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THE V–22 OSPREY: COSTS, CAPABILITIES AND CHALLENGES

HEARING

BEFORE THE

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

HOUSE OF REPRESENTATIVES

ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

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THE V–22 OSPREY: COSTS, CAPABILITIES AND CHALLENGES

TUESDAY, JUNE 23, 2009

HOUSE OF REPRESENTATIVES,
COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM,
Washington, DC.

The committee met, pursuant to notice, at 2:12 p.m., in room 2154, Rayburn House Office Building, Hon. Edolphus Towns (chairman of the committee) presiding.

Present: Representatives Towns, Cummings, Kucinich, Tierney, Clay, Connolly, Quigley, Van Hollen, Cuellar, and Issa.

Staff present: John Arlington, chief counsel—investigations; Lisa Cody and Katherine Graham, investigators; Neema Guliani, investigative counsel; Adam Hodge, deputy press secretary; Carla Hultberg, chief clerk; Mike McCarthy, deputy staff director; Jesse McCollum, senior advisor; Steven Rangel, senior counsel; Ophelia Rivas, assistant clerk; Jenny Rosenberg, director of communications; Christopher Sanders, professional staff member; Ron Stroman, staff director; Laurence Brady, minority staff director; Jennifer Safavian, minority chief counsel for oversight and investigations; Frederick Hill, minority director of communications; Dan Blankenburg, minority director of outreach and senior advisor; Adam Fromm, minority chief clerk and Member liaison; Stephen Castor, minority senior counsel; Ashley Callen, minority counsel; and Glena Sanders, minority Defense fellow.

Chairman TOWNS. The committee will come to order.

Today's hearing is on the V–22 Osprey, an aircraft that has been in development for about 25 years and has a very controversial past. This hearing, however, looks beyond the checkered past and focuses on the current issues raised in a new report by the Government Accountability Office.

According to the GAO, the V–22 has operational problems that raise serious questions as to whether the aircraft can accomplish the full range of its missions as a helicopter. It was intended to replace on the range of the mission provided by other modern helicopters. GAO found that the V–22 has problems with parts, maintenance, reliability, and availability. And I understand the reliability issue is one in which the Department of Defense concurs.

In addition, GAO found that the V–22 may not be operationally effective in combating questions of the ability of the aircraft to operate in both extreme heat and extreme cold. In short, GAO found that the Osprey has severe operational and suitability problems.

And these problems have not come cheap. Since 1983, more than $27 billion has been appropriated for the V–22 program. The cost

per aircraft has almost tripled since the Osprey's inception to some $120 million each. And the cost of the programs may rise even higher given expected increases in operation and support costs.

Let me be clear. The value of just one American service member is priceless. And if a $120 million aircraft like the V–22 does the best job of protecting our troops and helping them to accomplish their mission, then it should be supported. But at $120 million per aircraft, the Osprey had better work as advertised.

When we first convened this hearing a month ago, I decided, with the support of the ranking member, Congressman Issa, to postpone the hearing because the Department of Defense had failed to produce certain key records pertaining to the Osprey. It took them a few weeks to do it, but finally we obtained copies of the after-action report and other data we had requested.

The additional documents raised even more serious questions about the V–22. The Marine Corps' own reports on the performance of the Osprey in Iraq reveals that the Osprey was restricted to a very limited role due to its vulnerability to hostile fire, its lack of maneuverability, and its unreliability in the heat and sand in Iraq.

In the course of our investigation, we asked the Defense Department for an inventory of all their Ospreys and how many of those were ready for combat. The answer was both surprising and appalling. Since 1988, the Marine Corps has bought 105 Ospreys; of this number, only 47 are considered combat deployable. Worse, we asked the Marine Corps how many of these are ready for combat on any given day. On the day the Marine Corps picked, June 3rd of this year, only 22 of these 47 Ospreys were ready for combat. In other words, fewer than half would be used for combat on a good day.

At this point, I have strong reservations about the future of this aircraft. And let me say, I am anxious to hear from our witnesses on this particular issue.

At this point, I yield 5 minutes to the ranking member of the committee, Congressman Darrell Issa of California.

[The prepared statement of Hon. Edolphus Towns follows:]

**HOUSE COMMITTEE ON
OVERSIGHT & GOVERNMENT REFORM**

**OPENING STATEMENT OF
CHAIRMAN EDOLPHUS TOWNS**

**Hearing: The Future of the V-22 Osprey:
Costs, Capabilities, and Challenges**

June 23, 2009

Good morning. Thank you all for being here.

Today's hearing is on the V-22 Osprey, an aircraft that has been in development for about 25 years and has a very controversial past. This hearing, however, looks beyond that checkered past and focuses on current issues raised in a new report by the Government Accountability Office (GAO).

According to GAO, the V-22 has operational problems that raise serious questions as to whether the aircraft can accomplish the full range of missions of the helicopter it was intended to replace, or the range of missions provided by other modern helicopters.

GAO found that the V-22 has problems with parts, maintenance, reliability, and availability—and I understand the reliability issue is one in which the Department of Defense concurs. In addition, GAO found that the V-22 may not be operationally effective in combat and questions the ability of the aircraft to operate in both extreme heat and extreme cold.

In short, GAO found that the Osprey has severe operational and suitability problems. And these problems have not come cheap.

Since 1983, more than $27 billion has been appropriated for the V-22 program. The cost per aircraft has almost tripled since the Osprey's inception, to some $120 million each. And the cost of the program may rise even higher given expected increases in operation and support costs.

Let me be completely clear: the value of just one American service member is priceless—and if a 120 million dollar aircraft like the V-22 does the best job of protecting our troops and helping them to accomplish their missions, then it should be supported.

But at $120 million per aircraft—the Osprey better work as advertised.

When we first convened this hearing a month ago, I decided, with the support of Ranking Member Issa, to postpone the hearing because the Department of Defense had failed to produce certain key records pertaining to the Osprey. It took them a few weeks to do it, but finally we obtained copies of the after-action reports and other data we had requested.

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In the course of our investigation we asked the Defense Department for an inventory of all of their Ospreys and how many of those were ready for combat. The answer was both surprising and appalling.

Since 1988, the Marine Corps has bought 105 Ospreys. Of this number, only 47 are considered "combat deployable." Worse, we asked the Marine Corps how many of these are ready for combat on any given day. On the day the Marine Corps picked, June 3rd of this year, only 22 of these 47 Ospreys were ready for combat. In other words, fewer than half could be used for combat on a good day.

At this point I have strong reservations about the future of this aircraft. I want very much to hear what our witnesses will have to say about these issues.

Thank you.

Mr. ISSA. Thank you, Mr. Chairman. Thank you for holding this hearing today. And thank you again for postponing the original hearing to give a better opportunity for the Department of Defense to provide us with the information necessary to conduct our oversight.

As Chairman Towns said, the Osprey has certainly had a checkered past. Additionally, with the high cost of the Osprey and the claimed unique mission, it is important that this committee be an honest broker.

The V–22 clearly is a unique aircraft, a hybrid helicopter and airplane, it does enjoy an ability to fly faster and further than any helicopter in the fleet. Having said that, Mr. Chairman, I am a child of the 1960's and I am a soldier of the 1970's. I had an opportunity in the 1977–1978 timeframe to be part of a research project dubbed TASFAL. TASFAL was a fly off between a great many aircraft designed to kill tanks.

Fortunately, I was not a tank platoon leader at the time, and as we went through that, I became acutely aware that the Department of Defense and the U.S. Congress can, in fact, buy aircraft for unique missions that let us down. In this case, the A–10 was unable to perform as well as either attack helicopters, the Tow Cobra or even an F–4, in killing tanks, Soviet-equivalent tanks, and surviving. That has left me skeptical anytime someone tells me that an aircraft uniquely does a job.

Like Ike Skelton from Missouri, I believe we have to make you prove it.

Today, we are going to hear testimony that certainly surprised us. It showed us that, in fact, although this aircraft is unique and does meet certain specifications that may in the future be essential to a vertical lift, long self-deployment and, in fact, a mission that could happen again but happened during my military career. In the 1970's, when our embassy was taken hostage in Iran, the absence of an aircraft like the Osprey caused us to have to refuel and refit in the desert. That mid-desert night led to the loss of both materiel and men that left us embarrassed and unable to rescue our embassy personnel in Tehran, ultimately having to wait until they were released at the whim of the Iranian Revolutionary Guard.

Notwithstanding that great need and these many years later, we certainly have to ask, where are we today? And, as the chairman said, we are at 22 combat-ready aircraft on a given day. And if we accept that the Osprey is worth further investment—and as a Congressman with 44,000 Marines at Camp Pendleton, I hope in fact we will make that decision—then how do we go from a low readiness of an aircraft with great promise to one that, in fact, has higher readiness, better survivability and, in fact, is more prepared for that day in the desert or night in the desert that may never come again, but if it comes, we may need this aircraft?

Mr. Chairman, thank you for holding this hearing. I look forward to the testimony.

[The prepared statement of Hon. Darrell E. Issa follows:]

EDOLPHUS TOWNS, NEW YORK
CHAIRMAN

DARRELL E. ISSA, CALIFORNIA
RANKING MINORITY MEMBER

ONE HUNDRED ELEVENTH CONGRESS

Congress of the United States

House of Representatives

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

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Statement of Rep. Darrell Issa
Ranking Republican Member
Committee on Oversight and Government Reform
"The Future of the V-22 Osprey: Costs, Capabilities, and Challenges"
June 23, 2009

Thank you, Chairman Towns, for holding this hearing.

Today our Committee examines one of the most complex engineering and acquisition programs undertaken by the Department of Defense – the V-22 Osprey.

The V-22 is a unique aircraft – a hybrid helicopter-airplane – that takes off and lands vertically like a helicopter but flies like an airplane.

While we continue to conduct meaningful oversight of the Defense Department and specifically the Marine Corps as it relates to ambitious projects like the Osprey program, we do from time to time need to take a step back and be frank with ourselves. Have we done our job?

And I submit Mr. Chairman, the case of the V-22 Osprey is a case study in missed opportunities for real Congressional oversight.

DOD awarded the first Osprey contract to the joint Bell-Boeing team in 1983. Since then, the V-22 has drawn on nearly 2000 suppliers in over 40 states and created jobs in 276 congressional districts.

While the Marine Corps was an early advocate for the V-22 Osprey as a replacement for their aging, Vietnam-era helicopters, DOD remained skeptical due to production delays, cost overruns, and the changing strategic environment. The Marine Corps has consistently taken the position that the Osprey was critical to its mission.

Bipartisan congressional action overrode DOD's repeated attempts to cancel, slow or reevaluate the program.

Obviously it is does not take a genius to figure out that when a major program like the Osprey is creating jobs in 276 congressional districts, it is a program that is going to be very difficult to conduct hard hitting oversight on.

The three questions the Congress must always ask when conducting oversight into sophisticated acquisition programs are: Is the project on time; is it on budget; and when it's ready, will it be able to perform its mission as designed.

If the answer to any of these three questions is no, then we are obligated to find out why and determine what can be done to put the project back on the right track. If the derailed project is hopelessly delayed, hopelessly over budget, and not likely to perform as conceived, we ought to consider whether the program is worthwhile to continue.

We need to perpetually ask ourselves whether we are making a prudent investment on behalf of the taxpayers.

The Osprey has been one of the most famously criticized DOD programs in history. Its development took 25 years, cost nearly $20 billion, and claimed the lives of 30 people in four separate crashes. Numerous investigations have uncovered various scandals, including the falsification of maintenance records and quality documentation.

After finally making its combat debut in Iraq, we are now in a position to evaluate whether the Osprey performs as it was designed. After the three combat deployments to Iraq, the early returns are mixed; potential for improvements exist, but that is expected in any nascent aviation program.

We have learned its unique hybrid design presents some operational challenges but it also demonstrates the ability to "shrink the battlefield." Many V-22 operators will admit that many of the capabilities have not been fully exploited. For example, its slow, helicopter-like take-offs and landings makes it vulnerable to ground fire, and its heaviness makes it difficult to maneuver quickly.

Despite some of its challenges, the Marine Corps has not been deterred. The Osprey remains the Marines' top aviation priority.

Marine Corps leaders believe the Osprey provides an unprecedented capability to quickly and decisively move personnel and equipment. The aircraft is intended to perform troop and equipment transport, amphibious assault, search and rescue, and special operations.

Through FY2008, more than $27 billion has been appropriated for the V-22 program. The Defense Department plans to acquire 458 aircraft at a total acquisition cost of $54.2 billion. This translates to a per-unit cost of $118.4 million per aircraft. In 1986, when the Osprey was first being conceived, the per aircraft cost was to be $42 million. This represents nearly a 200% increase.

Today isn't the time to complain about why the Osprey development took so long, or cost so much. That is oversight that should have been occurring for the last 25 years.

Today is the day to hear about how the Osprey performs in theater and whether it is meeting the Marine Corps' needs, and more specifically whether at its current price point, the aircraft is a cost effective use of taxpayer dollars.

Thank you again. We look forward to today's testimony.

Chairman TOWNS. Thank you very much.

At this time, I yield 5 minutes to the chairman of the Subcommittee on National Security and Foreign Affairs, Mr. Tierney of Massachusetts.

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

As you are well aware, the Subcommittee on National Security and Foreign Affairs continues to focus extensively on wasteful defense programs. I can't underscore enough the importance of oversight of programs that just don't seem to measure up to our expectations even though we continue to throw money at them.

Annually, Congress gets a report on the health of the Department of Defense's major weapons acquisitions portfolio from the Government Accountability Office; and frankly, with $300 billion in cost growth, that portfolio is anything but healthy. Swine flu is not the only epidemic around here.

Defense cost overruns have waylaid budgetary flexibility at a time when we face economic hardship at home and significant challenges abroad. It is time to take a hard look at programs that have a history of procurement challenges and see where improvements, if any, have been made to those programs to ensure a better return on taxpayer investment. If problems continue, then it may be time to reconsider more drastic action on the part of Congress.

Today, we have the case of the V–22, a program with quite a storied procurement history, involving almost every type of challenge imaginable, resulting in cost overruns compounded over nearly a quarter century. The aircraft was intended as a more capable replacement for an existing helicopter; however, in its report the GAO expressed concerns about the ability of the V–22 to perform a full range of missions that these helicopters could, including operating in harsh climates.

Now, the Department of Defense is going to procure fewer than half of the originally planned 1,000 V–22s. How is that an original plan calling for 1,000 of them that is now going to be fulfilled by fewer than half of that number with fully less-capable aircraft?

What is equally concerning is that amongst this error-laden procurement process for the V–22, the program has been allowed to survive without proper scrutiny for such a long time because political decisions have trumped technical and budgetary realities. The elimination of such a program or even reducing orders for it can have difficult consequences on employment in some Members' districts. It is not a new strategy for large contractors to devise and follow a strategy of spreading the work over several facilities and subcontractors encompassing as many States and districts as possible in order to ensure protection of their profits. This is a legitimate and serious matter for all those rightfully concerned about our economy and our work force.

Still, it would seem that a better course would be to develop a policy for keeping those people at work in burgeoning innovative industries and developing systems that help achieve our national security priorities, but that don't become antiquated before completion and that do so within planned budgets and planned schedules.

The alternative of continuing failed programs as jobs programs that are rife with waste or abuse of the procurement system and, in many instances, fail to produce the needed weapons systems to

protect those who protect us is not the wisest course. In most instances, such a program probably would not be the most efficient and cost-effective jobs program at any rate.

As we look at this out-of-control issue with defense contracts, we ought also to look at our policies for protecting the financial security and employment prospects of those to be affected by cuts to wasteful programs. We owe good workers that, given Congress and the administration's complicity in allowing such a problematic condition to develop.

Thank you for your time, Mr. Chairman.

[The prepared statement of Hon. John F. Tierney follows:]

Statement of John F. Tierney
Committee on Oversight and Government Reform
U.S. House of Representatives

Hearing on: "The Future of the V-22 Osprey: Costs, Capabilities, and Challenges"

As Prepared for Delivery

June 23, 2009

Thank you, Mr. Chairman, for holding this important hearing. As you are well aware, the Subcommittee on National Security and Foreign Affairs continues to focus extensively on wasteful defense programs. I cannot underscore enough the importance of oversight of programs that just do not seem to measure up to expectations, even though we continue to throw money at them.

Annually, Congress gets a report on the health of DOD's major weapons acquisitions portfolio from GAO and, frankly, with $300 billion in cost growth, that portfolio is anything but healthy. Defense cost overruns have waylaid budgetary flexibility at a time when we face economic hardship at home and significant challenges abroad. It is time to take a hard look at programs that have a history of procurement challenges and see where improvements, if any, have been made to those programs to ensure a better return on taxpayer investment. If problems continue, then it may be time to consider more drastic action toward such programs on the part of Congress.

Serving as an example, today we have the case of the V-22—a program with quite a storied procurement history involving almost every type of challenge imaginable, resulting in cost overruns compounded over nearly a quarter century. In its report to this Committee, the GAO expressed concerns about the ability of the V-22 to perform the full range of missions that previous helicopters could, including operating in harsh climates. Now, DOD is going to procure fewer than half the originally planned 1000 V-22s. It seems an odd strategy that an original plan calling for 1000 of them is now going to be fulfilled by fewer than half that number, with a fully less capable aircraft.

Of equal concern is that the V-22 program has been allowed to survive without proper scrutiny for such a long time because political decisions have trumped technical and budgetary realities. The elimination of such a program, or even reducing orders for it, can have difficult consequences on employment in some Members' districts. It is not a new strategy for large contractors to devise and follow a strategy of spreading out work over facilities and subcontractors encompassing as many states and districts as possible in order to ensure protection of their profits. This is a legitimate and serious matter for all those rightfully concerned about our economy and our workforce.

It would seem that a better course would be to develop a policy for keeping those people at work in burgeoning innovative industries and in developing systems that help us achieve our national security priorities, but that do not become antiquated before completion; and that do so within planned budgets and schedules. The alternative of continuing failed programs as "jobs programs" that are rife with waste or abuse of the procurement system and in many instances fail to produce the needed weapons systems to protect those who protect us is not the wisest course.

As we look at this out of control issue with defense contracts, we ought also to look at our policies for protecting the financial security and employment prospects of those to be affected by cuts to wasteful programs. We owe good workers that, given Congress' and the Administrations' complicity in allowing such a problematic condition to develop.

Thank you for the time, Mr. Chairman.

Mr. TOWNS. Thank you very much.

Any other Members seeking recognition?

The gentleman from Maryland, Mr. Cummings.

Mr. CUMMINGS. Thank you very much, Mr. Chairman. I want to associate myself with all the comments that have been made here this afternoon. I want to thank you and the ranking member for holding this hearing.

One of the things I think about as I sit here, Mr. Chairman, is a matter that we are dealing with in my role as chairman on the Subcommittee on Coast Guard and Maritime matters in the Transportation Committee, and that is our deepwater project. This reminds me so much of that. It is incredible, and we have been straightening that out; but we started, Mr. Chairman, with three things that I said to my committee, and I want to say that to these wonderful gentlemen here this afternoon.

First, we must get what we bargain for, period. We must get what we bargain for. You don't buy a lawnmower that doesn't cut grass. It makes no sense.

No. 2, I said to my subcommittee, whatever we buy for the military, it must do no harm to them. We are out there, our young people—I also serve on the board of the Naval Academy, and I see a lot of our young people go into the Marines and do wonderful things. But the idea that we might be buying equipment with the American people's money that could actually do harm to those folks makes no sense whatsoever.

And, three, I said we must make sure that whatever equipment we buy, that it is the equipment that they need to carry out their mission. End of game. That is it. If we can do those three things, then we have done a lot.

Sadly, this Osprey appears to have failed all three of them—to fail all three of them, then the question becomes, Mr. Chairman—which I am interested to hear today—how did we get to this point? I think Mr. Tierney was very clear, and I think he made a good statement when he said a lot of times this is based on politics. And I believe that is quite true.

And also, the other piece is, politics to what extent? To the extent of a plane costing this kind of money, unable to do what it is supposed to do? Harming our people? We are not getting what we bargained for.

And then you have to ask the question—the people who are in charge, our acquisitions people, the people who are responsible—is there incompetence? Are we stuck in a culture of mediocrity? Is there no empathy for our military?

These are the questions that have to be raised, and I hope that they are answered. And, Mr. Chairman, I look forward to hearing our witnesses. I thank you.

With that, I yield back.

Chairman TOWNS. I now yield to the gentleman from Virginia.

Mr. CONNOLLY. I thank the chairman. And I want to thank you, Chairman Towns, for convening this important hearing.

This committee has devoted substantial resources to investigating contracting practices, and appropriately so. With the dramatic rise in volume and value of contracts, we must enhance our man-

agement and oversight capacity so we are maximizing return for the taxpayer.

In previous hearings, this committee has discussed the shortage of acquisition personnel, specifically in the Department of Defense. During the Bush administration, the value of contracts doubled with virtually no significant increase in procurement personnel. At a Smart Contracting Caucus meeting just this past week, members of this committee discussed how we need to increase the capacity as well as the number of acquisition personnel.

As this committee's work has demonstrated, our acquisition challenges are real. With these systemic challenges, it is not surprising that we have not resolved problems exemplified by the V–22 Osprey. By most indications, this would seem to be a very expensive piece of equipment that has not performed as promised. Despite its failure to perform, Congress has spent more money on it, even as it becomes apparent it will never perform as promised.

The Government Accountability Office has noted that the V–22 suffers from an unreliable supply chain and a frequent shortage of parts. We should not need the GAO to identify this problem. If the Department of Defense does not have the capacity to identify such problems themselves, then we need to determine how to ensure that it can in the future.

Similarly, we should not need the GAO to identify problems with continual and unforeseen increases in cost. Our acquisition personnel need to be equipped and need to be there to be able to preempt this kind of problem in the first place.

Mr. Chairman, we have chosen a very powerful example to demonstrate the need to reform our acquisition process in the Federal Government. I hope that we can use the lessons from the V–22 to identify steps that we can take to avoid repeating these mistakes in the future, through enhancing the capacity of our acquisition systems and personnel.

And I thank the chairman.

Chairman TOWNS. Thank you very much.

At this time we would like to swear in all our witnesses. Would you please stand and raise your right hands.

[Witnesses sworn.]

Chairman TOWNS. Let the record reflect that all the witnesses answered in the affirmative. You may be seated.

Let me begin by giving some background on our various witnesses.

Mr. Mike Sullivan is the Director of Acquisition and Sourcing Management at the Government Accountability Office, who will testify about GAO's report entitled, "Assessments Needed to Address V–22 Aircraft Operational and Cost Concerns to Define Future Investments," which is being released today, and identifies operational suitability plus challenges concerning the V–22 Osprey.

Welcome.

Mr. Dakota L. Wood is a senior fellow at the Center for Strategic and Budgetary Assessments, an independent, nonpartisan policy researcher, who will testify about the CSBA's report, "Strategy for the Long Haul, the U.S. Marine Corps: Fleet Marine Forces for the 21st Century."

Welcome.

Lieutenant General George Trautman is the Deputy Commandant for Aviation for the U.S. Marine Corps. The General will testify about operational and cost issues regarding the V–22 and the current and future use of the aircraft.

Welcome.

Colonel Karsten Heckl is a Marine Corps pilot and the commander of a V–22 squadron. He will discuss his experience flying a V–22. Welcome.

Dr. A.R. Rivolo is a retired Air Force pilot who flew combat operations during the Vietnam War, an aviation expert who worked on operational testing and evaluation of the V–22 for the Institute for Defense Analyses, which provides direct analysis and support to the Office of the Secretary of Defense, Director of Operational Tests and Evaluations. He will discuss inherent safety issues regarding the V–22 and operation limitations.

Welcome.

I will ask the witnesses to summarize their testimony in 5 minutes. The yellow light means you have a minute left, and of course, the red light means stop. Then, we will have time to raise some questions and look forward to your answers.

So, Mr. Sullivan, why don't we start with you?

STATEMENTS OF MICHAEL J. SULLIVAN, DIRECTOR OF ACQUISITION AND SOURCING MANAGEMENT, ACCOMPANIED BY JERRY CLARK, SENIOR ANALYST, GOVERNMENT ACCOUNTABILITY OFFICE; DAKOTA L. WOOD, SENIOR FELLOW, CENTER FOR STRATEGIC AND BUDGETARY ASSESSMENTS; LIEUTENANT GENERAL GEORGE J. TRAUTMAN III, DEPUTY COMMANDANT FOR AVIATION, ACCOMPANIED BY LIEUTENANT COLONEL KARSTEN HECKL, COMMANDER, MARINE MEDIUM TILTROTOR SQUADRON 162 (VMM–162), U.S. MARINE CORPS; AND DR. ARTHUR REX RIVOLO, U.S.A.F. (Ret.)/AVIATION EXPERT

STATEMENT OF MICHAEL J. SULLIVAN

Mr. SULLIVAN. Thank you, Mr. Chairman. Before I begin, let me just for the record state that Mr. Jerry Clark is up here. He is a Senior Analyst with the GAO, who headed up the work on this specific assignment and has significant institutional memory and knowledge on the V–22. He is here to help with answering questions.

Mr. Chairman, Congressman Issa, members of the committee, I am pleased to be here today to discuss the status of the V–22. I would like to make some brief points in my opening statement, and ask that my written statement be submitted for the record.

Chairman TOWNS. Without objection.

Mr. SULLIVAN. We recently completed a review of the MV–22's operations in Iraq, recent testing and training results, and the program's past, current, and future costs.

First, with regard to operations in Iraq, we found that the MV–22 successfully completed all of the missions it was assigned in low-threat operations and used its enhanced speed and range effectively to deliver personnel and cargo faster and farther than legacy helicopters.

Battlefield commanders indicated that they need more experience with the aircraft to better understand the limits of its role in some of the medium-lift missions because its speed cannot always be exploited and these missions may be better performed by legacy helicopters. The aircraft also had availability and reliability challenges in Iraq, as you had alluded to, Mr. Chairman.

While the acquired availability rate is 82 percent, the 12 aircraft with the three squadrons in Iraq were able on average 68, 61, and 57 percent of the time. In comparison, legacy helicopters were available about 85 percent of the time or greater, on average.

Parts reliability was a major cause of the V–22's availability. Specifically, we found that 13 parts were in very high demand because they only lasted on average less than 30 percent of their expected life, forcing cannibalization of other V–22s and even from the production line in the United States. V–22 engines also had some problems; expected to last 500 to 700 hours, they lasted less than 400 hours in Iraq.

Second, ongoing operational tasks and training have identified other challenges to the V–22's ability to conduct operations in high-threat environments, also while transporting personnel and cargo, operating onboard ships and operating in extreme environments. The program continues to work these challenges as it upgrades the aircraft, and will have three different component upgrade; however, this will be difficult since some of them arise from the inherent design of the V–22.

Third, the V–22 cost estimates have increased significantly from original baselines. Development cost has increased from $4.2 billion to $12.7 billion, over 200 percent. Procurement cost has increased about 24 percent, from $34.4 billion to $42.6 billion, even as the number of V–22s to be procured was reduced from over 900 to less than 500. It is also clear that operation and support cost through the V–22's life cycle will be much higher than originally anticipated.

Moving forward, the program plans to spend nearly $25 billion to buy 282 additional V–22s, and the cost to operate and support the aircraft through its life cycle is now estimated at about $75 billion.

Given these figures and the availability challenges we have discussed, we believe this is a good time for the Department to stop and once more consider the proper mix of transport capabilities as it moves into the future. This is why we recommended in our report that the Secretary of Defense perform a new alternatives analysis to clarify the V–22's role in transport operations, and require the Marine Corps to prioritize necessary improvements to the V–22 to improve its suitability and operational costs.

Thank you for your time, Mr. Chairman. I will answer any questions as they may come.

Chairman TOWNS. Thank you very much, Mr. Sullivan.

[The prepared statement of Mr. Sullivan follows:]

United States Government Accountability Office

GAO

Testimony

Before the Committee on Oversight and Government Reform, House of Representatives

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V-22 OSPREY AIRCRAFT

Assessments Needed to Address Operational and Cost Concerns to Define Future Investments

Statement of Michael J. Sullivan, Director
Acquisition and Sourcing Management

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GAO-09-692T

May 2009

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Highlights

Highlights of GAO-09-692T, a testimony before the Committee on Oversight and Government Reform, House of Representatives

V-22 OSPREY AIRCRAFT

Assessments Needed to Address Operational and Cost Concerns to Define Future Investments

Why GAO Did This Study

Since the 1980s, the V-22, developed to transport combat troops, supplies, and equipment for the U.S. Marine Corps and to support other services' operations, has experienced several fatal crashes, demonstrated various deficiencies, and faced virtual cancellation—much of which it has overcome. Although recently deployed in Iraq and regarded favorably, it has not performed the full range of missions anticipated, and how well it can do so is in question.

Given concerns about the V-22 program, GAO recently reviewed and on May 11, 2009, reported on MV-22 operations in Iraq; strengths and deficiencies in terms of the capabilities expected of the V-22; and past, current, and future costs. In that report, GAO recommended that the Secretary of Defense require (1) a new alternatives analysis of the V-22 and (2) that the Marine Corps develop a prioritized strategy to improve system suitability, reduce operational costs, and align future budget requests. The Department of Defense (DOD) concurred with the second recommendation, but not the first. GAO believes both recommendations remain valid. This testimony highlights GAO's findings from that report.

In speaking of the V-22, we are actually speaking of two variants of the same aircraft. The MV-22 is used by the Marine Corps; and the CV-22 by the Air Force to support special operations. This statement largely focuses on the MV-22, but also refers to the V-22 and CV-22.

View GAO-09-692T or key components. For more information, contact Michael J. Sullivan at 202-512-4841 or sullivanm@gao.gov.

What GAO Found

As of January 2009, the 12 MV-22s in Iraq successfully completed all missions assigned in a low-threat theater of operations—using their enhanced speed and range to deliver personnel and internal cargo faster and farther than the legacy helicopters being replaced. However, challenges to operational effectiveness were noted that raise questions about whether the MV-22 is best suited to accomplish the full repertoire of missions of the helicopters it is intended to replace. Additionally, suitability challenges, such as unreliable component parts and supply chain weaknesses, led to low aircraft availability rates.

Additional challenges have been identified with the MV-22's ability to operate in high-threat environments, carry the required number of combat troops and transport external cargo, operate from Navy ships, and conduct missions in more extreme environments throughout the world. While efforts are underway to address these challenges, it is uncertain how successful they will be as some of them arise from the inherent design of the V-22.

The V-22's original program cost estimates have changed significantly. From 1986 through 2007, the program's Research, Development, Test, and Evaluation cost increased over 200 percent—from $4.2 to 12.7 billion—while the cost of procurement increased 24 percent from $34.4 to $42.6 billion. This increase coincided with significant reductions in the number of aircraft being procured—from nearly 1,000 to less than 500—resulting in a 148 percent increase in cost for each V-22. Operations and support costs are expected to rise. An indication is the current cost per flying hour, which is over $11,000—more than double the target estimate for the MV-22.

After more than 20 years in development, the MV-22 experience in Iraq demonstrated that the Osprey can complete missions assigned in low-threat environments. Its speed and range were enhancements. However, challenges may limit its ability to accomplish the full repertoire of missions of the legacy helicopters it is replacing. If so, those tasks will need to be fulfilled by some other alternative. Additionally, the suitability challenges that lower aircraft availability and affect operations and support costs need to be addressed. The V-22 program has already received or requested over $29 billion in development and procurement funds. The estimated funding required to complete development and procure additional V-22s is almost $25 billion (then-year dollars). In addition, the program continues to face a future of high operations and support cost funding needs, currently estimated at $75.4 billion for the life cycle of the program. Before committing to the full costs of completing production and supporting the V-22, the uses, cost, and performance of the V-22 need to be clarified and alternatives should be reconsidered.

Mr. Chairman and Members of the Committee:

I am very pleased to be here today to discuss the current status of the V-22 Osprey program. Since the V-22 Osprey began development in the mid-1980s, it has experienced several fatal crashes, demonstrated a variety of deficiencies, and faced the virtual cancellation of the program—much of which it has been able to overcome. There are two variants of the V-22 tilt-rotor aircraft currently being used. The MV-22 variant for the Marine Corps will replace the CH-46E helicopter as the Marine Corps' medium-lift aircraft—to be used along with the heavy-lift CH-53[1]—to fulfill operational requirements such as transporting combat troops, supplies, and equipment. The Air Force's CV-22 variant will augment existing U.S. Special Operations Command aircraft. Until recently, the MV-22 was deployed in Iraq. While it accomplished assigned missions there, its usage did not encompass the full range of tasks anticipated for the aircraft. In addition, identified operational challenges raise questions concerning how effectively it can perform the full range of anticipated missions.

My testimony today is based on our recently issued report Defense Acquisitions: Assessments Needed to Address *V-22 Aircraft Operational and Cost Concerns to Define Future Investments*.[2] In view of our past work and others' highlighting concerns about the V-22 program, you asked us to determine whether the V-22 will perform as promised, and if it will, at what cost. To do this, we reviewed and reported on the system from three perspectives:

- Its operations in Iraq,
- Its strengths and deficiencies in terms of the capabilities expected of it, and
- Its past, current, and future costs.

Our work on both this testimony and the report on which it is based was conducted from June 2008 to May 2009 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our

[1]CH-53 helicopters are also being used, in part, to conduct medium-lift operations for the Marines Corps.

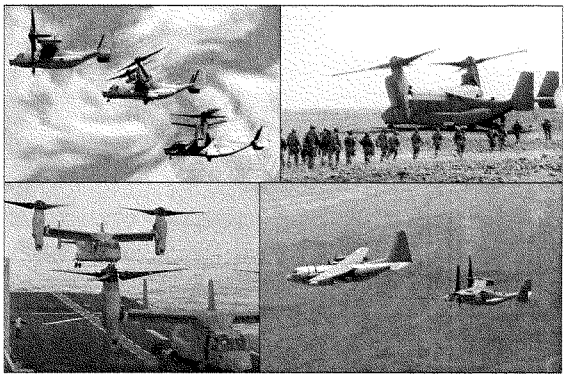
[2]GAO, *Defense Acquisitions: Assessments Needed to Address V-22 Aircraft Operational and Cost Concerns to Define Future Investments*, GAO-09-482 (Washington, D.C.: May 11, 2009).

audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

The V-22 Osprey is a tilt-rotor aircraft—one that operates as a helicopter for takeoffs and landings and, once airborne, converts to a turboprop aircraft—developed to fulfill medium-lift operations such as transporting combat troops, supplies, and equipment for the U.S. Navy, Marine Corps, and Air Force special operations. Figure 1 depicts V-22 aircraft in various aspects of use.

Figure 1: Views of V-22 Aircraft in Various Aspects of Use



Source: U.S. Navy, U.S. Marine Corps.

The Osprey program was started in December 1981 to satisfy mission needs for the Army, Navy, and Air Force. Originally headed by the Army, the program was transferred to the Navy in 1982 when the Army withdrew from the program citing affordability issues. The program was approved for full-scale development in 1986, and the first aircraft was flown in 1989. A month after the first flight, the Secretary of Defense stopped requesting funds for the program due to affordability concerns. In December 1989, the Department of Defense (DOD) directed the Navy to terminate all V-22

contracts because, according to DOD, the V-22 was not affordable when compared to helicopter alternatives, and production ceased. Congress disagreed with this decision, however, and continued to fund the project. In October of 1992 the Navy ordered development to continue and awarded a contract to a Bell Helicopter Textron and Boeing Helicopters joint venture to begin producing production-representative aircraft.

Low-Rate Initial Production began in 1997. In 2000, the MV-22 variant began operational testing, the results of which led the Navy's operational testers to conclude that the MV-22 was operationally effective and was operationally suitable for land-based operations.[3] Later evaluations resulted in testers concluding that the MV-22 would be operationally suitable on ships as well. Based on the same tests, DOD's independent operational testers concluded that the MV-22 was operationally effective but not operationally suitable, due in part to reliability concerns. Despite the mixed test conclusions, a Program Decision Meeting was scheduled for December 2000 to determine whether the V-22 should progress beyond low-rate initial production into full-rate production. Following two fatal crashes that occurred in 2000 and resulted in 23 deaths, the last one occurring just before the full-rate production decision, the V-22 was grounded and, rather than proceeding to full-rate production, the program was directed to continue research and development while low-rate production continued. Before the V-22 resumed flight tests, modifications were made to requirements and design changes were made to the aircraft to correct safety concerns and problems. A second round of operational testing with modified aircraft was conducted in June 2005. Both Navy and DOD testers then recommended that the aircraft be declared operationally effective and suitable for military use. The Defense Acquisition Board approved it for military use as well as full-rate production in September 2005.

[3]Operational Effectiveness is the measure of the overall ability of a system to accomplish a mission when used by representative personnel in the environment planned or expected for operational employment of the system. Operational Suitability is the degree to which a system can be placed and sustained satisfactorily in field use.

MV-22 Operations in Iraq Demonstrated Effectiveness for Assigned Missions but the Aircraft Continues to Experience Challenges

The MV-22 deployments in Iraq were considered successful. As of January 2009, the 12 MV-22s deployed in Iraq and utilized by three separate squadrons had successfully completed all missions assigned to them including general support—moving people and cargo—in what was considered an established, low-threat theater of operations.[4] These deployments confirmed that the MV-22's enhanced speed and range enable personnel and internally carried cargo to be transported faster and farther than is possible with the legacy helicopters the MV-22 is replacing. According to MV-22 users and troop commanders, its speed and range "cut the battlefield in half," expanding battlefield coverage with decreased asset utilization and enabling it to do two to three times as much as legacy helicopters in the same flight time. Cited advantages include more rapid delivery of medical care, more rapid completion of missions, and more rapid travel by U.S. military officials to meetings with Iraqi leaders. The MV-22 also participated in a few AeroScout missions and carried a limited number of external cargo loads.[5]

However, questions have arisen about whether the MV-22 is the aircraft best suited to accomplish the full mission repertoire of the helicopters it is intended to replace, and some challenges in operational effectiveness have been noted. Also, aircraft suitability challenges, such as unreliable parts and supply chain weaknesses, drove availability significantly below minimum required levels.

The aircraft's use in Iraq demonstrated operational challenges. For example, the introduction of the MV-22 into Iraq in combination with existing helicopters has led to some reconsideration of the appropriate role of each. Battlefield commanders and aircraft operators in Iraq identified a need to better understand the role the Osprey should play in fulfilling warfighter needs. They indicated, for example, that the MV-22 may not be best suited for the full range of missions requiring medium lift,

[4]Low threat includes sporadic small arms fire from random locations (maximum caliber 7.62 mm / .30 cal), and automatic weapons (assault rifles). Medium threat includes those threats, plus larger caliber weapons (.50 cal / 12.5 mm and 23mm, but not Anti-Aircraft Artillery (AAA)) adapted for anti-aircraft fire, more sophisticated aiming devices, and legacy man-portable air-defense systems. High threat environment may include mobile and/or stationary surface-to-air missiles, early warning radars, integrated AAA fire control systems, and interceptor aircraft.

[5]AeroScout missions were developed for and conducted by legacy helicopters. The concept arose prior to the V-22 arriving in Iraq. AeroScout missions are made to identify suspicious targets and neutralize those threats.

because the aircraft's speed cannot be exploited over shorter distances or in transporting external cargo. These concerns were also highlighted in a recent preliminary analysis of the MV-22 by the Center for Naval Analysis, which found that the MV-22 may not be the optimal platform for those missions.

Availability challenges also impacted the MV-22. In Iraq, the V-22's mission capability (MC) and full-mission capability (FMC) rates fell significantly below required levels as well as rates achieved by legacy helicopters.[6] The V-22 MC minimum requirement is 82 percent, with an objective of 87 percent, compared with actual MC rates for the three squadrons of 68, 57 and 61 percent. This experience is not unique to Iraq deployment, as low MC rates were experienced for all MV-22 squadrons, in and out of Iraq. In comparison, the Iraq-based legacy helicopter MC rates averaged 85 percent or greater during the period of October 2007 to June 2008. Similarly, the program originally had a FMC requirement of 75 percent; but its actual rate of 6 percent in Iraq from October 2007 to April 2008 was significantly short of that, due in large part to faults in the V-22's Ice Protection System. In areas where icing conditions are more likely to be experienced, such as in Afghanistan, this may threaten mission accomplishment.

Repair parts issues and maintenance challenges affected the availability of MV-22s in Iraq. V-22 maintenance squadrons faced reliability and maintainability challenges, stemming from an immature supply chain not always responsive to the demand for repair parts and aircraft and engine parts lasting only a fraction of their projected service life. The MV-22 squadrons in Iraq made over 50 percent more supply-driven maintenance requests than the average Marine aviation squadron in Iraq. A lack of specific repair parts took place despite having an inventory intended to support 36 aircraft as opposed to the 12 aircraft deployed. However, only about 13 percent of those parts were actually used in the first deployment. In addition, many parts that were used were in particularly high demand, which led to a shortage that caused cannibalization of parts from other V-22s, MV-22s in the United States, and from the V-22 production line.

[6]An aircraft that is mission capable (MC) is one that is in a material condition to perform at least one of its designated missions, while an aircraft that is fully mission capable (FMC) is in a material condition to perform all of its designated missions. The program has modified the MC requirement by stating that this threshold should be achieved by the time the fleet completes 60,000 flight hours, which officials expect to occur sometime near the end of 2009.

Thirteen V-22 components accounted for over half the spare parts unavailable on base in Iraq when requested. These 13 lasted, on average, less than 30 percent of their expected life, and 6 lasted less than 10 percent of their expected life. V-22 engines also fell significantly short of service life expectancy, lasting less than 400 hours versus the program estimated life of 500-600 hours.

Operational Tests and Training Exercises Have Identified Challenges to Accomplishing Full Range of Possible Operations

V-22 missions in Iraq represent only a portion of the operations envisioned for the aircraft, but operational tests and training exercises have identified challenges in the V-22's ability to conduct operations in high-threat environments, carry the required number of combat troops and transport external cargo, operate from Navy ships, and conduct missions operating in more extreme environments throughout the world. While efforts are underway to address these challenges, success is uncertain since some of them arise from the inherent design of the V-22.

- **High-Threat Environments:** The Osprey was intended to operate across a spectrum of high-threat combat situations, facing a broad range of enemy land- and sea-based weapons. However, its ability to do so is not yet demonstrated.
  - The V-22 has maneuvering limits that restrict its ability to perform defensive maneuvers and it does not have a required integrated defensive weapon needed to suppress threats while approaching a landing zone, disembarking troops within the landing zone, or while leaving the landing zone. Currently, the Marine Corps intends to employ the aircraft in a manner that limits its exposure to threats—a change from the original intent that the system would be able to operate in such environments.

- **Transporting Personnel and External Cargo:** Operational tests and shipboard training exercises have determined that the capacity of the MV-22 to transport troops and external cargo is, in some cases, below program requirements.
  - The V-22 cannot carry a full combat load of 24 Marines if equipped as intended. The average weight of each Marine fully equipped with improved body armor and equipment has risen from 240 to 400 lbs. As a result, the aircraft can only transport 20 fully loaded combat troops rather than the 24-troop requirement. Troop-carrying capacity may be further reduced in other configurations and flight scenarios.
  - Most external cargo loads have not been certified for high-speed transport and thus would not enable the V-22's speed to be leveraged. Anticipated new and heavier equipment would not be able to be transported by the Osprey. A 2007 Center for Naval Analysis study

found that the MV-22 will not be able to externally transport heavier equipment, such as the Joint Light Tactical Vehicle—which is to replace the Marine Corps' High-Mobility, Multi-Purpose Wheeled Vehicle (HMMWV). As a result, the study concluded that there will be less need for MV-22s for external lifting and an increased need for heavier lift helicopters.
  - The weight of the MV-22 with added equipment planned as upgrades to currently configured aircraft may pose a moderate risk to the program. The heavier the aircraft is, the less it can carry. Weight growth as a result of planned MV-22 upgrades could reduce the aircraft's operational utility transporting loads in higher altitude regions of the world, such as Afghanistan.

- **Operating on Navy Ships:** Efforts to ready the V-22 for deployment onboard Navy ships have identified numerous challenges.
  - Because it is larger than the helicopter it is replacing, ships can carry fewer V-22s than the predecessor aircraft. Also, the V-22 cannot fully utilize all operational deck spots on ships. The MV-22 is only cleared to take off and land from four of the six operational deck spots of the LHA- and LHD-class ships usable by CH-46s.
  - The Osprey's large inventory of repair parts also constrains hangar deck space essential for maintenance actions on the V-22 and other aircraft. The space needed for its repair parts is so large that some parts may need to be prepositioned ashore.
  - Safety concerns caused by downwash have been documented. The V-22's proprotors create downwash significantly greater than that of the CH-46s it is replacing. The downwash impacts operations below the aircraft, including troop embarkation and debarkation, hooking up external loads, and fastroping.[7] During shipboard exercises, the V-22's downwash dislodged equipment such as life raft container securing bands and was so severe in one instance that another person was assigned to physically hold in place the sailor acting as the landing guide. Recently completed tests on the CV-22 found that the significant downwash also had various negative effects on land-based missions.

- **Challenges Operating Globally in Extreme Environments:** The Osprey's ability to conduct worldwide operations in many environments is limited.
  - The V-22 had a requirement that its fuselage and cockpit be designed to restrict the entry of nuclear, biological, and chemical contaminants into

[7]Fastroping is a method used by troops to quickly exit a hovering aircraft.

the aircraft.[8] During initial operational tests numerous problems existed with the seals that maintained cabin pressure, so the system could not be used. Without it, operational V-22s are forced to avoid or exit areas of suspected contamination and decontaminate affected aircraft, likely reducing their availability and sortie capability.

- The MV-22 is intended to support diverse mission requirements that will require it to fly during the day or at night, in favorable or adverse weather, and across a range of altitudes from close to the ground to above 10,000 feet above mean sea level. Current V-22 operating limitations do not support helicopter operations above 10,000 feet. The MV-22 currently does not have a weather radar and the Osprey's Ice Protection System is unreliable, so flying through known or forecasted icing conditions is currently prohibited.

V-22 Costs Rose While Performance Requirements Were Modified

The V-22's original program cost estimates have changed significantly as research and development, and procurement costs have risen sharply above initial projections. Operations and supports costs are just beginning and are expected to rise. This has taken place in spite of the fact that performance standards and metrics for V-22 were modified throughout th development effort.

V-22 Business Case and Acquisition Strategy Have Eroded as Costs Have Increased Significantly and Are Expected to Continue to Rise

From initial development in 1986 through the end of 2007, the program's Research, Development, Test, and Evaluation cost increased over 200 percent—from $4.2 to $12.7 billion—while its procurement cost increased nearly 24 percent from $34.4 to $42.6 billion.[9] This increase coincided with significant reductions in the number of aircraft being procured—from nearly a thousand to less than 500 (most of which will be procured for the Marine Corps)—resulting in a 148 percent increase in procurement unit cost for each V-22. Operations and support (O&S) cost are also expected to rise. Table 1 details key aspects of the V-22 program's cost and schedule experience from development start to 2007.

[8]This requirement has since been dropped.

[9]Amounts are in constant fiscal year 2009 dollars.

Table 1: V-22 Cost, Quantity and Schedule Changes from Development Start to 2007

Costs in millions of constant fiscal year 2009 dollars

	1986	2007	Percentage change
Research & Development	$4,211.8	$12,682.0	201%
Procurement	$34,362.9	$42,585.2	24%
Procurement unit cost	$37.7	$93.4	148%
Average program unit cost (Research, Development, Test, and Evaluation plus Procurement costs)/Quantity	$42.3	$121.2	186%
Procurement quantities	913	456	-50.1%
Production years	1990-1999	1997-2018	
Initial operational capability	1992	June 2007	

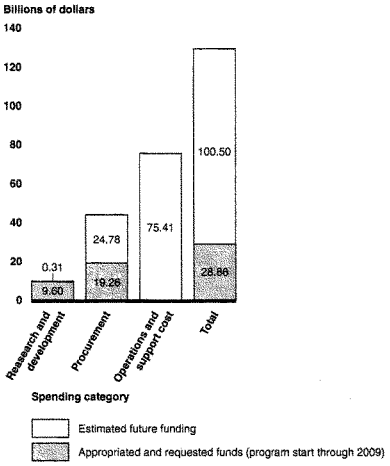
Source: GAO analysis of U.S. Navy V-22 Selected Acquisition Reports.

O&S costs—typically the largest portion of a weapon system's total costs—are currently reported at $75.41 billion for the life cycle of the program, but O&S costs for the program are just beginning and are expected to rise. One indication they may rise is the current cost per flying hour, which is over $11,000—more than double the target estimate for the MV-22 as well as 140 percent higher than the cost for the CH-46E.[10] The Osprey's Iraq experience demonstrated that the rise in cost is due in part to unreliable parts, the cost of some parts, and required maintenance.

As illustrated in figure 2, the program's estimated future funding needs are approximately $100 billion (then-year dollars)—nearly $25 billion in procurement and around $75 billion in O&S.

[10]These data were gathered after the Material Support Date, October 1, 2008, when the Navy assumed responsibility for all spares and repair parts needed to support a new weapons system, subsystem, or support equipment end item at Fleet operational sites.

Figure 2: V-22 Funding Profile (Then-Year Dollars)[11]



Source: *V-22 December 2007 Selected Acquisition Report.*

According to Marine Corps officials, the presence of unreliable parts contributed to reliability and maintainability issues for MV-22 deployed in Iraq, and a program is in place to address underperforming components. However, program management does not consider the current reliability and maintainability strategy to be coherent. Problems with parts reliability have resulted in more maintenance activity than expected, and if there is no improvement, overall cost and maintenance hours may remain high. Changes to the current engine sustainment contract with Rolls Royce—the

[11] O&S expenditures to date for the recently fielded MV-22 are not reported in the Selected Acquisition Report. O&S funding represents past and future funding needs. In fiscal year 2009 dollars, R&D would be $12.6 billion in past funds and $0.3 billion in estimated future funding; procurement would be $21 billion in past funds and $22.3 billion estimated future funding, and O&S would be $54.5 billion in estimated future funding.

V-22's engine manufacturer—could also affect the program's already rising O&S costs.

Key Performance Standards and Other Performance Metrics for MV-22 Modified

Initially, the Marine Corps' proposed performance parameters for the V-22 were focused on speed, range, and payload. However, the Joint Requirements Oversight Council deferred consideration of system requirements until completing the 1994 Cost and Operational Effectiveness Analysis that validated the V-22 over other alternatives. While reports indicate that the MV-22 is meeting all its key performance parameters, program officials said modifications were made to balance aircraft operational requirements against technical risks and program costs. In 2001, for example, modifications consolidated 14 key performance parameters into 7 for the MV-22 variant.

While the office of the Director, Operational Test and Evaluation (DOT&E) found the MV-22 operationally effective in 2000, it did not find it operationally suitable, due in part to reliability concerns. Mission capability, one of the metrics used to measure suitability, was modified in 2004 such that the mission capability rate does not now have to be met until the aircraft reaches system maturity (60,000 flight hours), whereas the requirement previously specified no minimum required number of flight hours. According to Marine Corps Headquarters officials, the aircraft currently has over 50,000 hours and may reach the 60,000 hour threshold within a year.

Concerns about V-22 weight increase and how it may affect aircraft performance have continued. In 2005, a DOT&E report on the second operational test of the MV-22 predicted a drop in performance due to a projected weight increase. However, according to Navy operational testers who tested the aircraft in 2007, performance did not decrease. DOT&E did not report on the 2007 test. The program office is currently tracking weight increase in the newest version of the aircraft as a potential risk to the achievement of select key performance parameters.

Concluding Observations

After more than 20 years in development and 14 years since the last cost and operational effectiveness analysis was developed to reaffirm the decision to proceed with the V-22 program, the MV-22 experience in Iraq demonstrated that the Osprey can complete missions assigned in low-threat environments. Its speed and range were enhancements. However, challenges may limit its ability to accomplish the full repertoire of missions of the legacy helicopters it is replacing. If so, those tasks will

need to be fulfilled by some other alternative. Viewed more broadly, the MV-22 has yet to fully demonstrate that it can achieve the original required level of versatility. To be useful to the warfighter in a variety of climates and places, its ability to address and resolve a range of operational challenges must be re-evaluated. Furthermore, suitability challenges that lower aircraft availability and affect the operations and support funding that may be required to maintain the fleet need to be addressed. Based on the Iraq experience, the cost per flight hour is more than double the target estimate. DOD is therefore faced with the prospect of directing more money to a program, the military utility of which in some areas remains unproven. Now is a good time to consider the return on this investment as well as other less costly alternatives that may fill the current requirement.

The V-22 program has already received or requested over $29 billion in development and procurement funds. The estimated funding required to complete the development and procure additional V-22s is almost $25 billion (then-year dollars). In addition, the program continues to face a future of high operations and support cost funding needs, currently estimated at $75.4 billion for the life cycle of the program. Before committing to the full costs of completing production and support the V-22, the uses, cost, and performance of the V-22 need to be clarified and alternatives should be reconsidered. Questions to consider include: To what degree is the V-22 a suitable and exclusive candidate for the operational needs of the Marine Corps and other services? How much will it cost? How much can DOD afford to spend? To what degree can a strategy be crafted for ensuring control over these future costs? If the V-22 is only partially suitable, to what degree can another existing aircraft or some mixture of existing aircraft (including V-22s) or a new aircraft perform all or some of its roles more cost effectively? Some consideration should be given to evaluating the roles such aircraft play in today's theaters of war and whether their performance warrants their cost.

Failure to re-examine the V-22 program at this point risks the expenditure of billions of dollars on an approach that may be less effective than alternatives. Furthermore, if the suitability challenges facing the program are not adequately addressed, the future cost of the program could rise significantly requiring funds that might otherwise be made available to satisfy other needs. This is why we recommended in our May 11 report that the Secretary of Defense (1) re-examine the V-22 by requiring a new alternatives analysis and (2) require the Marine Corps to develop a prioritized strategy to improve system suitability, reduce operational costs, and align future budget requests. DOD concurred with our second recommendation, but not the first. In non-concurring with our

recommendation for a new V-22 alternatives analysis, DOD stated that it supports validating required MV-22 quantities and the proper mix of aircraft, but not by means of a new V-22 alternatives analysis. Rather, DOD stated that planning for all elements of Marines Corps aviation (including required quantities, location, and employment of medium-lift assets) and total force affordability are reviewed and updated annually in the Marine Aviation Plan. We maintain our recommendation for a new alternatives analysis as a means of providing a comparison of a fuller range of alternatives, including their costs, operational suitability, and operational effectiveness under varying scenarios and threat levels. Furthermore, development of a V-22 alternatives analysis could assure congressional decision-makers that a reasoned business case exists that supports the planned acquisition of an additional 282 V-22s and an expenditure of almost $25 billion in procurement funds in fiscal years 2010 and beyond.

Mr. Chairman, this concludes my prepared statement. I would be pleased to answer any questions that you or other Members of the Committee may have at this time.

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Chairman TOWNS. Mr. Wood.

STATEMENT OF DAKOTA L. WOOD

Mr. WOOD. Thank you, Mr. Chairman, Congressman Issa, and distinguished members of the committee. It is my personal honor to appear before you today to discuss the MV–22 Osprey.

I have been asked to elaborate on various issues related to the Osprey originally outlined in the paper that you have already mentioned. The point of the larger project was to highlight a range of defense issues to be addressed and considered during the 2009 Quadrennial Defense Review.

This particular monograph of the Marine Corps examined the readiness of the service to do its part in meeting a set of emerging challenges, namely, the rise of large, hostile powers, a greatly proliferated world, and Islamist radicalized elements. There were also the "meat-and-potatoes" missions typically associated with Marine Corps deployments, such as noncombatant evacuation operations, mandatory assistance and disaster relief missions, and other various security cooperation initiatives that focused on working with other countries.

Within the paper, we describe the current state of the Marine Corps, discuss what the Corps must be able to accomplish in meeting these burgeoning challenges successfully, and briefly assess the service's program of record and related developments within the service that would pertain to or be impacted by these challenges and operational demands.

With specific reference to the MV–22 Osprey, we question the current Marine Corps plan to replace all of its medium-lift helicopters with the MV–22, and suggest that the Corps revisit this plan to see whether a mixed fleet of MV–22s and helicopters might be better.

During the Ospreys long period of development, some 25 years or more, changes in the operational and threat environments, increasing budgetary pressures, and the various implications arising from the service's own strategic and operational concepts suggest that a mixed fleet would provide more options and increased flexibility for the services at less cost than a fleet composed only of MV–22s.

As has already been mentioned, the Marine Corps is planning to acquire 345 of these aircraft at a total cost of $42 billion, or roughly $120 million each. Over the years, the aircraft has been the subject of controversy arising from engineering challenges and related developmental delays, some highly publicized crashes, and many funding debates; and certainly has strong supporters and equally passionate critics, both sides claiming that it is either better or worse than conventional helicopter alternatives.

Those favoring the program cited speed, range, and altitude advantages over helicopters, characteristics that make it possible for Marine Corps forces to execute operations from increased distances. Those against the program cite its troubled developmental history and its high cost relative to helicopters, and argue that less-expensive helicopters can just as effectively support ship-to-shore movements, amphibious landing operations, and various amphibious assault missions without having to coordinate with aircraft of lesser

capability. In other words, escort aircraft can't keep pace with the MV–22.

The argument between advocates and critics of the Osprey appears to rest on the fundamental question: Does the Marine Corps' commitment to field the MV–22s sole medium-lift helicopter-like capability help or hinder its ability to perform anticipated missions at an acceptable cost, both in dollars and overall effectiveness, in an operational environment? Or should the Corps pursue a much less-expensive path that gives it the ability to effectively execute the missions it will most likely encounter, even if this means it would not have the ability to conduct missions at extreme range in as timely a manner? Of course, not having the more advanced capability provided by the MV–22 precludes undertaking missions that would require it.

Mr. Chairman, I had planned on 5 minutes. I can jump right to the end and submit the rest of my comments for the record.

Chairman TOWNS. Without objection.

Mr. WOOD. In the end, the issue of the MV–22's value must be viewed within the context of the often competing demands and desired operational attributes, the nature of expected operational threat environments, and our experiences of how our forces are actually employed to achieve their objectives. Achieving such a balance isn't easy, and it inevitably requires compromises that would properly and carefully weigh the costs and benefits of various alternatives.

The Osprey can certainly enable the Marine Corps to perform a variety of missions far more effectively than has been possible in the past and undertake missions it would not otherwise be able to perform. But this capability also comes at a steep price both financially and in terms of the opportunity costs of absorbing a major slice of the Corps' modernization budget that may starve other badly needed modernization programs.

Mr. Chairman, with these issues serving as points for further discussion, I would be happy to respond to any questions this committee might have.

Chairman TOWNS. Thank you very much for your testimony.

[The prepared statement of Mr. Wood follows:]

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TESTIMONY

The Future of the MV-22 Osprey

Testimony Before the

U.S. House of Representatives

Committee on Oversight and Government Reform

Dakota L. Wood

Senior Fellow
Center for Strategic and Budgetary Assessments

May 21, 2009

Introduction

Mr. Chairman, Congressman Issa, and distinguished members of the Committee, it is my personal honor to appear before you today to discuss the MV-22 Osprey.

I have been asked to elaborate on various issues related to the Osprey originally outlined in a paper we at CSBA published this past fall entitled "The US Marine Corps: Fleet Marine Forces for the 21st Century," a monograph in a series of reports written for CSBA's "Strategy for the Long Haul" project.

The point of the larger project, begun nearly two years ago, was to "inform and shape the next administration's defense strategy review"; that is to say, to highlight a range of defense and national security issues to be considered in the 2009 Quadrennial Defense Review by whichever administration was to assume office following the national elections in November, 2008.

This particular monograph on the Marine Corps examined the readiness of the Service to do its part in meeting a set of emerging security challenges we addressed in detail in a separate paper. These challenges include defeating strains of violent Islamist radicalism, hedging against the rise of a hostile or more openly confrontational China or other authoritarian capitalist state, and preparing for a world in which there are more nuclear-armed regional powers. In addition to these specified challenges and their related operating environments, there are also the "meat-and-potatoes" missions typically associated with Marine Corps deployments, such as: non-combatant evacuation operations, humanitarian assistance and disaster-relief missions, various security cooperation initiatives that focus on working with the military forces of other countries, and serving as a general force-in-readiness able to respond to pop-up crises along the world's littorals.

Within the paper, we described the current state of the Marine Corps, discussed what the Corps must be able to do to help meet these emerging challenges successfully, and briefly assessed the Service's program of record and related conceptual, organizational, and operational efforts as they pertain to, or would be impacted by, the aforementioned challenges and operational demands.

With specific reference to the MV-22 Osprey, we questioned the current Marine Corps plan to replace all of its medium-lift helicopters—the CH-46E Sea Knight and the CH-53D Sea Stallion—with the MV-22 and suggested that the Corps revisit this plan to see whether a mixed fleet of MV-22s and a replacement helicopter might be better. During the Osprey's long period of development, some twenty-five years or more, changes in the operational and threat environments, increasing budgetary pressures, and the various implications arising from the Service's own strategic and operational concepts suggest that a mixed medium-lift fleet composed of MV-22s and a new helicopter would provide more options and increased flexibility for the Service at less cost than a fleet composed only of MV-22s.

As already mentioned, the Osprey has been in development for over a quarter of a century at a cost of more than $20 billion. The Corps plans to acquire a total of 345 at a projected total cost of $42 billion, roughly $120 million each. Over the years, the aircraft has been the subject of controversy arising from engineering challenges and related development delays, a

few highly publicized crashes, and many funding debates. It has strong supporters and equally passionate critics, both sides claiming that it is either better or worse than conventional helicopter alternatives. Those favoring the program cite its speed, range, and altitude advantages over helicopters, characteristics that make it possible for Marine Corps forces to execute operations from increased distances. Those against the program cite its troubled developmental history and its high cost (relative to helicopters) and argue that less expensive helicopters can just as effectively support ship-to-shore movements, amphibious landing operations, and various amphibious assault missions without having to coordinate with aircraft of lesser capability—this last point deriving from the fact that standard escort or attack helicopters would not be able to keep pace with the Osprey.

The argument between advocates and critics of the Osprey appears to rest on a fundamental question: does the Marine Corps' commitment to field the MV-22 as its sole medium lift helicopter-like capability help or hinder its ability to perform anticipated missions at an acceptable cost, both in dollars and overall effectiveness in an operational environment? Or should the Corps pursue a much less expensive path that gives it the ability to effectively execute the missions it is most likely to encounter even if this means it would not have the ability to conduct missions at extreme range in as timely a manner? Of course, not having the more advanced capability provided by the MV-22 precludes undertaking missions that would require it.

This leads one to assess the various advantages and disadvantages, or pros and cons, associated with either an MV-22 pure fleet or a mixed fleet of MV-22s and helicopters. From an institutional perspective, the Corps would benefit from the efficiencies of adopting the MV-22 as the sole replacement for its aging fleet of transport helicopters. By eliminating both the CH-46E and CH-53D and fielding the MV-22, supply, maintenance, avionics, and ordnance support will be simplified. Efficiencies would also be obtained in the training and assignment of personnel. Additional efficiencies might be realized in operational employment planning, since operating forces would become accustomed to the specific performance characteristics of the MV-22 rather than having to account for a mixture of platforms. If a mixed fleet approach is adopted, the Service will have to maintain all of the infrastructure and supporting establishment needed to service two platforms vice one, while also retaining the dissimilar communities that operate and maintain the helicopter fleet.

In evaluating such options, however, institutional efficiencies should not be the sole determinant. Resource limitations and overall force effectiveness must be taken into account. The United States has a Marine Corps to accomplish military missions for which it is uniquely suited—i.e. projecting combat power from a seabase to objectives ashore. But the resources made available to the Service to do this, to include equipping its operating forces for such tasks, are not unlimited. Therefore, other factors should also weigh heavily in deciding the type of capabilities to pursue, and the mix (if any) among the various types. Certainly, operational relevance and effectiveness, in addition to resource availability, must be taken into account.

A sound strategy should reflect careful prioritization in the allocation of limited resources. This often demands balancing a variety of capabilities and operational demands such that one can meet the challenges of the most likely threats or operational requirements while

hedging against threats or operational requirements that are less likely to occur, but that are of high consequence when they do occur.

As discussed in our monograph, the Corps' current approach to conducting routine operations in the littorals, expanding and enhancing its presence aboard US Navy ships, developing more aggressively its long-term relationships with the military forces of key US allies and partners, and meeting the likely operational demands of an assortment of missions associated with the strategic challenges facing the United States would all be ably served by a helicopter fleet. To be sure, a case can certainly be made that the MV-22's speed and range would enable the Marine Corps to conduct raids, support widely dispersed units, and influence a much larger battle space than is currently possible with a helicopter force, especially in sustained operations ashore.

For operations that cover a very wide expanse of territory, assuming they can be procured in sufficient quantities, an MV-22 fleet would be valuable in supporting the movement, sustainment, and reinforcement of dispersed small units. It should be noted, however, that the advanced capability of the Osprey, its speed and range, would preclude use of escort support from the Marine Corps' helicopter gunship, the AH-1W (soon to be AH-1Z) Cobra. Accordingly, an MV-22 raid force, or distributed operations force, would need to be supported by conventional fixed-wing, fighter-attack aircraft.

But, again, any assessment of the MV-22 must take cost into account, especially in what is likely to be an increasingly constrained fiscal environment. Just because the MV-22 can fly relatively long distances and at a relatively high rate of speed, it does not automatically follow that the type of missions it can undertake and the mission objectives it can accomplish justify the substantially greater cost of acquiring the capability in the first place.

Moreover, an MV-22-transported raiding force cannot travel with heavy armor or substantial ground mobility systems. Yet, if U.S. operations in Iraq and Afghanistan, or Israeli operations in Southern Lebanon, have taught us anything, it is that today even irregular enemy forces are likely to be equipped with very effective improvised and state-produced weapons. However, a force delivered and supported by MV-22s, operating far from supporting fires, will be limited in its ability to move, shoot, and sustain itself once on the ground.

Furthermore, the proliferation of modern anti-air weapons and more lethal anti-personnel capabilities to irregular forces likely means that even in low-end conflicts MV-22s may be highly vulnerable to enemy action while in flight. When all these factors are taken into consideration, it appears that the mission to be accomplished by an MV-22 transported force would of necessity have to be limited, both in duration and scope. The unanswered question is: does having the ability to conduct such a limited mission set justify its high cost?

A brief comparison of the MV-22 with a modern helicopter (the UH-60 is but one example) finds the Osprey easily outpaces a helicopter in speed and range. But the MV-22 possesses a substantially larger footprint and is therefore more restricted than a helicopter in the number of places it can land, whether ashore or at sea. For example, the rotor spread of an MV-22 is 85 feet, while a CH-46E has a 51-foot spread and a UH-60 one of 53 feet. This

characteristic could be troublesome in heavily congested urban environments, complex terrain, or around ships not configured to handle an MV-22. There is anecdotal evidence that MV-22 pilots in Iraq were more sensitive than their helicopter counterparts when it came to aggressively inserting their aircraft into situations where congested terrain was a prominent feature. It is unclear whether this is due to an increased sensitivity on their part to the first-time deployment of the Osprey to a war zone and the impact a crash or combat loss might have on the program, or whether it arose from a genuine safety concern associated with having to operate in urban terrain with an aircraft possessing a 50 percent larger rotor spread than a standard helicopter. But it does indicate there are differences in important performance attributes between MV-22s and helicopters, and not all of them favor the Osprey. The current shipboard deployment of MV-22s with the 22nd Marine Expeditionary Unit, and plans for deploying the Osprey to Afghanistan in the next year, should provide additional insights into such issues.

We should also not forget that even though an Osprey possesses greater range and speed, when it gets to its destination, it must transition to vertical flight and land in or take-off from a landing site just like a helicopter. This means that an MV-22 will encounter the same threats a helicopter would when inserting, extracting, or providing support to forces. Advanced man-portable air defense missiles (MANPADs), rocket-propelled grenades, heavy machines, and/or small arms will remain a feature of the threat environment and will continue to improve in effectiveness irrespective of the MV-22's speed and range advantages. Whether an Osprey is more survivable than a helicopter when under fire remains to be seen. While the loss of any aircraft is regrettable, especially when aircrew and embarked passengers are involved, one cannot discount the fact that the loss of a $100 million dollar aircraft will be more keenly felt than that of a $20 million helicopter.

Though the Marine Corps has routinely packaged the MV-22 as one part of an amphibious force's ability to conduct operations from the sea to objectives deep inland, the very fact that the MV-22 can out-range any other system used by an embarked force, yet cannot enable a small ground force to fight in a highly contested environment, should be cause for careful reflection upon the limitations of the MV-22. It would be very useful to analyze the various missions the Corps has been involved in over the past two decades (while the MV-22 has been in development) and, even more importantly, the types of missions the Corps envisions conducting in the coming years, to include the types of threats that may be encountered, and how they will be overcome. One outcome of such a study might be a revised assessment of the Marine Corps' MV-22 requirement. For example, the Marines may very well determine that MV-22s are best utilized in a paired relationship with their KC-130 Hercules fleet and that Marine Corps units embarked aboard amphibious ships are best supported with helicopters. The Osprey's range and speed would be well-matched by the capabilities of the KC-130 cargo aircraft and the mix of helicopters maintained aboard ship might better match the range of missions most likely to be undertaken by an amphibious force. In those instances where MV-22s are needed, or where operational demands could be forecast with confidence, MV-22s could be sent forward and embarked aboard ship or provide support for extended land operations just as KC-130s are called forward as they are needed today.

Conclusion

In the end, of course, the issue of the MV-22's value must be viewed within the context of the often competing demands of desired operational attributes, the nature of expected operational and threat environments, our experience of how forces are actually employed to achieve their objectives, and the resources available to support the overall force. Achieving such a balance is not easy. It inevitably requires compromises that, when done properly, carefully weigh the costs and benefits of various alternatives. The MV-22 Osprey can certainly enable the Marine Corps to perform a variety of missions far more effectively than has been possible in the past, and to undertake missions it would not otherwise be able to perform. But this capability also comes at a steep price, both financially and in terms of the opportunity costs of absorbing a major slice of the Corps' modernization budget that may starve other badly needed modernization programs.

Mr. Chairman, with these issues serving as points of departure for further discussion, I would be happy to respond to any questions this Committee might have.

Chairman TOWNS. General Trautman, first of all, let me thank you for your many years of service.

General Trautman.

STATEMENT OF LIEUTENANT GENERAL GEORGE J. TRAUTMAN III

General TRAUTMAN. Thank you, Mr. Chairman.

Mr. Chairman, Congressman Issa, distinguished Members, as the current leader of Marine Corps Aviation, it is a privilege for me to appear before you today to discuss the MV–22 Osprey tiltrotor aircraft, its performance in Iraq, and our plans for leveraging this capability in the future for the benefit of the men and women who ably serve our Corps.

Last month, the Commandant outlined before this Congress his vision of the Marine Corps of 2025. That vision portrays a fast, lethal, expeditionary force that is ready for the uncertainties of future combat operations, yet has the staying power of engagement in the most austere conditions imaginable. At the center of this vision is the MV–22 Osprey tiltrotor aircraft.

As always, your Marines are ready for full-scale theater war, we are ready for irregular warfare and insurgency, and we are ready for everything in between.

Today, we have a foot in two different streams. We are drawing down our forces in Iraq while at the same time we are building up forces in Afghanistan. This past year, your Marine Corps flew over 330,000 flight hours, with over 40,000 hours of these hours in combat zones in Iraq, Afghanistan, and the Horn of Africa. With last month's return of VMM–266 and its 12 Ospreys on board USS Wasp, Osprey squadrons finished their third consecutive 6-month deployment to Iraq. We will now turn the Osprey toward sustained operations at sea, and later this year we will deploy to Afghanistan and the challenges that await us there.

The Marine Corps is not interested in airplanes for their own sake. We are interested in the capabilities that airplanes provide to the aviation combat element in support of the Joint Force. With that in mind, I want to give you an example of what this aircraft can do.

In 1988, one of our former Commandants said, "If I am a commander operating off the coast of North Carolina, I want every bad guy from New York to Miami to be nervous." What he meant by this statement was, he wanted to find a way to keep an enemy force off balance by giving our Marines the kind of asymmetrical advantage the Osprey brings to the battlefield.

Simply put, the V–22 has transformed the way we are fighting in a manner akin to the introduction of the helicopter in the middle of the last century. We can now project combat-loaded Marines, soldiers, or Special Operators from a sea base or any forward site deep into the battlespace at the speed of a KC–130, and we can do it at altitudes above the ground threat that has tragically brought down so many conventional helicopters in Iraq, Afghanistan, and elsewhere. And then we can land that payload anywhere it is needed, just like a helicopter. With its speed, range, and survivability, the MV–22 is truly a game changer.

For the past 20 months, the Osprey has been in the fight. Since its introduction to the Iraq theater of war in October 2007, the Osprey has flown nearly 10,000 hours in combat, lifted over 45,000 passengers, and carried more than 2.2 million pounds of cargo, while completing every assignment imaginable. And it has done so flying faster, farther, and at more survivable flight profiles than any other assault support aircraft in the history of military operations.

As we move into Afghanistan later this year and we are required to cover a larger country than Iraq with Marines spread out even further, cutoff from one another and on foot in the equivalent of the Rocky Mountains, this aircraft will not be just a nice, new capability; it will be a crucial, critical necessity that saves lives and wins battles.

I have sent my staff around the world to speak with infantry battalion and platoon commanders, and their message is remarkably similar to that of our pilots: Get more of these assets into the fight.

Our logisticians, infantry officers, and our Marines have now seen what the Osprey can do. They have flown in the back of it, they have run down its ramp into landing zones in combat. They know that this capability means that we can move three times as many Marines five times farther and twice as fast as they could move those same Marines even in the most advanced conventional helicopters.

They know that as they transit to the objective, they are flying as high as 13,000 feet, out of the range of rifle fire, heavy machine gun fire, rocket-propelled grenades, and man-portable air-defense systems that are the weapons of choice for both irregular insurgents and the conventional soldiers who intend to do us harm. The infantrymen in the back of the aircraft, those 19-year-old riflemen whose well-being is the focus of the Commandant's vision and mine, are getting where they need to go in half the time, and the majority of the flight takes place in an altitude sanctuary well above the prevalent ground threat.

Like other types of aircraft in the early operational phases of their life cycle, the V–22 has experienced lower than desired reliability of some components. However, these challenges are not unique to this program. Aircraft like the F–14, 53 Echo, H–60, and F–18 have all had similar problems at this stage of their developmental process. The difference between the desired and observed rates is typically the result that spares our purchase for a new program based upon predicted engineering analysis. And when that analysis is informed by historical knowledge, improvement in availability and reliability occurs.

Mr. Chairman, thank you for this opportunity to speak with you today. Colonel Heckl is with me. He is one of our combat veteran V–22 squadron commanders.

I look forward to answering any questions that you may have. I have provided a written statement, and I request that it be entered into the record.

Chairman TOWNS. Without objection, the entire statement will be included in the record.

[The prepared statement of General Trautman follows:]

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STATEMENT OF

LTGEN GEORGE J. TRAUTMAN III, USMC
DEPUTY COMMANDANT FOR AVIATION

BEFORE THE

HOUSE COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

ON

UNITED STATES MARINE CORPS

MV-22B OSPREY PROGRAM

MAY 21, 2009

NOT FOR PUBLICATION UNTIL RELEASED BY
HOUSE OVERSIGHT AND GOVERNMENT REFORM COMMITTEE

Chairman Towns, Congressman Issa and distinguished Members of the committee, thank you for providing me with this opportunity to appear before you to discuss the Department of the Navy's MV-22B Osprey aircraft program. Your Marine Corps remains engaged every day in support of our ground forces in harm's way. For nearly eight years, we have been at an extraordinarily high operational tempo and we will sustain this pace as long as our nation calls. Your Marines are serving honorably and we remain guided by our tradition and history while we keep an eye on the future. The significant accomplishments of those who serve our Corps are a direct reflection of the tireless efforts and the consistent support of the military by the Congress and this committee. Thank you for your dedication and for your oversight.

The Fiscal Year 2010 President's Budget request includes $2.3 billion in APN for procurement of thirty MV-22Bs and continued development of follow-on block upgrades. Fiscal Year 2010 is the third year of the V-22 multiyear procurement contract. Our strategy supports a continued cost reduction and affordability trend, provides a stable basis for industry, and best supports the needs of the warfighter. The Fiscal Year 2010 appropriations will fully fund Lot 14 and procure long-lead items for Lot 15 under the V-22 multiyear contract.

The Marine Corps Combined-Arms Team

Marine Corps expeditionary operations typically center on what we call the "MAGTF," the Marine Air-Ground Task Force. In 1988, then-Commandant General Al Gray described his vision of the future of expeditionary warfare. Painting a vivid mental picture, General Gray stated that, "if I am a MEU commander off of North Carolina, I want every bad guy from New York to Miami to be nervous." General Gray's vision became reality last week when VMM-263 deployed aboard USS *Bataan* with the 22nd Marine Expeditionary Unit (or MEU). The leap in technology our former Commandant envisioned is now a reality, and the extraordinary range and speed of future expeditionary operations, once only imagined, are now the norm.

The MV-22B is not a one-for-one replacement for any of our current, aging helicopters. Osprey is not technology for technology's sake. The capability this aircraft represents does not just deliver Marines and equipment faster; it changes the entire calculus of planning and fighting at the

tactical and operational level for our joint force and MAGTF commanders. None of us knows what the 2025 battlefield will look like. What we do know is what your Marine Corps will look like: it will be fast, light, agile, expeditionary and lethal. Further, the Osprey will be a key component of the future of the Corps' contribution to the joint fight.

One of our officers described this capability perfectly, saying, "The Osprey is a great airplane that lands like a helicopter. It's not a helicopter that flies like an airplane." This aircraft shrinks the battlefield, flying higher, faster, farther, and longer than any of our legacy assault support helicopters. Osprey provides the commander with new speed and distance options in maneuvering while in support of Marine ground forces. It takes off and lands like a helicopter, but it transits from objective to objective at medium to high altitudes – above the small arms, man-portable air defense systems (MANPADS) and rocket-propelled grenades (RPGs) that have claimed so many of our conventional helicopters in Iraq. The MV-22B will save lives with its speed and range. It is now combat-tested and ready for deployment throughout the globe.

MV-22 Procurement

In September 2005, the Defense Acquisition Board approved MV-22B Full Rate Production. Initial Operational Capability was subsequently declared on 1 June 2007. By the end of Fiscal Year 2009, the Marine Corps will have one MV-22B Fleet Replacement Training Squadron, one operational test and evaluation squadron, and six tactical VMM squadrons home based at Marine Corps Air Station New River, North Carolina. Three of these New River squadrons have been combat tested in Iraq, and one is embarked with the 22nd Marine Expeditionary Unit afloat. At our current annual build rate of thirty aircraft, we are creating two Osprey squadrons per year. We have accepted delivery of 91 Ospreys, a quarter of our program objective of 360 aircraft. Our west coast transition will commence with the standup of squadrons at Marine Corps Air Station (MCAS) Miramar, California beginning in Fiscal Year 2010, followed by Okinawa bases in Fiscal Year 2013, then Marine Corps Base Camp Pendleton, California and Marine Forces Reserve by the end of the decade.

As the MV-22 is fielded over time, the capabilities will be increased via a block upgrade acquisition strategy. MV-22 Block A aircraft are now used predominantly in our training squadron. Block B aircraft are being fielded with our operational squadrons and will continue to be delivered via the current multiyear procurement contract. Block C aircraft are operational aircraft with mission enhancements that will be procured beginning in Fiscal Year 2010 and delivered to the fleet in Fiscal Year 2012. In addition, the Marine Corps is teaming with Special Operations Command to field a 7.62mm, all-aspect, crew-served weapon system that will provide an enhanced defensive suppressive fire capability. Pending successful developmental and operational testing, we expect to begin fielding limited numbers of this system later this calendar year.

Combat Operations Summary

A recent Commanding General of Multinational Forces – West in Iraq stated that, "I could dominate Al Anbar Province because I had V-22s, which are an amazing capability. I couldn't do what I did with just helicopters." This statement summarizes the Marine Corps' view of what this aircraft has done in the crucible of combat.

The MV-22B has been supporting our Marines in Iraq continuously since October 2007, with the third successive squadron recently completing a highly successful seven month rotation in support of Operation IRAQI FREEDOM just last month. In Iraq, our Ospreys have penetrated every threat zone, conducting assault support, Command and Control (Senior Leader Transport), Aero Scout, Tactical Recovery of Aircraft and Personnel, and Casualty Evacuation missions. Operating from Al Asad, the MV-22 effectively covered the entire country of Iraq, at twice the speed of conventional helicopters.

Over the past two years we have flown this aircraft hard. In Iraq, we have flown the Osprey at twice the rate we had previously planned and in very demanding, austere conditions and with a newly-fielded aircraft. It is important to note that VMMs 263, 162 and 266 have all deployed to and returned from Iraq and, while there, these squadrons flew ***the same ten*** Ospreys that originally arrived in theater in October 2007 along with two more aircraft we added in March 2008.

Therefore, all combat operational data is drawn from the most heavily-used twelve of our 91 aircraft. The dramatic upswing in operational flight hours in harsh environmental combat conditions has uncovered reliability and maintainability issues and these challenges are being addressed aggressively.

We accelerated introduction of the Osprey into the fight a year ahead of our programmed Material Support Date, despite the aviation logistics risks we knew we would incur, as well as the second-order effects we knew we would impose on transitioning the remaining east coast HMM squadrons. However, we simply could not hold back this revolutionary capability from supporting our Marines in combat. The operational performance metrics are impressive: the three VMM squadrons that have deployed to Iraq have flown over 9800 hours while executing more than 6000 sorties, carrying over 45,000 passengers and lifting 2.2 million pounds of cargo. The MV-22B completed these lifts almost exclusively by transiting at high altitudes and executing steep descents into all threat zones. To date, while they have been engaged with MANPADS and small arms, we haven't lost any of these aircraft in combat. The Osprey has shown that it can carry an operational load of 24 combat-loaded Marines out to a combat radius of 300 nautical miles at altitudes above the small arms and rocket-propelled grenade threat envelope; this dwarfs the 75 nautical mile radius of a CH-46E loaded with twelve Marines operating right in the heart of the enemy's threat envelope.

Reliability and Maintenance

This aircraft's usage has leapt dramatically since its deployment to Iraq and employment in combat. We began to consider the incredible potential of tilt-rotor technology almost three decades ago, but the V-22 community has flown 85% of its total flight hours since 2004, with *50% of its total program flight hours in the past two years alone*. These numbers are high in themselves; they are even more dramatic when one realizes that these hours have been flown in some of the world's harshest environments, in a combat zone, and in response to urgent operational warfighting requirements.

Most new aircraft - especially innovative technological advances like the Osprey - fly their first years at a slow and controlled rate of increasing hours, in a peacetime environment, and under highly controlled operational conditions. Like other types of aircraft in the early operational phase of their lifecycles, the MV-22B has experienced lower-than-desired reliability of some components and therefore higher operations and support costs, but this aircraft has experienced them in an acute fashion due to its early employment overseas. In effect, the operations and maintenance (O&M) costs and reliability issues which we are addressing are compressed: they seem more intense because they are happening in a shorter time, to fewer airplanes, in a more intense environment than is normal with new technology.

With the cooperation and support of our industry partners, we are tackling these issues head on with aggressive logistics and support plans that will increase the durability and availability of the parts needed to raise reliability and concurrently lower operating costs. The reliability and maintainability challenges of the MV-22B are not unique for an aircraft this early in its life cycle. What we now consider to be "legacy" airframes all once went through similar growing pains and a concentration of resources was required to bring improvement. The Naval Aviation Enterprise is responding to MV-22B in the short term by increasing the use of spares (sparing) and by focusing logistics. In the long term, the enterprise is incentivizing industry and making engineering changes to improve reliability.

Our average mission capable rate for the MV-22B in Iraq was 62%. This readiness rate represents the percentage of time an aircraft is free from downing discrepancies on a 24-hour clock. Assessed in another way, our deployed Ospreys averaged well over 70% aircraft available and "ready for tasking" at the commencement of each Air Tasking Order (ATO) day. This level of reliability is less than the threshold goal of 82% the Marine Corps desires. However, it is important to note that the MV-22B *accomplished all assigned tasking* in combat (with the exception of occasional and normal maintenance or weather aborts).

The MV-22 Program Manager has had an aggressive reliability Corrective Action Plan (CAP) in place since the fleet introduction of this aircraft. To ensure the CAP was sound, we have requested two separate outside non-advocate reviews. Both reviews reported the program's

foundation was strong, but the lack of dedicated funding sources and length of time required to process Class 1 engineering changes was inhibiting the incorporation of corrective actions in a timely manner. To address these issues, the Program Office implemented various initiatives, including incentivized Joint Performance Based Logistics contracts to increase reliability and improve component repair cycles; reduced cycle time to process and implement Class 1 changes to the fleet; and requested Operational Safety Improvement Program funding to address emerging reliability issues.

The Program Office has likewise recently instituted the V-22 Critical Item Logistics Review (CILR) process which will assist in providing a common list of degraders to ensure the optimized focus of the contractors, government integrated product teams, and the type/model/series team members in improving V-22 readiness and operational cost by addressing all of the logistics elements.

The difference between the desired and observed mission capable rates in the MV-22 program is due primarily to the premature failure of selected components. In the initial stages of any new aircraft procurement, spares are purchased to support the failure rates predicted by an engineering analysis rather than on actual historical data. A number of parts on this aircraft have failed sooner than predicted by this original engineering analysis. When errant predictions occur, the impact is a higher than expected demand on spare parts, thereby driving up the burden on the logistics system, increasing costs, and decreasing availability. Some examples of premature failures we have seen in the MV-22 are:

- Swashplate Actuator – Failed at 149 hours actual, versus 195 hours predicted
- Central Deice Distributor Bracket – Failed at 422 hours actual, versus 6,173 hours predicted
- Constant Frequency Generator – Failed at 192 hours actual, versus 404 hours predicted

An adjustment of 1,400 line items to the Operation IRAQI FREEDOM Aviation Consolidated Allowance List (AVCAL) in August of 2008 resulted in a sharp reduction in the number of

cannibalizations and customer wait times for parts and improved readiness rates. However, because spares procurement can take years to fully accomplish, we were then just receiving the increased spares quantities we purchased in late 2006.

Several degraders (such as infrared suppressor panels and center bodies and Coanda bleed air tubes and valves) that were originally designated as consumables are now repaired by the depot. The MV-22 depot will be fully operational in Fiscal Year 2011 and we anticipate they will then repair many more components than they do today.

Cost Factors and Mitigation

O&M costs of both deployed and home-based MV-22B squadrons are higher than predicted. Leadership tracks and addresses these conditions through an Executive Supportability Summit comprised of Marine and Air Force aviation advocates, Naval Inventory Control Point representatives, the Naval Air Systems Command, and the Original Equipment Manufacturers. The response by government has been to increase spares and improve maintenance procedures in the short term to keep availability at a manageable level while making engineering changes to components and systems and broadening repair capability at the aviation depots. Industry has responded by investing its own capital to improve production capacity of vendors while designing and implementing improvements to known and predicted degraders. The average year-to-date cost through March 2009 across the fleet, training, and test commands is $11,748 per flight hour, with the fleet-specific average being $9700. This cost is roughly comparable to that of our legacy CH-53E helicopters. Initial model forecasts used engineering predictions based on legacy systems. Adjustments to MV-22 estimates in the future, though, will include actual cost data and demonstrated reliability.

GAO Report

Last week, the Government Accounting Office released a report on the V-22. It is important to note that this report concluded that the Osprey is operationally effective, while mentioning the operational and cost issues that the Marine Corps is addressing. Reliability and availability are

parameters which affect operational *suitability*, not operational *effectiveness*. This aircraft is effective and suitable: it is the future of Marine Corps assault support, and is one of the foundations on which we are building the MAGTF of the future. However, we are not satisfied with current reliability numbers, and we are working with the V-22 program office and our industry partners to evaluate, address, mitigate and then resolve these issues.

While we agree with, and are addressing, availability and reliability issues, we do not agree with the GAO's recommendation that the Department of Defense conduct a new alternatives analysis. None of the alternatives allow me to fly our Marines as deep into the enemy's battlespace as quickly, nor to offer the takeoff and landing agility of a helicopter while transiting above the threat, thus protecting our embarked Marines, as does the Osprey. None of the options do these things, and that is why we are fully committed to this capability and to further exploiting the immense potential it holds for the future of joint warfighting.

The leadership of the naval service, nearly thirty years ago, made a conscious decision to take a generational leap in technology and give our MAGTF and joint force commanders an unsurpassed asymmetric advantage on the modern battlefield. Osprey technology is no longer new, but it is still unique. Our supply chain and logistics support systems are maturing, catching up to the aircraft, and as they do so we are confident the costs will fall as reliability and aircraft availability rates rise.

Bridge to the Future

We fully expect this aircraft to perform magnificently while supporting our widely dispersed Marines at high altitude and from austere bases throughout Afghanistan. In the irregular warfare environment, the solution to the small arms threat is often to simply fly over it, and in Afghanistan this aircraft will do just that. Analyzing the challenges of our current fight requires us to honor the complexities of engaging an enemy quickly and effectively, bridging the tyranny of distance, and countering the uncertainty of the enemy's lethalities in any clime and place.

The MV-22B has done exactly what we have asked it to do, and more. Its capabilities will form the Marine Corps' bedrock of our doctrine of operational maneuver from the sea. The commander of Task Force 58 (TF-58), who led the first Marines into combat in Afghanistan in November 2001, pointed out that mission accomplishment from ships based hundreds of miles away from the objective area was actually quite tenuous. TF-58 forces had to leapfrog from ships at sea, across one country and into the center of another, over mountainous terrain and hundreds of miles of empty desert. The Commanding General split his forces into helicopter lifts and vehicle convoys, dependent on the goodwill of host nation governments to move his Marines across international borders.

With Osprey, the operational burden of TF-58 would have been lightened considerably. The range, speed and altitude capabilities of V-22 would have allowed the commander to push the invasion force 400 miles from ship to objective, then maneuver that force quickly throughout the depth of the enemy's battlespace. This agility would have allowed TF-58 to operate at far lower operational risk while at higher tempo. This is the paradigm – light and expeditionary, ready to go anywhere at any time– at which the Marine Corps excels, and this is exactly what the country needs from its Corps. In order to bridge to the future force, we must have a nimble lethality which only a capability such as the Osprey can provide.

SUMMARY

We have interviewed dozens of our combat veteran MV-22B pilots over the past two years. The one consistent theme among them has been that they want to fly this aircraft even harder, higher and faster than we have to date. The Fiscal Year 2010 President's Budget reflects our commitment to the MV-22B Osprey program. We will continue to aggressively pursue efficiencies in the development, testing, procurement and sustainment of this aircraft and its components and weapons systems. Since 2001, the Marine Corps has been fighting shoulder to shoulder alongside our joint and allied partners overseas, supporting an extremely high operational tempo in two theaters while growing our force, introducing new aircraft and systems, and looking beyond the current fight. As we continue to shape naval aviation with your help, we have no doubt about the Osprey's key role at the center of our future warfighting vision.

In closing, Mr. Chairman, I thank you for the opportunity to testify before your committee regarding the Marine Corps' MV-22B Osprey program. I look forward to your questions.

Opening Remarks – LtGen George J. Trautman III

Mr. Chairman, Congressman Issa, distinguished members, as the current leader of Marine Corps aviation, it is a privilege for me to appear before you today to discuss the MV-22B Osprey tilt-rotor aircraft, its performance in Iraq, and our plans for leveraging this capability in the future for the benefit of the men and women who ably serve our Corps. Last month, the Commandant outlined before Congress his vision of the Marine Corps of 2025. That vision portrays a fast, lethal expeditionary force that is ready for the uncertainties of future combat operations, yet has the staying power of engagement in the most austere conditions imaginable. At the center of this vision is the MV-22 Osprey tilt rotor aircraft.

As always, your Marines are ready for full-scale theater war, we are ready for irregular warfare and insurgency…and, we are ready for everything in between. Today, we have a foot in two different streams: we are drawing down our forces in Iraq while at the same time we are building-up forces in Afghanistan. This past year your Marine Corps flew over 330,000 hours, with over 40,000 of those hours in combat zones in Iraq, Afghanistan and the Horn of Africa. With last month's return of VMM-266 and its twelve Ospreys onboard USS *Wasp*, Osprey squadrons finished their third consecutive six month deployment to Iraq. We will now turn the Osprey toward sustained operations at sea and, later this year, we will deploy to Afghanistan and the challenges that await us there.

The Marine Corps is not interested in airplanes for their own sake; we are interested in the capabilities that airplanes provide to the aviation combat element in support of the joint force. With that in mind, I want to give you an example of what this aircraft can do. In 1988, one of our former Commandants said, "if I am a commander operating off the coast of North Carolina, I want every bad guy from New York to Miami to be nervous." What he meant by this statement was that he

wanted to find a way to keep an enemy force off balance by giving our Marines the kind of asymmetrical advantage the Osprey brings to the battlefield. Simply put, the V-22 has transformed the way we are fighting in a manner akin to the introduction of the helicopter in the middle of the last century. We can now project combat loaded Marines, soldiers, or special operators from a sea base or any forward site -- deep into the battlespace -- at the speed of a KC-130 and we can do it at altitudes above the ground threat that has tragically brought down so many conventional helicopters in Iraq, Afghanistan, and elsewhere -- and then land that payload anywhere it is needed – just like a helicopter. With its speed, range, and survivability – the MV-22 is truly a game changer.

For the past twenty months, the Osprey has been in the fight. Since its introduction to the Iraq theater of war in October 2007, the Osprey has flown nearly 10,000 hours in combat, lifted over 45,000 passengers and carried more than 2.2 million pounds of cargo while completing every assignment imaginable. And, it has done so while flying faster, farther, and at more survivable flight profiles than any other assault support aircraft in the history of military operations. As we move into Afghanistan later this year, and we are required to cover a larger country than Iraq, with Marines spread out even farther, cut off from one another and on foot in the equivalent of the Rocky Mountains, this aircraft will not be just a nice new capability: it will be a crucial, critical necessity that saves lives and wins battles.

I have sent my staff around the world to speak with infantry battalion commanders and their message is remarkably similar to that of our pilots: get more of these assets into the fight. Our logisticians, infantry officers and our Marines have now seen what the Osprey can do; they have flown in the back of it; they have run down its ramp into landing zones in combat. They know that this

capability means they can move three times as many Marines five times farther and twice as fast as they could move those same Marines even in the world's most advanced conventional helicopters. They know that as they transit to the objective, they are flying as high as 13,000 feet, out of the range of the rifle fire, heavy machine gun fire, rocket-propelled grenades and man-portable air defense systems that are the weapons of choice of both the irregular insurgents and the conventional soldiers who intend to do us harm. The infantrymen in the back of the aircraft, those 19-year-old riflemen whose well-being is the focus of the Commandant's vision and mine, are getting where they need to go in half the time, and the majority of the flight takes place in an altitude sanctuary – well above the prevalent ground threat.

Like other types of aircraft in the early operational phase of their life cycles, the MV-22B has experienced lower-than-desired reliability of some components and therefore higher operations and support costs than predicted. However, these challenges are not unique for a program at this stage of its existence. Aircraft like the F-14, H-53E, UH-60 and F/A-18, platforms we later considered to be extremely successful "legacy" performers, all once went through similar growing pains and both time and a concentration of resources were required to bring about the desired improvements. The only thing that's different is that these examples - unlike the Osprey – all flew their first years at a slow and controlled rate of increasing hours, in a peacetime environment, and under highly controlled operational conditions

The average mission capable rate for the 12 MV-22's that deployed to Iraq for 18 straight months was 63%. This readiness rate represents the percentage of time each aircraft was free from any downing discrepancies on a 24-hour clock. Assessed in another way, our deployed Ospreys averaged well over 70% aircraft

available and "ready for tasking" at the commencement of each Air Tasking Order (ATO) day. This level of reliability is less than our desired goal, but it is important to note that the MV-22 still accomplished all assigned missions while operating in combat while exposed to the harshest desert conditions in the world.

The difference between the desired and observed mission capable rates in the initial stages of any new aircraft program is typically the result of the fact that spares are purchased to support failure rates based on predicted engineering analysis rather than on actual historical data. When errant predictions occur, as they inevitably do, the impact is a higher than expected demand on spare parts versus repaired parts, thereby driving up the burden on the logistics system, increasing costs, and decreasing availability. With half of its total program flight hours logged in the past two years and 80% in the last four, Osprey is just now building the historical trends that will enable accurate sparing and the increased depot level capacity that will drive down costs and increase availability on the flight line.

With the arrival of the Joint Strike Fighter just three short years from now, our operational commanders will be able to combine the effects of two transformational aircraft – the MV-22 Osprey and the F-35 Litening II - with the remainder of our aviation combat element to unleash a tempo, agility and speed of action that has never been possible in the past. Regardless of the future threats we will face, our unwavering mission remains to be the Marine Corps' aviation force in readiness across the full spectrum of combat operations. My pride in the accomplishments of our Marines, past and present, and the staying power of our military families is only exceeded by my confidence that we are properly poised to meet our future challenges.

Thank you for this opportunity to speak with you today. Colonel Heckl, who is one of our combat veteran MV-22 squadron commanders, and I look forward to answering any questions that you may have.

[Mr. Chairman, I have provided a written statement, and request that it be entered into the record.] .

Chairman TOWNS. Colonel Heckl.

STATEMENT OF LIEUTENANT COLONEL KARSTEN HECKL

Colonel HECKL. Sir, good afternoon. I am just here to answer questions. I have no opening statement, sir.

Chairman TOWNS. Thank you.

[The prepared statement of Colonel Heckl follows:]

NOT FOR PUBLICATION UNTIL RELEASED BY THE
HOUSE OVERSIGHT AND GOVERNMENT REFORM COMMITTEE

STATEMENT OF

LTCOL KARSTEN HECKL, USMC
FORMER COMMANDING OFFICER OF VMM-162

BEFORE THE

HOUSE COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

ON

UNITED STATES MARINE CORPS

MV-22B OSPREY PROGRAM

MAY 21, 2009

NOT FOR PUBLICATION UNTIL RELEASED BY
HOUSE OVERSIGHT AND GOVERNMENT REFORM COMMITTEE

Chairman Towns, Congressman Issa and distinguished Members of the committee, my name is Lieutenant Colonel Karsten Heckl. I was the commanding officer of VMM-162 from 31 August 2006 to 24 October 2008. During that time, I deployed my squadron to Iraq from March 2008 to September 2008. I have been with the program since 1999 and have over 400 hours in the aircraft. I thank you for the opportunity to be here today and I look forward to the opportunity to speak to the committee regarding my operational experience and the operational employment of the MV-22B.

Chairman TOWNS. Dr. Rivolo.

STATEMENT OF ARTHUR REX RIVOLO

Mr. RIVOLO. First, let me just say that I am not representing any organization. I have terminated my relationship with the Institute for Defense Analyses. I am here strictly as a private citizen.

Mr. Chairman, members of the committee, good afternoon. The V–22, conceived as a transformative technology 30 years ago, promised extensive new capabilities. Today, the aircraft, 30 years later, is operational with both the U.S. Marine Corps and the U.S. Air Force, but the promised capabilities have failed to materialize.

This much-awaited transformative aircraft has, in my opinion, turned out to be a disappointment, falling well short of its design goals. Additionally, two technical issues, order rotation and maneuverability in helicopter mode, make the V–22 problematic in a combat environment. I will address these issues one by one.

The design shortfall and load-carrying capacity has resulted in a compromise in the configuration and the construction of the V–22. As a result, the aircraft fails to meet the requirements for the critical "50 nautical mile, 10,000 external load" mission if all the safety operational requirements are imposed. In operations at high-density altitude, both the MV and the CV–22 have little or no capability above 8,000 feet density altitude, and such density altitudes are common and tactically relevant in the Afghanistan theater of operations.

In many operational situations today, the Marine Corps would have to call on their few CH–53s or on the U.S. Army's CH–47s to meet mission requirements. Similarly, the CV–22 called upon to conduct noncombat evacuation operation of an embassy in Kabul on a hot day would have no more than about a 60-nautical-mile range, once lifting out of the compound with a full complement of 24 evacuees. Any mitigation alternatives would include much-higher-risk operational options or the use of H–53s.

The inability of the V–22 to safely autorotate, now firmly established, has serious implications. The V–22 would fail to meet basic air worthiness directives of the FAA if it were a civilian transport.

Despite this, the U.S. Marine Corps leadership has shown little or no concern over this issue and has no problem requiring young men and women to ride as passengers in the V–22 under combat operations. I believe that this is reprehensible. It is a stand that the Marine Corps leadership should never have taken. And, by passive consent, the acquisition executives of the Department of Defense and the Congress are essentially in that same category.

The V–22 is susceptible in a combat environment to autorotation because of its design and because of its vulnerabilities. The conscious disregard of this substantial and unjustifiable risk qualifies as reckless behavior, in my opinion in the legal sense, on the part of these entities. The significant lack of maneuverability in turning and change in altitudes while in helicopter or conversion mode makes the V–22 susceptible to hostile fire while on approach to landing.

All operational testing of V–22 conducted to date has been scripted; that is, conducted without any opposing so-called "red forces" to add the element of surprise—essentially, a nonthreat en-

vironment. As a result, no data on the ability of V–22 to evade hostile fire while on approach to a landing zone are available.

Proponents argue that V–22 has been combat proven, given its operational experience in Iraq. This, I believe, is either delusional or disingenuous. The V–22 mission in Iraq was largely one of combat circulation. It is a euphemism for logistical support of carrying passengers and cargo from base to base in bus route fashion. Combat assault, the mission for which the V–22 was designed, remains unproven under realistic conditions.

Despite the rhetoric heard over the past 5 years about how V–22 is the ideally suited aircraft for combat operations in Afghanistan, the aircraft has not been deployed into that theater to date. One could speculate on the reasons for this, and I will not at this point.

Thank you for giving me the opportunity to testify. I am prepared to answer any questions. And, if I could, may I have my written testimony placed into the record? Thank you.

Chairman TOWNS. Without objection, your written statement will be included in the record.

[The prepared statement of Mr. Rivolo follows:]

Testimony of Arthur Rex Rivolo before the House of Representatives, Committee on Oversight and Government Reform

23 June 2009

From June 1992 to March 2009 I was the principal analyst for the MV-22 and CV-22 at the Institute for Defense Analyses (IDA), a nonprofit organization supporting the Office of Secretary of Defense, Director of Operation Test and Evaluation. In that capacity I have independently analyzed and evaluated extensive flight test and engineering data of the V-22, participated in engineering discussions with US Navy and Bell-Boeing engineers, participated in test planning working group meetings, observed flight testing, and flown as an observer aboard V-22s during routine operational missions and during official flight evaluation periods. On 13 March 2009 I terminated my employment at IDA and have since severed all relations with the organization. I am here as a private citizen expressing my personal views.

The V-22, conceived as a "transformative technology", three decades ago promised extensive new capabilities for the US Marine Corps and US Air Force special operations war-fighting missions. Today, thirty years later, the aircraft is operational with both the US Marine Corps and the US Air Force, but the promised capabilities have failed to materialize. The aircraft has fallen well short of its design load carrying capability. Additionally, two technical idiosyncrasies make the aircraft problematic in a combat environment. This much awaited, transformative aircraft has, in my opinion, turned out to be a disappointment, falling well short of its design goals. I will address these three critical issues in some detail.

1. Limited Load-Carrying Capacity

The load-carrying issue can be summarized in the chart shown in Figure 1.

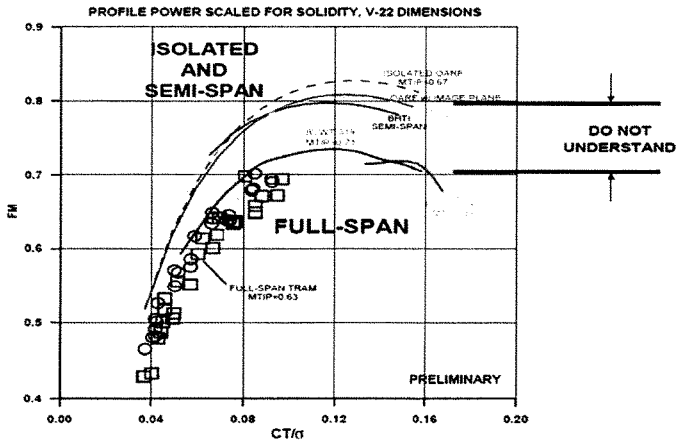

Figure 1.

The chart was presented at the Tiltrotor Aeromechanics Phenomena Conference held at NASA's Ames Research Center in 2001 following the crash of an MV-22 at Marana, Arizona.

Although the chart is highly technical it serves to illustrate the fundamental shortcoming. The graph is essentially a plot of rotor efficiency (vertical axis) verses rotor thrust (horizontal axis). What the chart shows is that the actual V-22 performance (shown by the orange line) falls well short of the design value (upper curves labeled "ISOLATED AND SEMI-SPAN") especially at the higher power levels. In addition, this difference is apparently not understood by the designers as noted by the "DO NOT UNDERSTAND" notation between the two lines indicating the difference between the expected value and realized value. This difference in rotor efficiency amounts to about 6000 pounds in load-carrying capacity.

This load-carrying shortfall has resulted in many compromises in the aircraft configuration and construction. For example, the requirement to be able to operate in a chemical, biological, and radiological (CBR) environment without the need for aircrews to wear bulky garments and respirators was compromised because the required overpressure to maintain positive air outflow in the aircraft would require strengthening the fuselage skin panels at the cost of increased weight. A second example is the decision not to replace all drive shaft segments, currently made of fire-susceptible composites, with titanium or steel because the weight increase would prevent meeting the critical mission requirements.

Despite all the compromises, V-22 still fails to meet the requirement for the critical 50 nautical mile, 10000 pound external load mission if all safety-related operational requirements are imposed. These safety requirements include landing with out-of-ground-effect hover power plus a 10% power reserve (margin) and a minimum landing fuel reserve. The practical implications of this shortfall are small as 40 or even 30 nautical miles capability for this mission could easily be compensated for by USMC commanders in the field. However, more compromising implications of the shortfall in the V-22 lifting capacity can be seen in other mission areas.

In mountain operations at high density altitudes, both the MV-22 and CV-22 have little or no capability above 8000 feet, density altitudes that are common and tactically relevant in the Afghanistan Theater of operations. As a practical example, consider a CV-22 conducting non-combatant evacuation operations (NEO) from the US Embassy in Kabul, Afghanistan on a hot summer day. Given the layout and location of the Embassy compound in Kabul, a CV-22 would require out-of-ground-effect hover power for a safe landing into the compound. Operational safety considerations imposed by Air Force regulation will require that an additional 10 percent power be available as a safety margin and further, that the aircrews calculate power available under the assumption that the engines are putting out 95 percent of rated power because of wear and tear.

Under these conditions, a CV-22 taking 24 personnel out of the Embassy compound would have enough fuel to travel about 60 nautical miles before requiring refueling. Alternatives to this are: taking a smaller number of personnel on the evacuation, landing outside of the Embassy compound in a place that allows landing without the safety power margin requirements (e.g., roadway, open field, etc.), or having

airborne or ground tankers available for refueling. All of these would significantly increase risk to the mission and make demands on available assets. By contrast, a CH-53E, an aircraft considerably lighter than V-22, under the same conditions could carry the same 24 evacuees over 400 nautical miles or take 35 evacuees to a distance of 250 nautical miles.

I turn now to two idiosyncrasies of the V-22 design that make the aircraft, in my opinion, problematic in a combat environment. The first is the inability of V-22 to safely enter into or recover from an autorotative descent. The second is a controllability and maneuverability issue due to the side-by-side rotor configuration design of V-22, and the implementation of a control system whereby a flight control computer, rather than the pilot, determines how much flight control input should be made. These render the V-22 incapable of the aggressive maneuvers needed for evasion of hostile fire while in conversion or helicopter mode. The only evasive maneuver available to the V-22 is a rapid conversion to airplane mode while maintaining heading. This is clearly problematic if the threat (missiles or bullets) are coming from the front quarter, which is usually the case.

2. Lack of Autorotation Capability

Autorotation is a helicopter's version of gliding. All helicopters have the ability to glide safely to ground following a complete and abrupt interruption of power caused by either engine(s) failure or by the deliberate removal of power to the rotors by pilot action necessitated by failures within the drive system of rotors, or failures within the rotors themselves. The inability of V-22 to safely autorotate has now been acknowledged by the manufacturer and the US Marine Corps, but little significance has been given to the implication this raises, which is – *the V-22 would fail to meet basic airworthiness requirements by the FAA regulation if it were a civilian transport aircraft*. Despite this, the US Marine Corps leadership has shown no concerns over this issue and has no problem requiring young men and women to ride as passengers in the V-22 under combat conditions.

Although airworthiness requirements of the FAA do not apply to military aircraft, equivalent requirements have been imposed on all passenger-carrying military aircraft in the past. The V-22 represents the first departure from this policy within the Defense Department. In my opinion, this represents a cynical disregard for soldiers' lives in favor of supporting a blind allegiance to the cause of this aircraft. The adoption of this reprehensible stand by the Marine Corps leadership, as well as by the Defense Department acquisition executives and the Congress, via their passive consent, makes these parties complicit in any future V-22 combat loss where autorotation could have saved lives. I believe this conscious disregard of a substantial and unjustifiable risk qualifies as reckless behavior in the legal sense.

The V-22 proponents who argue that V-22 is capable of making a safe all engine out landing by converting to airplane mode are either fooling themselves or willfully distorting the facts. The V-22 requires 12 seconds to convert from helicopter mode to airplane mode. In this interval, when both engines are inoperable or one engine has failed along with the interconnecting drive shaft, a V-22 will lose about 1600 feet of altitude under ideal conditions (i.e., no pilot errors.) Thus, any complete power failure while in

helicopter mode below 1600 feet above the ground will result in a catastrophic loss of the aircraft.

Additionally, the conversion process is so dangerous that the pilot's flight manual for the aircraft instructs (not recommends) pilots *not* to attempt conversion if the failure occurs while the nacelles are at or above 60 degrees regardless of altitude. Thus, in this case the flight manual, inexplicably, instructs pilots to enter autorotation, irrespective of altitude, knowing full well that the aircraft cannot safely autorotate.

3. Lack of Combat Maneuvering Capability

The V-22 is flown by a flight control computer – not the pilot. The pilot merely asks the computer for a given change of flight path, and the computer obliges by applying the necessary aerodynamic inputs to generate the requested change. Under near-equilibrium flight conditions, i.e., straight and level flight, steady turns, climbs, and descents, etc., the pilot's request and the computer's response are nearly simultaneous and the delivered inputs are exactly those requested by the pilot. However, under non-steady state conditions such as during evasive maneuvering, entry into autorotation, or unusual flight conditions such as vortex ring state, the flight control computer will attempt to protect the aircraft from structural overloads and other dynamical limits such as the flapping of the rotors (rotor disk not perpendicular to spindle shaft) by not producing the commands requested by the pilot's controls positions. This tends to significantly reduce the severity of any hard maneuver commanded by the pilot - the goal of evasive maneuvering.

The fact that the pilot has enough control authority to damage the aircraft during hard maneuvering is the reason why the flight manual places restrictions on how much flight control inputs can be used during evasive maneuvering. That a pilot actually has enough control authority to "break" the aircraft is unique to V-22. Concerns over this issue in V-22 have resulted in a significant decrease in the amount of control authority given to the pilot, making the aircraft less and less maneuverable. Key tests of combat evasive maneuvering scheduled in 2002 remain, to my knowledge, to be completed. Sending V-22 into real combat situations without the completion of these critical tests is, in my opinion, irresponsible.

Proponents argue that V-22 has been "combat proven" given its operational experience in Iraq. I cannot agree with this position as the mission in Iraq was largely one of "combat circulation", a euphemism for the logistical support of carrying passengers and cargo from one base to next in bus-route fashion. Combat assault, the mission for which V-22 was designed, remains unproven under realistic conditions. A deployment to Afghanistan would certainly serve that purpose but the risks associated with such a mission and the lack of lift capability in the Afghanistan Theater would seem to preclude such a deployment. Indeed, despite the rhetoric heard over the past five years about how V-22 is the *ideally* suited aircraft for combat operations in Afghanistan, the aircraft has not been deployed into that Theater to date. One could speculate on the reasons for this. I believe the principal reason is that operators and decision makers fully understand the risks involved both operationally and politically.

Concluding Remark

I have chosen to discuss what I consider the three major issues concerning operational effectiveness of V-22 in combat operations, as I deem these critical to the future of V-22 as a combat system. I have not discussed readiness and reliability or direct operating costs as I do not have access to recent data. However, I am well-versed in the history of these issues and I was in Iraq during the first deployment of the MV-22 and did manage to glean some information about day-to-day operations. I am prepared to answer any questions members of the Committee may have on these subjects.

Chairman TOWNS. Let me thank all of you for your testimony. And let me begin with you, General Trautman.

I understand there are no Ospreys currently in Iraq. If this is an aircraft that is so valuable, why isn't it being used?

General TRAUTMAN. Sir, we had Ospreys in Iraq for three successive deployments. As you know, at this point, Marine Corps operations in Iraq are starting to draw down. The situation in Al Anbar since October 2007 has been significantly changed, and the Marine Corps is turning its attention to focus on Afghanistan.

But the small number of squadrons that we have, we have only been able to have one squadron deployed at a time up until this point. By the fall, we will be able to have two squadrons deployed from North Carolina, and we look forward to having one squadron onboard ship and one squadron in Afghanistan by the fall.

Chairman TOWNS. Is it the troops or is it the Osprey that has the problem? You indicated you pulled them out, but the point is, is it the problem with the troops or problems with the Osprey?

General TRAUTMAN. No, sir. It is a success of the mission. The Al Anbar battlespace has successfully been transformed by the actions of multinational force west over the past 7 years. The Marine Corps forces in Al Anbar are drawing down at this point and we are reducing our force structure there commensurately, so we are bringing out AV–8s, we are bringing out attack helicopters, we are bringing out heavy-lift helicopters, and we brought out the V–22 Osprey.

So there is no problem. This is a success story, Mr. Chairman.

Chairman TOWNS. In your written testimony, you state that the Marine Corps has accepted delivery of 91 Ospreys. On June 2, 2009, your boss, the Commandant of the Marine Corps, told the House Appropriations Subcommittee on Defense that the Marines have 90 operational aircraft. However, we know that many of the Ospreys are not ready for combat. We also know that the Marines have had to cannibalize some of those Ospreys for spare parts.

Isn't it true that only 47 Ospreys are even theoretically combat deployable?

General TRAUTMAN. Mr. Chairman, we have a training squadron composed of 20 Ospreys that we would not deploy. This is a place where new pilots are shown how to fly the Osprey. We have four Ospreys in HX–21. This is a test squadron. We have five Ospreys in VMX–22, another operational test squadron. And so we have stood up a total of four squadrons, and we are in the process of standing up our fifth as airplanes are delivered.

Chairman TOWNS. So the answer is "yes?"

General TRAUTMAN. I was trying to describe the situation with regard to the Ospreys that are in the fleet. I am not sure what question the chairman is——

Chairman TOWNS. Let me move on then. I think it was "yes" you answered.

Isn't it also true that of that number, on a good day fewer than half of those are ready for combat?

General TRAUTMAN. No, sir. Typically, we have established about 63 percent operational readiness within the fleet by one measure, which measures every second of a 24-hour period.

Another measure, which is what we call "ready basic aircraft," which is the number of aircraft that are ready for tasking on a day when the air tasking order begins, we are actually in the low 70's—which is not acceptable, but it is not nearly as you describe, sir.

Chairman TOWNS. Let me go at this another way.

If the Commander in Chief, President Obama, asks the Marines to deploy today for a new special combat mission at a high-threat environment, how many Ospreys would be fully mission capable and ready to deploy to combat?

I am looking for the answer here. Go ahead.

General TRAUTMAN. In the mid-40's, sir. There are four squadrons of 12, so four times 12 is the number, sir.

Chairman TOWNS. I didn't hear you.

General TRAUTMAN. We have four operational squadrons of between 10 and 12 airplanes. So it is in the mid-40's. Approximately 45, 46, 47.

Chairman TOWNS. Let me switch to you, Mr. Sullivan.

Isn't it true that the Osprey is incapable of performing in the way it was originally intended?

Mr. Sullivan.

Mr. SULLIVAN. Well, we looked at how it performed in Iraq, first of all. So it is true that it was not able to complete the full envelope, the performance envelope that it was intended to perform in. However, it also wasn't asked to do all that in Iraq, mostly because there are things it can't do yet that they know it can't do.

Mr. CUMMINGS. Let me come back to you, General. Thank you, Mr. Sullivan.

If it will not perform in hot areas, it will not perform in cold areas, what do you need it for?

General TRAUTMAN. Mr. Chairman, perhaps I can have Colonel Heckl. He commanded a squadron through the hottest environment in the Middle East that I have ever encountered. He could probably talk to that question.

Colonel HECKL. Sir, I deployed my unit over there in March 2008 and we departed in October 2008. Some of what I have heard here today—I didn't have any prepared statements, but what I have heard here is kind of disturbing. Some of this is just blatantly inaccurate.

I don't agree with a single thing that Mr. Rivolo said.

I was over there, sir. We had days every day over 120 degrees. I don't know how much hotter anybody would want it to get. We had more dust storms. The wing, Third Marine Aircraft Wing, commanded by then-Brigadier General Alles, estimated they lost more than 10,000 flight hours due to weather, it was so severe. So it has operated in extreme heat. Extreme heat.

The hostile fire thing, you know, I assume everyone here is aware that we classify zones based on color code—green, red, black, yellow zones. We flew into black zones. As a matter of fact, the squadron that I replaced flew Senator McCain into a black zone in the middle of the day. That is as high a threat as it gets.

The maneuverability: This is an old discussion for Mr. Rivolo, proven years ago to be wrong. The demonstration is not scripted. And anybody that has flown into Baghdad International Airport under night vision goggles, knows how maneuverable the airplane

is. All you have to do is do a whiskey transition over to Liberty Pad, and you know how maneuverable the airplane is. It is blatantly false.

And last, the ability to operate—well, we already talked about the ability to operate in the heat. Again, I had the squadron over there for the entire summer, and we had temperatures well in excess of 120 degrees every single day.

Chairman TOWNS. I think it is appropriate that I allow Dr. Rivolo to respond, because I think you did call his name.

Dr. Rivolo.

Mr. RIVOLO. Everything the colonel said is correct. I mean, they did operate in 120-degree weather constantly in a pretty much sea-level environment.

My criticism is that at high-density altitudes is when the problems will arise. And that is also having to do with maneuverability. The problems only exist under certain conditions, but they happen to be conditions that are tactically relevant certainly in Afghanistan. The aircraft performs brilliantly at sea level. No one doubts that.

Chairman TOWNS. GAO, what did you find? Because there seemed to be some questions in terms of its ability to perform. I mean, did you find this as well?

Mr. SULLIVAN. I might let Mr. Clark fill in where I have gaps.

But I believe what we found is that it was—when it was over in Iraq with the three squadrons, it was for the most part limited to low-threat environment because of maneuverability problems or restrictions that they have that I believe they have in—even in the flight manuals themselves, right?

And maybe Mr. Clark can fill in some of the gaps here.

Mr. CLARK. Mr. Chairman, when we did our work, we looked at the flight manual which is considered the NATOPS manual, and according to that manual, the aircraft is prohibited from conducting air combat maneuvering or defensive maneuvering issues. So if Mr. Rivolo is saying that is an essential element in terms of survivability, according to that manual it's something that the aircraft is, they're prohibited from doing.

In terms of operating in the environments that we were talking about, we relied on the after-action reports that you, I believe, had asked for, and of course, we interviewed the unit that had deployed, the first unit that deployed and interviewed personnel from that unit. But those after-action reports of the first unit and of the unit, the third unit that was in Iraq, talk to issues that they had problems operating in the desert environment, talked to problems that the aircraft had in operating in terms of the heat. And I think the capability rates seem to reflect some of those problems if you looked at it on the months, in terms of the hotter months, would be a lower capability rates versus the cooler months. So there were those issues there that we did identify.

Chairman TOWNS. My time has expired. I yield to the gentleman from California, the ranking member.

Mr. ISSA. Thank you, Mr. Chairman. And I share the committee's entire concern that we want our Marines to have the best assets for each and every mission. I would like to go through a couple of quick questions, and I hope you'll indulge me if I ask that they be

as quick as possible. General Trautman, I understand that you're a Marine aviator, but isn't it true that the reputation of the C–5 is any time it lands it doesn't take off again for a long time? Just reputation, just something you may have heard over your years.

General TRAUTMAN. Yes, sir.

Mr. ISSA. And isn't it incredibly a cost overrun aircraft and expensive to maintain; and isn't it true that it no longer does any mission that is unique to the C–5, at least in the unclassified world?

General TRAUTMAN. I'm not qualified to answer that, sir.

Mr. ISSA. But it's a big airplane that only carries one tank, if you remember that part of it.

General TRAUTMAN. Yes, sir.

Mr. ISSA. It happens. Now the AV–8B, the B implying that it ain't the first, it killed a lot of Marines and some British aviators before they got it right, isn't that true?

General TRAUTMAN. Yes, sir.

Mr. ISSA. And isn't it true that as far as I know, we haven't had a single mission, as unique an aircraft as it is, that only that aircraft could do in a combat environment leading to a successful battle, in spite of the fact they worked the bugs, and it's able to do a mission that no other jet can do.

General TRAUTMAN. That's right. It's performing exceptionally well in Afghanistan today.

Mr. ISSA. OK. So we can have a really great aircraft that meets its requirement, and we may not have a war exactly suited to that requirement at the time that it's in the field; isn't that true?

General TRAUTMAN. The Marine Corps is worldwide deployable and has to be ready across the full range of military operational requirements.

Mr. ISSA. I'll ask you the one softball. If, in 1979, when we were trying to rescue our people in Tehran that had been taken hostage, in violation of all international law, what would have been different it that mission if the Osprey had been the primary aircraft?

General TRAUTMAN. It would have been a successful mission and we probably wouldn't be where we are with Iran today, Mr. Issa.

Mr. ISSA. Because it could have flown, self-deployed, flown nonstop and, in fact, been able to hit the target without the cluster that occurred in the desert.

General TRAUTMAN. We would have gone directly to the stadium. Delta Force would have come out in the stadium and carried out the mission as described. It wouldn't have been a 2- to 3-day evolution of landing in the desert and having the situation that occurred.

Mr. ISSA. Colonel Heckl, you've flown other rotor wing aircraft; is that correct?

Colonel HECKL. Yes, sir. My background, about 3,000 hours in CH–46s my whole career. And I flew in OIF 1 back in 2003 when we went into Iraq in the beginning, I was a 46 pilot.

Mr. ISSA. Well, I'm not nearly as qualified a pilot as you are, but isn't it true that all aircraft lose lift at high density altitude, basically a hot day, hot, humid day, the higher you are and the hotter it is, the more likely you are in a fixed wing to need a longer runway or a rotor wing to simply have to carry less on take off?

Colonel HECKL. Absolutely, sir. And that's one reason in Operation Tora Bora in the fall of 2001, 46s weren't even taken ashore.

Mr. ISSA. Because in fact——

Colonel HECKL. It could not perform.

Mr. ISSA. The high altitude there is a challenge to almost any helicopter made in the world.

Colonel HECKL. To every helicopter, sir.

Mr. ISSA. OK. And in your estimation, having flown the Osprey, with further development over time, can we, in fact, increase the at-altitude lift-off capability, just based on the record of rotor wings?

Colonel HECKL. There's no doubt about it, sir. Absolutely.

Mr. ISSA. So, in fact, even though a little bit like the AV–8 and a little bit like most of our other helicopters, generation one usually don't do as well. I'm a guy who was one of a four pack in a Huey every time it took off on a hot day at Ft. Riley. And by the way, that's close to sea level, but that was about all we could carry in a UH 1.

Colonel HECKL. Yes, sir. And like you said, an AV–8B, when I left the CH–46, we were on CH–46 Echo.

Mr. ISSA. OK. I'm going to ask you the tougher questions now, and I am concentrating to a great extent on you two in uniform, partially because some of the rest of you are more available to me all the time. Isn't it true though that in fact, many of the missions that we're doing in Iraq and Afghanistan we, in fact, can do with other rotor wing aircraft?

Colonel HECKL. Sir, I'll tell you, that you could do with other aircraft?

Mr. ISSA. Yeah. Many of them.

Colonel HECKL. Yes.

Mr. ISSA. So when the GAO talks about perhaps a smaller fleet or a mixed fleet, that is something this committee should look at tasking consideration of, just consideration of whether or not the mix is right.

General.

General TRAUTMAN. Well, yes, sir. And the Commandant does that routinely. Let me take you back 3 years when the decision was made to increase the size of the Marine Corps from 175,000 to 202,000. We did a thorough analytical look at what the aviation combat element of the Marine Corps should look like at the larger size. We looked at the Osprey and we saw that it performed at four times as well as the CH–46. But we also saw that we needed additional assault support assets. So what we did is we decided to grow the size of our CH–53 fleet from six to nine active squadrons, and the size of our light attack helicopter fleet, which includes the UH 1 Yankee, a middleweight lifter that will round out the B 22 perfectly in the context of the aviation combat element. And we increased our HMLA from six to nine.

Coming out of that deep dive, the Commandant and I are absolutely certain that we have it right today. But each and every year I publish, under the Commandant's name, an aviation plan, and we do retrospective thinking, introspective thinking, pardon me, about where we should go with our Marine Corps to provide the best force for the Joint Force Commander in an every changing world.

Mr. ISSA. In my opening statement I mentioned TASVAL back in the 1970's, and the recognition that at least at that time the systems aboard the A10 were not the best for killing tanks of the aviation assets we had in the field. There were changes made afterwards.

Do you welcome a similar test of all of the fixed and rotor wing assets, periodically, by the military, by either joint or a particular branch, in order to determine whether or not the mix is right and the assets meet the requirement as offered in real instrumented type combat situations where we can computerize and oversee, if you will, whether pilots and assets do what they say they'll do?

General TRAUTMAN. Sir, not only do we welcome it, we pursue it. Twice a year, the Marine Aviation Weapons and Tactics squadron based in Yuma, Arizona, performs a weapons and tactics instructor course, where we bring the most capable aviators in the Corps and other services, bring them together, do quite a bit of instrumented training and testing, and that's how we develop the ideas that enable us to go forward.

Mr. ISSA. Thank you. Thank you, Mr. Chairman.

Chairman TOWNS. I now recognize the gentleman from Massachusetts.

Mr. TIERNEY. Thank you, Mr. Chairman. Mr. Sullivan, according to your report, this V–22 is still having problems with unreliability on component parts?

Mr. SULLIVAN. That's true, yes.

Mr. TIERNEY. Can you explain that a little bit for us.

Mr. SULLIVAN. What we've found over in Iraq was that, despite the fact that they had taken more than the usual complement of spare parts that they would usually take, they were running out of parts, having to cannibalize other V–22s. And when we looked at the parts specifically, we found that there were 13 critical parts that were just not lasting long at all. In fact, as I stated in my opening statement, about 30 percent, they're getting about 30 percent of the usual time out of those. And in addition to that, the supply chain, the vendor supplying the parts, that's a very immature supply chain at that part, and they were having problems with that as well.

Mr. TIERNEY. Thank you. So General Trautman and Colonel Heckl, you don't dispute that, do you?

General TRAUTMAN. No, sir. I don't dispute that all. In fact, it's quite typical of other platforms that have reached about the 50,000 to 55,000 hour mark. The F14.

Mr. TIERNEY. You already testified that you have low aircraft availability, lower than you would like and lower than would be estimated as ideal.

General TRAUTMAN. Lower than ideal, yes, sir. That's right.

Mr. TIERNEY. So we have a plane here that in 1986, when they estimated at what would be 2009 dollars, we were going to get 1,000 of them over 10 years at $37.7 million each. Now we're looking at some projections, we're going to get less than 500 over 10 years, at about $93.4 million each, which is a pretty sizable thing. What caused that overrun, General?

General TRAUTMAN. Well, sir, the actual non-recurring flyaway cost of the Block B MV–22 in fiscal year 2009 is $64 million. Cost

increases, yes, sir. The cost increases throughout the years have been somewhat troubling. Projections in the 1980's for this platform, as well as other platforms, as some of the Members have pointed out, have not come to fruition. But $64 million a copy is much less than things like a Super Hornet, which are in the mid 80's.

Mr. TIERNEY. As my mother used to say, if everybody jumped off the Brooklyn Bridge, would you? That other programs had a problem, I don't think, diminishes the exact problem that we're dealing with on this one.

Let me ask you, have any of the contractors been fined, or at least not given their bonus as a result of this?

General TRAUTMAN. They haven't been fined, to my knowledge. There are incentive fees that have been either given or withheld throughout the years, and I'm not—I can get that for you in a follow-on.

Mr. TIERNEY. Mr. Sullivan, do you have any information on that?

Mr. SULLIVAN. I don't, but we'd be happy to look into that too.

Mr. TIERNEY. I'd very much appreciate if you do that; whether somebody's being held responsible for this. This is a 20—how many years program are we talking about here? 1986 we were going to get 1,000 at $37.7 million. We didn't have them in 1996, we didn't have them in 2006, we still don't have them today.

Mr. SULLIVAN. Right.

Mr. TIERNEY. So the V–22 Rolls Royce engines, well, one-half to two-thirds of their expected life span is all that we're getting out of them. Yet General, I understand that the Marine Corps has contracted to buy even more of the same engine. Negotiated a new engine sustainment with Rolls Royce that includes numerous exclusions. So who made that decision?

General TRAUTMAN. The decision is made by service acquisition executives, and I contribute to that.

Mr. TIERNEY. It's not just one person; it's a whole bunch of them that make that kind of decision?

General TRAUTMAN. No, the service acquisition executive in the Department of the Navy makes the ultimate decision.

Mr. TIERNEY. Who would that have been that made that decision?

General TRAUTMAN. Research development acquisition, Assistant Secretary of the Navy.

Mr. TIERNEY. So they apparently think if you're getting half to two-thirds of the expected life span of an engine is something that they ought to reward with an additional contract.

General TRAUTMAN. I believe it's a very wise decision with this performance-based logistics contract that we have with Rolls, the V–22 never goes without an engine. I wish I had a similar situation in other type model series.

Mr. TIERNEY. Could you describe for me the exclusions that are made in that contract for the additional engines and what the reasons are for those exclusions.

General TRAUTMAN. I'm not sure the contract has been negotiated. You're talking about the performance-based logistics contracts that are being negotiated now? The negotiations are not complete.

Mr. TIERNEY. The sustainment contracts that they've been negotiating with Rolls Royce.

General TRAUTMAN. One example would be if the engineer particle separator is not working adequately, I think that's excluded.

As you said, we're negotiating this year, and we don't expect to finish negotiations until December timeframe.

Mr. TIERNEY. Is it possible to have another supplier proceed an engine that would require significant design changes and thus, I suppose would cost more but at least might work better?

General TRAUTMAN. At a significantly increased cost and detriment to the program, there's a possibility we could go in another direction if the performance-based logistics negotiations don't go the way we desire, that's something that's on the table, of course.

Mr. TIERNEY. So, it just sounds to me, General, that we're talking about having a choice. We can either pay for underperforming engines, or start over again and pay even more for engines that are designed properly.

General TRAUTMAN. Well, the engines are staying on about 600 hours, which is typical of other similar airplanes operating in that austere, challenging environment.

Mr. TIERNEY. Mr. Clark, is that the kind of response you're getting, 600 hours?

Mr. CLARK. Sir, when we looked at the data from the Iraq experience, it was not. It was less than 400. Now, again, I'm not sure if he's looking at the other aircraft not deployed.

Mr. TIERNEY. Well, General, let's talk about deployed aircraft then. Are you disputing Mr. Clark's testimony that you get less than 600 hours?

General TRAUTMAN. I'm not disputing. I'm saying that it's about 687, as I recall, fleetwide, which means—and in Iraq I think it's approaching 500 hours. We've instituted changes that have enabled us to get up to around the 500-hour mark.

Mr. TIERNEY. You can talk faster than I can, General, but I'll slow you down a little bit. The question was, in Iraq, where the examination was done, they're not making even 500 miles, never mind 600, right?

General TRAUTMAN. Approaching 500 hours in Iraq, that's right.

Mr. TIERNEY. All right. Mr. Sullivan, what do we need to do? What does the Department of Defense and Marine Corps need to do to get this program back on track, or is there anything they can do?

Mr. SULLIVAN. You know, I think one of the problems with—most of the problems with this program are probably, you know, it's been around a long time and has taken most of its hits. At this point, it's not meeting all of its requirements. But I would agree a little bit with what the General says is that it's still relatively new. They're still doing some operational testing on it. Some of these things are growing pains that it will grow out of. However, I think that there are some inherent design features on the V–22 that are going to keep it from being the most optimal choice that the Marines are thinking they're going to have, I guess is the best way to say that. They're having, you know, you're looking at, first of all they've taken a big hit on the unit cost. So there's already, it's

going to cost a lot more than they thought to buy the remaining 280 aircraft.

Chairman TOWNS. The gentleman's time has expired. I now yield 5 minutes to the gentleman from——

Mr. TIERNEY. Can he finish his answer, Mr. Chairman?

Chairman TOWNS. I thought he finished.

Mr. SULLIVAN. I think what has to happen is, as we recommended, that they need to look at the proper role of the V–22 and a proper mix. There's a lot of things that the CH–46 and the 53s can do as well as the V–22. And I think that we think that the mix should be looked at again.

In addition, the Marines have to stay on top of these reliability issues. You know, there's obviously a problem with some of the specific parts on this, and the supply chain, and we recommended that they take a good study of that as well.

Mr. TIERNEY. Thank you.

Chairman TOWNS. And there'll be a second round. Gentleman from Maryland.

Mr. CUMMINGS. Thank you very much, Mr. Chairman. General Trautman, I listened to your testimony very carefully. You know, we had asked the Marine Corps to compile a list of incidents and mishaps involving the MV–22 since the aircraft was approved for full rate reduction in 2005. However, we discovered that many of the incidents involving the V–22 since that time were not included in the report by the Marine Corps. And General, I heard you say all these wonderful things about this aircraft. Why did the Marine Corps fail to include all of these incidents in their report to the committee?

General TRAUTMAN. Sir, I'm not sure what you're talking about. I have a June 15, 2009 information paper that was provided to the committee that, in my judgment, includes everything that has happened to the V–22 going back to 1992.

Mr. CUMMINGS. Now, when you presented that information, is that only dealing with damage to the aircraft or personnel or other mishaps included?

General TRAUTMAN. All mishaps. Category C, B and A. All mishaps are included in the documentation we provided on June 15th.

Mr. CUMMINGS. All right. And so do you consider the grounding of all your combat aircraft a minor incident?

General TRAUTMAN. Grounding of aircraft is never a minor incident; of course not, sir.

Mr. CUMMINGS. And what about the forced landings in Iraq? Are those a part of the incidents that you would have there?

General TRAUTMAN. Precautionary landings that take place, no, sir. If a precautionary landing takes place, that's actually a benefit associated with the Osprey in that a conservative pilot can land and determine what's going on in his airplane in a way that regular airplanes cannot. So no, it did not include precautionary landings, sir.

Mr. CUMMINGS. Well, our staff compared your report to the—we did a search of the Osprey and found that there were many, many more mishaps than we had reports on. So I'm sure that's just—you know, perhaps you can clear that up for us.

General TRAUTMAN. Yes, sir. We will clear that up for you, and I stand ready to do that with anybody at any time.

Mr. CUMMINGS. Thank you very much. As I sit here, I was just thinking, there's probably some things that you all agree on. But there's a cardinal question here, and that is, that Mr. Sullivan and his group have made some recommendations, and there's a question as to whether a country that is spending, is in deep economic trouble, can wait for, to work out all the kinks, when perhaps we could get something much more effective, even if it's a mix with the Osprey.

And I think what is bothering me as I sit here, just looking at it from a very practical standpoint, I think we can get so hardened in our positions that it's hard for us to see anything else. And this is just from sitting up here and observing. And this airplane, this Osprey, obviously, has some major problems.

And if I had an employee who only showed up 30 percent of the time, they could be the greatest employee in the world, but no job.

If I had somebody who I had certain expectations of that they were going to work 600 hours so and so, over a certain period of time, and they don't show up, or they're not available, what good does it do me?

And so I'm just trying to figure out, where does the defense of this airplane end and the beginning of getting what we bargained for, making sure our people are not harmed by the very things the taxpayers dollars are paying for, and getting our people, the equipment that they need?

When does that defense of the plane end and we say to the manufacturer: manufacturer, we know that you're watching C-Span right now, and we know that there are people that need jobs. Why don't you just correct and do the things that we need to be done so that we can provide the very best for the men and women who I know you love?

You've given your life for them, and I know you wouldn't just put somebody in a plane that perhaps would do them harm. I know you wouldn't.

But when you hear the testimony, it sounds like we don't end the defense and begin to say to the people who are creating this, come on now. Guys, this is America. This is the greatest country in the world. We can produce a plane that can get around the things that you all talked about. Are we that far behind?

Do you follow me, General?

General TRAUTMAN. I do, sir. And I would submit that we're doing precisely what you recommend. You know, if you go back in history and you look at the F–14 or you look at the CH–53 Echo or you look at the F–18, you will see that about the 50,000 to 60,000 hour mark, which is exactly where the V–22 is, in every case, readiness drops below anticipated predictive modeling. We are exactly where those other type model series have been, and now they're considered successful legacy performers, extremely successful performers.

We are engaged with the Naval Air Systems Command, the rest of the Naval air enterprise, and our industry partners to correct these issues that are staring us in the face. The reason we're defending the program is because this airplane will save lives. It has

already demonstrated that it will save lives. It is a positive thing for our Nation and that's why we feel passionate about it.

Mr. CUMMINGS. Thank you, Mr. Chairman.

Chairman TOWNS. Thank you very much. I now yield to the gentleman from Illinois, Mr. Quigley.

Mr. QUIGLEY. Thank you, Mr. Chairman. I think my colleague is correct. Sometimes when we have these discussions, positions get hardened and somewhat defensive. So I'd ask the General and the Colonel, looking at the other way, despite the issues of reliability and so forth, from a sheer flying point of view, what would you like this to be able to do that it doesn't do?

Colonel HECKL. Sir, to answer, I agree. I'm a 46 pilot. That's where I come from. But in reality, I'm an assault pilot. I carry Marines. I strap the airplane on, sir, and I can assure you that there's not a minute of the hundreds of hours I've accumulated in this airplane where I was concerned. Not one. As a matter of fact, when Marines die in helicopter crashes, on a, I guess I would say a regular basis, this airplane was designed from the ground up to be more survivable. There's no damage-causing mechanism, no weight over the cabin. There's all kind of things that we could discuss offline that make it more survivable that a 53, or 46, or any other traditional helicopter does not have.

All the weight is on the end of the wings. The auto rotation thing, again, addressed years ago. But I'll tell you, sir, it's the platform, the airplane did every mission. And I don't know where Mr. Sullivan and Mr. Clark were. They weren't at my deployment. I was the middle guy, the guy that did it during the heat, March to October. Didn't have a problem. I operated for 7 months filling combat line numbers and did not miss a mission.

I don't know what else we want. Do we want them, the reliability to improve? Yeah. I never want my car to break down. It still breaks down. Do I think it's going to get better? I do. But I'm going to tell you right now, sir, from an operational standpoint, which is my lane, this thing, I was 3 weeks in theater and we did a raid with Alpha company second and 504, Army guys, out of a single plane zone in Haditha, went and took down a zone that my 46 couldn't have even done.

I don't know what missions we're talking about here that it's not doing. I'm missing something, and I must have been asleep in Iraq for 7 months.

It does it all. We did cas evac, we did Medevac, we did raids. What else do you want? We moved Senator Obama from Ramahdi to Jordan, which would have taken me weeks in my 46.

So I just want to make sure you guys—because I agree with you. Let's go in to this thing eyes wide open and have an honest assessment. An irrational defense? No. But an irrational offense also.

I mean, in all honesty, the airplane performed very well. Were their areas we want to improve? Absolutely. I have some ideas that they have, about cleaning airplanes and stuff like that.

But let's not go into this thing thinking the airplane couldn't do its mission. It's not true.

Mr. QUIGLEY. I'm not trying to get you to think like that or to suggest something that you don't believe in. But on the other hand, as I said, as these positions harden it's just human nature. Some-

times it's hard to let your defenses down. And that may be, you know, taking it too far, but just telling us what you think.

I mean, for example, originally, I was told that this was supposed to have a nose-mounted Gatling gun. Is that correct?

Colonel HECKL. Sir, I think maybe it may have.

General TRAUTMAN. Let me comment on that. That was an objective, anecdotal objective early in the program and it proved to be not cost effective or technically feasible over 10 years ago.

Mr. QUIGLEY. Well, OK. With all due respect, the cost effective horse has gotten out of the fence here and is running all over the place. But for effectiveness, I guess I want to know from either one of you gentlemen, whether or not it matters in those kind of situations that this might be in Afghanistan, having a front-mounted machine gun.

General TRAUTMAN. It does matter, and so we're doing two things, sir. One is, we're upgunning the ramp-mounted weapon system from a 7.62 to a 50 caliber, and when the squadron deploys in the fall, it will have a 50 caliber weapons system.

The second thing we've done is we've partnered with the Air Force to build a defensive weapon system that is mounted on the belly of the aircraft, and it will be an all-aspect weapon system that can shoot 360 degrees around the Osprey. We finished developmental test of that defensive weapon system, and I anticipate operational tests being completed in August. And the squadron that goes to Afghanistan will be, I'm confident, will be armed with the all-aspect weapon system that we've been working on over the last few months.

Mr. QUIGLEY. I'm sorry. Could you repeat that? When will this be, this full system be implemented?

General TRAUTMAN. The developmental test is complete. We're doing some software changes, and we will do operational tests in July and August, and by September we should have a full-up, all-aspect weapons system, and we'll deploy eight of these systems with the squadron that deploys to Afghanistan in the fall.

Mr. QUIGLEY. I appreciate your candor gentleman. Thank you.

Chairman TOWNS. The gentleman from Virginia, Mr. Connolly.

Mr. CONNOLLY. I thank the chairman. Colonel, you clearly are an enthusiast for the V–22. And I take your testimony very seriously, having been in Iraq and in the combat zone.

I'm just curious. When I was in Iraq, we had a very big sand storm back in February and all helicopters were grounded. Could the V–22 have operated in a sand storm?

Colonel HECKL. Sir, I don't know if that was a staged question, because the airplane has a new capability called—it has an approach mode with a hover capability. And we actually had a case where we had an emergency leave, trying to get a Marine out. His wife had been in an accident back stateside. We had one of these sand storms which, if you were there over the summer, we had a lot of them. He was up in Wahlid, which is on the Syrian border. We were actually able to use the airplane to shoot an approach in less that a quarter mile visibility to a pad in Wahlid. The 46 would have been struggling to even make the range, sir, much less the ability to operate in that kind of limited visibility.

Mr. CONNOLLY. OK. Were you aware of cannibalization for the V–22s in Iraq?

Colonel HECKL. Sir, we cannibalized on frogs.

Mr. CONNOLLY. I cannot hear you.

Colonel HECKL. I'm sorry, sir. We cannibalized on CH–46s. We did cannibalization. It's something no commander ever wants to do with his airplanes, but sometimes, if a part isn't there and we have a mission, we will cannibalize. We tried to avoid it because it's double work on the Marines.

Mr. CONNOLLY. OK. Let me ask the General. What's it cost per copy for a V–22?

General TRAUTMAN. The non-recurring flyaway cost of a block B MV–22 in 2009 is $64 million.

Mr. CONNOLLY. Not the $90-something million Mr. Tierney referred to?

General TRAUTMAN. Well, sir, as you know, there's many ways to cut, to describe the cost of airplanes. I'm giving you a factual cost defined as non-recurring flyaway cost. Program cost, larger program costs take a different cut at the issue.

Mr. CONNOLLY. Mr. Sullivan, would you agree with that cost estimate?

Mr. SULLIVAN. I think probably what we have in our report is the $93.4 million, which represents, that's strictly an average procurement unit cost. That's basically the procurement dollars divided by the number of——

Mr. CONNOLLY. By the way Mr. Sullivan, Mr. Quigley and I have a little private bet. Where are you from, may I ask?

Mr. SULLIVAN. You'll be wrong. Chicago.

Mr. CONNOLLY. We're both right. Sorry. We heard those flat vowels. I had to ask.

Mr. SULLIVAN. But if I could just, because this is something that comes up all the time, and I'm not sure what the General's number is referring to, but it sounds to me like it would be, if you took the last, the one, the last one off the line right now, because the cost tends to decrease as they learn more, you would get the flyaway cost for the system. It sounds like that may be the number that he's quoting.

If you take the average from the first one you build to the last one, that's going to be less expensive. It would be about $93 million.

Mr. CONNOLLY. That's the average.

Mr. SULLIVAN. That's the average right now estimated, yes.

Mr. CONNOLLY. Well, General, let's just say, for the sake of argument, it's somewhere between $64 and $93 million. When you cannibalize one of those things, that's a pretty expensive cannibalization because of lack of spare parts, isn't it?

General TRAUTMAN. Cannibalization is not something that we like to do, but we do it in every type model series from time to time.

Mr. CONNOLLY. Yes, but in this particular case we have a report from the GAO that says that in this, with respect to the V–22, this is a chronic problem. It isn't an ordinary problem only in the combat zone. It's actually a chronic problem with this particular aircraft. Is that not true?

General TRAUTMAN. I don't think so. I mean, I don't think it's any more chronic or typical in this airplane than in other airplanes.

Mr. CONNOLLY. So you take issue with the GAO finding with respect to that issue?

General TRAUTMAN. No, I think the GAO probably found cannibalization and aptly criticized it.

Mr. CONNOLLY. No, no, no. With respect to the problem of reliable supply of spare parts.

General TRAUTMAN. Oh, we do. Absolutely. We do not have the availability that we desire in the V–22 today. I already said that.

Mr. CONNOLLY. And to what do you attribute that problem?

General TRAUTMAN. I attribute it to several things. The first of which is that some components are not meeting the predicted mean time between failure that engineers several years ago said that these parts should provide. And that's probably the biggest issue.

The second biggest issue is supply, range, and depth of supply and the immature nature of the platform which has just passed material support date on October 1, 2008, 1 year after we deployed it into combat. So we've ridden this airplane far harder than any other airplane that I can describe in the last 30 years. And so the combination of riding it hard, having some predictive modeling not being as accurate as we would desire, has put us in a hole with regard to availability and reliability.

Mr. CONNOLLY. I see my time is up. But if the Chair would just indulge me with one last followup to that.

But General, given what you just said, would you not agree that the cannibalization with respect to this aircraft is a little bit unusual because of just what you said; that it's not your normal cannibalization, contributing to that cannibalization we're experiencing is this problem of supply chain for spare parts.

General TRAUTMAN. I'd have to do the analysis to make sure that I was right with regard to my answer. But I would say that any time you have an airplane that isn't providing the kind of availability that you desire there have reasons for that, and I would say there's probably a connection to increased cannibalization associated with that particular problem. I think that's probably accurate, sir.

Mr. CONNOLLY. I thank the Chair.

Chairman TOWNS. Thank you very much, gentlemen. We've been joined by the gentleman from Ohio. Yield 5 minutes to him for questions at this time.

Mr. KUCINICH. General Trautman, would you be able to yield most appropriately to questions about the falsifying of maintenance records?

General TRAUTMAN. I'm not sure I understand, sir. Say that again, please.

Mr. KUCINICH. The question that deals with falsifying of maintenance records, what was the reason? Does anyone here know what the reasons were why people attempted to falsify maintenance records? Why did they do that? I know there were convictions involved, but why was that done, do you know?

General TRAUTMAN. 10 years ago no, sir. I'm not qualified to respond to that.

Mr. KUCINICH. But the culture has changed, I take it, about maintenance records, is that right?

General TRAUTMAN. Absolutely.

Mr. KUCINICH. And what is that culture today?

General TRAUTMAN. I don't think you'll find an organization that is more upstanding and forthright than the U.S. Marine Corps, sir. That's my opinion.

Mr. KUCINICH. And so the performance of the V–22s in Iraq, what is it you're feeling has been the overall record of their level of performance?

General TRAUTMAN. Their performance has been outstanding. It's done things that no other airplanes in the history of mankind could do. Its availability and reliability has fallen short of our desired ideal, but producing up above 70 percent on a daily basis, adequately allowed to perform missions that were needed to be performed in al Anbar province.

Mr. KUCINICH. Is it your judgment that they would be operationally effective in high threat environments such as Afghanistan?

General TRAUTMAN. Well, Afghanistan is not what we would characterize as a high threat environment, sir. A high threat environment in the military vernacular includes an integrated air defense system that typically includes radar directed missiles. The Afghanistan environment will be, I anticipate, very similar to the Iraq environment which we would characterize as low or medium threat. A low- and medium-threat environment has conventional weapons, small arms, rocket propelled grenades and surface to air missiles, typically infrared surface to air missiles. So in that environment, I think the Osprey will be just as effective as it has been in Iraq.

Mr. KUCINICH. Have you, yourself, had the opportunity to be in one of those V–22s on any mission fights?

General TRAUTMAN. I haven't been on any mission flights. I probably have a little over 10 hours at the controls of the airplane in fairly sterile garrison operations.

Mr. KUCINICH. Colonel Heckl, have you been in a V–22 on a mission flight?

Colonel HECKL. Yes, sir. I had command of the second squadron in Iraq for 7 months.

Mr. KUCINICH. And can you tell me what—have you ever had any operational difficulties with that in high threat environments?

Colonel HECKL. Well again, sir, by the definition, not high for us, but no, sir, I haven't.

Mr. KUCINICH. Well, in the Iraq environment, did you have any operational difficulties with it?

Colonel HECKL. No, sir. And sir, I'll just give you just a real quick anecdote. I think everybody's familiar about the CH–46 that got shot down a few years ago, killed everybody on board. It was by a surface to air missile, heat seeking missile.

One thing in this airplane, the speed, like when we would go into Baghdad, sir, regularly, which is right on the edge of a black zone, back in 2008, so there were potential for surface to air missiles. The approach mode of this airplane, we call it thermally IR cooled because you've got the power back. You're coming down at a real high rate of speed, and it's very difficult and it's proved in op eval,

very difficult for heat seeking missiles to track the airplane. And you combine that with the aircraft survivability equipment on board, and the aircraft is very survivable. Sir, I would fly the airplane into any threat environment.

Mr. KUCINICH. Is there any problem with cabin visibility?

Colonel HECKL. Sir, that's an old—the crew chief, the enlisted guys in the back have difficulty, the windows are smaller. But I will tell you, sir, to the pilots up front——

Mr. KUCINICH. What is that like, though when you're in a vehicle moving at such a high right of speed if there's a problem with cabin visibility? Does that cut down your possible response or your judgment in any way?

Colonel HECKL. No, sir. And the fact is, again, the aircraft survivability equipment on the aircraft is going to indicate any threat coming at me probably quicker than anybody in the back trying to look out of a window. It's very similar to CH–53 echo, sir. The windows are smaller than normal and they're a little bit higher, and visibility's a little more reduced.

Mr. KUCINICH. One final question, Mr. Chairman. I see my time's expired.

The V–22 was originally designed to have a gun mounted in its chin. And I understand they changed the design to have a variant mounted on the aircraft's rear ramp. Now, if you take that into consideration, what you just said about visibility, does that, in any way, compromise the ability of the craft to defend its crew in a combat situation?

Colonel HECKL. No, sir, because the nose-mounted weapon, if we'd have ever gotten it, which there was a lot of discussion at the tactical level about what good that would be on the nose of an aircraft that moves at 250 miles an hour—it would be controlled by the pilots. So, the visibility—and the visibility up in the cockpit, sir, is very, very good, particularly compared to my old C–46.

Mr. KUCINICH. And the rear quadrant of the craft is protected then?

Colonel HECKL. We have the ramp-mounted weapon now, sir, that I had in Iraq. And the crew chiefs man that off the ramp. And sir, most ravine shots, assault aircraft were rear hemisphere shots, and that's why we did that.

Mr. KUCINICH. Thank you, sir. Thank you, Mr. Chairman.

Chairman TOWNS. Let me begin with you, Mr. Sullivan. Your GAO reports say the V–22 may have problems operating in extreme temperatures and even aboard ships. It is true that this complex revolutionary aircraft has problems in hot and cold weather and operating on ships.

Now, Colonel Heckl says that's not true. Where did you get the information from?

Mr. CLARK. Mr. Chairman, my team went onboard the ship with one of the Osprey squadrons. I spent 4 days with them, interviewing shipboard people and the Osprey squadron. And onboard ship, the Osprey is a larger aircraft. It was intended to operate off of six operational deck spots on the flight deck. That was the desire. But two of those spots near, at the super structure, for various reasons, are not cleared for it to operate off of, take off, or land vertically. So that limits the aircraft. And also, because of its size, the squad-

ron, the air combat element that would deploy on the ship in the past with the CH–46s would have deployed with 12 CH–46s, and the other elements of the air combat element, the CH–53s and the AV–8s and such. But with the Osprey size, they are going only to deploy with 10.

And we also found that the hanger deck, which is used to work on the aircraft out of the elements, because of the aircraft's size, there were—it restricted movement of other aircraft potentially around it if it was maintenance being conducted.

In addition, we found that the inventory of spare parts that the aircraft would deploy with, called the AFCAL, that was significantly greater in volume than the CH–46s, to the point that not all of the parts would be able to deploy with the ship, would have been to be positioned somewhere else. And that was an issue.

In terms of operating in extreme environments, the full mission capability rate, which is not a requirement, but is measured on the aircraft, on the first squadron, it was, I believe, around 6 percent. And the problem there is essentially, is the aircraft capable of meeting all assigned missions?

The problem was the ice protection system with the aircraft. It essentially has been a problem for some time. It doesn't work. And so in any situation where you might fly into icy conditions, that would be a concern, so that hindered that also.

And we also looked at the issue of at altitude. According to a NATOPS manual, there is a compromise between altitude and weight; that the aircraft certainly can fly at altitude in airplane mode, but in helicopter mode, landing, that there is a tradeoff between the aircrafts, the altitude and the weight of what it's carrying, either fuel or troops or cargo.

Chairman TOWNS. Thank you very much. Dr. Rivolo, in your testimony you indicate the V–22 has an inherent design flaw that affects the V–22 Osprey's load-carrying capacity, indicating that the problem is so complex that the aircraft designers don't even understand it.

That is scary. Your chart is rather complicated, so please explain further, if you can put it up there, in a sentence or two that——

Mr. RIVOLO. The intent of my testimony was to bring out the fact that the original designers had great hope for this aircraft. The initial wind tunnel runs and calculation show that we would have a truly spectacular aircraft. As a result of actually building the aircraft, the numbers fell well short. So as a result, the aircraft has a lifting capacity which is about 6,000 pounds less than was expected. And we have lived with this because it still has considerable capability. But that difference, that lack of efficiency which has materialized, has resulted in compromise after compromise and the aircraft is not performing as it was designed to.

If you were listening to a briefing in 1988, the aircraft was spectacular in its anticipated performance. And I just wanted to bring out the fact that, I realize that this is old news and there's not a lot of interest in it. But the aircraft is not as capable as it was designed to be, and we are living with that, obviously.

Chairman TOWNS. Your testimony indicates that the V–22 may have problems conducting combat maneuvers. What do you mean by that?

Mr. RIVOLO. Yeah, that's, again that apparently is very old news. I have very serious concerns that, and we're talking about rare occurrences. We're not talking about day-to-day operations. If you are making an approach to a high density altitude and you're in helicopter mode with a full load of Marines and someone jumps out with an RPG, you're going to be very, very hard pressed to get out of there. And that has been documented. It's not a debatable thing.

The only option the airplane has, it can convert very rapidly going forward. But forward is usually where the bullets are coming from.

So my concern has been that in a real environment like Afghanistan, and I believe that once this aircraft deploys there—the reality of what's happening in Afghanistan, things are not getting better. Things are getting very much worse in Afghanistan—that the aircraft will be asked to fly these missions, and it will run into some of its idiosyncrasies. And until those happen, the discussions are not going to take place because we have been raising those issues now for at least 10 years.

And as I said, it's not only the Marine Corps, but I think the community at large sees it as passe' information. We're not interested in that; whereas, to me, the fact that the aircraft could not be certified by the FAA, and we are asking Marines to—not pilots, pilots know fully well what the risks are. They take them. But for a Marine who's told get into that airplane, when that airplane could not be certified as airworthy, there's a real problem there. There's a real, real problem with attitudes. And that's the reason why I'm here. I mean, I don't like to come down and get beat up. I get beat up all the time.

Chairman TOWNS. Let me ask you then, General Trautman, you just heard Dr. Rivolo say that if the FAA examined the MV–22 it would not certify as being flightworthy. He just said that. By Federal Aviation Administration standards, the MV–22 is not safe for flight. Does the Marine Corp disagree with the FAA standards?

General TRAUTMAN. Absolutely, sir, or we wouldn't put our Marines in the V–22. I can't—I'm not an expert on the FAA. I have no idea what this individual is saying. I know that most of the other things that he says I don't agree with and I find flaw with, but I'm not sure about the FAA's position.

Chairman TOWNS. Mr. Sullivan, the GAO report indicates that the costs associated with the MV–22 are expected to rise significantly, due to operation and support. Why? I don't understand why.

Mr. SULLIVAN. One of the things that we looked at is the costs now are about $11,000 per flight hour, which is much higher than they had originally estimated that and much higher than they expected. And with the problems that they're having now with reliability, we think it's prudent to expect that cost to operate and support that aircraft through its life cycle will probably go up some more. It's at, the total estimate now is at $75 billion for the 30 or so year life cycle of the V–22.

Chairman TOWNS. I yield to the ranking member.

Mr. ISSA. Thank you, Mr. Chairman.

Mr. Sullivan, following up on that, isn't the single greatest overrun cost the fact that the engines are lasting dramatically less time than originally planned?

Mr. SULLIVAN. Could you repeat that? I'm sorry.

Mr. ISSA. Isn't the greatest single upcost, the fact that the engines last roughly half what they were intended to last?

Mr. SULLIVAN. I think that's right now, yeah, that's a huge cost that they have.

Mr. ISSA. And following up on that, do you recall the first Gulf war?

Mr. SULLIVAN. Yes, sir.

Mr. ISSA. I do. Do you remember that basically our helicopters went into the first Gulf war, ingested and died like this, and they didn't last even a quarter what they were intended to, and we almost had to shut down in that relatively short time leading up to the campaign while they were trying to figure out how to stop the ingesting of dust from killing those aircraft engines almost overnight. Do you remember at least reading about that?

Mr. SULLIVAN. Yes, I do.

Mr. ISSA. So, if, in fact, Boeing and its partners do their job, and with the Marines, and increase the longevity of that and a few other parts, isn't it true that although that projection might be right, it also could be reduced considerably by those parts coming closer to their original intended life span?

Mr. SULLIVAN. You know, I think that's a possibility, yes. But it is just that, a possibility. Right now it takes an awful lot to maintain those engines after they've been run through there.

Mr. ISSA. General, have you charged your partners in this to get those times up on parts that are underperfoming the original specs?

General TRAUTMAN. We have indeed, sir. We work very closely together. If I could just give you a couple of examples and reasons why I believe and our industry partners believe that these costs are going to come down significantly, not go up. A flapper on. In the beginning, we were removing and replacing flapper ons at a cost of $280,000 per flapper on. We've now figured out a way to repair these onsite for less than $10,000.

Another example are bleed air valves. They were a throwaway item. $27,000 per. Now we're repairing them at $5,000 per. I could give you many examples, but I don't want to eat up your time. That's the way that we're working together with the OEM to improve the cost and reliability of this airplane.

Mr. ISSA. Colonel, before you flew the CH–46, what was your primary flight trainer? What did you learn to fly on?

Colonel HECKL. CH–46, sir. I learned to fly a TH–57 and then a——

Mr. ISSA. OK. So you started with a light trainer.

Colonel HECKL. Yes, sir.

Mr. ISSA. You weigh 200 pounds?

Colonel HECKL. Yes, sir.

Mr. ISSA. How much could a light trainer carry on a hot day, just you and the instructor?

Colonel HECKL. That was about it. On a hot day, we actually, a couple of guys were large enough that we would exceed the CG limit, so, yes, sir.

Mr. ISSA. OK. I learned to fly on a 172. The reason I learned to fly on a 172 is that my trainer was 220 pounds. I was 205 pounds,

and on a hot day a Cessna 150 wouldn't take off with full fuel, and we weren't allowed fuel management. Our rules for Army aviation is we had to have full fuel on take off. I think they may have changed it now.

So part of what you do, I'm assuming, on hot days is you manage fuel so that you're not always with full fuel, you're with the amount of fuel you need to help get those packs back up where they need to be when you're in high altitude on hot days.

Colonel HECKL. Absolutely, sir. Fuel management's an issue in any rotor craft.

Mr. ISSA. That was my next question you anticipated is that all your aircraft you're always dealing with, on hot days at least, in high altitude, you're dealing with tradeoffs between fuel and passengers.

Colonel HECKL. Absolutely, sir. In the Air Force with the CV variant actually trains to manage fuel to a point where they will dump fuel if they need to make them——

Mr. ISSA. And you're not a fixed wing pilot at all. But do you know of any Air Force aircraft, any jet, any prop that doesn't have a fuel to pack to altitude limitation where there's tradeoff?

Colonel HECKL. Not that I'm aware of, sir. I know certainly in rotor wing.

Mr. ISSA. Well, that kind of brings me back, I think, to a couple of questions on this. This aircraft is not a combat aircraft. It is an aircraft that operates in combat, meaning it's not an attack aircraft, it's not designed to fly into bullets and RPGs deliberately, right?

Colonel HECKL. No, sir. Actually the design was so that it would avoid those things.

Mr. ISSA. So the little bit of chicken armor beneath your seat is not intended for you to take RPGs regularly?

Colonel HECKL. I hope not, sir.

Mr. ISSA. And that's true of the CH–46 and any other of that type of transport aircraft.

Colonel HECKL. Yes, sir.

Mr. ISSA. If you were flying any of the heavy lifts, but the CH–46 and you were just at that critical time final, heavy, coming in at altitude, and you suddenly started taking fire, how hard is it for you to get up and move in the opposite direction quickly?

Colonel HECKL. Extremely difficult, sir. As a matter of fact, when I went into OIF in March 2003, we had Marines that were loaded because we thought, you know, we're wearing all our gas gear and everything else. My aircraft, even though I managed the fuel, I barely had a minimal amount of power to conduct a wave off which is a, you know, pretty standard procedure. So very difficult, sir.

Mr. ISSA. And Doctor, to be fair to you because we have been sort of talking to the other side, isn't it true that if you were to evaluate any and all aircraft that the military operates, that they would all have some of these tradeoffs? And last, are you familiar with the DC–3, I guess it was CH–46?

Mr. RIVOLO. Yes.

Mr. ISSA. Are you aware that the FAA will not certify that aircraft today because it can't come out of a flat stall? It is an unsafe

aircraft even though it has the most amount of hours and the safest record of any aircraft in aviation history?

Mr. RIVOLO. Yes, I'm aware of that.

Mr. ISSA. So the FAA certification you spoke to, although important, is not always the only telling factor.

Mr. RIVOLO. No, not at all. But if I might say, that, you know, at some point we will be back to this committee with a different issue because that rare event, you know, it is a rare event. It will happen. And if you deliberately do not plan for that, then we will be called to answer. That's my only issue, sir.

Mr. ISSA. That's a good one. And thank you. Thank you, Mr. Chairman.

Chairman TOWNS. Thank you very much. I yield to the gentleman from Maryland, Mr. Cummings.

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

I tell you, if I was sitting here as a judge, this is a, to me, this is a continuation of this defense of mediocrity, and it bothers me tremendously. We've got a spare parts problem. We're cannibalizing planes that some say cost $64 million, others say more. And how many people have been, how many deaths have resulted from the use of the V–22, General?

General TRAUTMAN. There was a mishap in 1992. I believe four people were there. Another mishap in 2000, 9 years ago, where 19 were killed and another in 2000, less than 9 years ago where I think 4 were on board.

Mr. CUMMINGS. So more than 30.

General TRAUTMAN. Just under 30, sir.

Mr. CUMMINGS. And there appears to be a design problem with the V–22. It was designed with this forward fighting chin gun which was never mounted because of a lack of accuracy; is that right?

General TRAUTMAN. Not a lack of accuracy, no, sir. I think we determined that the pilots had more important things to do than be attack helicopter pilots operating a chin gun.

Mr. CUMMINGS. But the guns couldn't be mounted on the side since the rotors were in the way, and the windows were far too small for observation or aiming; isn't that right?

General TRAUTMAN. That's why we're excited about the defensive weapon system, all aspect weapon that's made it through developmental tests and that will soon do operational tests this summer.

Mr. CUMMINGS. Then we have an aircraft that can be docked, take off and land from small decks and fly far inland to drop off combat ready troops as the Osprey is supposed to do would be particularly attractive to troops that deploy aboard ships. However, the V–22's turbo jet engines blow hot exhaust directly on the deck and burn away the no skid surface and warp and singe the metal deck. As a result, flight operations have to be limited so that V–22s never sit at one place with engines running for more than a couple of minutes, an impossibility when launching over 30 aircraft. Does that——

General TRAUTMAN. That's not accurate, Mr. Cummings. You know, we have 5 weeks of sustained deployment operations now from VMM–263, which was out on the USS Bataan. They are operating and doing a marvelous job. They've carried more passengers,

more cargo, their readiness rates are higher than anyone else embarked with them.

What I think you're referring to, sir, is when the necells are in the perpendicular mode to the ship, you don't want to leave them in the perpendicular mode for more than a few minutes. You want to adjust them, which is fine to do on the deck. You adjust them after landing, and then you leave them pointed slightly aft, and you can do that for long periods of time without having a problem.

Mr. CUMMINGS. How long can do you that?

General TRAUTMAN. Thirty to 40 minutes. And if you're going to stay more than 30 to 40 minutes with your engines turning on an LSD or an LPD, we have a work around where we bring out essentially a hot plate that goes underneath the nasal and then they can stay for an unlimited amount of time.

Mr. CUMMINGS. But other than that they could burn the no-skid surface of the——

General TRAUTMAN. Well they could if you didn't follow the techniques, tactics and procedures that we've developed to accommodate that problem, which we've done.

Mr. CUMMINGS. And General, you said that there were, you had concerns about availability of spare parts.

Now I want to go to Mr. Sullivan. Mr. Sullivan, how significant is that, and where is that controlled in the process, the acquisition process?

It seems to me that, in the beginning of a process, you figure out the spare parts that you might need. And the gentleman has talked about how we're going through this evolution. And it seems to me that if we're truly going through an evolution and we're truly looking at the problems that are occurring, that are happening, that we would prepare for the spare parts because cannibalization doesn't seem to be the best of alternatives. Where does it come in? Is that an acquisitions problem or what?

Mr. SULLIVAN. I think that is an acquisition program problem. And generally speaking, in the best of circumstances, you would have a design maturity curve, so to speak, where you figure out your mean time between failure rates and your reliability rates before you get anywhere near producing aircraft, and then you work down that curve.

I think it's legitimate to say that, you know, this is a somewhat immature supply chain. But they have parts that are lasting only a third as long as they had predicted back when they had critical design reviews, 10, 15 years ago. So that, to us, should be a major concern. They should be further down a design growth curve then they are today.

General TRAUTMAN. Sir, may I comment.

Mr. CUMMINGS. Yes. If the chairman allows. Thank you Mr. Chairman.

General TRAUTMAN. Sir, the issue is that you use engineer predictive analysis, so engineers predict how long parts will last. They predict mean time between failure. Every type model series that enters into service, at about the 50,000 to 60,000 hour mark, which is exactly where the V–22 is, starts to develop an actual historical track record. The actual historical track record when parts fail is never the same as the engineering predictive analysis. And so

when a part fails before it was predicted to fail, which several parts on the V–22 have done, you are not spared properly to immediately remove and replace those parts.

So there's a lead time involved, and that's what impacts all type mode series as they go through this particular stage of their life cycle. It's not something that I enjoy or appreciate, but it's typical of the way engineering predictive analysis goes in 2009.

Mr. CUMMINGS. But I understand there's a storage problem in that you had three times the number of parts needed and went through all of them. Is that true?

General TRAUTMAN. No, that's not accurate at all sir. I'm not sure who would say that.

Mr. CUMMINGS. Thank you, Mr. Chairman.

Chairman TOWNS. I now yield 5 minutes to the gentleman from Virginia, Mr. Connolly.

Mr. CONNOLLY. Dr. Rivolo, you use some pretty strong language. You used the word "reprehensible." You used the word "disingenuous" to describe the Marine Corps management of this project and this particular aircraft, in various context. You've heard both the Colonel, who actually operationally has maintained and flown the vehicle, and you've heard the General's explanation for cost overruns, cannibalization, and operational capability. What's your reaction to what you've heard, in light of the strong language you put in front of this committee?

Mr. RIVOLO. The strong language is feelings that I've had for many years, since 1999 when basically I discovered that the program was lying about the auto rotation results that we were getting. And these are official channels. When I discovered that, it seemed to me that the whole program should have been reevaluated simply on the this air worthiness issue. And instead it was very quickly dismissed by a bogus argument that the aircraft can make engine outlanding as an airplane, which is true.

However, since the aircraft is both an airplane and a helicopter, it must meet airworthiness directives as an airplane and as a helicopter.

So I have been very angry over this, because I have always looked at my job as looking out for the welfare of the people that ride in those airplanes. I lost that battle. I had some very, very vicious, vicious fights with the acquisition executives, with the Director of Operational Tests, and basically I lost the battle. And my job is to bring it out.

We had some meetings. We had meetings with the Commandant, we had meetings with the Secretaries of Navy. We had a horrible meeting in Duncan Hunter, Sr.'s office.

All of that was hashed out and basically dismissed as irrelevant. And I don't believe that it is irrelevant to have an airplane that when in helicopter or conversion mode, if there is a power interruption, everybody is guaranteed to die. And that is what we have in V–22.

Mr. CONNOLLY. Let me ask it. All right. We have an airplane that costs almost three times what it was originally estimated to cost. We have an airplane that had some bugs that had to be worked out that cost some lives. Yeah, we had some falsified

records, but we are over that now. And the airplane seems to be—and we have scaled back our expectations of the airplane.

Maybe our expectations were too unrealistic. And now—now it is performing well though we have to cannibalize it because we are not quite satisfied with the supply chain of spare parts. But it seems to be functioning and functioning well in a combat situation, even under extreme situations, as the colonel indicated. What is wrong with that? Maybe we just need to scale back our expectations and accept the fact that the good should not be the enemy of the perfect.

Mr. RIVOLO. I think that is what we have been doing since the year 2000.

Mr. CONNOLLY. But what is wrong with that? At least it is functioning and doing its job in Iraq.

Mr. RIVOLO. To different agendas it has different meanings. To the operators, the V–22 is a phenomenal machine. It is an incredible machine. It has enormous capability, enormous flexibility. It is just a dream machine.

But there are some idiosyncrasies that will come back to bite us at some point. And, historically, we in the aviation community have had rules, and we have abided by those rules.

Mr. CONNOLLY. All right. Let me ask you a final question because I am about to run out of time, and I will ask Mr. Sullivan to comment, if the Chair will indulge as well.

We had a question just a little while ago about maybe the contractors should have been fined. The assumption behind that question is, the only people responsible for the problems with the scope of mission, design, and operational capability and costs were the contractors somehow.

To what extent did the Marine Corps, did the Pentagon, did the Federal Government—to what extent should we bear responsibility for the acquisition process that turned out to be less than perfect? I mean, to what extent are we also culpable at the Federal Government?

Mr. RIVOLO. We in the government? I think we are totally culpable. We are essentially saying, yes, your airplane is not airworthy, but we are going to put Marines in it. It is OK because that rare event, it may happen, but it is not important, OK?

When it happens, we will talk about it, but it is not important, because the overall capability that this aircraft gives us is so great that we can do without that.

And I just think that is unconscionable. I am sorry, but that is my position.

Mr. CONNOLLY. I wonder if the chairman would indulge Mr. Sullivan to simply respond to that question?

Chairman TOWNS. Thank you very much.

Let me begin by thanking the witnesses today. At the outset of this hearing, I expressed strong reservations about the performance and costs of the V–22 Osprey, but I wanted to hear what our witnesses had to say before reaching a conclusion.

What we have heard today convinces me that the dream of a viable, high-speed, long-range tiltrotor aircraft has not been realized. Moreover, there is at least some evidence that the aircraft is inherently unsafe.

To sum up, it can't be used in hot weather, it can't be used in cold weather, it can't be used in sand, it can't be used in high-altitude locations; and it has restricted maneuverability. The lists of what the Osprey cannot do is longer than the list that it can do.

Not only has the Osprey failed to live up to its initial billing, it has failed expensively as well. Our investigation indicates that we have gotten half the aircraft for three times the cost. That is not a recipe for longevity.

I am looking to ask the staff—I am going to ask the staff to prepare a report on the findings of this investigation, which we will forward to the Appropriations Committee with recommendations for further action. It is time to put the Osprey out of its misery and to put the taxpayers out of their misery.

And, without objection, the committee stands adjourned.

[Whereupon, at 4:13 p.m., the committee was adjourned.]

[The prepared statement of Hon. Diane E. Watson follows:]

Opening Statement

Congresswoman Diane E. Watson

"The Future of the V-22 Osprey: Costs, Capabilities, and Challenges."

Full Committee
Oversight and Government Reform Committee

Tuesday, June 23, 2009
2154 Rayburn HOB
2:00 PM

Mr. Chairman, thank you for holding today's hearing regarding the V-22 Osprey. Since the inception of the V-22 program in 1981 the aircraft has revealed numerous challenges which have called into question the soundness of the aircraft. These complications have included cost overruns, maintenance issues, and most importantly its safety and effectiveness.

Originally, the V-22 Osprey was estimated to cost $40 million per aircraft. It is now estimated that each V-22 may cost as much $118.4 million, with the overall program 186 percent over budget.

It has been reported that the V-22 requires frequent part replacements, even including the aircraft's engines. A large inventory of replacement parts which accompanied three squadrons of V-22s on their deployment to Iraq has been quickly depleted, requiring the cannibalization of other aircraft. One of the deployed V-22 squadrons had a mission capability rating of 57 percent, well below the Marine Corps 82 percent minimum requirement.

Furthermore, the V-22 has tragically suffered a number of fatal accidents over the years. We have fortunately not experienced any such incidents recently, but concerns remain. For instance, as the V-22 begins its deployment to Afghanistan, questions persist as to whether it is the best aircraft available for our Military personnel in that theater of war.

More disheartening, is learning that the Department of Defense has not been forthcoming with information pertaining to the V-22. I hope the committee's investigations, the newly released GAO report, and the Defense Department's cooperation can bring greater transparency and understanding to the problems surrounding the V-22 program.

Mr. Chairman, thank you and I yield back the balance of my time.

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