended that you amend the so-called Customer Service Initiative to avoid the appearance of a conflict of interest with your safety mandate, and it is apparent that the FAA has not been making adjustments to the Customer Service Initiative.

Mr. SABATINI. Well, Mr. Chairman, I will tell you that I have personally visited every region and directorate and had audiences of hundreds of people, and I made it very clear that we work for the public, that what we do with the aviation community is on behalf of the public and that our first and most important mandate is safety.

I have also put out highlights that go to every one of our employees and restated once again that our customer is the public.

Mr. OBERSTAR. Have you changed your fundamental document, the Customer Service Initiative, the written document itself? Have you changed that?

Mr. SABATINI. That has not yet changed, sir.

Mr. OBERSTAR. That is what I am referring to.

Mr. SABATINI. That has not yet changed, sir, and we are taking steps to address that.

Mr. OBERSTAR. You are going to do that?

Mr. SABATINI. We are taking steps to address that, sir.

Mr. OBERSTAR. Okay. In light of what we have been discussing, I won't ask you for a deadline, but when do you expect to publish a new document?

Mr. SABATINI. Can I get back to you on that, sir?

Mr. OBERSTAR. Of course.

Mr. SABATINI. Thank you.

Mr. OBERSTAR. With great interest.

Now we have come back to this issue of a deadline, a date set, a date specific. Why was a date specific set and why didn't the FAA in this case adhere to its longstanding principle that the aircraft is safe when you say it is safe, not when a date is met?

Mr. SABATINI. Is that directed to me, sir?

Mr. OBERSTAR. Of course.

Mr. SABATINI. Okay. Several things, sir. There are many lessons learned here. For one, I would like to restate that date did not mean that, come hell or high water, we would just issue a type certificate. We simply will not do that.

The time line from the first three-year window that we had with Eclipse slipped to the right an additional two years.

So let me say that we are going to review this process completely, and we are going to change the way we do business to make it clear so that there isn't even the appearance that an agreed-to time line on how one can expect to have a product certified is not misunderstood to mean that we will issue a certificate by that date.

I can assure you, sir, that we will take every step necessary to adjust that so that we never have that appearance happen again.

Mr. OBERSTAR. I am delighted to hear you say that. That is establishing a spirit of compliance, oversight and of safety responsibility that I expect from the FAA and I expect from you.

Mr. SABATINI. Yes, sir, and you have it.

Mr. OBERSTAR. But how did that date come to be? Where did it come from?

Mr. SABATINI. May I just provide a context and perspective, sir? It may take just a little bit of time.

One of our goals is increased safety in our FAA Flight Plan. We know that over the many, many years that FAA has been in business, we have continuously improved the safety record. One of the goals is not only to improve on the commercial fatal accident rate but also in the general aviation accident rate.

In that context, we recognize that industry is capable of producing new technology such as aircraft like a VLJ, which technically has no official standing or meaning. It is a term of art.

We know that the introduction of turbine engines to a small aircraft like that will significantly improve safety because it has tremendous power, great climb performance, is able to fly higher than the weather, is the introduction of advanced integrated avionics, provides terrain avoidance capability, weather radar, and situational awareness, all at the fingertips of a pilot who is well trained.

Mr. OBERSTAR. That is great context. You are leading to your point to answer my question.

Mr. SABATINI. Yes. The point is that we have a responsibility to allow new technology to come into the system so that we can continue to improve on the general aviation safety record.

If you go back in time, during that period when we were developing our Flight Plan which is agency-wide with the very broad goals, there were 24 such airplanes in various stages of application

or ideas that were brought to our attention. The one that was most prominent at that time was the Eclipse because they seemed to be ahead of most other manufacturers.

In the Flight Plan, what we said is that we would type certificate a Very Light Jet. We didn't name it at the high level nor at the AVS business level.

John chose to, being a good manager, say, well we are making great progress with this VLJ. It seems like a likely candidate. And, for that reason, he specifically identified it.

But it was in the context of being a federal agency acting on behalf of the public, and assuring them that we could safely bring into being and into operation the best technology that we could provide to the industry.

Mr. OBERSTAR. So, in that context, you decided that a deadline had to be set by which time you would complete that certification?

Mr. SABATINI. Well, if the manufacturer could complete the certificate.

Mr. OBERSTAR. So you are saying that date really came, sui generis, from within the organization.

Mr. SABATINI. Well, it came from the manufacturer who proposed that they could meet that date.

Mr. OBERSTAR. The manufacturer proposed the date, not you.

Mr. SABATINI. Yes, the manufacturer proposed it.

Mr. OBERSTAR. And then you embraced that date and said, okay, that is the date by which we will complete our work.

Mr. SABATINI. Yes, and it is dependent on us having the resources to do it. There is much that goes into agreeing to a time line.

Mr. HICKEY. Mr. Chairman, if I can add a couple items in terms of setting dates, all certification programs, almost without exception, are set by the applicants' dates. History is littered with cases where they are never met. The dates are not met because they fail to provide the necessary information for the agency.

Mr. OBERSTAR. In this case, you issued a provisional type certification by that date.

Mr. HICKEY. This was back in July that they were shooting for a full type certificate. They failed to provide the information necessary to get a full type certificate, so we issued a provisional type certificate.

Mr. OBERSTAR. It seems to me that you shouldn't have issued a provisional. If the FAA stamp of approval means something, then it means you meet our standard. We are not giving you an IOU.

Mr. HICKEY. No. I am sorry, sir. A provisional is a very clearly delineated certificate in Part 21. It is not a secondary type certificate. It is a certificate in its own right. It, historically, is often used for an applicant to achieve that and then enable them to go out and market the airplane, et cetera.

They elected to go for a provisional when they determined they could not get a full type certificate, and we issued the provisional when they met those standards. But with every provisional, it is loaded.

Mr. OBERSTAR. What did that mean operationally for the company? Let me stop at that. What did it mean for Eclipse?

Mr. HICKEY. It was an airplane that was virtually unflyable. It had so many limitations, it was essentially worthless. It had more value from a marketing standpoint than it had from an operational standpoint.

Mr. OBERSTAR. In 2007, we had 491 general aviation aircraft fatalities. FAA's work has brought that number down and so has AOPA's education program for pilots, and a great deal of work has been done to bring it from 684 fatalities on average a year down to 491.

But with that in mind, you have to maintain your continued vigilance especially at the start of a process, in the certification, the type certification process. That is what we are looking for.

Mr. HICKEY. Sir, I couldn't agree with you more. I think as we demonstrated by issuing the certificate at that time and as the SCR validated, that airplane was type certificated properly and was in a condition for safe operation.

I must add to what you said. You have said an absolutely correct statement.

For every one of these airplanes, like an Eclipse or a new Cessna or any one of these new airplanes with the fancy avionics, for every one of those airplanes that enters the airspace system, an older, more antique airplane leaves the system. That has an incremental improvement in safety. We are very, very mindful of that when we do these certification programs.

Mr. OBERSTAR. But here, we have the situation where the software problems led to engine freezing at full power and just narrowly avoiding an accident by very skilled pilots.

Mr. HICKEY. May I comment on that, sir?

Mr. OBERSTAR. Yes, go ahead.

Mr. HICKEY. That was not a software failure in that particular case. That was the design, it turns out.

Mr. OBERSTAR. Design of what?

Mr. HICKEY. That was an intended design that when one engine had some form of an anomaly, that the other engine would go to full thrust. That is my understanding of the Eclipse design. I believe the following panel can elaborate on it.

What they didn't realize, what they didn't envision at the time was that the scenario that actually occurred created more of a problem than it solved.

But I don't believe that this was a software failure that we should have uncovered during certification.

Mr. OBERSTAR. But it was a design.

Mr. HICKEY. It was a design intended to solve one problem.

Mr. OBERSTAR. And that it was faulty is not a problem? That is what you are saying.

Mr. HICKEY. It was faulty in another scenario, that is correct, sir.

Mr. OBERSTAR. Yes, that is what we are getting at.

Mr. HICKEY. Okay.

Mr. OBERSTAR. Now Mr. Hayes earlier described that the pilot pushed the throttle forward, and there was metal that jammed, and that caused the problem. What we understand is that the software itself was faulty in its design.

Mr. HICKEY. Yes, sir.

Mr. OBERSTAR. And someone is supposed to pick that up ahead of time.

Mr. HICKEY. We didn't know what we didn't know. You are right, sir.

Mr. OBERSTAR. Okay. Mr. Haueter, have you and NTSB reviewed this issue?

Mr. HAUETER. Yes, we have. We looked at the investigation.

The throttle levers did not jam full forward. By going full forward, they exceeded the software's logic. They went past, say, the 100 percent point. The software was designed that if you go outside a range, use the last valid piece of information which was full throttle.

Mr. OBERSTAR. Has that situation occurred in any other flight of this aircraft?

Mr. HAUETER. Not that I am aware of.

Mr. OBERSTAR. That it did occur was a signal that there was a big problem or was that software taken out of the aircraft and corrected in all other aircraft of that type?

Mr. HAUETER. Eclipse has since gone back and changed the software logic, yes, sir.

Mr. OBERSTAR. Did they ground the aircraft until it was done?

Mr. HAUETER. No, they didn't ground the airplanes.

They inspected the throttle quadrant assemblies. FAA came out with several ADs, and then there was a change to the software logic.

Mr. OBERSTAR. There were some 200 aircraft produced at that point.

Mr. HAUETER. Yes, a little over 200. Yes.

Mr. OBERSTAR. A little over 200, is that correct, Mr. Hickey?

Mr. HICKEY. Yes, roughly around 200, sir. Yes, sir.

Mr. OBERSTAR. Did FAA intercede at that point and say, "you have a problem here, you have to go back and fix it" and tell the owners of the aircraft "don't fly until you get your software replaced?"

Mr. HICKEY. Well, what we did is, I believe, issue the airworthiness directive on the day the NTSB issued the recommendation. It called for the pilots to do a check on the throttle quadrant to make sure that it didn't exceed and engage that inadvertent software function.

All the while, we are in the process, or Eclipse is in the process, of designing a fix for the software because, sir, the software itself did what it was intended to.

But as we often see in certification, some designs are intended to do one thing, but they inadvertently cause problems in another thing, and that is what was the case here.

Mr. OBERSTAR. Thank you, Mr. Chairman.

Mr. COSTELLO. Thank you, Chairman Oberstar.

Let me clarify a point before I recognize my friend from North Carolina.

Mr. Sabatini and Mr. Hickey both, you have referred and we heard from the Inspector General about the Special Certification Review Team, and you have indicated that immediately when these issues came to light the Acting Administrator put this review team together.

It is my understanding from talking to the Inspector General and the Acting Administrator that assembling the review team was actually a recommendation of the Inspector General, that he recommended that to the Acting Administrator. So I wanted to make that point.

Secondly, I think at some point the IG may have suggested that, Mr. Wojnar, you were on the review team. Is that correct?

Mr. WOJNAR. That is correct, Mr. Chairman.

Mr. COSTELLO. He questioned that maybe that could have been a conflict of interest with you reviewing the certification that you had basically been in charge of. But those are just items for the record that I think we should clarify.

And, I think a very important point to make about the review team, and you correct me if I am wrong, but I am told that the review team did not look at any of the issues related to the approval of the production certificate. Is that correct?

Mr. SABATINI. That is correct, sir.

Mr. COSTELLO. In much of the IG's testimony today and his written testimony, he testifies about manufacturing problems that continue today. So my question is have you gone back, the review team, and conducted a review of the production process of the EA-500?

Mr. SABATINI. Well, let me begin by saying, Mr. Chairman, that we cooperated fully with the Inspector General, and until the 11th hour there wasn't a single word mentioned about issues around production certificates. So we focused on the issuance of the type certificate.

But rest assured, Mr. Chairman, we are not narrowly focused. We are going to review this entire process.

We are going to apply pretty much the same standard of oversight that we do with the issuance of an Air Carrier Certificate: Unless you satisfy a particular phase, the first phase, you are not going to go beyond that first phase until you satisfy everything that needs to be done.

That is under review, and I can assure you that it is going to be completed in a timely fashion. So the approach that we are going to take with type certification is going to mirror a great deal of what we do with the air carrier world.

Mr. COSTELLO. After the production certification went forward and was approved by the FAA, your own auditors, FAA auditors according to the Inspector General, of this aircraft, the suppliers of Eclipse found significant deficiencies occurring that should have been corrected.

I mean your own people. After the production certificate was issued, your own inspectors found that there were deficiencies, things that should be, in fact, addressed. That took place. They were found between February and August of 2008.

So I could go into a long list of them. You know what they are: Receiving or accepting nonconforming parts or tools, parts not properly stored or marked, failure to follow manual procedures, uncalibrated tools, revision to tooling and so on. I could go on and on.

The largest user of the EA-500, FAA inspectors found problems with Eclipse supplier-manufactured parts on 26 of the 28 aircraft operated by that company, the largest user.

So my question is what have you done? What has the FAA done with the findings of those inspectors concerning the manufactured parts on 26 of those 28 planes?

Mr. SABATINI. May I defer that question to Mr. Wojnar, please?

Mr. COSTELLO. Sure.

Mr. WOJNAR. Mr. Chairman, I think that shows that the certificate management is working as it should in the FAA in the oversight of Eclipse. I, personally, don't have the information on those details. As I said, I have not been involved in the oversight of Eclipse since production certification.

But it is a normal thing. We do not issue a production certificate and walk away. Our oversight continues indefinitely. So, while we will have to provide the details, I think it illustrates that our system is working.

Mr. COSTELLO. Well, if it is a normal thing when 26 of the 28 aircraft with the largest user, that your own people have identified problems with the manufactured parts, please tell me that you are doing something about this as we speak.

Mr. SABATINI. Mr. Chairman, I don't have that information at my fingertips. We are addressing that, but I don't have the specifics, and I would like to get back to you on that, sir.

Mr. COSTELLO. I would say that if I were in your position, that would be a high priority for me to address those issues without delay.

Mr. SABATINI. It is, sir.

Mr. COSTELLO. The Chair now recognizes Mr. Hayes from North Carolina.

Mr. HAYES. Thank you, Mr. Chairman.

Mr. Wojnar, I missed something here. Just comment, if you will, on the review panel. You were on there. Was there anything inappropriate about that?

Mr. WOJNAR. Thank you for the opportunity, sir, to make the clarification.

I was not involved in any way with the Eclipse type certification. I was formerly an executive in Aircraft Certification, but by the time of the type certification, I had left Aircraft Certification to join the Flight Standards Organization in the FAA, and I had been gone approximately a year from Aircraft Certification.

So there, in fact, really was no conflict for me.

Mr. COSTELLO. If the gentleman would yield, just so I have a clear understanding here because maybe I am confused. Were you involved in the production certification?

Mr. WOJNAR. Yes, sir.

Mr. COSTELLO. For the Eclipse EA-500?

Mr. WOJNAR. Yes, I was involved in the production certification which is a totally separate FAA decision.

Mr. HAYES. You didn't give me a chance to say, of course, I will yield.

If there were a time line or if there were no time line, the moment of certification comes, is the FAA going to certify a plane that is unsafe?

Mr. SABATINI. Absolutely not.

Mr. HAYES. Anybody else have a different answer to that?

So I don't think the issue here is the time line.

Next question, if you look at the process now, being where we are today, what are the major issues that you think this panel should deal with going forward?

What are the major issues? Again, remember on the top of our letterhead here is safety.

Mr. Haueter, you are the Safety Board guy.

Mr. HAUETER. I think one of the issues we see is and our certification study found that some of the assumptions you have in certification do not pan out as time goes by.

Mr. HAYES. Explain which assumptions.

Mr. HAUETER. Well, I think one of the assumptions here was to the throttle lever, that it would not go out of 100 percent range. Obviously, we had a pair of pilots who found, with normal force, it would.

Mr. HAYES. So that means they pushed it right on into that panel, and it exceeded what the software said it would do.

Mr. HAUETER. That is correct.

Mr. HAYES. How do you plan for that?

Mr. HAUETER. Well, it is something you have to consider, I think, during certification. I am surprised that wasn't found during the certification process by the test pilots.

Mr. HAYES. Okay. Any others?

Again, we have an issue and, Mr. Oberstar, you and I have talked about that. That is something. How do we prepare for the unexpected beyond any normal parameters?

All right, Mr. Hickey?

Mr. HICKEY. Mr. Hayes, I would like to offer a couple things that I think this Committee is certainly looking for us to say. I have spent a lot of time since this has come up thinking about what would I do differently and what we should do differently because I completely agree with this Committee. These problems should never happen again, I do believe.

Mr. HAYES. Now this event should never happen again. What is the event that should never happen again? Let's make sure we are on the same page.

Mr. HICKEY. The event is an airplane was certificated, type certificated and production certificated, and there is a group of people who are very disappointed and disagree with those decisions.

I consider that to be a failure. I take full responsibility for that as Director of Aircraft Certification.

Mr. HAYES. Okay. I think that is important. I didn't understand that until you clarified.

I hope the gentleman and the lady who are here understand because that is part of our responsibility, whatever department we are in, to make sure. The relationship between management and the folks that are being managed is crucial.

All right, go ahead.

Mr. HICKEY. Right. So, clearly, as I have been thinking about it. The fact that we place very high focus and attention on completion of a type certification program, whether it is an Eclipse or a Boeing or any other program, that can lead to problems. Especially when

certification is in many ways out of the control of the FAA. I think that is a lesson we learned and we are no longer doing that.

When we build our Flight Plan and our AVS Performance Plan and my Aircraft Certification Plan, we create objectives that we clearly see are well within our control. So we don't place undue pressure on individuals to meet certain deadlines when it is really out of their control. I think that is a lesson learned that we have had since then.

Mr. HAYES. Well, I am a little confused by that. You can't set the timetable for the company, whoever it is, and they can't set the timetable for you. Your timetable is controlled in large measure by us, how many resources, how many people, but again there can only be so many people in one place at one time.

I am not sure how we refine that down to a take-away from this discussion.

Mr. HICKEY. Let me try this. The take-away I think we have is how we conclude agreements between the FAA and companies on certification programs. We develop these project plans where we are committing to each other to do certain things and meet certain deadlines. But those deadlines are only conditional upon the other group meeting their deadline.

So our performance is being measured on our ability to meet the deadlines we have committed to, and that deadline could very well be noncompliance. It doesn't necessarily mean we will find compliance or that the certificate will be issued. I think that is a very different thing from what occurred several years ago.

Mr. HAYES. Maybe somebody who is not building airplanes, and somebody who is not inspecting airplanes but who has audit experience sits down at the beginning of the process and says, folks, your time line is realistic or it is not realistic.

So, again, we have to be careful so that undue burden is not put on either one because those tensions do exist.

Mr. HICKEY. I agree with you, sir.

Mr. HAYES. The last thing, and I am trying to remember what it was. Again, looking forward to the ongoing discussion, I think this is the beginning, not the end of the process.

A single pilot, in certification, you can certify an airplane, daylight/night, VFR/IFR, known icing/no ice. So it needs to be clear to anybody that doesn't fully understand that a provisional certificate is not an anomaly. It is not escaping.

That is just like you can put an incapable pilot—and we had that example earlier—in a capable airplane, and those don't mix. The fact that there is a provisional certificate, assuming the provisions of the provisional are met, that is not a big deal.

As someone pointed out earlier, DayJet has decided for marketing reasons, they will furnish 2 pilots for their Part 135 operation. This is fine. But again, with complete review, this airplane can easily and safely be flown by one well-trained, one qualified, well-qualified and current pilot. So let's keep all that going.

Mr. Chairman, thank you.

Mr. Oberstar, I think, has a puzzled look.

Mr. SABATINI. Mr. Chairman, if I may correct a statement I made?

Mr. COSTELLO. I thank the gentleman.

Were you wanting him to yield?

Mr. OBERSTAR. Mr. Graves, has he been recognized?

Mr. COSTELLO. Mr. Graves is going to be recognized next.

Mr. Sabatini, you wanted to clarify a point.

Mr. SABATINI. Yes, thank you.

Early on in the conversations working with the Inspector General, in a Power Point presentation, I have learned that production certification issues were mentioned, but only recently did we have an opportunity begin to address those issues with them.

Mr. COSTELLO. The Chair now recognizes the gentleman from Missouri, Mr. Graves.

Mr. GRAVES. Thank you, Mr. Chairman.

Unfortunately, I have to go handle five bills on the floor here in a minute for the Committee, at least from our side. I haven't been up here for which I apologize, but if I could yield to Mr. Hayes I would love to continue to hear this and sit here and listen.

Mr. COSTELLO. Mr. Hayes.

Mr. HAYES. I think I pretty well completed unless there is an issue that any of you or all of you collectively would like to bring to our attention and make sure we are not missing an important take-away here.

Okay, the customer service thing, I think we never put the finishing touches on the relationship there. Would any of you like to again clarify for all of us exactly what the approach is?

I haven't really seen it as customer service since day one, but what do you think it is now going forward?

Mr. HICKEY. Mr. Hayes, I would like to address that from a type certification standpoint.

Long before the CSI was implemented, I believe in 2002 or 2003, the type certification process has had what we call an appeal process.

Engineering is very much not black and white but very gray. On dealing with compliance of any regulation, there are often very complicated and very technical debates over whether an airplane company is complying with a regulation.

For the most part, it works fabulously. We write issue papers. We document the position that the FAA feels is appropriate for compliance to this regulation. The applicant writes the position that they would propose to do.

For the most part, we come together. We have an agreement on how compliance can be shown.

On occasion, there are issues where there are differences of opinion. The company feels that they would like to show compliance in this way. The FAA has a different nuance. The parties are a little bit concerned about this or a little bit concerned about that, and so they stress that.

Keep in mind the regulation, quite frankly, is very performance-based. It gives flexibility to meet the requirement.

For many years, what we have is, when the debate has ended, we have a process that has been well documented and it is reflected in the agreements we make. Disagreements get elevated to the next level.

This is not a case of a customer getting some favorable treatment. This is a case of a different set of eyes, a more senior set

of eyes reviewing both sides, looking at the issue to see if we can come to resolution.

If that fails, the resolution goes to another higher level, and it goes to a senior level until we reach resolution. That is a very common thing, and it happens, and it should have happened in this process with respect to the software certification.

Unfortunately and regrettably, I must say it did not. There was not an issue paper written. I think there were decisions made without documentation, and it is not surprising that there are a number of the people who testified who felt that their position was inadequately conveyed and considered.

I seriously regret that, and I take full responsibility for that.

So one of the take-aways I have from this process is that I am going to strictly enforce this process of getting issue papers such that, again in the event of this type of issue, the people like Mr. Wallace, who had a very strong opinion, can have a vehicle for presenting that opinion where we have a very documented way of dispositioning it.

Mr. HAYES. If he loses, how are you going to deal with it? And if you lose, how are you going to deal with it?

Mr. HICKEY. Unfortunately, in our business, not everyone is in agreement with every issue.

Mr. HAYES. Mr. Graves, thank you. I yield back.

Mr. GRAVES. I don't know if it has already been asked, but how much time does it usually take to certify an aircraft? What is the average time?

It took five years for Eclipse. Isn't that a little long or is it not a little long? Am I mistaken there?

Mr. HICKEY. Yes, sir, Mr. Graves, it is a little long.

The regulations create a nominal period of time, and it is largely based on the need for setting the certification basis. A company wants to know precisely what are the regulations they have to design their airplane to.

If you don't set that, regulations come and go and the airplane, when it is just about done, may have to comply with a new regulation, et cetera.

The regulations call for, for a transport airplane like a Boeing, five years as the nominal period.

For all other products, which would include the Eclipse 500, three years is the standard period. It turned out they needed over five years to do it. We granted an extension to them.

Mr. GRAVES. Thank you, Mr. Chairman.

Mr. COSTELLO. I wonder if you would yield to the Chair, Mr. Graves.

Mr. GRAVES. I will yield. I would be happy to, Mr. Chairman.

Mr. COSTELLO. Just to clarify a point, when we are talking about five years and we haven't gotten into this issue with this panel, but the ODAR was issued in 2002, about four years before the Design Certification was issued.

So when we are talking about five years to get a time line and an understanding of this, the fact is that Eclipse was not going full-force through the process. There were issues with an engine where they had to change course. There were issues with investors and other things.

It wasn't that they were pressing the FAA or they were moving forward the entire time. They had some issues that they had to deal with externally as well. Is that an accurate statement, Mr. Hickey or Mr. Sabatini?

Mr. HICKEY. I think it is accurate, Mr. Chairman.

Mr. COSTELLO. Thank you.

The Chair now recognizes Chairman Oberstar.

Mr. OBERSTAR. Mr. Hickey, I want to compliment you on accepting responsibility, and I accept your version of what FAA is going to do rather than Mr. Hayes who is trying to, I think, reword what you are saying.

I think you are on the right course. You have found some shortcomings in this process, very serious shortcomings, and both you and Mr. Sabatini are committed to correcting those. That is the spirit of leadership that I expect from FAA, and we will watch very closely.

To put the issue that you described earlier, a procedure in which those who are deeply involved in the certification process raise questions, raise issues and have concerns can be sure that they are fully responded to. It is not a question of he loses or you lose. The question is does the owner-pilot lose?

Your job, the FAA's, is to make sure that doesn't happen.

Mr. HICKEY. I agree, sir.

Mr. OBERSTAR. So it is not who loses and who wins. The real issue is are there concerns raised by professionals—skilled, talented, seasoned professionals within the agency, fully respected, fully responded to, not deadlines that are arbitrarily or externally or even internally established.

In this certification process, you are right. It takes at least five years for transport aircraft to reach certification, at least, longer if you go back into the engineering and design.

It was at least five years before the Cirrus all-composite aircraft was certified, and they complained about this, that and the other and a whole host of things. But those strain gauges were essential to test that wing structure. Should it be two wings joined in the middle? Should it be a single wing?

They went through a great deal of testing to make sure that the ultimate design, type certificated and production certificated by the FAA, was the right design.

At 41,000 feet in the air, I have said it so many times, there is no curb to pull over and look under the hood and see what has gone wrong.

Mr. HICKEY. I know.

Mr. OBERSTAR. You have to get it right on the ground, and that brings me to the question of the one-pilot versus two-pilot.

The information we have is that FAA test pilots were opposed to approval of the aircraft for single-pilot operation, yet they were overruled. I want you, Mr. Sabatini or you, Mr. Hickey to respond to that.

Mr. SABATINI. Well, let me begin with how the process works, sir, if I may.

Once an airplane has been demonstrated to meet type certificate and by design is approved for single-pilot operations because engi-

neers have done the study to determine that the switches and the controllability of the aircraft is suited for that.

Once that is done, it now needs to be determined how, operationally, we will introduce this aircraft. That is the job of the Flight Standardization Board. They make determinations as to what kind of training is required, what kind of type rating should be issued and a host of other responsibilities.

As Mr. Hickey mentioned and I will reiterate, this process that we have observed here lacked much in terms of project management and communication.

What happened with the beginning of the Flight Standardization Board is Eclipse went directly to the Flight Standardization Board. That will not happen again. In doing that, Eclipse presented to the Flight Standardization Board an aircraft that had not been demonstrated to conform to type design, which is unusual.

We ended up with three phases of the Flight Standardization Board. Phase one was terminated because the airplane could not demonstrate, based on the kind of training that our Flight Standardization people were receiving, to determine that they could safely operate this aircraft as a single pilot.

They deconvened, and at that point in time is when the single pilot issue arose. They met again, and other issues arose. It wasn't until the third time that they got together that the Flight Standardization Board determined that the work load for a single pilot was now acceptable, that the training that was being delivered was appropriate for that kind of operation.

I know that pilots have been interviewed who have said that it is a high work load. Well, these are the very same pilots who have been tested and have demonstrated they are capable and competent of operating these airplanes as a single pilot.

Mr. OBERSTAR. That latter point, the testing level, is extremely important.

Mr. SABATINI. Absolutely.

Mr. OBERSTAR. If you are going to be operating this very high-tech aircraft, you really have to know. You have to go through a much more rigorous regime.

Are you saying then that within the FAA this issue of one versus two pilots was vigorously debated and resolved in the favor of a single pilot?

Mr. SABATINI. Well, the Flight Standardization Board made that determination. The Board alone made the determination.

Mr. OBERSTAR. Certainly, from the standpoint of the manufacturer, they would much rather sell an aircraft whose operational cost was lower because you only have one pilot, not two.

Mr. SABATINI. That is true. But operationally, the Flight Standardization Board made recommendations for two types of rating for that airplane. One is for a single pilot and the appropriate training. Testing and qualification is required.

The other is for a multi-crew. It has been mentioned that DayJet operates as a crew of two.

I recall long before DayJet even existed, Mr. Iacobucci came in and visited with us and told us about his business plan. I spoke to him just the other day to verify my recollection. He never intended to ever operate as a single pilot.

It has always been his business model for customer reasons to operate with a crew of two even though his pilots are being issued single-pilot certificates. Their business plan requires them to operate as a multi-crew.

Mr. OBERSTAR. What is the basis for distinction between single-pilot and multi-pilot?

I will rephrase my question. What are the FAA-established distinctions between those two ratings?

Mr. SABATINI. Well, of course, the training is essential, appropriate to the aircraft.

Mr. OBERSTAR. But it is for the same aircraft.

Mr. SABATINI. For the same aircraft. Then there must be, for single-pilot, you must have a headset and a couple of other things that escape me right now that are mentioned in the Airplane Flight Manual and must be available for that kind of operation so that it eases the burden on the pilot.

But let me just say, airplanes are built with many systems. I have started in this business as an FAA Inspector. I have administered many flight checks.

I am also a pilot, and I have been given many flight checks. I have never had the luxury of operating an airplane during those conditions with everything working. You always test or are tested when most of the systems fail to determine your ability to operate that airplane safely with whatever condition exists at that point in time.

The FAA requirements are very clear in the practical test standards, whether it is for an operating rule for Part 135 or any other operation. The pilot must demonstrate that he is competent and qualified to operate that aircraft alone with systems inoperative.

Mr. OBERSTAR. Does that also require recurrent training?

Mr. SABATINI. Absolutely, sir, particularly under 135.

Mr. OBERSTAR. Well, I look forward to the commitment you have made to reprinting the Customer Service Initiative, unless we abolish it altogether in a future legislation, and to the interim corrections from lessons learned that Mr. Hickey has described and I think with quite earnestness.

Mr. Chairman, I think it would be appropriate either to have an in camera review or a Committee review at a later date to assess the follow-up compliance with our own standards.

Mr. COSTELLO. I think that is an excellent suggestion.

I had mentioned earlier in the hearing that we expect in the not too distant future that we will have the FAA, Eclipse and others, other stakeholders here involved come back, sit down and discuss what progress has been made relative to future action on the part of the FAA and pending issues with the aircraft.

I only have one remaining question, and it is for Mr. Haueter.

You heard Chairman Oberstar's question on certifying the aircraft for a single pilot. Given the complexities of the aircraft and the fact that the FAA test pilots recommended or wanted it not to be certified as single-pilot but two-pilot, do you agree with the FAA's decision to certify it as a single-pilot?

Mr. HAUETER. I don't think I have enough information. Certainly the Cessna Citation was certified for single-pilot operation. It is not

that greatly different than the Eclipse necessarily. I don't know all the facts here.

Mr. COSTELLO. All right, good. Thank you.

Mr. Hayes, any closing comment?

If not, let me thank this panel, and let me restate what Chairman Oberstar said, Mr. Hickey. We appreciate the fact oftentimes people come before the Subcommittee and Full Committee and we are used to hearing people deny and push responsibility and blame on other people.

We are pleased to hear you take responsibility for some of the things that you think the FAA needs to correct in the future regarding when there are people who are objecting internally. So we appreciate your honesty.

I also want to mention, as I mentioned at the earlier panel, we had, as you know, current FAA employees who had the courage to come here and to speak with us and testify about their opinions. There is one former FAA employee and the current employees who testified.

We will be following very closely to make sure that there is no retribution towards those employees. I have asked them specifically to contact me personally if, in fact, they feel that there is retribution, if there is a job reassignment, if there is any retribution whatsoever.

So I believe and I hope that you believe that it is healthy for people to come forward and to state their opinions regardless if you agree with them or not. I think it strengthens the operation, in this case, at the FAA. I hope you will respect the fact, as we do, that they had the courage to come forward and discuss their differences of opinions with you and to state their opinions on the record.

With that, we again thank you for your testimony, and this panel is dismissed. We would ask the next panel to come forward, please.

Members of this next panel are coming forward to be seated. I will introduce them: Ms. Peg Billson, President and General Manager, Manufacturing Division, Eclipse Aviation Corporation, accompanied by Mr. Roel Pieper, the Chief Executive Officer, Eclipse Aviation Corporation; and Mr. Clyde Kizer, retired aerospace executive.

Lady and gentleman, if you will come forward, I would ask you to remain standing and I will administer the oath, if you will.

We have all three. Is Roel Pieper here?

Ms. BILLSON. He had to leave.

Mr. COSTELLO. He had to leave. Okay.

If you will raise your right hand please, do you solemnly swear that the testimony you give before this Committee in the matters now under consideration will be the truth, the whole truth and nothing but the truth, so help you, God?

For the record, please show that both witnesses answered in the affirmative.

First, we thank you for your indulgence here in listening to all of the testimony. I am quite certain that you wanted to be here, but we had hoped to get to this panel sooner.

With that, I will recognize Ms. Billson for your testimony.

TESTIMONY OF PEG BILLSON, PRESIDENT AND GENERAL MANAGER, MANUFACTURING DIVISION, ECLIPSE AVIATION CORPORATION; CLYDE KIZER, RETIRED AEROSPACE EXECUTIVE

Ms. BILLSON. Thank you, Mr. Chairman and the Committee.

I am Peg Billson. I am currently the President and General Manager of Eclipse Aviation's Manufacturing Division. Over the previous three years, I was the Chief Operating Officer of Eclipse Aviation, responsible for the type certification and production certificate of the Eclipse 500 jet.

My background is that I have a Bachelor's and Master's in Aerospace Engineering. I am a private pilot, and I have had 25 years in the industry at McDonnell Douglas, Honeywell and now at Eclipse, designing, building and certifying airplanes.

In fact, I am also an instrument-rated pilot, and I have about 80 hours in the Eclipse 500.

Mr. Roel Pieper, as we stated, was here just until about five minutes ago, and he is our current Chairman and CEO of Eclipse.

I would like to address some of the things that I have heard here today and read, so I can clear up some misconceptions or our perspective of how we believe the process went.

The first is with the Inspector General's report. I think it is important to highlight that Eclipse Aviation has not been interviewed by the Inspector General. So as we look forward to that opportunity, we also are not knowledgeable of what the March, 2007 complaint refers to. We have never been shown that. We don't know the basis of that.

We look forward over the coming months to be able to participate in that process, so we can clear up what I have heard today as a lot of misstatements, misconceptions, misunderstandings in the data that I have heard today.

Specifically, it is not accurate to state that EASA, the European certifying agency, has denied certification of this airplane. In fact, we are in the middle of the process, and we expect it to be completed in the next few weeks.

When that is completed, it will verify that this airplane has been demonstrated to comply with not only the FAA's requirements but all of the European Union's requirements as well, demonstrating this airplane is safe to fly in not only the United States but the European Union nations.

But the next point I would like to make is that Eclipse cooperated fully with all levels of the FAA management through our certification processes and through the approval of our pilot training program. That would be the type certification process, the production certification process and the Flight Standards Board.

Yes, we had challenges. We have been at this for a long time. Occasionally, we did encounter lack of understandings, disagreements on what the process was going forward. So, when we would run into those situations, we would work up the layers of levels within the FAA until we could agree or reach agreement to both of us that this was the right process to go forward.

I think the most significant or prominent area where this was highlighted was during the production certificate. We believe it is very rare that new production certificates are granted, and so the

experience level within the FAA on how to accomplish this process is limited.

And so, throughout the process, there are numerous instances where there was different direction, misdirection, change in direction on what was required to achieve our production certificate. It was only after my inability to get that clarity with the head of the Fort Worth certification office at that time did we elevate our concerns to the Washington headquarters and asked for assistance.

After they evaluated the situation, they decided to convene an independent board of experienced people to work with the Fort Worth office and Eclipse Aviation and lead us through the process of certifying this airplane or helping us attain our production certificate. In fact, it did take eight months after we received our type certificate to earn our production certificate.

I certainly respect and appreciate the perspectives of the FAA inspectors that are here today and had the courage to come forward. It was a very confusing, frustrating time where everybody played different roles at different periods of time.

And so, I think that frustration level that I even experienced personally supports the decision to let's bring in an independent group of experienced people to help lead all of us through this process, which is what they did.

Let me also talk then briefly about the Flight Standards Board and the confusion around the Flight Standards Board who ultimately made the single-pilot evaluation determination and approved our pilot training program.

I gave them an immature airplane twice. I won't do that again. I am experienced several times in certifying airplanes. This was the first time I went through a Flight Standards Board process, and it is perfectly logical that I needed to give them a type design compliant airplane, so they could cleanly and clearly effect their evaluation.

We had some false starts. It was an inefficient process.

So I would really characterize today's hearing as a lot of people are trying to resurrect years of work by a lot of hard people. We are not all remembering it exactly correct.

But the results were effective. We have a compliant airplane, we have a safe airplane, and I am proud of my role on the Eclipse 500 program.

Mr. COSTELLO. Thank you.

Mr. Kizer.

Mr. KIZER. Chairman Costello and Members of the Subcommittee, thank you for the opportunity to testify today.

My name is Clyde Richard Kizer, and my statements reflect observations, facts and opinions garnered over a 44-year technical career in the aerospace industry.

I realize that the focus of these hearings is on the certification of the Eclipse EA-500. My statements today relate for the requisite requirement for the concept of alternative method of compliance to assume a vibrant environment of innovative engineering and technology development for the aerospace industry.

Absent the application of technical vision and the exploration of new materials, concepts and processes, our Nation will rapidly fall behind in this globally critical industry. My comments relate spe-

cifically to the need for a methodology that allows consideration of alternate means of compliance within the regulatory process.

My experience and training relate predominantly to the arena of airline aircraft continued airworthiness, and I will focus my comments to that position, but the concepts that I discuss have value for all venues of technical development albeit with differing practical priorities, frequencies of application and regulatory oversight requirements.

Equally important to the success of the aerospace industry as the alternate method of compliance is the development of and adherence to minimum standards for regulatory compliance to ensure the safety of the aircraft, the public and the national airspace system.

The remarkable safety record of the U.S. air transport industry is the result of the robust process of communications, coordination and exchange of technical information that exists between the operators, the manufacturers and the regulatory agency. No single entity within these constituents can assure the desired level of safety independently.

The success of the endeavor depends on effective collaboration. The free exchange of technical information provides a venue for innovative alternative technical resolution of potential problems from differing perspectives of responsibility.

Over time, the process allows a variety of methods for technical problem resolution from which it is possible to develop a best practices resolution for standardization, effectiveness and efficiency. Absent such approach, standardization might potentially be achieved by forced adherence to the least effective methodology.

Over decades of commercial air travel, many new technologies have been developed to improve the safety and efficiency for the traveling public. Emerging technologies demand a conservative approach for application, operation and regulatory control to assure that the safety of the system is not compromised. That conservative approach results in the establishment of minimum standards of performance that protect the industry while allowing flexibility in the development of the new technologies.

Unfortunately, the term, minimum standards, occasionally connotes an atmosphere of laxity when in fact it is just the opposite—restrictive set of requirements that must be met in a very conservative approach to develop new technologies and/or methods for resolution of technical problems.

It is a general truth that no two aircraft leave the manufacturer's production line in exactly the same configuration. Additionally, once an aircraft enters service, no two aircraft of similar type are in exactly the same configuration within a given airline or between the airline fleets.

The responsibility of the airlines is to maintain their aircraft so that they conform to type design and type certification requirements that were established to assure airworthiness for the certification and production of commercial aircraft. This requirement for conformance is termed continued airworthiness.

The continued airworthiness process includes incorporation of methods to address any action that modifies the original type certification requirements such as airworthiness directives, supple-

mental type certificates and so on. The industry dedicates considerable technical resources for maintenance and engineering activities to meet this responsibility.

When technical problems are defined and addressed by manufacturer service bulletins or regulatory requirements, the specified means of corrective action frequently requires variations due to configuration differences, material applications or other considerations.

When corrective actions are mandated by the FAA, generally by issuance of an airworthiness directive, such actions frequently include a means to employ differing methods, materials and/or timing to accomplish the mandatory action. These alternatives are allowed only after approval by the FAA Aircraft Certification Office designated in the AD. FAA approval for alternative methods must be obtained prior to the required date for completion of the action defined in the AD.

This approach is described as the Alternative Method of Compliance or AMOC process. The AMOC process allows accommodation for alternatives that might not have been known or considered at the time the AD was written. The primary requisite for this process rests with determination that the alternative provides an acceptable level of safety that is equivalent to that required by the AD.

As a comparison of the viability of the alternative methodology, a similar process is allowed during certification by longstanding regulation 14 CR 21.21. Now we won't go on that because that is the certification process, but it is a similar process and it is Equivalent Level of Safety or ELOS.

It is obvious that the AMOC and the Equivalent Level of Safety or ELOS processes allow consideration for differing technical expertise, varying operational experiences, new technologies and innovative methodologies while protecting the safety and efficacy of the air transport system and not compromising the responsibility or prerogatives of the regulatory authority.

The intent of the AMOC/ELOS process is to maintain or improve the safety of the aircraft and the industry while allowing the employment of technical innovation and new technologies to resolve technical problems.

Over many years, the concept of alternative methods of compliance has proven to be a safe and effective approach for regulatory compliance. The AMOC/ELOS process has provided creative alternatives that are crucial to the air transport industry, and in my experience it is that these processes are equally essential for general aviation.

Thank you very much.

Mr. COSTELLO. I thank you, Mr. Kizer.

The Chair would recognize the Ranking Member for any questions that you may have. I only have a few and then a statement to make, but I would recognize Mr. Petri.

Mr. PETRI. Well, I want to thank both of you for your testimony and for so patiently waiting through the day until we reach this point.

This was a five, almost six-year process for Eclipse, and it was a new learning experience, I think, for that organization. This is the first certification that you went through, is this correct?

Ms. BILLSON. This is the first certification that the Eclipse Aviation Company went through. It is the fifth certification that I have personally been through.

Mr. PETRI. Mr. Kizer, you have over 40 years of experience in this whole process, and you obviously know a lot more about it than certainly I ever will.

My concern is we are having to figure out here, and this is a kind of small example of it, how to have some standards, make sure that we don't get people who are irresponsible into the system as suppliers or assemblers or whatever and, at the same time, have a very dynamic system that allows new innovation into it.

In that connection, a fellow I had the opportunity to listen to give lectures about this named Burt Rutan who is way out.

Mr. KIZER. He is outside the box.

Mr. PETRI. The greatest aviation designer probably, one of them in world history, if not.

He was pleading at the meeting I was at when he was entering the competition for this new space vehicle, that it be classified not as an airplane but as a spaceship because then it wouldn't have to be certified. They don't certify spaceships.

His reason wasn't he wanted to escape any regulation or anything. It was that he felt the psychology of defending a particular design was exactly opposite of what he was trying to build in his organization, which was that every day he wanted people to assume that the worst could happen and figure out a better and safer way of doing it.

So they are constantly making what they hope are improvements, refinements. It is a very dynamic process.

He felt once they were trying to define and defend a particular design, it changes your mind. You are trying to defend why it is safe rather than question how to make it safer.

That would end up stifling innovation and be counterproductive to true safety. We would end up with some safety innovations that would not be made because of that.

I don't know if that is worth commenting or not. But what we want, don't we, is to have a collaborative where people are conspiring to be as innovative and have a safe product at the end of the day rather than just playing games on each other and not communicating and pretending to meet standards. How do we do that?

Does that make any sense at all to you?

Mr. KIZER. I would just like to make a general statement in that regard.

The people in this industry who bear the responsibility for human lives, whether it is in the military side or the commercial side, I have never met anyone who did not bear that responsibility with great commitment. No one that has the responsibility for safety or for personal lives would make decisions that would put those things in jeopardy.

So, consequently, when we are exploring new technologies, we know there is great promise, but we also know that lacking a history with those new technologies we have to take a very conservative approach to the development of the technologies.

That sometimes means that we use things in different applications other than aircraft and we garner some experience with it,

but it frequently means that we use the technology in lesser modes instead of the primary modes until we develop enough history that we can explore the full potential of the technology.

And, we have to demonstrate ahead of time minimum safety standards, sometimes in terms of inspection periods and things like that, until we garner the experience or limitations on the application until we have the experience to take those technologies and fully explore their potential.

Everyone, be it an engineer or a pilot or a mechanic or a production guy on the line, all know that when they are working with new technology they have to do so in a step by step process in order to fully exploit that new technology.

Mr. COSTELLO. The Chair thanks you, Mr. Petri and now recognizes my friend from North Carolina, Mr. Hayes.

Mr. HAYES. Thank you, Mr. Chairman, and thank you all for being here.

You have been here a long time. You have heard a lot of things. Some are observations. Some are accusations. Some were opinions. Some were facts.

Kind of sum up again, as I asked the last panel, where we are with this process and what it means to you as a manufacturer in how you would like to see the process proceed, again, because the confidence that the world has in our aviation and in our regulatory agencies, among other things, must come out of this process as being unscathed and still the gold standard.

So just let me offer you time to generalize on what do you think we need to do to make sure that this process has been most effective today.

Ms. BILLSON. Sir, today, a lot of what I have heard is confusion between a type certification, a production certificate, putting a certificate of airworthiness on an airplane and getting approval of a pilot training program. So I think that is a lot of the confusion that has come out today.

One of the other things that has been highlighted is I will offer up two thoughts. One, the FAA and industry have to work together to drive closure on certifying product. We have to work together.

The FAA, right now, appears to have a very effective process where it is the obligation of the manufacturer to come forward and say, this is how long I think it is going to take, given these sort of assumptions. The FAA comes forward and says, given everything I have to do, this is what I can do to support you on the time line you want. And you work together to negotiate a time line that you are trying to achieve.

There is always an understanding if something changes, if there is a risk, if a test doesn't pass the way you thought it was going to do, that is going to affect your time line and you are going to adjust it appropriately.

I think what needs to be highlighted is that there are different sets of experiences. So there are some people that are experts in Part 25 Certification, some in Part 23, some that know how to do production certificates.

If I would offer up anything, it is maybe the FAA wants to approach these types of projects based on pools of experienced people, not just assigning them by region.

Mr. HAYES. Mr. Kizer?

Mr. KIZER. Well, we are at a state where in many cases the knowledge and the experience and the training of the people that are required to regulate the industry is frequently behind the technology.

That is not a condemnation of the FAA. That is a reality, that the technology moves so fast, that unless you are continually being reeducated in universities and self-training, it can get ahead of you.

It is vitally essential that we have a methodology, I think, that draws upon the best expertise in the industry, wherever it comes from, to help develop the technology.

If the FAA needs help in the field from a higher level or from the engineering group that exceeds their capability, they ought to have that authority to seek that assistance. And, if it takes bringing people in from the industry or from the universities to educate the process, we need to have that as well because we quickly, both in the area of composite materials and in digital avionics and electronics, are moving ahead faster than we can stay educated.

Mr. HAYES. A quick question, I don't think we touched on it today. In a certified repair shop, you have an employee who is designated as the Chief Inspector. In the manufacturing and production process, do you have a similar employee?

Mr. KIZER. The big aircraft manufacturers do. I don't know about Part 23.

Mr. HAYES. Do you know, Ms. Billson?

Ms. BILLSON. I don't have somebody per se that is designated as the Chief Inspector in my production line. I do have the people that are the Chief DAR and then leaders throughout my quality organization.

Mr. HAYES. For a minute, I think it would be helpful. There have been some specific actions cited: the throttle issue, the dual versus single pilot issue, the static port issue. Those are the three that come to mind.

As a follow-on for this, Mr. Chairman, if you would just address a letter to the Chairman and a copy to me, what the issue was from your perspective from the beginning, how it was handled at the time and how it has been ultimately satisfied. Again, I think it is good for the product and for the process.

With that, Mr. Chairman, that pretty well wraps me up unless you all would like to add anything else.

Ms. BILLSON. We would be more than pleased to do that, sir.

Mr. COSTELLO. I would agree, Mr. Hayes. As I said, we are going to revisit as a result of our discussion to talk about what progress has been made.

You made the statement, Ms. Billson, that the IG has not spoken with you.

This whole hearing and the investigation conducted by the Inspector General was about the FAA and the process that the FAA is using in the certification process. They obviously received complaints from employees and others internally within the FAA, and they responded and conducted an investigation.

This hearing is not about Eclipse. It is about the FAA and the process that they use. You just happen to be the product that was

in the shop at the time, and there are serious allegations that were made here at the witness table. You heard them yourself.

It is our goal to provide aggressive oversight to make certain that the FAA, in fact, is doing their job. We have seen in other areas of the economy what the lack of oversight can result.

It is our hope that, as Mr. Sabatini said today in his testimony, that they are going to go back, reassess some of the things that they had done, establish a procedure for certification in the future, for a new type of aircraft that is coming online like the Very Light Jet, to develop procedures to get out in front as opposed to reacting.

So I appreciate your testimony here today. We have some other issues that we will be addressing in writing, and I would ask if you would comply with Congressman Hayes' request to address some of these issues in writing to us. We would appreciate that.

I would give you and Mr. Kizer an opportunity, if you would like, for any closing remarks. I would be happy to offer you that opportunity.

Ms. BILLSON. Well, I think I reinforce and support your objective, but I think the purpose of the Inspector General's investigation is to get to the facts. And so, Eclipse offers to talk with the IG to help clear some of the misstatements and the mis-facts that are in the current testimony as I have heard it today. So I think that is the most important thing to highlight,

I think the other point we would like to emphasize is that we are very proud of the certification of the Eclipse 500 program and the hard work of the FAA employees. I mean they just did a fantastic job on this program. They worked hard, and I think in the light of day they are proud of the product that they certified and the airplane that is out there right now.

Of the data we have looked at, we have the best safety record of a general aviation that has entered service in the last two decades. That doesn't mean we ever acquiesce our accountability to continue to drive and improve and react rapidly when issues occur.

It is a complex process executed by a lot of humans. You are never going to get it right. So you have the obligation to continue to follow up, analyze, work with your customers, understand how your airplane is performing and improve it. That is what we are committed we will continue to do.

Thank you, sir.

Mr. COSTELLO. We thank you.

Mr. Kizer.

Mr. KIZER. No further comments, sir.

Mr. OBERSTAR. Very good.

Mr. Petri, unless you have further questions or comments, we thank both of you, Ms. Billson and Mr. Kizer, for testifying, and this concludes the hearing.

The Subcommittee will stand adjourned.

[Whereupon, at 3:33 p.m., the Subcommittee was adjourned.]

OPENING STATEMENT OF
THE HONORABLE RUSS CARNAHAN (MO-3)
HOUSE TRANSPORTATION AND INFRASTRCUTURE COMMITTEE
AVIATION SUBCOMMITTEE

Hearing on
FAA Aircraft Certification: Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EA-500
Wednesday, September 17, 2008

#####

Chairman Costello and Ranking Member Petri, thank you for holding this hearing on the investigation of the rushed approval of both the type and production certifications of the Eclipse EA-500, despite safety concerns with the design and manufacturing of the aircraft raised by numerous FAA certification engineers and aviation safety inspectors.

In 1996 Congress removed the "promotion of aviation" FAA mandate, making it clear that the FAA's explicit obligation was to the safety of the traveling pubic. Congress realized that there could be conflicting interest keeping the FAA from meeting its chief purpose, safety. Yet here we are twelve years later dealing with a lack of regard in safety, due to the FAA continuous consideration of the aviation industry as their customers rather than the traveling public.

I am appalled by the allegations that the engineers and safety inspectors in AIR found deficiencies in the design, and yet the EA-500 became certified and the warning signs ignored. What is more disturbing is why these allegations of deficiencies were overlooked. It seems that the Eclipse founder, Vern Rayburn, had a strong influential presence with FAA senior managers. The same senior managers who allegedly relieved those worried with design deficiencies of their former duties with the Eclipse program, and replacing them with those more amenable to management's desire to certify the aircraft by its self-imposed deadline.

I hope that we can understand why FAA certified a plane that had eighty-one Service Difficulty Reports filed over a ten month period, and learn from the experience without the loss of future lives. I expect that a greater caution will be given to the concerns of engineers and safety inspectors in the future.

I would like to thank the witnesses for joining us today, and I look forward to your testimony.

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STATEMENT OF
THE HONORABLE JERRY F. COSTELLO

FAA AIRCRAFT CERTIFICATION: ALLEGED REGULATORY LAPSES IN THE CERTIFICATION AND MANUFACTURE OF THE ECLIPSE EA-500
SEPTEMBER 17, 2008

- I welcome everyone to our Subcommittee hearing on FAA Aircraft Certification: Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EA-500.

- For the past few years, I have asked the question – does the Federal Aviation Administration (FAA) have adequate resources to accomplish its mission and in turn, are they relying too heavily on its safety record in order to demonstrate its ability to keep a safe system? Over these past two years, our hearings in the Aviation Subcommittee and the full Committee have demonstrated an agency that is short on resources, low in morale, and incapable of adequately overseeing its critical safety programs.

- Today, the Department of Transportation Inspector General's (IG) report details alarming problems within the FAA.

- I am extremely disappointed that the FAA again lacks the ability to oversee its programs – in this case its certification programs. Unfortunately, this hearing will expose an agency that is as interested in promoting aviation and befriending manufacturers as it is in carrying out its number one responsibility of protecting safety and the flying public.

- It is inexcusable and unacceptable to ignore rules, regulations and standard practices to accommodate those you have a responsibility to regulate -- when you have people's lives in your hands! This Subcommittee, the Congress and the

- The aircraft certification and production process is complicated, requiring very technical expertise and understanding. When trying to do so on an emerging, new class of Very Light Jets (VLJs), like the Eclipse EA-500, one would expect the FAA to provide an appropriate amount of time and resources to make sure "we get it right." However, questions have been raised by the IG and by current and former FAA employees that corners were cut during the certification and manufacturing process; deficiencies were overlooked; and this new type of aircraft was pushed through the process in order to meet internal agency goals.

- As a result, the hearing today focuses on two central questions: did the FAA follow its regulations when certifying the Eclipse EA-500 -- and in production of this aircraft? And was safety compromised?

- The IG, Calvin Scovel, will provide testimony which details serious issues with FAA's certification and manufacture of the Eclipse EA-500.

- One of the most disturbing findings to me in the IG's report is that instead of mandating that problems be resolved, the FAA accepted "IOUs" from Eclipse to resolve the problems at a later date. In this case, an "IOU" was allowed on the avionics system that ran the plane. I question the practice of using "IOUs" in any instance. However, to use an "IOU" on

- It gets worse – according to the FAA's own testimony on page 10 and 11, Eclipse delivered 11 EA-500 to customers prior to the completion of the "IOU" on this critical avionics system. In an exchange of letters which I will submit for the record, Eclipse was to "retain control of the aircraft" until the issue was closed out. Clearly, that did not happen.

- The IG will also testify that thirteen known deficiencies were unresolved when the FAA approved a production certificate. That is unprecedented and a direct violation of regulations; and yet, the FAA allowed it. Eclipse repeatedly

- Further, there is evidence to suggest that the FAA developed an inappropriate relationship with Eclipse, forcing FAA employees to expedite the Eclipse EA-500 aircraft through certification and the production approval process, even though serious concerns were raised.

- I have said time and again safety cannot be compromised. In this case the FAA is treating manufacturers like "customers" instructing its employees to "build relationships with our customers" instead of acting as regulators. For example, the FAA's own test pilots said the EA-500 should not be certified as a single pilot plane because of in-flight concerns such as

- The FAA should be vigilant in ensuring the highest level of safety and be willing to slow down the certification process and shut down production if such action is warranted to protect the flying public. Deadlines and goals should have been adjusted once deficiencies were found.

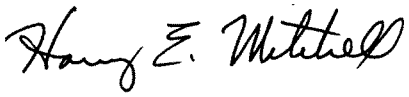
- Finally, we have seen a pattern at the FAA of an agency that is reactive – not proactive. Only after getting briefed by the

- It is not enough to have safety regulations in place. The FAA must enforce those regulations.

- This Subcommittee has made safety a top priority and the FAA and manufacturers must do the same. We cannot have the agency responsible for aviation safety rely on the past or overlook problems by rushing certification in an effort to meet self-imposed goals. We expect and deserve more!

- With that, I want to again welcome the witnesses today and I look forward to the testimony.

- Before I recognize Mr. Petri for his opening statement, I ask unanimous consent to allow 2 weeks for all Members to revise and extend their remarks and to permit the submission of additional statements and materials by Members and witnesses. Without objection, so ordered.



Statement of Rep. Harry Mitchell
House Transportation and Infrastructure Committee
Subcommittee on Aviation
9/17/08

--Thank you Mr. Chairman.

--Last spring, we learned that individuals at the Federal Aviation Administration ("FAA") allowed thousands of commercial airline passengers to fly on planes long past their inspection deadlines. The lapses put an estimated 13,000 Sky Harbor passengers at risk.

--At the time, we were warned about an allegedly overly cozy relationship between individuals at the FAA and those at the airlines that they are supposed to regulate.

--As we hear today's allegations of still more FAA safety-related missteps, I am concerned that we may not have reached the bottom of these allegations of coziness.

--We will hear from the U.S. Department of Transportation's Inspector General (IG) about the FAA's decision to award certification to a new aircraft, the Eclipse EA-500, "even though there were known deficiencies in its supplier and quality control systems."

--If true, this is very disturbing.

--I look forward to hearing from our witnesses. At this time, I yield back.

STATEMENT OF
THE HONORABLE JAMES L. OBERSTAR
SUBCOMMITTEE ON AVIATION
OVERSIGHT AND INVESTIGATIONS HEARING ON
"FAA AIRCRAFT CERTIFICATION: ALLEGED REGULATORY LAPSES IN THE CERTIFICATION AND MANUFACTURE OF THE ECLIPSE EA-500"
SEPTEMBER 17, 2008

Today's hearing continues a long history of oversight investigations by the Committee on Transportation and Infrastructure aimed at protecting those who rely on our Nation's transportation system. Today we will hear the results of an investigation into allegations that the Federal Aviation Administration (FAA) rushed to approve both the type (TC) and production certifications (PC) of a new aircraft, the Eclipse EA-500, despite safety concerns raised by a number of FAA certification engineers and aviation safety inspectors over the design and manufacture of the aircraft.

We will again hear from dedicated professionals, who had the courage to work with the Inspector General of the Department of Transportation (DOT) and our Committee--professionals who want to make air travel safe for all. There are disturbing similarities between the testimony we will hear today, and the hearing we held on April 3rd involving regulatory abuses at the FAA office charged with overseeing Southwest Airlines. Once again, we will hear how the FAA's "Customer Service Initiative" mistakenly treats those who are the subject of regulation as the

"customer," and how it has the potential to create conflicts with the FAA's one and only mandate--safety.

I fear that complacency may have set in at the highest levels of FAA management, reflecting a pendulum swing away from vigorous enforcement of compliance, toward an industry-favorable, cozy relationship. This time it involves a manufacturer instead of an airline.

In this case, the FAA remains steadfast in its assertion that no Federal regulations were violated. However, when the findings of this investigation are viewed in total, there is a disturbing suggestion that there was another "cozy relationship" and reduced level of vigilance on the FAA's part during the process of approving the type certificate and the production certificate of the Eclipse EA-500.

With the significant risks posed by a new aircraft, powered by new technology, and produced by a new manufacturer, it seems logical to have expected the FAA to exercise much greater scrutiny than in the typical certification program with an established manufacturer such as Airbus, Boeing, Cessna, etc. Moreover, the EA-500 represented an entirely new class of aircraft, and did not easily fit into the FAA's normal certification regime. The EA-500 has advanced avionics and turbine engine technology more characteristic of a large transport aircraft. Its only commonality with

a typical general aviation aircraft is its light weight and small passenger capacity. However, the FAA chose to use certification requirements for general aviation aircraft rather than the more rigorous requirements that should be required of aircraft with a greater degree of complexity.

Instead, FAA seems to have been unusually lenient given the priority it assigned to the Eclipse certification project and the collaborative relationship that was developed with Eclipse management. FAA actually had the audacity to put in its performance plan that the Eclipse would be certified by September 30, 2006, and it did everything in its power to make sure it met that date, including signing type certificate approval exactly on September 30, 2006--a Saturday, and also the end of Fiscal Year 2006, coincidentally. How could the FAA possibly know when the aircraft would be ready for certification?

It seems entirely illogical and inappropriate for senior FAA management to assign itself a date by which an aircraft is to be ready for certification approval and then to find reason to actually meet that date, when just days prior, numerous FAA personnel believed there was overwhelming evidence that the aircraft was not ready for certification. On the contrary, it would appear that the burden of when an aircraft is ready to be certified should fall entirely upon the manufacturer, and it should be none of FAA's concern as a matter of policy. It is clearly not the FAA's responsibility

to meet a manufacturer's certification deadline, which is used to satisfy potential customers and company investors. The FAA's only responsibility should be to respond in a timely fashion to an applicant's approval documentation and to provide a "yes" or "no" decision on whether an aircraft is ready for safe certification.

It is also interesting to note that the FAA Rotorcraft Certification Directorate in Fort Worth, Texas, which was assigned primary responsibility for evaluating the EA-500, appears to have been very diligent in its attempt to adhere to established certification regulations and appears to have performed admirably. However, their decisions and recommendations were routinely overruled by higher-level FAA management, with "customer service" to Eclipse looming as a strong influence.

Congress removed "promotion of aviation" from the FAA's mandate in 1996. The FAA's recent behavior suggests that the promotion of aviation is still an integral part of FAA's culture.

In the Eclipse case, it appears that when design deficiencies were identified that appeared to be non-compliant with FAA certification requirements, senior FAA management became personally involved, overruled lower-level engineers and inspectors, worked diligently to find "work-arounds," to find "alternative approval

rationales and techniques," and to accept "IOUs" for later compliance. In many ways, the certification process in this case was conducted "backwards" from the clear intent and requirements of FAA certification regulations. Instead of certifying on the basis of safety alone, FAA senior management appeared to be highly motivated to find ways to explain why design deficiencies identified by FAA engineers and inspectors as "unsafe" were indeed "flawed," but they were still "acceptable for certification" by simply changing the approval criteria. Indeed, one broad policy issue that needs further examination relates to the many "loopholes" FAA has at its disposal to find "alternative means of compliance" or "equivalent levels of safety" for certification regulations. Thus, the allegations and findings in this case are cause for concern and suggest the immediate need for a broad policy review of FAA certification practices.

I look forward to hearing the testimony of all of the witnesses today.

Congresswoman Laura Richardson
Statement at Transportation and Infrastructure
Subcommittee on Aviation Hearing on
"FAA Aircraft Certification: Alleged Regulatory
Lapses in the Certification and Manufacture of the
Eclipse EA-500"
Wednesday, September 17, 2008
2167 Rayburn House Office Building-10:00 A.M.

Mr. Chairman, I want to thank you and Ranking Member Petri for holding today's hearing on the certification and manufacture of the Eclipse EA-500 aka VJL (Very Light Jet).

I understand that VJLs are intended to have lower operating costs than conventional jets, and are able to operate from runways as short as 3,000 feet. Very Light Jets can bring an aircraft option to those areas that are ignored by commercial airlines and provide a faster option of means of transportation for short- distance

trips. However, I also understand that the creation of a Small Aircraft Transportation System needs to be held to a higher standard. The purpose of today's hearing is to determine if proper oversight has been applied to the Very Light Jet by the FAA.

If and when consumers decide to secure private options for air travel, consistent safety measures must be taken when it comes to flying. It is our job in the committee to get accurate facts on whether or not safety measures were taken when it came to the manufacturing and certification of the Very Light Jet.

I look forward to hearing from today's witnesses and I thank them for joining us here today.

Thank you, Mr. Chairman.

Testimony of Peg Billson
President and General Manager, Manufacturing Division
Eclipse Aviation Corporation

House Transportation and Infrastructure Subcommittee on Aviation
"FAA Aircraft Certification: Alleged Regulatory Lapses
in the Certification and Manufacture of the Eclipse EA-500"
September 17, 2008

Chairman Costello and Members of the Subcommittee, thank you for the opportunity to testify today on the certification process of the Eclipse 500 and its unmatched safety record.

I am currently President and General Manager of the Manufacturing Division at Eclipse Aviation Corporation (Eclipse), located in Albuquerque, New Mexico. In this capacity I am responsible for the company's engineering, supply chain, quality, production and flight operations. From 2005 to until last month I served as Eclipse's first Chief Operating Officer.

I have bachelor and master degrees in aerospace engineering and have worked in the aerospace industry for more than 25 years. The majority of my experience includes providing leadership for the design, build and in-service support of commercial airliners. I am also an instrument rated pilot with more than 80 flight hours in the Eclipse 500 alone.

Prior to Eclipse, I served at Honeywell International's Aerospace Division in a variety of positions, including Vice President of Airframe Systems, Vice President of Aircraft Landing Systems and Vice President of Engineering for Engines, Systems and Services. Prior to Honeywell, I spent thirteen years at McDonnell Douglas Corporation, leaving as Vice President of the MD-11, MD-80 and MD-90 Commercial Aircraft programs.

I am very proud to have played a lead role in bringing the Eclipse 500 — the world's first very light jet — to market. Eclipse is currently the world's leading VLJ manufacturer and has delivered more than 250 aircraft in 21 months of deliveries.

Eclipse Aviation was founded under the thesis that by providing remarkably lower costs of jet transportation, new markets, new companies and new jobs could be created in American communities that could benefit from point-to-point air transportation. In addition to being the most fuel-efficient and environmentally-friendly jet available, the Eclipse 500 has technology and capabilities normally found in jets costing millions of dollars more, including the latest from Boeing Commercial Airliners. The Eclipse 500 has an acquisition cost dramatically lower than any other jet and empirical data demonstrates that its total operating costs are the lowest of any jet available. This breakthrough has made the benefits of jet transportation available to more people than ever before and inspired an emerging generation of entrepreneurs to create a new form of

air travel — the air taxi. The Eclipse 500 also opened up a new world of convenient air transportation to communities in the United States that are experiencing a decline in commercial service or are simply not served by commercial airlines, thereby enabling economic growth in these areas.

With me today is Eclipse's new CEO, Roel Pieper. Mr. Pieper replaced Vern Raburn, the founder of Eclipse Aviation in July of this year and is providing leadership and experience in taking Eclipse to the next level of growth and operational excellence. Mr. Pieper has extensive executive experience in both the United States and Europe. He is also the Founder and Chairman of the European Technology and Investment Research Center (ETIRC) Aviation, a company which provides European business communities with affordable, on-demand air-taxi jet travel.

We are proud of what Eclipse has accomplished, proud of the safety record the Eclipse 500 has earned to date and proud that we deliver unprecedented performance, reliability, training and service to general aviation. We also are proud that Eclipse employs more than one thousand New Mexicans who manufacture and support the Eclipse 500; plus facilitating thousands of additional jobs at our suppliers throughout the United States.

Designed and Tested with Safety as Top Priority

In more than 32,000 total fleet hours — including more than 5,000 flight test hours — 21 months of customer deliveries and with more than 250 aircraft delivered, no injury or fatality to any Eclipse 500 pilot or passenger has ever occurred. No other aircraft in two decades has entered service with a better safety record.

We believe Eclipse 500's safety record is unprecedented for a new Federal Aviation Regulation Part 23 (General Aviation) aircraft. Our claim that the Eclipse 500 is the most-tested and safest general aviation aircraft can be substantiated by reviewing the following:

- From its suite of advanced avionics, to the structural makeup of the airframe, safety was the overriding tenet of Eclipse's design philosophy for the Eclipse 500.
- To meet the FAA's stringent certification requirements, Eclipse assessed the Eclipse 500's performance and safety across thousands of test points, many in excess of what is required under FAR Part 23.
- The average number of hours accumulated by a test fleet during FAA certification is 1,100 hours. The Eclipse 500 test fleet accumulated more than 5,000 hours prior to FAA type certification.
- The Eclipse 500 state-of-the-art cockpit is designed for safety through the redundancy of vital systems and its ability to reduce a pilot's workload. To ensure availability of critical flight data, the Eclipse 500 is equipped with redundant, high reliability, solid state electronic sensors and displays.
- Eclipse exceeded FAA requirements during static testing of the Eclipse 500 airframe. During these tests, limit loads — as well as ultimate loads — were placed on the airframe. The airframe met all test points on the first test; a testament to the structural integrity of the aircraft.

- Eclipse worked with specialists from 10 different FAA Aircraft Certification Offices (ACOs) and cross-functional FAA departments. The company was among the first to follow the FAA Certification Process Improvement (CPI) program. Detailed FAA involvement in a certification process is a hallmark of the CPI program.
- The CPI program allows the FAA to focus on safety-critical or unique design features as they are being created. Eclipse shared these and the preliminary design concepts of the Eclipse 500 with the FAA well in advance of the flight testing portion of the certification process.
- From the company's inception, Eclipse has intended to conduct its own flight training curriculum to ensure a stringent and thorough process is followed to meet all FAR Part 142 requirements. Eclipse is the first U.S. aircraft manufacturer to employ a FAA-approved Flight Operational Quality Assurance (FOQA) program for its pilots and customers. FOQA is a voluntary program involving the routine analysis of aircraft data for operational risks and has been identified as a key contributor to superior safety records in Part 121 scheduled air carrier Safety Management Systems (SMS).

Challenges in Achieving Type Certification (TC)

The FAA type certification process for a new aircraft is the culmination of years of hard work from hundreds of people from many companies and government agencies. Gaining certification requires hundreds of certification tests and substantiation reports and thousands of testing hours conducted under the scrutiny of the FAA. Our certification process for the Eclipse 500 was instigated long before I came to Eclipse. As a result, there may have been several personnel changes during the course of the process that I and other members of the current Eclipse Aviation leadership team were not aware of.

Eclipse cooperated fully with the FAA during the certification process we undertook. We received the provisional type certification (TC) for the Eclipse 500 in July 2006. It had been the intention of Eclipse management to reach full type certification in time to announce this milestone at EAA's AirVenture in Oshkosh, Wisconsin. Shortly before AirVenture it became evident that the Eclipse 500 would not achieve TC by the event because we had not yet demonstrated compliance to every regulation, specifically the fuel tanks on the wing's tip. Thus, Eclipse requested and received a provisional TC based on what it had accomplished.

Receiving the provisional TC was a significant milestone for the company because it demonstrated to our customers and our employees just how close we were to finishing the entire type certification process. Eclipse never used this provisional TC for any other purpose than as a milestone. We did not present any aircraft for a Certificate of Airworthiness (C of A) or operate any aircraft under the provisional TC.

Two months later, Eclipse was indeed able to show full compliance to the regulations and the Eclipse 500 received the standard type certificate on September 30, 2006.

Challenges in Achieving Production Certification (PC)

To receive a Production Certificate (PC) a company must demonstrate that it has rigorous manufacturing and quality processes in place to repeatedly produce the design that was certified. A company is not required to obtain a PC to produce airplanes. It was Eclipse's intent to obtain a PC directly after the TC. However, Eclipse and the FAA worked through a number of challenges before receiving the PC on April 26, 2007; seven months after receiving the full TC.

In hindsight, it is not surprising that it took us seven months past our TC and more than a year in total to receive our PC. We were a new company with a new design, new manufacturing process and, although most had extensive previous experience, we were a combination of people working together for the first time. We experienced challenges getting all of these processes working in unison.

In addition, it is rare for a new PC to be granted and therefore the experience with such things is limited within the FAA. We believe that the FAA did not initially have the people with the appropriate knowledge and experience assigned to our PC team. After repeated contradictory directions and lack of clarity around the approval process, Eclipse management expressed concern to FAA senior management that ongoing issues affecting granting Eclipse's PC were not correctly addressed. The FAA assigned an independent board comprised of technical personnel with exceptional experience to oversee the PC process — with the assistance and full involvement of the existing FAA leadership. Together, Eclipse, the independent and experienced board and our assigned FAA officers executed the PC project plan as outlined in the FAA regulations. After demonstrating compliance to the regulations, we were granted our PC on April 26, 2007.

Approval of Our Pilot Training Program Through the Flight Standards Board (FSB)

FAA regulations require that a pilot of a jet aircraft must be rated in that type of aircraft. This is called a Type Rating. A Flight Standards Board (FSB) is convened by the FAA once an aircraft is certified to evaluate and approve the pilot training program for a particular aircraft. The Eclipse 500 program was no different. To date 375 people have passed their FAA check ride and have received their Eclipse 500 Type Rating.

There has been much discussion regarding our interaction with the FAA's FSB. Between September 23, 2006 and December 13, 2006 Eclipse experienced two false starts with the FSB. On these two occasions Eclipse proceeded through the FSB process with a premature aircraft and the FAA correctly ceased the process until a completed aircraft could be presented. However, between January 16, 2007 to January 26, 2007, Eclipse provided the FSB with a complete and reliable production aircraft. With this aircraft the board was able to complete its evaluation of the pilot training program for the Eclipse 500.

It's important to highlight that during this timeframe, Eclipse was still a developing and young company coming to grips with aircraft production best practices. At the time, we did not fully understand the value of using a fully production representative aircraft for this approval. In hindsight, a more prudent course would have been to attempt approval once our aircraft matured to a certified level.

In-Service Experience of the Eclipse 500

Again, in more than 5,000 flight test hours, more than 32,000 total fleet flight hours, 21 months of customer deliveries and with more than 250 aircraft delivered, no injury or fatality to any Eclipse 500 pilot or passenger has occurred. No other aircraft in two decades has entered service with a better record. However, as with any new design, we have had issues with the reliability of some of our systems and components.

There are several ways to document the initial in-service record of a new aircraft.

- A Service Difficulty Report (SDR) is required by FAA Part 135 regulations for on-demand air carriers and Part 121 scheduled air carriers to report the occurrence or detection of failures, malfunctions or defects in an aircraft concerning 16 very significant events. By contrast, most privately operated aircraft, such as business jets, are not subject to the same stringent reporting requirements. The FAA instituted the SDR process to analyze and identify safety trends. An aircraft operator sends the SDR to the FAA for recording.
- A Service Bulletin (SB) is a path for aircraft and systems manufacturers to alert operators and customers to a change or update to an aircraft or how it is operated. Manufacturers can issue an SB to proactively inform operators and customers of changes or updates. Manufacturers are responsible for notifying operators and customers of an SB and its requirements.
- An Airworthiness Directive (AD) is the only mechanism that the FAA can use to mandate a change or inspection of the type design for aircraft that have already received a standard Certificate of Airworthiness. When an AD is published, the FAA sends the AD to all U.S. registered owners of an aircraft.

Service Difficult Reports (SDRs)

To date, 94 SDRs have been filed by Eclipse 500 operators since the aircraft was certified. Ninety-three (93) of these were filed by DayJet Corporation, the largest operator of the Eclipse 500 (28 aircraft) and the nation's first per seat, on-demand air taxi service.

Eclipse has analyzed the 93 SDRs submitted by DayJet and has concluded that only one meets the requirements of an SDR. It is our assessment that DayJet went beyond the required reporting requirements of significant difficulties and chose to report through the SDR process additional maintenance events and other issues. We believe DayJet did so out of an overabundance of caution and a certain amount of inexperience with the SDR process in an effort to build robust communications with its FAA Flight Standards District Office (FSDO) in Washington D.C.

Eclipse, as required, has a very robust process in place to review, disposition and act upon all SDRs. Our SDR review process is performed on an ongoing basis by a cross-functional group familiar with the design of the Eclipse 500. This group includes engineers, aircraft system leads, and Designated Engineering Representatives (DERs). The group makes individual recommendations for dispositions of the SDRs to the FAA. To date, 59 of the 94 SDRs have been recommended for closure to the FAA.

NTSB Investigations

Since entering service the Eclipse 500 has been the subject of two investigations by the National Transportation Safety Board (NTSB). The preliminary reports have been released on both; one is classified as an incident and one as an accident.

The incident occurred on June 5, 2008 at Midway Airport in Chicago, Illinois. The root cause of this incident was a flaw in the requirement for the software logic in the engine control system. This requirement was established at least two years prior to certification of the type design. The aircraft system during the incident performed exactly the way the software had been designed and certified to perform and was not the result of any hardware failure. Two teams of experienced engineers at Pratt & Whitney Canada (the engine manufacturer) and Eclipse Aviation — plus two certifying agencies: The FAA and Transport Canada — missed this requirement flaw. It was simply human error. Eclipse Aviation, along with the FAA, has taken action to ensure the continued safe operation of the Eclipse 500 while changes are being made to the software logic.

The accident occurred on July 30, 2008 in West Chester, Pennsylvania. A pilot operating an Eclipse 500 overran a runway at Brandywine Airport while landing. The preliminary NTSB report states that "No preimpact mechanical failures of the flight control system, brake system, engine control systems, or engines were discovered." After leaving the runway, the aircraft traveled down a 40-foot embankment and crossed a service road before coming to rest against a bank of trees and a chain link fence about 184 feet past the end of the runway. The aircraft was substantially damaged, yet the pilot and his young child were not injured. In fact, the aircraft cabin interior showed almost no signs of damage. This is a further testament to the design integrity of the Eclipse 500.

In Service Reliability and Improvements

The responsibilities of introducing a new aircraft are immense. Eclipse employs a variety of methods and systems to mitigate and prevent any service issue and to continually improve our aircraft. The aircraft possesses an electronic ecosystem that, for the first time in a FAR Part 23 aircraft, supports real-time communication about operating parameters. Thus, DayJet, as well as other Eclipse 500 operators, are now receiving data from the aircraft's advanced software and technical systems regarding systems health, troubleshooting and fault isolations. The aircraft's systems and equipment were designed to prevent cascading failures and limit the effects of single failures to manageable results. Extensive fault insertion testing and safety analysis prevents serious failures in the aircraft systems and equipment. The positive results of this design assurance program

have been proven throughout the continual examination of in-service difficulties of the Eclipse 500.

Eclipse employs a number of internal methods to identify, analyze and address in-service difficulties to ensure the continued airworthiness and safety of the aircraft. Two of the most notable are the internal Safety Review Board (SRB) and the review of the previously mentioned Service Difficulty Reports (SDRs).

The SRB consists of representatives from Flight Operations/Safety, Aircraft/System Safety, Quality Assurance, Engineering, Certification and Customer Support. This group also involves additional specialists for each situation and develops required containment actions for fielded aircraft concerns. In addition to the SRB and SDR reviews, an internal Reliability and Maintainability group evaluates the overall reliability of the aircraft and performs in-depth Root Cause and Corrective Action (RCCA) analyses as part of our overall Failure Reporting and Corrective Action System (FRACAS). The outputs of these efforts drive changes to the production process and, in some cases, design changes to improve the reliability of the aircraft.

Summary

Eclipse Aviation is dedicated to ensuring our aircraft and customer pilots are the model for general aviation safety. We have challenged the industry status quo by embracing technology and programs enabling comprehensive data collection, while shouldering the responsibility of continuously and proactively improving the Eclipse 500 and how it is operated. As a result, the Eclipse 500 was built to deliver exceptional safety performance. Its standard safety features rival those of aircraft costing millions of dollars more. The state-of-the-art Eclipse 500 cockpit is designed for safety through the redundancy of vital systems and its ability to reduce pilot workload.

Mr. Chairman and Members of the Subcommittee, Eclipse did something no other company has accomplished. We developed a truly revolutionary aircraft and created a new market segment that helped return relevancy and growth to general aviation. In the process, we created something much more difficult than an airplane; we created a blue chip company with more than 1,000 employees, all dedicated to building the best jet in the history of general aviation. We look forward to delivering unprecedented performance, reliability, training and service to general aviation and to our customers for many years to come.

Thank you for your time today. I will be pleased to answers any and all of your questions.

Respectfully submitted,

Peg Billson

ECLIPSE
AVIATION

October 16, 2008

Honorable Jerry F. Costello
Chairman
Subcommittee on Aviation
586 Ford House Office Building
U. S. House of Representatives
Washington, DC 20515

Dear Chairman Costello:

Thank you for your October 1st letter requesting additional information from the Eclipse Aviation Corporation ("Eclipse") concerning the Federal Aviation Administration's (FAA) certification of the Eclipse 500.

As you my recall from my recent testimony before the Subcommittee, the Eclipse 500 has an unprecedented safety record for a new Part 23 (General Aviation) aircraft. **In more than 38,000 total fleet hours and with more than 250 aircraft delivered, no injury or fatality to any Eclipse 500 pilot or passenger has ever occurred.** No other aircraft in two decades has entered service with a better safety record.

From its suite of advanced avionics, to the structural makeup of the airframe, safety was the overriding tenet of Eclipse's design philosophy for the Eclipse 500. In order to meet the Federal Aviation Administration's (FAA) stringent certification requirements, Eclipse assessed the Eclipse 500's performance and safety across thousands of test points, many in excess of what is required under Part 23. We are proud that the Eclipse 500 test fleet accumulated more than 5,000 hours prior to FAA type certification (the average number of hours accumulated by a test fleet is 1,100).

In fact, the FAA's Special Certification Review (SCR) team, comprised of experts in the certification process, undertook an independent analysis of various issues regarding the type certification of the Eclipse 500. Last month, they reported their findings and reconfirmed that the Eclipse 500 was in full compliance with the FAA Certification requirements and is a safe aircraft.

At it's peak in July 2008, Eclipse employed over 2000 employees throughout the United States and over 2 times that amount at our suppliers. Over 90% of our suppliers are based in this country. We at Eclipse are proud of the jobs we have created and the economic growth our airplane has enabled.

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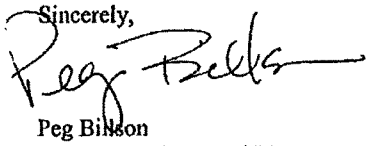
Thank you again for the opportunity to testify before your committee last month on behalf of one of the safest aircraft ever produced.

Sincerely,



Peg Billson
President and General Manager
Airplane Division
Eclipse Aviation
Attachment

Attachment **October 16, 2008**

FAA Aircraft Certification: Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EA-500

Questions for the Record

QUESTION: As you know, the focus of the Committee and IG investigations were not on Eclipse, per se, but were focused entirely on the FAA. However, we have heard testimony from numerous witnesses, that Eclipse management, in particular the former CEO, repeatedly appealed to senior management in Washington whenever they did not like what they were hearing from the regional certification office. Please comment?

Eclipse Response: Eclipse followed the communications procedures set forth in the FAA Certification Process Improvement (CPI) program. Those procedures allowed us to work with, and communicate with, specialists from 10 different FAA Aircraft Certification Offices (ACOs) and cross-functional FAA departments. All communications with either the ACOs, or any other FAA personnel at any level, were consistent with the detailed level of FAA involvement in the certification process that is an essential element of the CPI program.

QUESTION: The former Eclipse CEO, Mr. Raburn, seems to have been very aggressive in attempting to influence senior FAA managers in Washington. Did you observe this or otherwise have any knowledge that this was taking place?

Eclipse Response: Other than the procedures referenced in our response to question 1, I have no knowledge of other communications by Mr. Raburn with FAA personnel.

QUESTION: Do you know how often Mr. Raburn contacted the FAA Administrator, Mr. Sabatini, or Mr. Hickey?

Eclipse Response: I do not know.

QUESTION: Did he have routine contact with any or all of these officials?

Eclipse Response: Other than the procedures referenced in our response to question 1, I have no knowledge of other communications by Mr. Raburn with FAA personnel.

QUESTION: Was it a strategy of Eclipse management to appeal any adverse certification decision to senior FAA management?

Eclipse Response: No.

QUESTION: Did Eclipse have contractual obligations with investors that required it to receive FAA TC approval by September 30, 2006?

Eclipse Response: No.

QUESTION: What were the financial implications to Eclipse if you had not met that date?

Eclipse Response: There was no direct financial implication to Eclipse if it had failed to receive FAA Type Certification for the Eclipse 500 by September 30, 2006. In fact, September 30th had never been established as a certification date. March was the original certification date; then May; then June; then September 22nd. We finally finished showing compliance to all of the regulations the following Friday.

However, had the date been missed, Eclipse would have had to give certain customers who had placed deposits on the Eclipse 500 the right to terminate their deposit agreements and demand refund of their deposits. We cannot estimate how many customers, if any, would have elected to terminate their deposit agreements under this hypothetical circumstance.

QUESTION: We are aware that at the time of type certification, Eclipse had only complied with 23 of 65 items required to certify the avionics software using the approved industry standard (DO-178B). Is this why you pressured FAA to find an "alternative means of compliance?"

Eclipse Response: The FAA regulations do not allow for an "Alternative Means of Compliance" as part of the type certification process, so Eclipse did not request nor did the FAA grant one. Eclipse certified the avionics system by fully showing compliance to FAR 23.1301 or FAR 23.1309.

QUESTION: Did Eclipse file a Customer Service Initiative appeal in Washington, when the FAA Flight Standardization Board refused to recommend the EA-500 for single pilot operation?

Eclipse Response: The Flight Standards Board (FSB) expressed concerns regarding the state of the autopilot functionality and questioned whether or not it met the regulations. A letter was sent to James Ballough from Vern Raburn on December 15, 2006, stating that *'In accordance with Federal Aviation Administration (FAA) Flight Standards Customer Service Principles, Eclipse Aviation is elevating our concerns regarding...we believe you [Ballough] to be the next element in the chain of command.'* Our letter outlined the process that was used during the type certification process to ensure that the single pilot workload was acceptable.

QUESTION: How many EA-500s is DayJet operating today?

Eclipse Response: None. DayJet has suspended its air taxi operations.

QUESTION: How many total EA-500s are currently in <u>routine</u> operation?

Eclipse Response: I am not sure of what is meant by "<u>routine</u>", but there are currently over 225 Eclipse 500 aircraft in operation, which does not include the 28 Eclipse 500 aircraft previously flown by DayJet.

ECLIPSE
AVIATION

September 30, 2008

The Honorable Jerry Costello
Chairman
Subcommittee on Aviation
Committee on Transportation and Infrastructure
U.S. House of Representatives
Washington, D.C. 20515

The Honorable Thomas Petri
Ranking Member
Subcommittee on Aviation
Committee on Transportation and Infrastructure
U.S. House of Representatives
Washington, D.C. 20515

Dear Congressmen Costello and Petri:

I would like to thank you again for the opportunity to testify on September 17th before the Aviation Subcommittee regarding the certification of the Eclipse 500.

I have included two letters that I request be included in the official hearing record. They are:

1. A letter to the Department of Transportation's Inspector General (IG) requesting that Eclipse Aviation be given the opportunity to be formally interviewed by the IG's office prior to his report being finalized.

2. A letter to the Aviation Subcommittee on three specific issues Congressman Hayes asked Eclipse to clarify and address.

Thank you.

Sincerely,

Peg Bellson
President and General Manager
Airplane Division
Eclipse Aviation

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The Honorable Calvin L. Scovel III
Inspector General
U.S. Department of Transportation
1200 New Jersey Avenue SW
Washington, D.C. 20590

September 22, 2008

Dear Mr. Scovel:

I read and listened to your recent statement provided to the House Aviation Subcommittee on September 17th with great interest. As Eclipse Aviation's current President and General Manager of Eclipse Aviation's Airplane Division and its Chief Operating Officer during the certification process (both type and production) of the Eclipse 500, I was personally involved in many of the issues you raised during your appearance before the Subcommittee.

As I indicated during my oral testimony, Eclipse is disappointed not to have had an opportunity to be interviewed directly by your staff prior to the hearing and development of your public statement. As you know, IG personnel did make a visit to Eclipse in July 2008, along with FAA personnel, in order to access FAA files relating to the certification process of the Eclipse 500. At no time during this visit, however, did your staff interview Eclipse personnel with firsthand knowledge of the issues you are reviewing.

Eclipse continues to be supportive of the ongoing review into the Eclipse 500 certification process. However, as the certification process is an intricate and complex process it is imperative that information presented to oversight authorities, such as our office, be accurate. In this regard, I was disappointed to see many of the facts and assertions in your testimony to be out of context and factually inaccurate. Given the opportunity to discuss the issues with your team, I am certain that a complete and accurate accounting of the various issues can be presented prior to your report being made final.

I have outlined a few examples of inaccurate information presented in your statement:

- Statement – The Eclipse 500 was designed for use on "soft fields" and certified tires not designed for hard, paved runways.

  Fact – The Eclipse 500 was not designed or approved for unpaved fields, nor was that capability ever sought in certification. The tires delivered on the Eclipse 500 are not meeting their promised durability from the supplier and a change in tire type is in FAA certification testing now.

- Statement - FAA granted ODAR status in 2002 before approving the design of the aircraft without the "proven experience to perform the functions requested."

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Fact – Eclipse received ODAR status on four items in 2002, all relating to suppliers. In fact, Eclipse did not receive full ODAR status until seven months after it received its Production Certificate. A new company does not equal inexperienced people.

- Statement – Eclipse applied and FAA approved an alternative means of compliance for the aircraft's avionics software.

  Fact – The FAA did not use an alternative means of compliance to certify the Eclipse 500's avionics software. Under FAA regulations, this is not possible. Actually, FAA approved the avionics software by showing compliance to 23.1301 and 23.1309; the required regulations.

- Statement – EASA has declined to certify the Eclipse 500 for operation in Europe.

  Fact – EASA has not declined to certify the Eclipse 500 and in fact, there is an agreed to line of sight to receive EASA certification, without restrictions within the next 60 days.

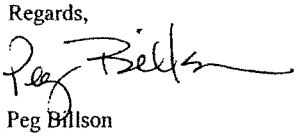
- Statement – In interviewing Eclipse's largest customer and operator of the Eclipse 500, one pilot "lacked the confidence that the aircraft could be operated safely by a single pilot." Therefore, it is recommended that the Single Pilot certification be reviewed.

  Fact – This is hearsay and selectively choosing the views of a single pilot to push for a review of the Single Pilot certification of the Eclipse 500. The Eclipse 500's demonstrated safety record speaks to the fact that the aircraft's fundamental design combined with Eclipse's FAA approved training program is working today and producing the safest aircraft introduced into general aviation in the last twenty years.

At this time, I would formally request that Eclipse be given the opportunity to be interviewed by your staff at the earliest possible date. As you move to conclude your investigation and finalize your report, I believe it is imperative that Eclipse's perspective, views and facts be appropriately given adequate consideration.

I look forward to hearing from you or your staff shortly.

Regards,



Peg Billson
President and General Manager
Airplane Division
Eclipse Aviation

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September 30, 2008

The Honorable Jerry Costello
Chairman
Subcommittee on Aviation
Committee on Transportation and Infrastructure
U.S. House of Representatives
Washington, D.C. 20515

The Honorable Thomas Petri
Ranking Member
Subcommittee on Aviation
Committee on Transportation and Infrastructure
U.S. House of Representatives
Washington, D.C. 20515

Dear Congressmen Costello and Petri:

I am writing in response to a request made during the September 17th hearing by Congressman Hayes that Eclipse Aviation ("Eclipse") provide a letter to the Subcommittee addressing three items related to the certification of the Eclipse 500 – the throttle quadrant assembly, single pilot certification and the pitot-static ports. The Subcommittee requested that Eclipse describe how these issues were addressed during the certification of the Eclipse 500, any problems that arose and their ultimate resolution.

I am happy to have the opportunity to provide the details surrounding these issues and the steps Eclipse took to resolve them.

Throttle Quadrant Assembly

On June 5, 2008 an Eclipse 500 on approach to Chicago's Midway Airport experienced a thrust-lever failure involving software that caused uncontrollable maximum engine thrust. As outlined in the Eclipse 500's emergency procedures manual, the pilots shut down one of the engines which immediately caused the second engine to begin idling and be unresponsive to the throttle. The pilots declared an emergency and landed the aircraft without injury.

The root cause of this accident was a flaw in the requirement for the software logic in the engine control system. This requirement was established at least two years prior to certification of the Eclipse 500 type design. The aircraft system during the accident performed exactly the way the software had been designed and certified to perform and was not the result of any hardware failure. Two teams of experienced engineers at Pratt & Whitney Canada (the engine manufacturer) and Eclipse plus two certifying agencies –

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the FAA and Transport Canada – missed this requirement flaw. It was simply human error.

Shortly after the Chicago incident, Eclipse was in immediate contact with the FAA and quickly determined appropriate preventive action while a longer term fix for the software could be developed. Eclipse issued a Customer Pilot Communication on June 9, 2008 advising operators not to use excessive force against the throttle forward stops. An Eclipse Service Bulletin was also issued to check the throttle quadrants on every Eclipse 500 to ensure that reasonable forces against the forward stop would not result in exceeding the maximum allowed throttle angle. The FAA issued an Airworthiness Directive (AD) mandating compliance with the Eclipse Service Bulletin. In less than 24 hours all Eclipse 500 fleet operators had compiled with the AD inspection requirement and were operating their aircraft normally.

As a follow-on design improvement Eclipse and Pratt & Whitney Canada are proceeding with an engine control system software change to provide more margin between the maximum expected throttle angle for normal operation and the angle at which the system senses an out-of-range condition. The new software will also ensure complete separation between the left and right engine controls. The software change is expected to be certified and fielded later this year.

The fact that the Eclipse 500 has experienced in-service difficulties warranting airworthiness directives does not imply that the aircraft was improperly certified. In fact, a comparison of the most recently introduced Part 23 (General Aviation) aircraft reveals a similar number of ADs and Service Difficulty Reports during delivery of their first 240 aircraft (see attachment). The vast majority of jet aircraft experience service issues that result in airworthiness directives and corrective action.

Single-Pilot Certification

It was always the intent to have the Eclipse 500 certified as a single-pilot aircraft as is most FAR Part 23 aircraft. In 2006, Eclipse requested that the FAA certify the aircraft for Single Pilot Instrument Flight Rules (SIFR) operations. FAA's Flight Standardization Board (FSB), which determines the pilot type rating of an aircraft, began its evaluation of this request.

In September 2006 and again in December 2006, the FSB met twice to evaluate Eclipse's pilot training program. In both instances Eclipse provided the FSB with a non-production representative airplane such that they were not able to complete their evaluation. At the time, Eclipse did not fully understand the value of using a fully production representative aircraft for this approval. That was our mistake and the FSB correctly ceased its evaluation process until Eclipse addressed all outstanding issues.

It is the issues identified during these two "false" starts that has confused some to conclude that the FSB recommended a two-pilot crew when in fact, when the evaluation was completed, a single pilot type rating was approved. In early 2007, we provided the FSB with a production compliant airplane and they were able to issue the SIFR operations type rating on January 26, 2007. Since then 432 people have passed their

FAA check ride and have received their Eclipse 500 type rating for single pilot operations.

It should be noted that the Eclipse 500 is not alone in its single-pilot rating. The attachment lists a number of other similar Part 23 jets that are certified for single-pilot operations. Single-pilot operations has long been the norm in the industry.

Pitot-Static Ports

An aircraft's pitot-static system is a system of pressure sensitive instruments that measures airspeed, altitude and rate of climb. Eclipse sought and received an "Equivalent Level of Safety" (ELOS) designation for the Eclipse 500's pitot-static system. It is important to note that FAA regulations and order allow for special conditions, such as an ELOS, when an unusual design feature of an aircraft is presented.

The Department of Transportation's Inspector General (IG) has referred to problems with the Eclipse 500's pitot-static system traced to "moisture build-up... due to the unusual placement of the static ports on the top of the aircraft nose and the lack of drainage."

Yes, it is factual that the Eclipse 500 has received a number of reported occurrences of alerts indicating a difference sensed between the left and right airspeed sensing systems. Moisture build up in the static system is suspected to be the cause of these discrepancies. Technical investigations have found that, although positive drainage exists, the system can be overwhelmed under certain conditions such as *melting snow on the static ports or heavy rain*. Eclipse is providing static port covers to our customers to protect against excessive water getting into the system.

Regardless, it should be noted that the design of the EA500 includes a redundant and *separate standby* pitot-static probe that has *always continued to provide airspeed and altitude information* when anomalies in the primary system have occurred.

The Eclipse family continues to be proud of bringing the world's first very light jet to market. The Eclipse 500 has an unprecedented safety record for a new Part 23 aircraft. In more than 38,000 total fleet hours and with more than 250 aircraft delivered, no injury or fatality to any Eclipse 500 pilot or passenger has ever occurred. No other aircraft in two decades has entered service with a better safety record.

Thank you again for the opportunity to provide these facts and our perspective on these issues.

Sincerely,

Peg Billson
President and General Manager
Airplane Division
Eclipse Aviation

Example Part 23 Aircraft Safety Comparison
Serial # 1 - Serial # 240

Make Model	Estimated Delivery SN1 - SN240	Single Pilot Certified?	Estimated Months to delivery 240 aircraft	Airworthiness Directives (AD)	Service Bulletins (SB)	Service Difficulty Reports (SDR)	Total Accidents	% of fleet with accident	Fatal Accidents	% of accidents that are fatal	Actual Fatalities
Eclipse 500	December 2006 - August 2008	Yes	20	3	72	92**	2	0.8%	0	0%	0
Cirrus SR20/SR22	August 1999 - November 2001	Yes	27	0	32	8	5	2.1%	2	40%	4
Columbia 300/350/400	December 2000 - June 2004	Yes	42	1	n/a	2	3	1.3%	0	0%	0
Cessna Citation Mustang (510)	n/a*	Yes	n/a	0	32	1	3	2.9%	0	0%	0
EADS Socata TBM 700 (850)	December 1990 - June 2003	Yes	150	18	n/a	65	11	4.6%	4	36%	9
Pilatus PC-12	June 1994 - December 2000	Yes	78	18	110	70	0	0.0%	0	–	0
Raytheon Premier I/IA	April 2000 - June 2007	Yes	86	3	85	29	2	0.8%	0	0%	0
Cessna Citation CJ1 (525)	March 1993 - February 1998	Yes	59	1	219	32	1	0.4%	0	0%	0
Cessna Citation CJ2 (525A)	October 1999 - December 2004	Yes	62	0	75	10	2	0.8%	0	0%	0
Cessna Citation CJ3 (525B)	October 2004 - May 2008	Yes	43	3	57	14	1	0.4%	0	0%	0
Liberty XL2	n/a*	Yes	n/a	0	n/a	0	5	5.3%	0	0%	0
Diamond DA-42	January 2005 - March 2007	Yes	26	0	n/a	0	0	0.0%	0	–	0
Piaggio P180	n/a*	Yes	n/a	25	n/a	52	3	2.4%	0	0%	0

* For companies that have delivered less than 240 of one model as noted by "n/a", the total fleet to date was used for comparison purposes

** 90 of the 92 Eclipse 500 SDR were submitted by DayJet

Example Part 23 Aircraft Safety Comparison
Since First Delivery

Make Model	Single Pilot Certified?	Estimated Deliveries as of E.O.M. August 2008	Airworthiness Directives (AD)	Service Bulletins (SB)	Service Difficulty Reports (SDR)	Total Accidents	% of fleet with accident	Fatal Accidents	% of accidents that are fatal	Actual Fatalities	Incidents
Eclipse 500	Yes	248	3	72	92*	2	0.8%	0	0%	0	3
Cirrus SR20/SR22	Yes	4,010	12	212	224	91	2.3%	40	44%	77	7
Columbia 300/350/400	Yes	700	6	n/a	24	9	1.3%	5	56%	16	0
Cessna Mustang	Yes	102	0	32	1	3	2.9%	0	0%	0	0
EADS Socata TBM 700 (850)	Yes	285	35	n/a	69	18	6.3%	8	44%	17	0
Pilatus PC-12	Yes	800	42	213	248	12	1.5%	4	33%	11	1
Raytheon Premier I/IA	Yes	250	3	95	47	2	0.8%	0	0%	0	1
Cessna CJ1 (525)	Yes	875	7	416	138	14	1.6%	6	43%	18	1
Cessna CJ2 (525A)	Yes	330	2	139	17	6	1.8%	0	0%	0	0
Cessna CJ3 (525B)	Yes	265	3	60	16	1	0.4%	0	0%	0	1
Liberty XL2	Yes	95	0	n/a	0	5	5.3%	0	0%	0	1
Diamond DA-42	Yes	490	5	n/a	19	0	0.0%	0	–	0	0
Piaggio P180	Yes	125	25	n/a	52	3	2.4%	0	0%	0	1

*90 of the 92 Eclipse 500 SDR were submitted by DayJet

Sources

1) Delivery Time and Total Deliveries: General Aviation Manufacturers Association Quarterly Shipment Reports and Aircraft Bluebook
2) AD's: FAA airworthiness directives database (http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAD.nsf/MainFrame?OpenFrameSet)
3) Service Bulletins: Manufactures Product Support/Technical Publications where available
4) SDR: AviationDB Service Difficulty Report (SDR) Query (http://www.aviationdb.com/Aviation/SdrBriefQuery.shtm)
5) Accidents/Fatalities/Incidents: NTSB Accident Database & Synopses (http://www.ntsb.gov/ntsb/query.asp)
   Note: The NTSB reports accidents and incidents during experimental flight testing, all data above reflects both delivered and flight test accidents/incidents/fatalities

ECLIPSE
AVIATION

October 9, 2008

The Honorable John Mica
Ranking Member
Committee on Transportation and Infrastructure
U.S. House of Representatives
Washington, D.C. 20515

Dear Congressmen Mica:

I am writing in response to your letter dated September 26, 2008 in which you request that Eclipse Aviation ("Eclipse") respond to several questions raised during the course of the September 17, 2008 hearing regarding the certification of the Eclipse 500.

I am happy to have the opportunity to provide Eclipse's views and perspectives on these important issues.

Is the EA-500 a safe airplane?

The Eclipse 500 has an unprecedented safety record for a new Part 23 aircraft. In more than 38,000 total fleet hours and with more than 250 aircraft delivered, no injury or fatality to any Eclipse 500 pilot or passenger has ever occurred. No other aircraft in two decades has entered service with a better safety record.

Therefore, without hesitation, I am confident and proud to state that the Eclipse 500 is one of the most-tested and safest Part 23 (General Aviation) aircraft. From its suite of advanced avionics, to the structural makeup of the airframe, safety was the overriding tenet of Eclipse's design philosophy for the Eclipse 500. In order to meet the Federal Aviation Administration's (FAA) stringent certification requirements, Eclipse assessed the Eclipse 500's performance and safety across thousands of test points, many in excess of what is required under Part 23. We are proud that the Eclipse 500 test fleet accumulated more than 5,000 hours prior to FAA type certification (the average number of hours accumulated by a test fleet is 1,100).

In fact, the FAA's Special Certification Review (SCR) team, comprised of experts in the certification process, undertook an independent analysis of various issues regarding the type certification of the Eclipse 500. Last month, they reported their findings and reconfirmed that the Eclipse 500 was in full compliance with the FAA Certification requirements and is a safe aircraft.

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In retrospect, what could have been done differently?

Eclipse's biggest mistake during the certification process was our lack of experience in dealing with the FAA's Flight Standardization Board (FSB). By providing the FSB with a non-production representative airplane on two different occasions, we contributed to the confusion surrounding the process by which the Eclipse 500's was awarded its single pilot rating.

If we had it to do differently, Eclipse would have waited and provided a production complete aircraft for the FSB to make their pilot training evaluation.

Why did it take five years to certify the Eclipse 500? How long should it take?

The typical timeframe to develop and certify a completely new aircraft is between 4 and 5 years. Eclipse applied for a type certificate in July 2001. According to FAA regulations, type certification applications for aircraft like the Eclipse 500 are generally effective for three years.

Eclipse's 5 year certification process is largely due to the faulty engine originally envisioned for the Eclipse 500. Eclipse ended its relationship with Williams International in November 2002 after it became clear that the development of the engine for the Eclipse 500 was significantly behind schedule and was not going to meet the requirements of the aircraft.

In February 2003, we announced a partnership with Pratt & Whitney Canada to develop the engine for the Eclipse 500. As a result of changing engine manufacturers, Eclipse experienced a delay of 24 months in its certification process.

The process of delegation and alternative means of compliance is set up to recognize the size, complexity and maturity of the industry organization being regulated and certified. In your view is this an appropriate way to see that safety is improved as technology improves?

It is important to note that Eclipse did not seek nor did the FAA approve any Alternative Means of Compliance (AMOC) for the Eclipse 500, as reported in the Department of Transportation Inspector General's (IG) testimony on September 17, 2008. According to FAA regulations, an AMOC can not be used during the certification process of an aircraft and therefore, was not used on the Eclipse 500.

However, FAA regulations do allow an "Equivalent Level of Safety" (ELOS) designation to be used when new and unique design features of an aircraft are presented. ELOS designation was used on the Eclipse 500. Approval of an ELOS goes through strict scrutiny and is reviewed and approved by FAA's Part 23 Standards Office in addition to the Aircraft Certification Office (ACO).

In our view, allowing the FAA and aircraft manufacturers the flexibility to achieve compliance with specific regulatory requirements is the best manner in which to ensure safety is improved as technology improves.

Some have characterized "alternative means of compliance" as a "loophole." Is that a far and correct representation? Can you characterize the negative effects to aviation is such alternative means of compliance were not allowed?

As I mentioned in my answer above, ELOS is fully explained in FAA regulations and FAA order. It is no loophole. While it makes sense for some aircraft manufacturers to follow published compliance methods, others may choose to meet and exceed regulations through a different process. Both approaches should be encouraged. I would argue that an ELOS designation invites more oversight, as additional experts review the request in detail to ensure the highest level of safety is being sought for the flying public.

We must maintain flexibility in the process and recognize the fact that the regulations will not satisfy nor keep pace with American ingenuity. ELOS allows such American creativity to continue to keep the U.S. as one of the world's aeronautical leaders.

Thank you again for the opportunity to provide our perspective on these issues. Should you have any additional questions, please feel free to contact me.

Sincerely,

Peg Billson
President and General Manager
Airplane Division
Eclipse Aviation

Committee on Transportation and Infrastructure's Subcommittee on

Aviation Regarding FAA Aircraft Certification:

Alleged Regulatory Lapses in the Certification and Manufacture of the

Eclipse Aviation EA-500

Prepared by Witness Maryetta Broyles,

Technical Program Management Specialist, Aircraft Certification Service,

SW Region Rotorcraft Directorate,

Manufacturing Inspection Office, ASW-180

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817-222-5183

September 17, 2008

Opening

Good morning, Chairman Oberstar, Chairman Costello, Congressman Mica, Congressman Petri, and Members of the Subcommittee.

I am an Aviation Safety Inspector (ASI) in the Fort Worth Manufacturing Inspection Office of the FAA. **One** of my duties as an ASI, is to evaluate new and existing manufacturing companies that produce commercial aircraft and new replacement parts for aircraft. I have been called to present the facts pertinent to the issuance of the Manufacture of the Eclipse EA-500 aircraft at Eclipse Aviation Corporation, located in Albuquerque, New Mexico.

I have worked for the FAA for 20 years. After coming to the FAA, I obtained my Airframe and Powerplant License. This required 3 years of night school while working full time. During my tenure as an ASI, I have performed over 485 evaluations including Aircraft Certification Systems Evaluation Program (ACSEP) of aircraft manufacturing facilities. As of this date I have been on three Production Certification Boards (PCB's). The purpose of the PCB is to evaluate the eligibility of the applicant for issuance of a Production Certificate based upon the preliminary findings and recommendations of the of the Manufacturing Inspection District Office (MIDO) and the PCB's review of the applicant's facilities and Quality Control Data.

Eclipse Aviation submitted an application for an Approved Production Inspection System (APIS). This was the first step in preparing Eclipse for a Production Certificate (PC). On July 10 through 21, 2006, I was a team member for the APIS preliminary District Office audit at Eclipse Aviation. The team consisted of five members. This evaluation was to determine if Eclipse Aviation's Quality System had the capability to comply with 14 CFR, Subpart F, §21.125. During the evaluation 15

noncompliances of the system were documented. The FAA sent a letter to Eclipse Aviation identifying the noncompliances, and requested corrective action.

On September 15, 2006, Eclipse made application for a Production Certificate. On September 25, through 29, 2006, I returned to Eclipse, as a team member, to review the corrective actions from the previous July APIS preliminary District Office (DO) audit and to review the Functional Test Procedures for production aircraft serial number 000001. When we arrived at Eclipse, corrective actions for the previous DO audit were not presented to us and had not been implemented. Since the corrective actions were not in place, we began our evaluation of the Functional Tests. The procedures were failing the review. The testes were written incorrectly, documentation was incomplete, and were not passing the specification requirements as documented. Once we determined the tests were not in compliance, the team leader switched the focus of the team to continue with the ongoing preliminary District Office audit. During this audit 20 additional noncompliances were identified. The FAA sent a letter to Eclipse identifying the noncompliances, and requested corrective action.

During the September 2006, visit at Eclipse it seemed that the company was not seriously working toward corrective action of the noncompliances discovered from the July 2006, audit. The push was to get the first production aircraft certified rather than work toward corrective actions of the quality system. The more we tried to coach the company to correct the quality system, the more resistance there seemed to be.

December 11 through December 20, 2006, I returned to Eclipse. The company's focus had shifted from getting a Production Certificate to getting an airworthiness certificate issued on aircraft Serial Number 000001. Eclipse sent corrective actions from the July and September audits to the FAA on November 16, 2006. These corrective actions were not verified because our management conveyed to

us that we were to work on nothing but the airworthiness of the aircraft. There were three inspectors on-site to complete 31 Functional Tests and verify the conformity of the aircraft to type design. Eclipse was to conduct all FTP's prior to presenting the aircraft to the FAA for approval. The agreement in place between FAA and Eclipse was that the company would present a signed FAA Form 8130-9, "Statement of Conformity" certifying that, the company had complied with 14 CFR, Subpart B, Section 21.33(a) which refers to Section 21.33(b) and states in part, "the applicant must make all inspections and tests necessary that materials and products conform to specifications, parts of the products conform to the drawings and manufacturing processes, construction, and assembly conform to those specified in type design." When the FAA received the signed certifying documents, we would conduct all the Functional Tests on one aircraft. Once the first aircraft passed all the tests, we would look at fewer tests for the second aircraft, and even less on the third. When Eclipse demonstrated they could produce a conforming aircraft, we would allow the Organizational Delegation Airworthiness Representatives to conduct the conformity and inspection of the aircraft. The FAA would then spot check the aircraft and issue a Standard Airworthiness Certificate.

Eclipse presented the aircraft to the FAA with a signed "Statement of Conformity" and we began conducting the tests. The tests failed repeatedly. During the December visit, we reviewed 28 of the 31 Functional Tests. 11 of the 28 tests passed. Examples include:

- The Cabin Pressure Vessel and Delta P Limiter was presented to the FAA five times. When we checked it on December 13, 2006, it failed again.
- The BASS (VORE/FACV) & CCS Door Actuator was presented to the FAA four times and failed again on December 15, 2006. After three attempts, the test passed.
- The Avionics RTS was presented to the FAA three times. When conducting the test the display panel went blank. When I asked the technician what happened, she stated "That happens all the time." The test failed.

- The Landing gear System was presented to the FAA nine times before it passed the FAA review.

Eclipse needed to rewrite some of the FTP's to meet the requirements so the tests could be performed properly.

I went on vacation the week following the trip to Eclipse and returned to work on January 3, 2007. When I returned I was informed that a Standard Airworthiness Certificate had been issued to aircraft serial number 000001 on December 31, 2006. This was surprising to me due to the numerous Functional Tests that had failed inspection and were incomplete when we left Eclipse on December 20, 2006.

The July and September, 2006, audits documented 35 noncompliances. Eclipse sent corrective actions from the July and September audits to the FAA on November 16, 2006. These corrective actions were not verified.

The official Production Certification District Office Audit was conducted February 5, 2007, through February 15, 2007. I was not on this team. The team documented 42 noncompliances during the audit. From July 10, 2006 to February 15, 2007, three audits of Eclipse Aviation's quality system were conducted. A total of 77 noncompliances were documented.

During my visits to Eclipse, I felt that Eclipse was controlling our schedules and managing FAA resources. An example of Eclipse calling the shots was when we called our manager and asked that we be allowed to return to Fort Worth one day early due the weather conditions. We were told to stay and complete our inspections. We continued with the inspection, while most of the Eclipse employees were told to leave due to hazardous weather. Another example; in April, 2007, Eclipse was preparing

an aircraft for certification. We were told by Eclipse to go back to the hotel and we would be on-call all weekend. They said it may be midnight before the aircraft was ready for certification, but whenever they called we should be ready. The aircraft was not ready for certification until the following week.

On March 2, 2007, Manager, FAA AIR-1 appointed an independent team to oversee airworthiness and the Production Certificate for Eclipse. The Rotorcraft Directorate Manager was removed from the program and we were informed that the independent team leader was now managing the project. When the team leader took over, he removed the FAA Principal Inspector from the program. The project was then transferred from the San Antonio Manufacturing Inspection District Office (MIDO) to the Fort Worth MIDO. A MIO inspector was assisting the San Antonio MIDO with the transition to the Fort Worth MIDO. A short time later, the MIO inspector was removed from the project.

In April 2007, I was selected to be a team member on the Production Certification Board for the issuance of the Production Certificate. The evaluation was conducted April 9, 2007, through April 16, 2007. Sitting in the back of the room were five FAA managers. My Manager was assigned as the Production Certificate Board Chairman. During the internal FAA in-brief, the independent team leader spoke to the team and stated that Eclipse had been audited numerous times. He talked about how the company had improved since he had been appointed leader of the program. Because I had been to Eclipse on several previous occasions, I was surprised that they had made such a turn-around in just a few months. The independent team leader continued his briefing and stated that we were there to look at the quality system and determine if a Production Certificate should be issued. He stated that we should do a high level or overview of the system because the company had already been audited numerous times. It was then stated "in other words we need to only go an inch-deep when evaluating the quality system." I was shocked when I heard this statement. I had never been told to go only an inch-deep when conducting an audit. Order 8120.2D, Production Approval and Certificate

Management Procedures, paragraph 48 b., states that the applicant should be advised that the PCB is responsible for making a **thorough** evaluation of the applicant's QC system/data, organization, production facilities, and if deemed necessary, supplier facilities. I remembered that Eclipse hadn't provided corrective action for the first audit for 4 months and the second audit for 2 months. Then the focus shifted from audits to getting the first production aircraft certified and the corrective action from the first two audits had never been verified. To do only an overview of the system when corrective actions were not verified and Functional Tests were failing was in conflict with our guidance.

When the meeting was over I went to the production floor to conduct my evaluation of the manufacturing system. I am a very thorough evaluator. During my evaluation I found issues with the Horizontal Stabilizer Assembly. The position light wire was crimped too tight, which could cause chafing. The bonding application on the de-ice boot was not fully covering the entire area approximately ½-inch from the leading edge. These discrepancies should have been corrected before the Eclipse inspector signed it off. I requested the drawings to evaluate the condition further. When looking at drawings, one drawing led to another and so on. My escort said to me "Maryetta you are going more than an inch-deep. You are going too deep." I was surprised that my escort had heard that statement. I do not know how he received the same information that was briefed only to the FAA. I acknowledged his remark.

With the five managers sitting in the back of the room, taking notes on everything that was said, I felt as if we were being monitored on our performance. In all my years as an inspector for the FAA, I have never felt the pressure from FAA Managers that I felt when Eclipse was trying to get their Production Certificate. We were being monitored on our performance and with the removal of Managers and Inspectors from the project; I was cautious about what I said and did. I have successfully approved several other companies for production and have never experienced this level of involvement or

monitoring from Washington Headquarters. We followed our guidance and regulations and spent enormous amounts of time coaching and providing assistance to Eclipse. Issues were identified to prevent safety problems. We were directed to get the job done and money and resources was no object. I am proud to represent the FAA and be a part of a world-class organization in advancing aircraft safety. Our actions during this trying time were honest.

One of the core values of AIR is to praise each other publicly, and recognize and regard others for excellence. I feel the inspectors were pressured and discredited when we were trying so hard to accomplish our job.

This concludes my statement.

Testimony of

Tomaso DiPaolo, Aircraft Certification National Representative
National Air Traffic Controllers Association

Before the House Transportation and Infrastructure Committee
Subcommittee on Aviation
Wednesday, September 17, 2008

FAA Aircraft Certification:

Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EA-500

The National Air Traffic Controllers Association (NATCA) represents aviation safety professionals including the aerospace certification engineers, flight test pilots, and technical/administrative personnel in the Federal Aviation Administration's (FAA) Aircraft Certification Division. In addition to my 20 years of service as an aerospace engineer at the FAA's Chicago Aircraft Certification Office, I serve as the NATCA Aircraft Certification National Representative.

The FAA Aircraft Certification Division is authorized by Congress with the inherently governmental mission of ensuring that aircraft are designed, analyzed, and tested to a minimum level of safety. Once proper testing and analysis are conducted, these engineers review the results and determine whether the aircraft is in compliance with safety regulations. If all regulations have been met, the FAA gives its seal of approval by issuing a type certificate (TC). Normally aircraft have various limitations, such as weight, performance, or life limits. These limitations are to be denoted in the type certificate data sheet (TCDS), flight manual, and maintenance and overhaul manuals. Some aircraft are approved with heavily restrictive limitations. This allows the aircraft to enter the market but only to be flown in a limited capacity, giving the company time to fix the remaining concerns.

In the case of the Eclipse 500 Jet type certification project, safety, employee complaints, and undue FAA management pressure for speedy certification forced NATCA to file a grievance. All information discussed herein is produced under the protections of this hearing, applicable law, and Congressional authority. Information is presented in chronological order although some information may have been disclosed to the Union after the grievance was filed.

Creating the Partnership Safety Plan

According to the FAA's type certificate data sheet (TCDS) for the Eclipse EA500 aircraft (referred to as a Very Light Jet), the application was dated in July of 2001, but briefings to the FAA actually began in spring of 2001. As the Very Light Jet (VLJ) represented an entirely new aircraft design, Eclipse experienced issues with design development, testing and safety. As a result, the project was not completed within the standard three years[1] and the company applied for and was granted an extension. Although a second extension could have been granted, no such request was ever made.

Responsibility for this project was initially given to the FAA's Chicago Aircraft Certification Office (ACO) in conjunction with both the Williams Engine Company (Williams) and the Eclipse Aviation Corporation (Eclipse). During the project, the Chicago ACO employees were required by FAA management to create a Partnership for Safety Plan (PSP) with Eclipse – a plan that outlines the goals and procedures specific to this project – and complimentary Project Specific Certification Plan (PSCP) to support the PSP goals. This PSP outlined a number of procedures, timelines and goals that fell outside of the FAA's authorization and other federal

[1] Ref FAR 21.17

aviation safety regulations. The need for a PSP or PSCP is only recommended by an FAA Order and is not required by law or regulation.

Some troubling aspects of the Eclipse PSP and PSCP included:

- A timeline that forecasted type certification by December 2003, highly aggressive for a new company and new aircraft design.
- The FAA committed to "optimal delegation" to the "maximum extent practicable," handing over much of their oversight and testing responsibilities to the company itself, a dangerous decision for such a new aircraft design.
- Implications that Eclipse would have sole decision-making power over who would be the Administrative Designated Engineering Representatives (DERs). The PSP also assigned that the key representative for the Administrative DER position would be from the Williams Engine Company.
- All Eclipse data would be returned to Eclipse after TC issuance and not maintained by the FAA.
- Eclipse was allowed to appeal technical decisions to higher level FAA management and could limit when the FAA needed a safety concern document, such as a special condition or an issue paper.
- The PSCP highlighted the dependence of Eclipse's aircraft design on aviation equipment that had been granted a Technical Standard Order (TSO). By using TSO units throughout the aircraft, it shifts costs and pressure for certification onto the TSO company (supplier). In addition, the PSCP highlighted that the Williams engine and the Eclipse aircraft were highly integrated and interdependent.

Pressure on Eclipse Engineers

In November of 2002, the Williams engine was dropped from the aircraft design. In February of 2003, the Pratt & Whitney of Canada (PWC) 610F-A engine was identified as the replacement engine. This was a major technical engineering design change and the whole propulsion and software integration system needed to be revamped. Despite the new need for additional research and design, the certification timeline did not change. Eclipse engineers and flight test pilots were then under extreme pressure to meet their business plans. For example, Eclipse personnel informed FAA engineers that they would need to do research and development for aircraft flight testing in only 7days then present the aircraft immediately to the FAA for type inspection authorization (TIA) certification flight testing.

The Eclipse DERs were being pushed to meet the company perceived minimum of the regulatory requirements and to further minimize testing in order to meet these requirements. For example, during a three-month stretch, the Company DERs were continually trying to tell the FAA engineers what the intent of complying with fuel systems regulations were despite the fact that the FAA engineers were clear in what the regulations required.

In 2003, the Eclipse project was transferred from Chicago ACO to the southwest based ASW-150/Airplane Certification Office (based in Fort Worth, Texas, referred to as "ASW"). The Chicago team had about 9 employees while the ASW-150 had about eight employees with the assistance of five more from other certification offices.

FAA's Imposed Pay for Performance Plan

On July 10, 2005, the FAA unilaterally imposed a new pay system and work rules on multiple NATCA bargaining units including the Aircraft Certification. The new, non-negotiated pay system is called Core Compensation. One aspect of this pay system is that it replaces annual step increases with Superior Contribution Increases (SCI). These SCI increases are awarded to some individuals based on a management only assessment of their performance for the fiscal year.

This is problematic on a number of levels. First, it creates a competitive work environment since there are only a fixed number of SCI increases which is not conducive to the type of teamwork required for such high level engineering projects. Second, managers are not required to clearly justify why a particular employee was chosen or denied an SCI. This allows managers to use subjective or in some cases inappropriate criteria for rewards or punishment. In the case of Eclipse, FAA managers were able to retaliate against an employee who refused to buckle under management pressure to change their technical positions. Third, it is our understanding that top FAA management pay is tied to the accomplishment of goals within the FAA business plan, which contains a number of non-safety items. For example, the FY 2006 business plan contained the goal of certifying a Very Light Jet by the end of the Fiscal Year. As pay was tied to the accomplishment of this goal, FAA engineers in the Eclipse project came under significant pressure to certify Eclipse within this time frame, despite outstanding safety concerns and the lack of demonstrated compliance to the safety regulations.

FAA-Private Sector Cross Pollination

In the fall of 2001, it was announced that the former FAA project officer overseeing Eclipse project, Mr. Randy Griffith, had left the FAA and was now the Eclipse Aviation Airworthiness Coordinator. Mr. Griffith thus became the principal point of contact to the FAA on behalf of Eclipse. This appears to be in violation of FAA ethics standards. According to the FAA ethics training manual for 2006 a former agency employee who accepts a job may "have some limitations in communicating with his former agency on his company's behalf" and one cannot, for a period of two years, represent his or her new employer before their former agency."[2]

Pressures on Project Officers

Project Officers (members of the NATCA Aircraft Certification bargaining unit) also found themselves under tremendous pressure regarding the Eclipse certification project. One example of this occurred during a technical meeting with Eclipse, the project officer, and the Chicago ACO. The meeting began with the project officer taking a firm position in regards to function and reliability testing policy. During a break, the project officer was informed that the lead manager of the Small Airplane Directorate (SAD) was on the phone, so he was brought into a private Eclipse office to take the call. After the break was over, the project officer returned to the meeting and chose to back off his technical position. The project officer later told a Chicago ACO engineer that during the telecom, the lead manager from SAD ordered him to back off his technical position in regards to function and reliability.

[2] Federal Aviation Administration Annual Ethics Training 2006 "A Brief Wrap on Ethics" pg 36

Additionally, project officers were forced to do their jobs without proper support and without open communication with front-line ACO engineers. One project officer was forced to juggle several projects in addition to Eclipse, and asked for assistance so that the Eclipse program could receive the attention it required. This officer was also tasked with coordinating the logistics of an Equivalent Level of Safety (ELOS) document for the Airspeed Indicating System in the Eclipse 500 Jet. An ELOS is written when, due to the unique design of a part or system in an aircraft, it is unable to comply with the letter of the safety standard but is able to comply with the intent of the standard. This project officer was not informed by FAA management of the technical opposition of the ELOS by the ACO engineers, and thus was tricked into helping create the ELOS despite outstanding safety concerns. This FAA management interference occurred many times in the Eclipse project. At the end of September of 2006, the project officer was told by his managers that "Eclipse had met their compliance goals", but was not made aware of the still open technical objections by ACO engineers.

Lack of direct communication with the ACO engineers coupled with the high level of FAA management involvement compromises the project's safety objectives. The standards themselves became muddled, while management coercion and lack of communication with engineers made it nearly impossible to determine if standards were being met.

Pre-Type Certificate Concerns with Eclipse – Fort Worth Aircraft Certification Office

After the project was moved to ASW-150 in Fort Worth, Texas, I started to receive many verbal complaints and concerns from employees. In the initial PSP, it was stipulated that after the project's transfer to the southwest region, the PSP would be reviewed and renegotiated. Unfortunately, after said transfer, complaints were made to me that the hands of the engineers in Fort Worth were tied due to the initial PSP and other earlier documents that prevented these engineers from formally bringing up new safety concerns. In one case, an engineer was opposed to an ELOS which was written to address how the airspeed indicating system and pitot static system were created, but his concerns regarding the ELOS and the performance of the Eclipse 500 Jet were dismissed by FAA management. Several months after the aircraft was approved, the FAA would have to reverse itself and write an airworthiness directive (AD or safety law) due to three incidents where the pitot static system failed due to freezing condensation – exactly what the engineer and the regulations said needed to be addressed. This AD also limited the aircraft to daytime flying and mandated the use of two pilots.

Because the design of Very Light Jets (VLJs) differed so significantly from conventional jets, Federal Aviation Regulation number 23 proved ill adapted for Eclipse certification. It was brought up to me, well after the filing of the grievance, that the Small Airplane Directorate (SAD) had issued an "unofficial Part 23 Jet Certification Guide" to address the application of new safety conditions to various classes of light jets. It is my understanding that the document was not applied in total to the Eclipse 500 Jet due to the objections of the Eclipse company and due to the PSP/PSCP goals and procedural limitations.

Provisional Type Certificate and Verbal Harassment

On July 27, 2006, the FAA held a large press event at the Experimental Aircraft Association (EAA) air show in Oshkosh, WI to announce the preliminary TC approval for the Eclipse 500 Jet. According to an FAA press release there were "no major problems" complicating a future issuance of the final TC. Yet problems persisted and the engineers continued to express their technical objections that the aircraft was not meeting the safety regulations. The FAA ignored these protests and issued the preliminary TC in spite of these issues.

A few weeks after the provisional TC press event, a meeting was held at the Eclipse headquarters in Albuquerque, NM. According to reports from engineers present at that meeting, Mr. John Hickey/AIR-1, and other top level FAA DC managers were present at the meeting, although managers from the small airplane directorate were conspicuously absent. During the meeting, Mr. Hickey told the group "we are here to save this company [Eclipse]". One engineer responded that his job was to make sure the aircraft complied with the safety regulations, and he was subsequently rebuked by Mr. Hickey in front of the other employees. Mr. Hickey then proceeded to intimidate and verbally attack each individual on the team. When I sought to address this harassment by calling Mr. Hickey in my capacity as the NATCA Representative, I was directed instead to his assistant manager, Dorenda Baker/AIR-2, who dismissed my concerns by saying that the engineers "misunderstood" Mr. Hickey and that he was only encouraging them to think outside the box.

Final Type Certificate – Outstanding Concerns

During September of 2006, I was informed by bargaining unit engineers that the Eclipse Avidyne electronics suite was still not functioning safely, had not complied with the TSO requirements, and needed further research and development. At times, one of the two screens the pilots were using would blank out for fifteen-second intervals and thus deprive the pilot of critical information. The first attempt to fix the problem was unsuccessful; rather than preventing the screens from turning blank, the changes prevented the blank screen from returning to functionality. Because of this safety concern, the engineer did not approve the related FAA document, citing that the electronics suite did not comply with regulations. Just as with the pitot static system, this engineer's technical assessment was proven accurate. In February of 2007, Eclipse announced that they were no longer going to use the Avidyne suite due to its lack of reliability and functionality and would be retrofitting aircraft with the Avio NG. In an informal conversation with Avidyne, I was told that with more time and testing Avidyne would have been happy to address what they acknowledged were legitimate pre-type certification safety matters.

Nothing would deter the FAA from their certification goal, not even ongoing tests. I was informed that while FAA flight test pilots were in the air conducting flight tests, a group of FAA managers had met and determined that the Eclipse aircraft had met their compliance goals. The FAA flight engineers and flight test pilots were shocked to say the least.

Well after the filing of the grievance, a copy of the FAA's final type certification board meeting minutes was provided to me for review. That meeting was held in late July of 2006 and highlighted four and a half pages of outstanding safety concerns and incomplete tests – some of

which I have outlined above. Despite these outstanding concerns, there was no discussion of moving the type certification goal past the end of September of 2006 and into the next fiscal year.

On September 29, 2006, I spoke with one of the engineers and was told that they were not going to sign off and approve the TC for the Eclipse aircraft. I reaffirmed to the engineers that NATCA was behind them 100% and appreciated the good safety work they had accomplished. These engineers did not sign off on the TC approval.

According to my understanding, the next day, September 30, 2006, FAA management ordered the Eclipse project manager to come into work on a Saturday and convinced her to sign off on an Eclipse document approving of all engineering and flight test aspects of the Eclipse 500 Jet. The final TC was then signed by the Ft. Worth AWS-150 Manager, Michele Owsley. The Eclipse TC document allows the aircraft to fly with almost no limitations, despite the clearly stated non-compliance of its software systems. The FAA type certificate data sheet (TCDS) fails to establish any significant limitations or restrictions or identify any mitigation document created especially for Eclipse by FAA management. Such limitations are standard procedure when outstanding concerns persist.

The FAA management issuance of a TC without allowing the aircraft certification engineers and flight test pilots to properly complete their assigned certification/safety responsibilities is in direct violations of laws, regulations, and policies. The issuance of a TC without concurrence of all FAA engineering and flight test personnel is a significant change in proper FAA engineering procedures. In addition, this behavior contributed to significant adverse affect to the morale and performance of the engineering workforce as it degraded their professionalism by ignoring their technical decisions and dismissing the value of comprehensive testing.

NATCA Files a Grievance

On October 20, 2006, after discussions with some of the FAA engineers that worked on the Eclipse program and local NATCA representatives, NATCA decided to file a grievance against the FAA. The grievance seeks to obtain proper legal protection and representation of the employees that were involved in the project and allow the employees the option to not work any further on the Eclipse project. In addition, the grievance seeks to remedy damages caused by the FAA's flawed pay for performance plan by prohibiting the FAA from penalizing any employee for expressing or noting safety issues during the Eclipse aircraft program. It was a concern of the Union that the imposed pay rules would allow managers to reprimand, issue negative performance evaluations or ratings, or deny employees any or the maximum performance pay increases (known as SCI ratings). Since the filing of the grievance, the Union has been approached by two employees that were given less than the maximum SCI rating due to their technical positions in the Eclipse program.

The FAA has never formally responded to the grievance although the grievance described a remedy wherein the Union and the agency could meet to bargain to restore the professionalism that is essential in the agency's safety mission. With FAA management continuing to overturn engineer's safety decisions and the diminishing trust between the FAA and the engineers,

NATCA has stepped in to file more grievances and technical safety letters and comments on behalf of its bargaining unit employees. NATCA bargaining unit employees have also submitted evidence to Congress of further examples of FAA management maintaining dangerously close relationships with the industry, as this problem is not limited to the FAA's relationship to the Eclipse Corporation.

Post Type Certificate Review

Many problems and near accidents have occurred with the Eclipse 500 Jet since the issuance of its final TC. A November 16, 2006, Avweb Flash article reports Eclipse grounding its Eclipse 500 Test Fleet. A memo from Eclipse to its customers states that the company chose to ground the Eclipse fleet for two weeks because of problems with the aft wing attachment bolt bushing. According to Eclipse, the aft wing attach was designed to prevent forward and aft wing flexing during hard landings. However, in the memo, the company expressed concerns over the potential for wing separation or failure on the Eclipse 500 Jet. The Eclipse memo also announced windscreen cracking problems in the patch holes where the windscreen attaches to the airframe. Cracks are reported on the outer layer, but loss of pressurization is a concern. The cracking is reported as a structural fatigue issue, which is unusual for an aircraft that is still so new, and Eclipse is requiring a 100 cycle visual inspection. In light of this, no action was taken by the FAA.

On March 2, 2007, an Eclipse advisory letter announced eight major safety and production in the areas of functional test procedures (FTP), manufacturing workforce, and production rate.[3] According to the article, the bolt bushing problem has been corrected, but Eclipse is still experiencing supplier delays and quality problems, FTPs are being rewritten because of accuracy issues, safety-critical friction stir has required special engineering analysis, and DER approval, and "some components" are experiencing higher failure rates than anticipated. Still no action was taken by the FAA.

In early June of 2008, an Eclipse 500 aircraft nearly has an accident at Midway airport in Chicago, IL. The aircraft almost crashes due to the failure of the highly integrated engine software and electronics system, which allow the pilot to control engines properly during landing. It came to NATCA's attention that an FAA chief scientific and technical advisor was rebuked for investigating this matter and for reporting his findings that the Eclipse software system was non-compliant to the regulations.

As recently as August of 2008 another engine software incident occurred. An Eclipse 500 Jet attempting to land in Pennsylvania drove off the end of the runway. It was reported that the engines were, again, unable to be shut down. No casualties were reported, but a small child may have been injured.

As of September of 2008, the European Aviation Safety Agency (EASA), the European equivalent of the FAA, has not yet certified the Eclipse 500 Jet. One outstanding technical concern is the 30 minutes of reserve electrical/battery power after loss of engine power, which

[3] Aero-News.net article "Eclipse 500 Production Schedule Slips Due To Several Issues" http://aero-news.net/news/commbus.cfm?ContentBlockID=50a01fc0-d407-4fa4-978a-52f735ed2b9c&Dynamic=1

had been approved by the FAA management. Like FAA engineers and the chief scientific and technical advisor (CSTA), EASA believes that the aircraft should have 60 minutes of reserve electrical/battery power. However FAA management overruled these technical findings during the US certification process.

In anticipation of this hearing, the FAA has begun and concluded a special certification review (SCR) of the Eclipse program and a service difficulty review report. In both cases, FAA engineers with the technical expertise on light jets have not been included in the final assessment of the data developed. The SCR team of alleged specialists is being asked to determine if any pre-TC safety issues have manifested as service difficulties since the aircraft entered the market. This team, led by a former Boeing employee, is composed of managers outside of the Small Aircraft Directorate and all but one of who reportedly have no experience with small jets certification. This team does not appear to comply with the intent of the FAA's SCR policy.

Conclusion and Recommendations

The FAA's behavior during the certification of the Eclipse 500 Jet was inexcusable. They intimidated and coerced federal employees into ignoring safety regulations. Our safety system works because of the laws and regulations that exist to protect the flying public, but it will only continue to function if those laws and regulations are followed. The FAA must have a zero-tolerance policy with individuals that encourage non-compliance and thus put the flying public at risk. Therefore, I would like to offer the following recommendations:

1. The FAA's business plan needs to be refocused on safety-only mission related goals. Mandating a specific timeframe for certification of an aircraft creates unnecessary pressure for speedy certification and compromises the safety and integrity of the aircraft.
2. Title 49 must be amended to allow the Union to negotiate fair and professional pay procedures that encourage and reward compliance to the safety mission of the agency.
3. Delegation must be restricted to individuals who are reviewed and approved directly by the FAA, not using a private company as a surrogate. Allowing a company to select the individuals who determine compliance creates a conflict of interest.

I would like to thank these engineers and flight test pilots who did their job by raising the questionable management tactics to the Union. I would also like to commend this committee and the Inspector General for investigating the questionable management tactics and allowing the truth to be presented in an open public forum.

Written Statement

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Aircraft Certification: Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EA-500

Given before the U.S. House of Representatives Committee on Transportation and Infrastructure's Subcommittee on Aviation on September 17, 2008

The FAA's Rotorcraft Directorate, has conducted itself in an ethical, honorable and professional manner in the matter regarding the Eclipse Aviation Corporation (EAC) Eclipse 500 jet. The employees involved in the Eclipse 500 certification as well as their fellow FAA employees from around the country are the finest employees I have had the privilege to serve with. There have been characterizations regarding professional competence and conduct that are unfair and unmerited.

As the Manager of the Rotorcraft Directorate, I was ultimately responsible for the engineering compliance oversight of the Eclipse 500, lead by Ms. Owsley. Likewise my role was similar in the oversight of the production/manufacturing aspects of the Eclipse 500.

The Eclipse jet is a novel jet in this day. However, the company is still required to demonstrate compliance to the Federal Aviation Administration rules regarding both design and production.

The events, which I will describe, regard a Department of Transportation Inspector General investigation into the inappropriate influence by FAA officials in both the EAC 500 Type Certification and Production Certification programs.

In August 2006, I was directed by the Director, Aircraft Certification Service to personally become involved in the Type Certification program of the EAC 500. This can differentiated from the 250 other programs within the Rotorcraft Directorate and my earlier position in the Engines and Propellers

Directorate, where I rarely had this type of either direction or Washington involvement.

The events leading to EAC 500 problems are numerous and somewhat complicated. I will as best I can simplify this portrayal. EAC was a brand new company that was trying to make a big splash in the aviation industry. Articles in various trade publications and interviews the Chief Executive Officer, Vern Raeburn created a very public and well documented awareness of the EAC 500.[1,2] Vern was even a keynote speaker at the Aircraft Certification Services' all-mangers meeting. However, they were befallen by an engine design issue that could only be solved by a completely new manufacturer. Imagine if you will, you have placed an order for a new 2009 automobile only to find that the promised power plant must be changed and you will have to wait – and the company still holds your financial deposit.

This was a company that aspired to go from a production rate of zero to 150 in the first year (2006) and 600 their second year (2007)-- Unheard of in the aviation industry and unrealistic. Further, this was a company that wanted to gain its engineering approval – aka TC, its production approval or PC, its Repair Station Certificate and have aircraft awarded their Standard Airworthiness Certification all within 15 days. That would similar to a student going to college for 4 years and expecting to get two BS's and a Master's all the same day -- Possible – but highly unlikely. No amount of FAA "coaching" would dissuade EAC executives and staff that this feat was not practical and overly ambitious. This did not stop the public proclamation of 31 March 2006 Type Certification date by EAC in both

Business and Commercial Aviation and *AOPA Pilot* magazines. During a July 2006 visit to EAC the FAA Administrator was briefed on the March 2006 TC date by Vern Raeburn; this created an additional "atmosphere" of expectation[3]. Mr. Raeburn's casual mention of several high ranking state and federal officials only raised our awareness of the political clout that could be brought to bear.

EAC had over the previous years, established a legacy of not meeting its commitments to the FAA. EAC rarely submitted a report on time, yet had the gall to drop a report on the FAA and want approval immediately. It was not uncommon for other FAA offices to tell the Ft. Worth Airplane Certification Office that they would not be able to forward an approval till a date that was well beyond what EAC was telling the Ft. Worth FAA offices. As a test pilot, I was also very concerned at the turnover in the test pilot community. During this program the FAA dealt with at least four different "chiefs" of flight test or similar titled persons. This certainly created an air of concern on the part of the FAA. As one company test pilot shared with me, ***his integrity test light had been pushed way too many times***. Each event in and of itself would not necessarily be concerning, however when you couple all this together – the pattern of misinformation, missed dates and a willingness to go straight to Washington DC left the field FAA personnel in a very untenable situation.

When it became apparent that EAC would not receive their TC by Oshkosh 2006 (EAA AirVenture) they requested they be granted a Provisional TC –

this caused the FAA to stop all work on the TC effort and focus resources on meeting this request.

On 14 Sept 2006, a late afternoon meeting was convened with the FAA employees involved with the EAC 500 in an Albuquerque hotel.[4] In attendance were the pilots, inspectors, engineers and four FAA Executives among the Executives was the Director, Aircraft Certification Service. It was completely clear to all FAA employees present that the current approach to the software certification on the EAC 500 was not going to meet the EAC 500 calendar schedule or the Service Director's timetables. As an aside, during my Software class at the Defense Systems Program Management course we were taught that software should be event driven not calendar driven. And, any software program with a calendar schedule – run the other way. The field FAA experts were justifiably unconvinced of EAC's ability to perform.

In this 14 September meeting, the FAA Software Engineer, Mr. Wallace tried to convey to the Service Director that the EAC approach would not follow the established FAA procedures and was sorely lacking in meeting the Agency's established and time-tested software certification procedures not to mention EAC and their vendor never meeting a calendar date for a data submission. Mr. Wallace was summarily subjected to a verbal barrage that conveyed that he, Mr. Wallace was not able to think "outside the box". It was at this point that I interjected myself between my staff employee and the Service Director. My "taking up" for him resulted in my dressing down and a humiliating verbal assault in front of my subordinates and peers. In 35

years of public service as an Army officer and FAA employee I have never suffered an experience as denigrating or unwarranted. It was clear to those present that Mr. Hickey was passionately making the case for thinking outside the box, however, the box must still be within the bounds of regulatory compliance and appropriate risk management. I have heard this Albuquerque meeting characterized as Mr. Hickey's passion for meeting customer needs and thinking outside the box – I would characterize it as an assault on our professionalism and our character.

Every FAA employee left that meeting with a clear picture that it was our responsibility, the FAA and not Eclipse to find a solution to the software issue. One was found. EAC and the avionics manufacturer would make attestations to the FAA that the software architecture had no "unsafe feature" and did "its intended function." A question that is fair to ask: Is it safe? The answer was yes. There was no incident that was not managed and/or mitigated by the cockpit procedures or the fact the aircraft could only fly in daylight and clear of clouds and no aircraft would be delivered to customers. The FARs only requires a minimum level of safety – EAC met this burden. By analogy, it would similar to the new car that can only be driven on dry country roads, no interstates, in day light conditions and you have to have a driving instructor with you.

The following week, the final Type Certification Board was held. The FAA agreed to numerous IOUs from EAC – this is not uncommon but the FAA personnel were under a great deal of pressure to meet the EAC target date of 30 September 2006.[5] What many of us were unaware of was the contractual

obligations to creditors that EAC had agreed to. Among these was that financial backing was contingent on gaining the FAA airplane Type Certificate within 30 days of Pratt & Whitney getting their FAA TC for the engine. Also, there were stock options/employee benefits tied to meeting dates. These items did not come to light until very late in the program and were extremely unsettling to many FAA employees not to mention the morale factor.

In the spirit of full disclosure - during my tenure we did help other companies in a comparable manner – our approach was "no harm no foul." If all the Federal Air Regulation compliance findings were made and all the Agency was waiting on was a formal report submission, and being legalistic about the submission would cost the company millions of dollars and the very livelihood of the employees -- we would accommodate the applicant.

There were other issues that were "floating" around this effort that FAA personnel were aware of. The FAA became privy to a mis-sent email detailing an EAC strategy to use the Service Director's influence in the software certification issue.[6] It would be fair to note that no evidence exists that the email was ever sent to Washington. However, it served notice to the FAA project employees that no Eclipse tactic was "out of bounds." Further, it became clear that EAC was prepared to go to the mat regarding the DO-178B software compliance. Their mantra was that DO-178B was not binding in a regulatory sense.[7] This was correct – however, at this point in time, there was no other means of software compliance that the FAA had agreed to. If the FAA were to have agreed up front to the EAC approach,

this method of compliance would have been properly staffed via an Issue Paper through the appropriate policy offices in the very beginning of the program. The FAA project team was trapped between Eclipse and the Service Director and we knew it. There was no chance that an Issue Paper would have been considered at this *11th hour* considering the pressures and "influence" faced by ACO personnel.

The EAC IOU for the avionics software was 15 Oct 2006.[8] The TSO approval for the avionics was finally granted on 23 March 2007 – some six months later.[9]

The production and manufacturing program suffer some of the same ills as the Type Certification program. In many respects, production is harder than the engineering. Engineering can change a design in a computer and generate a report – production involves suppliers, tooling, bricks and mortar, purchasing systems, storage, trained personnel, parts qualification, documentation and a quality system that will insure that each and every aircraft conforms to the Type Design data and is in condition for safe operation.

The FAA-mandated quality system is extremely thorough. The FAA system has insured that aircraft manufactured regardless of the size of the company are airworthy. The production and manufacturing issues at EAC were typical of a new company. EAC was trying to do too much with inadequate processes, controls and trained personnel.

From the time that EAC received their Type Certificate their focus became their Production Certificate. However, prior to the awarding of the TC, FAA inspectors had been doing ongoing inspection of Eclipse's quality system. In fact, FAA Inspectors completed a District Office audit prior to the award of the TC that documented numerous non-compliances.

The basic state of affairs post-TC was that Eclipse was not qualified to receive a Production Certificate. There were numerous issues. In order for an aircraft to be prepared for customer delivery and award of an FAA Standard Airworthiness Certificate, there are a series of Functional Test Procedures, 36 if I recall correctly that must be successfully completed. The Aviation Safety Inspectors from the Directorate spent an extraordinary number of hours editing and auditing these proposed procedures. There were numerous accounts of procedures being incomplete, the procedures not accurately or thoroughly evaluating the system and special tools not being called out in the procedure. There were numerous documented examples of EAC personnel signing off Functional Test Procedures as complete, in other words the aircraft systems passed. When FAA personnel followed up, the **systems failed to pass the procedures**. This further exasperated the situation. EAC was very vocal about the FAA being overly detailed. The FAA role is to oversight the FAA designees. It was established that EAC management was working around the EAC Organizational Designated Airworthiness Representatives or ODAR. By example, an aircraft was closed up -- that is floors installed prior to the ODAR inspecting the aircraft. When the Eclipse ODAR queried if the inspection of under-floor fuel lines, control cables, electrical cables and clamping still must accomplished? The

FAA responded – yes. This meant that the interior floor had to be removed to allow the required inspection. The FAA employees were "blamed" for this mismanagement of the workflow.

The quality system at Eclipse was in disarray. The personnel turnover, lack of personnel, pressures to have airplanes ready to sell post-TC award kept the company in a state of constant change. It was apparent to FAA personnel that ODAR personnel, persons acting on behalf of the FAA were being harassed and hassled for trying to meet the FAA standards.

In early March 2007, I received a phone call from the Director and Deputy Director of the Aircraft Certification Service regarding the documentation requested by the FAA to support the issuance of Airworthiness Certificates for the EAC 500 aircraft. The Eclipse CEO, Vern Raeburn had called the Service Director to complain that the FAA was making unreasonable records requests. An email from Mr. Lauer, San Antonio MIDO Manager to EAC, Mr. Dwight Byars had been sent to appraise EAC of FAA expectations.[10] From that phone call and I paraphrase: "Vern wanted to know why does the FAA want the @#$% @#$% sealant records?" At the time, I did not know the answer and I informed the Service Director that I would find out. It was on this same telecom that I was informed that Mr. Ron Wojnar would assume oversight of the production/manufacturing issue with Eclipse and I was relived of those duties. Back to sealant records – After consulting with the experts on this I discovered the sealant records have to be examined to insure that the shelf life has not been exceeded. Ordinarily, the shelf life of sealants would be insured by the Production Certificate quality control

system – a system that Eclipse was unable to demonstrate. It is appropriate to point out this phone call event was in reference to aircraft Serial Number 3. This aircraft had previously been rejected for its airworthiness certificate and this records review was required for the FAA re-inspection. The manufacturing office manager, Mr. Lauer in his email to EAC was putting into writing the records for review in conjunction with the physical inspection of the aircraft that are required by FAA Order 8130.2F and 14 CFR part 21. The Eclipse furnished records for Serial Number 3 showed 393 deviations from the type design. Although many of these were small or minor deviations, this was a properly conducted review.

Regarding my being "relived", at this point I felt it would only validate what we were doing and have "Washington" come in and experience first-hand what had been going on with the FAA's efforts with Eclipse. We had been following FAA Orders so: What was the downside to a third party looking into the issue? I was sorely naïve and the result highlighted an ethical climate that was unsettling.

There is an ***EAC Production Certification Report*** generated by Mr. Wojnar to the Ms. Baker, the Deputy Service Director.[11] It contains data that portrays a story that is accurate in some regards but also has a slant and factual inaccuracies that would make the Aviation Safety Inspectors from the Rotorcraft Directorate look overbearing and zealous. It also contains misleading statements regarding myself and the Rotorcraft Directorate staff. It should be noted that verbal reports from Mr. Wojnar to me on 6 March 2007 (and I have the notes) and my staff did not reflect the same content as the written report.[12] This report was only recently made available to

Rotorcraft Directorate personnel after the notice of this Subcommittee Hearing. I requested this report from Ms. Baker back in the summer of 2007 and she denied that request.

The FAA Manufacturing Inspection District Offices will normally conduct District Office audits to ascertain the readiness of an applicant for a PC inspection. The first of three FAA District Office audits showed that Eclipse had numerous areas that needed improvement. The subsequent audits had numerous write ups. The last of the three audits, out-briefed on 16 Feb 2007, documented 70 non-compliances. At the completion of the out-brief with Eclipse management, the Chief Operating Officer was informed by myself that a lot work was required. I had further conversation with the COO the following morning. We estimated it would take 3-6 months for Eclipse to make the necessary corrective actions. It was three months to the day when Eclipse was awarded their Production Certificate.

These issues detailed are but a few of the issues the FAA employees dealt with. The bigger cultural issue was the demonstrated lack of confidence in the field FAA employees by Mr. Hickey and others. This coupled with the access Eclipse had to senior leadership and the inability to have a balanced story portrayed was a gross injustice. The FAA inspectors, engineers, and pilots deserved better. It goes without saying you will hear a different story from your subsequent panel. In fact, I expect to be maligned, disparaged and at best displayed as incompetent – I will let the record speak for itself.

I will survive this event. The bigger concern is the tarnished reputation of the FAA employees involved particularly the ones who tried to raise concerns. It was my duty as the leader of the Rotorcraft Directorate to insulate the staff from the "unfairness". The FAA team "felt" undermined and threatened by having their decisions questioned from Washington. This poisoned the atmosphere and morale was terrible. There are 250 other companies the Rotorcraft Directorate oversees – no other similar set of circumstance comes close to this situation. In fact, the final Quality Management Review conducted prior to my resignation, as I recall had over 30 Positive comments from customers.

Integrity is something I learned at the feet of my father - a 28-year career Army officer. I was an Eagle Scout and served over 20 years in the Army as an enlisted soldier, a Warrant Officer and Commissioned Officer, I have three brothers that are officers in the Armed Forces. One brother is a serving Inspector General. My son is in the Army as well. Integrity is at the root of our desire to be public servants.

When leadership gives more standing to the applicants than the FAA professionals, especially given the track record that was well-known, it undermines the role of the FAA in performing its government oversight function. I have made mistakes in my career – but the handling of the EAC 500 program is not one of them.

My decision to leave the FAA was reached over a year ago and was not the EAC 500 program. It was clear to me that my value system and leadership

style were in conflict with senior leadership. It was time to close that chapter and move on.

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[1] Business & Commercial Aviation EAC Jul 05

[2] AOPA-Pilot EAC Article Jul 05

[3] PowerPoint Briefing, EAC CEO to FAA Administrator, 11 June 2005

[4] Email, Michele Owsley to FAA personnel, subject: FAA only meeting Albuquerque, NM. 9/13/06

[5] Final Type Board PowerPoint presentations from EAC, (Avionics-Electrical, Mechanical systems, Interiors-Flammability, Power plant and fuel systems. 21 September 2006.

[6] Email, Ken Harness to EAC Executive Management, subject: EFID TC plan 8-31-06.doc, date: 31 August 2006

[7] Letter, EAC to FAA, subject: Response to FAA Ft worth ACO Letter, date 8 September 2006

[8] Personal notes, EAC meeting with David Downey 1 September 2006

[9] Letter, FAA, Boston ACO to Avidyne Corporation, subject: TSO Authorization, C2d, C3d, C10b, C43e, C44b, C47, C49b, C55, C95, C113, and C139 for AVIO Multifunction Display. 23 March 2007.

[10] Email. From Mr. Lauer, FAA to Mr. Byars, EAC, subject: Airworthiness Inspection, P-2 & P-3. dated: 2/26/07.

[11] Report, Mr. Wojnar to Ms. Baker, FAA Report, ECLIPSE AVIATION CORPORATION, Production Certification

[12] Notes, Telcon with R Wojnar and David Downey, 6 Mar 06

Federal Aviation Administration

Memorandum

Date: August 2, 2007

To: Dave Downey, Manager, Rotorcraft Directorate

From: Dorenda D. Baker, Deputy Director, Aircraft Certification Service
Dorenda D. Baker 8/2/07

Subject: Mid-Year Performance Discussion Follow-Up

This serves as a follow-up to mid-year performance discussion regarding your performance, specifically regarding your management of the Eclipse certification program. Our discussion of your performance addressed the following:

Performance Expectation, Item 3 - Demonstrate application of the leadership dimensions that comprise the Executive Success Profile: (a) Achieving Operational Results, (b) Leading People, (c) Building Relationships, (d) Leading Strategic Change.

During the initial discussion of your fiscal year 2007 Executive Performance Management Plan, on October 31, 2006, John Hickey AIR-1 explained and reiterated his expectation that Executives personally engage with their staff to understand issues and to help resolve conflicts with industry. This expectation is directly aligned with the performance expectation in your Executive Performance Management Plan to demonstrate application of leadership dimensions.

The need to reiterate the expectation of executive personal engagement came as a result of failures that occurred in the Eclipse Type Certification (TC) program. After receiving a number of indicators that the program was in disarray, John Hickey personally traveled to Albuquerque to investigate the reports. He found that the certification team was imposing requirements on Eclipse that were not based in the regulations and that the staff didn't seem to understand that under §21.21 the applicant is entitled to a type certificate if the design meets the applicable airworthiness requirements and has no unsafe feature. When Eclipse requested a Provisional Type Certificate the staff didn't appear to understand part 21 Subpart C-Provisional Type Certificates. Again the applicant has an entitlement under §21.81. During his visit, John Hickey expressed his expectation that you, as an AIR Executive, are responsible for coaching your employees. You are expected to personally engage with your staff and customer and to assure proper application of the regulations.

Following his visit John Hickey had to intervene on a number of occasions to assure that the certification team was following FAA regulations, Orders and policy. This is unacceptable. As an Executive you should have demonstrated the leadership dimensions of 1) building

relationships by personally working with Eclipse to fully understand the issues that they were facing, 2) leading the certification team in assuring proper adherence to our Orders and application of the regulations and 3) achieving operational results by developing a mutually agreed plan to achieve certification of the Eclipse 500. We understand that you had a number of meetings/telephone calls with executives at Eclipse however; the results did not indicate that you fully understood the complexity of the issue and the working relationship of the FAA certification team with Eclipse. Had you been personally engaged in developing a solution to the problems and counseling the certification team it would not have developed into an issue that required intervention by AIR-1.

Four months after John Hickey reminded you of his expectation that you personally engage in conflicts between your staff and our customer, he received a call from the President of Eclipse complaining that the FAA was again imposing requirements that went beyond the part 21 regulations. Prior to the call, AIR-1/-2 received a number of e:mails and Dashboard updates from you describing the problems that the Eclipse company was having in their pursuit of a Production Certificate (PC). As a result of your input, we believed that you were personally involved in assuring that the Rotorcraft Directorate employees were following the regulations and Orders. You led us to believe that the delays and problems were exclusively due to Eclipse not understanding their responsibility to oversee production and develop a reliable quality control program. After listening to the complaints from Eclipse management John Hickey discussed the company's concerns with you. He found that you failed to personally engage with your staff and the company. As a result he removed you from oversight of the Production Certificate activity and a new leader, Ron Wojnar, was sent to investigate the allegations and get the program back on track. You welcomed the opportunity to have an impartial party review the problems stating that you felt that he would find that everything had been handled properly.

On March 6th, Ron Wojnar, met with Jerry Strentz, ASW-180, to understand FAA's position on the issues at Eclipse. Ron Wojnar called upon expertise from the Transport Airplane Directorate and the Engine and Propeller Directorate to assist him. March 13-16 the team met with Eclipse to hear their side of the story.

Ron Wojnar discovered that the FAA team was not following Order 8120.2D (8/17/2004), Page 12. The Order is as follows:

"...PART 2. FAA ACTIONS DURING THE SIX-MONTH PERIOD

"24. FAA CONFORMITY DETERMINATIONS. Subsequent to the date of issuance of the TC and prior to the issuance of an APIS or PC, the MIDO/CMO has full responsibility for determining whether the product or part(s) thereof conform to the type design and are in a condition for safe operation. The MIDO/CMO has the responsibility for performing inspections of incoming materials (at the source, if necessary), installations, and the completed products. The MIDO/CMO has the responsibility for documenting each inspection on FAA Form 8100-1, Conformity Inspection Record,
so that each product or part(s) thereof inspected has a complete inspection record..."

Proper adherence to the Order would require:
1. Inspections of incoming materials "at the source, if necessary", (e.g. Fuji.)

2. Installations, (e.g. in-process inspections of systems installations, major structural component installations.)
3. Completed products, (e.g. final inspection of the completed airplanes.)

This also requires a complete FAA inspection record for each airplane on FAA Form 8100-1, (a file or book for each airplane.) Instead of inspecting the aircraft during production and overseeing incoming materials etc. the ASW inspectors were inspecting the aircraft when it was completely assembled. Nonconformances were discovered when the aircraft was presented at the end of production and the inspectors blamed Eclipse, yet production under a Type Certificate requires the FAA to conduct in process inspections. You failed to ensure the inspections were properly conducted in accordance with the above Order.

Ron Wojnar discovered that FAA employees were concentrating on producing long lists of non-conformities rather than assessing the root cause or the criticality of the findings. The inspectors needed to be counseled to understand that the task of the Manufacturing Inspection District Office (MIDO) inspector is not to document as many discrepancies as possible in the airplanes and the quality system, but to work with the manufacturer to address the root cause of the non-conformances. Valuable FAA inspector time was wasted trying to rationalize some perceived airplane nonconformities that were not founded in regulatory requirements. Your personal involvement would have surfaced these issues.

During this period a number of non-conformities with the wing installations were identified. When Ron Wojnar pushed the team to focus on the root cause of the non-conforming wings it was found that the MIDO had not conducted an on site visit of the Fuji facility in Japan to assess their capability to produce the wing to the Eclipse specifications. The decision not to visit Fuji to assess their capability to produce this critical component of the aircraft was made by you. As stated above, subsequent to the date of issuance of the TC and prior to the issuance of the PC, the MIDO has full responsibility for determining whether the product or part(s) thereof conform to the type design and are in a condition for safe operation. This includes performing inspections of incoming materials, at the source if necessary. This clearly was not accomplished. Ron Wojnar was told that the inspectors advised you of the need to go to Japan but you denied the trip based on resource constraints of the continuing resolution even though AIR-1 and AVS-1 have continually stipulated that priority be given to continued operational safety and surveillance activity. Failure to send personnel to evaluate the Fuji facility indicates you do not have the level of understanding of the AIR/AVS direction expected of executives or you made a unilateral decision to not follow that direction.

Ron Wojnar also discovered that the inspectors did not understand the difference between issuing a conforming aircraft a certificate of airworthiness and assessment of a quality control program leading to issuance of a Production Certificate. Certificates of Airworthiness were being delayed because the production quality control program was inadequate even though the aircraft non-conformities could be resolved. This lack of understanding imposed an unnecessary burden on the company. You failed to ensure that your inspectors fully understood Production Certificate requirements.

It was also discovered that an inspector revoked a certificate of airworthiness. The FAA can not revoke the certificate without taking official certificate action. Issues like this indicate a lack of discipline to follow FAA Regulations, Orders and Guidance. It is your responsibility to assure that your staff follows FAA Orders and policy and does not require anything of an applicant that is not based in regulations. It is not their prerogative to deviate unilaterally.

Much like the certification program, the team of inspectors did not have an agreed schedule for closure of action items and issuance of the Production Certificate. The rationale shared with the Ron Wojnar was that the schedule continually slipped therefore it was not worth maintaining. Not having an agreed schedule resulted in misunderstandings regarding FAA commitments and Eclipse responsibilities. Having a plan that is fully endorsed by both the FAA and the applicant is fundamental to building relationships and achieving operational results. Without a schedule no one was being held accountable.

The Manufacturing Inspection Office had a spreadsheet of things that needed to be accomplished prior to issuance of a PC but it had not been fully coordinated with Eclipse. After assessing the status of the PC program the first thing Ron Wojnar did was to use that spreadsheet to create a Project Specific Certification Plan (PSCP). The team sat down with the Eclipse Vice Presidents of quality and production and worked out a mutually agreed plan with specific criteria for the issuance of the PC. The Eclipse personnel were pleased that the FAA not only was committing to work toward a PC, but there were actual clear goals and dates, directly traceable to Order 8120.2D.

The PSCP contained a section on the airworthiness certification schedule, which they agreed to update every Thursday. When the schedule changed because of company issues, it became very clear that the FAA was not holding up aircraft deliveries. It is this type of personal involvement that we expect of our executives in order to build relationships with our customers and to achieve operational results.

On April 26, 2007, approximately six weeks after Ron Wojnar took over leadership of the program, the Production Certificate was issued and a number of aircraft we issued airworthiness certificates.

Another area that illustrates your lack of personal involvement was the monitoring of the progress toward issuance of the PC prior to the deadline specified in §21.123. The requirement for the MIDO to periodically assess the applicant's progress toward an approved production inspection system (APIS) or PC, and keep the directorate office apprised is as follows:

"...25. ASSESSING THE APPLICANT'S PROGRESS. The MIDO/CMO should periodically assess the applicant's progress in complying with the regulations for obtaining approval of an APIS or PC. If it appears that the applicant is delaying this action or may not be eligible for an APIS or PC by the deadline date, the applicant should be advised in writing of all known deficiencies. Also, the applicant should be cautioned that after the deadline date, the FAA will not issue any airworthiness certificates or any other approvals unless an extension of the time period is authorized by the directorate manager. The MIDO/CMO should keep the directorate office apprised as to the applicant's progress..."

An attempt at this may have been made but the 6 months deadline specified in §21.123 ran out without issuance of an extension letter. If you had been personally involved in the schedule to achieve a PC this would have been a major milestone in the original plan.

As discussed in your mid term review we did not see evidence of your personal involvement in addressing the issues that arose during the Eclipse type certification program and after being counseled on the expectation of the level of involvement you failed to interject yourself to that level in the production certification activities.

You have failed to demonstrate the leadership dimensions that comprise the Executive Success Profile: (a) Achieving Operational Results, (b) Leading People, (c) Building Relationships, (d) Leading Strategic Change.

(a) Achieving Operational Results

a. You did not obtain and manage the human capital, financial resources necessary to properly support the needs of Eclipse Certification program.

b. You did not evaluate the failures in the certification program and apply them to make improvements in the services provided in the Production Certification program.

(b) Leading People

a. You did not deal with the conflict between the FAA staff and the Eclipse personnel;

b. You did not mentor the FAA staff on their role in certifying aircraft, or foster techniques to build teamwork and cooperation.

(c) Building Relationships

a. You did not work with Eclipse management to fully understand the issues and communicate those issues to AIR-1.

b. You did not act as an unbiased liaison between internal and external stakeholders to resolve the issues.

c. Your relationship with Eclipse is seriously compromised. It is important to develop skills to obtain cooperation from others on difficult issues without losing their future support.

(d) Leading Strategic Change

a. After problems were encountered in the certification of the Eclipse 500 AIR-1 explained his expectation that you personally engage in managing programs when they run into difficulty, and to develop solutions to overcome obstacles. When the Eclipse Production Certificate program ran into difficulty you did not meet his expectations.

As an Executive, we expect you to work with the Senior Leadership of our customers. If you do not have the necessary resources within your Directorate we expect you to request assistance. If you are unfamiliar with the regulations and Orders we expect you to read them or seek advice from the process owner (Directorate/Division Executives).

Your personal relationship with the Eclipse Executives is deficient. As one of your major customers we expect you to work to improve the relationship.

You are currently not meeting your performance expectations. I am hoping to see an immediate improvement in your performance. Please note that if your performance does not improve, you may be placed on a formal Opportunity to Demonstrate Performance.

National Transportation Safety Board

490 L'Enfant Plaza, SW
Washington, D.C. 20594
(202) 314-6000

Tom Haueter
Director
Office of Aviation Safety

Testimony of
Thomas Haueter
Director, Office of Aviation Safety
National Transportation Safety Board
Before the
Transportation and Infrastructure Committee
Aviation Subcommittee
U.S. House of Representatives

FAA Aircraft Certification: Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EQ-500
September 17, 2008

Good morning Chairman Costello, Ranking Member Petri, and Members of the Committee. Thank you for allowing me the opportunity to present testimony on behalf of the National Transportation Safety Board regarding the Eclipse 500 airplane. It is a privilege to represent an agency that is dedicated to the safety of the traveling public.

Although the Safety Board is not directly involved in aircraft certification and manufacturing processes, the Board strives to improve aviation safety through detailed accident and incident investigations and subsequent recommendations. To date, the Board has conducted five investigations involving Eclipse 500 airplanes. One of these events occurred 3 years ago, and the investigation is complete. The other four events have occurred since April 2008, and the investigations are still ongoing. I would like to provide you with a brief description of the circumstances of each of these events.

- On September 3, 2005, an Eclipse 500 was substantially damaged when it landed with its landing gear up at Albuquerque, New Mexico. The two commercial pilots were not injured. The Safety Board's investigation found that the pilot did not complete the before-landing checklist and failed to extend the landing gear before landing.

- On April 17, 2008, an Eclipse 500 experienced a stuck rudder trim during a simulated single-engine instrument approach to Flint, Michigan. The pilots landed the airplane without incident at Pontiac, Michigan.

- On June 5, 2008, an Eclipse 500 sustained minor damage when its flight crew experienced a loss of thrust control at Chicago Midway International Airport. I will discuss this event in more detail momentarily because it resulted in the Safety Board's urgent recommendations to the Federal Aviation Administration (FAA).

- On July 17, 2008, an Eclipse 500 sustained minor damage during an in-flight separation of the aft lower left side wing-to-body fairing during cruise flight near Rockford, Illinois.

- On July 30, 2008, an Eclipse 500 departed the runway while landing at West Chester, Pennsylvania. The airplane was substantially damaged, and the two persons on board were not injured.

Regarding the June 2008 incident at Chicago Midway International Airport, the flying pilot reported that, while crossing the runway threshold for a landing attempt, the airplane encountered a 10- to 15-knot windshear and developed a high sink rate, which the pilot arrested by applying power. The airplane's touchdown was normal, and the pilot retarded both thrust levers to idle. However, shortly afterward, the pilot found that the airplane was accelerating rapidly through 100 knots. The pilot confirmed that the thrust levers were at idle, but he noted that the engines were at maximum power and that the airplane was continuing to accelerate. Because the airplane was rapidly approaching the end of the runway and could not be slowed, the pilot decided to abort the landing.

As the airplane was climbing out, the pilots found that the thrust lever position had no effect on power from either engine. The flying pilot lowered the flaps and landing gear to control the airplane's speed. However, the pilots found that, to remain below 200 knots, which is the maximum operating speed for the flaps and landing gear, the airplane needed to maintain a shallow climb. The pilots declared an emergency and were cleared by the air traffic control tower to land on any runway.

The pilots noted that the airplane's engine indicating and crew alerting system displayed that the left and right engine full authority digital electronic controls, or FADECs, had failed. The pilots referenced the quick reference handbook's emergency procedures section for engine control failure, which contained instructions for a single engine control failure but not for a dual engine control failure. The procedures advised that, when one engine control failed, its respective engine should be shut down. Thus, the pilots shut down the right engine and began to maneuver the airplane toward the runway. However, shortly afterward, they noted that the left engine was at idle and would not respond to the thrust lever commands. Fortunately, the airplane had sufficient altitude to reach the runway for a successful landing. Without the resourcefulness of the pilots, the visual meteorological conditions that prevailed at the time, and the airplane's proximity to the airport, the successful completion of this flight would have been unlikely.

The Eclipse 500 airplane does not have any mechanical linkage or cables between the thrust levers and the engines. Instead, the airplane's thrust levers are connected to potentiometers that convert the movement of the levers to an electrical signal that is transmitted to the engines' FADECs by electrical wiring. Each FADEC continuously checks itself and the opposite engine's FADEC to ensure that all of the components are working correctly. Each engine control has two separate channels: one is in control, and the other stands by to become active if a component in the active channel fails. If both channels fail, the FADEC software will continue to control its engine by reading data from the opposite engine. If both channels fail on both engines' thrust levers, the FADEC software is programmed to ignore the thrust levers' positions and maintain the requested thrust level of the last valid thrust lever position.

Tests have found that, when the thrust levers on the Eclipse 500 were pushed against the maximum power stops using a normal application of force -- that is, a force that a pilot might

normally use during flight -- it was possible to cause the control system to detect an out-of-range setting that would result in an engine control failure. These faults could be cleared by cycling the electrical power to the FADECs.

The findings of the investigation to date indicate that it is likely that the pilot advanced the thrust levers up to the maximum power stops when reacting to the windshear to arrest the sudden increase in the sink rate. This action likely caused the dual channel failures in both thrust levers. Then, because of the programming logic of the FADEC software, the engines maintained the thrust level of the last valid thrust lever position. In this case, that position was at, or nearly at, maximum power, so the engines remained at that high power setting.

During this incident, the fault in the right engine was cleared when the flight crew shut down that engine. However, because the FADEC software was programmed so that the left engine would mirror the thrust lever position of the no-fault right engine, which was positioned at idle after shutdown, the power in the left engine was reduced to idle. After the pilots shut down the right engine to attempt to regain engine control, it is likely that the left engine rolled back to idle immediately. Thus, the pilots were flying with one engine that was shut down and another engine that would not advance past idle, and they had no emergency procedures to address the situation.

This dual channel failure of both thrust levers occurred after the airplane had accumulated only 238 hours and 192 cycles since new. The thrust levers are part of the throttle quadrant assembly. The Safety Board's investigation found that other throttle quadrant assemblies failed in a similar manner during testing, which suggested that there might be a design or quality problem in the Eclipse 500's throttle quadrant assembly.

On June 12, 2008, one week after the incident at Chicago Midway International Airport, the Safety Board issued two urgent recommendations to the FAA. The first recommendation, A-08-46, asked the FAA to require an immediate inspection of all Eclipse 500 airplane throttle quadrants to ensure that pushing the throttle levers against the maximum power stops would not result in an engine control failure and to require that any units that fail the inspection be replaced and that the replacement parts be similarly inspected. On the same day, the FAA issued an airworthiness directive to require pilots of Eclipse 500 airplane to evaluate the throttle quadrants to see if a control fault would occur.

Eclipse has since developed an FAA-approved test procedure and issued an alert service bulletin that provided standardized procedures for testing and, if necessary, modifying the thrust lever. In August 2008, the FAA superseded its original airworthiness directive to mandate the Eclipse alert service bulletin, which is to be accomplished by a person who is authorized to perform maintenance.

The Safety Board's second urgent recommendation, A-08-47, asked the FAA to require Eclipse to immediately develop an emergency procedure for a dual engine control failure on the Eclipse 500 airplane and then to incorporate the procedure into the airplane flight manual and quick reference handbook via an airworthiness directive.

Eclipse developed emergency procedures for a dual engine control failure, and the FAA issued an airworthiness directive stating that these procedures were to be incorporated into the airplane flight manual and the quick reference handbook. Eclipse also reprogrammed the FADEC logic to limit the thrust lever out-of-range angle and not make it a hard fault so that, when the thrust lever was retarded to below the out-of-range angle, the FADECs would resume reading the thrust lever position. These FADEC logic changes were to be incorporated into Eclipse 500 airplanes while they are at service centers for maintenance.

This concludes my prepared statement. I will be happy to answer any questions you may have.

National Transportation Safety Board
Washington, D.C. 20594

OCT 1 7 2008

Honorable Jerry F. Costello
Chairman
Subcommitee on Aviation
Committee on Transportation and Infrastructure
U.S. House of Representatives
2251 Rayburn House Office Building
Washington, D.C. 20515

Dear Mr. Chairman:

Enclosed are the responses of Thomas E. Haueter, Director of the Office of Aviation Safety, to questions regarding his September 17, 2008, testimony before the Subcommittee on "FAA Aircraft Certification: Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EA-500."

Owing to the October 17, 2008, deadline noted in your letter, Mr. Haueter, who is currently attending the ICAO Meeting in Montreal, has asked me to transmit his responses to you.

If I may be of further assistance to you in this matter, please do not hesitate to contact me at 202-314-6006.

Sincerely,

for Brenda Lee Yager, Director
Government and Industry Affairs

Enclosure

FAA Aircraft Certification: Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EA-500

1. **Mr. Haueter, Given the complexities of the aircraft and the fact that the FAA test pilots recommended or wanted it not to be certificated as single-pilot but two-pilot, do you agree with the FAA's decision to certify it as a single-pilot?**

   I am not aware of the detailed findings of the FAA test pilots or subsequent actions taken to resolve any issues identified by the FAA test pilots. Therefore, it is difficult for me to agree or disagree with the FAA's decision to certificate the airplane for single-pilot operations. Additionally, the Safety Board is not involved in the FAA's certification process; however, I would expect that the findings of the FAA test pilots would be a major factor in the final certification of an airplane. At this point in time, however, the Safety Board has no official position on this issue.

2. **What are the experience levels of the pilots operating the jet at Midway on June 5th?**

   The pilot in the left seat reported that he had over 21,000 hours of total flight time, including over 300 flight hours in the EA-500. He had type ratings in Boeing 727, 737, McDonnell Douglas DC-3, and DC-9 airplanes; Convair 240, 340, and 440 airplanes; and Lockheed 382 and 1129 airplanes. The pilot in the right seat reported that he had 2,400 hours of total flight time, including 89 flight hours in the EA-500.

3. **Mr. Haueter, do you think that the June 5th incident could have been a fatal incident if there was one pilot operating the jet, of if even two less experienced pilots were operating the jet? Do you think that a single pilot would have had time to reference the manual in a similar incident? Also, has that situation occurred in any other flight of this aircraft?**

   It is definitely a benefit to have two pilots on board in an emergency situation, because this allows one pilot to fly the airplane while the other references the airplane's manuals. One of the keys to a successful landing on June 5th was that the pilots of the accident airplane chose to remain in close proximity to the airport while they evaluated the engine control problem. Certainly having two pilots facilitated their trouble-shooting efforts while essentially remaining in the airport traffic pattern. Had they chosen to fly farther from the airport, it is unlikely that they would have been able to make a successful landing. However, it is also still possible that a single pilot or a less experienced crew could have managed a successful landing. We are not aware of a loss of engine control on another EA-500 aircraft.

4. **Mr. Haueter, are you comfortable that the FAA certified this aircraft for single-pilot operation, given its complexity, over the objections of the FAA's own test pilots?**

   The EA-500 appears to be of similar complexity to other light jet aircraft, such as the Cessna Citation and Cessna Mustang, which have been certificated by the FAA for single-pilot operations. Advances in avionics and systems have enabled smaller crews, to include single pilots, to better manage flight operations. I do not know the specifics of the FAA test pilots' concerns or the resolution of those concerns. However, I would be uncomfortable with any certification process if their concerns were not resolved prior to the aircraft being certificated. At this point in time, however, the Safety Board has no official position on this issue.

5. **Does the NTSB have concerns that the EA-500 has experienced an unusual number of problems given the small numbers of aircraft currently operating in the system?**

   The Safety Board has investigated 2 accidents and 3 incidents involving the EA-500. Additionally, we are aware of many of the Service Difficulty Reports (SDR) and Aviation Safety Reporting System (ASRS) reports regarding the EA-500. The Safety Board does not have the data to compare these reports to those of other aircraft upon initial introduction of a new fleet. The number of reports has prompted greater scrutiny by our investigative staff, and the Safety Board's investigative staff continues to monitor the SDR and ASRS reports and their relevance to our accident and incident investigations.

Testimony of Clyde R. Kizer
Retired Aerospace Executive

Before the

Committee on Transportation and Infrastructure

Subcommittee on Aviation

Regarding

FAA AIRCRAFT CERTIFICATION: ALLEGED REGULATORY LAPSES IN THE CERTIFICATION AND MANUFACTURE OF THE EA-500

September 17, 2008

Testimony of Clyde R. Kizer
Retired Aerospace Executive
Before the
Committee on Transportation and Infrastructure Subcommittee on Aviation

Regarding

FAA AIRCRAFT CERTIFICATION: ALLEGED REGULATORY LAPSES IN THE CERTIFICATION AND MANUFACTURE OF THE EA-500

September 17, 2008

BACKGROUND

U.S. Navy (1960-1982)
Active Duty (1960-1974)
Reserves (1974-1982)
Naval Officer/Aviator/Experimental Test Pilot
Retired with the rank of Captain

I served two combat tours in Southeast Asia, flew as an Experimental Test Pilot for two tours at the U.S. Naval Air Test Center, NAS Patuxent River, Maryland, served as the Executive Officer then Commanding Officer of a squadron and retired with the rank of Captain with over 30 service awards.

United Airlines (1974-1988)
Engineering Test Pilot (1974-1982)
Director Engineering (1982-1984)
Vice President Technical Services (1984-1988)

My responsibilities included all aspects of engineering, quality assurance, quality control, flight test and technical publications for the (then) largest air carrier in the free world. During my tenure of technical leadership the fleet underwent unprecedented growth from 7 aircraft models with 7 different engine types to 22 aircraft models with 23 different engine types; the first National Aviation Safety Program inspections were conducted; United conducted a number of STC and alternate means of compliance initiatives; and, the airline never received a civil penalty for failure to comply with regulatory requirements.

Air Transport Association (1988-1990)
Vice President Engineering and Maintenance

During my tenure at ATA, I initiated and led the activities of the Airworthiness Assurance Task Force following the structural loss of a significant portion of upper fuselage skin on a 737 aircraft. Other responsibilities included industry interface for all U.S. Government technical organizations (military and civil); coordination of general industry activities related to certification, regulation, and rule making; interface for international air transport and regulatory activities (IATA, ICAO, JAR, etc.);

interface for general airline/manufacturer activities (Boeing, Douglas, Lockheed, Airbus, Convair, etc.); and coordination with all other industry associations (union, civil, technical, professional, etc.).

Midway Airlines (1990-1992)
Senior Vice President Operations
I served as Senior Vice President Operations (flight operations and maintenance) for Midway Airlines until Midway declared bankruptcy in 1992.

Airbus Industries North America---Customer Services (1992-2004)
President/COO

Responsible for all customer service activities (training, spares and material control, publications, field engineering, maintenance, engineering, regulatory coordination, contract administration) for North America Airbus operators, as well as for training and spares/material control for South America Airbus operators.

ORGANIZATIONS (some no longer current since retirement)

American Institute of Aeronautics and Astronautics (AIAA): former member of the Honors and Awards Committee
Society of Automotive Engineers (SAE)
Society of Experimental Test Pilots
Flight Safety Foundation
Sperry Award Committee
Quiet Birdmen

BOARDS

Chairman/Vaughn College Board of Trustees (1997 to present)
Chairman/Discovery of Flight Foundation---in support of Wright Experience/Wright aircraft reproductions (2005 to present)
Board of Trustees/Council on Aviation Accreditation (2004)
Chairman/Doll Technology Board of Directors (2003 to 2006 approximate dates)
Member Board of Directors/TIMCO (MRO facility) (2004 to 2006 approximate dates)
Congressional Medal of Honor Society Golf Classic/Executive Committee (2005)

EDUCATION/TRAINING/DESIGNATIONS

Bachelor of Science Degree/Bio-Chemistry/Eastern Michigan University (1960)
Designated: U.S. Naval Aviator (1961)
Designated: U.S. Naval Air Intelligence Officer (1963)
Designated: Special Weapons Handling Officer (1964)
Graduate: U.S. Naval Test Pilot School (1965)
Designated: U.S. Naval Aeronautical Engineer (1968)
Designated: U.S. Naval Weapons Systems Procurement Officer (1968)
Senior Executive Program/Stanford University (1986)

FAA LICENSES

Airline Transport Pilot
Airplane Multi-engine/Land
B-727, B-737, B-747, B-757/767, DC-8, DC-10
Commercial Privileges
Airplane Single Engine Land and Sea
Rotorcraft-Helicopter SK-61

Single-engine/Sea
Rotor-craft: Helicopter
Flight Engineer Turbojet Powered
(note: rated in B-747, DC-10 and DC-8 aircraft by UAL)

INDUSTRY ACTIVITIES

FAA Airworthiness Directive Compliance Team---2006-15-15 (2008)
FAA Airworthiness Directive Compliance Team---AD Process Review Team (2008)
National Research Council/USAF Non-Tactical Aircraft Re-engine Study (2006)
National Research Council/USAF Non-Tactical Aircraft Winglet Study (2007)
National Research Council/U.S. Aviation Research Capabilities Study (2005)
National Research Council/U.S. Air Transport Industry Safety---Technical Study (2004)
Ad Hoc Team to Review VLJ/UA Certification/Operational Considerations: Nicholas A. Sabatini, Associate Administrator for Aviation Safety (~2004)
U.S. Congress, Office of Technology Assessment/ *Safer Skies With TCAS: Traffic* Alert *and Collision* Avoidance System–A *Special* Report (1989)

EMPLOYMENT STATUS

Although I provide my time, experience and opinions to those who request it on a regular basis, I am retired and, by choice, have never received pay (other than expenses) as a consultant. Except for my position on the Board of Directors at TIMCO, all of my industry activity, since retirement, has been with government, government sponsored, or non-profit, organizations related to improving safety, technology and operations within the aerospace industry.

STATEMENT

My name is Clyde Richard Kizer and my statements reflect observations, facts and opinions garnered over a 44 year career in the aerospace industry.

I realize that the focus of these hearings is on the certification of the Eclipse EA-500. My statement today relates to the requisite requirement for the concept of "alternate method of compliance" to assure a vibrant environment of innovative engineering and technology development for the aerospace industry. Absent the application of technical vision and the exploration of new materials, concepts and processes our nation will rapidly fall behind in this globally critical industry.

My comments relate specifically to the need for a methodology that allows consideration of alternate means of compliance within the regulatory process. My experience and training relates predominately to the arena of airline aircraft continued airworthiness, and I will focus my comments to that portion of the industry, but the concepts that I discuss have value for all venues of technical development, albeit with differing practical priorities, frequencies of application and regulatory oversight requirements.

Equally important to the success of the aerospace industry as the alternate method of compliance is the development of, and adherence to, minimum standards for regulatory compliance to assure the safety of the aircraft, the public and the national air space.

The remarkable safety record of the U.S. Air Transport Industry is a result of the robust process of communications, coordination and exchange of technical information that exists between the operators, the manufacturers and the regulatory agency. No single entity within these constituents can assure the desired level of safety independently. The success of the endeavor depends on effective collaboration. The free exchange of technical information provides a venue for innovative alternative technical resolution of potential problems from differing perspectives of responsibility. Over time, this process allows a variety of methods for technical problem resolution from which it is possible to develop a "best practices" resolution for standardization, effectiveness and efficiency. Absent such an approach standardization might potentially be achieved by forced adherence to the least effective method.

Over decades of commercial air travel many new technologies have been developed to improve the safety and efficiency for the travelling public. Emerging technologies demand a conservative approach for application, operation and regulatory control to assure that the safety of the system is not compromised. That conservative approach results in the establishment of minimum standards of performance that protect the industry while allowing flexibility in the development of new technologies. Unfortunately, the term "minimum standards" occasionally connotes an atmosphere of laxity when, in fact, it is just the opposite---a restrictive set of requirements that must be met in the very conservative approach to development of new technologies and/or methods for resolution of technical problems.

It is a general truth that no two aircraft leave the manufacturer's production line in exactly the same configuration. Additionally, once an aircraft enters service, no two aircraft of similar type are in exactly the same configuration---within a given airline, or between airline fleets. The responsibility of the airlines is to maintain their aircraft so that they conform to the type design and type certification requirements that were established to assure airworthiness for the certification and production of

commercial aircraft. This requirement for conformance is termed "continued airworthiness". The continued airworthiness process includes incorporation of methods to address any action that modifies the original type certification requirements, such as Airworthiness Directives, Supplemental Type Certifications, etc. The airlines dedicate considerable technical resources for maintenance and engineering activities to meet this responsibility.

When technical problems are defined and addressed by manufacturer service bulletins, or regulatory requirements, the specified means of corrective action frequently requires variations due to configuration differences, material applications, or other considerations. When corrective actions are mandated by the FAA, generally by issuance of an Airworthiness Directive (AD), such actions frequently include a means to employ differing methods, materials and/or timing to accomplish the mandatory action. These alternatives are allowed only after approval by the FAA Aircraft Certification Office designated in the AD. FAA approval for alternative methods must be obtained prior to the required date for completion of the action defined in the AD. This approach is prescribed in 14 CFR part 39 as the Alternative Method of Compliance, or AMOC, process. The AMOC process allows accommodation for alternatives that might not have been known, or considered at the time the AD was written. The primary requisite for this process rests with a determination that the alternative provides an acceptable level of safety that is equivalent to that required by the AD.

As a comparison of the viability of the alternative methodology, a similar process is permitted during certification by long standing regulation [14 CFR 21.21 (a) (1)]: "Upon examination of the type design, and after completing all tests and inspections, [a type certificate is awarded if the Administrator finds] that the type design and the product meet the applicable noise, fuel venting, and emissions requirements of the Federal Aviation Regulations, and further finds that they meet the applicable airworthiness requirements of the Federal Aviation Regulations or that *any airworthiness provisions not complied with are compensated for by factors that provide an equivalent level of safety.*

It is obvious that the AMOC and equivalent level of safety (ELOS) processes allow consideration for differing technical expertise, varying operational experiences, new technologies and innovative methodologies while protecting the safety and efficacy of the air transport system and not compromising the responsibility, or prerogatives, of the Regulatory Authority. The intent of the AMOC/ELOS processes is to maintain, or improve, the safety of aircraft and the industry while allowing the employment of technical innovation and new technologies to resolve technical problems. Over many years, the concept of alternative methods of compliance has proven to be a safe and effective approach for regulatory compliance. The AMOC/ELOS processes have provided essential alternatives that are crucial to the air transport industry and my experience is that it is equally ssential for general aviation.

U.S. House of Representatives
Committee on Transportation and Infrastructure

James L. Oberstar
Chairman

David Heymsfeld, Chief of Staff
Ward W. McCarragher, Chief Counsel

Washington, DC 20515

John L. Mica
Ranking Republican Member

James W. Coon II, Republican Chief of Staff

September 30, 2008

Mr. Clyde Kizer
4287 Ringwood Road
Nokesville, Virginia 20181

Dear Mr. Kizer:

On September 17, 2008, you were a witness at a Subcommittee on Aviation hearing on the certification of the Eclipse 500 aircraft. I thank you for your participation and ask that you provide written responses to the Committee on the following questions-for-the-record:

- Some have characterized "alternative means of compliance" as a "loophole." Is that a fair and correct representation? Can you characterize the negative effects to aviation if such alternate means of compliance were not allowed?

- Is it common for design issues on aircraft to be discovered in service even after the certification process is complete? Is it even reasonable to assume that every design flaw will be found during the process? What are some examples of aircraft, other than the Eclipse 500, where Airworthiness Directives were written to solve design flaws after type certification?

Thank you for your kind attention to this letter and please let me know if you have any further questions.

Sincerely,

John L. Mica
Ranking Republican Member

October 17, 2008

The Honorable John L. Mica
Ranking Republican Member
Committee on Transportation
and Infrastructure
U.S. House of Representatives
Washington, DC 20515

Ref: ltr. Dated September 30, 2008

Dear Congressman Mica:

In accordance with your letter dated September 30, 2008, I am submitting the following comments in response to the questions contained in that correspondence. If these responses do not adequately satisfy the intent of the queries, I will be pleased to provide whatever additional input that is required.

Thank you for the opportunity to address the issue of "alternative means of compliance" as a methodology to assure continued air worthiness for the air transport fleet of aircraft as well as the concept of "equivalent level of safety" as a counterpart methodology to the aircraft certification process.

Sincerely,

COMMENTS IN RESPONSE TO QUESTIONS FOR THE RECORD

Clyde R. Kizer
October 17, 2008

Questions for the record:

Some have characterized the "alternative means of compliance" as a "loophole." Is that a fair and correct representation? Can you characterize the negative effects to aviation if such alternative means of compliance were not allowed?

Response:

Alternative Means of Compliance (AMOC) is a regulatory methodology provided for technical problem resolution for the process of continued air worthiness (in-service maintenance of aircraft airworthiness) in the air transport industry. A similar methodology termed the "equivalent level of safety (ELOS) processes" is permitted during certification by long standing regulation. The intent of the AMOC/ELOS processes is to maintain, or improve, the safety of aircraft and the industry while allowing the employment of technical innovation and new technologies to resolve technical problems. Over many years, the concept of alternative methods of compliance has proven to be a safe and effective approach for regulatory compliance. Both processes allow consideration for differing technical expertise, varying operational experiences, new technologies and innovative methodologies while protecting the safety and efficacy of the air transport system and not compromising the responsibility, or prerogatives, of the Regulatory Authority.

The varying approaches provided by alternate means of compliance allow the potential for ultimate industry standardization in the form of "best practices" as those best practices are manifested over time. Absent alternative means of compliance, the industry might be forced to apply the least efficient, or most expedient, approach to technical problem resolution in terms of safety and effectiveness.

Failure to develop innovative engineering and new technologies to address improved safety and effectiveness (efficiency and economics) of the aviation industry would have an extremely adverse impact on aviation safety and could drive industry users to superior products from Europe and Asia. Absent the challenge to creativity within the industry supplied by alternate means of compliance, our technically trained personnel might seek venues outside of the United States to exercise their creativity.

The AMOC/ELOS processes have provided essential alternatives that are crucial to the air transport industry.

COMMENTS IN RESPONSE TO QUESTIONS FOR THE RECORD

Clyde R. Kizer
October 17, 2008

Questions for the record:

Is it common for design issues on aircraft to be discovered in service even after the certification process is complete? Is it even reasonable to assume that every design flaw will be found during the process? What are some examples of aircraft, other that the Eclipse 500, where Airworthiness Directives wee written to solve design flaws after type certification?

Response:

Design issues discovered in service: By definition, Airworthiness Directives change the original type certificate for an aircraft from the approved type design. This procedure establishes a demonstrated need to redefine the design specifications. The regulatory action is implemented to address a number of existing, or potential, discrepancy classifications:

1. Though the probability for a known fault or failure to occur may be remote new technology, materials or engineering concepts allow such a significant improvement in the air worthiness status that it must be implemented.
2. Faults, or failures, are determined that were never anticipated, or tested for, during the certification process.
3. The original certification process did not adequately address failures, of faults, resulting from unintended human interaction.
4. Though the aircraft demonstrated compliance with certification requirements, materials, processes, or designs were not robust enough to withstand the rigors of normal operational use.

Every flaw to be determined during certification: The complexity of modern transport aircraft is so great that the number of potential failures resulting from design, material, production variance, and human interaction faults is virtually infinite. Since it is impossible to investigate an infinite number of variables in the finite period of time allocated for certification, many faults and failures are not manifested until a relatively large number of aircraft accumulate service experience, hence exposure to the failure mode, exponentially.

Examples of in-service design issue determination: Attachment I is provided as a random search of recent ADs for which the apparent intent was to rectify a design issue that was not determined during the certification process.

The following are personal experiences where ADs, or operational variances, were required to accommodate technical problems not determined during the certification process:

1. Design redundancy protects the integrity of critical functions in the event of a single, or even multiple, failures. Historically, where failure modes have been demonstrated to be a function of time, or frequency, the industry has mixed and matched affected components (flight control surfaces, flight control system components, engines, etc.) to minimize the exposure to multiple failures. This situation occurred early in the service life of the Boeing 767 (around 1984) aircraft when time/cycle related delimitation of composite fight control surfaces were manifested. The airlines mixed new controls with older controls to preclude simultaneous failures. No serious failures were encountered in operation.
2. In the era of digital electronics, computer driven and integrated system transport aircraft a number of faults and failures have developed in association with the new technology. A common failure mode for first generation digital electronic equipment resulted from power transients, or system interface, difficulties. Airport ground power sources are notoriously "dirty" with respect to frequency and amplitude control of output ac power and, since digital equipment lives in an analog world, the interface frequently caused unexpected faults or failures. It was not uncommon, in my experience, to have to reset, or reinitialize, digital electronic indicators or systems (A320 aircraft) following power transients when shifting between ground, APU and engine-driven power sources. Likewise, digital display failures have occurred as the result of power spikes in operation.
3. It is not uncommon for design faults or failures to manifest themselves many years after the entry into service for an aircraft. The DC-10 and 747 (Explosive Decompression - Loss of Cargo Door in Flight, United Airlines Flight 811 Boeing 747-122, N4713U Honolulu, Hawaii, February 24, 1989. Revised NTSB Report Number: AAR-92-02, adopted on 3/18/1992) cargo door design problems did were not identified until each aircraft had been in service for over 10 years.
4. The certification of the DC-10-10 included the capability for CAT II/Autoland which gave the aircraft autoflight capability to the (then) lowest ceiling/visibility limits to include an autopilot controlled landing. After a few years of operations of the DC-10-10 aircraft, the carriers with the two largest fleets in North America, United Airlines and American Airlines, experienced excessive, and operationally unacceptable, touchdown dispersions and rates during autoland operations. Both carriers participated with the FAA and Douglas in an extended evaluation program to investigate potential causes for the problem. The evaluation showed that, even though the aircraft and its systems were certified for CAT II/Autoland, the tolerances in the electronic components that interfaced in the autoflight mode to provide that capability could not be retained over time by airline maintenance practices. The resolution to this certification anomaly required that the aircraft be precluded from Autoland operations under CAT II conditions, or that newer components be purchased with the capability to retain the required tolerances for CAT II/Autoland operations. United Airlines opted to restrict their DC-10-10 fleet from Autoland operations under CAT II conditions.

This brief summary, and the attached survey of recent Airworthiness Directives, demonstrates that, even though properly certificated, Airworthiness Directives, and operational procedures, are sometimes required to assure safe and reliable operation of for some aircraft.

Attachment I

BRIEF REVIEW OF DESIGN RELATED AIRWORTHINESS DIRECTIVES

1. **EMBRAER**: This AD results from a report of *smoke in the cockpit*. We are issuing this AD to prevent *ignition of a windowsill drain hose by an overheated relay*, which could cause fire and smoke in the cockpit. **(Design problem not determined during certification.)**
2. **McDonnell Douglas**: This AD results from the determination that the *thrust reverser* systems on McDonnell Douglas Model DC-8-62, DC-8-63, DC-8-62F, and DC-8-63F airplanes *do not adequately preclude inadvertent deployment* of the thrust reversers. We are issuing this AD to prevent inadvertent deployment of the thrust reversers during takeoff or landing, which could result in loss of control of the airplane. **(Design problem determined after years of operational experience.)**
3. **Boeing** Model 747-400 series airplanes: This AD results from reports of *decompression panels on the smoke barrier opening in flight and on the ground without a decompression event.* We are issuing this AD to prevent inadvertent opening or tearing of decompression panels, which could result in degraded cargo fire detection and suppression capability, smoke penetration into an occupied compartment, and an uncontrolled cargo fire, if a fire occurs in the main deck cargo compartment. **(Design problem determined after years of operational experience.)**
4. **Airbus** Model A300 airplanes: This AD results from fuel system reviews conducted by the manufacturer. We are issuing this AD to *reduce the potential of ignition sources inside fuel tanks*, which, in combination with flammable fuel vapors, could result in fuel tank explosions and consequent loss of the airplane. **(No design problem determined, but new design provides significant improvement to prevent potential problem.)**
5. **Airbus** Model A330: This AD was prompted by reports of detached and damaged float valves in the left and right fuel tanks of the trimmable horizontal stabilizers (trim tanks). We are issuing this AD to *prevent, in the event of a lightning strike to the horizontal stabilizer, sparking of metal parts and debris from detached and damaged float valves*, or a buildup of static electricity, which could result in ignition of fuel vapors and consequent fire or explosion. **(Though properly certified, failure mode existed that was not manifested during the certification process.)**
6. **Boeing** Model 747SP, 747SR, 747-100, -100B, -100B SUD, -200B, -200C, -200F, and -300 series: To prevent *improper deployment of the escape slide/raft or blockage of the passenger/crew doors* in the event of an emergency evacuation, which could result in injury to passengers or crewmembers, accomplish the following: Modify the escape slide/raft pack assembly in accordance with Boeing Service Bulletin. **(Improved design addresses potential original design problem manifested after years of operational experience.)**
7. **Boeing** Model 777-200 series airplanes: This AD results from fuel system reviews conducted by the manufacturer. We are issuing this AD to *prevent energy from a lightning strike on the bushing for the sump drain valve from arcing to the inside of the center fuel tank wall*, which could create an ignition source in the fuel tank and result in a fuel tank explosion. **(No design problem determined, but new design provides significant improvement to prevent potential problem.)**

8. **Bombardier** Model CL-600-2B19: This AD results from a report that the *shear pin located in the input lever of two pitch feel stimulator (PFS) units failed due to fatigue*. We are issuing this AD to prevent undetected failure of the shear pin of both PFS units simultaneously, which could result in loss of pitch feel forces and consequent reduced control of the airplane. **(Though properly certified, failure mode existed that was not manifested during the certification process.)**

Testimony Statement

Ford J Lauer III
Manager
Federal Aviation Administration
Manufacturing Inspection District Office
10100 Reunion Place, Suite 650
San Antonio, Texas 78216

Aircraft Certification: Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EA-500

Given before the U.S. House of Representatives Committee on Transportation and Infrastructure's Subcommittee on Aviation on September 17, 2008

Statement of Ford J Lauer III, Supervisory Aviation Safety Inspector/Manager, San Antonio Manufacturing Inspection District Office, Rotorcraft Directorate.

Given before the U.S. House of Representatives Committee on Transportation and Infrastructure's Subcommittee on Aviation on September 17, 2008:

[redacted]

[redacted] In July of 2006, I was appointed as a new probationary Supervisory Aviation Safety Inspector and Manager of the San Antonio Manufacturing Inspection District Office. The San Antonio Manufacturing Inspection District Office is staffed by a manager, five aviation safety inspectors, and an administrative assistant. The San Antonio Manufacturing Inspection District Office has geographical responsibility in the states of Texas, Louisiana, and New Mexico. The San Antonio Manufacturing Inspection District Office reports to the Rotorcraft Directorate Manufacturing Inspection Office. The Fort Worth Manufacturing Inspection District Office and the Oklahoma City Manufacturing Inspection District Office both also report to the Rotorcraft Directorate Manufacturing Inspection Office. At the time of my appointment as the San Antonio Manufacturing Inspection District Office Manager, FAA manufacturing inspection responsibilities for the Eclipse project were under the authority of a Program Manager assigned by the Rotorcraft Directorate Manufacturing Inspection Office. Since I was a newly appointed manager and was unfamiliar with the Eclipse project, the Manager of

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the Rotorcraft Directorate Manufacturing Inspection Office elected to maintain the assigned Program Manager in place rather than turn the Eclipse project over to me. In this capacity I assisted the Program Manager as a subordinate. In late December of 2006, the assigned Program Manager moved on to other duties, and I was given more responsibility on the Eclipse project. Specifically, those responsibilities consisted of coordinating and scheduling an FAA District Office Audit in connection with the Eclipse application for a Production Certificate, and airworthiness certification of Eclipse airplanes manufactured under type certificate only. In addition to personally conducting these activities at the Eclipse facilities in Albuquerque, New Mexico, I also assigned FAA inspectors from the San Antonio Manufacturing Inspection District Office to conduct these activities on a rotational basis. Because of the nature of the Eclipse project, I never had the relative autonomy or decision making authority FAA Manufacturing Inspection District Office managers typically have on similar projects. All decisions and actions were coordinated with and concurred with by the Manager of the Rotorcraft Directorate Manufacturing Inspection Office prior to implementation.

In the July through December timeframe, I made several trips to the Eclipse facility to assist the FAA Program Manager in various tasks. These tasks included inspecting the first production airplane. The FAA Program Manager and I witnessed functional test procedures and inspected the airplane to verify it conformed to design drawings. The

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Given before the U.S. House of Representatives Committee on Transportation and Infrastructure's Subcommittee on Aviation on September 17, 2008:

FAA Program Manager and I observed numerous instances where the airplanes did not conform, yet had been signed off by Eclipse Company inspectors and FAA designees through it did conform. Eclipse company inspectors and FAA designees were repeatedly instructed by the FAA Program Manager that airplanes and functional test procedures should not be signed off and presented for FAA inspection unless everything conformed.

Functional Test Procedures are common in the industry, and are used to test various aircraft systems for proper operation before releasing the aircraft for flight. The Program Manager and I observed numerous instances where the Eclipse functional test procedures were not being complied with. For example, tools referenced by part number in the functional test procedures were identified with different part numbers and in some cases tools completely different than those called out were being substituted. Oils, hydraulic fluids, and other materials called out in the functional test procedures were also being substituted. Rather than complying with or revising the functional test procedures, identifying tools properly, or obtaining the referenced tools and materials as applicable, Eclipse elected to sign off the functional test procedures as being properly accomplished. The Program Manager and I also conducted conformity inspections to verify that aircraft were manufactured in accordance with the design drawings included in the Type Certificate. Numerous nonconforming characteristics were observed, such as improperly installed fasteners, misrouted electrical wiring, unsatisfactory safety wire, wrong fasteners being used, inadequate clearances between moving parts, etc. The Program

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Manager gathered the Eclipse inspectors and supervisors, and instructed them to thoroughly inspect the airplanes and functional test procedures, and to have them revised where necessary. Additionally, Eclipse personnel were instructed that airplanes and functional test procedures should not be signed off and presented for FAA inspection unless everything was correct. On subsequent visits to Eclipse, the Program Manager, I, and other FAA inspectors encountered the same or similar issues on other airplanes being presented for FAA inspection. Through a preexisting agreement between Eclipse and the FAA, it had been established that the Eclipse FAA designees would accomplish key inspections and witness functional test procedures. When FAA inspectors re-inspected to verify that the Eclipse FAA designees were performing adequately, nonconforming characteristics were consistently observed.

It was my perception that Eclipse employees were under substant pressure from their management to deliver airplanes. I observed that Eclipse management would not hesitate to complain to FAA management when they perceived FAA inspectors were interfering with Eclipse's ability to deliver airplanes. On numerous occasions, when FAA inspectors told Eclipse personnel something they did not want to hear, the reply was to the effect that Eclipse could not live with that and the issue would be elevated. To support the airplane delivery schedule, Eclipse expected an FAA inspector presence virtually around the clock, and made this known to FAA management. As a result, I and several of the

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FAA inspectors worked a great deal of overtime at Eclipse, including weekends and holidays. Having to maintain a virtually constant FAA inspector presence at Eclipse had a huge effect on the San Antonio Manufacturing Inspection District Office's ability to keep up with other work. I proposed to establish certain days of each week (i.e. Tuesday & Wednesday) where FAA inspectors would be at Eclipse. Anything Eclipse had ready on those days would be FAA inspected, and anything not ready would be inspected the following week. My proposal was not accepted, and I was directed to have FAA inspectors available at Eclipse to support their schedule, which pretty much meant seven days a week. It should be noted here that Rotorcraft Directorate management became concerned about FAA inspectors becoming fatigued. Rotorcraft Directorate management thus directed that FAA inspectors would not work or travel on weekends. This decision was reversed however, and FAA inspectors were instructed to support Eclipse as necessary, including weekends.

With the departure of the assigned FAA Program Manager from the Eclipse project, I realized that I needed to assign one of the San Antonio Manufacturing Inspection District Office inspectors to serve as the Principal Inspector. FAA inspectors are typically assigned to serve as the Principal Inspector of several aviation manufacturing companies. Principal Inspectors typically conduct all necessary FAA oversight at the companies assigned them. The Eclipse project required too much FAA involvement however for

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any one FAA inspector to be able to keep up with. I assigned several FAA inspectors to assist the Principal Inspector in carrying out the required tasks.

The first production airplane was issued a standard airworthiness certificate by me at the end of December 2006, after some two months of ongoing inspection, rework by Eclipse, and re-inspection, as well as ongoing functional test procedure witnessing, rework by Eclipse, and re-witnessing, until all nonconformances were resolved and it was found that the airplane conformed to the type certificate and was in condition for safe operation. During my visits, I spent a great deal of time providing assistance and advice to Eclipse inspectors on how they could bolster the quality system to ensure airplane inspection status. I let the Eclipse inspectors know what I had seen work in other companies. On individual levels the Eclipse inspectors seemed interested in what I was showing them. However, I never saw any of my recommendations or suggestions tried or implemented.

In late January, Eclipse presented the second production airplane for FAA inspection and airworthiness certification. Eclipse had submitted signed FAA forms containing certifying statements that the airplane had been inspected by Eclipse, was found to be airworthy, conformed to its type certificate, and was in condition for safe operation. The FAA inspector's inspection of the airplane indicated that Eclipse had neglected to adequately inspect the airplane before making application for airworthiness certificate

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and thus possibly violated FAA regulations by making an apparent false statement on the FAA forms. I consulted with the Rotorcraft Directorate Manufacturing Inspection Office Manager in Fort Worth, and it was determined that an investigation should be initiated for a possible violation of federal regulations. An investigation case was initiated in accordance with FAA policy. It should be noted here that FAA policy established that every apparent or alleged violation must be investigated, and that the Enforcement Investigation Report is the means for documenting an investigation. A letter of investigation notification was sent to Eclipse in early February, requesting any statements they cared to make. Additionally, Eclipse was notified that they should accomplish thorough re-inspection of the airplane to determine its true conformity status. Eclipse responded to the investigation notification in writing and stated that they internally investigated and could find no evidence of violations or any unsafe condition with the aircraft. Eclipse management had taken exception to both the investigation and the communication that the airplane should be re-inspected, and elected to take those matters to a higher level of FAA management. Application for FAA airworthiness certification of an aircraft must be accomplished by the applicant submitting FAA Forms 8130-6, *Application for Airworthiness Certificate,* and 8130-9, *Statement of Conformity.* The Eclipse submitted FAA Form 8130-6 contained the certifying statement— *"I hereby certify...the aircraft has been inspected and is airworthy and eligible for the airworthiness certificate requested."* The Eclipse submitted FAA Form 8130-9

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contained the certifying statement—*"The aircraft described above, produced under type certificate only...conforms to its type certificate, is in a condition for safe operation, and was flight checked on 1-30-2007."* Upon inspection, the FAA inspector found that the airplane pitot static functional test procedure failed; the airplane weight and balance report contained numerous errors; unqualified parts tags found on installed AHORS units; numerous improperly installed HiLok and Huck fasteners; production flight test not signed off in airplane log; and the keyboard for pilot data entry was labeled "EXPERIMENTAL ONLY." Both flap actuators were found identified as "EXPERIMENTAL ONLY" as well as several other numerous other nonconforming characteristics. Title 14 Code of Federal Regulations part 21, section 21.2 states that *"No person shall make or cause to be made (1) any fraudulent or intentionally false statement on any application for a certificate or approval under this part; (2) Any fraudulent or intentionally false statement in any record or report that is required to be kept, made, or used to show compliance with any requirement for the issuance or the exercise of the privileges of any certificate..."* FAA Order 2150.3A (in effect at the time), paragraph 202.f. required that *"every apparent or alleged violation must be investigated and appropriately addressed."* Paragraph 202.e. required that *"when an investigation is warranted, it should be conducted promptly."* Paragraph 900.a. established that *"the EIR is the means for documenting, assembling, organizing, and presenting all evidence and other pertinent information obtained during an investigation."*

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In February a District Office Audit was accomplished, prior to preparation for the Production Certification Board Audit. FAA policy (FAA Order 8120.2) requires both a District Office Audit and Production Certification Board Audit prior to issuance of an FAA Production Certificate. The District Office Audit was a thorough evaluation of the Eclipse airplane production quality control system. During the District Office Audit, over one hundred discrepancies were documented and consolidated into forty-two separate noncompliances. A notification of results was sent to Eclipse so that they could implement corrective action. The San Antonio Manufacturing Inspection District Office did not accomplish any follow-up to the District Office Audit. The Eclipse project was reassigned to the Fort Worth Manufacturing Inspection District Office in the late March-April timeframe, so all District Office Audit follow-up was accomplished by that office. It should be noted that there were two previous attempts at accomplishing a District Office Audit, the first being in approximately July of 2006. Not all areas of the Eclipse quality control system were evaluated. There was also a problem in that issuance of the type certificate had to be postponed, which affected the District Office Audit. Additionally, most of the areas of the Eclipse quality control system that were evaluated were relocated by Eclipse to other facilities after being evaluated. In approximately October of 2006 a second attempt at a District Office Audit was attempted. I was not

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personally involved, but was informed that virtually nothing was audited due to the team having to focus on inspection of Eclipse airplanes.

[redacted] The assigned Senior Advisor brought in two assistants from outside the Rotorcraft Directorate. In emails from an assistant to the Senior Advisor, I was informed that the investigation case was wrong because Eclipse's nonconforming airplane could not result in a violation of 14 CFR part 21, section 21.2. I discussed the matter with FAA legal at the FAA Fort Worth Regional Office and was told that the investigation was indeed proper. I described the entire investigation case in detail in a report I assembled, entitled *Sequence of Events, Enforcement Case Number 2007SW430002, Eclipse Aviation Corporation.*

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In mid March the Senior Advisor implemented a work the agreement between Eclipse and the FAA known as a Project Specific Certification Plan. Consistent with the Project Specific Certification Plan established that the FAA would recognize and utilize Eclipse's QA work process to the greatest extent possible in inspecting the Eclipse airplanes. FAA inspector utilization of FAA designees has been a common FAA practice, but only after companies have been able to demonstrate that their inspectors and FAA designees were reliable. In order to streamline FAA inspector utilization of airplanes, a hope was that within the Project Specific Certification Plan established a set amount of time for FAA inspection of each Eclipse airplane. Language within the Project Specific Certification Plan also established that the FAA would not require removal of airplane interiors, floor boards, etc., which FAA inspections were performed. The Project Specific Certification Plan mentioned was revision "A" and was signed on March 15, 2007. It is my understanding that it has been revised several times since then. It should be noted here that FAA policy (FAA order 8130.2) establishes that the FAA has full responsibility for ensuring that aircraft manufactured without a production approval conform to their design and are in condition for safe operation. Up to the time the Project Specific Certification Plan was implemented, the Eclipse inspectors and FAA designees had not yet demonstrated that they were reliable in signing off airplane inspections and functional test procedures. I have never encountered, nor have I ever heard of, any working agreement, project specific certification plan, or situation other than the Eclipse project,

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where limits were placed upon the ability of FAA inspectors to thoroughly inspect aircraft.

[redacted] My decision was driven by all of the events I had experienced and observed in connection with the Eclipse project up to this point.

In March, the FAA Principal Inspector, while at the Eclipse facility, informed me that an FAA designee at Eclipse had issued an experimental airworthiness certificate without having obtained the required authorization from the San Antonio Manufacturing Inspection District Office. Additionally, the Principal Inspector informed me that the FAA designee did not possess the appropriate designee function code to be able to issue the airworthiness certificate, so could not have received such authorization anyway. The Principal Inspector communicated with the former Program Manager in the Rotorcraft Directorate Manufacturing Inspection Office to ask what the process was for revoking an airworthiness certificate. The former Program Manager replied with the requested information. I was informed later through informal communication that the Principal Inspector allegedly took it upon himself to take possession of the airworthiness certificate, but that he later gave it back. No formal complaint was brought to me concerning the alleged incident. I did however counsel the Principal Inspector as well as

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ensured that all FAA inspectors at the San Antonio Manufacturing Inspection District Office were made aware of the requirements for pursuing revocation of an airworthiness certificate.

In mid to late March I was informed by the Manager of the Rotorcraft Directorate Manufacturing Inspection Office that the Fort Worth Manufacturing Inspection District Office would assume responsibility for the Eclipse project. Involvement of the San Antonio Manufacturing Inspection District Office in the Eclipse project thus ended. Two FAA inspectors from the San Antonio Manufacturing Inspection District Office were utilized by the Fort Worth Manufacturing Inspection District Office for a few more weeks to ensure a smooth transition.

[redacted]

As a veteran of United States military service, I know the meaning of integrity, loyalty, and dedication. In the military I lived by those words, and as an FAA employee and

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public servant, I continue to live by them. I have been with the FAA since 1997, having served in the New Cumberland Manufacturing Inspection District Office in Harrisburg, Pennsylvania and the Oklahoma City Manufacturing Inspection District Office in Oklahoma City, Oklahoma. I feel confident that the personnel of those offices will provide positive testimony as to my integrity, loyalty, and dedication.

This statement was assembled based on the history of events as I remember them. Additionally, I obtained some information from archived electronic correspondence and official FAA records.

This concludes my statement, and I await the Subcommittee's questions.

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STATEMENT OF NICHOLAS A. SABATINI, ASSOCIATE ADMINISTRATOR FOR SAFETY, AND JOHN J. HICKEY, DIRECTOR OF THE AIRCRAFT CERTIFICATION SERVICE, ON "FAA AIRCRAFT CERTIFICATION: ALLEGED REGULATORY LAPSES IN THE CERTIFICATION AND MANUFACTURE OF THE ECLIPSE EA-500," BEFORE THE HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE, SUBCOMMITTEE ON AVIATION, SEPTEMBER 17, 2008.

Chairman Costello, Congressman Petri, Members of the Subcommittee:

I appear before you today to discuss the procedures, policies and decisions leading to the certification of the Eclipse EA-500 (Eclipse aircraft), a very light jet (VLJ) that received Federal Aviation Administration (FAA) certification on September 30, 2006. There have been numerous assertions by heretofore unnamed sources that the certification of this aircraft was rushed, achieved despite it not meeting appropriate standards, and accomplished due to extreme pressure placed on the FAA employees responsible for certification. While I am prepared to discuss the details of the Eclipse certification, I must state unequivocally at the outset what goes without saying: that FAA professionals would never and, in this case, did not, certify an aircraft that they knew to be unsafe or one that did not meet standards. I am unaware of any FAA safety professional who would choose to put the safety of the flying public at risk by certifying an unsafe product for introduction to the NAS. Signing his or her name to the certification of an aircraft or component only if it meets detailed technical standards is fundamental to the continued safety of the national airspace system (NAS).

Because of the growing interest and alleged skepticism about the airworthiness of the Eclipse aircraft, I assembled a team of experts to review data compiled in connection with the certification of the aircraft, a Special Certification Review team (SCR). I felt it was important to have the SCR headed by a highly respected individual whose personal and professional integrity are above question. That's why I was so pleased when Jerry Mack, a former Boeing executive who has extensive certification experience from the manufacturer's perspective, agreed to head the team. The charter of the SCR directed

them to conduct an independent analysis and evaluation of the aspects of the type certification of the Eclipse aircraft that we understood were the subject of concern. All of them are highly respected professionals with technical expertise in different areas critical to type certification.

The job of the review team was not an easy one but everyone pulled together and dedicated themselves, traveling around the country to meet with the key people and review the voluminous documents involved. Last Friday, the SCR announced its findings. The team's bottom line was critical: FAA's certification of the Eclipse aircraft was appropriate because it did meet the required standards. In addition, the team did not find any unsafe condition needing immediate attention. This is good news--that, in the opinion of some of the best technical experts in this country, the Eclipse aircraft meets the required standards and was, therefore, legally entitled to receive certification. Their report will be available to the Committee for your review.

But also important to me and my team was learning of the deficiencies the SCR identified with regard to communication within the certification team and with regard to the documentation of decisions. I take seriously the criticism that the teams we assigned to this project did not communicate well with one another or with Eclipse. We fully accept the SCR's criticisms of the process and agree that changes need to be made. I believe that if our type certification team had documented its various concerns in issue papers, as required, and had followed that process to resolution, all FAA staff involved in the project would have better understood and accepted the certification approach that was used in this project. I assure you that we will take every opportunity to improve communication at all levels of our organization and to ensure that our staff are accountable and follow national processes to appropriately document certification decisions.

The Certification Process: An Overview

One of the challenges of this hearing is that the FAA's aircraft certification process is highly complex and technical. It is an extremely dynamic process, which means that no

two certifications are identical. Fundamental to any certification is to have FAA staff and the Applicant working closely together to establish general timelines and expectations, and to identify deliverables. The specifics of how the project should proceed are detailed in two planning documents, the Partnership for Safety Plan (PSP) and the Project Specific Certification Plan (PSCP). In these documents, the FAA and the Applicant agree to operating practices for a certification project. Each phase of the project is built on early mutual awareness of key certification issues, commitment to planning and managing the project, early identification and resolution of issues, and other elements to achieve the vision of the project. All phases of the project are designed to contribute to improving safety and assisting with the mitigation of cost and project risk. It's an extremely interactive process with both FAA staff and the Applicant agreeing to specific goals and responsibilities.

During type certification the FAA determines whether the design of the aircraft meets all the applicable regulatory requirements. At this stage, the approval is of the type design, not subsequently produced aircraft (approval of which is authorized under a production certificate, described below). FAA regulations specify the safety requirements, but the Applicant is free to propose the method they will use to demonstrate compliance. In the type certification process, it is the normal and preferred method for an Applicant to propose methods of compliance and then document such methods in their certification plans. Most frequently, the Applicant will use the methods of compliance published in FAA general guidance material, because they are known to be acceptable and the results are more predictable. However, it is important to understand that while the regulatory requirements are mandatory, the specific methods of compliance are not.

It is also important to understand that the law requires the Applicant to achieve *defined, minimum standards*. If those standards are met, the Applicant is legally *entitled* to a type certificate.[1] Do not mistake the term "minimum standards" for "minimal standards." It is unworkable to require anything other than the "minimum standards" prescribed in the regulations in order for the Applicant to know exactly what it has to demonstrate.

[1] 14 C.F.R. § 21.21.

Moreover, the FAA is required by law to establish clear regulations for these applicants to follow,[2] and is likewise obligated not to act arbitrarily or capriciously.[3] For an FAA professional to require something other than what is outlined in the regulations is not only inappropriate, it is illegal.

Once an Applicant receives its type certificate, it has six months to obtain a production certificate or an approved production inspection system. The production certificate is issued when the Applicant demonstrates that it can reliably reproduce aircraft that meet the approved type design.[4] Obtaining a production certificate is extremely challenging for a new company entering the industry because they must establish the physical and procedural infrastructure to develop the capability to consistently reproduce aircraft that conforms to the type certificate. Until a production certificate is issued, the FAA must inspect each aircraft the Applicant produces as it is being built in order for us to ensure that the aircraft meets the approved type design. This is why we require that the Applicant obtain the production certificate within six months of the type certificate. FAA cannot indefinitely dedicate resources to inspect every aspect of every aircraft built by the Applicant.

In addition, an FAA Flight Standardization Board (FSB), composed of FAA pilots and other experts in flight operations, usually begins work near the end of the Type Certificate activities and is required to address any unique aspects of a new airplane. It determines operational suitability of the aircraft and its systems, requirements for flight crew training aids, type rating requirements for pilots, and any unique or special training requirements. These are determined through flight tests, meetings with the Applicant, review of documents, etc. Setting these standards and demanding that the Applicant meets them are regulatory obligations of the FAA.[5] The FSB also determines emergency evacuation capability, the resolution of flight standards issues, and other tasks as appropriate. The Board's membership includes operations inspectors from FAA district

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[2] 5 U.S.C. §§ 551 et seq.
[3] See, e.g., National Ass'n of Home Builders v. Defenders of Wildlife, 127 S. Ct. 2518 (2007).
[4] 14 C.F.R. § 21.135.
[5] 14 C.F.R. Parts 91, 121, 135.

field offices or representatives from the FAA headquarters as appropriate, a board chairperson from the FAA's Airplane Evaluation Group (AEG), and an alternate chairperson. While the FSB evaluation is not part of the certification process of the physical aircraft, it is an essential part of the evaluation of the aircraft because it determines how the aircraft may be operated.

We cannot stress enough that this brief description of FAA's certification of an Applicant's product is an extreme oversimplification of the complexity and pressures associated with the process. In turning to the specifics of the Eclipse certification, more of those complexities and pressures will become apparent. While the Eclipse certification process was fairly typical in terms of encountering those complexities and pressures, it was unusual in some other respects. The Eclipse certification process involved an Applicant that had never before attempted to obtain FAA certification of its product. The process also involved an FAA field office that—though very competent in certifying aircraft products—had never before been responsible for a high profile, highly anticipated product. This situation resulted in FAA headquarters carefully monitoring both the type and production certification of the Eclipse aircraft.

During the process, some differences of opinion or questions of regulatory policy that arose during the Eclipse certification were raised to FAA headquarters level for resolution. In this instance, I believe raising the conflicts or questions to headquarters was the appropriate and right thing to do. This Committee has been justifiably critical of the FAA when headquarters failed to step in when problematic issues arose in the FAA regional and district offices. This is a case where headquarters management properly intervened to support and guide our field staff in working through problems that arose.

Type Certification Issues

Some of the problems that were a focus of concern during the type certification process involved the aircraft flaps, stall warnings, screens blanking, and most significantly, how and whether the avionics should have been approved. As I briefly review each of these issues and why I believed they were properly addressed, I would ask that you focus on

the standard that had to be met and remember that if the standard was met, the law requires FAA to issue the certificate.

For an aircraft to fly safely, it is important that the flaps on the wings operate properly. Consequently, there is a certification requirement that the aircraft have a system to prevent the flaps from moving to an unsafe, asymmetrical position. This problem was recorded only once during certification. However, test pilots did cite a more frequent problem of receiving flap failure messages. Most flap failure messages were caused by system errors. The problem identified by the test pilots was mitigated by improving the flight manual procedures to assure operational safety. The problem experienced by the pilots was not the result of the certification standard not being met.

A second area of concern involved what were viewed as too frequent stall warnings experienced by FAA pilots. The dialogue on this issue has often been referred to as "false stall warnings," which is very misleading. The certification requirement is that the warning system activate as the aircraft approaches the stall speed. During testing, the stall warning system activated appropriately. There were no "false warnings." What was ultimately determined was that the maneuvering speeds and abnormal flap landing approach speeds that the manufacturer provided to the FAA pilots in the flight training manual and the airplane flight manual, respectively, were slower than they should have been. Consequently, operating at those speeds meant the FAA pilots were flying closer to the stall speed than they should have been, thus resulting in a more frequent activation of the warning system than pilots expected. The pilots assumed the stall warning system was activating inappropriately and referred to the activation as false warnings. The fact was that the system worked properly, but some of the speeds the pilots relied on were inaccurate and, ultimately, changed by the manufacturer. Again, the certification standard, that the stall warning system notify the pilot that he or she was approaching stall speed, was met. The training manual and flight manual speeds were changed before the first airplane was ever delivered to a customer.

The next area we reviewed was blanking of the screens of the Electronic Flight Information System (EFIS). The EFIS provides many required controls and displays for the pilot. It consists of two Primary Flight Displays, a Multifunction Display, an Autopilot Control Panel, a Center Switch Panel, and a keyboard. There were a total of three screens on the control panel. Although there were times when a screen blanked out, the bottom line is that never more than one screen blanked out at any given time. The required standard is that one display of information, essential for continued safe flight, be available to the crew. In the case of Eclipse, the pilot always had the requisite information available to continue safe flight. Consequently, the required standard was met.

Finally, and perhaps most importantly, were the allegations that a portion of the aircraft's avionics system was certified to less than the applicable standards. I say that this is perhaps the most significant area of concern during the certification process because it is this issue that ultimately resulted in the Director of the Aircraft Certification Service, John Hickey, getting involved in the type certification.

Fundamental to understanding this matter is to understand how the FAA certifies avionics. The manufacturer of any avionics component can apply to the FAA for a Technical Standard Order Authorization (TSOA). A TSOA allows a component manufacturer to certify its product for a broader use—i.e. to enable it to sell its product to a range of aircraft manufacturers, not just to Eclipse who was applying for the type certificate in this case. A TSOA is not required to obtain a type certificate. In this case, Avidyne, the avionics manufacturer received its TSOA after Eclipse received its type certification. When an airplane is certified and contains components without TSOAs, the aircraft manufacturer becomes responsible for the component, both in the design and in the production.

During the Eclipse certification, as the negotiated target date for the issuance of Eclipse's type certification came closer, it became clear that Avidyne, the manufacturer of the avionics system, would not qualify for a TSOA by the target date. In order not to delay

the timely issuance of the type certificate, Avidyne and Eclipse decided to have the avionics certified as part of Eclipse's type certification, while Avidyne continued its separate, parallel work on getting its TSOA. The FAA could certify that the Avidyne product met standards on the Eclipse aircraft, without making the determination that it met requirements for a TSOA. This certification approach is common for components of an aircraft.

Because of the change in approach, a disagreement arose between Eclipse personnel and our staff in our Aircraft Certification Office (ACO). Specifically, the issue centered around a dispute as to what actions were necessary to achieve compliance with the standards. To receive TSOA approval for certain types of software-driven avionics such as the one Avidyne was developing, an applicant is explicitly required to demonstrate satisfactory completion of the industry standard, referred to as "DO-178B. However, to receive a type certificate, there is no explicit requirement to meet DO-178B. In fact, the regulation governing this lists multiple ways to meet the requirements.[6] Consequently, Eclipse submitted a plan to meet the type certification requirements through a combination of ground tests, flight tests, laboratory tests, and other activities.

It was the belief of the ACO staff that Eclipse needed to complete DO-178B testing anyway in order to achieve the type certification, and informed Eclipse of that requirement. Eclipse officials notified FAA headquarters officials that they considered the ACO's requirement to meet DO-178B to be incorrect when seeking a type certification. Rather, Eclipse argued, the type certification standards allowed for its proposed plan for compliance.

John Hickey was concerned that FAA policies and procedures were not being followed and traveled to Albuquerque, accompanied by the headquarters officials tasked with ensuring the development and implementation of national certification policy. John and these headquarters staff met with the FAA certification team to discuss whether the

[6] 14 C.F.R. § 21.305.

appropriate standards were being required, given the request that the component be evaluated only as part of the Eclipse type certification.

I support John's decision to elevate this matter by bringing in the headquarters certification policy staff. As I mentioned, this was a situation where there was an FAA field office that had not previously been responsible for the certification of a high profile, complex project and an Applicant that had never been through the certification process. The change in Eclipse's compliance strategy came relatively late in the program and left little time for the FAA to develop a response strategy. It was entirely appropriate that headquarters evaluate the differences of opinion about how the matter should proceed. In the end, John left it to the headquarters policy officials to determine whether the Eclipse proposal that Avidyne's product had already met the requisite standards for type certification, was appropriate. They ultimately agreed with the Eclipse position.

I realize that this decision created resentment and raised questions for some people. No one likes to be second guessed or overruled. I know that. It takes a strong manager to intervene in a process when he knows his input will be unpopular. But making difficult decisions that are the right decisions is what leadership is all about.

As a final comment on the issuance of the type certificate, much has been made of the fact that the certificate was signed on a Saturday. I want to reiterate the complexity and pressure involved in the certification process. High profile projects always involve a strong and dedicated push at the end to meet the negotiated deadline, if possible. The pressure is always to reach a decision. It is never to reach a particular outcome. The deadline is always negotiated for a reason. The Applicant needs to know whether it can be certified by that date—in this case, September 30, 2006--for its own business reasons. The FAA has agreed to provide the resources necessary to assist the Applicant and do the necessary evaluations by the target date. It is a shared goal. If FAA agreed to a date that fell on a Saturday, then it was because the office believed the goal could be met by that date. Certification on that date, regardless of the day of the week, should not receive undue attention.

Production Certificate Issues

Turning to the production certificate, Eclipse had six months from receiving its type certificate, or until the end of March 2007, to obtain its production certificate or an approved production inspection system. Until it received a production certificate, Eclipse could only produce airplanes with very close FAA supervision of its production system and of the inspection and airworthiness certification of each airplane produced. Once again, the deadline created pressure for those individuals working on this stage of the process.

Eclipse faced some challenges during this phase. The first Eclipse airplane was delivered to a customer at the end of December 2006. Subsequently, Eclipse fell behind in its delivery schedule and was unable to deliver airplanes to customers as promised. This may have been attributable to a number of factors, including that the company suffered from frequent changes in key personnel and an overall lack of awareness of aircraft production best practices. The company was frustrated that its production schedule was in disarray and believed FAA was part of the problem. FAA employees were frustrated at Eclipse's inability to consistently reproduce a product that met the approved design standard, thus requiring continued heightened FAA supervision of the production process.

All the while, the March 30th deadline for production certification loomed large. The increasing pressures on both sides resulted in a degradation of the personal and professional relationships necessary to achieve success and led to a number of unprofessional encounters that once more came to the attention of headquarters and John Hickey. There were allegations by Eclipse that the standards being applied were inappropriate and allegations by FAA staff that the regulations were not being followed.

With this backdrop, in early March, John established an independent team to oversee completion of the production certificate and, in the interim, the airworthiness certification of individual airplanes. The team was made up of highly respected FAA professionals

from across the country and led by Ron Wojnar, who is a senior advisor in the Flight Standards Service. The independent team found that some FAA policy and procedures for airworthiness and production certification were not being followed, and that there was no effective FAA management plan in place to provide a roadmap for the parties to understand how to achieve a production certificate in the requisite time.

Consequently, the first action directed by the team was to jointly develop and implement a revised, more detailed PSCP, one of the planning documents I described earlier. This management tool defines the roles, responsibilities and expectations for both the FAA and the Applicant in order to meet the desired milestones and ensure compliance with regulations and policies. It does not change any regulatory requirements. It just provides specific steps for how to meet those requirements taking into consideration FAA's past experience with the Applicant and our knowledge of best practices. In this instance, it amplified a less detailed plan that had previously been developed.

As a result of the PSCP and weekly meetings or telephone conferences to hold everyone accountable for meeting the PSCP goals, the production certificate was issued on April 26, 2007. (The FAA granted Eclipse an extension of the six-month deadline for issuing the production certificate on March 29, 2007, as permitted by the regulation.[7]) A total of 11 Eclipse aircraft had been delivered prior to the issuance of the production certificate, with the FAA inspecting and certifying each individual airplane.

During the production certification process, two FAA professionals were removed from the production certification team, at the direction of the FAA Manager of the local Manufacturing Inspection Office. Their removal was endorsed by Ron Wojnar, the head of the independent team. The management officials concluded that these FAA professionals were frustrated with their interaction with their Eclipse counterparts. Understandably, their frustration may have led to a lack of objectivity—a factor that FAA management appropriately considered.

[7] 14 C.F.R. §21.123.

Once again, a headquarters action resulted in some local FAA officials being challenged about the way they had conducted the production certification process. Once again, it is understandable that those individuals, whose judgments and decisions were questioned, would be offended. And, once again, our leadership and the difficult decisions we've made have been challenged as inappropriately deferential to the Applicant. But the fact is that we sent in the best and the brightest to ensure the most appropriate outcome based on the legal requirements. That additional review by FAA should be commended and not condemned. The attention and interest of FAA headquarters staff should not be viewed as inappropriate. It should be viewed as a government doing its job to make the system safer and working to introduce ever safer products into the NAS.

Flight Standardization Board Issues

As the production certificate team was performing its duties, FAA's Flight Standards Service began its review with the FSB. The FSB team is required to evaluate the manufacturer's training programs, aircraft manuals, checklists, aircraft system performance, and equipment functionality to determine the aircraft's suitability, training and flight checking requirements, and crew configuration for operation in accordance with FAA regulations. Because of the aircraft's design and performance, the FSB was also required to determine the pilot type rating for the aircraft. Eclipse requested that the aircraft be certified for Single Pilot Instrument Flight Rules (SIFR) operations, and the FSB evaluated the aircraft in accordance with these standards.

For a new airplane requiring a type rating under FAA regulations,[8] the FSB uses the broad guidance specified in FAA Advisory Circular 120-53, for a type rating determination and to evaluate the manufacturer's training program for a new aircraft. Additionally, FSB pilots/safety inspectors are required to complete the training program and operate the airplane to the standards required by the Airline Transport Pilot/Type Rating Practical Test Standards, and in accordance with the Airplane Flight Manual normal, abnormal, and emergency procedures and operating limitations. When it becomes difficult for the majority of FSB pilots to complete the manufacturer's training

[8] 14 C.F.R. § 61.31.

program and be able to operate the airplane at the required standards, an aircraft's training program could be deficient, its operational workload could be too high for the average pilot, or it could be a combination of both. If the FSB determines that the workload is too high, it will not issue a type rating for a single pilot.

The FSB met at the Applicant's headquarters on September 23, 2006 and adjourned on October 6, 2006 without issuing a type rating for the operation of the aircraft. During this evaluation period or "Phase I," the FSB found numerous problems with the aircraft, including screen blanking of the flight displays, nuisance stall warnings, flap failures, unavailable autopilot functions necessary for SIFR operations, etc. Because these issues led to an extremely high cockpit workload during IFR operations, it would have necessitated two pilots to fly the aircraft. At that time, the FSB was unable to issue a single pilot type rating for this aircraft as requested by the Applicant, and made recommendations to Eclipse that the problems be resolved before presenting the aircraft for another FSB review. The FSB process worked – our team evaluated the product according to our standards, and when the product could not meet those standards, the FSB refused to issue the type rating.

The FSB reconvened on December 6, 2006 ("Phase II"), after Eclipse indicated that the Phase I problems had been addressed. While many of the 15 original issues had been resolved, some were still outstanding. Additionally, the FSB found three other issues that needed resolution before a type rating could be issued. The FSB adjourned on December 14, 2006. Once again, the standards were not compromised, our rules were followed, and the process worked.

Finally, the FSB reconvened for a third evaluation ("Phase III") in January 2007. The FSB found that most of the previous outstanding issues had been resolved, but identified four issues with the aircraft, some of which had previously occurred. Once again, the team required the Applicant to take corrective measures in order to bring the aircraft in compliance with the standards for a SIFR operations type rating. Eclipse did resolve all

the problems during Phase III, and the FSB issued the SIFR operations type rating on January 26, 2007.

During and after every phase of the FSB's evaluations, all the problems that came to light were briefed fully to Eclipse staff and management for them to address and resolve. A number of them were resolved while the FSB was present; others were resolved during the time between the phases. Management in both the Aircraft Certification Service and the Flight Standards Service were also informed of the issues.

In short, the FSB process worked exactly as it should have. The Applicant presented their aircraft to the FSB for evaluation and a type rating determination. The FSB tested the aircraft and found it lacking in certain respects. The team required that the Applicant resolve the problems before proceeding further, and the Applicant did. While it was an undoubtedly frustrating process on both sides, all the issues were in fact resolved, and the FSB, in accordance with the law and FAA policy, issued the appropriate SIFR type rating.

Conclusion

The certification of Eclipse was a challenging project. It is impossible to convey in a single overview the complexities and thousands and thousands of decisions that went into the aircraft's certification. I know that this Committee understands the process is demanding one. Tough decisions were made and people were pushed to work hard. Could certain things have been done differently? Absolutely, but that would be the case with any lengthy, complicated process that receives this level of investigation and scrutiny after the fact.

Our bottom line is that FAA has a vested safety interest in the certification of new aircraft. Each new generation of aircraft tends to be safer than the ones that preceded them. Our regulatory standards continue to raise the safety bar as new technologies are introduced. For this reason, FAA wants new airplane programs to succeed. But by succeed, I mean we want to help manufacturers meet all the regulatory requirements for

their product. But helping them succeed never means giving them a pass on regulatory safety requirements so they can meet delivery schedules.

A good government is a government that is dedicated to its mission, accountable to the public and responsive to the needs of its citizens. I understand and appreciate that this Committee wants to ensure that responsiveness does not result in less than vigilant regulatory oversight. I am keenly aware of your concerns because they are my concerns as well. As always, you have my commitment to holding my organization and the industry we regulate to the highest aviation safety standards in the world.

Mr. Chairman, this concludes my statement. I will be happy to answer your questions at this time.

U.S. Department
of Transportation
**Federal Aviation
Administration**

October 31, 2008

Mr. Clay Foushee
U.S. House of Representatives
Committee on Transportation and Infrastructure
Oversight and Investigations Staff
586 Ford House Office Building
Washington, DC 20515

Dear Mr. Foushee:

Attached please find responses to questions for the record for the September 17, 2008 hearing on "FAA Aircraft Certification: Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EA-500," sent by Chairman Costello to Mr. Nicholas Sabatini, Mr. John Hickey, and Mr. Ron Wojnar.

We apologize for the delay in responding, and thank you for your understanding.

Sincerely,

Mary U. Walsh
Assistant Chief Counsel
For Legislation

Enclosure

FAA Aircraft Certification: Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EA-500

Questions for the Record

Panel III

The Committee is requesting a follow up to the questions listed below that were addressed at the hearing, but were not answered.

1. Mr. Wojnar, as you heard in the testimony and you are very much aware, the production certification was approved with 13 outstanding deficiencies as was identified by the Inspector General and it took a better part of the year after the approval was given to get these corrected with the aircraft still being built and placed into service. In retrospect, in the future, would you do that differently? Would you issue the production certification for these outstanding issues to be addressed with an IOU, essentially awarding a production certification and allowing the manufacturer to go forward and, at a later date, correct or address these issues? Secondly, is this normal, appropriate, or in the best interests of the public?

RESPONSE:

There may be some confusion as to the 13 items referenced in the question. There are 13 action items contained in the FAA/Eclipse Aviation Corporation (EAC or Eclipse) production certificate project specific certification plan (PC-PSCP). These are not "specific production problems" or "deficiencies," and had no bearing on the issuance of the production certificate (PC) itself. The PC-PSCP was signed on June 6, 2007, about five weeks after the PC was issued. The PC-PSCP was a post production certificate, proactive approach, aimed at continuous improvement in communications, notifications, production approval holder (PAH) responsibilities, and accountability, to ensure all regulatory requirements were continually being met by Eclipse after the issuance of the PC. The PC was issued to Eclipse because they met the applicable requirements for PC issuance. These "13 items" included actions for both Eclipse and the FAA to follow-up on in the interest of continuous improvement.

In February 2007, the FAA conducted a District Office Audit in preparation for the issuance of a PC at Eclipse. During the audit, 42 non-compliances were documented. All 42 items and corrective actions were evaluated and found acceptable by the FAA. Twenty-nine of the 42 were closed immediately. That left thirteen (13) non-compliances, which had follow-up actions to be completed. It is not uncommon to have non-compliances that take long term corrective actions to resolve and still meet the requirements to receive a PC.

In both cases it is a normal process to document items for continued improvement, and agree on an action plan.

2. Mr. Hickey, how many times has the FAA issued a certification on a Saturday afternoon? If this has occurred, as you indicated at the hearing, provide the Subcommittee with the aircraft make/model and the date of certification.

Furthermore, couldn't that have happened on the following Monday, during a normal workweek? Why was it necessary for an inspector to come in on a Saturday to certify it?

RESPONSE:

The FAA has issued the following certificates on the weekend. Four certificates have been issued on a Saturday and four on a Sunday.

TC and TCDS Number	**DATE**	**Day of the week**	**Make**	**Model**
2H3	December 10, 1960	Saturday	Bell helicopter	47G-2A
2A3	July 25, 1965	Sunday	Mooney	M20F
A4SW	September 3,1988	Saturday	Ayres Corporation	S2R-T65
A00006WI	March 26, 1995	Sunday	Hafei Aviation Industry Co., Ltd. (Haic)	Y12 IV
H6SO	June 29, 1996	Saturday	Southwest Florida Aviation	SW205A-1
P43EA	March 29, 1997	Saturday	Sensenich Wood Propeller Co	W90T6JA
2A3	February 7, 1999	Sunday	Mooney	M20S
2A3	October 15, 2006	Sunday	Mooney	M20TN

The FAA frequently works outside normal business hours during aircraft type certification programs. Federal Aviation Regulations (FARs) entitle an applicant to a type certificate when the FAA finds that the aircraft has met the applicable standards and has no unsafe feature or characteristic. Once the FAA has made these findings, there is no basis for waiting to issue the type certificate.

NOTE: NO QUESTIONS NUMBERED 3 OR 4 WERE SUBMITTED.

5. Mr. Sabatini, there were 11 of these planes that Eclipse was permitted to deliver to their customers with the above-mentioned deficiencies and IOUs outstanding. What is the FAA's justification for allowing this to happen?

RESPONSE:

As noted in the response to Question 1, these "deficiencies" had no bearing on the issuance of the PC and would have no effect on aircraft delivered by Eclipse.

6. Mr. Sabatini, please provide a response to Mr. Oberstar's inquiry as indicated below in the transcript of the hearing:

RESPONSE:

See response to Question 7 below.

7. Mr. Sabatini, in April, we recommended that you amend the Customer Service Initiative to avoid the appearance of conflict-of-interest with your one and only safety mandate. This is another example of that appearance of conflict-of-interest. When do you expect to publish a new document in place of the current Customer Service Initiative? What steps are you taking to address this issue?

RESPONSE:

We have developed the Consistency and Standardization Initiative, which clearly states our commitment to the public. It sets out our expectations for the aviation community when they work with us and articulates our commitment to provide timely and complete responses in a respectful and professional manner. It is under final review within the FAA.

8. Mr. Sabatini, much of the IG's testimony focused on the manufacturing problems of the EA-500 that continue today. Your "Special Certification Review Team." apparently did not look at any of the issues related to the approval of the production certificate (PC), despite numerous problems identified by various FAA inspectors and engineers, and the PC was a major focus of the IG investigation. The IG testified that these manufacturing problems continue with the aircraft today. Have you gone back and conducted a review of the production process of the EA-500? If not, when will this take place?

RESPONSE:

The Special Certification Review (SCR) team was chartered to evaluate specific issues of compliance regarding the *type certification* of the Eclipse EA-500 because this was the initial area of review by the Office of the Inspector General, based on concerns raised by employees since the issuance of the type certificate. The SCR was to review and evaluate certain areas of the type certification and continued operational safety information to determine if the type design complies with 14 CFR Part 23 requirements. The charter did not include a review of the production certification.

With regard to the production certificate (PC), the FAA has provided oversight of Eclipse's production approval for approximately a year and a half. There have been ongoing principal inspector and supplier control audits conducted by the Fort Worth Manufacturing Inspection District Office (MIDO) since issuing the PC.

FAA Order 8100.7C, Aircraft Certification Systems Evaluation Program (ACSEP), outlines the process utilized to determine if FAA production approval holders (PAH), their priority parts suppliers, and delegated facilities are complying with applicable regulations and the procedures established to meet these regulations. The ACSEP is an element of the Aircraft Certifications Service's Continued Operational Safety Process and evaluates the actual operating practices of a production approval holder and delegated facilities against the Code of Federal Regulations, FAA-approved data, and the facility's internal procedures. ACSEP evaluations are conducted at regular intervals for all PAHs. Shortly after the issuance of the Eclipse PC, an ACSEP audit was scheduled for September 2008.

The ACSEP evaluation at Eclipse Aviation was conducted from September 23 through October 2, 2008, and consisted of eight team members. The ACSEP evaluation team identified no safety-related noncompliance. The team identified some areas for continued improvement in the quality system, and are working on an action plan with Eclipse. The issues observed during the ACSEP included examples of company employees not following company documented procedures and suppliers not following Eclipse procedures. The procedures associated with producing an airplane are extensive and complex; therefore it is common during an audit to find instances where a particular procedure is not being completely followed. The observations we made during the Eclipse ACSEP evaluation are typical of observations we find at other PC holders.

9. Mr. Sabatini, FAA inspectors found problems with Eclipse supplier-manufactured parts on 26 of the 28 aircraft operated by the largest user of the EA-500. So my question is what have you done? What has the FAA done with the findings of those inspectors concerning the manufactured parts on 26 of those 28 planes?

RESPONSE:

We believe the Committee may be referring to service difficulty reports (SDRs) submitted on Eclipse EA-500 aircraft. Nearly all of these SDRs were submitted by the then-largest user of the EA-500 who operated 28 aircraft. We are answering this question based on the assumption that the Committee is referring to these SDRs.

Service difficulties occur in all type certificated aircraft, and the reporting of them is an important source of data to the FAA. Reviewing SDRs and evaluating whether they indicate a safety issue is an important part of the Aircraft Certification Service mission. The responsible airplane certification office has been monitoring service reports on the EA-500 since the airplane first entered service. Some of the service reports we received on the Eclipse EA-500 resulted in the FAA issuing airworthiness directives (AD) on the pitot probe. The majority of SDRs reviewed did not constitute an unsafe condition warranting airworthiness directive action.

In addition to the airplane certification office's review of Eclipse SDRs, we also tasked the Special Certification Review (SCR) team to review SDRs on the Eclipse EA-500. The SCR team identified and reviewed a total of 85 SDRs pertaining to the Eclipse 500. Overall, the SCR team concluded the majority of the SDRs resulted from reliability issues separate from compliance with the minimum FAA standards. Three of the SCR team's recommendations were related to service issues and are presented below:

Recommendation No. 3
The FAA and Eclipse should conduct a root cause analysis of the operational trim and mistrim issues being reported in the field.

Recommendation No. 4
The FAA and Eclipse should conduct a root cause analysis of the trim actuator failures documented through the SDR system and other in-service reports.

Recommendation No. 5
All cognizant FAA offices (ACO, MIDO, AEG, and CMO) should work together to establish appropriate corrective action for fire suppression bottle failure issues documented through the SDR system and other in-service reports.

We value the SCR team's recommendations and have accepted them. We have established a team that is developing an action plan to address the recommendations of the SCR team.

Questions NOT Addressed at the Hearing (09-17-2008)

Please provide responses to the questions listed below. Although not asked at the hearing, the Committee requests that you provide an official answer to each question.

10. You say that FAA met all pertinent certification regulations, but the Inspector General found that it is the totality of actions or inactions that raise strong reasons for concern. What is your reaction to that statement?

RESPONSE:

The FAA's certification process and obligations are extremely complex. What may appear to some as a reason for concern may in fact be a minor issue; conversely, what may not concern some may be of great consequence to our aviation experts. The certification of Eclipse was a challenging project. While there were certainly challenges at each stage of the certification process, at every stage, the EA-500 was ultimately determined to meet the certification requirements given the data and information known at the time. Thus, while the "totality of actions or inactions" is cited as a reason for concern, in fact, the certification program, as evaluated by our experts was found to meet all of the applicable regulations. In doing so, the applicant was legally entitled to certification under the Federal Aviation Regulations.

11. Why was Eclipse Aviation Authorized as an Organizational Designated Airworthiness Representative (ODAR)? Doesn't a company need to have a history of demonstrated experience as a company in order to receive this designee status? How could Eclipse have been granted this with it being a completely new company 4 years prior to issuance of the TC?

RESPONSE:

To receive an ODAR, per FAA Order 8100.8, the applicant must be a Production Approval Holder or a non-PAH (i.e. Eclipse Aviation Company at the time of ODAR issuance) involved in a high probability of obtaining an FAA production certificate (PC) for a type certificate product. Eclipse demonstrated a need for an ODAR, based on the production plan for the airplane.

Applications submitted by non-PAH organizations must show evidence of an ongoing type certification program and an established quality control system among other things. The ODAR applicant is required to meet all Designated Airworthiness Representative (DAR) qualifications for the functions they will perform by ensuring that the individual authorized representatives *collectively* meet the qualification criteria in FAA Order 8100.8, Designee Management Handbook. New companies are able to meet the requisite qualification criteria by hiring professionals who gained their experience working for other aircraft companies.

The Eclipse airworthiness representatives given ODAR authority had extensive industry quality assurance experience, including work at Raytheon and GE Aircraft Engines. Per FAA Order 8100.8, the FAA considers applicants' total relevant experience, not just experience gained with the manufacturer seeking the ODAR.

12. It appears that FAA lays out approved methods for compliance, but in the case of Eclipse, used "work-arounds," "alternative means of compliance," found reason for "equivalent levels of safety," etc. While these techniques are sometimes necessary, given evolving technology in aerospace, do you think such means can also be abused?

RESPONSE:

The terms "work-arounds," "alternative means of compliance," and "equivalent levels of safety" are terms that appear to be misunderstood. The FAA did not allow Eclipse to use an "alternate means of compliance" to meet design certification requirements. The term "alternate means of compliance" or "AMOC" has been mischaracterized as a way of showing compliance differently from the normal or established manner. To clarify: the term AMOC is typically associated with an Airworthiness Directive (AD). The AD is a regulatory requirement that defines "specific" actions to occur within a specific timeframe, to address an unsafe condition. In this sense, an AMOC is a means to use an "alternate" or different method from that defined in the AD, to correct the unsafe condition and comply with the AD. Compliance via an AMOC provides the same level of safety as compliance per the means outlined in the AD.

There is nothing in the Federal Aviation Regulations (FARs) that permits the FAA to accept anything other than the approved level of safety compliance. The regulations allow options for applicants on how to comply with the requirements. Should an applicant choose to exercise one of the legally permitted options and meets the required level of safety, that applicant is entitled to receive certification of its product. Because applicants are still required to meet our safety standards, the FAA has no evidence that these legally permitted options are being abused.

The FARs provide minimum airworthiness standards and typically do not specify a required means of complying with those standards. For many airworthiness standards, the FAA has defined an acceptable means of compliance in an advisory circular. Advisory circulars clearly state that they provide one means, but not the only means, of complying with the applicable standard(s). When an applicant chooses to use another means to demonstrate compliance per the regulations, it is not a "work-around."

Equivalent level of safety findings, which are provided for in 14 C.F.R. § 21.21, are made when literal compliance with a certification regulation cannot be shown and compensating factors exist which can be shown to provide an equivalent level of safety. Each finding includes a description of any design changes, limitations, or equipment imposed to make the finding of equivalency. An explanation of how the actions taken provide an equivalent level of safety to that intended by the regulation is also provided.

It is important that applicants have the ability to demonstrate compliance with certification standards using a variety of methods. Such options facilitate the certification of new, innovative, safety-enhancing technology into aircraft designs.

In determining acceptable means of compliance and making equivalent level of safety findings, the FAA follows FAA Order 8110.4C. The process for making an equivalent level of safety finding is rigorous and thorough, to assure that such findings are appropriate. The rigor of this process is one of the reasons we have not seen abuse in the use of equivalent level of safety findings.

13. Do you believe the FAA's Customer Service Initiative CSI), which has been previously debated in our April 2008 Full Committee hearing, played a role here?

RESPONSE:

We appreciate that this Committee has strong feelings about FAA's use of the word "customer." We do not believe that the use of this word in and of itself played a role in how the Eclipse certification was handled. As Mr. Hickey described at length at the hearing, there has long been in place a process to resolve problems and disputes that arise during a certification process. Engineering is not a black and white exercise, but rather one that is shades of gray. It is extremely common for two engineers to approach a problem, or how to resolve that problem, differently. The process used by the Aircraft Certification Service to identify, document and resolve differences in approach with respect to how to meet a regulatory standard are set out in FAA Order 8110.4c and the Partnership for Safety Plans developed between the FAA and the applicant.

14. The IG testified that the FAA identified the EA-500 as a "priority certification." Why does the FAA place a priority on one certification program over another? What made this so important from an FAA policy standpoint?

RESPONSE:

The FAA did not label the EA-500 as a "priority certification." However, like most successful organizations, the FAA has a clear vision of its goals and objectives. At the highest level within the FAA, these goals and objectives are outlined in the FAA's strategic plan, called the Flight Plan. The FAA Flight Plan contains broad, overarching goals along with objectives, strategies, and initiatives to attain those goals.

The 2006-2010 FAA Flight Plan included a strategy to: "Establish standard procedures and guidelines for general aviation operators," as well as a supporting initiative to, "Ensure that safety oversight and regulatory compliance keep pace with changes in the general aviation environment." This strategy and initiative were in support of Objective 2, "Reduce the number of fatal accidents in general aviation," under the FAA Flight Plan goal of Increased Safety.

In support of this FAA Flight Plan goal, strategy, and initiative, the FY 2006 AVS Business Plan included a strategic activity to, "Support the operation of Very Light Jets (VLJs) in the NAS." Completing certification of the Eclipse EA-500 was identified in the FY 2006 AIR Performance Plan as an example of a VLJ which would operate in the NAS. In hindsight, as Mr. Hickey stated at the hearing, this did lead to high focus on and attention to completion of this particular type certification program.

As we acknowledged at the hearing, one of the lessons we have learned in this process is not to create objectives that rely on circumstances outside of our control, such as relying on another party meeting its own deadline. As Mr. Hickey noted at the hearing, we should be measuring our performance on our own ability to meet the deadlines to which we have committed, and that those deadlines could very well result in findings of noncompliance.

15. The Inspector General found that the Eclipse Manager of Certification, Randy Griffith, had previously worked as an FAA official on the Eclipse certification. He resigned from the FAA and went directly to work from Eclipse with no "cooling off' period. Is this appropriate?

RESPONSE:

At the time Randy Griffith left FAA and went to work for Eclipse, there was no required cooling off period for someone in his position. There still is not one. Therefore, Mr. Griffith accepting a position with Eclipse was appropriate. It is quite common for former FAA employees to go to work for industry and vice-versa. Both FAA and private industry benefit from employees with a range of aviation experience and expertise. It would be an extreme hardship to prohibit an FAA employee from going to work for the private sector in the aviation industry for some set period of time because he or she worked for the FAA. Limitations on some types of interaction by a former FAA employee on behalf of his or her new company may be appropriate, and are defined by 18 U.S.C. §§ 207 and 208.

16. It has been pointed out to us that Eclipse had contractual agreements for additional financial backing, as well as employee bonuses and stock options tied to that date. Were you aware of that?

RESPONSE:

The FAA was aware that Eclipse had business reasons for wanting to meet the target date. However, FAA had no documented information about the specifics of either Eclipse's contractual agreements for financial backing or employee bonuses. The certification schedule was jointly agreed to by Eclipse and FAA.

17. Why in the world is it appropriate for FAA to accept IOUs for things that are deficient in exchange for approving certification? Why not wait until all non-compliant items have been fixed before approval?

RESPONSE:

For clarification, the FAA assumes that the reference to IOUs and certification approval refers to the type certification process and the agreement that Eclipse would maintain operational control of all certificated aircraft until the requirements of "DO-178B" were met.

A Technical Standard Order Authorization (TSOA) allows a component manufacturer to certify its product for use in multiple aircraft. A TSOA is not required to obtain a type certificate. When an airplane is certified and contains components without TSOAs, the aircraft manufacturer becomes responsible for the component, both in the design and in the production.

To receive TSOA approval for certain types of software-driven avionics such as the one Avidyne was developing, an applicant is explicitly required to demonstrate satisfactory completion of the industry standard, referred to as "DO-178B." However, to receive a type certificate, there is no explicit requirement to meet DO-178B. The regulation governing this lists multiple ways to meet the requirements. Consequently, Eclipse submitted a plan to meet the type certification requirements through a combination of ground tests, flight tests, laboratory tests, and other activities. This certification approach is common for components of an aircraft.

As the Special Certification Review team found, the "IOU" had no bearing on the TC being issued since the aircraft met the applicable standards and had no unsafe feature or characteristic. The "IOU" applied to Avidyne's eventual compliance with DO-178B in order to receive its TSOA, which it did in March 2007. Pending that eventual compliance, Eclipse agreed to maintain operational control of all certificated aircraft.

18. Mr. Hickey, one of major problems identified prior to TC approval was that the software only met 23 of the 65 requirements outlined under the industry-standard software approval criteria (DO-178B). You and Mr. Wojnar ignored this and found "an alternative means" for avionics software approval. If 40 or more items could not be demonstrated to be compliant, how in the world, could you be comfortable with an alternative means of compliance and ignore the only widely accepted industry standard?

RESPONSE:

First, the FAA would like to clarify that Ron Wojnar had *no* involvement in the topic covered by this question. Mr. Wojnar became involved in the airworthiness and production certification in March-April 2007, several months after the type design was approved in September 2006.

As noted in Question 17 above, Federal Aviation Regulation (FAR) 21.305 states that parts and appliances may be approved under a parts manufacturer approval (PMA), technical standard order (TSO), in conjunction with type certification procedures for a product, or in any other manner approved by the Administrator. As stated above, Eclipse chose to certify the electronic flight instrument system (EFIS) under the type certification, and the EFIS was properly certificated using appropriate airworthiness standards. The applicable airworthiness standards when certificating under the type design are FAR 23.1301 and 23.1309. Although FAA advisory circular (AC) 23.1309-1 provides that DO-178B is an acceptable means of compliance with these standards, the AC states that the guidance is, "an acceptable means, but not the only means", for showing compliance. The AC goes on to say, "This material is neither mandatory nor regulatory in nature and does not constitute a regulation." The applicant has the option of using a different means of compliance.

The SCR team specifically reviewed this topic and found that the data presented to the airplane certification office was adequate for showing compliance with FAR 23.1301 and 23.1309 for the EFIS at the time of type certification.

19. You say the "Midway software problem" was never seen in the certification program, but many other software problems were. Since software is at the heart of the entire EA-500 design, doesn't the existence of unknown and unverified features of the design lead one to be uncomfortable in approving it? Yet you overruled expert software engineers who refused to sign off because it had not been properly verified.

RESPONSE:

The electronic flight instrument system (EFIS) software and full authority digital engine control (FADEC) software are completely different issues. The issue regarding appropriate software certification standards that arose in September 2006 was related to the electronic flight instrument system (EFIS) software, not the FADEC software.

The incident at Chicago Midway on June 5, 2008 was related to a failure not associated with the software. After this incident, the FAA immediately reviewed the details of the incident and quickly determined appropriate corrective action. We issued an emergency airworthiness directive (AD) on June 12, 2008, requiring before-further-flight evaluation of Eclipse throttles and incorporation of an airplane flight manual (AFM) procedure for dual engine control failure. This AD grounded the fleet until the throttle evaluation and AFM updates were completed. The issues leading to the incident were not known at the time of type certification, and once they were known, the FAA took immediate action to address them.

20. You said the problems with the airplane occurring today were not seen in the certification program, but issues that have occurred were warned about by the certification team. Why were you so reluctant to trust your own experts?

RESPONSE:

The FAA is not reluctant to trust our own experts. These same experts identified and resolved problems during the certification process. Ultimately, these same experts issued the certifications for the EA-500.

We are aware of one problem that arose in service that is related to a potential issue discussed during type certification – drainage of moisture from the pitot system. The certification team thoroughly evaluated this potential issue and believed it was satisfactorily addressed before type certificate issuance. Problems in service that were unanticipated at the time of certification are not rare, which is why the FAA continues safety oversight of aircraft and operations.

As with any type certification program, many potential issues arose during the Eclipse program, and each was thoroughly evaluated. It is important to note that the FAA's role is to review the design issues for areas of non-compliance and unsafe characteristics or features. If a design is able to be shown compliant and does not have unsafe characteristics or features, then the design issue may be undesirable to the customer/operator, but has no bearing on the issuance of a type certificate. Most issues that have occurred in service on the Eclipse EA-500 are of this nature.

21. It appears the approval process was a bit "backwards" here. Rather than acting upon design concerns, you seemed to try to find reasons that it was OK, even though design flaws were seen and identified. The pitot-static system is a good example of this, is it not?

RESPONSE:

The pitot static system received an equivalent level of safety (ELOS) determination because the team concluded that the design was safe and not flawed. The ELOS finding was made based on the existence of compensating factors that were determined to provide an equivalent level of safety to pitot-static drains. Once the aircraft was type certified and began operations at altitude, freezing in the lines leading up to the pitot probe was detected. A design change was made that rerouted the lines and added a drain to the system and these changes were required by an airworthiness directive. It is quite common for operational experience to reveal safety issues that were not detected during type certification and are subsequently corrected through airworthiness directives.

22. Is it sufficient that just because you don't see a problem during a certification evaluation, it is OK for approval, especially when highly qualified engineers and pilots pinpoint potential design deficiencies?

RESPONSE:

The type certification process is based on finding compliance to the regulations, which are performance-based regulations. Throughout the certification program, the FAA team works with the applicant on the identification of failure modes and design issues so that a finding of compliance can be made. Identification, follow-on discussions and an action plan to address potential failures are a part of the process. The applicant is then responsible to develop its compliance plan and make the demonstration of compliance to the FAA.

The FAA examines the type design, completes the appropriate tests and inspections, and determines whether the product meets the applicable airworthiness requirements or that any airworthiness provisions not complied with are compensated for by factors that provide an equivalent level of safety. Upon the FAA's finding that the product complies, and that no feature or characteristic makes the product unsafe, the applicant is entitled to a type certificate under the Federal Aviation Regulations.

As with any type certification program, many potential issues arose during the Eclipse program, and each was thoroughly evaluated. It should be noted that many potential issues that arise during a type certification program are neither non-compliances nor unsafe conditions. In such cases, the issue has no bearing on the issuance of a type certificate. Most issues that have occurred in service on the Eclipse EA-500 are of this nature. Any issues that have represented a non-compliance or unsafe condition have already been addressed or are being addressed.

We did acknowledge at the hearing that there were failures in communication, coordination and documentation with respect to certain aspects of both the type and production certification processes. These failures have resulted in misperceptions and we must strive to improve in these areas in order to avoid some of the problems we encountered with Eclipse in future certifications.

23. The FAA has now issued several pitot-static system airworthiness directives (ADs), the latest on September 9, because it has now been shown that the approved design is indeed defective and causes the very problems warned about. This looks like just one more example of where the FAA did not exercise adequate due-diligence and was more concerned about helping the manufacturer over satisfying safety oversight responsibilities. Please comment.

RESPONSE:

The equivalent level of safety (ELOS) finding that the team made for the Eclipse EA-500 pitot/angle-of-attack probe was based on a thorough review of the design. Although the probe's design had no provisions for water drainage, the team determined that compensating features existed which would provide an equivalent level of safety to the airworthiness standard. One of these compensating features was that the pitot system was shown by testing to be resistant to the ingress of water, and that water in the system would not adversely affect the operation of the pitot system. Another compensating feature was that the heated probe was the low point in the pitot system, and that any moisture or frozen water would be vaporized by the heated probe.

The ELOS finding was made as provided for in FAR 21.21. FAA followed policy in Order 8110.4, which included the development of an issue paper to define the issue and facilitate its thorough examination by both the Airplane Certification Office in Ft. Worth and the Small Airplane Directorate Standards Office in Kansas City. Per the FAA order, a memorandum documenting the ELOS finding was prepared and approved by management in both the Airplane Certification Office and the Small Airplane Directorate.

The process for making an equivalent level of safety finding is rigorous and thorough. The equivalent level of safety finding made for the pitot probe on the Eclipse EA-500 was appropriate given the data and information known at the time of type certification.

After type certification, we received reports of loss of primary airspeed indication due to freezing condensation within the pitot system. As a result, Eclipse developed a design modification, and we mandated it through airworthiness directive action. It is not uncommon for service experience to reveal safety issues not known or understood during the type certification process and that must be corrected by airworthiness directive action.

24. It has been a controversial topic for years that FAA uses less rigorous safety standards for aircraft that are smaller and with fewer seats. Should FAA re-evaluate its certification regime and apply more rigorous standards according to the complexity of the aircraft, as opposed to the number of seats in the aircraft?

RESPONSE:

Part 23 of the Federal Aviation Regulations (FARs) contains appropriate minimum airworthiness standards for most small airplanes. When we find that a proposed design aspect of an airplane contains technology not envisioned by FAR Part 23, we apply any necessary additional airworthiness standards through the issuance of special conditions per FAR 21.16. We applied such special conditions on the Eclipse type certification program.

The FAA reevaluated the appropriateness of its light jet certification requirements in the late 1990's, as the Eclipse and Safire jets began development. Before the late 1990's, the FAA had certified several light jets and had traditionally applied special conditions that increased the performance standards. Applying these special conditions was consistent with light jet technology at the time, which typically resulted in jets having high takeoff and landing speeds (and long takeoff and landing distances) when compared to piston-twin-engine airplanes.

However, as the Eclipse EA-500 design was being developed in the late 1990's, early performance estimates showed that the EA-500's takeoff and landing speeds and distances were actually closer to light piston-twin-engine airplanes than typical transport category jets. These performance estimates showed that the FAA's previous assumption on jet performance was outdated and the FAA needed to reevaluate its certification standards for jets against existing small airplanes, especially for the lighter weight jets.

After the Eclipse reevaluation, the FAA determined that the appropriate airworthiness standards for light jets weighing 6,000 pounds or less (like the Eclipse EA-500) were the existing FAR 23 rules for normal category airplanes. These airworthiness standards require all turbine-powered airplanes under 6,000 pounds to meet many of the same performance standards for piston twin engine airplanes over 6,000 pounds.

The FAA determined that the existing airworthiness standards were appropriate and sufficient in most areas for the Eclipse EA-500 type certification. However, we did find that a few airworthiness standards were inadequate or inappropriate because of novel or unusual design features. As a result, we issued certain special conditions, as provided for in FAR 21.16, which became part of the certification basis for the Eclipse EA-500.

In 2003, an Aviation Rulemaking Committee (ARC) was formed to review the certification and operational requirements for small jets. The group reviewed normal and commuter category airworthiness standards, as well as existing special conditions.

The ARC recommended modifying 41 existing Part 23 rules. Most of the recommendations are based on the current special conditions applied to Part 23 jets.

In addition, one of the Special Certification Review (SCR) team's recommendations was for the FAA to reevaluate the criteria for applicability of function and reliability (F&R) testing. We agree with this recommendation and have already implemented a solution. We had already developed a generic issue paper to apply F&R testing requirements to turbojets weighing less than 6000 pounds. We are currently applying F&R requirements, via special condition, on two active projects: the Diamond D-Jet and the Cirrus jet. We will continue to have internal discussions to determine if a rule change to FAR 21.35 requiring F&R testing for turbojet powered airplanes less than 6000 pounds is appropriate.

25. The "Special Certification Review 'Team" (SRT) was initiated by FAA on August 11, 2008, after word of the IG and Committee investigation leaked out, and looked specifically at 4 certification issues. It does not appear to have focused on the larger policy issues that are the topic of this hearing. Would any of you care to comment?

RESPONSE:

The Eclipse Special Certification Review (SCR) team was established to evaluate specific issues of compliance regarding the type certification of the Eclipse Aviation EA500. A number of concerns were raised by employees since the issuance of the type certificate, and more recently, by whistleblowers reporting to the Oversight and Investigations Staff of the House Committee on Transportation and Infrastructure. In cases where such questions are raised, it is appropriate to conduct an SCR in accordance with FAA Order 8110.4C, Paragraph 2-7 e.(1).

The Eclipse SCR team was tasked to objectively review and evaluate certain areas of type certification and continued operational safety information to determine if the type design complies with the 14 CFR part 23 requirements. Specifically, the SCR team was to: 1) review whether the aircraft was properly certificated in the following areas: aircraft trim, flaps, screen blanking, and stall speeds, in accordance with Federal Aviation Regulations Part 23 on the date the type certificate was issued; 2) review service difficulty reports (SDRs) to determine whether they indicate that concerns raised during the certification process are manifesting themselves in operation; and 3) determine whether SDR data indicate any other areas of concern in the operation of the aircraft.

The SCR team final report identified 8 findings and made 6 recommendations, which have been accepted by the FAA. We are currently working to address the SCR team's recommendations.

26. All of the SRT members were FAA officials, except for Mr. Mack, who was a hired consultant, correct? How can they be viewed as "independent?"

RESPONSE:

The Special Certification Review (SCR) team was convened to provide an objective assessment of whether the issuance of the type certificate for the EA-500 aircraft was appropriate and in accordance with applicable FAA regulations and standards. The goal was for the SCR to have completed its findings prior to the Committee's hearing on September 17, 2008, in order for those findings to be considered at the hearing. Consequently, we sought a highly respected individual whose personal and professional integrity was well acknowledged to lead the team. We felt strongly that this individual should from outside the FAA. We believe our choice of Jerry Mack was a good one and we are appreciative of his efforts.

The remainder of the team consisted of FAA employees, all of whom are experts in their respective fields and all of whom have are highly respected. None of the individuals on the SCR were involved in any aspect of the Eclipse certification they were charged with reviewing. The universe of individuals who have the expertise to analyze and evaluate the technical matters involved in aircraft certification is small. Most either work for FAA or have worked for FAA.

We believe the SCR, led by Jerry Mack and comprised of FAA professionals highly respected by the aviation community, was appropriate and consistent with FAA policy. The report itself, which identifies FAA shortcomings in areas of coordination and communication, evidences that the FAA employees on the team were objective and felt empowered to tell the truth as they saw it. They were in no way influenced by FAA during their evaluation and we do consider them to have been an independent review team.

27. Who appointed this team?

RESPONSE:

The team was appointed by Acting Administrator Bobby Sturgell and Nicholas Sabatini, Associate Administrator for Safety.

28. Mr. Wojnar, why did you implement new procedures that prohibited FAA inspectors from looking under the floorboards, when it was well documented that they were finding numerous manufacturing deficiencies that did not comply with the approved design?

RESPONSE:

The independent team appointed by Mr. Hickey in March 2007, which was led by Mr. Wojnar, found during the period of March 13-15, 2007, that aviation safety inspectors (ASIs) were not inspecting Eclipse airplanes as required by FAA Order 8120.2D. The order required:

> "**24. FAA CONFORMITY DETERMINATIONS**. Subsequent to the date of issuance of the TC and prior to the issuance of an APIS or PC, the MIDO/CMO has full responsibility for determining whether the product or part(s) thereof conform to the type design and are in a condition for safe operation. The MIDO/CMO has the responsibility for performing inspections of incoming materials (at the source, if necessary), installations, and the completed products. The MIDO/CMO has the responsibility for documenting each inspection on FAA Form 8100-1, Conformity Inspection Record, so that each product or part(s) thereof inspected has a complete inspection record."

No inspector was prohibited from completely inspecting airplanes, and floorboards and interior furnishings were removed when necessary to completely inspect the aircraft. However, the independent team was concerned that the ASIs should have completed the inspection of areas under floorboards earlier in the production process to prevent the need for subsequently removing the floorboards.

Although floorboards and interiors were removed when necessary to re-inspect, the independent team recognized that for the long term, a plan was needed for completing the necessary inspections in-process (before floorboards and interiors were installed). Such a plan was agreed to on March 15, 2007, between the FAA and Eclipse. This plan was a, "Project Specific Certification Plan (PSCP) for Production Certification," and provided for inspection of the airplanes prior to the installation of floorboards and interiors, eliminating the need for them to be removed. In addition, FAA ASIs inspected the airplanes when they were fully completed. This is standard practice in the FAA and industry.

It is important to note that, regardless of the number of manufacturing deficiencies that were found during various inspections. FAA inspectors ensured that they did not issue standard airworthiness certificates until all such discrepancies were corrected at the end of the assembly process.

29. Mr. Sabatini and Mr. Hickey, in your written testimony you state, "FAA professionals would never and, in this case, did not, certify an aircraft that they knew to be unsafe or one that did not meet standards." However, Michele Owsley, a Manager in Aircraft Certification Service, wrote a letter to Randy Griffith, the Certification Manager at Eclipse, on June 26, 2008 following the incident at Chicago Midway. One part of the letter states, "[O]ur review of the design information thus far indicates several design regulatory non-compliances," and goes on to raise questions regarding engine isolation, power plant controls and others. In light of this, do you stand by your written statement?

RESPONSE:

Yes. The FAA, including Ms. Owsley, did not know of any unsafe condition or noncompliance at the time of type certification. The Eclipse EA-500, like most other airplanes, has experienced issues in service after having been type certificated. The Chicago Midway incident revealed issues that were not known at the time of type certificate issuance.

30. Eclipse is part of a new generation of very light jets (VLJs), which have gained attention due to the fact that the price of these jets will be lower and because the advanced avionics software will make it easier for pilots to fly. Based on all of the issues that have been uncovered in these planes, do you think that's its safe for a single pilot, who may not have a wealth of experience, to be flying these planes?

RESPONSE:

VLJs have gained attention because of lower initial purchase costs, their new technology integrated systems, the ability of the airplanes to operate at high altitudes, and the increase in performance associated with jet operations. From a practical aspect, these VLJs are even easier to fly by a single pilot than most of the high performance turboprop airplanes currently flown by a single pilot at similar altitudes and airspeeds. In addition, pilots of VLJs are required to complete a formal training program leading to the issuance of a type rating for the specific airplane type, further increasing the safety of VLJ operations. In addition, the advanced avionics configurations being certificated in VLJs should make the airplanes easier to fly in single pilot operations, particularly for less experienced pilots.

Although we believe the design characteristics and pilot training requirements will make VLJs safe for single pilot operations, the FAA evaluates each new airplane type during type certification testing to determine minimum flight crew requirements. Each VLJ that we certificate is examined and a determination made, per Federal Aviation Regulation (FAR) 23.1523, of the minimum flight crew required for that airplane type.

During the type certification program, the EA-500 was put through evaluation for the express purpose of determining the minimum flight crew requirement. The evaluation team consisted of five FAA test pilots and one FAA flight test engineer. The team determined the minimum crew required was a pilot and copilot (crew of two), or a single pilot provided certain equipment was available.

Separate from the type certification program, the FAA's Flight Standardization Board (FSB) evaluated the Eclipse EA-500. The FSB determined the training requirements needed for safe single-pilot operations in the EA-500 airplane. Each pilot who is issued a type rating for flying the EA-500 as a single pilot completes a rigorous training and testing process.

Both of these elements are important for single pilot operations; the airplane must be designed such that it can be safely flown by a single pilot, and the pilot must be adequately trained, qualified, and current to fly the airplane as a single pilot. Both of these elements exist with the EA-500. It is safe for a properly trained and appropriately rated single pilot to fly a properly equipped Eclipse EA-500.

31. Before embarking on a VLJ certification project, why did FAA not reevaluate its certification requirements for the needs of such a jet?

RESPONSE:

Part 23 of the Federal Aviation Regulations (FARs) contains appropriate minimum airworthiness standards for most small airplanes. When we find that a proposed design aspect of an airplane contains technology not envisioned by FAR Part 23, we apply any necessary additional airworthiness standards through the issuance of special conditions per FAR 21.16. We applied such special conditions on the Eclipse type certification program.

The FAA reevaluated the appropriateness of its light jet certification requirements in the late 1990's, as the Eclipse and Safire jets began development. Before the late 1990's, the FAA had certified several light jets and had traditionally applied special conditions that increased the performance standards. Applying these special conditions was consistent with light jet technology at the time, which typically resulted in jets having high takeoff and landing speeds (and long takeoff and landing distances) when compared to piston-twin-engine airplanes.

However, as the Eclipse EA-500 design was being developed in the late 1990's, early performance estimates showed that the EA-500's takeoff and landing speeds and distances were actually closer to light piston-twin-engine airplanes than typical transport category jets. These performance estimates showed that the FAA's previous assumption on jet performance was outdated and the FAA needed to reevaluate its certification standards for jets against existing small airplanes, especially for the lighter weight jets.

After the Eclipse reevaluation, the FAA determined that the appropriate airworthiness standards for light jets weighing 6,000 pounds or less (like the Eclipse EA-500) were the existing FAR 23 rules for normal category airplanes. These airworthiness standards require all turbine-powered airplanes under 6,000 pounds to meet many of the same performance standards for piston twin engine airplanes over 6,000 pounds.

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32. Why was a production certificate (PC) awarded when there were known deficiencies in the supplier and quality control systems?

RESPONSE:

The production certification board that convened to examine the company for its production certificate found that it met the two basic requirements in the rules: first, that Eclipse had established a quality control system, and second, that it could maintain that quality control system. Therefore, the PC was issued.

In February 2007, the FAA conducted a District Office Audit in preparation for the issuance of a PC at Eclipse. During the audit, 42 non-compliances were documented. All 42 items and corrective actions were evaluated and found acceptable by the FAA. Twenty-nine of the 42 were closed immediately. That left thirteen (13) non-compliances, which had follow-up actions to be completed. It is not uncommon to have non-compliances that take long term corrective actions to resolve and still meet the requirements to receive a PC.

33. Why did FAA allow Eclipse to use alternate means of compliance to meet design certification requirements, despite unresolved design problems, which are still ongoing today?

RESPONSE:

The FAA did not allow Eclipse to use an "alternate means of compliance" to meet design certification requirements. The term "alternate means of compliance" or "AMOC" has been mischaracterized as a way of showing compliance differently from the normal or established manner. To clarify: the term AMOC is typically associated with an Airworthiness Directive (AD). The AD is a regulatory requirement which defines "specific" actions to occur within a specific timeframe, to address an unsafe condition. In this sense, an AMOC is a means to use an "alternate" or different method from that defined in the AD, to correct the unsafe condition and comply with the AD. Compliance via an AMOC provides the same level of safety as compliance per the means outlined in the AD.

As explained in the responses to Questions 12 and 17, there are "alternative" ways to show compliance for a certification program. Compliance can be shown through various regulatory mechanisms, including for example Special Conditions, Equivalent Level of Safety (ELOS) finding, and Exemptions. All of these examples, plus the options outlined in 14 C.F.R. § 21.305, are legally defined options for showing compliance. If these options were not allowed, the FAA would not have a regulatory method of compliance available to support new, innovated aircraft designs, or parts, which are crucial to the continued advancement in aviation technology and safety.

34. FAA officials have continuously downplayed the significance of the "false" or inappropriate stall warnings that pilots continue to experience with this plane. When a single pilot, who does not have the breadth of experience needed, sees a stall warning pop up, don't you think that would send the pilot into a panic? When is the pilot supposed to know if they should take the stall warning seriously or not? It seems that this may be dangerous for the plane to "cry wolf", in effect.

RESPONSE:

Pilots are trained, examined, and rated to fly specific types of aircraft. If a pilot receives a type rating to fly an EA-500, it means he or she has demonstrated the required proficiencies to handle the aircraft in a range of situations and circumstances. We would not expect a pilot who receives an Eclipse type rating to panic as the result of receiving a stall warning. The pilot should respond, as trained, to any stall warning s/he receives. The stall warning system met certification standards. In fact, some of what has been characterized as "false" warnings, were in fact appropriate warnings because the operational speeds in the training manual were inaccurate. Subsequent to certification and before the first airplane was ever delivered to a customer, Eclipse increased some of the speeds in the training manual and airplane flight manual. These actions effectively reduced the "false" stall warnings.

Questions Addressed at the Hearing (09-17-2008)

If you would like, you may provide additional responses and information to the questions that were addressed at the hearing.

35. Do you think it is appropriate for senior FAA management to set specific dates for certification approval, in formal executive performance goals, for when a new aircraft is going to be certified?

RESPONSE:

Senior FAA management did not set specific dates for certification approval. With regard to the controversial date in the type certification, September 30, 2006, that date was set by the applicant. This is a very common practice in certification programs. The applicant proposes the schedule for certification, which the FAA then reviews. Depending upon resource allocation, vacation time, other simultaneously occurring projects, etc., the certification schedule may be modified. This allows both the FAA and the applicant to allocate resources and otherwise plan for the management of the certification program.

One of the lessons we have learned is to not place significant focus or attention on completion of a type certification program when such an event is in many ways out of the control of the FAA. Based on that lesson, we have changed the way we write our organizational goals. Now when we build our FAA Flight Plan, Aviation Safety business plan, and Aircraft Certification Service performance plan, we establish objectives that are within the control of the FAA to meet. We do this so that we do not place undue pressure on individuals to meet certain deadlines when those deadlines are outside of FAA's control.

36. Isn't it true that the date when an aircraft is certified is almost exclusively in the control of the manufacturer, and NOT the FAA?

RESPONSE:

It is true that the applicant must submit the type design, test reports, and computations necessary to show that the airplane meets the applicable certification requirements and therefore is the primary "driver" of the certification schedule. It is the FAA's responsibility to review the applicant's submittals and find that the airplane complies with the appropriate standards.

The FAA works with each applicant via a Project Specific Certification Plan (PSCP). These plans facilitate the certification program by allowing the FAA and the applicant to mutually plan the program milestones based on the available resources. The FAA and the applicant discuss the milestones of a certification program and each commit to actions. For example, if the applicant wants to begin type inspection authorization (TIA) testing by a certain date, then the FAA requires certain data submittals and certain actions, such as a conformity inspection, to be completed by a reasonable date in advance of the TIA test date, to allow time to review the data and approve or disapprove it. These milestones and timeframes are agreed to between the applicant and the FAA. Once the PSCP is signed, each party abides by the schedule and is accountable if it misses one of its deadline.

37. Don't you think that the FAA should, as a matter of policy, not be concerned about when an aircraft is certified, just that it is safe for certification?

RESPONSE:

The FAA's focus in all type certification projects is on determining whether the product meets the appropriate standards and whether it has any unsafe feature or characteristic.

38. Do you believe that it is appropriate for the FAA to concern itself with the fact that its certification decisions, or delays in certification, may cause financial hardship for a company?

RESPONSE:

FAA's primary focus is always safety. Delays in the certification process often occur and did with respect to the certification of the EA-500. We do not hesitate to make certification decisions that result in program delays. At the same time, we cannot ignore the fact that we must be good stewards of the public trust as we carry out our responsibilities. We do this by following our processes and fulfilling our obligations within a reasonable, mutually agreed upon time frame whenever possible

39. The bottom line here is that there is strong "appearance" that you bent over backwards to make sure the EA-500 got certified by the date the company wanted. Your own records show you spent more money on this certification than any other comparable program. Wouldn't it have been more prudent to wait until all the design problems identified had been corrected? Why was 9/30 so important?

RESPONSE:

The FAA is responsible for the issuance of the type certificate. If the airplane meets the applicable airworthiness standards and has no unsafe feature or characteristic, then the applicant is entitled to a type certificate.

We know of no other certification program comparable to the Eclipse EA-500. This was a new company developing an all-new airplane that incorporated new technology, both in its design and manufacture. The company was located in a city that was not home to either an FAA airplane certification office or a manufacturing inspection district office. The project was managed by an FAA office that needed to supplement its certification team with FAA personnel from other FAA offices. The certification program extended to over 5 years instead of the typical 3 years. FAA management of the program transferred from one airplane certification office to another during the middle of the program. All of these factors combined to result in a significant draw on FAA resources, both in labor hours as well as in travel funds. These labor hours and travel expenditures were necessary for the FAA to adequately carry out its function of examining the type design, completing the necessary tests and inspections, and determining whether the product met the applicable certification requirements.

40. We've heard testimony that Mr. Hickey applied unusual or inappropriate pressure on FAA engineers and inspectors to approve the aircraft because of his self-imposed executive performance goal to get it done. Please explain why you think so many people have complained about your decisions in this case?

RESPONSE:

As Mr. Hickey testified at the hearing, in the case of Eclipse, there were problems with coordination, consultation and documentation that may have left certain employees feeling that their positions had not been thoroughly considered. This is a failing that we acknowledge and are working to rectify in future certifications. Mr. Hickey is a hands-on manager who is determined to hold his employees accountable for meeting stated goals whenever possible. He expects them to work hard to identify, understand and overcome problems. He considers it part of his job to intervene when he learns that people are not working through problems, as he intervened in the case of Eclipse. It is appropriate for senior executives to make difficult decisions, even if those decisions make some people unhappy.

41. Mr. Hickey, we've heard from two different witnesses that you convened a meeting a few weeks before the TC was approved, and that you were unusually harsh, some have said abusive. It is reported you said, "We are here to save a company." That causes us great concerns in light what many of us consider the "overly cozy" relationship the FAA seems to have developed with industry of late. Please comment.

RESPONSE:

As noted in response to Question 40, we acknowledge that some employees were unhappy with the manner in which Mr. Hickey intervened in the Eclipse type certificate process. However, at no time did he say that it was up to FAA to save the company.

42. Mr. Hickey why did you reassign FAA personnel who found design problems with the aircraft and refused to sign off on the design? That looks very suspicious, as it did to the IG.

RESPONSE:

No one was reassigned during the EA-500 type certification process (when the design of the aircraft is examined) because of his or her actions or decisions on the project. Personnel reassignments that occurred during this time were made by the respective office managers and were associated with routine resource management over the course of a lengthy program. In no case did Mr. Hickey reassign any FAA personnel during the type certification program.

43. Mr. Hickey, you sent Mr. Downey the manager of the Ft. Worth office a letter of reprimand when you relieved him of that responsibility, saying among other things, that he failed to work well with the customer. It appears that his "failure" was based upon his strong belief, based upon his expert credentials, that the design was not ready for approval. You then sent your former Deputy, Mr. Wojnar to take over. Doesn't this look a bit cozy?

RESPONSE:

To clarify one point, the EA-500 had already received its type certificate when we sent the letter to Mr. Downey, and his own testimony states that he stood by that certification. By his own statements, Mr. Downey did not believe that the design was not ready for approval.

During the production certification process, Mr. Hickey became aware of practices and behavior of certain FAA employees that he found inappropriate. When Mr. Hickey learned that Mr. Downey was aware of the employee actions and was, apparently, untroubled by them, he lost confidence in Mr. Downey's ability to effectively manage the process. Because he no longer believed that Mr. Downey was capable of providing objective oversight and guidance, Mr. Downey was removed from the Eclipse project.

Mr. Hickey felt strongly that he needed to understand whether FAA personnel were acting within the scope of appropriate regulations and guidance or were imposing requirements beyond the regulatory minimums. He appointed a team comprised of objective experts, led by Mr. Wojnar. Mr. Wojnar was selected to head the team because of his years of expertise and his unquestionable integrity. The team was charged with understanding both sides of the allegations of misconduct and helping to work through the problems that existed.

44. We now know that software problems led to both engines freezing at full power and were responsible for a near fatal accident at Midway on June 5, 2008. Even the FAA official (Ms. Owsley) who signed the original TC now acknowledges that certain features of the software are not compliant. Shouldn't it have been a clue that software might be a significant problem given the aircraft could not satisfy the industry-std. certification methodology?

RESPONSE:

Following a wind shear encounter on final approach, the pilot of an Eclipse EA-500 airplane applied full throttle using enough force against the forward stops to exceed the design throttle position signal maximum range. The associated fault mode held the engine thrust settings at the last known throttle position, which was maximum. Following the balked landing, the pilot elected to shutdown one engine. Upon shutdown of the one engine, the opposite engine thrust reduced to idle and was unresponsive to subsequent throttle lever movement. The pilot was able to land the airplane with no injury or substantial damage.

The FAA immediately reviewed the details of this incident and quickly determined appropriate corrective action. We issued an emergency airworthiness directive (AD) on June 12, 2008, requiring before-further-flight evaluation of Eclipse throttles and incorporation of an airplane flight manual (AFM) procedure for dual engine control failure. This AD grounded the fleet until the throttle evaluation and AFM updates were completed.

The issues leading to the incident were not known at the time of type certification, and once they were known, the FAA took immediate action to address them.

45. The Ft. Worth certification team was also concerned about the design of the pitot (PEE-TOE) static system because it did not have moisture drains, which could cause contamination and inaccurate airspeed, rate of climb and altitude readings. They did not want to certify it, but the decision was transferred to another office in Kansas City. In this and other areas, it looks like the FAA went "answer shopping." If you didn't like the decision by one office or engineer, you went shopping for an affirmative answer elsewhere. Please comment?

RESPONSE:

The equivalent level of safety (ELOS) finding that we made for the Eclipse EA-500 pitot/angle-of-attack probe was based on a thorough review of the design and was a finding made jointly by both the Airplane Certification Office in Ft. Worth and the Small Airplane Directorate. This was not a case of the decision being transferred to the office in Kansas City. Rather, both offices worked together to make the finding collaboratively. This is our normal process for making ELOS findings and is consistent with policy in FAA Order 8110.4. We used an issue paper to define the issue and facilitate its thorough examination by both the Airplane Certification Office in Ft. Worth and the Small Airplane Directorate Standards Office in Kansas City. The issue paper was originated by engineers in the Airplane Certification Office, concurred with by engineers in the Standards Office, and approved by management in both offices. After completing the issue paper, a memorandum documenting the ELOS finding was prepared and approved by management in both the Airplane Certification Office and the Small Airplane Directorate.

The process for making an equivalent level of safety finding is rigorous and thorough. The equivalent level of safety finding made for the pitot probe on the Eclipse EA-500 was appropriate given the data and information known at the time of type certification.

46. One of the very interesting points made in the IG testimony was that the EA-500 did not "easily fit" into FAA's existing certification regimes because it represented a new class of aircraft that was very complex and more characteristic of complex, large transport category aircraft. Yet, the Eclipse was certified using more lenient general aviation guidelines. Was this prudent or appropriate?

RESPONSE:

We disagree with the assessment that the EA-500 is more characteristic of large transport category aircraft. Part 23 of the Federal Aviation Regulations (FARs) contains appropriate minimum airworthiness standards for most small airplanes. When we find that a proposed design aspect of an airplane contains technology not envisioned by FAR Part 23, we apply any necessary additional airworthiness standards through the issuance of special conditions per FAR 21.16. We applied such special conditions on the Eclipse type certification program.

The FAA reevaluated the appropriateness of its light jet certification requirements in the late 1990's, as the Eclipse and Safire jets began development. Before the late 1990's, the FAA had certified several light jets and had traditionally applied special conditions that increased the performance standards. Applying these special conditions was consistent with light jet technology at the time, which typically resulted in jets having high takeoff and landing speeds (and long takeoff and landing distances) when compared to piston-twin-engine airplanes.

However, as the Eclipse EA-500 design was being developed in the late 1990's, early performance estimates showed that the EA-500's takeoff and landing speeds and distances were actually closer to light piston-twin-engine airplanes than typical transport category jets. These performance estimates showed that the FAA's previous assumption on jet performance was outdated and the FAA needed to reevaluate its certification standards for jets against existing small airplanes, especially for the lighter weight jets.

After the Eclipse reevaluation, the FAA determined that the appropriate airworthiness standards for light jets weighing 6,000 pounds or less (like the Eclipse EA-500) were the existing FAR 23 rules for normal category airplanes. These airworthiness standards require all turbine-powered airplanes under 6,000 pounds to meet many of the same performance standards for piston twin engine airplanes over 6,000 pounds.

The FAA determined that the existing airworthiness standards were appropriate and sufficient in most areas for the Eclipse EA-500 type certification. However, we did find that a few airworthiness standards were inadequate or inappropriate because of novel or unusual design features. As a result, we issued certain special conditions, as provided for in FAR 21.16, which became part of the certification basis for the Eclipse EA-500.

In 2003, an Aviation Rulemaking Committee (ARC) was formed to review the certification and operational requirements for small jets. The group reviewed normal and commuter category airworthiness standards, as well as existing special conditions. The ARC recommended modifying 41 existing Part 23 rules. Most of the recommendations are based on the current special conditions applied to Part 23 jets.

In addition, one of the Special Certification Review (SCR) team's recommendations was for the FAA to reevaluate the criteria for applicability of function and reliability (F&R) testing. We agree with this recommendation and have already implemented a solution. We had already developed a generic issue paper to apply F&R testing requirements to turbojets weighing less than 6000 pounds. We are currently applying F&R requirements, via special condition, on two active projects: the Diamond D-Jet and the Cirrus jet. We will continue to have internal discussions to determine if a rule change to FAR 21.35 requiring F&R testing for turbojet powered airplanes less than 6000 pounds is appropriate.

47. Should FAA reevaluate how it is treating this new class (VLJs) of aircraft for certification?

RESPONSE:

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48. You say FAA asserts that it met all pertinent certification regulations, but comment that it is the totality of actions or inactions that raise reason for concern. Could you please elaborate?

RESPONSE:

To the best of our knowledge, no FAA official has commented that it is the totality of actions or inactions that raise reason for concern. We note that the FAA's certification process and obligations are extremely complex. What may appear to the layperson as a reason for concern may in fact be a minor issue; conversely, what may not concern the average person may be of great consequence to our aviation experts. The certification of Eclipse was a challenging project. It is impossible to convey in a single overview the complexities and thousands and thousands of decisions that went into the aircraft's certification. While there were certainly challenges at each stage of the certification process, at every stage, the EA-500 was ultimately determined to meet the certification requirements given the data and information known at the time. Thus, while the "totality of actions or inactions" is cited as a reason for concern, in fact, the certification program, as evaluated by our experts was found to meet all of the applicable regulations. In doing so, the applicant was legally entitled to certification under the Federal Aviation Regulations.

49. Mr. Wojnar, you served on the Special Certification Review Team that looked at the Eclipse 500's certification process and issues. Do you think that it was appropriate for you to serve on this team, which was intended to conduct an independent review, when you yourself were personally involved in the airworthiness certification and productions certification processes? Mr. Hickey, since you sent Mr. Wojner down to oversee the production certification evaluation for you, would you like to comment on this?

RESPONSE:

The SCR was given a limited charter to review whether or not the issuance of a type certificate for the EA-500 aircraft was appropriate and in accordance with FAA regulations and policies. While the IG and Committee investigation ultimately focused on the production certificate as well, at the time the SCR was convened, the focus was primarily on matters involved with the issuance of the type certificate, which is why the charter was limited to the indentified issues. While Mr. Wojnar was involved in overseeing the process leading to the issuance of Eclipse's production certificate, he had no involvement with the issuance of the type certificate. Consequently, it was not a conflict for Mr. Wojnar to review matters surrounding the issuance of the type certificate.

50. Wasn't it a "conflict-of-interest" to appoint Mr. Wojner to serve on the Special Certification Review Team, when you handpicked him to "rescue" the production certification program?

RESPONSE:

As noted in the response to Question 49, there was no conflict of interest for Mr. Wojnar to review issues surrounding the issuance of Eclipse's type certificate because he had no involvement in that certification.

51. What are you views of the Inspector General's findings?

RESPONSE:

The FAA has reviewed the written testimony of the Inspector General and his office's recommendations. We feel that in a number of instances there were misunderstandings and misrepresentations of the information provided to the Inspector General's office, leading to inaccuracies in the statements throughout the testimony. One clear example of this is the reference to the "high frequency of tire failure", and that the IG understood that "the high rate of tire failure was likely due to the fact that the aircraft was initially designed for use on "soft fields" (e.g., dirt and grass). This example, in addition to many others in the testimony misrepresents the issues and do not accurately depict the certification activities related to the Eclipse EA 500.

The recommendations made in the testimony are presently being reviewed within our organization and will be considered as appropriate.

52. The FAA's own test pilots felt strongly that the EA-500 should not be certified for single-pilot operation. Eclipse CEO Raburn appealed this decision under the Customer Service Initiative, and senior FAA management reversed the decision. Why?

RESPONSE:

FAA test pilots determined that the EA-500 should be certified for single-pilot operation, provided certain equipment is available. This determination was made as part of the FAA's finding of compliance with FAR 23.1523, "Minimum flight crew", during the type certification process. In making this determination, the FAA used a Multi-Pilot System Usability Evaluation (MPSUE) process. The MPSUE included five FAA pilots and one FAA flight test engineer. A variety of flight profiles were flown with various failures induced to assess crew workload using the Bedford scale. The FAA found that the minimum flight crew for the EA-500 was either a pilot and copilot, or one pilot provided certain equipment is available.

Separate from the type certification program, the FAA's Flight Standardization Board (FSB) then evaluated the Eclipse EA-500. The FSB determines aircraft type rating requirements and develops the minimum training requirements used for flight crewmember qualification. The FSB determines the operational suitability of the aircraft and its systems; requirements for flight crew training aids; type rating requirements for pilots; and other items. In its interim summary presented in December 2006, the FSB briefed a preliminary determination that the EA-500 required a two pilot crew to operate safely. However, it is beyond the scope of the FSB to determine compliance with the FAR 23.1523 design standard. The FSB is charged with determining the training and other pilot requirements necessary to successfully complete a type ride practical test.

Eclipse communicated its concern with the FSB's preliminary determination that two crew were necessary because such a determination was outside the FSB's scope. However, the FAA found that the proposed Eclipse Aviation training program as reviewed by the FSB at the time was inadequate in preparing an applicant to pass a single pilot instrument flight rules (IFR) type certification check. The FAA and Eclipse subsequently worked together to determine the proper level of training, checking, and currency requirements needed to support safe single pilot operations in the Eclipse EA-500.

53. The largest operator of the EA-500 refuses to operate it with a single-pilot. Numerous pilots interviewed in this investigation felt it was very unsafe to operate this aircraft with a single-pilot due to its complexity. Please comment.

RESPONSE:

The operator referred to in the question is DayJet. Mr. Sabatini confirmed with DayJet's then-president/CEO, Ed Iacobucci, that it was always part of DayJet's business plan that they operate with two pilots, regardless of the type of aircraft being flown. Consequently, the decision to fly the EA-500 with two pilots instead of one was not based on the operational characteristics of the aircraft.

We cannot speak to individual criticisms of pilots that were spoken with in the course of the Committee's investigation because we do not know who they are or from what circumstances their criticisms arose. We are aware of some criticisms from the pilots on the Flight Standardization Board who flew the aircraft. We have determined that the problems cited resulted from them flying an aircraft that was not compliant with the type certificate at the time it was flown.

54. You state in your testimony that, "High profile projects always involve a strong and dedicated push at the end to meet the negotiated deadline, if possible." Why is there a negotiated deadline? Why does the FAA, as a regulatory agency charged with overseeing aircraft safety, "negotiate" with carriers that it is supposed to oversee?

RESPONSE:

The FAA works with each applicant via a Project Specific Certification Plan (PSCP). These plans facilitate the certification program by allowing the FAA and the applicant to mutually plan the program milestones based on the available resources. The FAA and the applicant discuss the milestones of a certification program and each commit to actions. For example, if the applicant wants to begin type inspection authorization (TIA) testing by a certain date, then the FAA requires certain data submittals and certain actions, such as a conformity inspection, to be completed by a reasonable date in advance of the TIA test date, to allow time to review the data and approve or disapprove it. These milestones and timeframes are the items which are discussed or "negotiated" between the applicant and the FAA. Once the PSCP is signed, each party agrees to the schedule and recognizes the implications and is accountable for a missed deadline. Rather than using the term "negotiated deadline," perhaps the word "coordinated" would have been a better choice of words. What was intended to be conveyed is that the FAA and applicant determine a realistic schedule that both parties can support. Such coordination is important for the FAA because it is the only way we can effectively and efficiently manage our resources in carrying out our obligations in the type certification process.

55. Does the FAA have adequate general aviation certification requirements specifically designed for very light jets (VLJs)?

RESPONSE:

Part 23 of the Federal Aviation Regulations (FARs) contains appropriate minimum airworthiness standards for most small airplanes. When we find that a proposed design aspect of an airplane contains technology not envisioned by FAR Part 23, we apply any necessary additional airworthiness standards through the issuance of special conditions per FAR 21.16. We applied such special conditions on the Eclipse type certification program.

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U.S. Department
of Transportation
**Federal Aviation
Administration**

November 4, 2008

The Honorable John L. Mica
Ranking Republican Member
U.S. House of Representatives
Committee on Transportation and Infrastructure
2165 Rayburn House Office Building
Washington, DC 20515

Dear Mr. Mica:

Attached please find responses to questions for the record for the September 17, 2008 hearing on "FAA Aircraft Certification: Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EA-500," sent by you on behalf of Congressman Robin Hayes.

We apologize for the delay in responding, and thank you for your understanding.

Sincerely,

Mary U. Walsh
Assistant Chief Counsel
For Legislation

Enclosure

cc: The Honorable Robin Hayes

September 17, 2008
Subcommittee on Aviation
Hearing on
"FAA Aircraft Certification:
Alleged Regulatory Lapses in the Certification and
Manufacture of the Eclipse EA-500"

Questions for the Record
From Congressman Robin Hayes
and
Congressman John L. Mica

To

The Honorable Robert Sturgell
Acting Administrator
Federal Aviation Administration

Is the EA-500 a safe airplane?

The FAA issued the Type Certificate (TC) for the EA-500 airplane on September 30th, 2008. The FAA will only issue a TC once the applicant (Eclipse in this case) has shown compliance to the applicable standards and the aircraft has no feature or characteristic that makes it unsafe for its intended use.

The FAA chartered a Special Certification Review Team (SCR Team) to evaluate specific issues of compliance on the type certification. This team conducted its review between August 11, 2008 and September 12, 2008. The SCR Team concluded the aircraft met the applicable requirements for a type certificate.

The FAA has always contended that the aircraft met the applicable standards and is safe for operation.

In retrospect, what, could have been done differently?

The FAA as well as the SCR Team found that certain aspects of the project management could have been more comprehensive. Specifically, commonly used FAA internal communication processes, such as issue papers or policy memorandums to provide guidance to the project team, were not used consistently to document means of compliance. Additionally, communication between the team and other FAA organizations could have been enhanced to allow a smoother transition from the certification of the aircraft design to the operational certification. Finally, the FAA could have better ensured that appropriate technical disciplines were assigned during the critical phases of the project.

The FAA is undertaking an effort to review our internal procedures to assure that communication within the team and other organizations within the FAA can be strengthened.

Why did it take five years to certify the Eclipse 500? How long should it take?

The normal timeframe for the certification of an aircraft under Federal Aviation Regulations Part 23 is 3 years from the date of application. This is an acceptable amount of time for a typical general aviation aircraft.

The 5 years taken to complete the certification of the EA 500 was due to a number of factors. One factor being that the EA500 is an advanced technology, highly integrated aircraft. Another factor which contributed to the large portion of the delay in the certification schedule was the company's decision to change from the Williams engine to a Pratt and Whitney engine, approximately 18 months into the program. Considering the integration of the systems with the aircraft, the certification program schedule was dependant on having the airframe/power plant configuration established. The first flight initially occurred with the Williams engine in August of 2002. The change to the Pratt and Whitney Engine came in February 2003. The first flight with the Pratt and Whiney engine occurred in December 2004. At this point, the program had been on-going for over 3 years. The certification program for the new Pratt and Whitney engine itself also had to be accounted for in the Eclipse Certification Schedule.

The process of delegation and alternative means of compliance is set up to recognize the size, complexity and maturity of the industry organization being regulated and certified. In your view is this an appropriate way to see that safety is improved as technology improves?

The FAA considers delegation as appropriate and necessary for assuring that the FAA can continue to maintain and improve the safety of the aviation fleet. Delegation is a key component which supplements and aids the FAA workforce. This system is a long standing, sound, and well-established system, which enables the FAA to focus on the safety critical areas, while using delegation to support our workforce on the day-to-day tasks related to certification.

In the certification process, "different" regulatory methods of compliance, i.e. alternative means of compliance, achieve same or equivalent levels of safety for the certificated product. These alternative means of compliance are an important safety tool for the Aircraft Certification Service and are instrumental in the certification of new, innovative aircraft designs, as well as in the achievement of advancement in aviation technology. These different methods provide the FAA and the manufacturer a mechanism to show compliance, and obtain the required level of safety, for certification of aircraft components for which there may be no suitable certification process enumerated in the regulations.

Some have characterized "alternative means of compliance" as a "loophole". Is that a fair and correct representation? Can you characterize the negative effects to aviation if such alternate means of compliance were not allowed?

The term "alternate means of compliance" or "AMOC" is a way to show compliance differently from the normal or established manner. To add some clarification, an AMOC is associated with an airworthiness directive (AD). The AD is a regulatory requirement that defines specific actions that the owner/operator must take within a specific timeframe to address an unsafe condition. Compliance via an FAA approved AMOC provides the same level of safety as compliance per the method outlined in the AD.

AMOCs for ADs are an essential aspect of safety management and are necessary for a variety of reasons. For example, specific airplanes may have incorporated modifications, alterations, or repairs that make compliance with AD procedures impossible. In such cases, the AMOC process allows owner/operators to devise an alternative method of addressing the unsafe condition. Without the AMOC process, an owner/operator could be unable to comply with the procedures specifically outlined in the AD, would not be able to propose a different method of compliance and the airplane would be grounded.

Like the use of AMOCs for ADs, the FAA has a variety of means to show compliance with the airworthiness standards during type certification projects, including special conditions, equivalent level of safety (ELOS) findings, and exemptions. All of these examples, plus the options outlined in 14 CFR §21.305, are legally defined options for establishing appropriate certification standards and for showing compliance. If these options were not in place, the FAA would not have the ability to establish certification standards or accept appropriate compliance demonstrations and would hamper the implementation of technology that increases aviation safety.

Before the Committee on Transportation and Infrastructure
Subcommittee on Aviation
United States House of Representatives

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FAA's Certification of the Eclipse EA-500 Very Light Jet

Statement of
The Honorable Calvin L. Scovel III
Inspector General
U.S. Department of Transportation

Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to testify today regarding the Eclipse EA-500 very light jet. Our testimony today is based on the initial results of our investigation of the Federal Aviation Administration's (FAA) process used to certify the EA-500. It is important to emphasize that we did not assess the safety of the aircraft itself. Further, our investigation was limited to the Eclipse certification only; we did not examine FAA's process for certifying and overseeing the aircraft manufacturing industry in general.

As this Subcommittee is aware, safety is a shared responsibility among FAA, aircraft manufacturers, airlines, and airports. Together, these form a series of overlapping controls to keep the system safe. The United States has achieved an impressive safety record—a remarkable accomplishment given all the changes occurring within the industry.

Over the past several years, multiple manufacturers have been designing a new class of aircraft called very light jets or VLJs. VLJs are small aircraft with advanced technologies that cost less than other business jets. Aviation forecasters predict that thousands of VLJs will enter the National Airspace System over the next 2 decades.

Eclipse EA-500
Source: Aviation Business Index

Experts also predict that VLJs will be targeted towards private general aviation users as well as on-demand, point-to-point air taxi operators. In 2006, FAA certified the first VLJs—one of which was the Eclipse EA-500, a six-seat jet aircraft, which featured advanced avionics and better fuel efficiency. Eclipse Aviation was formed in 1998 with the intent of introducing new technology to the aviation industry.

When a manufacturer embarks on building a new aircraft, it must receive two separate approvals from FAA before the aircraft can be mass produced: (1) a design certification (approving the design of the aircraft) and (2) a production certification (approving the manufacturer to begin mass production of the aircraft). FAA issued the design certificate for the Eclipse EA-500 on September 30, 2006, and the production certificate on April 26, 2007. It is important to note, however, that even after a manufacturer has received certification approval, FAA is responsible for ensuring that each aircraft manufactured under its design certificate meets the approved design and is in condition for safe operation.

While the industry was generally excited about the introduction of the technologically advanced jet, some FAA employees were concerned that it was "pushed through" the certification process too quickly. In March 2007, our office received a complaint concerning the certification process for the Eclipse EA-500. The complainant alleged that senior FAA officials prevented FAA inspectors from properly inspecting the production of the Eclipse jet by, among other things, reassigning the inspectors who had identified numerous deficiencies with the aircraft's production and prohibiting the new inspection team from looking under the aircraft floorboards during final inspection.

During our ongoing investigation of the allegations, other FAA employees raised additional concerns that senior officials in FAA's Aircraft Certification Service short-cut both the design and production certification processes. The complaints alleged that those officials may have compromised safety by (1) certifying Eclipse's design despite knowledge of Eclipse's failure to meet certification requirements for avionics software, stall warnings, flaps, and cockpit screens and (2) rushing approvals required for Eclipse to mass produce its jet.

Mr. Chairman, a significant issue overshadowing FAA's certification of the EA-500 is the inherent risks associated with a new aircraft utilizing new technology, produced by a new manufacturer, and marketed with a new business model for its use. Because of these factors, we would have expected FAA to exercise heightened scrutiny in certifying the aircraft. In addition, because the EA-500 has advanced avionics and turbine engine technology typical of large transport aircraft combined with the light weight of smaller, private aircraft, it did not easily fit into FAA's existing certification framework.

FAA chose to certify the EA-500 and other VLJs using certification requirements for general aviation aircraft rather than the more stringent certification requirements for larger transport aircraft. However, in a post-design certification, "lessons-learned" internal review of the Eclipse project, FAA managers acknowledged that the general aviation certification requirements were "inadequate to address the advanced concepts introduced on this aircraft." We understand that FAA is developing a Notice of Proposed Rulemaking (NPRM) to clarify certification requirements for VLJs. Given the issues surrounding the EA-500 certification, FAA should expedite the NPRM to allay future concerns with this expanding industry segment.

In certifying the EA-500, FAA asserts that it met all pertinent certification regulations. However, our initial investigation results show a combination of FAA actions and inactions indicating that the Agency expedited the certification processes for the EA-500 to meet a September 2006 deadline in the Aviation Safety line of business fiscal year (FY) 2006 Performance Plan.

Specifically, FAA allowed Eclipse to use alternate means of compliance to meet design certification requirements despite unresolved design problems identified during testing. Those alternate actions may have contributed to problems that are still reported by Eclipse users today. FAA also awarded Eclipse a production certificate even though there were known deficiencies in its supplier and quality control systems. In addition, the company experienced significant problems replicating its approved design. We are also concerned that the priority designation of the EA-500 may have affected FAA's relationship with and oversight of Eclipse as it quickly moved this new aircraft through the certification process.

My remarks today will focus on the three following points.

FAA Allowed Eclipse To Use Alternate Means of Compliance To Meet Design Certification Requirements Despite Unresolved Design Problems—Users Continued To Report Similar Problems After Certification

During the design certification of the EA-500, Eclipse applied and FAA approved alternate means of compliance for the aircraft's avionics software and airspeed and altitude indicator (pitot-static system). More importantly, recent events reported by Eclipse aircraft users indicate that other problems identified during the design certification continued after the design was approved, including erroneous stall warnings, cockpit display failures, and flap movement problems. Further, users are still reporting that the aircraft is experiencing a high rate of tire failure.

In addition, our analysis of two safety problem reporting systems disclosed numerous issues similar to those encountered during the design certification process; many of these problems have been reported with the EA-500 over the last year. For example, Service Difficulty Reports (SDRs)[1] disclosed that between June 2007 and July 2008, the largest user of the EA-500 submitted 84 SDRs for 28 Eclipse aircraft. While SDRs are to be expected with any new aircraft, the fact that many of those reported for the EA-500 appear to relate back to design issues is troubling.

A recent incident involving the EA-500 has heightened attention regarding the aircraft's design certification. On June 5, 2008, an EA-500 on approach to Chicago Midway airport experienced a throttle failure that resulted in an uncontrollable maximum power thrust from its engines. After consulting the emergency procedures, the pilots shut down one of the engines; however, this action caused the second engine to roll back to idle power and be unresponsive to the throttle. The pilots declared an emergency and were able to land the plane without injury to the two pilots or two passengers.

During its investigation into the incident, the National Transportation Safety Board (NTSB) expressed concern about the reliability of an assembly that failed after

[1] SDRs are submitted by operators when a failure or defect occurs in the aircraft structure or is detected if that failure or defect has endangered or may endanger the safe operation of an aircraft.

accumulating only 238 hours and 192 cycles. The NTSB also raised concerns that the problem could be due to flaws in the design logic for the software that controls the engines and issued two recommendations to FAA requiring (1) immediate inspection of all EA-500 engine throttles and (2) an emergency procedure to address dual engine control failure.

On June 12, 2008, FAA issued an Airworthiness Directive (AD)[2] that requires operators to examine throttle controls for identified faults and replace assemblies as necessary. Since awarding the design certificate to Eclipse, FAA has issued a total of six ADs for various components of the EA-500.

As a result of this incident, FAA engineers re-examined the software that controls the engines and discovered software logic flaws that should have been resolved before design certification. At the end of June 2008, the local FAA certification manager sent a memorandum to the manufacturer requiring Eclipse to develop an approach to bring the aircraft design into certification compliance for that system. Eclipse is currently addressing FAA's requirement.

FAA Awarded Eclipse a Production Certificate Despite Known Deficiencies in the Company's Supplier and Quality Control Systems

FAA granted Eclipse a production certificate on April 26, 2007. A production certificate is FAA's approval that the manufacturer has demonstrated the ability to manufacture aircraft using an FAA-approved design without further FAA airworthiness inspections. To obtain a production certificate, however, manufacturers are required to undergo FAA quality control reviews and an FAA Production Certification Board review to determine if they have complied with all regulations. FAA's quality control reviews, which began in July 2006, identified numerous deficiencies, with 42 serious deficiencies (including 4 involving software) identified as late as February 2007.

The Production Certification Board completed its review on April 26, 2007—the same day the production certification was granted—and identified two serious, overarching deficiency issues. First, the Board found that Eclipse had not completed the requirement to show that it had established and could maintain a quality control system. Second, the Board found significant issues associated with Eclipse's controls over its suppliers. Despite the impact that these issues could have on the production process, FAA awarded the production certification to Eclipse with 13 specific production problems.

Additionally, before it received its production certification, Eclipse encountered numerous problems replicating its own aircraft design on the factory floor. A significant concern was that manufacturing deficiencies were not identified by Eclipse

[2] FAA issues an Airworthiness Directive when it finds that an unsafe condition exists and that the condition is likely to exist in other products of the same design.

inspectors designated to certify aircraft airworthiness. For example, in one instance, Eclipse presented an aircraft to FAA for airworthiness certification with approximately 20 airworthiness deficiencies, even though an FAA-approved Eclipse inspector had previously inspected the aircraft for airworthiness and found no non-conformities.

FAA's Desire To Promote the Use of VLJs May Have Contributed to Its Decision To Accelerate the Eclipse Certification Process

A significant concern surrounding this issue, Mr. Chairman, is that FAA designated the Eclipse EA-500 VLJ as a priority project for certification in its FY 2006 Performance Plan for the Aviation Safety line of business. In this plan, FAA stated that it would certify the aircraft design by September 2006. Although FAA met this deadline, the specific designation as a priority certification may have resulted in reduced vigilance on the Agency's part during the aircraft's design and production certification processes. We identified four other FAA actions that raise concern regarding the Agency's safety oversight focus in this matter:

- **FAA granted Eclipse Organizational Designated Airworthiness Representative (ODAR) authority to certify its own aircraft for airworthiness 4 years before Eclipse obtained a design certificate.** This authority allowed Eclipse to approve and document parts as they were manufactured, with Eclipse inspectors overseeing manufacturing processes on FAA's behalf. However, it is unclear to us why FAA determined that Eclipse met the qualifications to perform its own inspections since Eclipse was a new manufacturer with no history of manufacturing an aircraft or shepherding a design through the design certification process. Further, FAA inspectors found numerous deficiencies on planes that had been accepted and approved by Eclipse inspectors.

- **FAA granted single-pilot operation certification for the EA-500 despite FAA Flight Standardization Board[3] concerns.** Eclipse originally envisioned that the EA-500 would be marketed to individual owners. However, because of the many in-flight problems reported by pilots, the Board determined that the aircraft required a two-pilot crew. On December 15, 2006, Eclipse initiated a customer service complaint to protest the Board's recommendation. FAA subsequently rescinded the two-pilot recommendation on January 29, 2007.

- **FAA replaced the inspection team that had identified deficiencies at Eclipse and restricted the new team's inspection activities.** After FAA removed the original inspection team, it assigned the former FAA Headquarters Deputy Director of Aircraft Certification responsibility for the Eclipse certification project. This individual assembled a new team of inspectors and developed a

[3] The FAA Flight Standardization Board is a group of FAA pilots who test-fly the new aircraft to determine readiness for users.

policy that limited the inspectors' ability to fully inspect the aircraft for airworthiness.

- **FAA allowed one of its engineers formerly assigned to the Eclipse project to take a high-level position at Eclipse without a "cooling-off" period.** While at FAA, the engineer evaluated and approved Eclipse's proposed methods for meeting FAA's certification requirements for the design phase of the aircraft. When he left FAA, he immediately began working at Eclipse as Director of Certification, serving as the focal point between Eclipse and FAA concerning the company's compliance with FAA's certification requirements.

Mr. Chairman, the results of our investigation and those of the NTSB, as well as concerns expressed by EA-500 users and FAA employees, clearly underscore the need for FAA to take immediate actions to ensure that existing problems reported by Eclipse users are quickly resolved. At our recommendation, FAA established a Special Certification Review Team last month to verify that Eclipse corrects design and production problems associated with the EA-500 and determine that the aircraft is in condition for safe operations. The team concluded the certification of the EA-500 was appropriate because it met FAA requirements for the focus areas reviewed. We received a copy of the team's report on Saturday and are reviewing its findings and recommendations.

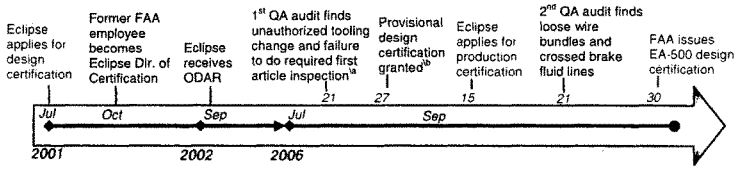
However, based on our interim results, we are recommending that FAA take several immediate actions. Those include expediting its NPRM to clarify certification requirements for the expanding VLJ industry segment; refraining from granting new, inexperienced manufacturers authority to certify the airworthiness of their own aircraft prior to design certification; and verifying that the certification process for single-pilot operations of the EA-500 was appropriate.

I would now like to discuss these issues in further detail.

FAA Allowed Eclipse To Use Alternate Means of Compliance To Meet Design Certification Requirements Despite Unresolved Design Problems—Users Continued To Report Similar Problems After Certification

We found that in certifying the EA-500 design, Eclipse used and FAA approved an alternate means of compliance. While FAA regulations permit alternate means of compliance, we are particularly concerned that FAA applied a less stringent standard to the avionics software design, which the aircraft heavily relies upon for operation. Users have since reported problems directly related to the EA-500 software, such as cockpit display failures. In addition, other problems with the aircraft design have surfaced, such as airspeed and altitude indicator (pitot-static system) discrepancies, erroneous stall warnings, and tire failures. The timeline below shows key dates leading up to the design certification for the EA-500.

Figure 1. Eclipse Design Certification

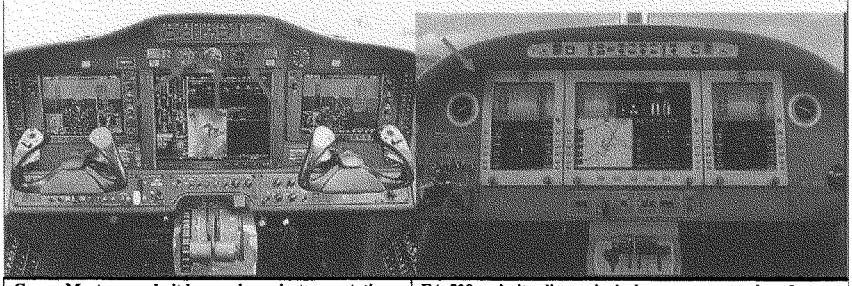


[a] First article inspection: A required inspection of a newly produced or revised part, assembly, or product.
[b] Provisional design certification: An approval of the aircraft design that allows for limited flight and operational testing of the aircraft.
Source: OIG analysis of FAA data

The Eclipse EA-500 relies extensively on software to operate. The Eclipse EA-500 is a technologically advanced aircraft with an integrated avionics system that controls several of the aircraft's crucial systems and displays, sensor data processing, and subsystem monitoring. For example, this system enables the flight crew to control landing gear, cabin pressurization, lighting, trim, and electrical systems.

This integrated system also handles key data that flows to the aircraft's flight management system, such as global positioning (GPS), altitude, direction, and velocity data. The EA-500's avionics system is solely computer-based; it does not have stand-by instruments to monitor flight-critical information (other VLJs like the Cessna Mustang have back-up [analogue] systems; see figure 2 below).

Figure 2. Comparison of Cessna and Eclipse Cockpit Systems



Cessna Mustang cockpit has analogue instrumentation (gauges) in addition to a computer screen display	EA-500 cockpit relies exclusively on a computer-based system

During the EA-500 design certification, Eclipse applied and FAA approved alternate means of compliance for the aircraft's avionics software. Given the EA-500's dependence on its avionics software, we would have expected FAA to perform rigorous analysis and testing prior to design certification. We found, however, that FAA did not require this software to be approved to the accepted industry standard before certification. Instead, FAA accepted an "IOU" from Eclipse, which stated that the aircraft would meet the accepted industry standard at a later date. In exchange, Eclipse agreed to maintain control of the aircraft—meaning that it would not be released to customers.

While FAA guidance concerning this process allows for deviation from normal accepted practices, we are concerned about the level of review that FAA conducted in certifying the software. Specifically, FAA Advisory Circular 20-115B states the following:

> An applicant for an [FAA design certification] for any electronic equipment or systems employing digital computer technology may use the considerations outlined in RTCA document DO-178B [industry standards] as a means but not the only means to secure FAA approval of the digital computer software.

FAA software technical specialists we spoke with told us that the RTCA document was essentially the "de-facto standard" for software approval. We also spoke with FAA inspectors (who routinely approved aircraft software applications) who stated that FAA's proposed actions of accepting an IOU from the manufacturer were so contrary to its long-established business practices that they did not meet the safety standards normally required of other applicants.

The IOU from Eclipse addressed tests that its software supplier needed to complete to meet industry standards for the software driving the avionics system. However, when

FAA issued the design certificate, Eclipse's software supplier had only completed 23 of the 65 tests. The supplier subsequently completed all 65 tests by June 2007; however, EA-500 users continued to report problems with the cockpit instrumentation as recently as May 2008. For example, our analysis of SDRs submitted between June 2007 and July 2008 by the largest user of the EA-500 shows 22 malfunctions of the instrument display, including faulty airspeed readings that caused aborted take-offs and autopilot malfunctions.

In a post-design certification, "lessons-learned" internal review of the Eclipse project, FAA managers acknowledged that "FAA supported flight testing without completing software validation" even though Eclipse had a "significant software vendor integration issue." This review also noted that "FAA created innovative processes to support [the] program [but] there are risks associated with not following documented processes."

In fact, even the local FAA manager who approved the Eclipse design certification has since expressed concerns over the process used for certifying the aircraft software. In a July 16, 2007, memorandum to the Director of the Aircraft Certification Service this manager stated the following:

> During the TC [design certification], we accepted a lesser level of validation and consequently the FAA ended up doing a great deal of developmental flying with Eclipse, a task that the company should accomplish prior to FAA TIA [preliminary aircraft] testing. In conducting a lessons learned review after the initial TC [design certification], we identified the level of software certification as an issue we would treat differently on subsequent certifications.

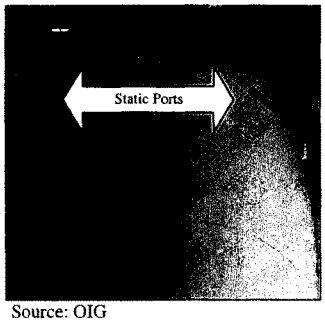
A specific concern related to the avionics software was that the cockpit screen was blanking or freezing both before and after design certification. FAA regulations state that the electronic display indicators must be designed so that if one display fails, another display would remain available to the crew without the need for immediate action by the pilot for continued safe operation. The cockpit display is critical instrumentation for the pilot; it displays vital information such as airspeed, altitude, flap position, and rate of climb. In the case of the EA-500, the cockpit display is even more critical because there is no back-up, analogue instrumentation.

In order to award the design certificate, FAA permitted Eclipse to fix the software "bug" that caused the screen blanking after the design certification was issued. However, Eclipse was not able to do so until January 18, 2007—nearly 4 months after the design certification was awarded. While this fix appeared to address the software "bug," our analysis of SDRs reported by the largest user of the EA-500 between June 2007 and July 2008 disclosed one instance of cockpit screen blanking that occurred during the final approach for landing.

During the design certification process for the EA-500, Eclipse applied and FAA approved alternate means of compliance to certify the aircraft's system that controls airspeed and altitude indicators. The Eclipse EA-500 design for the pitot-static system (which indicates airspeed, altitude, and rate of climb) did not include a drainage system for excess moisture, unlike the typical design for other aircraft. Eclipse developed and initially tested the EA-500 pitot-static system and reported no early significant problems. However, it is important to note that this initial testing took place in Albuquerque, New Mexico—an extremely dry climate with little rainfall. Once the aircraft was brought into more humid climates, such as Florida, problems began occurring with airspeed and altitude cockpit indicators.

The source of these problems was eventually traced to moisture build-up inside the pitot-static system. This occurred due to the unusual placement of the static ports on the top of the aircraft nose (see figure 3 below) and the lack of drainage; the static ports are normally located on the sides of the aircraft to mitigate moisture.

Figure 3. EA-500 Nose Pitot-Static Ports



Source: OIG

Federal aviation regulations require that "the design and installation of each air speed indicating system must provide positive drainage of moisture from the pitot-static system." However, FAA can approve a non-typical design by granting the manufacturer an "Equivalent Level of Safety" (ELOS) exemption. In this instance, FAA granted an ELOS for the EA-500 pitot-static tube as proposed by the manufacturer. The ELOS was based on Eclipse's assertion that the pitot-static system included a heating system designed to dry any moisture that might accumulate.

According to FAA inspectors we spoke with at the Fort Worth FAA certification office (the office responsible for Eclipse certification), they were uncomfortable that the pitot-static design lacked sufficient drainage and declined to approve the ELOS, even with the heating system. To overcome these objections, FAA referred the ELOS approval to the Kansas City Small Airplane Directorate, which agreed to approve it.

In response to the pitot-static system problem, FAA issued an AD on June 14, 2007, limiting operations of the aircraft to two-pilot operations only and only under visual flight rule conditions.[4] FAA issued a second AD that was effective on February 26, 2008. This AD lifted the restrictions for those aircraft whose owners had installed the design modification for the pitot-static system developed by Eclipse for existing aircraft. However, users we spoke with told us that while the modification required by the AD has helped reduce the number of incidents, it has not eliminated the problem.

For example, as recently as April 2008, the pilot of an EA-500 experienced a warning signal that the two instruments measuring airspeed did not agree during take-off. The pilot then aborted the take-off and returned the aircraft for maintenance inspection. Subsequent inspection of the aircraft revealed moisture build up in the pitot-static system; after draining out the moisture, the aircraft returned to normal service without problems.

Eclipse aircraft users continued to report other post-design certification problems with the EA-500, including erroneous stall warnings, flap movement failures, and a high rate of tire failure.

- Erroneous Stall Warnings: The EA-500 experienced erroneous stall warnings before and after the design certificate was awarded. FAA regulations state ". . . the stall warning must not occur during takeoff with all engines operating, a takeoff continued with one engine inoperative, or during an approach to landing." These stall warnings continued to occur after Eclipse received its design certificate on September 30, 2006. According to FAA pilots we spoke with, erroneous stall warnings can be extremely hazardous, particularly when landing. For example, they may cause pilots to either take urgent actions that can prove dangerous based on the belief that they are experiencing a stall or ignore them because they have proven to be erroneous in the past.

  Nearly 3 months after the design certification was issued, FAA was able to attribute some of the stall warnings to flying the aircraft at inappropriate speeds. However, pilots have recently reported this problem with the EA-500 through SDRs and a voluntary, anonymous safety reporting system, the Aviation Safety Reporting System. At least three additional reports regarding stall warnings have been reported through these two systems between June 2007 and July 2008. All three involved problems on take-off.

[4] Flying under visual flight rules (VFR) requires that the pilot (or pilots) have enough forward visibility and clearance from clouds to safely operate the aircraft without referring to cockpit instruments.

- Flap Movement Failures: FAA regulations state that the main wing flaps must be designed so that the occurrence of flap failure is "extremely improbable." However, both before and after the design certificate was awarded, the aircraft had problems with flaps sticking in position. The impact of this on the aircraft is that a "flaps up" landing can require up to 100 percent more landing distance. This landing length may not be available for every general aviation pilot who flies the EA-500, which is not equipped with anti-skid brakes. During testing of the aircraft in December 2006, FAA's Flight Standardization Board recommended that it be restricted to two-pilot operations stating:

  > The immediate issue that has caused the Board to reach this conclusion is the repeated flap failures that have occurred during recent flights. These failures are now approaching a frequency of one flap failure for every 10 attempts to operate the flaps. The flight control problem affects safety of flight and acceptable operational reliability.

  FAA Headquarters officials overruled the Board's recommendation and approved it for single-pilot operations in January 2007 after receiving a customer service complaint from Eclipse. While only 1 instance of flap failure was reported through an SDR after design certification, our analysis of SDRs from the largest EA-500 user between June 2007 and July 2008 disclosed 21 reports of other flight control part malfunctions (i.e., rudder, flaps, aileron, and elevator).

- High Rate of Tire Failure: During our site visits to the largest user of the EA-500, pilots we spoke with raised other issues that were not identified during the design certification of the aircraft. For example, they expressed concerns about a high frequency of tire failure associated with the aircraft. In subsequent discussions with these and other EA-500 users, they told us that the high rate of tire failure was likely due to the fact that the aircraft was initially designed for use on "soft fields" (i.e., dirt and grass). However, it is now being used almost exclusively on standard, paved airport runways.

  Since the tires were meant for soft field use, they are softer and less durable than the harder, longer-lasting aircraft tires commonly used on standard, paved runways. As a result, the aircraft requires an even higher degree of speed control and precision upon landing to prevent tire "blow-outs" during landing, which places additional workload on the pilots. Because pilots continued to report tire failures with the EA-500, Eclipse has submitted the required data to FAA to obtain certification for a more durable tire.

  Pilots also expressed concerns that the tires on the aircraft were wearing excessively because the landing gear was designed with a slight inclination inwards, towards the fuselage. As a result, the entire surface of the tires was not contacting the runway evenly, thus causing excessive wear on the exposed sides of

the tires. We understand that Eclipse is modifying the aircraft's design to correct this problem.

According to FAA, none of the problems experienced by users today were identified during the design certification. FAA asserts that none of the current problems experienced by EA-500 users were identified during the design certification. However, in our opinion, there is sufficient evidence that these problems were occurring during that period and that FAA *should have* known about them.

For example, in the 2 weeks preceding award of the design certification on September 30, 2006, Eclipse test-flew the aircraft for 100 hours as a pre-condition for receiving the certification. During those flights, the pilots experienced (1) at least 4 erroneous stall warnings during landing, (2) 10 instances of cockpit screen freezing or blanking, and (3) 18 cases of actual flap failure or flap-failure messages on the cockpit display. All of these are problems that users continued to report after design certification. Table 1 shows the design problems that occurred before and after FAA awarded Eclipse its design certification.

Table 1. Eclipse EA-500 Design Discrepancies Found Before and After Design Certification

Issue Found[a]	Pre-Design Certification		Post-Design Certification		
	Joint FAA & Eclipse Flight Testing[b]	**Flight Standardization Board[b]**	**Flight Standardization Board**	**Service Difficulty Reports**	**Aviation Safety Reporting System**
Erroneous Stall Warnings	4	9	10	2	1
Screen Blanking	10	2	None Documented	1	None Documented
Flap Malfunctions	18	None Documented	8	1	1
Airspeed Disagrees	1	None Documented	None Documented	13	2
Air Data Computer Failures	20	None Documented	1	1	None Documented
Autopilot Failures	7	None Documented	None Documented	3	2

\a Number of instances based on documentation obtained currently; more instances may exist.
\b Joint FAA & Eclipse Flight Testing accomplished by Aircraft Certification Office (ACO) Pilots; Flight Standardization Board testing conducted by separate group of FAA pilots.
Source: OIG analysis of FAA data

Based on the results of our investigation to date, the conclusions in FAA's lessons-learned review, and—most importantly—the problems that continue to impact pilots, we believe that FAA should have exercised greater diligence in certifying the EA-500 design. Going forward, FAA must ensure that the approval of aircraft involving so

many unknowns (e.g., new technology and new manufacturer) is subjected to close scrutiny and thorough risk analysis.

Last month, at our recommendation, FAA established a Special Certification Review Team to verify that Eclipse corrects design and production problems associated with the EA-500 and determine that the aircraft is in condition for safe operations. The team completed its assessment last week and concluded the EA-500 met applicable certification requirements for the issue areas reviewed. We received a copy of the team's report on Saturday and are reviewing its findings and recommendations.

FAA Awarded Eclipse a Production Certificate Even Though It Knew of Deficiencies in Eclipse's Quality Control and Supplier Control Systems

FAA granted Eclipse a production certificate on April 26, 2007. A production certificate is FAA's approval to manufacture aircraft using an FAA-approved design. Prior to obtaining a production certificate, every aircraft manufactured by Eclipse was required to receive an FAA inspection and certificate of airworthiness before it could be released to a customer. Once Eclipse received its production certificate, however, it could mass produce and certify its own aircraft for airworthiness without FAA inspection approval.

Before receiving a production certificate, manufacturers are required to undergo two steps: (1) FAA quality control audits and (2) an FAA Production Certification Board review. Once FAA completes its quality control audits and the manufacturer has corrected all findings, FAA will convene the Board to consider a manufacturer's application for production certification. The purpose of this review is to determine if the manufacturer has complied with all regulations required to obtain a production certificate.

A key issue for the Board is to ensure that corrective actions for any non-satisfactory conditions of non-compliance have been addressed *prior to issuing a production certificate*. In the case of the EA-500, however, we found that FAA issued the production certification before Eclipse corrected identified deficiencies. Further, FAA audits of Eclipse supplier controls, which were conducted post-production certification, found that significant deficiencies continued to occur.

Beginning in July 2006, FAA safety inspectors who specialize in aircraft manufacturing conducted three quality control audits of Eclipse. Each of these audits identified numerous deficiencies, including improperly manufactured parts and uncalibrated, unmarked tools. For example, one review conducted by FAA in February 2007 identified 42 deficiencies, including 4 involving software used for aircraft operations (e.g., pilot displays).

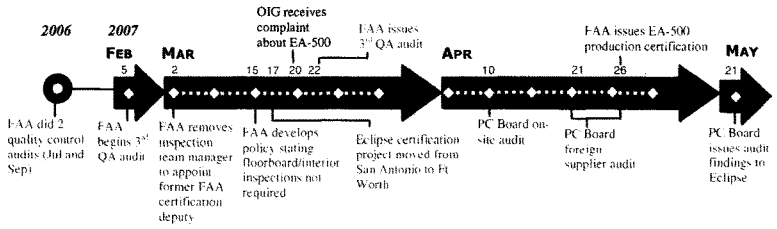
On April 10, 2007, when the Production Certification Board was convened, only 29 of the 42 deficiencies identified in FAA's quality control audits had been corrected. Despite the 13 uncorrected deficiencies, the Board finalized the on-site (in New Mexico) portion of its review of Eclipse quality control on April 12, 2007.

On April 21, 2007, the Board arrived in Japan to review one of Eclipse's foreign suppliers. It completed this portion of the review on April 26, 2007—the same day that FAA awarded Eclipse its production certification. When the Board finalized its review and transmitted its findings to Eclipse on May 21, 2007, (almost a month after Eclipse had the production certification) it identified two serious, overarching non-conformities with Eclipse production.

First, the Board concluded that Eclipse had not completed the requirement to show that it had established and could maintain a quality control system. Second, based on its review in Japan, the Board concluded that Eclipse had significant issues with control over its suppliers.

Despite the impact that these non-conformities could have on the production process, FAA awarded the production certification to Eclipse on April 26, 2007, with a total of 13 known, unresolved production problems (primarily associated with Eclipse supplier and quality control systems). The Board did not close out its open review items until February 2008. The following timeline shows key dates leading up to the production certification for the EA-500.

Figure 4. Eclipse Production Certification



Source: OIG analysis of FAA data

Three months after FAA issued the production certification, the 13 unresolved action items remained open. We are concerned because FAA was aware of unresolved deficiencies that continued after it granted Eclipse its production certification. In a July 16, 2007, memo to the Director of Aircraft Certification, the local certification office manager stated the following:

> Thirty-two airplanes have received Standard Airworthiness certificates. Twenty-one of these have been since the Production Certificate was [issued] on April 26, 2007. There are 13 action items on the Project Certification Plan that completes the [production certificate]. Some of these action items are complete and some are behind schedule. Eclipse is scheduled to complete the action items by the end of the year.

The 13 remaining findings included requirements addressing Eclipse's oversight of its suppliers and adherence to its own quality assurance processes. For example, corrective actions to address these 13 findings included the following:

- Establish new procedures for Eclipse to inspect its suppliers on site.
- Establish new procedures to inspect parts received from foreign suppliers.
- Develop and submit a "shelf-life" policy to determine when certain aircraft parts have expired (e.g., sealants, engine oil, and fluid compounds).
- Develop procedures to protect parts vulnerable to damage from electrostatic discharge (i.e., parts/software that could be damaged by power surges and other electrical shock).
- Perform an internal audit of its quality assurance processes.

Additionally, before Eclipse received its production certification, it encountered numerous problems replicating its own aircraft design on the factory floor. A significant concern was that manufacturing deficiencies were not identified by Eclipse's ODAR inspectors designated to certify aircraft airworthiness. For example, in one instance, Eclipse presented an aircraft to FAA for airworthiness certification with approximately 20 airworthiness deficiencies, even though an FAA-approved ODAR inspector had previously inspected the aircraft for airworthiness and found no non-conformities.

Other examples of deficiencies FAA identified included improperly installed fasteners on the wings, oxygen lines routed across control cables, and wires chafed by the airframe. Aircraft also failed functional test procedures for critical systems such as landing gear, communications, flaps, pitch trim, fire protection, and transponders.

FAA inspectors told us that Eclipse repeatedly submitted aircraft for airworthiness certification with previously identified discrepancies that had still not been corrected, and they expressed frustration over the time and resources spent inspecting aircraft that were clearly not ready for inspection. For example, on the first aircraft, FAA inspectors found deficiencies associated with the landing gear on eight separate inspections. Table 2 below shows discrepancies that FAA inspectors identified on the first three EA-500 aircraft *after* they were certified by Eclipse inspectors.

Table 2. Manufacturing Deficiencies Found by FAA Inspectors After Eclipse Inspectors Certified the Aircraft

Discrepancy	Aircraft 1	Aircraft 2	Aircraft 3
Failed Functional Tests			
Landing Gear Rigging	8 times		
Landing Gear on Extension During Flight Test		2 times	
Aileron Trim	2 times		
Bleed Air Supply Subsystem (BASS)	4 times		
Cabin Pressurization	5 times		
Electrical Power Distribution System	2 times		
Pitot-Static System		2 times	3 times
Transponder	2 times		
Airspeed Measuring System/Air Data System	3 times	2 times	
Oxygen Mask Drop			2 times
Wire Chafing			
Numerous wire bundles on aircraft structure behind instrument panel		3 times	
Engine Bleed Valve Line on insulation	1 time		
Starter Generator cables assembly	1 time		
Multi-Functional Display Wires on the aircraft structure, both sides		1 time	
Loose Wiring			
Engine wiring harness to BASS module	1 time		
Canon Plug and Wire Harnesses	1 time		
Electrical connectors where the wings attach to the fuselage, left and right sides		1 time	
Weight & Balance			
Human Calculation Errors	2 times	1 time	
Rivets/Grommets/Fasteners			
Engine grommet misaligned	1 time		
Fasteners and rivets improperly installed		2 times	1 time

Source: OIG analysis of FAA data

After granting the production certification, FAA audits of Eclipse supplier controls found significant deficiencies occurring that should have been corrected. During our investigation, we found that FAA inspectors conducting audits of Eclipse's supplier quality control between February and August of 2008 identified multiple issues that should have been corrected. FAA initiated enforcement actions for seven out of the seven Eclipse suppliers it audited. That is, during the audits, the FAA inspectors identified serious non-conformities associated with aircraft parts, materials, or manufacturing processes used for the EA-500 by Eclipse suppliers. These included the following:

- Receiving or Accepting Non-Conforming Parts or Tools: Suppliers were not performing receiving inspections for parts or materials received from *their* suppliers. In addition, suppliers were producing parts using design specifications that were either unapproved or outdated. Suppliers also received, accepted, and used non-conforming materials from *their* suppliers.

- Parts Not Properly Stored or Marked: Non-conforming/deficient parts were found on the suppliers' shop-room floors that were not marked as deficient, which meant that technicians could not determine if they passed or failed a receiving inspection; therefore, they could have been mistakenly used in production.

- Failure To Follow Manual Procedures: Work instructions at one foreign supplier were not written in English, which meant that inspectors from both the manufacturer and FAA could not verify that the work instructions were written as required. Supplier personnel were also using outdated instructions to perform weight and balance calculations of flight control surfaces (i.e., flaps, ailerons, etc.). In addition, suppliers' certificates of conformance (a tag confirming that the part conforms to requirements) did not contain process specifications as required by the engineering documentation.

- Uncalibrated Tools: Several gauges that require strict calibration were found uncalibrated. Further, these tools were not included in the database that tracks tool calibration (this system ensures that tools requiring calibration meet required specifications within required timeframes). Calibrated tools are highly sensitive and used in safety-critical manufactured components, such as the wing assembly or the actuators that control flight surfaces (i.e., flaps, ailerons, etc.).

- Revisions to Tooling and Procedures Without Approval From Eclipse: FAA inspectors observed technicians hand-trimming hinge and access covers for the elevator (which controls aircraft pitch) without any documentation or engineering authorizations. In addition, one supplier revised supplier manuals, material specifications, process specifications, and workmanship standards with no evidence that the changes had been approved by Eclipse or FAA.

Additionally, at the largest user of the EA-500, mechanics found problems with Eclipse supplier-manufactured parts on 26 of the 28 EA-500 aircraft operated by the company. Specifically, Eclipse supplier-manufactured bell cranks (which control aileron movement) were corroding, causing excessive friction during operation resulting in severe degradation and limited functionality. As a result, all 26 aircraft had to have their bell cranks replaced—some on more than 1 occasion. In one instance, an aircraft's bell crank had to be replaced only 6 weeks after that aircraft's airworthiness certificate was issued.

The fact that these issues continued to occur post-production raises questions about FAA's ability to maintain proper oversight when advancing the production of new

aviation technology. FAA has established good steps to oversee this process, but those steps were rendered ineffective since FAA treated them as mere formalities rather than prerequisites to certification.

FAA's Desire To Promote the Use of VLJs May Have Contributed to Its Decision To Accelerate the Eclipse Certification Process

A significant concern surrounding this issue, Mr. Chairman, is that FAA specifically designated the Eclipse EA-500 VLJ as a priority project for certification. In FAA's Aviation Safety line of business FY 2006 Performance Plan, FAA identified Eclipse as a priority certification activity, stating that it would support the operation of VLJs in the National Airspace System by issuing:

> . . . a [design certification] for a new small airplane by September 2006. Eclipse Aviation will obtain [a design certification] for small jet powered by P&W [Pratt and Whitney] 610 engines and using extensive new technology avionics.

We are concerned that the specific designation of Eclipse as a priority certification may have resulted in undue pressure to meet the deadline, thereby resulting in reduced vigilance from FAA during the aircraft's design and production certification processes. In FAA's post-design certification, lessons-learned review of the Eclipse project, FAA managers acknowledged that "FAA supported an aggressive certification schedule" and that it expended "32,000 hours; $2.0 million (salary, travel, and overtime costs); and hundreds of hours of [compensatory] time," indicating that they believed these efforts were inappropriate.

In fact, with authorization from FAA managers, three inspectors exceeded the number of overtime hours allowed by Federal regulations in their attempt to ensure Eclipse received its design certification by the September 2006 deadline. In addition, as a pre-condition to receiving design certification, FAA flew the test plane for 30 flights, encompassing 100 flight hours over the 2-week period preceding the September 30, 2006, issuance of the design certificate.

An important point, Mr. Chairman, is that FAA met its Performance Plan deadline and awarded the design certification to Eclipse on Saturday, September 30, 2006.

With the significant risks posed by a new aircraft utilizing new technology and produced by a new manufacturer, we would have expected that FAA would have exercised greater scrutiny in certifying the aircraft. In addition, because the EA-500 has advanced avionics and turbine engine technology typical of large transport aircraft combined with the light weight of smaller, private aircraft, it did not easily fit into FAA's existing certification framework.

FAA chose to certify the aircraft and other VLJs using certification requirements for general aviation aircraft rather than more stringent certification requirements for larger transport aircraft. However, in FAA's post-design certification, lessons-learned review of the Eclipse project, FAA managers acknowledged that the general aviation certification requirements were "inadequate to address the advanced concepts introduced on this aircraft." We understand that FAA is developing an NPRM to clarify certification requirements for VLJs. Given the issues surrounding the EA-500 certification, FAA should expedite the NPRM to allay future concerns with this expanding industry segment.

In addition to the priority certification, we identified four issues that raise concern regarding FAA's safety oversight focus in this matter: (1) FAA granted Eclipse an ODAR appointment much earlier in the process than it has for other manufacturers, (2) FAA granted single-pilot operation certification for the EA-500 despite concerns from the FAA Flight Standardization Board and users, (3) FAA replaced the inspection team overseeing Eclipse and restricted the new team's inspection activities, and (4) a former FAA engineer assigned to the Eclipse project took a position as Director of Certification for Eclipse.

FAA granted Eclipse authority to certify its aircraft for airworthiness before approving the design, which is far earlier than it has for other manufacturers. FAA granted Eclipse an ODAR appointment on September 3, 2002. The ODAR designation allowed the company to approve and document parts as they were manufactured, with internal Eclipse inspectors overseeing manufacturing processes on FAA's behalf. To receive an ODAR designation, FAA regulations require the organization to have proven experience to perform the functions for which the authorization was requested.

FAA does not typically grant ODAR authority before an aircraft company obtains its design certification. However, FAA guidance allows for this if the organization has a "high probability of obtaining a production certificate." In the case of Eclipse, FAA granted ODAR designation to the manufacturer 4 years before the company obtained a design certificate for its aircraft and 5 years before it obtained its production certification.

Given that FAA must have known that Eclipse was several years away from obtaining design certification, we question how FAA determined the company had a "high probability" of receiving its production certificate. FAA has granted ODAR authorization prior to issuing a design certification for only one other new VLJ manufacturer, Adam Aircraft; however, this manufacturer is in bankruptcy. In fact, as shown in table 3 below, Eclipse is the only operating manufacturer to receive its ODAR authorization *before* the aircraft design was approved by FAA.

Table 3. FAA Approvals for Other New Manufacturers of VLJs

Manufacturer	Design Certificate Issued	Production Certificate Issued	ODAR issued
Eclipse	September 30, 2006	April 26, 2007	September 3, 2002
Cirrus	October 23, 1998	June 12, 2000	September 8, 2006
Liberty Aircraft	February 19, 2004	April 6, 2006	November 18, 2006
Adam Aircraft	May 11, 2005	None (Company bankrupt)	May 17, 2002
Sino Swearingen*	October 27, 2005	None	None

* The small jet from this manufacturer was not classified as a VLJ because of its weight, but it is often used for comparison purposes to the Eclipse certification because it was design certified by the same FAA office during the same time period.
Source: OIG analysis of FAA data

It is unclear why FAA determined that Eclipse met the qualifications to perform its own inspections since Eclipse was a new manufacturer with no history of manufacturing an aircraft or shepherding a design through the design certification process. In our view, these facts should have raised questions regarding Eclipse's ability to perform this function. As discussed earlier, FAA inspectors found numerous deficiencies on planes that had been inspected and approved by Eclipse inspectors with ODAR designations. This would indicate that FAA granted early ODAR authority in an attempt to expedite the certification process, rather than granting it as a result of diligent and thorough oversight.

We also found evidence indicating that the individuals selected for the Eclipse ODAR may not have been fully qualified to perform inspection tasks. For example, when one FAA principal inspector showed improperly installed fasteners to Eclipse ODAR authorized representatives, they could not articulate how to inspect for proper installation. The FAA inspector expressed significant concerns that the ODAR representatives lacked sufficient knowledge to certificate the airworthiness of aircraft.

In our opinion, FAA should carefully evaluate the propriety of granting ODAR authority for new, inexperienced manufacturers prior to design certification, especially in the case of light-weight aircraft that rely heavily on new technology. Further, FAA's ODAR designation process should more thoroughly evaluate designees' skill level and experience and ensure that the company designees are allowed to conduct their inspections properly and without interference from the manufacturer. In the case of Eclipse, FAA's post-design certification, lessons-learned review noted that [ODAR] designees "reported pressure by the company to make submittals before data was *[sic]* complete."

FAA granted single-pilot certification for the EA-500 despite concerns from the Flight Standardization Board and users: Eclipse originally envisioned and designed the EA-500 as a single-pilot aircraft with the goal of marketing it to individual owners. However, pilots reported in-flight concerns (e.g., complexity of new software, cockpit display "freezing," discrepancies with airspeed and altitude indicators, and a minimally effective autopilot system) that could create an undue burden on a single pilot. Because of these factors and the level of the aircraft's functionality at the time, FAA's Flight Standardization Board determined on December 13, 2006, that the aircraft required a two-pilot crew.

Despite the concerns raised by FAA's Flight Standardization Board, the President and Chief Executive Officer of Eclipse initiated a customer service complaint on December 15, 2006, against the Board to protest its two-pilot recommendation for the aircraft. In a December 21, 2006, response to Eclipse, the Director of Flight Standards Service agreed with the company's assertions without additional testing or information, stating that he "wanted to assure [Eclipse] that Flight Standards will do everything possible to work with Eclipse Aviation in assuring a successful conclusion to our efforts."

An important point, Mr. Chairman is that on January 29, 2007, FAA rescinded the recommendation and determined that a single pilot could operate the aircraft at the aircraft's existing level of functionality.

Yet, the overseas equivalent to FAA, the European Aviation Safety Agency (EASA), has declined to certify the EA-500 for operation in Europe. EASA's primary concern is that single-pilot operation is unsafe due to the lack of normally required equipment on the aircraft, such as a robust autopilot system. Conversely, EASA certified the Cessna Mustang VLJ, which had the necessary equipment to meet its level of certification, with no additional requirements.

We spoke with pilots at the largest operator of Eclipse aircraft, one of whom stated that he "lacked confidence that the aircraft could be operated safely by a single pilot." These concerns are even more significant considering that the pilots we spoke with have considerable amounts of commercial flying time. Further, they work for a company that has well-organized flight operations and dedicated maintenance support and uses *two-pilot flight operations* with the EA-500. This company also worked closely with the manufacturer to develop its own solutions for problems discovered in its fleet of purchased Eclipse aircraft. By contrast, a single pilot or owner is likely to have less flight experience and no dedicated maintenance or flight operations support.

FAA replaced the inspection team that had identified deficiencies at Eclipse and limited inspection activities. We found that FAA replaced the original FAA inspectors on the Eclipse project and limited the replacement team from thoroughly inspecting the aircraft. At this point, in March 2007, Eclipse had received the design certification, and its aircraft were undergoing FAA airworthiness inspections. These were required as the company had not yet received its production certification. Upon receipt of this certification, the company would be able to mass produce the aircraft without FAA certifying the airworthiness of each individual aircraft.

After multiple incidents of aircraft being presented to FAA for airworthiness certifications when numerous deficiencies existed, the manager of the FAA manufacturing inspection office sent an e-mail to Eclipse on February 26, 2007, with the approval of his supervisor.

In the e-mail, he detailed all of the steps that Eclipse needed to complete to comply with FAA requirements for obtaining an airworthiness certificate. According to FAA officials we spoke with, Eclipse senior management believed these requirements exceeded the FAA regulations and complained to officials within FAA Headquarters. In March 2007, FAA Headquarters officials removed the FAA manager who sent the e-mail from the project, stating that he had stepped outside his authority in laying out the regulatory requirements to the manufacturer.

We spoke with other FAA managers, including the supervisor of the removed manager, and they stated that the steps outlined in the e-mail *were* appropriate because FAA is ultimately responsible for certifying the airworthiness of each new aircraft. Specifically, FAA Order 8130.2F places the responsibility on FAA to ensure that each aircraft manufactured under its design certificate meets the approved design and is in condition for safe operation.

FAA Headquarters officials also removed the Directorate Manager in charge of both the manufacturing inspection and design certification offices from the Eclipse project. In a six-page letter of reprimand, FAA officials stated that the Directorate Manager failed to meet expectations associated with meeting its customer service initiatives. Specifically, the letter stated that he needed to "build relationships with our customers and achieve operational results." The letter further stated "your personal relationship with the Eclipse Executives is deficient. As [Eclipse is] one of your major customers we expect you to work to improve the relationship."

In fact, FAA Headquarters officials required the Directorate Manager to undergo a peer appraisal, consisting of a 360° review (i.e., a process for collecting observations from multiple sources about individual performance) and invited the Chief Operating Officer of Eclipse to be one of the individuals appraising his performance in certifying the EA-500. While the Directorate Manager's supervisors were the group

that rated him lowest, the Directorate Manager's customers were the group that rated him the highest.

With the removal of the local inspection manager, the Directorate Manager, and other FAA inspectors who repeatedly identified discrepancies, the FAA Headquarters Director of Aircraft Certification at FAA Headquarters assigned his former deputy responsibility for managing oversight of the Eclipse certification project. The deputy assembled a new team of inspectors and developed a policy that limited the inspectors' ability to fully inspect the aircraft for airworthiness. The deputy was also selected as a member of the FAA Special Certification Review Team, which recently concluded that the design certification of the EA-500 met FAA standards.

Specifically, FAA's Production Certification Plan did not require Eclipse employees to remove floorboards or interior panels for FAA inspectors. Before this policy was established, FAA inspectors had found numerous deficiencies on planes that had already been inspected and certified by ODAR-designated Eclipse inspectors.

In FAA's post-design certification, lessons-learned review of the Eclipse project, FAA managers acknowledged that "issues were not worked at the appropriate levels in the organization." In our view, FAA's actions in this instance present a troubling picture of the production certification process for the EA-500 and underscore our concerns that the Agency focused primarily on promoting new aviation technology rather than ensuring proper safety oversight.

A former FAA engineer assigned to the Eclipse project became Eclipse's certification director. During our review, we were concerned about an unusual set of circumstances surrounding the former FAA project officer on the Eclipse certification project. The engineer worked on the Eclipse certification project from January 2000 until October 2001. In his capacity as the project officer for FAA, the engineer evaluated and approved Eclipse's proposed methods for meeting FAA's certification requirements for the design phase of the aircraft.

When he left FAA, he immediately went to work at Eclipse as the Director of Certification. In his new role with Eclipse, he served as the focal point between Eclipse and FAA regarding the company's compliance with FAA's certification requirements. Essentially, he performed the same function for the company as he did under FAA, with no consideration given to any potential conflicts of interest.

We have previously recommended that FAA revise its post-employment guidance for aviation safety inspectors to require a "cooling-off" period when an FAA inspector is hired at an air carrier he or she previously inspected. To avoid potential conflicts of interest, FAA should also consider applying this requirement when aircraft certification inspectors or engineers leave the Agency for employment with private aviation companies that they previously regulated.

FAA Must Take Immediate Actions To Ensure That Continuing Problems Reported by Eclipse Users Are Quickly Resolved

Mr. Chairman, the results of our investigation and those of the NTSB, as well as concerns expressed by EA-500 users and FAA employees, clearly underscore the need for FAA to take immediate actions to ensure that existing problems reported by Eclipse users are quickly resolved.

Last month, at our recommendation, FAA established a Special Certification Review Team to verify that Eclipse corrects design and production problems associated with the EA-500 and determine that the aircraft is in condition for safe operations. The team completed its assessment last week and concluded that the certification of the EA-500 was appropriate for the areas reviewed. We received a copy of the team's report on Saturday and are reviewing its findings and recommendations. However, based on the interim results of our investigation, we are recommending that FAA take the following actions:

1. In view of the problems we have identified, FAA must reassess the propriety of its single-pilot certification for the EA-500.

2. FAA must expedite its NPRM to clarify certification requirements for the expanding VLJ industry segment given the differences between certification requirements for large transport and general aviation aircraft.

3. FAA should carefully evaluate the propriety of granting ODAR authority to new, inexperienced manufacturers prior to design certification. Further, FAA's ODAR designation process must more thoroughly evaluate designees' skill level and experience and ensure that the company designees are allowed to conduct their inspections properly and without interference from the manufacturer.

4. FAA must discontinue prioritizing specific manufacturers' programs in its Performance Plan for special attention to prevent any appearance of favoritism or the perception of diminished vigilance in its oversight mission.

5. FAA must implement a "cooling-off" period for its aircraft certification safety inspectors and engineers before allowing them to accept positions with the manufacturers they formerly regulated.

That concludes my testimony, Mr. Chairman. I would be happy to answer any questions you or other Members of the Subcommittee may have.

HANDOUTS: PANEL 1

INSPECTOR GENERAL
CALVIN SCOVEL

I. FAA Internal Briefing: Lessons Learned

II. Outline for FAA Designation of Eclipse as a Priority Certification Project

Eclipse Lessons Learned

Federal Aviation Administration

Presented November 1, 2006

HISTORY

- ⇨ FAA expended 1200 hours prior to TC application
- ⇨ 2001- Project opened in Chicago to much excitement
  - PSCP developed with Chicago ACO
- ⇨ Approved Friction Stir Welding process
- ⇨ Project moved to Ft. Worth
  - Honored previous agreements between Chicago and Eclipse
  - Updated PSCP; included generous delegation plan
  - Good working relationship between Eclipse and FAA continues

HISTORY

- ⇨ 2003 - Eclipse changed engine from Williams to P&WC, delaying company commitments
- ⇨ FAA issued Eclipse ODAR
- ⇨ Approved new technology fire suppressant agent
  - Worked with Tech Center and EPA
- ⇨ Eclipse used Unigraphics models; no drawings submitted to FAA unless requested
  - Data posted on Web for FAA retrieval
- ⇨ Tremendous amount of software and system integration used on this aircraft

HISTORY

- ⇨ FAA supported flight testing without completing software validation
- ⇨ FAA supported concurrent flight testing
- ⇨ FAA agreed to incremental TIAs; issued 20 TIAs
- ⇨ FAA supported an aggressive certification schedule
- ⇨ Eclipse flight test management personnel changes created FAA safety concerns
- ⇨ Designees reported pressure by the company to make submittals before data was complete

ISSUES

- ⇨ Eclipse had vendor/supplier issues
- ⇨ Significant software vendor integration issues
- ⇨ CSTAs try to apply part 25 policy
- ⇨ Eclipse wanted TC, C of A and PC on same day; quality system not mature enough
- ⇨ Eclipse insisting on FAA support when they are not ready - TC,PC, FSB, Airworthiness

ISSUES

- ⇨ Eclipse made last minute decision for Provisional TC
- ⇨ FAA agreed to AFM procedures to mitigate F&R issues
- ⇨ FAA agreed to compliance reports being completed after TC
- ⇨ ACO engaged AIR-100 to support company request to incorporate EFIS and autopilot approval as part of TC instead of as TSO
- ⇨ Eclipse made late change to airplane operating system and decided to do their own integration

OBSERVATIONS

- ⇨ Eclipse internal communications are broken
- ⇨ Eclipse made external commitments by calendar date rather than by certification event
- ⇨ FAA created innovative processes to support program
  - There are risks associated with not following documented processes
  - Prompted internal and external criticism about the certification
- ⇨ Political pressure and economic viability of the company negatively affected all FAA team members

OBSERVATIONS

- ⇨ Issues were not worked at the appropriate levels in the organization
- ⇨ The program was highly delegated with success
- ⇨ This program did not exhibit the characteristics that we are striving to achieve by minimizing the expenditures of FAA resources
  - 32,000 hours; $2.9M (salary, travel, OT)
  - Hundreds of hours of comp time
  - Pace impacted company and FAA personnel and their families

OBSERVATIONS

- ⇨ Part 23 regulations and TSOAs are inadequate to address the advanced concepts introduced on this aircraft
- ⇨ Eclipse did not freeze the aircraft design prior to F&R flights; and changes were made up to week of certification
- ⇨ TSO's for software driven devices may not be adequate when devices are installed

OBSERVATIONS

- ⇨ FAR XX.1309 reliability numbers really do not apply to software driven hardware, so lack of reliability for displays, for instance, may not be reason enough to find a non-compliance

- ⇨ Directorate system worked well; SAD responses were complete and timely

Outline for FAA Designation of Eclipse as a Priority Certification Project

FAA Flight Plan

Strategy Establish standard procedures and guidelines for general aviation operators.

INITIATIVES

- Ensure that safety oversight and regulatory compliance keep pace with changes in the general aviation environment.

AVS Business Plan

Strategic Initiative: Safety Oversight

Ensure that safety oversight and regulatory compliance keep pace with changes in the general aviation environment.

Strategic Activity: Very Light Jets (VLJ)

Support the operation of Very Light Jets (VLJs) in the NAS.

Targets:

Issue a Type Certificate for a new model small airplane by September 2006.

AIR Performance Plan

Certification

FAA Flight Plan 2006-2010: Ensure that safety oversight and regulatory compliance keep pace with changes in the general aviation environment. AVS: Support the operation of Very Light Jets (VLJs) in the NAS.

- **Issue a Type Certificate for a new model small airplane by September 2006.** Eclipse Aviation will obtain TC for small jet powered by P&W 610 engines and using extensive new technology avionics.

Source: FAA

U.S. Department of Transportation
Office of Inspector General
Questions for the Record
Subcommittee on Aviation, Committee on Transportation and Infrastructure,
U.S. House of Representatives
November 3, 2008

Chairman Costello

Question #1: Could you provide the Committee your views on the FAA Special Certification Review Team's Report on the type certification of the EA-500 VLJ?

Based on the preliminary results of our investigation of the EA-500 very light jet (VLJ) certification, we recommended that the Federal Aviation Administration (FAA) independently verify that the certification process was conducted appropriately. The Special Certification Review (SCR) was a good first step in implementing this recommendation. The SCR was conducted by a panel of highly regarded experts who were tasked with determining if the design certification (type certificate) of the EA-500 met regulatory requirements in four specific areas: cockpit displays/screen blanking, stall speeds, trim, and flaps. The SCR team concluded that the certification process met regulatory requirements in these four areas.

However, the SCR team did not review any of the issues surrounding the EA-500's production certification. Further, one of the SCR team members (an FAA Senior Advisor) had been directly involved in the production certification process, which could have affected the panel's independence. We will continue reviewing issues related to the production certification and report on them early next year.

Question #2: Are you aware of any certification processes in which FAA issued an IOU, allowing an aircraft to be certified despite known deficiencies with the understanding that they could correct these issues later?

During our review, FAA inspectors told us that it was not unusual to accept an IOU with action items during aircraft certification. At this time, we do not know if FAA has accepted IOUs for safety-critical items on other aircraft types, as it did for the avionics software on the EA-500. We intend to explore this area in greater detail as we move forward with our review.

Under FAA's current guidance, there are two ways by which FAA can allow an alternative means of compliance to a regulatory requirement if the manufacturer demonstrates that its technology meets the intent of the existing regulation:

(1) Grant a waiver.

(2) Make an Equivalent Level of Safety Finding.

FAA accepted an IOU from Eclipse stating that the software used in the aircraft's cockpit instrumentation would meet accepted industry standards at a later date. FAA's current regulations do not allow IOUs to be accepted as an alternative means of showing compliance for certification; therefore, this action represented a deviation from FAA's own regulatory framework. Since Eclipse was a new manufacturer attempting to certify a new design that heavily relied on electronic cockpit instrumentation, we believe it would have been prudent for FAA to require compliance with accepted industry standards for software certification *at the time the type design certificate was awarded.*

Question #3: One of the issues is that the test pilots at FAA were opposed to approving the aircraft for single pilot operation, yet the FAA overruled their own pilots. What was their justification for overruling the pilots?

While evaluating the EA-500, the board of FAA test pilots identified numerous issues that they believed would require a two-pilot rating.[1] These included limited autopilot functionality, erroneous stall warnings, and blanking of the cockpit display screens. When these pilots presented their findings to Eclipse management, the Eclipse Chief Executive Officer sent a letter to the Flight Standards Director to protest the two-pilot recommendation and request that FAA review the decision under its Customer Service Initiative. Shortly after FAA received this letter, the test pilot board reevaluated the aircraft. As a result, FAA determined that Eclipse had addressed enough of the service difficulties identified with the aircraft during flight testing to issue a single-pilot recommendation. This certification was granted to the EA-500 about a month after the Eclipse Chief Executive Officer requested the Customer Service Initiative review.

During our review, we found that some Eclipse operators use two pilots to fly the EA-500 as a matter of policy, while others use only one pilot. We spoke with a number of EA-500 pilots who had extensive private and commercial experience. Many of these pilots questioned the validity of the single-pilot certification for this

[1] As part of the certification process for a new or modified aircraft, a board of FAA test pilots is charged with determining aircraft type rating requirements (an authorization to fly a specific type of aircraft). The FAA test pilots fly and evaluate the aircraft and determine items such as training requirements and whether or not the aircraft can be operated safely by one pilot.

aircraft. Further, the problems with in-service aircraft detailed in our prepared statement can all potentially increase pilot workload beyond acceptable limits for one pilot. Accordingly, we believe that FAA should immediately review its single-pilot certification for the EA-500 to ensure that the aircraft is indeed safe for that type of operation.

Question #4: As you are aware, an FAA manufacturing certification manager purchased professional liability insurance because of his concerns about his role in the certification program. Have you ever heard of a case of this occurring in the past?

We are not aware of any other instances of managers purchasing professional liability insurance. This question would be better suited for submission to FAA for a detailed response. According to the certification manager's September testimony, he based his decision on all of the events he had experienced and observed in connection with the Eclipse project.

Question #5: In your testimony, you laid out a list of deficiencies in which FAA inspectors identified serious non-conformances associated with aircraft parts, materials or manufacturing processes used for the EA-500 by Eclipse suppliers. You go on to list issues with receiving and accepting non-conforming parts or tools, parts not properly stored or marked, failure to follow manual procedure, uncalibrated tools, revision of tools and procedures without approval from Eclipse. You also stated that at the largest user of the EA-500, FAA inspectors found problems with Eclipse supplier manufactured parts on 26 of the 28 EA-500 aircraft operated by the company. Have these issues been addressed by the FAA?

At this time, we are unable to say whether all of these issues have been fully addressed. However, our investigation is ongoing, and this is one area that we will explore in greater detail. FAA identified the issues you referenced while auditing Eclipse's manufacturing and production facilities and processes—including evaluations of its suppliers—and identified serious non-conformances associated with critical parts and processes. These audits are an integral part of the production certification process. Additionally, company mechanics at the largest user of the Eclipse VLJ found problems with supplier-manufactured parts on 26 of the 28 company-operated EA-500 aircraft.

FAA has recently undertaken a full-scale, top-to-bottom review of Eclipse's manufacturing and production processes (an Aircraft Certification Systems Evaluation Program [ACSEP] audit). We understand that FAA has identified non-

compliances across several categories, including Manufacturing Processes, Manufacturing Controls, and Supplier Control. Prior FAA audits at Eclipse identified similar discrepancies in Eclipse's manufacturing and supplier control processes. If the discrepancies identified indicate continuing or repetitive problems with reproducing the approved design, it will then be clear that further work is needed from FAA to address previously identified issues.

House of Representatives
Committee on Transportation & Infrastructure
Subcommittee on Aviation

Testimony of Dennis Wallace
Hearing on FAA Aircraft Certification
And Manufacturing of the Eclipse EA-500

Dennis Wallace
Software Engineer
FAA
817.222.4635
11 September 2008

Good Morning Mr. Chairman and Honorable Members of this Committee.

My name is Dennis Wallace. I am a software engineer employed by the FAA and I am currently assigned to the Rotorcraft Certification Office in Fort Worth, Texas as the FAA Software Technical Specialist. I have been employed by the FAA for the past twelve years.

Prior to my employment with the FAA I worked for the Department of Defense in various positions for twenty-six years. I am also a veteran of the United States Air Force, having served four years on active duty and twenty-one years on active reserve.

I am here before you today to give an account of my recollection of the events in the final days leading up to the issuance of an FAA Type Certificate for the Eclipse 500 very light-jet airplane, which is being developed and manufactured by the Eclipse Corporation, in Albuquerque, New Mexico.

My specific role in this project was to provide typical FAA certification oversight of Eclipse and its' suppliers development of airborne software for this aircraft to ensure that it satisfied the safety requirements defined in the applicable Federal Aviation Regulations. According to what the company submitted, and FAA agreed to, aircraft level Plan for Software Aspects of Certification (PSAC), Eclipse and its' suppliers were to develop their software in accordance with the guidelines of RTCA DO-178B as a means to secure FAA approval of their digital computer software as a showing of compliance to 14 CFR 23.1301 and 14 CFR 23.1309. As there are no specific regulations that discuss how to certify software, these are the governing safety regulations and DO-178B is the standard, FAA recommended approach for the certification aspects of airborne software.

DO-178B was published in 1992 and has become the universally accepted governing procedure for such software certification efforts. DO-178B uses layers of checks and balances in an attempt to prevent errors from manifesting in the code. These include a defined and structured development process, independent peer reviews, quality assurance, configuration management and the rigor of testing that must be accomplished.

I was initially assigned to work on this project in 2001 and since that time I have been the primary person at the FAA responsible for oversight of the software certification activities on this project, which also included the conduct of numerous software development audits at Eclipse and also at its' suppliers.

On the morning of Tuesday, September 12th 2006, while conducting a software review at one of Eclipse's suppliers, I received a telephone call from the FAA program manager of the Airplane Certification Office, ASW-150, informing me that I needed to attend a meeting at a hotel in Albuquerque on Wednesday evening, September 13th 2006 and that I should be prepared to give a status report for the software being developed by that particular supplier. When I arrived for that meeting, I was prepared to report to those attending the meeting the facts that the supplier had not yet completed final design

review, had not entered test readiness review, and that the company was aware that "dead code" (inactive code) still needed to be removed. Most importantly, I was also going to report that, in my opinion, only approximately one-third of the required objectives of RTCA DO-178B had been satisfied.

Instead of support, what I received was a rather harsh line of questioning from the FAA AIR-1 and AIR-100 managers that basically questioned the validity and utility of the long-accepted RTCA DO-178B software certification procedure. They also harped on the fact that there were no airworthiness rules specifically related to software certification.

I tried to explain to them that Eclipse had signed up to comply with DO-178B for themselves and their suppliers via the aforementioned aircraft level PSAC. I went on to state to them that while it is true that there are no Part 23 rules that are unique to software approval, DO-178B is a traditionally and universally accepted means to secure FAA approval for digital computer software as a showing of compliance to the general rules 14 CFR 23.1301 and 14 CFR 23.1309, which are applicable to all Systems & Equipment onboard the aircraft. Also, DO-178B provides a level playing field for all aircraft software developers and, as such, it has contributed to a standardized approach to the software aspects of certification – standardization being a goal which FAA management has publicly espoused and promoted to its workforce for years. As an aside, I told them that this was how I teach software aspects of certification to all of the FAA engineers at the FAA Academy and if I was doing this incorrectly, then maybe we need to change the course content to reflect how it should be done.

I was told by the AIR-1 manager in what I perceived to be a very direct, animated, and threatening manner, that my position on this constituted "antiquated thinking" and that I best "start thinking outside the box." He further stated that we were here to "save a company" and then, looking directly at the then Rotorcraft Directorate manager, said he "shouldn't have to come to Albuquerque to do his job." That was when I realized two things: 1) The supplier was not the problem- I was perceived by management to be the problem - because I wasn't going to accept the software since it had not been shown by the applicant to be compliant to the applicable safety regulations, and 2) The bus had already left the station and not only was I not on the bus, I felt I was being thrown under it. I remained silent for the rest of the meeting because it was clearly evident from the statements made that management intended to drive the bus on this certification effort and that they would not listen to me, despite the fact that I felt I had greater cognizance of both the project design and the governing applicable regulations. My reference to "the bus" here stems from a book that FAA management has promoted as a must read on management technique.

On the following morning, Thursday, September 14th 2006, I attended a meeting at Eclipse, along with other FAA personnel. In attendance were, if not all, the majority of FAA employees from the previous evening's FAA only meeting, and a dozen or so Eclipse employees. In that meeting, the company proposed a mitigation strategy that the company wanted the FAA to accept as an alternative to the supplier having to satisfying

the software objectives of RTCA DO-178B. It is my "continued" opinion to this day that FAA management was strongly encouraging the FAA team to accept this proposed company mitigation strategy.

The next week, I telephoned the supplier's Designated Engineering Representative (DER) and asked him to submit an FAA Form 8110-3 stating that the software satisfies DO-178B and complies to 14 CFR 23.1301 and 23.1309. I received the requested 8110-3s dated September 19th 2006 stating "23.1301 (a) and (d) 23.1309 (a), (b)(1) as applicable to the intended installation to the extent demonstrated by partial compliance with RTCA DO-178B." This became part of the mitigation package (EAC R02-5014 Rev B) for which I was asked to sign off on. I did so on September 28th 2006 by stating only that "I concur that the software partially complies with DO-178B." The clear implication here is that neither the DER, nor I, concurred that the software was completely compliant.

When I arrived at work on Monday October 2nd 2006 I was surprised to hear that Eclipse had already received its' FAA Type Certificate the previous Saturday, September 30th 2006. Subsequent to that I went back to work on other projects and do not recall having any significant contact with Eclipse until the spring of 2007, when the company presented a design change to their AVIO system. I am currently working that design change project.

This concludes my opening remarks. Thank you, Mr. Chairman and Honorable Members of this Committee.

Testimony of

Patrick Forrey, President,
National Air Traffic Controllers Association

Before the House Transportation and Infrastructure Committee
Subcommittee on Aviation
Wednesday, September 17, 2008

FAA Aircraft Certification:

Alleged Regulatory Lapses in the Certification and Manufacture of the Eclipse EA-500

Over the past two years, this committee has gathered many times to investigate the irresponsibility of the FAA. We have discussed the Administration's failure to oversee airline inspections and properly staff air traffic control facilities. Today we are bringing to light yet another failure of the FAA – to ensure the soundness of the Eclipse 500, pioneer of the burgeoning Very Light Jet industry. I am here to testify to the shortcomings of the process that allowed such a flawed aircraft to enter the market.

As the president of the National Air Traffic Controllers Association (NATCA), I represent aerospace engineers and test pilots who test every aspect of aircraft design to ensure the safety of pilots and passengers. These professionals are highly-skilled, well-trained and dedicated to the safety of the flying public.

Beginning in July 2001 there were approximately 15 engineers and five test pilots working to assess the safety of the Eclipse 500 prototype. The process was proceeding normally, with engineers performing and overseeing a battery of tests and discovering issues to be addressed by the Eclipse Corporation.

According to ordinary FAA procedure, for a new aircraft to be issued a type certificate (TC), each engineer responsible for testing a unique aspect of the aircraft design must sign off on the TC – approximately eight individuals for a project this size. These engineers are responsible for areas such as: electrical, software, and mechanical systems, structures (aircraft strength), and propulsion, while test pilots are responsible for flight testing. On the 29th of September 2006, a Friday, engineers were asked to sign off on the TC, but due to outstanding technical and safety concerns, refused. The following day, a Saturday that was the very last day of the fiscal year, the FAA abandoned its usual procedures, and FAA management granted the TC to eclipse with only one individual signing off.

Two aspects of prevailing FAA culture contributed to this breach of procedure and hasty certification of the Eclipse 500: the close relationship between the FAA and private sector aviation industry players and a business plan that rewards managers for speed rather than safety. Both represent a deterioration of the FAA's safety culture.

The inappropriately close relationship between the FAA and the private sector was brought to light when this committee investigated the failure of the FAA to conduct aircraft inspections at Southwest Airlines (SWA). As a result of the relationship between SWA management and FAA management, the FAA failed to ground 47 aircraft that were overdue for inspection for cracks in the fuselage, and another 70 aircraft overdue for rudder inspections. As a result, thousands of flights carrying hundreds of thousands of passengers were flown in potentially unsafe aircraft.

This situation has played out again with Eclipse. Despite persistent concerns over the safety of the aircraft, FAA management signed off on the plans to manufacture, sell, and fly this aircraft without significant restrictions. They have again shirked their responsibility as a safety organization and have opted instead to help support a corporate bottom line.

There is a fundamental conflict between the goals of a business and that of the agency who oversees that business's industry. A business's goal is to make money. In the case of the Eclipse Aviation Corporation that means developing, manufacturing, and most importantly selling Very

Light Jets. Therefore, the company's objective is to obtain the necessary certifications as quickly and as inexpensively as possible so that they can begin delivering aircraft to buyers. Eclipse wants its aircraft to be safe, both because it does not want to cause injury and because doubts about the safety will affect the company's bottom line. But the ultimate responsibility for aircraft safety is inherently governmental and resides with the FAA.

The FAA's job is to ensure that – in its haste to enter aircraft into the market – aircraft manufacturers have not overlooked threats to the safety of their planes. The FAA's primary concern must be the integrity of the aircraft and the safety of the flying public. Cost to the company or delays in sales should not factor into this process.

Unfortunately, cozy relationships, coupled with the desire of many FAA employees to work for private sector industries after leaving the government, make many in the FAA reluctant to enforce safety regulations that may cost the company time and money. In the case of eclipse, they granted TC before the aircraft met the minimum safety level and was ready to enter the market.

The second issue driving the FAA's failure to properly test the Eclipse 500 is a flaw in the FAA "business plan." In an effort to behave more like a business, the FAA "instituted a 'Pay for Performance' system that ties annual pay increases to achievement of performance targets."[1] This system often runs contrary to the Agency's safety mission, as performance targets are often based not on the quality of the technical assessment but on achieving a goal within a specified time frame.

In their 2006 business plan, the Aviation Safety (AVS) division of the FAA included the goal of certifying a Very Light Jet (VLJ) for production by the end of the 2006 Fiscal year. As the fiscal year was drawing to a close the Eclipse 500 – best publicized and furthest along of the VLJs - had not yet achieved certification. On the last day of the fiscal year FAA management pushed this certification through, without receiving the appropriate sign-offs from engineers and despite outstanding safety concerns. According the FAA "pay for performance" standards, business plan goals were met, and FAA management was rewarded for expediting this process.

Some engineers were penalized for keeping the safety of the Eclipse 500 a priority over the speed of certification. Several reported receiving poor performance reports based solely on the content of their technical findings. Because they found safety problems in the design of the Eclipse 500, whose correction that might result in a delay to certification, they were denied bonuses.

The problem with the Eclipse 500 is not the relatively narrow issue of a faulty aircraft; it is the far broader issue of an Agency with flawed priorities. The FAA has abandoned its safety culture and shirked its responsibility to keep the flying public safe.

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[1] http://www.faa.gov/about/plans_reports/like_business/

Recommendations:

1. The FAA's pay for performance system should only include goals that directly address the degree of safety and public protection maintained. Goals mandating certification deadlines encourage management to pressure their employees into hasty certification, potentially compromising the integrity and safety of the project.

2. Title 49 must be amended to allow the Union to negotiate fair and professional pay procedures that encourage and reward compliance to the safety mission of the agency.

3. In order to limit closeness between the agency and the corporations it oversees, engineering project leads should be assigned on a case by case basis using either a round robin or bidding system. No individual should be regarded as a permanent liaison to a particular company.

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