AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

NASA'S ASTRONAUT HEALTH CARE SYSTEM—RESULTS OF AN INDEPENDENT REVIEW

HEARING

BEFORE THE

SUBCOMMITTEE ON SPACE AND AERONAUTICS

COMMITTEE ON SCIENCE AND TECHNOLOGY

HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

FIRST SESSION

SEPTEMBER 6, 2007

Serial No. 110–52

Printed for the use of the Committee on Science and Technology

Available via the World Wide Web: http://www.house.gov/science

U.S. GOVERNMENT PRINTING OFFICE

37–640PS WASHINGTON : 2008

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2104 Mail: Stop IDCC, Washington, DC 20402–0001

COMMITTEE ON SCIENCE AND TECHNOLOGY

HON. BART GORDON, Tennessee, *Chairman*

JERRY F. COSTELLO, Illinois
EDDIE BERNICE JOHNSON, Texas
LYNN C. WOOLSEY, California
MARK UDALL, Colorado
DAVID WU, Oregon
BRIAN BAIRD, Washington
BRAD MILLER, North Carolina
DANIEL LIPINSKI, Illinois
NICK LAMPSON, Texas
GABRIELLE GIFFORDS, Arizona
JERRY MCNERNEY, California
PAUL KANJORSKI, Pennsylvania
DARLENE HOOLEY, Oregon
STEVEN R. ROTHMAN, New Jersey
MICHAEL M. HONDA, California
JIM MATHESON, Utah
MIKE ROSS, Arkansas
BEN CHANDLER, Kentucky
RUSS CARNAHAN, Missouri
CHARLIE MELANCON, Louisiana
BARON P. HILL, Indiana
HARRY E. MITCHELL, Arizona
CHARLES A. WILSON, Ohio

RALPH M. HALL, Texas
F. JAMES SENSENBRENNER JR., Wisconsin
LAMAR S. SMITH, Texas
DANA ROHRABACHER, California
ROSCOE G. BARTLETT, Maryland
VERNON J. EHLERS, Michigan
FRANK D. LUCAS, Oklahoma
JUDY BIGGERT, Illinois
W. TODD AKIN, Missouri
JO BONNER, Alabama
TOM FEENEY, Florida
RANDY NEUGEBAUER, Texas
BOB INGLIS, South Carolina
DAVID G. REICHERT, Washington
MICHAEL T. MCCAUL, Texas
MARIO DIAZ-BALART, Florida
PHIL GINGREY, Georgia
BRIAN P. BILBRAY, California
ADRIAN SMITH, Nebraska
PAUL C. BROUN, Georgia

SUBCOMMITTEE ON SPACE AND AERONAUTICS

HON. MARK UDALL, Colorado, *Chairman*

DAVID WU, Oregon
NICK LAMPSON, Texas
STEVEN R. ROTHMAN, New Jersey
MIKE ROSS, Arizona
BEN CHANDLER, Kentucky
CHARLIE MELANCON, Louisiana
BART GORDON, Tennessee

TOM FEENEY, Florida
DANA ROHRABACHER, California
FRANK D. LUCAS, Oklahoma
JO BONNER, Alabama
MICHAEL MCCAUL, Texas

RALPH M. HALL, Texas

RICHARD OBERMANN *Subcommittee Staff Director*
PAM WHITNEY *Democratic Professional Staff Member*
KEN MONROE *Republican Professional Staff Member*
ED FEDDEMAN *Republican Professional Staff Member*
DEVIN BRYANT *Research Assistant*

CONTENTS

September 6, 2007

	Page
Witness List	2
Hearing Charter	3

Opening Statements

Statement by Representative Bart Gordon, Chairman, Committee on Science and Technology, U.S. House of Representatives	19
Written Statement	19
Statement by Representative Ralph M. Hall, Ranking Minority Member, Committee on Science and Technology, U.S. House of Representatives	20
Statement by Representative Mark Udall, Chairman, Subcommittee on Space and Aeronautics, Committee on Science and Technology, U.S. House of Representatives	14
Written Statement	15
Statement by Representative Tom Feeney, Ranking Minority Member, Subcommittee on Space and Aeronautics, Committee on Science and Technology, U.S. House of Representatives	16
Written Statement	18

Panel 1:

Colonel Richard E. Bachmann, Jr., Chair, NASA Astronaut Health Care System Review Committee; Commander and Dean of the U.S. Air Force School of Aerospace Medicine	
Oral Statement	21
Written Statement	23
Biography	26
Dr. Richard S. Williams, Chief Health and Medical Officer, National Aeronautics and Space Administration	
Oral Statement	28
Written Statement	30
Dr. Ellen Ochoa, Director, Flight Crew Operations, NASA Johnson Space Center	
Oral Statement	32
Written Statement	34
Mr. Bryan D. O'Connor, Chief, Safety and Mission Assurance, National Aeronautics and Space Administration	
Oral Statement	38
Written Statement	39
Discussion	
Contrasting Views and Findings From the Astronaut Health Care System Review Committee	43
Risks of Pre-flight Alcohol Consumption	45
Differences and Methods of the Reviews	46
Scope of Investigation	49
Anonymity of Survey	49
Alleged Instances of Alcohol Abuse	50
Policies to Insure Employee Openness	51
Extent of Alleged Alcohol Abuse	52
Openness of Safety Reporting/Recommendations and Future Programs	53

Page

Panel 2:

Dr. Michael D. Griffin, Administrator, National Aeronautics and Space Administration
Oral Statement 57
Written Statement 59

Discussion
Implementation of Recommendations 61
NASA Safety Culture 64
Anonymity and Authenticity of Reported Incidents 67
Charter of the NASA Astronaut Health Care System Review Committee 68

Appendix: Answers to Post-Hearing Questions

Colonel Richard E. Bachmann, Jr., Chair, NASA Astronaut Health Care System Review Committee; Commander and Dean of the U.S. Air Force School of Aerospace Medicine 72
Dr. Richard S. Williams, Chief Health and Medical Officer, National Aeronautics and Space Administration 80
Dr. Ellen Ochoa, Director, Flight Crew Operations, NASA Johnson Space Center 85
Mr. Bryan D. O'Connor, Chief, Safety and Mission Assurance, National Aeronautics and Space Administration 87
Dr. Michael D. Griffin, Administrator, National Aeronautics and Space Administration 90

NASA'S ASTRONAUT HEALTH CARE SYSTEM—RESULTS OF AN INDEPENDENT REVIEW

THURSDAY, SEPTEMBER 6, 2007

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON SPACE AND AERONAUTICS,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
Washington, DC.

The Subcommittee met, pursuant to call, at 10:05 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Mark Udall [Chairman of the Subcommittee] presiding.

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON SPACE AND AERONAUTICS

Hearing on

NASA's Astronaut Health Care System—
Results of an Independent Review

Thursday, September 6, 2007
10:00 a.m. – 12:00 p.m.
2318 Rayburn House Office Building

WITNESS LIST

Panel 1

Col. Richard E. Bachmann, Jr.
Chair
NASA Astronaut Health Care System Review Committee
Commander and Dean of the U.S. Air Force School of Aerospace Medicine

Dr. Richard S. Williams
Chief Health and Medical Officer
NASA

Dr. Ellen Ochoa
Director
Flight Crew Operations
NASA Johnson Space Center

Mr. Bryan O'Connor
Chief
Safety and Mission Assurance
NASA

Panel 2

Dr. Michael Griffin
Administrator
NASA

Section 210 of the Congressional Accountability Act of 1995 applies the rights and protections covered under the Americans with Disabilities Act of 1990 to the United States Congress. Accordingly, the Committee on Science strives to accommodate/meet the needs of those requiring special assistance. If you need special accommodation, please contact the Committee on Science in advance of the scheduled event (3 days requested) at (202) 225-6371 or FAX (202) 225-0891.
Should you need Committee materials in alternative formats, please contact the Committee as noted above.

HEARING CHARTER

SUBCOMMITTEE ON SPACE AND AERONAUTICS
COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

NASA's Astronaut Health Care System—Results of an Independent Review

THURSDAY, SEPTEMBER 6, 2007
10:00 A.M.–12:00 P.M.
2318 RAYBURN HOUSE OFFICE BUILDING

Purpose

On Thursday, September 6, 2007 at 10:00 a.m., the House Committee on Science and Technology's Subcommittee on Space and Aeronautics will hold a hearing to examine the results of two reports on the National Aeronautics and Space Administration's (NASA) astronaut medical and behavioral health care system. The first, the report of the NASA Astronaut Health Care System Review Committee, provided an independent assessment of NASA's medical and behavioral health care system. The second, a Johnson Space Center internal review considered opportunities for lessons learned in light of the incident involving NASA astronaut Lisa Nowak. The hearing will explore the findings and recommendations of these reports and any actions NASA plans to take in response to them.

Witnesses

Witnesses scheduled to testify at the hearing include the following:

Panel 1

Col. Richard E. Bachmann, Jr., Chair, NASA Astronaut Health Care System Review Committee; Commander and Dean of the U.S. Air Force School of Aerospace Medicine

Dr. Richard S. Williams, Chief Health and Medical Officer, NASA

Dr. Ellen Ochoa, Director, Flight Crew Operations, NASA Johnson Space Center

Mr. Bryan O'Connor, Chief, Safety and Mission Assurance, NASA

Panel 2

Dr. Michael Griffin, Administrator, NASA

Potential Issues

The following are some of the potential issues that might be raised at the hearing:

- The external review of the astronaut health care system identified a number of significant concerns—what was the basis of the committee's findings and recommendations?
- The external review of the astronaut health care system identified a number of "problematic" cultural and structural issues. Is there any evidence that the NASA culture, particularly as it relates to the astronaut program, unwittingly encourages the downplaying of human factors problems (substandard task performance, risky behaviors, other behavioral issues) that if unaddressed may pose risks to flight safety or have mission impacts?
- How pervasive are the problematic conditions highlighted by the external review committee, and how should NASA go about getting an answer to that question?
- Are NASA's decision appeal processes, anonymous reporting systems, and other safety and mission assurance efforts adequately capturing human factors risks, and if not, what should be done?

- To what extent, if at all, should NASA get involved in the off-duty lives of its astronauts in the interest of ensuring that astronauts get the proper support and services for dealing with behavioral issues or problems, especially those that may not violate a medical or behavioral health standard but which could potentially pose a flight safety risk or have a mission impact if left unaddressed?
- How can NASA ensure that an open and objective environment exists within the agency for addressing medical or behavioral concerns?
- What explains the disconnect between the information provided by interviewees to the external review committee and the information provided to Mr. O'Connor during his investigation?
- Is NASA's timeline for resolving questions and implementing recommended improvements to NASA policies, procedures, and practices appropriate, and what will Congress need to do, if anything, to ensure that the recommendations are actually implemented?

Background Information

In the wake of the arrest of astronaut Lisa Nowak, the NASA Administrator ordered an independent external review of NASA's astronaut health care system, focused on space medicine operations at the Johnson Space Center (JSC). It did not focus on the specifics of the Lisa Nowak incident. In addition, an internal review was undertaken by JSC management to determine *"whether there were any indicators which could have prompted NASA to take actions that could have averted the sequence of events."* As part of the JSC review, *"astronaut selection and retention procedures were reviewed to see if there were any lessons learned that could be incorporated into the improved practice of behavioral medicine."*

A. Report of the NASA Astronaut Health Care System Review Committee

In carrying out the NASA Administrator's directive, Dr. Richard Williams, the NASA Chief Health and Medical Officer (CHMO), prepared the task statement for the external review committee; selected the Chairman of the committee; selected the members of the committee, based on nominations from various federal agencies of *"appropriately credentialed physicians and mental health professionals, employed by the Federal Government or on active duty in the military services, and experienced in medical and behavioral health support to organizations and personnel engaged in critical or hazardous operations;"* and appointed two NASA employees as ex-officio members of the committee, one astronaut as a consultant, and one NASA employee as executive secretary. The chairman of the committee was Col. Richard Bachmann, Commander of the USAF School of Aerospace Medicine and specialist in aerospace medicine. A list of the committee members is included as Attachment 1 to this hearing charter.

Purpose of the Assessment

As stated in the report of the external review committee, the purpose of the assessment was as follows:

"To provide rapid objective assessment, problem identification, and recommendations for action or further study of the following specific areas to the Chief Health and Medical Officer and NASA Administrator:

1. *Medical evaluation for acceptance to the Astronaut Corps, to include psychological testing*
2. *Annual medical examination and certification of astronauts for flight duty*
3. *Periodic medical and psychological evaluation and testing of astronauts*
4. *Astronaut certification for space flight, from a medical and behavioral health perspective*
5. *Professional qualifications of health care providers*
6. *Quality/adequacy of medical practice relative to expected standards of care and*
7. *Administrative considerations of health services, including:*
   a. *Provider credentials and privileging*
   b. *Record-keeping*
   c. *Communication and reporting*
   d. *Disposition of aeromedical concerns; and*

e. Privacy considerations

8. Behavioral health considerations within the context of the NASA Personnel Reliability Program (PRP)

These criteria were provided to the committee to help focus the review, but did not constrain or limit the review. During the first committee meeting, the CHMO asked the committee to provide opinions on the following additional questions:

9. To what extent are disorders of conduct indicative of underlying mental health pathology?

10. To what extent can regular psychological testing or psychiatric evaluation predict a disorder of conduct or 'act of passion'?

11. What systemic procedures could be put in place to predict disordered conduct?"

Approach and Schedule

The review committee was selected and appointed in late February 2007. The committee held three sets of meetings: in Washington, DC on March 28th, at JSC on April 23–26th, and in San Antonio on May 30–31st. During the JSC meeting, the committee members received briefings from and had meetings with NASA personnel. Following that, the committee members split up and held private interviews with astronauts, flight surgeons, and astronaut family members. Members interviewed eight of 21 space medicine flight surgeons [who support flight crews], all of the clinic-assigned flight surgeons [who provide clinic services for astronauts and family members] and all of the behavioral health staff. The groups also reviewed the facilities, offices, and relevant documents for those functional areas.

The NASA astronaut office informed the Astronaut Corps of the opportunity to speak with the committee on a voluntary basis. Fourteen currently active astronauts (all but one had flown in space) chose to speak to the members. Five astronaut family members also volunteered to speak to committee members. After the JSC visit, the committee had follow-up conversations/e-mail exchanges with a number of the interviewees. The interviews were intended to be anonymous and confidential, and Col. Bachmann cites that as the reason the committee's report does not "name names" or provide information that could identify specific individuals. There were no prepared sets of questions. Instead, the members conducted open-ended interviews to allow interviewees to offer whatever information they chose to share with the committee members.

The committee held its third and final meeting on May 30–31, 2007 at the USAF School of Aerospace Medicine to consider draft findings that had been developed by the members and to write the report. As stated in the report: *"The findings and recommendations expressed in this report represent the unanimous opinion of the committee."* The option of doing minority reports was made available to the committee members but none saw the need to do so. The committee submitted its draft report on June 21, 2007 to the NASA Chief Health and Medical Officer *"to allow NASA functional areas an opportunity to provide comments and correct factual errors or misstatements."* Col. Bachmann and the members of the committee briefed the senior NASA management (including the NASA Administrator via teleconference) on July 16, 2007. NASA Headquarters released the report to the public and held a press conference on July 27, 2007.

Major Findings of the External Review

The external review committee's report identified a number of significant issues related to NASA culture, communication, and behavioral concerns. In conversations with staff, Col. Bachmann emphasized that the issues and concerns cited in the report, which are reflected in the report's findings, were raised by the interviewees in the course of the confidential interviews. For example, the committee members did not ask the interviewees about alcohol use by astronauts—the incidents cited in the report were volunteered by interviewees during the course of the interviews as specific examples of safety concerns. According to Col. Bachmann, various concerns referenced in the report were based on information provided by interviewees who were eyewitnesses, and did not represent second- or third-hand hearsay. Moreover, the types of concerns raised by interviewees were consistent across a large proportion of the interviewees. As noted in the committee's report: *"Although they do not represent a random or exhaustive sample of the larger population of astronauts and family members, the issues raised were remarkably consistent and compelling and deserve focused attention."*

The following represent some of the most notable findings in the external review report [a complete set of findings and recommendations can be found in the external review committee's report, which has been provided to Subcommittee Members]:

- *"Many anecdotes were related that involved risky behaviors by astronauts that were well known to the other astronauts and no apparent action was taken. Peers and staff fear ostracism if they identify their own or others' problems."*
- *"As the review progressed, it became apparent that major vulnerabilities, underlying root causes, and contributing factors extend well beyond the specific medical aspects of NASA operations. . .These issues are so ingrained and longstanding that it will take senior leadership action to remediate them."*
- *"Problems of communication were evident among the four areas addressed: flight medicine, behavioral health, flight medicine clinic, and the Astronaut Office. This theme recurred in a variety of venues during the committee's visit to JSC, and also extended to communication between these areas at JSC and Headquarters."*
- *"Several senior flight surgeons expressed their belief that their medical opinions regarding astronaut fitness for duty, flight safety and mission accomplishment were not valued by leadership other than to validate that all (medical) systems were "go" for on-time mission completion. Instances were described where major crew medical or behavioral problems were identified to astronaut leadership and the medical advice was disregarded. This disregard was described as "demoralizing" to the point where they said they are less likely to report concerns of performance decrement. Crew members raised concerns, regarding substandard astronaut task performance which were similarly disregarded."*
- *"Interviews with both flight surgeons and astronauts identified some episodes of heavy use of alcohol in the immediate pre-flight period, which has led to flight safety concerns. Alcohol is freely used in crew quarters. Two specific instances were described where astronauts had been so intoxicated prior to flight that flight surgeons and/or fellow astronauts raised concerns to local on-scene leadership regarding flight safety. However, the individuals were still permitted to fly. The medical certification of astronauts for flight duty is not structured to detect such episodes, nor is any medical surveillance program by itself likely to detect them or change the pattern of alcohol use."*
- *"Astronaut medical and behavioral health care is highly fragmented. . ."*
- *"Psychological testing evaluation is conducted, and is intended to identify applicants who can adapt most readily and perform effectively in the extreme environment of space flight. However, this information is rarely and inconsistently used."*
- *"There is no periodic psychological evaluation or testing conducted on astronauts. Once selected as an astronaut candidate, astronauts have no psychological evaluation for the remainder of their careers unless selected for long duration missions."*

Risky Behaviors—*"Many anecdotes were related that involved risky behaviors by astronauts that were well known to the other astronauts and no apparent action was taken. Peers and staff fear ostracism if they identify their own or others' problems."* JSC officials described to staff several mechanisms that are in place for peers or staff to bring forward concerns about astronaut behavior, performance, or concerns about flight safety. Those mechanisms include anonymous safety reporting systems, approaching flight surgeons, the chief of the astronaut office, the crew commander, or other management. In addition, astronauts have access to the behavioral health clinic, the Employee Assistance Program, and to flight surgeons. However, Col. Bachmann indicated to staff that the external review heard instances of concerns about personal behavior that could be embarrassing and substandard performance during training and on-orbit, that could potentially impact a mission but for which no actions were taken. He noted that human factors issues were a consistent theme of the interviews, but that his committee was not equipped to determine how widespread those issues were across NASA and that determining the extent of the problem should be an important task for agency management.

Barriers to Communication—*"Problems of communication were evident among the four areas addressed: flight medicine, behavioral health, flight medicine clinic, and the Astronaut Office. This theme recurred in a variety of venues during the committee's visit to JSC, and also extended to communication between these areas at JSC and Headquarters."* JSC officials told staff that JSC is preparing an anonymous survey to explore the relationship between astronauts and flight surgeons and man-

agers; to identify whether astronauts or flight surgeons have concerns in raising flight safety or crew suitability issues or whether barriers exist to doing so; and whether there are suggestions for changes to policies and procedures. A group from JSC Human Resources, including individuals with experience in survey design, is developing the survey and will analyze the results. The Flight Crew Operations Directorate and the Space Life Sciences Directorate, among others, are providing input on the questions to be included in the anonymous survey. (Staff has assembled a non-comprehensive list of the key NASA and JSC offices, and associated office responsibilities, involved in Astronaut Health Care and Safety that is provided as Attachment 2.) The Flight Crew Operations Directorate told staff that it will hold a Town Hall meeting with astronauts to discuss the results of the survey. JSC plans to issue the survey in mid-September. The results will be summarized in a report that will be delivered to the JSC Director. While supporting the idea of an anonymous survey, Col. Bachmann told staff that he thinks that it is very important that the questions be structured to avoid being overly narrow in focus; rather, the questions need to be open-ended to encourage anonymous comment, and the questions should be comprehensive enough to cover all of the issues raised in the report. In that regard, NASA might benefit from having its proposed survey reviewed by external survey experts.

Disregard of Flight Surgeon and Crew Opinions—*Several senior flight surgeons expressed their belief that their medical opinions regarding astronaut fitness for duty, flight safety and mission accomplishment were not valued by leadership other than to validate that all (medical) systems were "go" for on-time mission completion. Instances were described where major crew medical or behavioral problems were identified to astronaut leadership and the medical advice was disregarded. This disregard was described as "demoralizing" to the point where they said they are less likely to report concerns of performance decrement. Crew members raised concerns regarding substandard astronaut task performance which were similarly disregarded.* JSC medical officials indicated that professional disagreements among flight surgeons and between flight surgeons and program officials could occur and were not suppressed. They described to staff several appeals mechanisms that flight surgeons can take should they choose to seek further consideration of a final medical decision that differs from the one they put forth. One official noted that he was unaware of cases where flight surgeons felt disregarded and was not aware of any cases in which a flight surgeon had made a medical decision that had been overruled by Shuttle or ISS program management. Col. Bachmann indicated that the interviewees themselves were the ones using the word "disregarded," and that it was a theme that recurred in the interviews. Mention of "flight safety" and "mission impact concerns came directly from the interviewees. He also noted that the committee heard from individuals who chose not to take concerns to the next level of management due to the "demoralizing" effects of being disregarded.

Use of Alcohol in Pre-flight Period—*"Interviews with both flight surgeons and astronauts identified some episodes of heavy use of alcohol by astronauts in the immediate pre-flight period, which has led to flight safety concerns. Alcohol is freely used in crew quarters. Two specific instances were described where astronauts had been so intoxicated prior to flight that flight surgeons and/or fellow astronauts raised concerns to local on-scene leadership regarding flight safety. However, the individuals were still permitted to fly. The medical certification of astronauts for flight duty is not structured to detect such episodes, nor is any medical surveillance program by itself likely to detect them or change the pattern of alcohol use."* As noted above, Col. Bachmann stressed that in its anonymous interviews the committee members did not use a prepared set of questions and did not ask about alcohol use. Instead the instances of alcohol use were offered up by the interviewees as examples of safety concerns they had witnessed. He later elaborated in the NASA press conference that one instance cited involved a T–38 aircraft and the other involved an ISS/Soyuz launch opportunity. Further, during the NASA press conference that accompanied the public release of the external review report, Col. Bachmann stated that *"the two specific incidents of alcohol use that we put into the report were specifically chosen to illustrate a larger problem, to call attention to the larger issue which is the role of the flight surgeon in protecting both the individual's health, flight safety, and mission completion, and the fact that the flight surgeons and other astronauts who described their role in these incidences and other which we did not obtain further details on were to say that they felt concerned that their professional input seemed to be disregarded, at least at the local level, and that they were demoralized by that disregard to the point that they felt like they would be less likely to report concerns or performance decrement in the future."* Col. Bachmann indicated to staff that based on the information provided to the committee in the interviews, he con-

sidered the reports of alcohol use to be more credible than NASA's characterization of them as simply "allegations." NASA Safety and Mission Assurance chief Bryan O'Connor conducted an investigation of the reported instances of alcohol use and concluded that *"within the scope and limitations of this review, I was unable to verify any case where a space flight crew member was impaired on launch day, or where there was a disregard by managers of a flight surgeon or co-crew member recommendation that a crew member not fly Shuttle or Soyuz."*

B. NASA Response to Recommendations of External Review

According to a NASA "Fact Sheet on the Findings of the Astronaut Health Care System Review Committee," that accompanied public release of the review committee report on July 27, 2007, NASA reported the following steps to respond to the committee's recommendations:

- *"Look for ways to enhance use of behavioral health data in the astronaut selection process*
- *Take steps to ensure that flight surgeons, trainers, and astronauts are free to communicate concerns of flight safety to senior leadership and encourage such communication*
- *Adopt a formal code of conduct for the Astronaut Corps*
- *Provide regular training to flight surgeons regarding behavioral health assessments*
- *Promote better communication from flight surgeons to all astronauts on their personal status with regard to medical qualification for space flight assignments*
- *Work to enhance a program of external peer review of NASA's medical and behavioral health staff*
- *Establish one credentialing and privileging authority for both the flight medicine and behavioral health providers, with documented processes for accountability*
- *Institute behavioral health assessments in conjunction with annual astronaut flight physicals"*

During the press conference held on July 27, 2007, Ms. Shana Dale, NASA Deputy Administrator, stated that:

> *"NASA's existing T–38 Aircraft Alcohol Use policy that has historically been applied to space flight has been explicitly extended as an interim policy to flight on any space craft. This interim policy prohibits alcohol use for 12 hours prior to flight and further states that astronauts will neither be under the influence nor the effects of alcohol at the time of launch. A comprehensive review of alcohol use policy prior to aircraft use or space flight is already underway."*

In addition, on July 26, 2007, the Deputy Administrator of NASA, requested an internal review of *"reported allegations of heavy use of alcohol by astronauts in the immediate pre-(space) flight period."* These incidences were identified in the report of the Astronaut Health Care System Review Committee. A summary of the selected issues, findings, and recommendations of the *Space Flight Safety Review* is provided below. NASA has indicated to staff that additional responses to the report and a recommendations implementation plan will be forthcoming later in the year.

Space Flight Safety Review

The safety review was conducted by the Chief of the Safety and Mission Assurance, Mr. Bryan O'Connor. According to the final report, which was released to the public on August 29, 2007, the scope of the review *"focuses on the space flight safety implications of alcohol use or abuse. . .those things that could cause impairment during launch day flight preparation."* The after effects of alcohol use, such as hangover, were included in the scope of the review. *"The relevant question. . .was, 'Did we have a situation where a crew member presented on launch morning in an impaired state, was observed as such by flight surgeon or another crew member, and was then cleared to fly by operational management over the objections of the flight surgeon (or other crew member)?' Aircraft flying operations in general were out of scope."*

According to the written report, the safety review involved inspection of crew quarters facilities at JSC and the Kennedy Space Center and a review of policies and procedures before launch. Records of JSC and Space Shuttle program hotlines, the NASA Safety Reporting System (NSRS), and NASA's close call and mishap reporting systems for *"astronaut alcohol abuse and space or aircraft flight"* were also

examined. The review examined this data over the past 20 years. In addition, the review encompassed voluntary interviews, held on a **non-confidential** basis, with astronauts, flight surgeons, research and operations support nurses, Shuttle-suit technicians, close-out-crew technicians, and the mangers and staff of flight crew quarters.

Selected Findings and Recommendations

- Finding: *"Alcohol is available for crew use, and although it is possible to abuse it during limited private times, the culture of professionalism in today's Astronaut Corps, along with the highly visible, structured and supervised schedule during the last several days prior to launch provide reasonable controls to avoid flying an alcohol-impaired crew member."*
- Finding: *"In light of all the other controls in place on launch day, the L–0 flight surgeon check provides a reasonable likelihood of identifying signs of illness or impairment of the level that would threaten flight safety, but it could be supplemented by closer first hand observation prior to crew departure for the pad."*
    - Recommendation: *"A flight surgeon should be located in the suit room during suit up to allow more direct contact with the crew members on launch day and reduce the reliance on a suit tech (non-clinician) picking up any last minute medical issue."*

The report includes reference to the T–38 policy on alcohol use per *Aircraft Operations and Training Procedures: T–38 Operating Procedures,* Volume 1. JSC Aircraft Operations Division, 2005:

> *"***5.4.3 Alcohol** *A crew member is not qualified for flight (takeoff) within 12 hours of consuming alcoholic beverages. NASA air crews are expected to conduct themselves in a common sense manner. Excessive drinking even prior to 12 hours, enough to cause a hangover, is outside the spirit of the regulations. The policy is that air crews will neither be under the influence nor the effects of alcohol at the time of takeoff."*

As noted above, the NASA Deputy Administrator has stated that this policy has been expanded to include space flight. According to NASA medical personnel, the medical basis for applying the 12-hour rule to space flight operations has not yet been determined.

C. Johnson Space Center (JSC) Internal Review Findings

As noted earlier in this hearing charter, *"In response to the actions of astronaut Lisa Nowak. . .NASA JSC conducted an internal review of records and of the workplace. There were two purposes for the internal review. First, NASA JSC looked to determine whether there were any indicators which could have prompted NASA to take actions that could have averted the sequence of events. In addition, astronaut selection and retention procedures were reviewed to see if there were any lessons learned that could be incorporated into the improved practice of behavioral medicine."*

The assessment considered 1) existing psychological screening for admittance into the Astronaut Corps and the nature of any ongoing psychological evaluations during an astronaut's career, 2) any indicators, including interactions with Lisa Nowak and other astronauts or NASA employees that may have raised concerns, and 3) recommended changes to practices or procedures and lessons learned for the future.

The review included the following recommendations:

- *"Conduct a 30-minute Behavioral Medicine assessment in conjunction with annual medical flight physicals.*
- *Perform Behavioral Medicine flight assessments for Shuttle crew members.*
- *Enhance aeronautical adaptability ratings (an assessment of fitness for flying duties) in astronaut medical selections."*

D. Activities of Other Oversight and Advisory Bodies

The Aerospace Safety Advisory Panel (ASAP) has not issued a position on either the internal or external report.

According a letter dated August 24, 2007 sent from the NASA Inspector General to the NASA Administrator, *"In September 2007, we plan to initiate a review of NASA's actions taken in response to reports of astronauts' pre-flight use of alcohol. . . Our review will evaluate the report of the Astronaut Health Care System Review Committee and the SMA* [Safety and Mission Assurance] *review, including*

their respective objectives and methodologies and determine whether additional work by our office is warranted."

ATTACHMENT 1

External Review Committee Members

Chair—Richard E. Bachmann, Jr., Colonel, USAF, MC, CFS, Commander, USAF School of Aerospace Medicine, specialist in aerospace medicine

Timothy W. Sowin, Colonel, USAF, MC, SFS, Chief, Aviation Neuropsychiatry Branch, USAF School of Aerospace Medicine, specialist in psychiatry and aerospace medicine

James P. Bagian, Colonel, USAFR. MC, SFS, Chief Patient Safety Officer, Department of Veterans Affairs, specialist in aerospace medicine and former NASA astronaut-physician

Mark S. Bauer, Professor of Psychiatry, Brown University & Providence Veterans Affairs Medical Center

James R. Fraser, Captain, MC, USN (ret), Deputy Federal Air Surgeon, specialist in aerospace medicine

Sandra A. Yerkes, Captain, MC, USN (ret), Director, NAVMED Medical Accessions, psychiatrist

Elizabeth K. Holmes, Captain, MSC, USN (ret), Stockdale Center for Ethical Leadership, clinical psychologist

Paul M. DeLaney, Captain, JAGC, USN, Chief of Staff, Office of the Judge Advocate General, Dept. of the Navy, medico-legal advisor

Ex officio members:

James M. Duncan, NASA Chief of Space Medicine Operations at JSC

Wayne R. Frazier, NASA Office of Safety and Mission Assurance

Consultant:

Ellen S. Baker, current NASA astronaut physician

Executive Secretary:

John R. Allen, NASA Program Executive, Crew Health and Safety

ATTACHMENT 2

Selected List of NASA Offices Involved In Astronaut Health Care and Safety

NASA Headquarters		
Office of the NASA Administrator	Oversees all agency offices, activities, and employees	
Office of Safety and Mission Assurance	Responsible for agency safety and mission assurance	Reports to the Administrator
Office of the Chief Health and Medical Officer	"*Responsible for the oversight of all medical aspects of all national and international NASA missions involving humans*," according to Dr. Williams' biography.	Reports to the Administrator
Medical Policy Board	"*Responsible for health and medical policy and oversight of medical activities*" according to a NASA charter document NC 1000-12, effective July 25, 2007	Chaired by the Chief Health and Medical Officer or designee
Johnson Space Center		
Office of Johnson Space Center Director	Oversees all employees and activities at Johnson Space Center	Reports to the Administrator
Flight Crew Operations	"*Responsible for overall planning, direction, and management of flight crew operations and JSC aircraft program activities*," according to JSC's website.	Reports to the Center Director
Space Life Sciences Directorate	Responsible for activities including the Human Research Program, Space Medicine Division, Habitability and Environmental Factors Division, and Human Adaptation and	Reports to the Center Director

	Countermeasures	
Space Medicine Division	Oversees medical activities including those of the Flight Medicine Clinic, Occupational Health Clinic, Behavioral Health Unit, and Medical Operations Group	Reports to the Director of Space Life Sciences
Aerospace Medicine Board	"*a clinical and implementing body for addressing crew medical qualifications*," according to NASA document NC 1000-12.	Chaired by a senior JSC non-astronaut physician
JSC Safety and Mission Assurance	Safety and Mission Assurance at JSC	Reports to the Center Director

Chairman UDALL. I want to first welcome all of our witnesses to today's hearing. We appreciate your service to the Nation and your assistance to this subcommittee as we carry out our oversight responsibilities.

In particular, I would like to thank Colonel Bachmann and his review committee for their efforts to provide NASA and the Congress with an independent assessment of NASA's astronaut health care system.

I would also like to thank Administrator Griffin for his willingness to ask for such a review. I think it was a good decision that reflects well on the agency.

It is clear to me, and I think all Americans, that NASA's astronauts represent the Nation's best and brightest. We all respect their skill and bravery. In carrying out their challenging missions they often make it look so easy that we sometimes forget that they are human beings who face the same medical and behavioral issues that the rest of us have to deal with, along with the added rigors of high-stress jobs, long hours of training, extended absences from families and friends, and high-risk space flights.

It is thus critically important that NASA ensure that the astronauts be provided with the best possible medical and behavioral care throughout their careers.

In addition, NASA astronauts, flight surgeons, and support personnel need to be confident that the lines of communication with the agency are open and responsive so that concerns can be quickly identified and addressed in a manner that maintains the level of trust so vital to safety and optimal performance. I don't think anyone inside NASA would disagree with those goals.

That is why after reviewing Colonel Bachmann's committee's report I decided that this subcommittee needed to hold a hearing to examine the report's findings and recommendations. However, my decision was not made for the reasons that you might think.

While there has been a great deal of attention given to the finding related to alcohol use, and I have little doubt that there will be discussion of that finding at today's hearing, too, I think we do a real disservice to the independent review committee if we ignore the warning flags they are raising about the state of communications within the agency on both medical and behavioral matters affecting the astronauts.

Let me read just a few of the findings from the report that I think should concern us all. "Many anecdotes," and I am now quoting from the report, "were related that involved risky behaviors by astronauts that were well known to the other astronauts and no apparent action was taken. Peers and staff fear ostracism if they identify their own or others' problems."

To continue quoting from the report, "Several senior flight surgeons expressed their belief that their medical opinions regarding astronaut fitness for duty, flight safety, and mission accomplishment were not valued by leadership other than to validate that all medical systems were go for an on-time mission completion. Instances were described where major crew medical or behavior problems were identified to astronaut leadership, and the medical advice was disregarded. This disregard was described as demoralizing to the point where they said they are less likely to report concerns

of performance decrement. Crew members raised concerns regarding substandard astronaut task performance which were similarly disregarded."

"As the review progressed," again, I am quoting from the report, "it became apparent that major vulnerabilities, underlying root causes, and contributing factors extend well beyond the specific medical aspects of NASA operations. These issues are so ingrained and longstanding that it will take senior leadership action to remediate them.

"There is no periodic psychological evaluation or testing conducted on astronauts. Once selected as an astronaut candidate, astronauts have no psychological evaluation for the remainder of their careers unless selected for long duration missions. Astronaut medical and behavioral health care is highly fragmented." That ends the quoting directly from the report itself.

And I don't think anyone can listen to those findings and think all is well within NASA's astronaut health care system. This subcommittee needs to hear from Colonel Bachmann the basis for his review panel's findings.

Equally important, this subcommittee needs to hear from NASA management their plans for addressing the concerns raised by the independent review, not just the alcohol-related ones.

Whatever the merits of focusing the agency's attention on trying to get employees to publicly verify or refute reports of alcohol use that those employees had provided in confidence to the independent review committee, I think it runs the risk of unintentionally worsening a communications environment at NASA in which, to quote the independent review committee, "Peers and staff fear ostracism if they identify their own or others' problems."

Instead, it may be more appropriate to the disconnect, what is being said in private and what is being said in public by NASA personnel and another indicator that the broader issues raised by the independent review committee warrant close and sustained attention. And I certainly hope that that will be the approach taken in the days and weeks ahead.

Well, we have a great deal to examine today. I again want to welcome our witnesses, and I look forward to your testimony.

[The prepared statement of Chairman Udall follows:]

PREPARED STATEMENT OF CHAIRMAN MARK UDALL

Good morning. I first want to welcome all of our witnesses to today's hearing.

We appreciate your service to the Nation and your assistance to this subcommittee as we carry out our oversight responsibilities.

In particular, I would like to thank Col. Bachmann and his review committee for their efforts to provide NASA and the Congress with an independent assessment of NASA's astronaut health care system.

I'd also like to thank Administrator Griffin for his willingness to ask for such a review—I think it was a good decision that reflects well on the agency.

It is clear to me that NASA's astronauts represent the Nation's best and brightest. We all respect their skill and bravery.

In carrying out their challenging missions, they often make it look so easy that we can sometimes forget that they are human beings who face the same medical and behavioral issues that the rest of us have to deal with, along with the added rigors of high-stress jobs, long hours of training, extended absences from families and friends, and high-risk space flights.

It thus is critically important that NASA ensure that the astronauts be provided the best possible medical and behavioral care throughout their careers.

In addition, NASA astronauts, flight surgeons, and support personnel need to be confident that the lines of communication within the agency are open and responsive so that concerns can be quickly identified and addressed in a manner that maintains the level of trust so vital to safety and optimal performance.

I don't think anyone inside NASA would disagree with those goals.

That is why after reviewing Col. Bachmann's committee's report, I decided that this subcommittee needed to hold a hearing to examine the report's findings and recommendations. However, my decision was not made for the reason you might think.

While there has been a great deal of attention given to the finding related to alcohol use—and I have little doubt that there will be discussion of that finding at today's hearing too—I think we do a real disservice to the independent review committee if we ignore the warning flags they are raising about the state of communications within the agency on both medical and behavioral matters affecting the astronauts.

Let me read just a few of the findings from the report that I think should concern us all:

- *"Many anecdotes were related that involved risky behaviors by astronauts that were well known to the other astronauts and no apparent action was taken. Peers and staff fear ostracism if they identify their own or others' problems."*
- *"Several senior flight surgeons expressed their belief that their medical opinions regarding astronaut fitness for duty, flight safety and mission accomplishment were not valued by leadership other than to validate that all (medical) systems were "go" for on-time mission completion. Instances were described where major crew medical or behavioral problems were identified to astronaut leadership and the medical advice was disregarded. This disregard was described as "demoralizing" to the point where they said they are less likely to report concerns of performance decrement. Crew members raised concerns regarding substandard astronaut task performance which were similarly disregarded."*
- *"As the review progressed, it became apparent that major vulnerabilities, underlying root causes, and contributing factors extend well beyond the specific medical aspects of NASA operations. . .These issues are so ingrained and longstanding that it will take senior leadership action to remediate them."*
- *"There is no periodic psychological evaluation or testing conducted on astronauts. Once selected as an astronaut candidate, astronauts have no psychological evaluation for the remainder of their careers unless selected for long duration missions."*
- *"Astronaut medical and behavioral health care is highly fragmented. . ."*

I don't think anyone can listen to those findings and think all is well with NASA's astronaut health care system.

This subcommittee needs to hear from Col. Bachmann the basis for his review panel's findings.

Equally importantly, this subcommittee needs to hear from NASA management their plans for addressing the concerns raised by the independent review—not just the alcohol-related ones.

Whatever the merits of focusing the agency's attention on trying to get employees to publicly verify or refute reports of alcohol use that those employees had provided in confidence to the independent review committee, I think it runs the risk of unintentionally worsening a communications environment at NASA in which, to quote the independent review committee: *"Peers and staff fear ostracism if they identify their own or other's problems."*

Instead, it may be more appropriate to take the "disconnect" between what is being said in private and what is being said in public by NASA personnel as another indicator that the broader issues raised by the independent review committee warrant close and sustained attention.

I hope that will be the approach taken in the days and weeks ahead.

Well, we have a great deal to examine today. I again want to welcome our witnesses, and I look forward to your testimony.

Chairman UDALL. The Chair now is pleased to recognize the gentleman from Florida, the Ranking Member, Mr. Feeney, for an opening statement.

Mr. FEENEY. Well, thank you, Mr. Chairman, and thank you for having this important hearing. I want to tell you that it is impor-

tant enough that the Ranking Member of the Full Committee, the esteemed Mr. Hall, is here. I offered to defer to let him give the first opening speech, but he thought our weakest link ought to go first.

But we take the challenges that NASA has in the behavioral and the physical and the psychological well being as very, very important, and this is an opportunity, both for oversight committees of Congress and NASA and other outside experts to find ways to dramatically improve as we go forward the well being of astronauts in a wide variety of areas.

After the Lisa Nowak incident earlier this year, NASA Administrator Mike Griffin, to his credit, convened the NASA Astronaut Health Care System Review Committee. I want to thank this distinguished panel of aerospace medical experts for their service. I also want to commend Administrator Griffin for inviting independent review of the health care system.

We can put the report's sensationalistic element aside for a moment. The committee provided several thoughtful recommendations to heighten the importance of human factors to improve the monitoring of each astronaut's physical and mental well being. After the Shuttle is retired, NASA's Constellation program will return Americans to the Moon for extended stays. An astronaut's physical and psychological well being will be more important in the future of America's space program and not less important.

So it is imperative to thoroughly examine this issue and establish an astronaut health care system that properly addresses future and not just current medical concerns. I note that one of the challenges in going beyond low-Earth orbit with human beings, even bigger perhaps than the mechanical and technical and scientific challenges, are the physiological challenges on astronauts that will spend extended periods in space.

Unfortunately, the report's sensationalistic element, specifically allegations of astronaut intoxication shortly before space flight, drowned out the remainder of the report. Since the report's issuance in late July, these allegations remain uncorroborated. No eye witness has come forward to specifically state who, what, when, and where.

So far the search for corroboration reveals the shortcomings of relying on anonymous allegations, and I know that the Colonel Bachmann's committee had its mission, and it did it well, and there are advantages to having anonymous and voluntary people come forward, but there are disadvantages, too. While anonymity can certainly promote candor, but without corroboration such allegations often unfairly force good men and good women to prove a negative.

My office has heard from astronauts and NASA officials all deeply devoted to human space flight and highly credible who adamantly deny this misbehavior represents current or recent conduct. These people have longstanding, firsthand knowledge of the astronaut program and simply state that alcohol influence during the immediate pre-flight period does not exist. Because an astronaut interacts with so many people during this period, I find it difficult to believe that such behavior could go undetected.

But I don't want the alcohol issue to detract from a more troublesome finding that flight surgeons and astronauts in general may be hesitant to report major crew medical or behavioral problems because their concerns would be disregarded or ignored.

And James Oberg, a distinguished and respected space commentator, followed up last month with a very thoughtful story detailing inconsistent approaches to significant astronaut health concerns.

I want to applaud NASA for being open to the committee's recommendations, and I join the distinguished Chairman of this subcommittee in suggesting that we focus on the future and how we can improve astronaut safety and well being, and I think that is the approach NASA should and will take.

This type of culture, normally called a normalization of deviance after the first Shuttle disaster, has contributed now to two Shuttle accidents. It cannot be allowed to flourish in the most demanding of human endeavors, that is human space flight. We have to be ever vigilant against such behavior, and I am very much appreciative for Chairman Udall for calling this hearing.

[The prepared statement of Mr. Feeney follows:]

PREPARED STATEMENT OF REPRESENTATIVE TOM FEENEY

After the Astronaut Lisa Nowak incident earlier this year, NASA Administrator Mike Griffin convened the NASA Astronaut Health Care System Review Committee. I want to thank this distinguished panel of aerospace medical experts for their service. I also want to commend Administrator Griffin for inviting independent review of this health care system.

If we can put the report's sensationalistic element aside for a moment, the committee provided several thoughtful recommendations to heighten the importance of human factors and to improve the monitoring of each astronaut's physical and mental well-being.

After the Shuttle is retired, NASA's Constellation program will return Americans to the Moon for extended stays. An astronaut's physical and psychological well-being will be more and not less important. So it is imperative to thoroughly examine this issue and establish an astronaut health care system that properly addresses future and not just current medical concerns.

Unfortunately, the report's sensationalistic element—allegations of astronaut intoxication shortly before space flight—drowned out the remainder of the report.

Since the report's issuance in late July, these allegations remain uncorroborated. No eyewitness has come forward to specifically state who, what, when, and where.

So far, this search for corroboration reveals the shortcomings of relying on anonymous allegations. Anonymity can certainly promote candor. But absent corroboration, such allegations unfairly force good men and women to prove a negative.

My office has heard from astronauts and NASA officials—all deeply devoted to human space flight and highly credible—who adamantly deny this misbehavior represents current or recent conduct. These people have longstanding first-hand knowledge of the astronaut program and simply state that alcohol influence during the immediate pre-flight period doesn't exist. Because an astronaut interacts with so many people during this period, I find it difficult to believe that such behavior could go undetected.

But I don't want the alcohol issue to detract from a more troublesome finding that flight surgeons and astronauts are hesitant to report "major crew medical or behavioral problems" because their concerns would be disregarded or ignored. And James Oberg—a distinguished and respected space commentator—followed up with last month's thoughtful story detailing inconsistent approaches to significant astronaut health concerns.

This type of culture—called a normalization of deviance—contributed to the *Challenger* and *Columbia* accidents. It cannot be allowed to flourish in the most demanding of human endeavors—human space flight. We must be ever vigilant against such behavior.

Today's hearing is part of that vigilance.

Chairman UDALL. Thank you, Mr. Feeney. At this point I am pleased to acknowledge the presence of the Chairman of the Full Committee, Chairman Bart Gordon, at the hearing, and I would like to ask unanimous consent to recognize him for any remarks he would like to make.

Without objection so ordered. Mr. Gordon.

Chairman GORDON. Thank you, Chairman Udall. Let me say that you and Ranking Member Feeney have made my job a lot easier. You have summed it up very well. I think there is a bipartisan interest obviously in this issue, and although the alcohol issues got a lot of the early publicity and certainly is something to be concerned about, in all reports I think it indicates that that was a very, a situation that was an anomaly.

The bigger concern is, is there an openness, is there a comfortableness within the NASA organization to other issues of flight safety? And we have different, I mean, we just have different testimony here, and I think that what I know is that there is certainly smoke. Whether there is fire, we won't be able to determine that today. I have no question that both panels are individuals of integrity, trying to do the right thing, and I think this will be a healthy exercise for NASA.

But the real question is, you know, is there that comfortableness within the NASA flight safety operation that allows everyone to step forward without feeling somehow they are ostracized, without feeling somehow they have been demoralized, quoting the report, about prior overlooks?

So, again, I welcome, and I think Mr. Feeney and Mr. Udall have summed up our charge today, and I look forward to hearing this testimony and some interaction between the members of the panels.

[The prepared statement of Chairman Gordon follows:]

PREPARED STATEMENT OF CHAIRMAN BART GORDON

Thank you, Chairman Udall, for yielding to me. I will be brief.

When NASA released the report of the independent review panel that examined NASA's astronaut health care system, it provoked a bit of a firestorm due to the report's references to astronauts and alcohol use.

Unfortunately, that firestorm has all but eclipsed what to me are some of the most important findings in the report—namely, the findings that indicate that flight surgeons and astronauts have faced difficulties in getting adequate attention paid to medical and behavioral problems.

When I read statements in the report such as:

> *"Many anecdotes were related that involved risky behaviors by astronauts that were well known to the other astronauts and no apparent action was taken. Peers and staff fear ostracism if they identify their own or other's problems."*
>
> And *"Instances were described where major crew medical or behavioral problems were identified to astronaut leadership and the medical advice was disregarded. This disregard was described as 'demoralizing' to the point where they are less likely to report concerns of performance decrement. . ."*

. . .those statements trouble me.

Getting to the bottom of the concerns raised by the panel is what I think NASA leadership needs to focus its attention on. And in getting to the bottom of those concerns, I hope NASA will heed the advice contained in Col. Bachmann's written testimony:

> *"NASA must ensure that people can identify such safety and human performance concerns within NASA without fear of reprisal or career injury. Public statements that such things are simply impossible, challenging the veracity of these*

findings rather than acknowledging how difficult raising such concerns can be, do not encourage openness and safety."

To my way of thinking—and with all due respect to Administrator Griffin—disparaging a finding in the independent review panel's report as an "urban legend" doesn't do much to encourage that needed openness. . .especially when the Chair of that same independent panel is prepared to testify that the finding is based on voluntary interviews with eyewitnesses to the incidents.

I hope NASA can move beyond such statements and instead turn its attention to giving the findings and recommendations of Col. Bachmann's panel the attention that they deserve.

He and his committee have done NASA and the Nation a service in identifying a number of issues that need attention and in offering recommendations to improve NASA's astronaut health care system.

NASA certainly doesn't have to agree with all of those findings and recommendations. But I hope that the agency will take them seriously.

We all recognize the bravery and dedication of the Nation's astronauts. We need to do our part to ensure that we give them the best astronaut medical and behavioral health care system possible.

Thank you, and I yield back my time.

Chairman UDALL. Thank you, Chairman Gordon. As Mr. Feeney noted, the Ranking Member, Mr. Hall, is also present. I would like to ask unanimous consent that he also be recognized for any opening remarks he would care to make.

Without objection, so ordered.

Mr. HALL. Mr. Chairman, thank you, and I thank you for doing what you are doing. I realize that you had to do it, and Bart Gordon is a fine Chairman and great native Tennessean, and I admire him very much, enjoy working with him.

But, you know, I am so pro-NASA and pro-space and pro-Mike Griffin that it is just really something that, accusations sound more to me like someone that is wanting to be quoted rather than something that might have happened by our most red, white, and blue members of public service at any stage here. Our very finest educated men and women that put their life in the hands of those of us who light the stick of dynamite that sends them off. Above and beyond public servants and I hate to even see a hearing on something like this, but I understand the Chairman, that it is something when you have these allegations you have to hear it, and you have to, it is best to clear the air, and I hope we can do that here.

I do want to thank you, Mr. Chairman, for—and I thank the panelists for being here today to speak on this health reports, what I would like to look at it as is most of you know I have been a longtime supporter of astronaut safety, and indeed, it has been my primary goal in relation to the U.S. space program. And I have argued for years that we need to do everything we can to insure that the men and women who are launched into outer space are prepared and equipped with everything they need to do the job and return to Earth safely. I believe this is also the goal of each and every person working on the Shuttle program at NASA.

In the wake of the *Columbia* disaster, Congress held a series of investigations aimed at addressing the problems that led to the accident, and these investigations culminated with the CAIB report that outlined suggestions for NASA. So I know that Administrator Griffin and his team have taken these suggestions seriously and have implemented a series of changes at NASA to address the concerns.

I don't look forward to the hearing, but I do look forward to staying here and listening to the testimony, particularly from the Administrator on the progress of these changes and what NASA can do to continue to improve as we move forward. And as my good friend, Representative Feeney, points out, we need to continue to be vigilant, and as this Chairman is going to do, I know from knowing him and his family before him that they will address problems and they meet problems head on at NASA and everywhere else so that there is a culture of safety that prevails.

I look forward to the hearing, and I yield back my time, and I thank the Chair.

Chairman UDALL. I thank the Ranking Member for his always insightful remarks and look forward to his participation further in the hearing.

If there are other Members who wish to submit additional opening statements, your statements will be added to the record.

Without objection, so ordered.

At this time I would like to turn to the panel and recognize our first panel witnesses. I would like to introduce everybody in the panel, and then we will come back and start with Colonel Bachmann. And I did want to initially introduce Colonel Richard E. Bachmann, who is appearing before the Subcommittee today in his capacity as the Chair of the NASA Astronaut Health Care System Review Committee.

To Colonel Bachmann's left is Dr. Richard S. Williams, who is the Chief Health and Medical Officer at NASA. Further to the left on the table is Dr. Ellen Ochoa, who is the Director of Flight Crew Operations at NASA, and our last witness on the first panel we have Mr. Bryan O'Connor, the Chief of Safety and Mission Assurance at NASA, a very esteemed and highly-qualified panel. Welcome to all of you.

As our witnesses should know, spoken testimony is limited to five minutes each, after which Members of the Subcommittee and in this case the Full Committee will have five minutes each to ask questions.

So we will begin with Colonel Bachmann. Thank you for being here, and the floor is yours, Colonel.

Panel 1

STATEMENT OF COLONEL RICHARD E. BACHMANN, JR., CHAIR, NASA ASTRONAUT HEALTH CARE SYSTEM REVIEW COMMITTEE; COMMANDER AND DEAN OF THE U.S. AIR FORCE SCHOOL OF AEROSPACE MEDICINE

Colonel BACHMANN. Mr. Chairman and distinguished Members of the Committee, good morning. It is truly an honor for me to speak to you today about the findings of the NASA Astronaut Health Care System Review Committee.

NASA chartered this committee and selected the members to review the medical and behavioral health care that is provided to astronauts, provide opinions as to what, if any, procedures or testing could be put in place to predict disordered conduct or acts of passion. The entire report, each finding and recommendation, was approved and is supported unanimously by the entire committee.

The work of further evaluation and action on the information contained within the report falls to NASA. The committee reviewed documents and conducted interviews of behavioral health medical professionals, astronauts, and family members. Because we were focused on systems issues rather than the behavior of specific individuals, we encouraged NASA personnel to speak freely and assured them that the report would not include any personally-identifiable information.

As the review progressed it became apparent that major vulnerabilities, underlying root causes, and contributing factors extend well beyond the specific medical aspects of NASA operations.

The report's most important issues and risks can be summarized in the following three areas: First, NASA personnel feels strongly that human factors concerns are disregarded to the point where they are reluctant to identify such concerns in the future.

Second, the supervisors, peers, and other NASA personnel must be empowered and expected to enforce standards of conduct.

And third, that medical and behavioral health services should be integrated and focused on astronaut performance enhancement. The perceived disregard of human factors concerns has the greatest safety implications and demands immediate attention.

Unfortunately, a disproportioned amount of attention has been focused on astronaut alcohol use. Separately, NASA astronauts and medical personnel describe two specific instances of alcohol use to the committee as examples of a much larger issue. The NASA personnel felt that human factors concerns with significant safety implications had been disregarded when raised to local on-scene leadership.

The interviewees were eyewitnesses to the events and provided the information voluntarily and unprompted to the committee. We wish to emphasize again that the specifics of the incidents should not be the focus of the attention. The general sense of disregard for human factors described as demoralizing to the point where NASA personnel are less likely to report concerns of performance decrement is the fundamental concern NASA must investigate and remedy.

We understand the outrage that some members of NASA have expressed at this particular finding. However, public statements that such things are simply impossible, challenging the veracity of the findings, referring to them as unproven allegations or urban legends rather than acknowledging how difficult raising such concerns can be, do not encourage openness and safety, make future reporting even less likely, and increase the risk of future mishaps or incidents.

The recently-released NASA space flight safety review did not prove that the evidence described to us did not happen, only that NASA personnel who shared their concerns with the committee during the interviews did not bring these same concerns forward during the safety review. We believe this may represent continued fear and barriers to communication and may be a cause for greater, not less, concern.

The committee identified a number of structural and cultural issues that currently exist in NASA that make it even more difficult to predict an episode of disordered conduct and made rec-

ommendations to ameliorate them. These recommendations include instituting a formal written code of conduct, creating enduring supervisory mentoring relationships with effective feedback and evaluation, and empowering supervisors, peers, and support staff to bring forward concerns.

Solutions will require a systems-based approach. NASA has acknowledged the intent to act upon most, if not all, of these recommendations. Each finding and recommendation should be explicitly addressed and tracked to resolution with both internal and external oversight.

We believe the first and most important step that needs to be taken by NASA is to conduct a thorough, appropriately-constructed, anonymous survey of the relevant populations covered by this report. This survey must be carefully worded in order to obtain valid, actionable information. NASA senior leadership must provide vocal support for the survey and encourage NASA personnel to be open, honest, and thorough in their replies. They must be assured of anonymity, freedom from reprisal, and that the information will be used appropriately. Otherwise the concerns will be driven further underground.

Only with such a comprehensive, anonymous, valid, and visibly-supported survey can NASA truly determine the scope of the problems and drive toward system solutions.

Thank you.

[The prepared statement of Colonel Bachmann follows:]

PREPARED STATEMENT OF COLONEL RICHARD E. BACHMANN, JR.

Mr. Chairman, Honorable Members of the Science and Technology Committee, good afternoon.

My name is Colonel Richard Bachmann. I am the Chairman of the NASA Astronaut Health Care System Review Committee. This committee was chartered by NASA in February 2007 to conduct a review of the medical and behavioral health care provided to astronauts and to provide opinions as to what, if any, procedures or testing could be put in place to predict disordered conduct or acts of passion.

In order to accomplish this review, the NASA Chief Health and Medical Officer contacted the senior medical officers of various federal agencies, such as the Department of Veterans Affairs, the Department of Defense, and the Federal Aviation Administration, and solicited nominations of "appropriately credentialed physicians and mental health professionals, employed by the Federal Government or on active duty in the military services, and experienced in medical and behavioral health support to organizations and personnel engaged in critical or hazardous operations." The NASA Chief Health and Medical Officer selected the committee members from the pool of nominees based on professional credentials, operational experience and availability. Assignment and notification to the committee members occurred in late February 2007.

I was asked by the NASA Chief Health and Medical Officer to serve as Chairman. I am an Air Force flight surgeon, specialist in Aerospace and Occupational Medicine, and until last week, I was the Commander and Dean of the US Air Force School of Aerospace Medicine. I am now the Special Assistant to the Air Force Research Laboratory Commander, and the new Commander of the US Air Force School of Aerospace Medicine works for me.

The committee members are as follows:

Colonel Timothy Sowin, Air Force flight surgeon, specialist in both psychiatry and aerospace medicine, and currently the Chief of the Aviation Neuropsychiatry branch at the U.S. Air Force School of Aerospace Medicine.

Colonel James Bagian, Air Force Reserve flight surgeon, specialist in aerospace medicine, former NASA astronaut-physician, and currently Chief Patient Safety Officer, Department of Veterans Affairs.

Mark Bauer, specialist in psychiatry, Professor of Psychiatry, Brown University and Providence Veterans Affairs Medical Center.

James Fraser, Captain U.S. Navy retired, specialist in aerospace medicine, currently Deputy Federal Air Surgeon, Federal Aviation Administration.

Sandra Yerkes, Captain U.S. Navy retired, specialist in psychiatry, currently Director, NAVMED Medical Accessions.

Elizabeth Holmes, Captain U.S. Navy retired, clinical psychologist, currently on faculty at the Stockdale Center for Ethical Leadership.

Paul DeLaney, Captain U.S. Navy Judge Advocate General Corps, currently assigned to the U.S. Navy Chief of Staff, Office of the Judge Advocate General.

Ex officio members of the committee are:

James Duncan, NASA Chief of Space Medicine Operations at Johnson Space Center

Wayne Frazier, NASA Office of Safety and Mission Assurance

Consultant—Ellen Baker, current NASA astronaut physician

Executive Secretary—John Allen, NASA Program Executive, Crew Health and Safety.

The committee members were nominated by their respective federal agencies and selected by NASA because of their diverse backgrounds, extensive experience, and professional credentials. The committee's overarching goal is to enhance the ability of NASA to perform its mission safely and effectively. All the members of the committee feel greatly honored to have been selected for this task, and look upon it as a civic duty to the Nation.

It is important to reiterate that the committee's findings, recommendations and opinions provided to NASA in this report do not reflect the official positions of the Air Force, Navy, Department of Defense, FAA, or VA. The committee was called into being by NASA to provide this report, and with the delivery of the report, the committee's mission is complete. The committee members will continue to be available to NASA to provide clarification or explanation on the report itself, but the work of further evaluation, deliberation and action on the information contained in the report falls to NASA. The committee was not intended to provide ongoing oversight or assess NASA's response to any issues raised in the report.

Our task was to identify potential vulnerabilities in NASA's medical and behavioral health system and to recommend to NASA potential corrective actions or areas requiring further study.

The committee convened for its first meeting at NASA Headquarters in Washington, DC, on March 28, 2007 and received informational briefings from a wide variety of NASA functional experts. NASA provided the committee with an extensive set of policy documents and reports for review and future reference.

After several weeks of document review, research and meetings via teleconference, the committee met at Johnson Space Center from 23 to 26 April, 2007. During this period, Johnson Space Center personnel presented informational briefings and were interviewed by the committee. Then the committee divided into small teams and conducted on-site reviews throughout the medical and behavioral health areas. These reviews consisted of document reviews and interviews with individuals and groups. NASA astronaut, medical and family support office personnel assisted in soliciting astronauts and family member volunteers to be interviewed by the committee. During the interviews, NASA personnel were encouraged to speak freely, and were assured that no personally identifiable information would be included in the report. Although the astronauts and family members interviewed do not represent a random or exhaustive sample of the larger population, the issues they raised during these unstructured interviews were remarkably consistent and compelling and deserve focused action.

The committee members met at the end of each day and reviewed their findings and observations with the entire committee. After the committee's departure from Johnson Space Center, astronauts and family members continued to contact and were interviewed by individual committee members.

Following the visit to JSC and subsequent interviews, each committee member wrote up his or her findings and recommendations and shared them with the entire committee via e-mail and telephonic discussions. The NASA astronaut advisor and ex-officio members of the committee were not included in the development of findings and recommendations, but were available to the committee to answer questions regarding NASA policies and procedures. The committee gathered at the U.S. Air

Force School of Aerospace Medicine from 30–31 May to draft the report. The committee decided to organize the report's findings and recommendations according to the specific questions given to the committee by the NASA CHMO at our initial formative meeting.

Each member was free to determine the level of significance required for any particular piece of information to be considered a finding. Each member's proposed findings and recommendations were grouped under the appropriate subject area and combined whenever possible. Each finding and recommendation was considered, discussed and carefully written to ensure significance, validity and clarity. The committee's criteria for a finding to be included in the report were based on whether the finding addressed a specific question NASA asked the committee to evaluate, and/or whether the issue identified significant concerns regarding astronaut health, flight safety or mission completion. During the initial phase of deliberations, we recognized that dissenting opinions might arise and allowed for a minority report to be included, but this proved to be unnecessary. The entire report, all findings and recommendations, were approved unanimously by the entire committee.

Work continued on the final wording for the next few weeks, with each proposed refinement reviewed and approved by the entire committee. A draft of the report was provided to NASA on June 21st for correction of any factual errors and we received their response on July 3rd. The committee formally presented the findings and recommendations to the NASA Administrator and senior NASA staff on July 16th. After some very minor revisions to provide additional clarity, the report was finalized and delivered to NASA on July 25th. NASA released the report to the public in concert with a news conference on July 27th.

The committee received outstanding support from NASA at every level of the organization. It was clear from every interview that NASA personnel are dedicated to accomplishing their mission—the interviews were characterized by openness, honesty, cooperation and a palpable desire to make things better. As the review progressed, it became apparent that major vulnerabilities, underlying root causes and contributing factors extend well beyond the specific medical aspects of NASA operations. Many of the cultural and structural issues identified in the report have existed for many years, pre-dating the current leadership team, are deeply ingrained and will take senior leadership action to remediate them.

The committee concluded that NASA's astronaut health care system provides easily accessible services to astronauts and their families, which were consistent with accepted standards of care. There is room for improvement in the provision of behavioral health services, particularly in selection, training, evaluation and support of astronauts preparing for and participating in space missions. The medical and behavioral health systems could be better integrated and focused on astronaut performance enhancement.

During the interviews, members of the NASA medical and astronaut communities raised significant concerns regarding barriers to communication. As examples of these barriers to communication, they described instances where medical personnel or fellow astronauts raised concerns about an astronaut's fitness for flight due to alcohol use in the immediate pre-flight period, and these concerns appeared to them to be disregarded or overridden. The committee is very concerned about this perception of disregard for human factors inputs, and strongly recommends that NASA conduct further evaluation using tools such as anonymous surveys, to determine the extent of such perceptions, and ensure that human factors concerns are appropriately identified and dealt with.

Unfortunately, since the release of the committee's report, a disproportionate amount of media attention has been focused on the section of the report discussing specific incidents of astronauts and alcohol use. In separate interviews, NASA astronaut and medical personnel described two specific instances of alcohol use to the committee as examples of a much larger issue: that NASA personnel felt that human factors concerns with significant safety implications had been disregarded when raised to local on-scene leadership. These incidents were described by eyewitnesses to the events, and were provided voluntarily and unprompted by NASA personnel to the committee. In order to encourage them to speak freely, the committee assured the interviewees that we would make every effort to keep names, dates and other specifics out of our notes and out of the report. The general sense of disregard for human factors, described as "demoralizing" to the point where NASA personnel are less likely to report concerns of performance decrement, is the fundamental concern NASA must investigate and address.

We understand the outrage that some members of NASA have expressed at this particular finding. The fact remains that the incidents described in the report that have generated so much concern and anger were told to the committee voluntarily by NASA personnel who were eyewitnesses to the incidents. NASA must ensure

that people can identify such safety and human performance concerns within NASA without fear of reprisal or career injury. Public statements that such things are simply impossible, challenging the veracity of these findings rather than acknowledging how difficult raising such concerns can be, do not encourage openness and safety.

Human behavior is complex. Prediction of future behavior, even by behavioral health experts, is extremely difficult to perform accurately. Systemic procedures alone cannot predict disordered conduct, but human factors concerns or issues that arise or are identified in one realm could be more effectively shared with others and potentially result in earlier intervention. The committee identified a number of structural and cultural issues that currently exist in NASA that make it even more difficult to predict an episode of disordered conduct, and made recommendations to ameliorate them. These recommendations include instituting a formal, written code of conduct, creating enduring supervisory/mentoring relationships with effective feedback and evaluation, and empowering supervisors, peers and support staff to bring forward concerns. Using similar processes, organizations as diverse as the military, the FAA and the VA have made great progress, with active supervisory and peer involvement, in changing cultural attitudes towards safety, accountability, empowerment and alcohol.

This report contains a wide range of findings and recommendations. Some of these recommendations will be relatively simple to implement, such as writing standard operating procedures to document processes, which are already in place. Some will take substantially more time and effort to implement, such as restructuring astronaut supervisory relationships or focusing the attention of psychologists on astronaut performance enhancement. Some recommendations entail changing deep seated, long standing aspects of astronaut, flight surgeon and safety cultures regarding alcohol use, code of conduct, acknowledgement of human performance issues, selection, training, evaluation and professional development, communication and privacy. None of these issues lend themselves to easy analysis or correction of a single factor. All of them require further study and evaluation by NASA. Solutions will require a systems-based approach and will take time to achieve.

We believe the three most important issues and risks in this report can be summarized in the following areas: First, NASA personnel's sense that human factors concerns are disregarded and that this has made them reluctant to identify such concerns in the future: second, that supervisors, peers and other NASA personnel must be empowered and expected to enforce standards of conduct; and third, that medical and behavioral health services should be integrated and focused on astronaut performance enhancement. The issue of perceived disregard of human factors concerns is by far the most worrisome and demanding of immediate attention.

To restate, the committee believes the first and most important step that needs to be taken by the NASA senior leadership is to conduct a thorough, anonymous survey of the relevant NASA populations covered by this report—medical personnel, astronauts, and training personnel. This survey should be carefully worded in order to obtain valid, actionable information. NASA senior leadership should provide vocal support for the survey and encourage NASA personnel to be open, honest and thorough in their replies. They must be assured of anonymity, freedom from reprisal and that the information will be used appropriately, otherwise the concerns will be driven further underground. The committee's report identified many areas of concern to NASA—only with such a comprehensive, anonymous, valid and visibly-supported survey can NASA determine the scope of the problems and drive toward systems solutions.

The committee appreciates the openness of and the assistance provided by NASA leadership, astronauts, medical personnel and family members. They clearly share the overarching goal of the committee—to enhance the ability of NASA to perform its mission safely and effectively.

Thank you.

BIOGRAPHY FOR COLONEL RICHARD E. BACHMANN, JR.

Colonel Richard E. Bachmann, Jr. is Commander and Dean of the U.S. Air Force School of Aerospace Medicine (USAFSAM), 311th Human Systems Wing, Brooks City-Base, Texas. This organization is the center for aeromedical education, training, and consultation in direct support of Air Force, Department of Defense and allied nations, providing peacetime and contingency support in hyperbaric medicine, human performance enhancement, dental investigations, aeromedical evacuation and environmental quality. It trains more than 5,000 students annually, maximizing more than $171 million in educational assets.

Colonel Bachmann was born in Grand Forks, ND and was commissioned through the Health Professions Scholarship Program. He served twice as a squadron flight

surgeon and has previously commanded at the squadron and group level. He served as the USAFE Chief of Aerospace Medicine during Operation ENDURING FREEDOM and was the Joint Task Force Surgeon for Operation ATLAS RESPONSE (Africa flood relief).

Colonel Bachmann is a chief physician and chief flight surgeon, board certified in both Aerospace Medicine and Occupational Medicine by the American Board of Preventive Medicine. He has flown over 1,400 hours in 28 aircraft types and was the first flight surgeon to fly the B–2.

EDUCATION

1982—Bachelor of Science in Biomedical Science (with High Honors), University of Michigan College of Literature, Science and the Arts, Ann Arbor, MI

1985—Aerospace Medicine Primary Course (Distinguished Graduate), USAF School of Aerospace Medicine, Brooks AFB, TX

1985—Doctorate of Medicine, University of Michigan Medical School, Ann Arbor, MI

1995—Master's degree in Public Health (Occupational Medicine), University of Michigan School of Public Health, Ann Arbor, MI

1996—Air Command and Staff College (correspondence)

1997—Residency in Aerospace and Occupational Medicine, USAF School of Aerospace Medicine, Brooks AFB, TX

1997—Air War College (correspondence), Outstanding Graduate

2001—Interagency Institute for Federal Health Care Executives, George Washington University, Washington, D.C.

2003—Master's degree in Strategic Studies (with distinction), Air War College, Air University, Maxwell AFB, AL

ASSIGNMENTS

1. June 1985–June 1986, Transitional Intern, David Grant Medical Center, Travis AFB, CA
2. July 1986–July 1989, Squadron Flight Surgeon, 48th Fighter Squadron, Langley AFB, VA
3. July 1989–July 1994, Chief of Flight Medicine, USAF Regional Hospital; later Squadron Flight Surgeon, 90th Fighter Squadron, Elmendorf AFB, AK
4. August 1994–June 1995, Resident in Aerospace and Occupational Medicine, Phase I, University of Michigan School of Public Health, Ann Arbor, MI
5. July 1995–June 1997, Resident in Aerospace and Occupational Medicine, Phases II and III, USAF School of Aerospace Medicine, Brooks AFB, TX
6. July 1997–July 1999, Commander, 48th Aerospace Medicine Squadron, RAF Lakenheath, UK
7. July 1999–July 2002, Chief, Aerospace Medicine Division, Office of the Command Surgeon, HQ USAFE, Ramstein AB, Germany
8. July 2002–June 2003, graduate student, Air War College, Air University, Maxwell AFB, AL
9. July 2003–July 2005, Commander, 509th Medical Group, Whiteman AFB, MO
10. July 2005–present, Commander and Dean, USAF School of Aerospace Medicine, Brooks City-Base, TX

FLIGHT INFORMATION

Rating: Chief Flight Surgeon, FAA private pilot

Flight Hours: More than 1,400

Aircraft flown: B–2, F–15B/D/E, C–9, E–3, E/K/RC–135, T–38 and 22 other major aircraft types

MAJOR AWARDS AND DECORATIONS

Legion of Merit

Meritorious Service Medal with three oak leaf clusters

Joint Service Commendation Medal

Air Force Achievement Medal

Global War on Terrorism Service Medal

Humanitarian Service Medal

Air and Space Campaign Medal

OTHER ACHIEVEMENTS/REGISTRY

Phi Beta Kappa Honor Society (1982)
Alpha Omega Alpha Medical Honor Society (1984)
Tactical Air Command Flight Surgeon of the Year (1988)
Diplomate of American Board of Preventive Medicine in Aerospace Medicine (1997)
Diplomate of American Board of Preventive Medicine in Occupational Medicine (1998)
Medical Licenses—Virginia, Michigan

PROFESSIONAL AFFILIATIONS

Aerospace Medical Association (Fellow and Life Member)
American College of Occupational and Environmental Medicine

EFFECTIVE DATES OF PROMOTION

Captain—10 Jun 85
Major—30 May 91
Lieutenant Colonel—30 May 97
Colonel—30 May 03

Chairman UDALL. Thank you, Colonel Bachmann.

Dr. Williams is recognized.

STATEMENT OF DR. RICHARD S. WILLIAMS, CHIEF HEALTH AND MEDICAL OFFICER, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Dr. WILLIAMS. Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to appear today to discuss the NASA Astronaut Medical and Behavioral Health Care Program. I am pleased to provide you with insight into this comprehensive program and discuss our plans regarding the findings of the NASA Astronaut Health Care System Review Committee and the internal review conducted at Johnson Space Center.

The NASA Astronaut Medical Behavioral Health Care Program has succeeded in keeping our astronauts healthy and ready to perform the challenging tasks that NASA asks of them. Over the course of our nation's 40-year human space flight endeavor, the health care system has contributed to the success of all NASA human space flight missions. No mission has thus far been abbreviated or terminated because of a health care issue. Longer duration exploration missions will provide new challenges, and we are committed to ensuring our program continues to provide the best medical and behavioral health care.

The health related recommendations of the Astronaut Health Care System Review Committee are thoughtful and will contribute to meeting the behavioral health challenges that lie ahead. I take the recommendations of the review committee seriously, and we thank the committee for all the time and effort involved in their study. Our overarching goal is to improve behavioral health and medical care for the astronauts.

Several of the committee recommendations were accepted immediately, and many more will be accepted in the coming months. Specifically, NASA accepts the recommendations concerning analysis and use of behavioral health data and will convene experts to address psychological testing as recommended.

Briefings by the flight surgeons to crew members concerning medical monitoring activities and briefings by principle investigators concerning research data collection and the context of obtaining informed consent will be re-emphasized. Effective communication between astronauts and flight surgeons will be addressed. We will ensure both groups are aware of the multiple pathways to communicate safety and health concerns, and we will be working together in support of NASA senior leadership to reinforce these concepts.

Flight surgeon scheduling and task assignment and flight medicine clinic operations will be closely examined with the goal of enhancing continuity of care to the greatest extent feasible. Options for providing effective behavioral health services to all flight assignable astronauts for the purposes of performing enhancement, performance enhancement will be reviewed, and a behavioral health assessment will be conducted as part of the annual astronaut physical examination. Options for flight surgeon behavioral health assessment training will also be identified.

A common credentialing and privileging process will be applied to behavioral health and aeromedical services, and a peer review of practice will be enhanced for both. NASA's electronic medical records system will be reexamined to provide maximum privacy consistent with safe medical practice in compliance with all applicable statutes and regulation governing privacy of medical information will be assured.

Process linkages between the behavioral health records system and the electronic medical record will be reviewed and established, and all appropriately-credentialed and privileged practitioners will be granted records access as appropriate. NASA will examine options for assuring quality of care delivered by community consultants and practitioners. Written operational instructions and procedures for the behavioral health clinic will be examined and enhanced as appropriate.

The Aerospace Medicine Board charter will be reviewed and updated to reflect appropriate membership, authority, and accountability. Regular meetings will be scheduled between behavioral health staff and flight surgeons to enhance clinical communication.

Our initial responses to the committee's recommendation were reviewed and endorsed by the NASA Medical Policy Board on August 21, 2007. The Medical Policy Board consisting of medical experts both external and internal to NASA is available to me for consultation on all NASA and medical policy.

The Medical Policy Board will provide ongoing implementation oversight, and I will provide progress reports to the NASA Administrator.

Commitment to flight safety remains the foundation of our effort, and we look forward to system improvements that will be realized as a result of this report.

I look forward to answering any questions you may have this morning.

[The prepared statement of Dr. Williams follows:]

PREPARED STATEMENT OF RICHARD S. WILLIAMS

Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to appear today to discuss the NASA Astronaut Medical and Behavioral Health Care Program. I am privileged to serve as the NASA Chief Health and Medical Officer. The Office of the Chief Health and Medical Officer was established as a new office in 2000 based on the recommendations of external advisory groups. The purpose was to provide an expanded oversight and policy role for the NASA's health care system. I am pleased to provide you with insight into NASA's comprehensive health care system and discuss our plans regarding the findings of the NASA Astronaut Health Care System Review Committee and the internal review conducted at Johnson Space Center (JSC).

Over the last two decades, the Johnson Space Center Space Medicine Division has developed an excellent relationship with the astronauts through astronaut and flight surgeon cooperation. The NASA Astronaut Medical and Behavioral Health Care program has succeeded in keeping our astronauts healthy and ready to perform the challenging tasks that NASA asks of them. Over the course of our nation's 40-year human space flight endeavor, the health care system has contributed to the success of all NASA human space flight missions. No NASA mission has thus far been shortened or terminated because of a health care issue. Longer-duration exploration missions will provide new challenges and we are committed to ensuring our program continues to provide the best medical and behavioral health care to the Astronaut Corps. The health-related recommendations of the Astronaut Health Care System Review Committee are thoughtful and will contribute to meeting the behavioral health challenges that lie ahead.

NASA Astronaut Medical and Behavioral Health Care Program

The NASA Astronaut Medical, Dental, and Behavioral Health Care program was established almost 50 years ago by NASA to ensure the health and well being of astronauts and their dependents. The program provides a comprehensive health care system for astronauts. Health care services are provided to ensure that astronauts meet established human health standards in support of mission needs.

Policy governing astronaut medical and behavioral health is set by NASA Headquarters. My office, the Office of the Chief Health and Medical Officer (OCHMO), is responsible for establishing policy and providing oversight of all NASA health and medical operations. The Johnson Space Center is responsible for management of all NASA space medical activities in support of human space flight. Astronauts and dependents have traditionally received health care services at the NASA Johnson Space Center Flight Medicine Clinic that included medical and dental care, as well as psychiatric and psychological services. As the focus of space flight changed to longer-duration missions, a separate behavioral clinic was established and behavioral health support was added to the pre-, in and post-flight support of astronauts flying on the International Space Station (ISS) and their families.

The Astronaut Medical, Dental and Behavioral Health Care program has evolved over time to meet changing mission needs and has incorporated enhancements that were a direct result of internal and external review. Notably, the Institute of Medicine (IOM) released a report in 2001 entitled "Safe Passage, Astronaut Care for Exploration Mission." This report led NASA to adopt an occupational health model for the health care of astronauts.

The findings of the *Columbia* Accident Investigation Board (CAIB) had an important impact on the NASA culture and this certainly touched the health care system. A governance structure including independent technical authorities was established to set technical standards and assure programmatic adherence to technical requirements. The Health and Medical Technical Authority was established in 2006 to take responsibility for health and medical program requirements and standards, and ensure NASA program compliance with them. The Health and Medical Technical Authority also provides a path for issues and concerns to be raised relating to crew health issues, and works very well with our occupational health model for astronaut health care delivery.

Roles, Responsibilities and Decision-making

Flight surgeons in the Space Medicine Division provide medical care to the astronauts utilizing the Flight Medicine Clinic at the Johnson Space Center. Primary medical care and annual physical examinations for aeromedical certification for space flight are performed by the flight surgeons. Medical conditions may arise that necessitate referral or consultation with external expert practitioners. Conditions that violate an established medical standard may require that an astronaut be relegated to duties not involving flying (DNIF) until the condition resolves. This is referred to as "grounding" an astronaut. Flight surgeons have the authority to ground

astronauts who have developed health conditions that prevent them from meeting medical standards. Any grounding decision is reviewed by the Chief of the Flight Medicine Clinic (FMC), and the Chair of the Aerospace Medicine Board (AMB), who must provide concurrence.

Waivers may be granted for many medical conditions if they are deemed stable and of no significance to the mission. Medical waivers must be based on best medical evidence and professional opinion and supported by sound aeromedical rationale. All cases for medical waiver consideration are reviewed by the Aerospace Medicine Board. In the case of permanent waivers, a recommendation is forwarded to me for review and disposition. The NASA Medical Policy Board (MPB), consisting of internal and external medical experts, is available to me for consultation on waiver decisions as well as all NASA medical policy matters.

Behavioral health specialists have been primarily responsible for evaluation of astronaut candidates for selection and for support of long-duration space flight astronauts and their family members. Astronauts are evaluated by psychiatrists or psychologists and are provided education and training on the rigors of long-duration space flight and confinement. This training enables the astronaut to recognize personal reactions to the isolated environment and aids the astronaut in maximizing performance and mission success. Counseling and therapy services are provided upon request to all astronauts and to all dependents. Behavioral health providers have the same authority to ground an astronaut (issue a DNIF status) and to bring a case to the AMB for evaluation and recommendation for waiver or disqualification.

Any astronaut wishing to contest a flight surgeon grounding decision can appeal to the Chief, Flight Medicine Clinic, or the Chief, Space Medicine Division. The appeal is reviewed by the Aerospace Medicine Board with a recommendation forwarded to me as indicated. Appeals can be raised directly to my attention by the astronaut for review and final decision.

Medical issues that arise immediately pre-flight or in-flight are discussed between operational, medical, and astronaut management authorities on a need-to-know basis giving due consideration to privacy, crew member health and safety, and mission impact. The Agency governance structure provides a path for dissenting opinions to be raised through the Health and Medical Technical Authority chain of command.

I made earlier reference to medical standards. They are defined to establish fitness for flight and fitness for duty. Under the leadership of the Space Medicine Division of the Space Life Sciences Directorate at the NASA Johnson Space Center, standards are developed by teams of experts in various fields of clinical medicine and aerospace medicine. The standards are reviewed and approved by the Aerospace Medicine Board at the NASA Johnson Space Center. The standards are then submitted to the OCHMO at NASA Headquarters, which authorizes a review by the Medical Policy Board (MPB) and final approval is granted for implementation. These standards were first developed in 1978 and have undergone several revisions since that time. The most recent revision was completed in July 2007.

Internal and External Review of Medical Practice

Biennial internal audits of the Flight Medicine Clinic are performed by my office. The objective of these audits is to review clinical practice, record-keeping, and compliance with applicable regulations. The most recent audit was conducted February 5–9, 2007. The findings of this review cited a number of Flight Medicine Clinic (FMC) practices as Agency Best Practices.

In addition, quarterly self-evaluations are performed to review standards of care, medical record documentation, and adherence to clinic policies and procedures. Documentation deficiencies that are identified are reviewed and corrected. In addition, the Chief of the Flight Medicine Clinic reviews all physical examinations for accuracy, consistency, and adherence to established policies.

External review of our behavioral medicine services was performed in February 2007. This review determined that NASA provided a competent group of behavioral health providers (BHP) rendering excellent clinical and occupational care. Recommendations were also made for improvement, and actions were in place to address many of these areas at the time of Dr. Bachmann's review. These actions specifically included credentialing of NASA BHP providers, privileging of BHP providers by the FMC, plans for external consultant peer review biannually by an aerospace psychiatry consultant, and implementation of a formalized, quarterly, internal peer review process.

Summary

NASA takes the recommendations of the Committee seriously, and we thank the Committee for all the time and effort involved in their study. We are evaluating

each recommendation and are in the early planning stages of responding to them. This task is made more difficult by the anecdotal nature of some of the findings of the report. Our overarching goal is to improve behavioral health and medical care for the astronauts. Several of the Committee recommendations were accepted immediately, and many more will be accepted in the coming months.

Specifically, NASA accepts the recommendations concerning analysis and use of behavioral health data, and will convene experts to address psychological testing as recommended. Briefings by the flight surgeons to crew members concerning medical monitoring activities and briefings by principal investigators concerning research data collection, in the context of obtaining informed consent, will be reemphasized. Effective communication between astronauts and flight surgeons will be addressed; we will ensure both groups are aware of the multiple pathways to communicate safety and health concerns; and we will be working together in support of NASA senior leadership to reinforce these concepts. Flight surgeon scheduling and task assignment and flight medicine clinic operations will be closely examined, with the goal of enhancing continuity of care to the greatest extent feasible. Options for providing effective behavioral health services to all flight assignable astronauts for the purposes of performance enhancement will be reviewed, and a behavioral health assessment will be conducted as part of the annual astronaut physical examination. Options for flight surgeon behavioral health assessment training will also be defined.

A common credentialing and privileging process will be applied to behavioral health and aeromedical services, and peer review of practice will be enhanced for both. NASA's electronic medical records system will be re-examined to provide maximum privacy consistent with safe medical practice, and compliance with all applicable statutes and regulations governing privacy of medical information will be assured. Process linkages between the behavioral health records system and the electronic medical record will be reviewed and established, and all appropriately credentialed and privileged practitioners will be granted records access as appropriate. NASA will examine options for assuring quality of care delivered by community consultants and practitioners. Written operational instructions and procedures for the behavioral health clinic will be examined and enhanced as appropriate. The Aerospace Medicine Board charter will be reviewed and updated to reflect appropriate membership, authority and accountability, and regular meetings will be scheduled between behavioral health staff and flight surgeons to enhance clinical communication.

These initial responses were reviewed and endorsed by the Medical Policy Board on August 21, 2007. The Medical Policy Board will provide ongoing implementation oversight. I will continue to coordinate and provide feedback to the Office of Safety and Mission Assurance and the Flight Crew Operations Directorate at the Johnson Space Center. Together we will provide regular progress reports to the NASA Administrator.

Commitment to the health and welfare of the astronauts and all NASA employees and to flight safety remains the foundation of our effort, and we look forward to system improvements that will be realized as a result of this report.

Chairman UDALL. Thank you, Dr. Williams.

Dr. Ochoa, the floor is yours for five minutes.

STATEMENT OF DR. ELLEN OCHOA, DIRECTOR, FLIGHT CREW OPERATIONS, NASA JOHNSON SPACE CENTER

Dr. OCHOA. Thank you. Good morning, Mr. Chairman, and Members of the Subcommittee. Thank you for the opportunity to appear before you today.

I have the privilege of managing the organization that includes the Astronaut Office and the Aircraft Operations Division at NASA Johnson Space Center. Prior to becoming Director of Flight Crew Operations a year ago and Deputy Director four years before that I was a member of the astronaut office for 12 years and was fortunate enough to fly on four Space Shuttle missions.

In my experience, astronauts prepare thoroughly and uncompromisingly for their missions. One of my crew mates compared it to preparing for the Olympics. Every act, every day is designed to

make sure that you are at your peak, both mentally and physically, when you launch into space.

About 10 years ago as we began assembly of the International Space Station, it became clear that astronaut preparation needed to be raised to a new level to accomplish the increased complexity of establishing and maintaining a permanent human presence in space. Along with the Missions Operations Directorate, whose job is to plan, train, and fly missions, and the Space Life Sciences Directorate, who insures the crew health, the Flight Crew Operations Directorate developed new processes, training, evaluation methods, and fitness standards to meet the challenge of assembling and operating the Space Station.

Standards for fitness for duty are determined, measured, and documented using a number of processes and tools. Comments and quantitative evaluations by instructors are documented in every phase of training and included in each astronaut's personnel file. In addition to training in many areas ranging from spacecraft systems to robotics and space walking to expedition preparation, NASA uses other processes to prepare and evaluate astronauts, including the Instructor Astronaut Program, the Commander Upgrade Program, and the Astronaut Evaluation Board. All of these are used by the Chief of the Astronaut Office in the Flight Assignment Recommendation Process.

Medical standards for flight are used by the Aerospace Medicine Board to make certification decisions. Certification results are addressed during bi-weekly meetings between astronaut and flight surgeon management. The communication and relationship between flight crew operations and the space medicine community is strong, allowing NASA to effectively address concerns regarding crew health and fitness. Flight surgeons are aware of their responsibility to assure that an astronaut's health or behavior does not present a risk to themselves or the mission, and the flight crew management, as well as NASA's leadership, support their efforts to do so.

Flight crews are very fortunate to have a group of flight surgeons who are not only excellent physicians but who understand the training and the operational environment of an astronaut and the implications of that astronaut, of that environment to astronaut health. The flight surgeons are dedicated to maintaining or returning astronauts to flight status when at all possible, keeping within the medical standards that protect health and mission success.

Following the events of last February, Johnson Space Center conducted an internal assessment, and NASA headquarters charted the Astronaut Health Care System Review Committee. While behavioral health recommendations were the focus of the health care committee report, the report also included a number of comments related to Astronaut Office behavior and processes. As the committee itself noted, they did not attempt to determine the veracity of those comments, nor was there any request for information on Astronaut Office processes, policies, or anything that could be characterized as Astronaut Office culture.

In response to the committee report NASA has taken decisive steps. Bryan O'Connor's thorough investigation confirmed my own personal experiences both as a crew member and a manager of

flight crew. We have found no instance where astronauts have used alcohol in immediate pre-flight period or were under the effects or influence of alcohol at launch. And no case where a flight surgeon or astronaut raised a concern about this to management.

NASA has also responded to the committee's report by developing an anonymous survey to determine what issues actually exist and their scope. This survey will be provided to the Astronaut Corps and flight surgeons this month. Both groups will be asked to respond to questions regarding communication, trust, and responsibilities and regarding potential concerns or barriers to raising issues with flight safety or crew suitability for flight.

Additionally, astronauts will be asked about policies and procedures dealing with astronaut performance and feedback, crew assignment, and space flight alcohol use. NASA will then develop a plan to address any issues identified by the survey report, a course of action that the committee indicated they intended as NASA's response.

In conclusion, I am extremely proud to represent the Astronaut Office, both within NASA and externally to Members of this committee, to the media, and to the public. Our astronauts are well prepared to carry out the Nation's Human Space Flight Program. They take their responsibility very seriously.

The same can be said of the entire NASA team that prepares and executes human space flight missions. The real proof of that lies in the tremendous accomplishments of our Human Space Flight Programs, accomplishments made possible by the dedicated people at NASA; our engineers, flight controllers, scientists, doctors, and astronauts.

I would be happy to respond to any questions.

[The prepared statement of Dr. Ochoa follows:]

PREPARED STATEMENT OF ELLEN OCHOA

Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to appear before you today to discuss the Astronaut Health Care System Review Committee report. I have the privilege of managing the organization that includes the Astronaut Office and the Aircraft Operations Division at the NASA Johnson Space Center in Houston, Texas. Prior to becoming Director of Flight Crew Operations one year ago, and serving as Deputy Director for four years before that, I was a member of the astronaut office for 12 years, and was fortunate enough to fly on four Space Shuttle missions.

The NASA Astronaut Office is made up of very talented and motivated people, who—after years of hard work, exceptional achievement in science and engineering education, and dedication to excellence in their careers—joined the corps through a rigorous and highly competitive selection process. Selection as an astronaut candidate is followed by years of intense preparation, including many types of training as well as work in support of all phases of the development and operations of NASA's human space flight programs. In my experience, astronauts prepare thoroughly and uncompromisingly for their missions. One of my crew mates compared it to preparing for the Olympics: every act that you do every day is designed to make sure that you are at your peak both mentally and physically when you launch into space. But at NASA, we hold our equivalent of the Olympics every few months, every time we launch a crew into space.

About 10 years ago, as we began assembly of the International Space Station (ISS), it became clear that astronaut preparation needed to be raised to a new level in order to accommodate the increased complexity and difficulty of our new mission: establishing and maintaining a permanent human presence in space. Both Shuttle missions to the Station, which can be thought of as "sprints," and the "marathon" long-duration stays on-board ISS, brought new challenges. Along with the Mission Operations Directorate—whose job is to "plan, train, and fly" missions—and the Space Life Sciences Directorate—who ensures the crew's health before, during, and

after flight—the Flight Crew Operations Directorate developed new procedures, processes, training, evaluation methods, and fitness standards to meet the challenge of successfully assembling and operating the ISS. These processes and tools have evolved over the past decade, and have served us well in preparing the corps for the rigors of space operations.

Astronaut Training and Evaluation

Standards for fitness for duty and for flight assignment are determined, measured, and documented using a number of processes and tools. Formal training, which is subject to both qualitative and quantitative evaluation, is accomplished by each astronaut in many different fields. Most of the training is conducted by the Space Flight Training Division within the Mission Operations Directorate at the Johnson Space Center. Comments and evaluations by instructors about each astronaut are documented in every phase of training and included in each astronaut's personnel file. These training records are accessible by the individual astronaut, and reviewed by the astronaut's branch chief, and the Chief of the Astronaut Office.

The main areas of training include the following:

Space Shuttle Systems and Operations, International Space Station System and Operations (including all International Partners' systems), and **Crew Resource Management** training ranges from tests of basic systems knowledge, to life-like simulations that test a crew's ability to work together to solve challenging failure scenarios.

Robotics (including the Shuttle 6-joint arm, the ISS 7-joint arm and new robotic arms from Japan and Europe), **Spacewalking** (which we refer to as Extra-vehicular Activity or EVA), and **Rendezvous** training follow formal curricula objectives; quantitative evaluations of astronauts during qualification simulations are documented in a database as part of the training records.

Aircraft training, including periodic check flights, prepares all astronauts for the high-stress, multi-task space environment, and Shuttle commanders and pilots receive detailed feedback on the hundreds of simulated Shuttle landing approaches that they fly.

Expedition Interpersonal Training is a program conducted by the Astronaut Office to provide an in-depth awareness of issues that may develop in an isolated and confined environment, such as during an extended stay on the ISS. Training includes workshops, outdoor team building and supervised leadership courses, and missions in extreme environments such as an undersea facility that place astronauts in the most realistic space analog environment available. These operational opportunities are integrated into the astronaut training program and used to provide feedback both to the astronauts and to astronaut management.

NASA also conducts various other types of training, such as **Russian language training.** Like the operational training discussed above, astronauts are rated and their evaluations are provided to each crew member and the Chief of the Astronaut Office on a periodic basis.

Other processes that NASA uses to prepare and evaluate astronauts include the following:

The **Space Shuttle Instructor Astronaut Program** provides standardization and evaluation of astronaut candidate training, continuing currency training (with a special emphasis on robotics and EVA), and assigned crew training. This program also reinforces an environment in which mentoring and knowledge sharing thrive.

The **Commander Upgrade Program** prepares mission commanders to manage crew and mission issues pre-flight, during flight, and post-flight. This program has been implemented for all Shuttle commanders since 2000; NASA plans to implement a formal program for ISS commanders to support the six-person crews that will start in 2009.

The **Astronaut Evaluation Board** is periodically convened by the Astronaut Office to review astronauts completing flight assignments, astronaut candidate training, or other astronauts recommended for review. The purpose of the Astronaut Evaluation Board is to determine the flight status of each astronaut, to decide upon corrective actions if necessary, and to pass recommendations of flight status and corrective actions to the Chief, Astronaut Office for final disposition. Astronauts who have been reviewed by the board are debriefed by the

Chief of the Astronaut Office, and the results are documented in their personnel file.

Mission performance feedback is provided by Commanders to each crew member after completion of a space mission. This personnel information on each crew member's performance includes strengths and any areas for improvement. Suggested areas of feedback include interpersonal interactions, knowledge base, attitude and work ethic, skills, and ability to balance technical assignments with training.

Flight Assignments

All of the policies, processes, and feedback described above are used by the Chief of the Astronaut Office in the flight assignment recommendation process. A particular crew assignment is based foremost on the specific mission requirements, and crew members are recommended based on their performance during training, systems knowledge and their ability to apply it in an operational environment, previous flight performance, effectiveness in technical job assignments, and assessments of leadership capability, teamwork, and judgment.

Other factors considered in flight assignment include international partner agreements, skill mix, appropriate mix of veteran and rookie crew members, anthropometric constraints due to EVA suit and vehicle sizing, and medical eligibility.

Medical Fitness for Flight and Duty

As noted in Dr. Williams' testimony, medical standards for fitness for flight and fitness for duty are developed by the Space Medicine Division of the Space Life Sciences Directorate at the NASA Johnson Space Center, in concert with experts in various medical fields internal and external to NASA. The standards are reviewed and approved at several levels, and are used by the Flight Medicine Clinic and Aerospace Medicine Board to make certification decisions. Certification results are reported to the Astronaut Office in weekly and monthly reports.

Astronaut medical issues affecting flight status for aircraft, and short and long duration space flight are also addressed during biweekly meetings between the Chief of the Astronaut Office and the Chief of the Space Medicine Division. Any medical issues that affect a member of an assigned crew are also coordinated with me and the Director of Space Life Sciences.

The communication and relationship between Flight Crew Operations and the Space Medicine community is strong and effective, allowing NASA to effectively address concerns regarding safety and crew health. Flight surgeons are aware of their responsibility to assure that an astronaut's health or behavior does not present a risk to themselves or the mission, and the Flight Crew Operations management, as well as NASA's leadership, support their efforts to do so. Medical issues that arise immediately pre-flight or in-flight are discussed among operational, medical, and astronaut management on a need-to-know basis, giving due consideration to privacy, crew member health and safety, and mission impact. NASA currently employs a system for reporting any situation requiring attention that may impact safety of flight that utilizes multiple and independent technical authority pathways outside of the flight program management to elevate and resolve concerns. Similar to the independent technical authority chain of command that deals with any technical issues related to flight safety, the agency governance structure provides a path for dissenting opinions to be raised through the Health and Medical Technical Authority chain of command. Additional program independent pathways for elevating concerns include the Johnson Space Center Safety and Mission Assurance Director or Center Director, the Center Ombuds, or to NASA Headquarters via the Chief Safety and Mission Assurance Officer, Bryan O'Connor. This governance structure is often reiterated to our employees and we have again re-emphasized these pathways to our astronauts and flight surgeons.

The flight crews are very fortunate to have a group of flight surgeons who are not only excellent physicians, but who understand the training and operational environment of an astronaut and the implications of that environment to astronaut health. The flight surgeons are tireless in their efforts to obtain the best possible care for an astronaut, during training anywhere in the world as well as in space, and they work long hours to ensure that any issue is thoroughly addressed. They are dedicated to maintaining or returning astronauts to flight status when at all possible, keeping within the medical standards that protect astronaut health and mission success.

NASA's Response to the Astronaut Health Care Review Committee Report

Following the events of last February, Johnson Space Center conducted an internal assessment to review and recommend changes to astronaut behavioral health

screening and assessment, and NASA Headquarters chartered an Astronaut Health Care Review Committee in order to more broadly review astronaut medical care, including behavioral health. There were some recommendations common to both reviews, including adding a behavioral health assessment as part of the annual astronaut physical examination. In addition, the Health Care Review Committee made a number of suggestions concerning behavioral health care, which are being followed up on by the Space Medicine Division.

While those recommendations were the focus of the review and the report, the report also included a number of comments related to astronaut office behavior and processes, based on meetings between some Committee members and some astronauts, astronaut dependents, and flight surgeons. The Committee did not attempt to determine the veracity of any statement, nor was there any request for information on astronaut office processes, procedures, policy, or anything that could be broadly characterized as astronaut office culture.

In response to the Committee report, NASA has taken decisive steps. As Bryan O'Connor has already testified, his thorough investigation confirmed my own personal experience as both a crew member and a manager of flight crew: we have found no instance where astronauts have used alcohol in the immediate pre-flight period, no instances of astronauts being under the effects or influence of alcohol at launch, and no case where a flight surgeon or astronaut has raised a concern about this to management, and, therefore, in no case was that concern ignored. To ensure that there is no future question regarding use of alcohol, I have taken the opportunity to clarify our space flight alcohol policy, and, based on Bryan O'Connor's review, will determine whether any revision or expansion of the policy is warranted.

NASA has also responded to the Committee's report by developing a systematic, comprehensive, and anonymous survey to determine what, if any, issues actually exist, which will be provided to the Astronaut Corps and flight surgeons later this month. Both astronauts and flight surgeons will be asked to respond to questions probing the relationship between the two groups and their respective managers as determined by level and quality of communication, trust, and clarity of responsibilities and authorities. Another objective is to understand any potential concerns in raising or responding to issues with flight safety or crew suitability for flight or any barriers that might exist to raising concerns. Additionally, astronauts will be asked about their understanding of and suggested changes or clarifications to policies and procedures dealing with astronaut performance and feedback, crew assignment, and space flight alcohol use. After a preliminary analysis of the survey responses has been conducted, the Chief of the Astronaut Office will hold astronaut all-hands meetings to clarify and validate the analysis in preparation for a final report. NASA will then develop a plan to address any issues identified through the survey. This is a course of action that the committee itself has indicated they intended as NASA's response to their report.

I am committed to understanding and addressing any issues that are identified by the survey, as are the Chief of the Astronaut Office, Steve Lindsey, the Chief of the Space Medicine Division, Dr. Mike Duncan, and the Director of Space Life Sciences, Dr. Jeff Davis. We are fully accountable to the Director of Johnson Space Center, Mike Coats, who in turn is accountable to the NASA Administrator. We will accomplish this while appropriately balancing these efforts with our primary duties of ensuring mission success and safety of round-the-clock flight operations on-board the ISS Program, and the planning and execution of the challenging Space Shuttle missions to complete the assembly of ISS.

Conclusion

I am extremely proud to represent the Astronaut Office, both within NASA at many different agency and program forums including flight readiness reviews and mission management team meetings, as well as externally—to the Members of this committee, to the media, and to the public. I admire and respect what America's astronauts accomplish day in and day out, while in space, in the air, and on the ground. Their hard work, dedication, and continual commitment to excellence and flight safety are the hallmarks of their profession.

I am confident that our astronauts are well-prepared to carry out the Nation's human space flight program and our next great era of Exploration; they take their responsibility very seriously. The same can be said of the entire NASA team that prepares and executes human space flight missions. The real proof of that lies in the tremendous accomplishments of our human space flight programs.

We just successfully completed STS–118, our 119th Shuttle mission, and the 22nd Shuttle mission to the ISS. Through 92 EVAs totaling 548 hours, we have learned to successfully construct complex structures, and repair and maintain them, even when the individual parts have been built and tested in several different countries

with no opportunity to do end-to-end tests prior to launch. A total of 13 countries have sent 140 people to the ISS. With the European and Japanese laboratories scheduled to launch in the near future, international cooperation will extend beyond the operational communities to the science communities. We are able to accomplish these extraordinary feats because of the extraordinary people at NASA, our engineers, flight controllers, scientists, doctors, and our astronauts.

I would be happy to respond to any questions that you have.

Chairman UDALL. Thank you, Dr. Ochoa.

Mr. O'Connor.

STATEMENT OF MR. BRYAN D. O'CONNOR, CHIEF, SAFETY AND MISSION ASSURANCE, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Mr. O'CONNOR. Mr. Chairman, Members of the Subcommittee and the Committee, thank you for this opportunity to address you on the subject of space flight crew safety.

As NASA's Chief of Safety and Mission Assurance, I report directly to our Administrator on matters dealing with ground safety and flight safety, and I also have policy and functional oversight responsibility for this agency, for the safety organizations assigned to each of the centers across the agency. My organizational relationships with flight crew operations and with the Chief Health and Medical Officer are included in my written remarks.

In its final report dated 27-July-2007, the Astronaut Health Care System Review Committee found the following: "Interviews with flight surgeons and astronauts identified episodes of heavy use of alcohol by astronauts in the immediate pre-flight period which led to flight safety concerns. Two specific instances were described where astronauts had been so intoxicated prior to flight that flight surgeons and or fellow astronauts raised concerns to local, on-scene leadership regarding flight safety. However, the individuals were still permitted to fly."

In response, the Deputy Administrator appointed me to review the reported allegations. The purpose of my review is two-fold. Number one, evaluate the committee's finding related to the inappropriate use of or abuse of alcohol by astronauts in the immediate pre-flight space flight period. And two, evaluate relevant existing policies covering alcohol use and abuse at NASA.

My approach to the review was to learn as much as I could about the reported allegations through interviews, data searches, and history review. The goal here was to establish the nature and the scope of any flight crew alcohol abuse, thus enabling a more informed course of action in our policies, procedures, risk mitigation strategies, our authority structure, and communication systems.

The scope of my review was limited to space flight, with focus on the activities on launch day from crew wake up until launch. For this potential flight safety issue, the relevant question was, did we have an instance where a crew member presented on launch morning in an impaired state, was it observed as such by the flight surgeon or another crew member, and then over their objections was cleared to fly that day by operational management?

Consistent with our standard approach to anonymous safety concerns, my investigative method included a search of over 1,500 anonymous reporting system and confidential hotline reports going back to 1987, when we first established the NASA Safety Reporting

System. And with the help of the NASA Safety Center we searched literally tens of thousands of mishap and close call records going back that same length of time. I received inputs by phone, e-mail, in person, from over 130 individuals who have been involved one way or another in activities during the last few days before launch, either at the Kennedy Space Center or at the Baikonur Cosmodrome in Kazakhstan. I heard from every one of our current operational flight surgeons and nearly 80 percent of the current Astronaut Corps and many former astronauts.

I also talked to suit technicians, medical staff, operational managers, crew quarters managers, food preparation and service staff, and closeout crew technicians. The closeout crew are the last people to see the crew before launch.

To supplement this review I reminded members of the flight community at all times that they should use the hotlines and the NASA Safety Reporting System for any flight safety information they felt reluctant to provide to me in an open forum, and I reviewed those hotlines and NSRS System throughout.

Also, NASA's preparing a focused anonymous survey as a follow up to this. This survey will try to flush out any residual concerns in this or other areas covered by the committee report.

Within the scope and the limitations of my review, I was not able to verify any case in which an astronaut space flight crew member was impaired on launch day or any case where a NASA manager disregarded recommendations by a flight surgeon or another crew member that an astronaut crew member not be allowed to fly on the Shuttle or the Soyuz. Should such a situation present itself in the future, I am confident from my review that there are reasonable safeguards in place, including such things as the flight surgeon check that morning, the presence of flight crew managers, TV cameras, suit technicians, and other technical and administrative staff and supervisors that would keep us from ever allowing an impaired crew member from boarding a spacecraft.

As for the chance that we will disregard a flight surgeon or a crew member's safety concerns, I found that although there may be occasional disagreements among operations and medical team members, all parties understood their roles and authorities and the multiple safety reporting and appeal paths we have put in place, some as late as the last two years.

My report makes one recommendation to improve flight surgeon oversight during launch day activities and several recommendations concerning relevant agency policies that should be improved for scope and clarity. This review is complete, but I have reminded our workforce that any alcohol abuse or other flight safety threats should be reported in an open forum or if necessary, through any one of the several anonymous reporting systems we have in place at NASA.

Thank you.

[The prepared statement of Mr. O'Connor follows:]

PREPARED STATEMENT OF BRYAN D. O'CONNOR

Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to address the Subcommittee on the subject of flight crew safety.

My name is Bryan O'Connor, NASA's Chief, Safety and Mission Assurance. I report directly to Dr. Griffin on matters dealing with ground and flight safety, and

I have policy and functional oversight responsibility for the safety organizations assigned to each of the Centers across the Agency, as well as to all Agency programs. My counterpart for health and medical matters is Dr. Rich Williams, NASA's Chief Health and Medical Officer, as well as the Agency's Designated Safety and Health Official. He has policy and functional oversight over of all health and medical activities at NASA. We both have oversight of astronaut-related activities; my emphasis is on safety and his is on health. I have a close relationship with the Johnson Space Center Director, Mike Coats, who is responsible for the health and safety of the astronauts. We and our delegates all share seats at readiness reviews and management councils as the agendas dictate. I have no direct oversight over health or behavioral issues except as they become or threaten to become safety issues. We ensure that appropriate safety and medical experts are members of human experimentation safety reviews, and we require medical or human factors professionals on all of our mishap investigation boards. Finally, following a recommendation from the *Challenger* accident, there is a standing flight safety panel chaired by an experienced astronaut who supports my human space flight activities, including selected assessments and readiness reviews.

There are several high level directives outlining NASA's health and safety programs, the highest being NPD 8710.2, NASA Safety and Health Program. Below that policy directive are other policy documents that outline responsibilities and contain requirements and standards for our programs. Examples are directives on occupational health and safety, emergency preparedness, and mishap reporting. Under our program management policies is the NASA Human Rating Requirements directive. All of these directives outline responsibilities for people in operations, medical and safety organizations. My organization has the authority to assure compliance with these policies and requirements. When we conduct audits, we always include appropriate operational and medical professionals to evaluate compliance with requirements in their areas of expertise.

The Astronaut Health Care System Review Committee Report

In its final report, dated 27 July, 2007, the Astronaut Health Care System Review Committee found the following: "Interviews with flight surgeons and astronauts identified episodes of heavy use of alcohol by astronauts in the immediate pre-flight period, which has led to flight safety concerns." Specifically, the report noted that "Two specific instances were described where astronauts had been so intoxicated prior to flight that flight surgeons and or fellow astronauts raised concerns to local on-scene leadership regarding flight safety. However, the individuals were still permitted to fly." The report findings, if true, describe a serious close call. NASA takes this matter very seriously as it represents a threat to our mission, and is a clear affront to NASA's core values of safety, integrity, teamwork and mission success. To address this potentially serious safety risk, NASA decided that a review of the events and circumstances was required. The Deputy Administrator chartered me to conduct a review that would evaluate the Committee's finding related to the inappropriate use or abuse of alcohol by astronauts in the immediate pre-flight period. My charter further calls for a review of existing policies and procedures related to alcohol use and space flight crew medical fitness during the immediate pre-flight preparation.

The Committee report offered three recommendations related to their alcohol abuse finding which cover policies dealing with alcohol use and abuse as well as communication management of safety concerns by crew members and flight surgeons. My approach to the review was to learn as much as I could about the reported allegations in order to establish the nature and scope of any flight-day impairment and subsequent override of legitimate flight surgeon or crew objections. This would enable a more informed course of action in our policies, procedures, risk mitigation strategies and communications systems. This review would be supplemented by ongoing safety and health actions responsive to other parts of the Committee report, an anonymous survey being prepared for distribution in September, as well as the several open and anonymous safety reporting systems already in place.

Scope and Method

Consistent with the serious implications of the Committee's report, my focus was on alcohol use or abuse that would have resulted in impairment on the day of launch. Equally important in my review was the reported disregard by management for the flight surgeon's or crew's recommendation against flight. I did not review alcohol use in general or as an aircraft safety issue, although I did review relevant policies to ensure that they are or will be consistent for space flight, aircraft flying and other mission critical activities. My question was, "did we actually have a case

where we strapped, or almost strapped, an impaired astronaut into a spacecraft over the objections of his or her flight surgeon, and if so, how did we get to that point, and what policies, procedures, risk mitigators do we need to change to avoid such an event in the future?"

The Committee Chairman provided a few important details about these incidents in his press conference, and a subsequent discussion with me, but he was unable to give us more information, references, timelines or sources for the reported allegations due to promised anonymity for witnesses. Therefore, I resorted to investigation techniques consistent with our other anonymous reporting systems. I reviewed relevant policies, procedures and near-launch timelines and staffing. I inspected the crew quarters facilities at both Johnson and Kennedy Space Centers, and interviewed managers familiar with the Cosmonaut crew quarters in Kazakhstan. I reviewed results from the Johnson Space Center and Space Shuttle Program hotlines, the NASA Safety Reporting System (NSRS), and NASA's close call and mishap reporting systems for evidence related to astronaut alcohol abuse and space or aircraft flight. My data search went back 20 years, a time-span where U.S. astronauts flew 94 Shuttle missions and 10 Soyuz missions.

I also reached out to people who spent time as crew members or in support roles in the crew quarters at the Kennedy Space Center and the Baikonur Cosmodrome in Kazakhstan. This included current and former astronauts, flight surgeons, research and operations support nurses, Shuttle suit technicians, close-out-crew technicians, and the managers and staff of the crew (quarantine) quarters. I asked them to volunteer any information they could give me about this matter. Consistent with safety investigation techniques, I avoided leading questions, and medical privacy matters not directly related to flight safety, allowing the individuals to give me whatever information they considered relevant. I heard from more than 90 individuals representing all of the groups mentioned. Although I received a good response, there are, understandably, still some who might be reluctant to come forward without a guarantee of anonymity. Therefore, I made it clear to all possible witnesses that they could use the confidential hotline or the anonymous NASA Safety Reporting System to tell me their story. In summary, this was a safety review, not a disciplinary investigation. The NASA Inspector General has announced his intent to review the results of this review, and if necessary to follow as appropriate to his authority and oversight responsibilities.

Results

The results of my inquiry and data search to date are as follows:

1. Alcohol, mostly wine and beer, is available in the crew quarters quarantine facilities for use by astronauts during off-duty hours. This practice exists under a combination of societal norms and local standard operating procedures.
2. Of the thousands of government mishaps and close calls recorded since the inception of our electronic mishap databases in the late 80s and early 90s, *none* involved alcohol or drug use or abuse by an astronaut.
3. Of the 680 anonymous safety concerns reported to and investigated by the NASA Safety Reporting System since its inception in 1987, *none* involved astronaut alcohol or drug use or abuse.
4. Of the 863 Safety Hotline reports recorded since its inception in 1991 to the present, *none* involves alcohol or drug use or abuse by an astronaut.
5. Although Johnson Space Center does not reveal the identities of personnel involved in disciplinary actions, the most recent report to OSHA covering the years 2002 through 2006 includes a total of seven such actions related to alcohol or drugs at the center. Informal input from Flight Crew Operations was that *none* of these involved astronauts.
6. Of the more than 90 individuals who answered my call for information, *not one* offered any evidence of alcohol use or abuse in the immediate pre-flight timeframe: Shuttle, Soyuz, or T–38, and none revealed any cases where management disregarded flight surgeon or crew concerns about crew alcohol and space flight.
7. Regarding relevant policy, there are some gaps in scope, and some areas in need of clarification.

My review revealed that, although alcohol is available to crew members, it is not known to be used during work hours or beyond the start of the mandatory sleep period, which begins at about 18 hours prior to launch for rendezvous missions (i.e., Space Station), and 12 hours before launch for other missions. Most people involved in the day of launch activities in crew quarters found it hard to imagine that a crew

member would put his/her mission and fellow crew members at risk by reporting on the day of launch impaired for space flight. Crew members reminded me that each one of them must be fit enough for an unaided emergency pad egress should there be a fire or other major emergency before liftoff. They practice this drill in the simulator and in the actual vehicle in the Terminal Countdown Demonstration Test normally held a couple of weeks before scheduled launch. Even a few seconds delay in unstrapping and egressing from the Shuttle could cost lives, and executing this demanding task while wearing heavy flight equipment takes the speed, coordination, judgment, and situational awareness that only exist in a sober crew member.

Then there is the lack of privacy. From the time the crew wakes on launch morning until they lift off, they are surrounded by crew members, managers, support crew, television crews, still photographers, crew quarters staff, etc. Breakfast, the first scheduled event, normally half a hour after wakeup, is in a room shared by their managers and other crew members. Shortly after breakfast, each crew member receives a short final visit from the flight surgeon. Although this last medical checkup is limited, the doctors tell me that it is adequate to reveal signs of alcohol impairment. Lunch is in front of live television cameras and, after lunch, the live television cameras are there for close-ups as the suit technicians, one per crew member, work closely with them through donning and system integrity checks. The doctors observe this activity as well. Walkout to the Astrovan is on live television and, when they reach the launch pad, the Close Out Crew helps the crew members don their parachute harnesses and strap them into their seats. These highly supervised, very public activities offer many opportunities to spot an impaired crew member, whether from alcohol or some other sudden medical problem, before their impairment could affect the mission. Finally, the crew commanders know that they are responsible for the performance of their crew in the training and flight environment. They know that thousands of people and millions of dollars are involved in getting a Space Shuttle to this point in the countdown, and they know the challenges and risks inherent in space flight. They know that if one of their crew members reported for work on launch morning impaired by alcohol, and a crew commander failed to report that and take other appropriate actions, that they would be held accountable nearly as much as the offending crew member.

The operation in Kazakhstan is similar to that at Kennedy Space Center, with some small differences. The crew members typically go to the Cosmonaut Hotel for quarantine two to three weeks before launch. Again, alcohol is available for off-duty hours, and there is a special ceremony held before the crew goes to the launch pad that involves a champagne toast. Those who have participated in this event told me that the amount of alcohol is very small, and most of the time, the crew members, Russian and American, only touch the glass to their lips. NASA flight surgeons did not express any concern to me about this ritual, even though it does violate the letter of most aviation alcohol policies. Another important difference in the Soyuz operation is that either the Russian or the U.S. flight surgeon has the authority to pull an impaired crew member from the flight up to and including launch morning. The Soyuz crews have fully trained backups for just such emergencies. One area of concern was that there is not always a room for the NASA flight crew management representative, who must then live across the street with the crew families in another building. This could limit crew management presence in off hours. My report recommends that NASA work with the Russian Space Agency to ensure full time accommodation for crew operational manager(s) in the Cosmonaut Hotel, thus duplicating the full time oversight situation at KSC.

As for T–38 and other aircraft flight activities, astronaut pilots come to NASA only after years of operational and flight test experience. Any pilot with a prior record of poor judgment would not be competitive in the selection process. So, it is commonly expected that those selected for the Astronaut Corps have a reasonable level of maturity as well as flying skill. They are trusted implicitly to fly professionally, and the relatively low mishap rate of NASA T–38 operations speaks to that (no class A mishaps in over 20 years and nearly 160,000 flying hours). Technically, it would not be difficult for a crew member to drink and fly impaired, especially when he or she is flying solo cross country. NASA's T–38 policy calls for 12 hours between the last drink and takeoff, and prohibits flying impaired. Also, most NASA astronaut T–38 pilots are active duty military detailees, and thus subject to the Uniform Code of Military Justice. They know that flying impaired, or acting in any manner unbecoming an officer on or off the job could be the first step to a court-martial. Having said that, some whom I interviewed admitted that it is possible that someone could have inadvertently violated the 12 hour rule by a small amount at some time in their military or NASA flying career (note: the FAA imposes an eight-hour restriction on airline pilots). However, none of them admitted to ever vio-

lating or witnessing a violation of what is arguably the more important part of any alcohol policy—that flying while impaired is prohibited.

As I looked at our policies regarding alcohol and flight, I found several areas where they conflict with one another, or are lacking in scope, specificity or clarity. For example, shortly after the Committee report was published, we realized that there is no specific "bottle to throttle" rule for space flight, as had been in place for many years for T–38 operations. As an interim step, and while we review all our policies and procedures in this area, we have since applied the T–38 rules to space flight.

Summary

Although my review by nature was not, and probably could never be, exhaustive, it represents a great deal more investigation than what I would normally do in response to an anonymous safety concern. I received over 80 percent participation of the astronaut and 100 percent participation of the flight surgeon communities. These are high percentages of survey participation, considering the substantial numbers who were engaged in the recent Shuttle mission, training in all corners of the globe, or on summer leave.

I cannot say conclusively that none of the incidents reported to the Committee ever happened. However, I was unable to verify that they did. I am confident that there are enough safeguards in the form of doctors, managers, and witnesses in place to prevent an impaired crew member from being strapped into a spacecraft. As for the relationships among flight crews, flight surgeons and operations and medical managers, I found as good a situation as I personally have seen in many years. The flight docs point with pride to the fact that, in over 25 years of Space Shuttle operations, including 119 Shuttle flights, not one has had to be terminated early for a crew medical problem. Although there may be occasional disagreements, I found that all parties understand their roles and authorities and the multiple safety reporting and appeal paths. Some or all of the reported incidents could possibly have happened during earlier times in the countdown where there are fewer witnesses and, if so, they would represent ground safety and flight schedule threats. Moreover, disregarding duly assigned flight surgeons on crew health matters is a serious matter, but the flight surgeon community was unanimous in their assurance that they have never been overruled or disregarded on a space flight safety call at launch time. This review was a focused look at the most serious implications of the Committee report. We will continue to monitor our anonymous reporting and other systems for indications of these kinds of problems. And, the safety community will continue to support the agency as it moves forward on the Health Committee's recommendations.

I will be happy to answer any questions you may have.

DISCUSSION

Chairman UDALL. Thank you, Mr. O'Connor. Thank you to the panel. We should give everybody an update. We have a looming set of votes, but we are going to start now with the first round of questions, and we will play it by ear because we do really want to hear from everybody on the panel and give everybody a chance to ask their questions.

At this point the Chair recognizes himself for five minutes.

CONTRASTING VIEWS AND FINDINGS FROM THE ASTRONAUT HEALTH CARE SYSTEM REVIEW COMMITTEE

Colonel Bachmann, I would like to focus on your testimony, and I speak for myself, although I think I might speak for other Members of the Subcommittee when I say it is hard for us to hear your testimony followed by that of the NASA witnesses and not be somewhat troubled. On the one hand your committee found that, quoting you, "Several senior flight surgeons expressed their belief that their medical opinions regarding astronaut fitness for duty, flight safety, and mission accomplishments were not valued by

leadership other than to validate that all medical systems were go for an on-time mission completion."

And to continue, "Instances were described where major crew medical or behavioral problems were identified to astronaut leadership, and the medical advice was disregarded."

And finally, your testimony and your committee relayed the following. "Crew members raised concerns regarding substandard astronaut task performance which were similarly disregarded." I then contrast that with Mr. O'Connor's space flight safety review report in which he includes an e-mail letter from all of the JSC mission operations flight surgeons in which they state, "In the course of astronaut mission, operations, and training our safety and medical concerns have not been ignored by NASA medical operations, the Astronaut Office, Mission Operations Directorate, the Aircraft Operations Directorate, NISS, and Shuttle Program Management."

And then with Dr. Ochoa's written testimony which states that, "The communication and relationship between flight crew operations and the space medicine community is strong and effective, allowing NASA to effectively address concerns regarding safety and crew health."

To pick up on what Chairman Gordon said in his remarks, it almost seems as though we are hearing about two completely different organizations. Why did your committee paint such a different picture than the one that NASA personnel is describing to the Subcommittee? And could you provide some specifics to help us better understand the basis for your committee's findings?

Colonel BACHMANN. Yes, sir, and I agree that the pictures that are painted by the two reports are diametrically in opposition.

Any answer about why would be speculation on my part. What the committee gathered together and wrote in the report and unanimously supports is what the astronauts and flight surgeons told us either face to face or over the phone during the course of our committee investigation, evaluation.

The fact that they are not coming forward with similar concerns when NASA asks the question, I believe still represents a problem. The why I think is an area of communication and concern about what is going to happen to them and what is going to be done with the information. That is why we really put a great deal of emphasis on the anonymous survey so that people feel that they can speak freely.

Chairman UDALL. Returning to your report, Colonel, "Many of the cultural and structural issues identified in this report," I am again quoting from what your committee wrote, as—let me start over. "Many of the cultural and structural issues identified in this report as problematic have existed for many years and some have existed since the earliest days of the astronaut programs. These issues are so engrained and longstanding that it will take senior leadership action to remediate them."

These are sobering words, and could you give me one or two examples of the cultural and structural issues your committee is talking about?

Colonel BACHMANN. Please keep in mind that the makeup of the committee was very diverse. We had military, flight surgeons, and health experts. We had civilians. All but one of the members of the

committee had some military experience, but we did have a member from the VA, who did not. We are familiar with the military environment, behavior of highly-skilled, highly-professional, highly-selected groups of people that still have human issues. They still fall victim to all the same kinds of issues that we do. There are doctors and military pilots and airline pilots who have trouble with drinking alcohol when they shouldn't. We have behavior problems that come as a surprise to co-workers.

And I think NASA is no different in that regard, and not to speak poorly of the Astronaut Corps, we think very highly of the astronauts, but we still remember that they are humans and fall victim to the same kinds of things we do.

The issues of the kinds of behaviors that are described should not come as a surprise to anybody who deals with people. The concern for us was that they are—they seem to come as a surprise because NASA astronauts are so very good. It is still unreasonable to think that they won't have individuals that have problems with alcohol, that they won't have individuals have problems with marital relationships, with money, and they need to set up a system where they can identify folks that are straying from the path sooner and do something about it before it becomes a major issue.

Chairman UDALL. Thank you, Colonel Bachmann. I want to recognize the Ranking Member, Mr. Feeney, and I am hopeful we might also be able to recognize the Chairman of the Full Committee, Mr. Gordon before we have to go to the Floor to vote. We will recess the Committee temporarily.

Mr. Feeney.

RISKS OF PRE-FLIGHT ALCOHOL CONSUMPTION

Mr. FEENEY. Well, thank you, and I guess I am hesitant to ask what may be the silliest question of 2007, but Mr. O'Connor, just why would it be a great risk if an astronaut or astronauts had too much to drink before flight? I have been in the simulator. I know that the medical risks, for example, vomiting into your mask are important, but if the launch is successful, the truth of the matter is that it is all technical and computer-driven. It is actually the emergency landing that is a concern, and other than it being poor practice, are there other concerns with, because the Soviets do have this tradition where shortly before takeoff they have a toast and you outlined that it is basically just touching to the lips, but in any event, it may be a silly question, but what other threats other than vomiting or the inability for somebody to safely land if there is an emergency landing would there be if astronauts were drinking immediately prior to flight?

Mr. O'CONNOR. Well, sir, let us say we had a crew of seven members getting ready to fly the Shuttle, and one of those members really didn't have much to do for the first three days of the mission. And then on day four they start working on some experiment. Even that crew member needs to be ready for an egress on the launch pad. Every single one of those crew members has to be able to convince their commander when they get onboard that they would be able to in emergency get out without assistance in case of an emergency on the launch pad, no matter what. And that really is the first challenge, I believe even before they light off the ve-

hicle and launch, is to have a crew that is fit, and they have their minds in order, and they are not going to need to be pulled out of the cockpit by somebody else, putting the crew at risk.

Mr. FEENEY. Not to mention that if one of them were caught to be drinking, you would have to cancel the whole flight potentially if you didn't have anybody to step in.

Mr. O'CONNOR. Well, that was part of my review was to look at that launch day. Is it possible that someone could actually wind up in the cockpit impaired? And if so, what sort of factors do we have in place to prevent that from happening? I found it really hard to imagine that you could get there, but let us say it wasn't alcohol. Let us say somebody fell down the stairs on their way to get suited up or banged their head into something or had a stroke, and they were perfectly fine the last time the flight surgeon looked at them. We still need to be able to look them in the eye, have the flight surgeon nearby even to the point where they walk out of the building, and I think that is one of the concerns that we had was that impairment by any means is something we want to prevent.

And we would hold off a launch, just as we did on STS–36 some years ago when the crew had a sick crew member. The flight surgeon went to management, said we got a sick crew member, management really didn't want to hear this. They were right in the middle of the launch countdown, and yet they had to agree the crew member was sick, let us know when he is ready to go, and we will launch. So he held off for two days.

DIFFERENCES AND METHODS OF THE REVIEWS

Mr. FEENEY. I mean, Colonel Bachmann and Mr. O'Connor, on the much bigger issue, and that is whether there is still a cultural problem with the comfort of reporting safety, whether it is technical, and by the way, I was there when Mike Griffin recognized, a technician that recognized on the wing I think it was, maybe he will address it later, in front of God and country and the press and other NASA employees and administrators, he recognized somebody that was literally a hero because he was a technician and discovered a problem with the exterior or the wing.

If that cultural change hasn't made its way to the medical area, that seems to be the crux of what this committee hearing is about.

Colonel Bachmann, because of the process that he used, voluntary, anonymous witnesses, finds one set of consistent testimony, and he has got a very credible panel. Mr. O'Connor finds a very different set of availability of communications and independent communication avenues and finds that nobody is reluctant to come forward. Could this be a bias in sampling error? I mean, I remember the headlines, Dewey defeats Truman because the pollsters call only people that owned telephones at the time. You got 80 percent to participate, Mr. O'Connor. Could it be that the 20 percent that didn't were part of Colonel Bachmann's report? Could it be? And he suggested in his testimony, which was not in his written testimony, that it may be an indication that there is continued fear on the part of some.

So maybe I ought to ask Mr. O'Connor that, because you have read his report. You had 80 percent compliance. Could we have a bias error here? Could we have people making false accusations to

the Bachmann committee, or could we have people that participated in his committee different than the 80 percent that participated in yours? And that would be my last question.

Mr. O'CONNOR. Well, sir, you have touched on several areas where there could have been differences. My review was conducted on a little bit different method. I put the word out to people that they can come and talk to me about whatever they feel comfortable about. I did not do, use any leading questions. I used standard safety investigation techniques.

I have to say that I got a lot more participation in this than I have ever gotten on one of these before. There were over 130 people who came forward or who answered my call specifically, because I did reach out to some people that were on certain missions that I wanted to make sure I have coverage of all the flights back through 1987. And so those weren't just people coming forward. It was me actually asking them to talk.

So it was a little bit different method. I also tried to define flight safety in a way that everybody understood, meant no kidding, impaired crew member in the cockpit. That is a different story than maybe flight safety from a generic view might be.

Chairman UDALL. Mr. O'Connor, if I might interrupt you.

Mr. O'CONNOR. Yes, sir.

Chairman UDALL. I want to make sure the Chairman given these pending votes has a chance to make any comments or ask any questions.

So the Chair recognizes the Chairman of the Full Committee, Mr. Gordon.

Chairman GORDON. Thank you, Chairman Udall. I will just make a quick—some observations.

One, Mr. O'Connor, I am a little surprised that your review was so narrow that it was—that the charge was simply as you stated limited to alcohol use on the day of launches. I would have hoped it would have been a broader view.

Dr. Ochoa, I am pleased that you are going to follow up there with this anonymous survey. I think that would be very helpful.

Dr. Williams, I thought you had a very constructive testimony. I would like if you would, you said you were going to accept, had accepted and would accept most of the recommendations. If you would, please, if you would send to us a written statement on which recommendations you will not accept and why and what kind of reporting process you are going to have.

[The information follows:]

MATERIAL REQUESTED FOR THE RECORD

NASA Astronaut Health Care System Review Committee Report Recommendations

(October 5, 2007)

NASA will address all the recommendations of the Astronaut Health Care System Review Committee Report, and will satisfy at least the spirit and intent of each recommendation. However, there are several health and medical recommendations that NASA will not implement as written for the reasons outlined below.

Recommendation 3.b.i.—Review flight surgeon task assignments and restructure where possible to enhance continuity of care. Consider

empanelling each astronaut to a team of 2–3 flight surgeons who are responsible for providing or overseeing every episode of care, whether or not they are the assigned crew surgeon.

NASA agrees that optimizing continuity of care is highly meritorious and reflects best practice. However, NASA does not believe empanelment is a solution that will be viable in the Agency's astronaut health care system. NASA flight surgeons are multi-tasked with activities that include: supporting astronaut training schedules; supporting deployed astronauts; providing health and medical support to ongoing International Space Station and Shuttle Program operations; participating in operational mission management activities; supporting the growing review board activities of the Constellation program; participating in simulations; supporting atmospheric flight operations; providing aeromedical certification services for astronauts, pilots, and flight controllers; and providing clinical care.

While NASA believes empanelment would be impractical in this multi-tasking practice setting, the Agency will review flight surgeon task assignments, including flight medicine clinic assignments, and identify any opportunities for task off-loading to enhance continuity of care.

Recommendation 6.a.i.—Develop privacy procedures that ensure that individual astronaut EMRs are viewable only on a strict need-to-know basis by those clinicians who are directly involved in relevant aspects of their care. Privacy policies should be consistent with civilian standards of practice and federal privacy laws.

NASA's electronic medical records (EMR) system is in compliance with the Privacy Act of 1974 and is consistent with civilian methods of practice. NASA's current EMR system privacy policies are similar to those in use by the Department of Defense and the Department of Veterans Affairs. NASA infers from this recommendation that access to individual EMRs should be password protected, and that only certain directly involved providers be granted access. In most EMR systems, as in NASA's, all appropriately credentialed and privileged providers can access the system, which is password protected, and then are able to access all EMRs. If NASA were to strictly interpret the model outlined in the Review Committee's recommendation, there could be untoward patient safety implications in some circumstances, such as a need for an appropriately credentialed and privileged provider—without specific individual records authority—to access a patient's record in an urgent or emergency situation. Impeding provider access to important or critical information from the record in such a situation could result in a problematic clinical outcome. NASA recognizes the critical importance of maintaining privacy and patient confidentiality. We are confident that our current EMR system provides the appropriate levels of privacy protection, balanced with patient safety, and is consistent with federal privacy laws.

Recommendation 6.f.i.—All behavioral health providers should have access to the EMR. A patient seen in behavioral health should have the clinical contact recorded in the EMR, and an explicit aeromedical disposition should be made by a flight surgeon. The full behavioral health note does not need to be included in the EMR. The behavioral health provider can discuss the case by phone or in person with the flight surgeon.

Behavioral health clinical contacts are recorded in the behavioral health records. NASA does not agree that all behavioral health episodes of care should be recorded in the EMR. We believe this could compromise privacy and serve as a disincentive for seeking behavioral health care. NASA does agree that behavioral health visits due to conditions that bear on a crew member's ability to perform their duties safely or that could impact a crew member's aeromedical certification should be recorded in the EMR, with appropriate aeromedical disposition. We also agree that the policy should be clarified to define the appropriate behavioral health information for documentation in the EMR. This will involve the development of inclusion criteria. NASA health and medical managers will coordinate the proposed criteria and policy with the Astronaut Office leadership.

And finally, it seems that, and, again, Colonel Bachmann, you know, you have the most unpleasant job here. We thank you for that. It seems that you were looking at a broader issue with more anonymous reports, although anonymous face to face, not just over the, you know, where Mr. O'Connor was looking at a more narrow,

on-the-record. So I think this can, might play some role there, and that is why I think Dr. Ochoa, your surveys would be helpful.

SCOPE OF INVESTIGATION

We are going to have to go, but I want to ask a question that I hope that you will answer when you come back, Mr. Bachmann. I quote, "Peers and staff fear ostracism if they identify their own or other problems." That is a very troubling statement. What was your review panel's basis for making that statement, and how confident are you that it doesn't represent just the view of one or two malcontents, particularly in respect to the letter that came in from the various flight surgeons?

And if you will think about that and answer that when we get back. Thank you, sir.

Chairman UDALL. Thank you, Mr. Chairman. We, the Committee stands in recess. We will return as soon as we can. Thank you.

[Whereupon, at 10:59 a.m. the Subcommittee recessed, to reconvene at 11:25 a.m., the same day.]

Chairman UDALL. I will thank you all for your patience. We will now return to questions of the first panel, and it is a great privilege to recognize the Ranking Member, the Judge and Congressman from the great State of Texas, Mr. Hall.

Mr. HALL. Thank you, Mr. Chairman.

Mr. O'Connor, the Chairman of the big Committee asked you some questions and inquired about why it was relegated to alcohol. There is a reason for that, is there not? What your scope was.

Mr. O'CONNOR. Yes, sir. The scope of my investigation was to look at the specific case that the two instances reported represented, and that was space flight safety, Soyuz, Shuttle, and to try to deal with that and try to understand whether or not we had adequate controls in place. If something like this happened, what was the nature of it so we could deal with how to remedy it?

We did not expand that to look at alcohol use among astronauts in a broader sense. That might take a different kind of study, a little longer if we were to do something like that. We didn't really need to do that. What we did was we kind of triaged this whole thing. When we first saw the words, flight safety, that, of course, raised a flag in my shop, and the very first thing we do, we did was we talked to the crew that was getting ready to launch the Shuttle. And we sat down with them, and we talked to them about communications, about dissent, what happens if the flight surgeon and the managers disagree, do they know how to use the system properly. And that was the first step.

The second step was to do this investigation, focused on flight safety for Soyuz and Shuttle. The third step then is the follow up with the anonymous survey that we will be doing that has a much broader scope. It looks at the whole aspect of communications and relationships among flight crew and flight surgeons in the broader sense.

ANONYMITY OF SURVEY

Mr. HALL. And with not having all the purported facts at your disposal, you were somewhat at a disadvantage, were you not?

Mr. O'CONNOR. Well, when I, I was at a sort of a disadvantage in that there is always a chance that someone may not feel comfortable talking to their safety guy.

Mr. HALL. Well, with no complaints against Colonel Bachmann, you weren't given the benefit of the many interviews that he made——

Mr. O'CONNOR. Oh, yes, sir.

Mr. HALL.—on many thrusts of this. Tell us about that, and I am going to ask Colonel Bachmann to give us that information, too.

Mr. O'CONNOR. Well, after we got Colonel Bachmann's report, he added some more information after that on two occasions for me, but he was hesitant and really could not give me more than that because of the promises that they had made to their own witnesses.

Mr. HALL. You are appearing in this committee and in this Congress you soon learn who you can depend on and whose word is good, and if their word is not good, nothing else is very good about them usually. And I think you took that attitude toward Colonel Bachmann, that he was keeping his word.

Mr. O'CONNOR. Yes, sir. That is why I didn't challenge it and treated it as I would any other anonymous report we get through out anonymous systems.

Mr. HALL. Colonel Bachmann, you couldn't give him all the facts because you had agreed to those from whom you extracted a lot of those facts that you wouldn't reveal their identity nor their employer. Is that correct?

Colonel BACHMANN. Yes, sir. That is correct. We acknowledge that they are all NASA personnel and astronauts and flight surgeons, but that is really as far as we were willing to go.

Mr. HALL. And you did that only because you didn't believe you could extract some of the answers from them that you extracted had you not agreed to give them the full cover. That is a correct statement, isn't it?

Colonel BACHMANN. Yes, sir. Really two-fold. We wanted them to speak freely, and we were focused on systems issues rather than any one individual.

Mr. HALL. They spoke freely knowing you weren't going to reveal their names and their employment to be scrutinized further by others who had the duty to scrutinize them further. Isn't that correct?

Colonel BACHMANN. Absolutely. Yes, sir.

ALLEGED INSTANCES OF ALCOHOL ABUSE

Mr. HALL. All right. Mr. O'Connor, then it came down to you, and you have scrutinized and observed many mishaps and many close calls, and have there ever been any that involved alcohol or drug use or abuse by astronauts since you have been doing that? Yes or no?

Mr. O'CONNOR. No, sir.

Mr. HALL. And have you, of the, I think you said 680 anonymous safety concerns, they were anonymous to Colonel Bachmann, reported to and investigated by the NASA Safety Reporting System since its inception in 1987, none of them involved alcohol, astronaut alcohol or drug use or abuse. Is that a correct statement?

Mr. O'CONNOR. That is correct.

Mr. HALL. And of the 863 safety hotline reports recorded since its inception in 1991, to the present, none involved alcohol or drug use or abuse by an astronaut. Correct?

Mr. O'CONNOR. That is correct.

Mr. HALL. And although Johnson Space Center doesn't reveal the identities of personnel involved in disciplinary actions, the most recent report to OSHA covered the years 2002, through 2006, includes a total of seven such accidents related to alcohol or drugs at the Center, and formal input from flight crew operations was that none of these involved astronauts.

Mr. O'CONNOR. That is correct.

Mr. HALL. And for the last, more than 90 individuals who answered your call for information, not one offered any evidence of alcohol use or abuse in the immediate pre-flight timeframe. Isn't that correct?

Mr. O'CONNOR. Yes, sir. With the one exception that since then there have been——

Mr. HALL. Yes.

Mr. O'CONNOR.—40 more, so I would raise that number to 130.

POLICIES TO INSURE EMPLOYEE OPENNESS

Mr. HALL. All right. And I would ask you this. I know in the aftermath of the *Challenger* and the *Columbia* accidents NASA has tried very hard to insure that there are open, independent communication paths to raise safety concerns. That is something I have been very involved in. Module, that was an escape hatch and insisted on it and had money in the budget for it a couple or three times. One time I think maybe one of the older astronauts that went up there after he was my age used a little some of that to go up and back, and I didn't like that, but I did like the fact that you were letting older astronauts go now and then.

But for those safety concerns, would you please discuss policies and or procedures that are now in place to insure employees are encouraged to report any safety flight issues, and would you please discuss how, if at all, you are changing or revising these policies?

Mr. O'CONNOR. Yes, sir. As you mentioned, we put the NASA Safety Reporting System into place after the *Challenger* accident. The purpose of it was to address those occasional cases where an employee does not feel comfortable using normal open means of communication. Maybe they had a disagreement with their supervisor and didn't feel they could go any higher. We put this system in place as a last resort for safety communications. Since its inception as you heard we have had 680 people who have used it for various reasons, including lack of communications or disregard for my concern, the kind of things that we talked about in, today. Those things have been part of that reporting system over the years.

Mr. HALL. And as my last question, I know my time is up, you, in your duty to report to the NASA Administrator, you were, as we would say in Texas, not on the ranch. You were kind of bridle haltered in that you didn't have the full facts to report to him because they weren't available to you. Is that correct?

Mr. O'CONNOR. That is one way of putting it. Yes, sir.

Mr. HALL. I yield back my time. Thank you.

Mr. LAMPSON. [Presiding] The gentleman's time is expired, and I will now claim five minutes for myself.

I want to start with Colonel Bachmann. First of all, I sort of feel a little bit like what Ralph Hall's comments were at the very beginning awhile ago. I think I am in so much awe and hold the Astronaut Corps in such respect that I wonder why we, it is unfortunate we had to have this kind of hearing. But I have a great deal of respect, and I know that the astronauts are committed to their families and to NASA and to our country and to our communities, and I have a tremendous amount of respect for everything that they do.

EXTENT OF ALLEGED ALCOHOL ABUSE

Colonel Bachmann, I know that there are a lot of astronauts who feel that the reports of alcohol use in your report have tarnished the reputation of the Astronaut Corps unfairly. As we have heard today, your report included two instances of alcohol use that NASA says it was unable to verify.

With all the confusion we have had since the report came out, I would like to sort of ask you to help us clear the air and ask just a few questions on that. Does the alcohol, does the inclusion of the alcohol incidents in your report indicate your committee thought, indicate that your committee thought that there was widespread abuse of alcohol in the Astronaut Corps?

Colonel BACHMANN. Sir, as we said in the report and as we said in the press conference when the report was released, the committee does not have sufficient information to describe the extent of alcohol use, alcohol problems in NASA in the Astronaut Corps. What we had were specific instances described to us, and we felt not as an underlying alcohol problem but as an underlying risk communication, human factors problem. And that the astronauts and flight surgeons were so concerned about how this information was handled that they brought those to us as kind of the prime examples, although they had many others. Those were the ones that were concerning most of them.

Mr. LAMPSON. How many people on your committee actually heard reports from individual astronauts regarding the alcohol use?

Colonel BACHMANN. The interviews took place over the space of several days. The bulk of them took place with multiple members of the committee in the room. The concerns brought forward by the flight surgeons, as best we can recall, we had at least three committee members in the room at the time that that particular story was told to us, the instance was described.

Mr. LAMPSON. How many people were on the committee?

Colonel BACHMANN. There are eight altogether.

Mr. LAMPSON. Eight. And three heard the——

Colonel BACHMANN. Sir, I would say at least three. Again, people were coming and going, but I know that at least three, if not more. The astronaut described alcohol incident was described to one member of the committee who brought that information back to the rest of us, and we discussed it.

Mr. LAMPSON. What were you trying to say when you included the two incidents that were volunteered to your committee by interviewees? Was there—what did you want to try to accomplish with that?

Colonel BACHMANN. Sir, again, we were highlighting the concerns that the NASA individuals felt, and they used these particular instances and others, but these particular instances were of greatest concern to them, that they used as examples of how significant safety issues did not receive traction when they were sent forward, that their professional opinions about the fitness for duty or the ability of the astronauts to do the task did not receive what they considered to be sufficient attention.

Mr. LAMPSON. Do you think that there is any real evidence to indicate that there is a significant problem with alcohol abuse in the Astronaut Corps?

Colonel BACHMANN. Sir, as we said in the report and during the press conference, we don't have a sufficient number of interviews to tell you how pervasive alcohol use problems might be. The description that we provided of the rules or lack of rules that governed use of alcohol in the crew quarters or the lack of a 12-hour rule explicitly defined for space flight, all have been validated by NASA, and in fact, those were some of the first actions they took was to institute explicit rules on the use of alcohol in those settings. So, we believe that makes the rest of the story more credible as well, the rest of the situation that they described has actually been validated by NASA.

OPENNESS OF SAFETY REPORTING/RECOMMENDATIONS AND FUTURE PROGRAMS

Mr. LAMPSON. Before he left Chairman Gordon had asked some questions, and I am going to take the remaining time to give you an opportunity to answer those. He had said what was your review panel's basis for making the statement of peers and staff fear ostracism if they identify their own or others' problems, and how confident are you that it doesn't represent just the view of one or two malcontents.

Colonel BACHMANN. Sir, the first part of that is how do we know that these don't represent just an isolated individual or a collection of individuals, and how do we reconcile that with the signed letter by it looks like the bulk of the flight surgeons at NASA. I would have to defer the answer back to the flight surgeons. In the group of people that told us that story I am confident that some of the members that signed that letter saying that they essentially, everything is fine, were present in the room when the story was told.

So I can't answer how they could tell one thing to us and a different, and sign a different letter out to NASA.

And as far as the statement about ostracism and issues with their peers, again, those were the words that the astronauts and the flight surgeons told to us. Those were not our interpretation. It is more of a summary, but those are the words that were used when the NASA people described the issue to the committee.

Mr. LAMPSON. I know my time is up, but I am going to take some of the time that Bart Gordon gave up awhile ago to get his questions in and answers, and he had gotten down to the point where he made a statement of, restatement of, "NASA must insure that people can identify such safety and performance concerns within NASA without fear of reprisal or career injury," and asked were you told of any instances where your interviewees had been sub-

jected to reprisals or had witnessed other individuals being subjected to them?

Colonel BACHMANN. Several vignettes were described where, and in this particular case flight surgeons described instances where they brought concerns forward, and they were subjected to what they called public humiliation. We didn't pursue it further than that, again, because the point of the issue was their reluctance to bring things forward because of how similar issues had been handled in the past.

Mr. LAMPSON. What does NASA need to do to fix the problem your review panel discovered? Uncovered?

Colonel BACHMANN. I think the most important thing, again, is for the NASA leadership at the highest levels to clearly state that they are concerned, and I think they have done that, and make every effort to get appropriate information that really will give them a sense for the scope of the issue. Face-to-face interviews are not the best way to get sensitive information when people feel their jobs might be at risk or that they might have other career consequences. That is why, again, we emphasized the need for a valid and anonymous survey that is not seen as a mere exercise but actually seen as vital to the success of NASA's future missions, where people will feel that they can speak freely.

If it is narrowly scoped or not clear to people that they can respond without somebody being able to figure out who said it, I am afraid that you could certainly get a useless piece of information back. And that is where I think the whole crux of the follow up to this hearing and this committee's work is to get good information from all NASA personnel affected by these issues.

Mr. LAMPSON. And the folks that I have spoken with, the leadership at NASA, areas where I have talked I believe that their commitment is to accomplish that. I think they are, I hold them in very, very high regard, and I know that they are concerned about safety and success both at NASA, and I know that we will be going forward with it.

I have gone way over my time, and I will now recognize Mr. Neugebauer from Texas. I am sorry. Mr. Bonner. Jo, excuse me.

Mr. BONNER. No problem, Mr. Chairman. Randy is a handsome fellow.

Mr. LAMPSON. Neither of you have much hair.

Mr. BONNER. I noticed that when I looked in the mirror this morning.

Colonel, let me follow up to the answer you just gave the Chairman, because I think it is timely. Could you expand on any recommendations that you would like to see that would help guide NASA in the future toward a development of more adequate follow-up surveys or questionnaires?

Colonel BACHMANN. Yes, sir. In fact, in the Air Force we have what is called a unit climate assessment that we routinely do upon taking command of a new organization, and since I have had the privilege of being a commander for a number of organizations, certainly nothing as large as NASA, but the survey is constructed with questions that you can answer on a one to five scale about how important or less important or critical or going well. You can give them the scope, you can put a number, and that actually gen-

erates some interesting data, but the more interesting data as a commander have been the free text blocks where people can type as much as they see fit to tell you what they are thinking. And honestly, if you see a comment made once and you never see it pop up again on anybody else's survey, that is interesting, and maybe you will want to go ask some more questions. But if you see similar issues come up in different voices, all pointing in the same direction, whether the number scale is consistent with that or not, you know you have got a problem, and you have to go figure out what is going on.

And the Air Force at least is, I think from where I sit, pretty good at keeping the information on who said it pretty secret. They have rules about demographics. If it asks you if you are a woman and you only have two, it will hide that information from you so you can't go figure out who the woman over 40 was in your unit that said that.

And, again, I would say that the questions need to be broadly or at least start broad and then they can get as specific as NASA sees fit, so they can answer specific questions. Are you aware of alcohol use, you know, in the immediate pre-flight period so that they were intoxicated when they went to a vehicle. That is one question. But a much broader question is are you aware of human factors issues that you feel didn't get appropriate attention. And then give them a text block where they can type in as many examples as they can think of.

So I think there is a science to conducting surveys, and I am certainly not an expert in that, but there are people who are, and I think that is who NASA is or should be looking at to help them build a survey that will get them the information they need.

Mr. BONNER. As a follow up, and this is really for the whole panel, how should NASA deal with an astronaut's natural reluctance to raise health or behavioral issues that they fear or believe may jeopardize their selection for future missions or assignments? And especially the two who have gone up. Based on your experience are your colleagues, are members of the Astronaut Corps confident that they can raise health issues or emotional or family problems without fear of jeopardizing their NASA careers? But it is really open to the whole panel.

Dr. Ochoa.

Dr. OCHOA. I will take that question, and first I would like to say that I am glad to hear that Colonel Bachmann and I are on the same page regarding the survey. We are planning a survey exactly as he has described. It will have a combination of qualitative and quantitative questions so that people do answer on a five-point scale as well as have the opportunity to write in comments in a number of cases.

I have not actually noticed astronauts being shy about bringing up issues of many different types of natures, but we want to make sure that they do feel comfortable. We believe this survey will give us some very good information about that.

We have a number of other programs in place where we emphasize to astronauts continuously about looking out for themselves and their crew mates. One of the main programs that we have is known as either crew resource management or cockpit resource

management, and you probably heard about it from the aviation industry. But a lot of it is to prevent crew error, obviously in critical situations, and what they are really looking at is not skills and knowledge but how do you understand when you or one of your crew mates may be tired, may be distracted, may not be feeling well, may be more prone to make errors. So any time we do a training session where we have a group of astronauts as a crew training together, the very first thing that we debrief is the crew resource management. And so we are always talking about looking out for each other and making sure that we are working as an effective team.

We also have a program in place called the Expedition Interpersonal Training Program, which was started several years ago because we wanted to prepare people for the long duration missions that they were going to have on the space station and also beyond. And part of that program we have workshops where we learn from previous expeditions, not only space expeditions but Antarctic expeditions, things like that, how people have dealt with interpersonal issues. We have cross cultural training since we fly with astronauts from different countries, and we sent people on outdoor leadership classes with trained supervisors where they talk about human factors issues. They talk about leadership styles, they talk about how do you keep a team going even if there are issues with one or more members of the team. The astronauts are given verbal feedback from the experienced leaders of those courses, and then each member of the team that has gone out and done this course essentially rates every other team member, sort of anonymously so at the end of that course each astronaut that has participated has feedback from every other person that they have been with to understand how they did themselves and how they are perceived by others.

Mr. BONNER. Thank you very much. We may have a follow-up question in writing to get a little bit more specific answer to the question, but thank you very much for that.

Mr. Chairman, thank you.

Chairman UDALL. Thank you, Mr. Bonner. I know we have a lot of additional questions for the panel, but we got to move to our second witness, Dr. Griffin. If I might I would like to pose one question for the record to Colonel Bachmann and also let you know per the committee rules that any member can submit additional questions for the record.

Before we broke for the votes, Colonel, I was talking about your sobering words in the committee report that issues of cultural and structural are so engrained and longstanding that it would take senior leadership action to remediate them. I would ask you to provide the Subcommittee with some specifics on the type of senior leadership action that you think are needed. Another way to put it would be what are the most important three things that NASA senior leadership needs to do to resolve the problems identified in your report so that we don't have to have another hearing like this a few years from now?

So I am not asking you to answer that today, but if you would just submit your thoughts for the record. I know the Subcommittee would appreciate it.

Colonel BACHMANN. Yes, sir. Will do.

Panel 2

Chairman UDALL. Again, I want to thank the panel. This has been very enlightening. I think I would speak for everybody on the Subcommittee when it comes to clearly every one of your commitment to NASA and to having the finest Astronaut Corps anywhere in the world. We look forward to working with you further. Thank you again, and at this point I dismiss this panel, and we will ask Dr. Griffin to join us up at the table.

Dr. Griffin, thank you for joining us. I don't think the good doctor needs an introduction of any length. We all know his talents and his commitment to NASA and his many, many successes. Thank you for joining us, and the floor is yours for as long as you need it, Dr. Griffin.

STATEMENT OF DR. MICHAEL D. GRIFFIN, ADMINISTRATOR, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Dr. GRIFFIN. Mr. Chairman, Ranking Member Hall from the Full Committee, Members, thank you very much for—Mr. Feeney, Members of the Committee, thank you for inviting me here today. I do have to admit I wish it were under better circumstances.

We all recognize that the behavior that led to the arrest of former astronaut Lisa Nowak, the murder of NASA engineer David Beverly in his office at the Johnson Space Center, and this recent report by a panel of outside experts containing allegations of improper use of alcohol by astronauts has shaken public confidence in NASA.

NASA is an institution comprised of our nation's best and brightest, an institution responsible for carrying out one of the noblest missions of our Government and our nation.

The personal conduct of NASA's workforce, including our astronauts, must be of the highest standards, beyond reproach, and day in and day out we do indeed demonstrate just such professional excellence and dedication to our mission.

But in the face of the allegations and adversity which we have encountered recently, we must ask and answer hard questions, and we have done that. The case of former astronaut Nowak is a matter for the courts to decide and is not an appropriate subject of comment for me here today.

But as a direct result of that unfortunate incident we did last February begin an in-depth review of how we might better provide for the behavioral health of our Astronaut Corps. Shana and I asked Dr. Richard Williams, NASA's Chief Health and Medical Officer, to organize a committee with membership external to NASA and having aerospace or having expertise in aerospace medicine and psychiatry to review the medical and behavioral health services provided to our astronauts.

We sought external advisors because we were concerned that we might have missed something with which others in the field with experience outside of NASA were more familiar. This review committee, chaired by Dr. Bachmann, Commander and Dean of the

U.S. Air Force School of Aerospace Medicine, provided me with their final report this past July.

Now, the report contained numerous findings and recommendations, many of which will be useful to us as we go forward. Without question, the portion of the report which has received the most attention was the citation by the panel of certain allegations of improper use of alcohol by astronauts preparing to fly, and further, that concerns expressed by flight surgeons on this point had been ignored by NASA management.

Now, given the seriousness of these allegations, the only responsible action we could take was to investigate them. Accordingly, Shana and I asked NASA's Chief of Safety and Mission Assurance, Bryan O'Connor, from whom you just heard, to conduct a careful examination of claims that astronauts had been impaired by alcohol in the immediate pre-flight period, as well as claims that management had not been responsive to concerns by flight surgeons and others about astronauts' fitness to fly.

As you have heard from Bryan, his extensive review found no evidence to support the claims that any astronauts were ever impaired by alcohol at launch time. Further, NASA's flight surgeons have voluntarily—I would say the bulk of NASA's flight surgeons have voluntarily put their names on a communication to Bryan saying that they had no evidence of impairment by astronauts on flight day, nor any instance of their concerns to management being disregarded, which has been the subject of earlier discussion.

We take and I take these allegations very seriously, just as we would any issue that could impact the safety of our missions. But at the same time I have also said that the story cited in the reports seem improbable to those of us familiar with the astronauts' rigorous and very public activities in the hours leading up to a space flight.

I personally began working with our astronauts more than 25 years ago, and I know many former and current members of the corps as valued colleagues and personal friends. The cited allegation of alcohol impairment prior to flight is simply not in accord with the behavior that I have personally seen from our flight crews.

Now, this allegation aside, the committee put substantial time, thought, and effort into their report. They really did, and we are grateful for their service in helping us to make NASA a better agency, and we are taking action to address the other concerns and recommendations from their report, which we believe will improve our astronaut health care procedures.

I have enumerated the actions we are taking in response to this report in my written testimony to this committee. One of those is that NASA's Astronaut Office is developing a formal code of conduct that will outline the professional standards expected of members of the Astronaut Corps.

Now, Chairman Udall and other Members of the this subcommittee, you will recall that many concerns about NASA's culture were expressed in both, in the aftermath of both Space Shuttle *Challenger* and *Columbia* accidents, and there were indeed unfortunate similarities in how those accidents occurred. A common

theme was the reluctance of senior managers to listen to and evaluate carefully concerns expressed by subordinates.

Nothing is more important to me than this matter. I have established as a non-negotiable criterion for management at NASA starting with those who report directly to me, that we must not fail to listen respectfully to our people. We must not fail to investigate and adjudicate the concerns which they express. We must not fail to act if necessary.

In today's NASA with the approach we have taken to implementing the recommendation of the *Columbia* Accident Investigation Board, to provide independent technical authority at NASA, every employee has at least two independent pathways which they may use to bring forth concerns to upper management. I have made the point on numerous occasions that there will be no retribution for employees at any level who bring forward a concern, that there will be praise, and that there will be respectful treatment of the concern, and it will be adjudicated. I believe that this is a matter of trust, and that this trust has been kept.

Now, I must point out that respectful treatment of an opinion does not necessarily imply a decision in one's favor. Any argument or dispute which reaches NASA managers has at least two people and almost always more who disagree, and it is not possible to decide in favor of all parties. But it is possible to provide all parties with a careful and respectful hearing, and that is what I seek for our agency.

Again, this is a matter of trust, and that is the culture change which I believe was needed and is occurring at NASA.

Now, one cannot prove a negative. I cannot prove that no one at NASA is afraid to speak up, but I hope that that is not the case, and I will use this forum to ask once again anyone who is watching this testimony, if you have a concern, please come forward, directly to me if necessary, and if necessary, I will protect your identity, but I must have facts, if they are out there, in order to make decisions.

Mr. Chairman, in this and many other ways we hope to restore any loss of public confidence in NASA that may have resulted from these unfortunate incidents.

Thank you.

[The prepared statement of Dr. Griffin follows:]

PREPARED STATEMENT OF MICHAEL D. GRIFFIN

Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to appear today to discuss NASA's Astronaut Medical and Behavioral Health Care Program, and the report of the Astronaut Health Care System Review Committee, released on July 27, 2007. In the wake of the recent incident involving former astronaut Lisa Nowak, I directed NASA's Chief Health and Medical Officer, Dr. Richard S. Williams, to conduct a review of the medical and behavioral health services available to NASA astronauts at the Johnson Space Center in Houston, Texas. My goal was to determine whether the incident may have been in any way foreseeable by those entrusted with the care of NASA astronauts. I hoped to learn whether the screening and evaluation procedures that the Agency employs for astronaut selection and assignment are as effective as they can possibly be, and whether the physical and mental health systems we have in place to support the Astronaut Corps are serving their intended purpose to the maximum possible extent.

In addition, Mike Coats, Director of Johnson Space Center (JSC), led an internal review that outlined and evaluated JSC's extensive health care programs for our astronauts, which includes their behavioral health, and recommended improvements to those programs, which we have already implemented. A more extensive behavioral health assessment will be added to annual flight physical examinations for all

astronauts. We also are emphasizing the importance of behavioral health support to Shuttle crew members, and offering time with behavioral health providers before, during and after flight. And, we are committed to improving the quality and usefulness of our psychological testing and assessment during astronaut selection.

The Review Committee convened by Dr. Williams was comprised of eight representatives of other federal agencies, highly experienced in the disciplines relevant to aerospace medicine and mental health, including a former astronaut and medical doctor. The Committee was chaired by Air Force Colonel Richard Bachmann, Commander of the U.S. Air Force School of Aerospace Medicine, from whom you have already heard today. I wish to acknowledge the commitment of time, effort, and dedication to the task put forth by Col. Bachmann and the members of the Review Committee in conducting their review and providing their report.

The Astronaut Health Care System Review Committee's report provided a number of recommendations that we believe will clearly improve our ability to provide comprehensive medical and behavioral health care support to the Astronaut Corps. Dr. Williams and his staff at both NASA Headquarters and the JSC, with the assistance of NASA's Medical Policy Review Board, have begun the process of implementing enhancements to NASA's Medical and Behavioral Health Care Program. We believe these enhancements will contribute in great measure to ensuring a continued history of stellar performance by the Astronaut Corps, while addressing gaps in support that have been identified by the Review Committee. Today you have heard Dr. Williams describe some of these improvement plans and efforts.

The Review Committee's report also contained findings that were based on anecdotal information provided to the Committee by unidentified personnel at JSC. These findings, which have received a particular focus of attention from the media, allege instances of alcohol abuse by astronauts on active flight status, and further, cite faults in communication between astronauts, their medical support professionals, and their management. The specter of problems with communication pathways between critical elements of the flight safety support team is a very serious concern, and one that I take seriously. Given the need for further information on which to make assessments regarding these findings, I asked Mr. Bryan O'Connor, NASA's Chief of Safety and Mission Assurance, to conduct an investigation into the anecdotal statements in the report related to astronauts being impaired by alcohol in the immediate pre-flight period and claims of management not being responsive to concerns by flight surgeons and others about astronauts' fitness to fly. Today you have heard Mr. O'Connor provide details of his investigation and findings. After reviewing 20 years' worth of records and interviewing scores of NASA personnel who are personally involved in, or witness to, the critical path for astronaut flight safety in the hours before launch, Mr. O'Connor was unable to find any evidence to support the claims that astronauts were ever impaired by alcohol at launch time. In fact, NASA's flight surgeons have placed their names on a communication saying that they have no evidence of alcohol impairment by astronauts on flight day, or any instances of their concerns to management being disregarded. I have stated previously that NASA takes these allegations very seriously-just as we would any issue that could impact the safety of our missions. But, at the same time, I also have said that the stories cited in the report seem improbable to those of us familiar with the astronauts' rigorous and very public activities during the hours leading up to a space flight.

Nonetheless, I remain highly cognizant of Mr. O'Connor's forthright acknowledgement, both in his summary findings and in person, that his investigation was conducted within limitations regarding anonymity, and that, in spite of overwhelming indicators that such behaviors could not occur without undue notice or redress, he cannot report conclusively that the incidents reported to the Review Committee did not happen. Therefore, it is only prudent that NASA move forward with purpose to close any gaps in policy and process, and take action to ensure that such occurrences and the possible risks that they could engender, do not ever become validated fact. I view the findings and recommendations provided by Col. Bachmann and the Members of the Review Committee as an opportunity for NASA to apply rigor and raise the standard for performance in teamwork and communication among its astronauts and their medical and behavioral flight safety team and operational flight safety personnel.

To achieve these goals, NASA's Medical Policy Board, made up of senior internal and external medical experts, is working with NASA's medical managers to determine how many of the changes and initiatives advocated by the Review Committee would fit into NASA health care procedures in a way that improves their effectiveness. We have accepted the report's recommendations concerning analysis and use of behavioral health data to improve selection criteria, and will convene expert working groups to advise us on any changes to our psychological testing. NASA is

evaluating the overall delivery of behavioral health services to astronauts and is planning additional training for flight surgeons in behavioral health assessments. As I have noted above, we will add behavioral health evaluations to annual flight physicals for all astronauts and we will strive to ensure better communication throughout the astronaut health-care system. We will work to ensure that astronauts understand fully the nature and purpose of all health related testing and data collection. We are re-evaluating our electronic medical records system to assure maximum utility and security of private medical information. Further, we are examining policies for assuring the quality of care we arrange for our astronauts by outside medical providers to determine if changes are needed. Importantly, we are working to ensure that everyone in the astronaut health care system understands the multiple pathways which are available to raise any health and safety concerns.

America's astronauts have always operated with the knowledge that much is expected of them in many areas, including personal conduct. But until now, these expectations and standards have not been codified into an official document. The JSC Astronaut Office is developing a formal code of conduct that will be a document outlining the expectations for this highly skilled group of professionals. To address organizational culture issues discussed in the report, NASA will conduct a number of internal assessments, including anonymous surveys to be completed by astronauts and flight surgeons, to provide feedback and gather information that we will use to improve communication and ensure that leadership is responsive to concerns and complaints, particularly those involving flight safety.

I am confident that the comprehensive slate of actions that is underway for improvements and enhancements to NASA's Medical and Behavioral Health System will yield a program capable of delivering the highest possible level of support to the Astronaut Corps and ensuring its continued unsurpassed performance. I am particularly proud to be making these statements today in the wake of another such demonstration of personal, professional, and technical excellence provided by the crew of the Space Shuttle Mission STS–118, which landed safely on August 21, 2007, after a very successful mission. In addition to adding a new segment to the International Space Station, successfully navigating demanding spacewalks, and delivering needed supplies to the Station, the crew and their NASA colleagues on Earth provided a fully validated example of the superb ability of the NASA team to communicate and engage in critical technical dialogue across disciplines to support educated decision-making in the face of real-time challenges. And to top it all off, through the efforts of Educator-in-Space Barbara Morgan, America's students were offered new and focused interactive opportunities to share in the excitement of this ongoing endeavor. This is the positive story that often takes a back seat to the sensational in news reports, but a story that I am honored to point out on behalf of the NASA Astronaut Corps and the teams of technical professionals that support them.

I would once again like to thank Col. Bachmann and the members of the Review Committee for their efforts. I would like to reassure the members of the Review Committee that, while much media attention has been given to the allegations relating to alcohol use, I and other NASA managers are giving the entire report the full and complete attention it deserves. We appreciate their interest in helping us to make NASA a better agency.

Again, thank you for the opportunity to appear before you today. I would be please to respond to any questions that you may have.

DISCUSSION

Chairman UDALL. Thank you, Dr. Griffin, Administrator Griffin.

I know the Subcommittee would now like to turn to some questions, and the Chair recognizes himself for five minutes.

You talked about the recommendations in the report and your intention to implement them. Do you have a timeline of which you are operating when it comes to the implementation?

IMPLEMENTATION OF RECOMMENDATIONS

Dr. GRIFFIN. Well, I don't know by what date Dr. Williams plans to bring recommendations or an assessment back to Shana and I. He probably does. My own view is that this is both important and urgent, but it is more important to get right than to get done

quickly. It is important that we treat this advice as we, as respectfully as we treat all advice from our advisory panels, whether of permanent standing such as the NASA Advisory Council or the Aerospace Safety Advisory Panel or ad hoc as was this panel. It is important that we treat their advice respectfully and that we evaluate it carefully, while nonetheless recognizing that at the end of the day you and other oversight committees and committee chairmen hold NASA responsible for our actions.

So we will evaluate the recommendations carefully. We are already of a mind, as I have said several times, to accept most of them. We will report to you any disagreement between the recommendations we choose to accept and those that we possibly think are not a good idea, and we will discuss. We will report back to you on the implementation, how the implementation is going.

And we will do it as quickly as we can do it and yet do it well.

Chairman UDALL. Thank you for that straightforward answer, Dr. Griffin.

I would like to turn to the committee's—the external committee's recommendation, in particular about carrying out a thorough anonymous survey that is carefully worded to obtain valid factual information. And Dr. Griffin, from the testimony of Dr. Ochoa and others it sounds as if NASA's prepared to conduct such a survey.

Dr. GRIFFIN. I cannot wait to do that.

Chairman UDALL. And it is not clear to me, however, that NASA has a lot of experience in crafting that kind of a carefully-worded, thorough survey that Colonel Bachmann recommended.

Could I ask you if NASA is planning to have a proposed—this proposed survey reviewed by any external organization that has expertise in this area, and if that isn't your current plan, would you be willing to do so in the interest of insuring that NASA gets the best survey possible?

Dr. GRIFFIN. I believe that Ellen expressed her agreement with Colonel Bachmann on all the points regarding the survey, and yeah, of course. We will craft what we think is the right survey, and we will have it reviewed by external experts in this matter to make sure that it is a well-done survey. In the course of pursuing my studies for an MBA I had one course in market analysis, and I feel that I am, if that course served no other purpose, it served to sensitize me to the way in which results purportedly obtained from a survey can depend on how the survey is worded and what the sampling environment is and who the target sample audience is.

So I join Colonel Bachmann in declining any expertise in this matter except to know that it is fraught with concern, and we will be very careful.

Chairman UDALL. If I could editorialize briefly knowing what I know of your private sector experience, I think you learned a lot more from that class than you suggest given the successes you have.

Dr. GRIFFIN. Well, I didn't drive anybody into bankruptcy if that is what you mean. So I will take that as an up-check.

Chairman UDALL. Be careful. We may get you involved in the sub-prime lending solutions.

Final question, Dr. Griffin. The independent review noted that employees said if they were concerned about coworkers' behaviors, they would raise concerns with a co-worker, management, or flight medicine official. However, the external reviews you have heard report notes that the flight surgeons were demoralized because their concerns were not valued. Do you have any specific plans at this point to do anything about this apparent disconnect?

Dr. GRIFFIN. Well, we, I mean, I do. Much of it will have to be, will rely, again, I will use this forum to emphasize if anyone has a concern, please use, I am sorry, NASA Safety Reporting System to write it down and send it in. Your anonymity will be protected. If anyone at NASA is concerned about an immediate supervisor or a supervisor's supervisor, then, and that concern exists, bring it to me. Many do so. My inbox stays full, and I don't think there is a person out there who can report back that a concern which was expressed to me was not dealt with, meaning, let me avoid the double negatives. I do deal with any concerns brought to me. I try to follow up.

Less formally than those mechanisms, I talk regularly, periodically with, I visit with our flight docs as I am at flight readiness reviews and Shuttle launch operations. I hope that it is clear to our flight surgeons as it is clear to our engineers and our scientists that not only do I want them to feel free to speak up, but they have an obligation to do so.

In fact, at this point I have to insert a concern. If we have people at NASA in today's environment who believe that they can't speak up for fear of retribution or ostracism, then I would urge them to go that extra mile and speak up, because that is their obligation. I need people working for NASA in this most demanding of environments where we launch people or hundreds of millions or billions of dollars of hardware into space, to work in this most demanding environment requires much. And it requires that people have the courage to bring forth their concerns through a management chain which has stated openly over and over again that you will receive a hearing.

I think our actions as a management team over the last two and a half years have supported that. When I came on board, one of the very first things I had to do was to delay a Shuttle launch that I desperately wanted to go. I had to delay it by several months because some engineers expressed to me their concerns that we had not done an adequate job of calculating all the debris trajectories, particularly ice debris and particularly off of a lock's feed line. So we did that.

Then I had to address a few months later a concern by some of our Earth scientists or some community Earth scientist who felt that their research was being modified for public release or that their concerns were not being appropriately heard, and we got all over that. And I made it clear in an extraordinarily clear written policy that the purpose of scientific and engineering investigation is to get a truth, and we do that through argument, through public discourse.

There have been other opportunities to address criticisms of lack of openness at NASA and concerns over retribution, and in every single case we have taken the side of open discourse, and I will do

it again here. So if there is anyone at NASA who has a concern, bring it forward. I need to hear it.

Chairman UDALL. Thank you, Dr. Griffin. I want to recognize the Ranking Member, but before I do, I did want to, in the context of a serious and important and substantive hearing today, comment positively on the process by which the situation with *Endeavour* was considered. I think it demonstrated the cultural changes that outside and internal groups have recommended, and perhaps it is the model also for what we are trying to do here, which is to drive some changes in how we manage the Astronaut Corps and how behavioral, medical problems but also potential upsides are reinforced and supported.

Dr. GRIFFIN. I think that process was NASA in action at its finest, and we did not launch with unanimity. Some engineers disagreed that the tile should fly, should re-enter and that a repair was needed. Others felt that it was fine. I personally heard all of the arguments on that matter, and we decided to fly, and that was the right decision as it turned out. But the people who felt we should not reenter that way were certainly not ignored or disregarded.

During that same launch operation I had lunch or I had many occasions to visit with flight docs, and I asked one of them privately, is there any possible way that you would feel a concern or an issue in bringing forth a concern, and the gentleman laughed at me and said, you are worried about a medical doctor bringing forth a concern. You know, this particular gentleman said I have no respect for a medical doctor who has a concern and fears that his job is in jeopardy.

That was an anonymous conversation, and it will stay anonymous, but there is a point there.

Chairman UDALL. Thank you. The Chair now recognizes the Ranking Member, Mr. Feeney, for five minutes or whatever time you——

NASA SAFETY CULTURE

Mr. FEENEY. Well, I will try to keep it to five. Thank you, Mr. Chairman.

And, again, I think this is an important hearing to clear the air, number one, and get this behind us, and number two, to improve any procedures that we can undertake that will help us improve, and I think that you have taken it in that spirit. And I want to tell you, you said more than once in your testimony that in the light of Nowak discussion or the Nowak incident and the discussion about astronauts flying while they may have been intoxicated preflight, that there has been a loss of confidence in NASA.

I really don't sense that, and I can tell you, I haven't lost an ounce of confidence in NASA or in you. I am confident that in complex organizations that have the most complex obligations and challenges that things are going to go wrong, and sometimes they will be technical, and sometimes they will be human factors, and sometimes they will be bad luck. But this is modern day America, 24/7 news, and bad luck doesn't happen. Everything is somebody's fault, and I think you are learning that, Dr. Griffin.

So like it or not, we are where we are, and I want to tell you I sympathize with how frustrating it is, because there were some specific anecdotes in the Bachmann report. By the way, I don't dismiss anything about the Bachmann report. I don't think you have either.

Dr. GRIFFIN. Nor did I.

Mr. FEENEY. Very credible people that I think undertook a very important mission, but the specific incidents that have made such news can't be documented or corroborated. And the more general allegations, it is a cultural problem that needs attention from the top senior leadership.

Fighting cultural problems is a little bit like shadow boxing, because I think that your administration has undertaken to change the culture of that reporting. And like I said, I witnessed the one incident live as we watched a Shuttle go off. But I guess in light of the fact that my goal is to go forward, I think that is what the Chairman of the Committee wants to do, it is what most of us want to do, and improve constantly the operations of NASA. And I am glad that we have had focus on this physiological, psychological, and physical well being.

The recommendations for the most part are not at issue that the Bachmann committee has made, but what is at issue is whether or not there is a cultural problem here. I mean, the last thing that the Colonel told us is that we need to fix the communications problem, and yet you and Dr. Ochoa and Dr. Williams and Mr. O'Connor, have said there are multiple avenues independently, anonymously that have been set in place in NASA in the last few years. And that includes flight surgeons or astronauts that have concerns about human safety.

So I guess the question I have is the Bachmann report suggests there is a cultural problem which is decades old involving communications about human well being. I am hearing from the NASA team unanimously that you do not believe that to be the case, even though you have adopted the recommendations or most of them about how to fix that communications problem.

Can you address that? Because why are we fixing something that is not broken I guess would be a simple way to ask that question.

Dr. GRIFFIN. And as the Administrator, actually, that is the most important question for me. There is, I mean, I think I have made it clear, and if anyone doubts my word, then I guess they do, but there is nothing more important to me in an agency like NASA than having an open, free, non-political discourse on difficult topics. Because what we do is not easy. We have to work very, very hard to get it right, and we don't always do that. But when we get it right, when we decide what we think the right course of action is, we should pursue that no matter what. And we only arrive at that through extensive and open discourse by all parties.

And I believe in that. Now, if we have had in the past cultural problems and we are trying to fix those, I can't guarantee that they are completely fixed. I can only, again, entreat people to trust this management team. I believe it when Colonel Bachmann says that the fact that people are willing to speak anonymously and not willing to speak face to face on the record is itself a problem. Yes, it is.

At the same time, I have no mechanism to deal with the fact of somebody saying, I have a concern, but I am afraid if I speak my concern that I will be ostracized, so I will keep it to myself. I mean, you can see the logical conundrum there.

So all we can do is, again, create a record, create a longstanding record of responding fairly, respectfully, positively to any concern brought to us and hope that that record of behavior will bring forth further behavior of the type that we seek. That is what I am desperately trying to do.

Mr. FEENEY. Thank you. I will yield back, Mr. Chairman.

Well, just briefly, and it is very hard sitting here to tell, either the Bachmann report was correct, that multiple witnesses consistently said there is a communications, intimidation factor, or what the NASA team, including you and the folks that testified before you, have said that you have done everything reasonably possible to fix it, and you are encouraging people. The recommendations that the committee made, whether the communications system now works as well as it can or not, will they do any harm if you adopt their—is it going to add new bureaucracy costs, or will, do you think those recommendations will enhance human safety regardless of whether there is a communications problem?

Dr. GRIFFIN. Well, our Medical Policy Board just looked at those issues and expressed an early view that our response to those recommendations being generally accepting of them was a good thing, and I support that view. I certainly don't think that they will do any harm. Yes, if we add additional process and procedure there is an opportunity cost of that. That means that some other activity of lesser importance will not get done. We will try to be judicious about that, and we will try not to impose a bureaucracy in our health care system.

But because communication is the sine qua non of all organizational management, we must invest in improving communication if, in fact, there are issues. I don't believe we have the issues that have been raised, and I have said that, but I am prepared to have my belief overturned by facts. I absolutely am. I can assert to you beyond question that my face-to-face communications, my telephone communications, and my e-mail communications are filled up with people who do not find me too intimidating to talk to.

But, of course, I can't identify those out there who find me too intimidating to talk to and thus are reluctant to express their opinion. So we will continue to work on encouraging open communications.

I believe in and I love this agency. I love this enterprise, you know. I love these people that we work with, and we want to make it as, the best that it can possibly be. I have never worked with finer people, and we have engaged in the process of launching folks into space or the folks who go into space. I have never worked with finer people. They are not perfect, and by the way, I am not perfect either and trying as hard as we can to get this right.

It is most difficult in the softer areas. If you want to ask me about the thermal margin on a tile, I can deal with that, probably until you fall asleep. If you want to ask me how do we know we have the best possible communications processes, I don't know. It is very hard, but we are trying.

Mr. FEENEY. Well, a great philosopher, Woody Allen, once said that 90 percent of life was just showing up, and what you are telling people if they have got problems with NASA issues, technical or human factors, they have got to show up.

Dr. GRIFFIN. Please show up. The decisions are made by the people who show up.

Mr. FEENEY. I will yield back, Mr. Chairman.

Chairman GORDON. Mr. Hall is recognized.

Mr. HALL. Mr. Chairman, thank you.

I am a little disappointed in your testimony, because you have always indicated to me that you were perfect.

Dr. GRIFFIN. Don't tell my wife.

ANONYMITY AND AUTHENTICITY OF REPORTED INCIDENTS

Mr. HALL. Right. Seriously, you know, you have to use the information you have, and you are not going to discard any of it because you need it. You need to know what the facts are, and you will run down every fact if I know you very well. I guess I can just cut mine short by saying when there is no degree of authenticity and no completely confirmed testimony, coupled with a cry or a whimper of anonymity, they don't want to be, know who they are, they are afraid they will lose their job, when you got that type witness compared with a witness such as yourself and this panel of every one of these people that are testifying, and you could testify under oath because we could require that, and you would be willing to. And the testimony is going to be read by the 435 members of the United States House of Representatives and the hundreds of their staffs over there and by millions of people that listen to you call them forth to come forth and give me that information.

Not much else you can do, is there?

Dr. GRIFFIN. If there is, I really wish someone would suggest it to me, because I would try it.

Mr. HALL. Well, you can sure remember that there is a difference in the authenticity of a guy who says I am going to tell you this, but you can't tell anybody who told it and be sure and don't tell them I work for them, and a guy that steps up there and then tows the line and tells you what the facts are and leaves you to make that decision. You are not so unfair that you would fire a guy that gave you news that you didn't like or shoot the messenger, are you?

Dr. GRIFFIN. No. I truly, I would like to assert, and it is an assertion, but I believe it can be backed up that I believe that I am and that the management team I have hired consists of people who can hear bad news, act on it, and deal with the truth and not punish the messenger. I believe that is what we have in place at NASA. If someone else believes to the contrary, then, again, I would like to hear about that, because I will fix it.

Mr. HALL. You are in the same situation of Mr. O'Connor when he said I cannot conclusively—cannot say conclusively that none of the incidents reported to the committee ever happened, however, I was unable to verify that they did. And you have to have verification, don't you?

Dr. GRIFFIN. That is correct, sir.

Mr. HALL. And you have a Chairman here, Mr. Gordon, you had the Chairman of the Subcommittee that have expressed their belief

in you and belief in the system and belief in the men and women that go at great peril into a fragile mission that is still fragile. I don't care what anybody says, and carry it out for us. Those are the people you want to believe and that you have to take testimony from, that you can rely on.

I yield back my time.

Chairman GORDON. Thank you, Mr. Hall, and Mr. Griffin or Dr. Griffin, I thank you and all of the witnesses for your time today. I apologize for the musical chairs. We have had different meetings going on.

Let me just quickly conclude. Once again, complimenting you and congratulating you on a successful *Endeavour* mission. I think it once again proves that when things work you, you are brilliant.

CHARTER OF THE NASA ASTRONAUT HEALTH CARE SYSTEM REVIEW COMMITTEE

Let me just quickly quote some conclusions from the earlier report. "Many of the cultural and structural issues identified in this report as problematic have existed for many years, and some of them have existed since the earliest days of the astronaut program. The current medical and operational leadership at NASA inherited most of the cultural and structural issues identified in this report. These issues are also engrained and longstanding and that it will take senior leadership action to remedy them."

To some extent it puts you in the position of having the push the noodle from behind. I know that is difficult. You have said all the right words today, and you meant it, and you were sincere about your openness. You do have to keep in mind, though, a lot of folks don't report directly to you, and so you know all of this. We don't have to go through that.

So let me just once again say that I was pleased with Dr. Williams' testimony, and I am sure he is going to get back to us on those, you know, what will be done and what won't be done. That will be very helpful.

I guess I will have to say why did you, or ask you why did you so narrowly define Mr. O'Connor's mission as to only inquire about alcohol abuse on the day of the mission rather than what I think are the more, and I think everybody here, you know, the larger issue of an openness and a feeling of comfort with the folks involved, being able to come forward?

Dr. GRIFFIN. Well, there is a bit of a misperception there. Bryan did as part of his charter ask also of each and every flight surgeon, have you felt uncomfortable coming forward? Do you feel comfortable coming forward? So that was part of it.

Now, the restriction to dealing with alcohol abuse in the immediate surroundings of a flight, distinguishing between urgent and important was the most urgent aspect of all of this, because that is an actual flight safety issue. Colonel Bachmann pointed out the sad truth that we are all flawed human beings, and that many very highly-accomplished people do have problems with relationships or problems with alcohol.

But if there were to be, and I am not saying that there is because I have not seen it, but if there were to be an astronaut who had a problem with alcohol but managed to suppress that problem in

the immediate flight environment, we would not have a safety or flight issue. Whereas if somehow someone managed to show up impaired for a flight, that would be a safety problem.

So with the limited amount of time to get on top of the more urgent issues, we asked Bryan to focus on dealing with those things which had been specifically raised in the report that I felt as Administrator absolutely required an early investigation.

Now, we have other things going on. We are not ignoring the other aspects. You heard Ellen Ochoa talk about the survey. We absolutely accepted that recommendation. As I said, I can't wait for the results of that survey. I want to know. We have re-emphasized NSRS. We, I have made person and public appeals for any concerns to be expressed with promises of protection for those expressing the concerns. So we are not ignoring the other aspects, but the most urgent thing was to deal with immediate safety of flight issues that potentially have been raised by that report. And that is what I asked Bryan to do.

Chairman GORDON. I just read it differently. I read the alcohol problems as isolated in the past and that he said that the bigger problem was lack of comfort by surgeons and others to be able to come, medical surgeons to be able to come forward, whether it is a diabetes problem, you know, whether it is a migraine headache that day, whether, you know, again, you know, we saw the accident two different ways. I thought he raised other issues that were more important, but I think that through this anonymous and Dr. Ochoa, I congratulate you on moving forward with that, and Dr. Williams, again, I think you have a good plan, and I think simply by raising this issue in an uncomfortable way for you, unfortunately, that it will probably do more good than anything you can do to put people on notice that these problems that you inherited need to be, or potential problems that you inherited need to be changed.

And I, again, thank you for your candor, for your service to the country, and for another successful flight. And this meeting is adjourned.

Dr. GRIFFIN. Thank you, sir.

[Whereupon, at 12:27 p.m., the Subcommittee was adjourned.]

Appendix:

Answers to Post-Hearing Questions

ANSWERS TO POST-HEARING QUESTIONS

Responses by Colonel Richard E. Bachmann, Jr., Chair, NASA Astronaut Health Care System Review Committee; Commander and Dean of the U.S. Air Force School of Aerospace Medicine

Questions submitted by Chairman Bart Gordon

Q1. In the lead-up to the findings and recommendations of the report, you note that many of the cultural and structural issues in the report have gone on for many years. Could you be more specific on cultural and structural issues that are problematic? What was the basis for that overarching finding?

A1. With regard to cultural and structural issues, the Committee was referring to the dominance of science and engineering perspectives (over medical and human factors analysis) within NASA and an organizational structure that places the Astronaut Board and the NASA research and engineering sciences in a position of vast empowerment as contrasted to the NASA medical organization. Astronauts select those who become Astronauts, perpetuating pre-existing perspectives and potential biases. Committee members reviewed the detailed reports of the *Challenger* and *Columbia* mishaps, as well as the Institute of Medicine Report (concerning the challenges posed by long duration space exploration missions). Many of the concerns raised in the Committee report echoed the findings of those reports, suggesting to the Committee that the cultural and structural issues were longstanding.

Q1a. The report states that "these issues are so ingrained and longstanding that it will take senior leadership action to remediate it"? *What actions should NASA senior leadership take?*

A1a. As previously discussed, NASA should administer a well-constructed, anonymous survey to determine the extent of the issues identified to the Committee during the interviews. Next, NASA senior leadership should initiate efforts to emphasize the importance of human factors awareness starting with workplace functional areas in such a way that appreciation of human factors concerns is vastly elevated from the current state. Committee members were told that it was common for NASA engineers to estimate that the likelihood of a human factors related contribution to an adverse event was "zero." While the Committee recognized that the NASA Astronaut selection process was one of the most rigorous in the world, selection of outstanding individuals simply cannot eliminate human vulnerability, particularly when under great stress. NASA leaders should instill concerns for mutual support, recognition of signs of stress or interpersonal strain, small unit empowerment to pursue those signs of stress or interpersonal strain, and an aim to intervene early with an effort to head trouble off early, with an effort toward avoiding interpersonal crises such as occurred with former Astronaut Lisa Nowak, rather than conducting damage control after the fact.

Q1b. How do the issues on NASA's culture that were raised by the committee's assessment compare with the cultural environment of the Air Force, Navy, or other high-risk operations?

A1b. Within U.S. military flying organizations there is a greater appreciation for the possibility of adverse human factors degrading the performance of aircrew, resulting in increased risk of mishap, potentially to a point that those human factors issues become causal or contributory to a mishap sequence. Certainly military flying units pride themselves in mission accomplishment and take substantial risks in training and in operational flying. Commanders and leaders of military flying organizations appear far more concerned with the potential impact of unchecked human factors than their NASA counterparts. NASA rightly assumes they have selected the very best and brightest personnel. To the Committee, NASA appeared to be overestimating the durability of that selection process with resultant complacency concerning human factors. Within military flying organizations much time, energy, and attention is given to the aviator showing possible signs of performance decrement owing to a troubled marriage, recent disappointments, repeated time away from home (owing to deployments), etc. Every interview of NASA personnel conducted by the Committee encountered observations of NASA personnel that all of those matters were the cost of doing business and the solution was to "suck it up and press on." Four experienced military flight surgeon Committee members were alarmed at the voiced under-appreciation for the possibility of a human factors related catastrophe.

Q2. Do you believe that NASA's plans to include a behavioral assessment at the time of an Astronaut's annual physical exam as well as NASA's plans to include a behavioral assessment after short-duration flights will identify what you testified as "individuals that have problems with alcohol. . .problems with marital relationships, with money" *or other problems that could lead to behavioral or performance risks?*

A2. It was the Committee's opinion that NASA's planned annual and post-mission assessments of psychosocial and behavioral factors is a major step in the right direction. Astronauts may still be highly reluctant to candidly communicate relevant human factors concerns if they fear removal from space mission eligibility as a result. Several NASA personnel interviewed expressed their personal belief that NASA had become a "one-mistake" organization—meaning one more fatality and the organization will face its demise. If self-identification of human factors worries is perceived personally as the equivalent of that type of "mistake," Astronauts will white-knuckle those interviews and press-on. Peers, supervisors, and trainers are more likely to successfully detect such problems than reliance on an annual exam or Astronaut self-identification.

Q3. Regarding your report's findings that "issues of cultural and structural. . .are so ingrained and longstanding that it will take senior leadership action to remediate them," *what was the basis for historical context of that finding?*

A3. The Committee's basis for the finding was based upon careful review of the investigation reports following the Challenger and Columbia mishaps and the Institute of Medicine Report regarding changes needed in readiness for long-duration space exploration. Many of our Committee's findings were previously identified in those reports.

Q3a. Dr. Ochoa testified that "nor was there any request for information on Astronaut Office processes, policies, or anything that could be characterized as Astronaut Office culture." *What was the reason for not requesting and reviewing those documents during the study process?*

A3a. The Committee was physically present at Johnson Space Center in the immediate aftermath of a murder-suicide at the JSC facility, and as such determined that no untoward demands would be placed on the senior leadership of NASA. The Committee met in person with two senior members of the Astronaut Office and had two-way dialogue with them about key issues. It was the Committee's view that the most helpful information was going to come from interviews and personal interactions. These interviews identified many Astronaut concerns regarding supervision, mentorship, feedback and many other issues as outlined in our report, which they felt were significant, regardless of what written policies were in place. Furthermore, several senior Astronauts stated in person that a variety of the written policies were regularly ignored with regard to personnel feedback and supervision. As such, the Committee opted to review NASA employees statements as to what was being done, rather than what was in NASA's written guidance as to what should have been done. The Astronaut Office insisted that feedback was being done; the interviewed Astronauts told us it was not being done. We believe that an assessment of Astronaut culture made on the basis of interviews with multiple Astronauts is more likely to represent what is actually happening than a review of written documents, policies or procedures.

Q3b. Could you please provide some specifics on the type of senior leadership actions that you think are needed?

A3b. In the Committee's opinion, NASA senior leadership should initiate efforts to emphasize the importance of human factors awareness starting with workplace functional areas in such a way that appreciation of human factors concerns is vastly elevated from the current state. NASA leaders should instill concerns for mutual support, recognition of signs of stress or interpersonal strain, small unit empowerment to pursue those signs of stress or interpersonal strain, and an aim to intervene early with an effort to identify problems early, with an effort toward avoiding interpersonal crises. NASA senior leadership should prioritize awareness of human factors concerns, mitigation of early signs of human factors strain, and proactive interpersonal interventions in an effort to create "successes" in managing human factors issues while offsetting existing inertia and resistance to these concepts as having too much risk of impacting mission assignment to be worth the potential benefit to the individual Astronaut or small group leader. In the Committee's opinion, such an effort would without a doubt strengthen NASA's future abilities to manage human elements of long-duration space exploration.

Q4. Your report states that "peers and staff fear ostracism if they identify their own or others' problems." *What was your review panel's basis for making that statement, and how confident are you that it doesn't represent just the view of one or two malcontents, particularly in respect to the letter that came in from the various flight surgeons?*

A4. Response: The Committee was shocked and disappointed by the direct contradiction of statements made by NASA personnel during in-person interaction with Committee members versus the subsequent official written statement obtained by NASA. During interviews, more than one senior NASA physician directly stated the findings that the Committee reported. Those statements were made in front of a sizable number of NASA physicians. Not one of those physicians expressed a contradictory opinion, or a differing opinion, or a re-framed perspective from what was directly stated to the Committee. It is certainly possible that those voicing those concerns were misinformed malcontents. (It remains hard to understand the passivity and tolerance of all of the other NASA physicians present should that be the case.) It is also possible that those making these statements were subsequently identified as "whistle-blowers" or "trouble-makers" and that interpersonal factors were brought to bear to silence and discredit their opinions. Certainly our Committee's efforts did not include sworn or written testimony, nor did it involve the use of law enforcement officials trained in interrogation aimed to arrive at the "truth" in the midst of reluctance to provide such information. It was and remains the Committee's unanimous opinion that the statements made about fear of ostracism and problems in communication were stated in sincerity and are accurately addressed in our report. We believe that the subsequent letter from the flight surgeons has very little, if any, credibility, and in fact confirms the atmosphere of fear of reprisal that was described to the Committee during the interviews. Similarly, the Astronauts who were willing to come forward to the Committee with their concerns did not repeat them to NASA when given the opportunity, but without anonymity. While we are sympathetic to the difficult position these flight surgeons and Astronauts were in following the release of our report and the strongly negative NASA public response to it, their subsequent silence, and the fact that this letter explicitly contradicts the statements they made during the interviews, causes the Committee to have grave concerns regarding the integrity of these individuals, their leadership, or both.

(These responses represent the Chairman's personal opinion, based on the Committee's findings and deliberations, and have been reviewed by some, but not all, of the Committee Members.)

Questions submitted by Chairman Mark Udall

Q1. Regarding flight surgeons who reported a disregard for their medical opinion on fitness for duty, flight safety, mission accomplishment, how pervasive was the issue?

A1. Based on our interviews, it was the considered opinion of the Committee that the NASA flight surgeons feel this disregard is a pervasive issue. This issue was discussed extensively during a group interaction with a significant number of NASA flight surgeons. Ample opportunity was given for the expression of opposing or contrary viewpoints and no dissenting opinions were raised, neither during the group session nor individually. Every aspect of the communications made to the Committee suggested that this was perceived to be a wholesale problem and not an occasional isolated incident, or something experienced by a few, but not the majority.

Q2. Your report states that "Problems of communication were evident among the four areas address: fight medicine, behavioral health, flight medicine clinic, and the Astronaut Office."

a. What drove your committee to that conclusion?

b. Could you elaborate on this issue?

A2a,b. During our interviews, the NASA behavioral health physicians stated they were very reluctant to communicate with flight surgeons for fear that a perceived violation of the confidentiality of their communications (such as sharing the information with the appropriate crew surgeon or flight surgeon) could cause a backlash from the Astronaut Corps resulting in "no Astronaut trusting the behavioral health clinic staff again." Physicians in behavioral health openly expressed uncertainty as to the ability of NASA flight surgeons to maintain the strict confidentiality of sensitive mental health care information, furthering their reluctance to share this infor-

mation with concerned flight surgeons. They expressed even greater concern about sharing medical information with the Astronaut Office. Numerous physicians discussed their perspective that involvement of the leadership of the Astronaut Office would only be pursued (by them) in the event that it appeared that an Astronaut had a clearly disqualifying health issue, and that more subtle performance decrement concerns would not be raised.

Q3. The report refers to anecdotes about risky behaviors. Could you provide examples of the types of risky behaviors mentioned?

Q3a. In what ways were those behaviors risky?

A3a. NASA personnel related several specific incidents: of Astronauts attempting to de-conflict ground-based communications to Space Shuttle-borne personnel amongst the Astronaut's current wife, American girlfriend, and Russian girlfriend, in violation of crew rest periods, as well as similar efforts to de-conflict the attendees (amongst wife, American girlfriend, Russian girlfriend) at launch, recovery, and other official NASA functions. Numerous members of the current Astronaut Corps expressed concerns about other U.S. Astronauts' excessive drinking of alcohol (with episodes of public intoxication) while completing training in Russia. While some portrayed this as a perceived irritation over the Russian tradition of toasting the achievement of milestones or of reaching significant agreements (even if it is nine in the morning), others said they had personally observed American Astronauts who had begun to drink excessively (evidenced by repeated instances of public intoxication) while in Russia. Along the same lines, American Astronauts stated that while in no way universal, it was becoming common for married American Astronauts to begin extra-marital relationships with Russian women during their periods of training at Star City.

Q3b. How does the military handle such behaviors?

A3b. (At the outset it should be noted that civilian employees of NASA cannot be held accountable under the UCMJ which applies to U.S. Military personnel, although Army, Navy, Marine, and Air Force personnel serving with NASA could be held so accountable.) Adultery is a criminal offense under the UCMJ, although conviction requires establishment of eyewitness testimony, confession, or photographic evidence confirming sexual relations of a married person with someone other than their spouse. However, the appearance of an adulterous liaison is a relatively commonly encountered phenomenon with military circles. It is usually approached by interview by the commanding officer with subsequent admonishments to end the relationship owing to its perceived impropriety, backed up by issuance of lawful orders to cease contact with the other party. If these no-contact orders are violated, that offense in itself is punishable without having to prove adultery. With regard to alcohol-related misconduct, this is again the province of the service member's commanding officer who has the option to issue verbal counseling, written counseling, admonishment, or reprimand, or to refer the individual for assessment by medical experts in mental health for an evaluation of a potential alcohol use disorder. Either problem-prone relationships or misuse of alcohol can be engaged by US Navy Human Factors Board or Council. Within the USAF, "Wingman" concepts would apply to earliest possible intervention with regard to risky use of alcohol. (Wingman concepts call for the earliest involvement of friend, peer, supervisor, medic, chaplain, etc., with aim toward heading off trouble before catastrophe strikes (such as a DUI arrest, family violence, suicide, etc.). Similar codes of conduct and expectations of behavior, both on duty and off, are in place at most civilian workplaces, with the prohibition of "office romances," due to their disruptive impact on office function, being very common. These measures are taken, not only to protect the individual's health and well-being, but to ensure safety and mission accomplishment.

Q4. The external review report states that "The medical certification of Astronauts for flight duty is not structured to detect such episodes [of alcohol abuse], nor is any medical surveillance program by itself likely to detect them or change the pattern of alcohol use." *Could you please elaborate on this finding? What, if anything, should NASA do differently?*

A4. At the time of the Committee's review, there was no structured attention given at any regular interval with regard to the issue of use of alcohol by Astronauts. Flight surgeons should make an assessment of alcohol use at every annual Astronaut physical to provide an opportunity for the Astronaut to self-identify alcohol concerns. However, annual interviews, lab tests or other "medical" evaluations typically have very low yield, even in the presence of frank alcoholism. The most likely mechanism to identify alcohol problems is based on the observation of inappropriate

behavior as witnessed by family members, co-workers or supervisors, and their willingness to come forward and identify the problem. Off-duty use of alcohol was characterized by Astronauts and flight surgeons as entirely a matter of Astronaut personal choice and preference. Astronaut leaders characterized it as "not their business" to observe use of alcohol by other Astronauts. While Astronauts interviewed could readily recall the policies of their parent military service (Navy, Air Force) regarding possible courses of action or interventions when observing a colleague drunk in public, they expressed uncertainty as to the applicability of those same approaches within NASA, owing largely to the fact that NASA is a civilian organization.

Q5. The report finds that "Astronaut medical and behavioral health care is highly fragmented and based on a medical disease model." *Could you please explain what is meant by "fragmented"?*

a. What, in your view, would be a better model for NASA to follow?

A5. By "fragmented" the Committee was referring to the fact that there was no system in place assuring that an Astronaut would receive medical care from the same flight surgeon over as long as possible a period of their NASA career. The exception to this was while assigned to a mission, during which it was likely that an Astronaut would be under the medical care of the same Crew Surgeon until their mission was accomplished. Many Astronauts spent long periods of time without an assignment to a specific mission. Those Astronauts could encounter medical care by any of dozens of flight surgeons serving on duty at the flight medicine clinic. Other than their annual medical examinations, most Astronaut health care was driven by a medical complaint causing the Astronaut to seek the care of whoever was on duty at the time they pursued care. There was an informal network of "preferred" flight surgeon providers often sought out by Astronauts for help with more significant health issues, but there was no published guidance for how that system was activated. Physician-Astronauts provided some medical care and used their influence to involve "preferred" flight surgeons in certain matters. The Committee believes that a "better" model for NASA to follow would be the assignment of each Astronaut and his/her family to the care of a team of one or two flight surgeons, subsequently making every effort that those physicians would be involved in the majority of medical care decisions for that Astronaut and family during their NASA service. This would enhance the development of a deeper relationship between flight surgeon and Astronaut, improving trust and increasing the likelihood that behavioral and medical problems can be identified and dealt with sooner.

Q6. You testified that "The general sense of disregard for human factors described as demoralizing to the point where NASA personnel are less likely to report concerns of performance decrement is the fundamental concern NASA must investigate and remedy." *What types of performance decrement were mentioned by interviewees and do you believe NASA's plans for an anonymous survey to Astronauts and flight surgeons will capture such concerns?*

A6. NASA flight surgeons and crew surgeons expressed belief that they were valued members of the NASA team with regard to aerospace medical subjects such as hazards of exposure to the microgravity environment or to radiation hazards, but did not express similar confidence with regard to their observations of human factors safety concerns which may fall outside the usual "clinical" realms, yet are often mentioned in post-accident safety investigations as causal or contributing factors. Some Astronauts interviewed expressed concerns about the ability of fellow Astronauts to perform technical aspects of their crew duties. While they expressed confidence that in the event that a crew member was marginally able to perform their assigned primary duties another crew member aboard the same mission would be fully qualified to perform those same duties, they felt there was a point in time where removal of the marginal crew member would delay the NASA timeline to an unacceptable degree, thus the discovery of this work-around solution of redundant competency. In at least one instance, an experienced Astronaut expressed the belief that human factors concerns related to the health status of a family member would render another Astronaut unable to perform up to expected standards, but would not result in removal from a crew—the burden of this situation would be left to the ingenuity of the mission commander to find a "work around" to prevent mission failure.

We believe the best way to get accurate data on the prevalence of problems at NASA is to conduct a well-constructed anonymous survey. People are much more likely to speak freely when they are not at risk of punishment for their answers. If a large percentage of NASA's workforce completes the survey, it should be obvious

whether the problems brought to us during the interviews were single voices or represent pervasive concerns. Clearly our Committee's provision of anonymity during our interviews was less than fully acceptable to NASA and much was made about the lack of "proof' that anonymous information provides. Our use of this approach opened the Committee's findings to criticism with regard to the reliability and credibility of who said what and why they said it. With regard to issues identified in NASA's subsequent "on-the-record" safety investigation (by-name, in writing) it was NASA's expressed opinion that their on-the-record survey was valid and our Committee's anonymous interviews far less so. All of this said, it would appear that NASA's planned anonymous survey may indeed generate different data than their prior on-the-record survey did. The usefulness of the data will depend on what is asked, how it is asked, whether NASA personnel feel safe to speak freely and whether they feel anything constructive will be done with the information. Once the survey is administered, the crux of the matter would then be, "What will NASA do with such data?"—a concern both for NASA and for those who provide oversight for NASA.

(These responses represent the Chairman's personal opinion, based on the Committee's findings and deliberations, and have been reviewed by some, but not all, of the Committee Members.)

Questions submitted by Representative Ralph M. Hall

Q1. The report of the NASA Astronaut Health Care System Review Committee (the "Report') states, "NASA must ensure the people can identify such safety and human performance concerns within NASA without fear of reprisal or career injury." *How does the military address this issue, especially with regard to pilots?*

A1. This is a broad and complex question. Within the context of a military aircraft mishap investigation there are two investigational boards conducted—one conducted in a non-attribution fashion, with an aim solely to get to the truth in an effort to prevent future mishaps; and a second to determine legal responsibility for the event, including potential criminal charges, loss of pilot rating, administrative reprimand, etc. Within the broader context of mishap prevention, the military has a variety of processes (as do the airlines) that allow both anonymous reporting (ironically the best known of these is under the oversight of NASA) and on-the-record reporting (for example filing of a Hazardous Air Traffic Report (HATR) following a near-miss mid-air collision). Both the USAF "Wingman" concept and the U.S. Navy Human Factors Boards emphasize the importance of, and the spontaneous gathering of, human factors data in the flying environment, the workplace, and even the social life of a military flying squadron. In this regard, the Navy's program is more robust, better described, and more clearly structured than is its Air Force counterpart, although both are founded on the similar concept—early intervention following earliest realization that there "may be a problem."

Q2. On page 10 of NASA's internal Space Flight Safety Review (led by Bryan O'Connor) there is an e-mail rebuttal from the NASA's Flight Surgeons. Without naming names, presumably these are some of the same folks the NASA Astronaut Health Care System Review Committee interviewed, and possibly some of the same folks who may have felt their concerns were disregarded. How should our committee view this proclamation by the flight surgeons? Can you make any recommendations as to how a survey should be designed to minimize undue peer pressure and elicit the free exchange of information?

A2. The Committee was shocked and disappointed by the direct contradiction of statements made by NASA personnel during in-person interaction with Committee members versus the subsequent official written statement obtained by NASA. During interviews, more than one senior NASA physician directly stated the findings that the Committee reported. Those statements were made in front of a sizable number of NASA physicians, including many who subsequently signed this letter. Not one of those physicians expressed a contradictory opinion, or a differing opinion, or a re-framed perspective from what was directly stated to the Committee. It is certainly possible that those voicing those concerns were misinformed malcontents. (It remains hard to understand the passivity and tolerance of all of the other NASA physicians present should that be the case.) It is also possible that those making these statements were subsequently identified as "whistle-blowers" or "trouble-makers" and that interpersonal factors were brought to bear to silence and discredit their opinions. Certainly our Committee's efforts did not include sworn or written testimony, nor did it involve the use of law enforcement officials trained in interro-

gation aimed to arrive at the "truth" in the midst of reluctance to provide such information. It was and remains the Committee's unanimous opinion that the statements made by the NASA flight surgeons during our interviews with them were stated in sincerity and accurately addressed in our report. We believe that the subsequent letter from the flight surgeons has very little, if any, credibility, and in fact confirms the atmosphere of fear of reprisal that was described to the Committee during the interviews. Similarly, the Astronauts who were willing to come forward to the Committee with their concerns did not repeat them to NASA when given the opportunity, but without anonymity. While we are sympathetic to the difficult position these flight surgeons and Astronauts were in following the release of our report and the strongly negative NASA public response to it, their subsequent silence, and the fact that this letter explicitly contradicts the statements they made during the interviews, causes the Committee to have grave concerns regarding the integrity of these individuals, their leadership, or both. With regard to the question of survey design, our Committee recommends a properly constructed, anonymous survey of appropriate NASA personnel, with an aim toward information gathering and interpersonal climate assessment, with senior leadership support, assurances of confidentiality, and an explicit intent to address any issues identified in order to improve safety and enhance human performance.

(These responses represent the Chairman's personal opinion, based on the Committee's findings and deliberations, and have been reviewed by some, but not all, of the Committee Members.)

Questions submitted by Representative Tom Feeney

Q1. The report of the NASA Astronaut Health Care System Review Committee (the "Report") recommends fostering a culture "that hold individuals and supervisors accountable for safe and responsible use of alcohol." *What conduct constitutes "safe and responsible use?" What conduct constitutes unsafe or irresponsible use? Does such accountability extend to off-duty alcohol use?*

A1. Consumption of alcohol causes measurable, predictable suppression of central nervous system function, including impairment of judgment, balance and reaction time, to name a few effects. A precise definition of what is "safe and responsible" would prove more difficult than offering examples of what is not safe and responsible. None of the episodes described to the Committee appeared to be subtle or open to differences of opinion. Drinking and driving is neither safe nor responsible. Drinking within 12 hours of scheduled T–38 flight duties is neither safe nor responsible. Public intoxication is neither safe nor responsible. The question concerning the extension of the concept of safe and responsible consumption of alcohol to "off-duty" time is an intriguing one. Our Committee would argue that such an extension to off-duty behavior should be included in the whole person concept of assessing and mitigating human factors and their potential impact on safety and mission effectiveness. Off-duty drunkenness may (or may not) signal the development of an alcohol-use disorder and may (or may not) represent a hazard to aerospace operations. Along the same lines, off-duty domestic violence may represent a threat to on-duty performance of flying duties, particularly if the domestic turmoil has upset sleep routines and caused distracting or upsetting daytime intrusions in the individual's thought processes. All of these issues, and many others of similar nature, represent human factors threats to safety and mission completion, and must be taken seriously by the entire NASA team.

Q2. The Report recommends refocusing psychologist expertise towards "providing performance enhancement to all Astronauts." *Please define "performance enhancement" and provide some examples of such enhancement in other disciplines.*

A2. The discipline of performance enhancement refers to assisting clinically normal people to improve their performance of challenging or key tasks. Common performance enhancement approaches involve improvement of public speaking ability, as well as improvement of team-building and team-leading skills. The field of "sports psychology" abounds in examples of taking an athlete with talent and basic skill to the next level of performance. Often the concept of performance involves an individual's recognition of an area he/she would like to strengthen, as contrasted with a suffering individual seeking relief of distress. An example of performance enhancement with potential relevance to Astronaut duties would be a veteran pilot with awareness that in stressful, difficult circumstances he tends to become increasingly authoritarian and issue orders, closing off discussion—working toward more active

team building, active listening, and rapid work with a group to generate an active solution with group buy-in.

Q3. The Report recommends that behavioral health evaluations include "recognized screening instruments for the above commonly occurring behavioral health issues." *Please identify each specific "behavioral health issue" and the corresponding "recognized screening instruments."*

A3. With regard to screening for misuse of alcohol there are two commonly used instruments (CAGE and AUDIT) that would be preferable over the utilization of no screening instruments (which is the current NASA approach). Of course, there are other approaches to alcohol misuse screening as well. With regard to screening for general behavioral health issues or for significant exposure to stress that might predispose to the development of health problems there are also a host of possible screening tools. One good prospect for such screening in the NASA population is the Outcome Questionnaire-45 (OQ–45), which is a screening tool (in widespread use throughout the USAF) that screens for a wide variety of psychological and interpersonal concerns. Another similar instrument is the Patient Health Questionnaire (PHQ, which gives subscores for a variety of health concerns, including depression. Another similar instrument, in widespread use throughout the U.S. DOD, is the Preventive Health Assessment (PHA). These screening measures can be followed by administration of more focused measures in the event say that an OQ–45 suggests the possibility of clinical depression, The Beck Depression Inventory (BDI) can be administered to amplify that finding. All of the screening tools and tests mentioned in this paragraph are low cost and require only a small investment of time. Likewise, any results would need follow-up with a health care professional.

Q4. The Report found: "Many anecdotes were related that involved risky behaviors by Astronauts that were well known to the other Astronauts and no apparent action was taken." *Reasonable people hold differing definitions of what constitutes a "risky behavior." Without violating the confidentiality promised by the NASA Astronaut Health Care System Review Committee during its work, please define "risky behavior" as used in the Report and provide examples of what does and does not constitute such a "risky behavior."*

A4. Risky behaviors referred to by the Committee as described by NASA Astronauts and flight surgeons included openly adulterous relationships (romantic relationships well-known to many co-workers acquainted with both the Astronaut's spouse and the Astronaut's girlfriend); interpersonal anxiety caused by attempting to maintain contact (during Shuttle space missions in space flight) with current wife, American girlfriend, and Russian girlfriend; drinking so much alcohol the night before a space launch (from Russia) that severe signs of intoxication became evident resulting in a NASA flight surgeon being assigned to assure that the Astronaut did not vomit and choke upon his vomitus; arriving at a NASA T–38 aircraft about to fly cross-country from Florida to Houston with such notable alcohol hangover that another NASA Astronaut refused to fly as fellow crew member with the Astronaut suffering the hangover, and so forth. The majority of "risky" behaviors mentioned by Astronauts and NASA physicians centered upon concerns such as these. It can be argued that any of these types of behavior put a person on course to court disaster. It can be argued that these represent variations on the theme of a consenting adult's free choice. In military aviation such behaviors are seen as potential signs of trouble brewing, including the kind of trouble that can be associated with aviation mishaps, loss of aircraft, and loss of lives, thus they are seen as the appropriate province of friend, wingman, and commander with an eye toward mitigation of risk.

(These responses represent the Chairman's personal opinion, based on the Committee's findings and deliberations, and have been reviewed by some, but not all, of the Committee Members.)

ANSWERS TO POST-HEARING QUESTIONS

Responses by Richard S. Williams, Chief Health and Medical Officer, National Aeronautics and Space Administration

Questions submitted by Chairman Bart Gordon

Q1. Could you please submit for the record which recommendations of the NASA Astronaut Health Care System Review Committee you will not accept and why?

a. What kind of reporting process will you use?

A1. NASA has developed a comprehensive response plan that integrates recommendations and actions from all three existing reports: the NASA Astronaut Health Care System Review Committee, the Space Flight Safety Review of Alcohol Use in the Pre-Flight Period, and the Johnson Space Center Internal Review. Progress will be reviewed quarterly by the Medical Policy Board, and a briefing to the Aerospace Safety Advisory Panel is anticipated early next year.

Q2. Your testimony notes that "External review of our behavioral medicine services was performed in February 2007. This review determined that NASA provided a competent group of behavioral health providers (BHP) rendering excellent clinical and occupational care. Recommendations were also made for improvement, and actions were in place to address many of these areas at the time of Dr. Bachmann's review." *Who conducted the February 2007 external review of behavioral medicine services, what was the charge to the reviewers, what were the main recommendations, and why did NASA perceive the need to solicit an additional independent review of astronaut health care?*

A2. The February 2007 review was conducted by Dr. Royden W. Marsh, employed by the U.S. Air Force (USAF) School of Aerospace Medicine on the Psychiatry consultation service. Dr. Marsh was known to NASA behavioral medicine staff and is an experienced aerospace medicine practitioner, having worked for many years in support of USAF aeromedical behavioral health services and having previously worked at Johnson Space Center. Dr. Marsh conducted his quality review of the Behavioral Health office and clinical care on February 28 and March 1, 2007. This review was conducted as part of NASA's overall program to insure quality of astronaut health care services. The scope of the review included credentialing, privileging, primary source verification, internal peer review, and external quality review of office procedures, medical record-keeping, and review of clinical care. Such a review is also done on a regular basis for the Flight Medicine Clinic. It should be noted that the preparations for this review were initiated in January 2007, approximately one month before the event involving Lisa Nowak.

The main recommendations from the review were related to credentialing and privileging, and external peer review. Dr. Marsh recommended several improvements to our credentialing and privileging procedures which have been incorporated. He also recommended formalization of external consultant peer review by an aerospace psychiatry consultant, and implementation of a formalized, quarterly, internal peer review process to enhance review of the Behavioral Medicine Clinic. NASA agreed with this recommendation and has incorporated it in our planning.

Q3. Col. Bachmann's testimony noted that one of the three most important issues identified by the external review is that "medical and behavioral health services should be integrated and focused on astronaut performance enhancement." *What steps, if any, does NASA plan to take with regard to using medical and behavioral health services to enhance astronaut performance?*

A3. NASA has accepted this recommendation and is now considering the appropriate changes to its services through its comprehensive response to the NASA Astronaut Health Care System Review Committee Report. The changes are being developed, and will be reviewed later this fiscal year by the Chief Health and Medical Officer's Medical Policy Board, a joint internal and external medical advisory group, whose members are senior physicians from NASA and other federal agencies.

Questions submitted by Chairman Mark Udall

Q1. Your testimony refers to the creation of the Office of the Chief Health and Medical Officer in 2000 as a result of recommendations of external advisory groups. Who were those groups, and why did they see the need to set up your office—what problem were they trying to fix?

A1. Prior to the establishment of the Office of the Chief Health and Medical Officer, this function existed within the Office of Life and Microgravity Sciences and the Office of Space Flight. The functional entity thus did not constitute an Agency-wide authority, and influence that could be exercised on behalf of health and medical policy and oversight and protection of research subjects was limited. In 1998, NASA requested that the National Academy of Sciences Institute of Medicine (IOM) review NASA's biomedical structure for transitioning from low-Earth orbit operations to exploration class human space flight missions to Mars. The IOM completed their study over the next two years and published *Safe Passage: Astronaut Care for Exploration Missions* (2001). The IOM suggested a central authority responsible for all NASA health and medical matters be developed The IOM specifically recommended: *"To support safe human exploration of space, the National Aeronautics and Space Administration (NASA) should pursue a two-component strategy: (1) it should pursue a comprehensive health care system for astronauts to capture all relevant epidemiological data, and (2) it should pursue a long-term, focused health care research strategy to capture all necessary data on health risks and their amelioration. An occupational health model should apply to the first pursuit. . . To accomplish this strategy, there should be an organizational component within NASA that has authority over and accountability.for all aspects of astronaut health."*

The Aerospace Medicine and Occupational Health Advisory Committee (AMOHAC) of the NASA Advisory Council (NAC) (as constituted at that time) also recommended that the position of NASA Chief Medical Officer, at the NASA Administrator's staff level, be established. Establishing such a position (with responsible staff) elevates cognizance of the importance of health and medical issues at the Agency level, clearly establishes policy and oversight authority for NASA's health care delivery efforts, and clearly establishes functional responsibility for health risk assessment and health standards definition. This allows effective oversight of all health related issues within the Agency, and, through health and medical standards development, provides guidance to NASA's biomedical research program in support of human space flight and the *Vision for Space Exploration.* NASA's current governance model, which established technical authorities (including Health and Medical Technical Authority), is well served by the Office of the Chief Health and Medical Officer, in parallel with the Office of the Chief Engineer and the Office of Safety and Mission Assurance.

Q2. Are alcoholism, alcohol abuse, and drug abuse/addiction encompassed in the established medical standards for fitness for flight and fitness for duty? If not, why not?

a. Can flight surgeons ground an astronaut due to behavioral health and has this ever occurred?

A2. Yes, these issues are addressed by established medical standards. Flight surgeons can ground an astronaut for failing any aeromedical standard, including those covering behavioral health issues. NASA has never grounded an astronaut (denied a waiver) or allowed an astronaut to fly (issued a waiver) for failing to meet behavioral health standards.

Q3. How are astronaut problems that do not violate a behavioral standard (debt due to gambling, infidelity, etc.) but that could pose behavioral and performance risks over time, handled?

A3. All NASA employees are subject to supervisory evaluation for maintaining work proficiency. This means that unless a person is incapacitated to a degree that they are not able to perform their job to their supervisor's satisfaction, no additional direct intercession is done without the explicit initiation and consent by the affected employee. However, the NASA Occupational Health Program promotes continued employee education related to stress at work, alcohol or other substance use or abuse, and other health issues. NASA, encourages employees to seek help, and makes available an Employee Assistance Program. Additional resources are available for astronauts and their families through the Behavioral Health Program. New processes are being developed to include an annual behavioral health exam for astronauts that should make behavioral health encounters routine and foster more communication between care providers and the astronauts.

Q4. The external review notes that "Astronauts are not required to report illnesses, injuries or medication use unless they determine them to be significant." *What is the reason for this practice?*

a. What protections exist to ensure that astronauts are not impaired by medication use that may not have been reported to flight surgeons?

A4. This practice is consistent with other aeromedical systems including the FAA. The astronaut is required to report any medical issue including medication that might represent a safety of flight issue, but not all over the counter medications that arc approved for flight status need to be reported. During the launch process, medical examinations and laboratory evaluations are conducted 10 days and two days prior to launch.

Q5. NASA has announced that it is accepting applications for the 2009 astronaut class. With the retirement of the Shuttle in 2010, the astronaut class of 2009 will be conducting longer-duration missions, making behavioral health an even more important factor for astronaut crews. Could you please describe in specific terms if the behavioral aspects of the selection process are being modified in response to the independent health care system review, and if so, in what ways?

A5. NASA is reviewing its behavioral health data to determine if changes need to be made to its process in light of the findings of the Astronaut Health Care System Review Committee and corresponding internal NASA reviews. Any recommendations for change would be evaluated prior to the next scheduled selection.

Q6. Your testimony notes that several aspects of the Independent Astronaut Health Care Review are being assessed and examined. What is the plan and schedule, and how will progress be monitored?

A6. NASA has developed a comprehensive response plan that integrates recommendations and actions from all three existing reports (NASA Astronaut Health Care System Review Committee report, the Space Flight Safety Review of Alcohol Use in the Pre-Flight Period, and the JSC Internal Review). Progress will be reviewed quarterly by the Medical Policy Board (MPB) and a briefing to the Aerospace Safety Advisory Panel (ASAP) is anticipated early next year.

Questions submitted by Representative Jo Bonner

Q1. If astronauts have been conditioned to view emotional problems as weaknesses to be suppressed and compartmentalized, of if they perceive that disclosing personal problems could derail their careers, they will understandably be reluctant to seek psychological counseling. How do you foster a supportive, trusting relationship between the astronauts and the behavioral health specialists?

A1. Several approaches, outlined below, are being pursued to foster a supportive and trusting relationship between the astronauts and the behavioral health specialists.

1) The behavioral health clinic is separate from the flight medicine clinic to maintain privacy.
2) Privacy Act regulations are followed to further maintain the privacy of behavioral health visits.
3) The behavioral health clinic is available for the astronaut dependents as well. Thus the whole family can get the appropriate psychological support.
4) New processes are being developed to include an annual behavioral health exam for astronauts that should make behavioral health encounters routine and foster more communication between care providers and the astronauts.

Q2. The Committee's Report states that NASA has to grapple with many cultural and structural issues, some of which have existed since the earliest days of the astronaut program. Do you agree with this assessment? If yes, what steps will you take to change such deeply ingrained behaviors?

A2. NASA has made many cultural and structural changes based on the *Columbia* Accident Investigation (CRIB) report recommendations (which have been previously reported to the Congress). To determine if there are other specific cultural or structural issues that need to be changed, NASA is first pursuing an anonymous survey to further characterize issues related to cultural and structural issues within the Astronaut Corps and within the cadre of flight surgeons. The survey is focused on communication, trust and decision-making. Results of this survey will be utilized to guide any needed changes to address issues of concern with the astronaut and medical communities.

From an Agency perspective, it is widely recognized that improvement in safety culture can be derived from improvements in the safety climate through active supervisory and peer involvement. The safety climate of an organization is defined by many factors including technical knowledge and behavior of its members with regard to safety. This includes opportunities for personnel exposure to safety prin-

ciples and practices, dissemination of safety lessons learned, the ease of safety communication up and down the organization, and the consideration of safety in management decisions.

NASA is pursuing a multi-faceted approach for improving safety climate across the Agency that will include the astronaut corp. This approach is based on:

- Integration of safety management with programmatic and engineering decision processes
- Achieving technical excellence in safety and mission assurance activities

The former is being implemented through NASA's governance model. The latter is being addressed by establishing the NASA Safety Center (NSC) to expand and strengthen the safety training element of NASA's safety program. Each approach is briefly discussed below:

NASA Governance Model—Over the past several years NASA has been defining and implementing an overall governance model that is based on: (1) responsible decision-making; (2) a balance of power; and; (3) the establishment of checks and balances. These elements and the practices are a direct outgrowth of the *Columbia* Accident Investigation Board (CAIB) findings and establish a framework for a safety culture to grow and thrive. These three elements permit ongoing lively discussion and debate to occur unfettered at all levels within the NASA organization. The NASA Administrator has set the overall tone for these discussions and debates by consistently challenging decisions and established policies looking for new ways to answer questions, and NASA has codified a formal process for dissent in NASA Procedural Requirements 7120.51), NASA Space Flight Program and Project Management Requirements. The visibility and clear definition of the overall decision process along with the examples of these processes set at the highest level of the Agency in the Program Management Council and other top level councils establishes the benchmark for the rest of the Agency to follow. Even so, NASA recognizes that even with these concepts documented and regularly exercised, there will be people that remain uncomfortable even in the most open of organizational safety climates. Some of that lack of comfort might be attributed to a lack of technical competency or standing among one's peers or from lack of confidence in the openness of management. As discussed in the following paragraphs NASA is taking steps to increase the competence (and confidence in the competence) of the NASA workforce relating to safety and mission assurance disciplines through the Technical Excellence activities, and we are also developing the capability to measure the overall climate with respect to safety.

Achieving Technical Excellence in Safety and Mission Assurance—NASA is committed to increase the awareness and concern for safety at all levels beginning with system safety in design and facility operations to astronauts and flight operations. Increased excellence and awareness in safety are necessary ingredients for strengthening our safety culture. The Technical Excellence Program being developed at the NSC will conduct educational programs to raise safety awareness, disseminate safety lessons learned, and increase the safety emphasis of NASA management and staff. Safety engineering and management courses that are being planned will address not only safety in the operational and design environment but also philosophy and doctrine that influence the various management and technical levels at NASA. We believe that the envisioned Technical Excellence Program will not only increase the safety competency of our workforce but will also increase management's awareness of the benefits that derive from sound safety management and safety engineering principles and processes being applied uniformly across the Agency.

Measuring and Communicating Safety Culture Using a Standard Process—Recognizing the importance of safety culture, our Office of Safety and Mission Assurance (OSMA), over the past two years, has developed and maintained contacts with several faculty members of the Naval Postgraduate School (NPS) and the University of California at Berkeley (UCB) who have developed a web-based safety climate survey tool for the Naval Aviation School. Recognizing the difficulty inherent in measuring safety culture, this tool uses safety climate metrics as an indicator of cultural strengths and weaknesses. After several exchanges of information and views between the OSMA and the NPS/UCB faculty, it was decided that a proof-of-concept should be undertaken to demonstrate the feasibility of using a similar tool at NASA. The Goddard Space Flight Center (GSFC) volunteered to participate in the first pilot study just completed. On August 24, 2007, the preliminary results of this pilot project were presented to OSMA. OSMA is currently evaluating the results of this study and is planning to conduct a series of additional pilot studies. These studies will allow OSMA to incrementally arrive at an Agency-wide safety culture shaping

and measurement process that will be effective for both design and operational environments at NASA. OSMA is also investigating whether this process will allow NASA on-site contractors to participate on a voluntary basis; contractor participation may be dependent on the specific contract. To this end, the activities outlined below are being pursued by OSMA.

- Examine the results of the GSFC study and past safety culture assessment and shaping processes performed at NASA as well as in other government and non-government organizations to determine best practices and analyze what practices could be adapted for NASA use.
- Develop a safety culture assessment and shaping process, or adapt/refine a currently employed process for NASA use that incorporates the applicable government and industry best practices. This process will include methods to educate Center leadership on the process, measure safety climate, analyze the survey data, and advise NASA Headquarters and Center leadership as to the results and recommended strategies to strengthen safety culture.

Together, these efforts will allow NASA to address many cultural and structural issues, some of which have existed since the earliest days of the astronaut program.

ANSWERS TO POST-HEARING QUESTIONS

Responses by Ellen Ochoa, Director, Flight Crew Operations, NASA Johnson Space Center

Questions submitted by Chairman Mark Udall

Q1. NASA has noted that it is working with astronauts to develop a code of conduct. Could you please describe what the code of conduct is expected to entail?

a. How will it be communicated to new and current astronauts and how will it be enforced?

A1. At NASA we not only abide by code of ethics regulations for executive branch employees, we also have documented core Values for all of us including our Astronaut Corps. These include safety, teamwork, integrity, and mission success. Anything we develop will be further definitions of expectations of behavior, acknowledging the visible role that astronauts play in representing NASA. A senior astronaut is currently leading a team of astronauts to develop these values and attributes that astronauts are expected to exhibit. Once developed they will be communicated to all astronauts and prominently displayed in conference rooms and other key locations, as well as discussed during new astronaut selection. We will discuss enforcement approaches after reviewing proposed expected principles of behavior developed by the astronaut team.

Q2. Col. Bachmann's testimony notes that "an anonymous survey of the relevant NASA populations, covered by this report-medical personnel, astronauts, and training personnel" *is the most important first step NASA needs to take. Will NASA's anonymous survey include all the groups identified by Col. Bachmann? If not, why not?*

A2. The survey included flight surgeons and astronauts only. The survey tool was selected to appraise the issues raised by crew members and flight surgeons because these were the specific groups that had raised issues with the Review Committee and we felt it should remain focused on these groups.

NASA leadership has other mechanisms in place to ensure that flight safety and mission success concerns can be raised and discussed without retribution by any personnel. In response to the External Committee finding, the Johnson Space Center (JSC) took the opportunity to remind affected staff of the importance of their responsibility to raise concerns, and the mechanisms available to them for doing so, including anonymous reporting systems such as the NASA Safety Reporting System (NSRS).

Training requirements and all aspects of preparation for aeronautical flight and space flight will continue to be rigorous and focused. Crew members are routinely evaluated on their performance by training personnel and we will continue to encourage open and honest assessments.

Q3. NASA has announced that it is accepting applications for the 2009 astronaut class. With the retirement of the Shuttle in 2010, the astronaut class of 2009 will be conducting longer-duration missions, making behavioral health an even more important factor for astronaut crews. Could you please describe in specific terms in what ways, if at all, the selection process is being modified in response to the independent health care system review?

A3. Both the External Committee and the Johnson Space Center (JSC) Internal Review recommended that NASA evaluate enhanced usage of suitability testing for "select in" purposes for acceptance into the Astronaut Corp. This testing will ultimately need to be validated against actual space flight performance. JSC will review the state-of-the-art for suitability testing and determine if any changes need to be made to the current astronaut selection process. This will include consultation with NASA aerospace psychologists/psychiatrists, external academic and industry-leading industrial and organizational psychologists. Based on the results of the review, it may be appropriate to develop a suitability standard for qualification of astronaut applicants at selection.

Q4. You testified that an "Astronaut Evaluation Board is periodically convened by the Astronaut Office to review astronauts completing flight assignments, astronaut candidate training, or other astronauts recommended for review." *Who are the members of the Board, when did it last meet, and what issues did it address in that meeting?*

A4. The Deputy Chief of the Astronaut Office usually serves as the Chairperson of the Astronaut Evaluation Board (AEB). Board members are senior astronauts, normally the Astronaut Office Branch Chiefs, whose leadership, experience, knowledge, and skills are applicable to the subject of concern and whose current job assignments make them available to serve on the board. Input is also gathered from training personnel in addition to other astronauts.

The last AEB was conducted on August 29, 2007. The purpose was to review the Space Shuttle and International Space Station expedition crew members recently returning from flight to determine if they were eligible for another flight crew assignment.

Q5. Your testimony notes that "NASA currently employs a system for reporting any situation requiring attention that may impact safety of flight. . .." *Have those pathways, including the Independent Health and Medical Technical Authority, been used to report issues regarding astronauts that may have affected safety of flight? If so, could you please elaborate?*

A5. No issues with astronaut behavior that may impact safety of flight have ever been reported using these avenues.

Q6. Your testimony notes that you have "taken the opportunity to clarify our space flight alcohol policy, and based on Bryan O'Connor's review, will determine whether any revision or expansion of the policy is warranted." *What plans, if any, does NASA have to consult the Space Life Sciences Directorate regarding the medical basis for the policy or any final changes to the alcohol policy?*

A6. The Flight Crew Operations Directorate will continue to consult the Space Life Sciences Directorate regarding all medical aspects of this and other policies. Biweekly meetings between space medicine and astronaut office management are taking place and will continue. NASA is in the midst of conducting an anonymous survey of astronauts and flight surgeons to provide additional feedback and gather suggestions for improvement in this and other areas as well.

Questions submitted by Representative Jo Bonner

Q1. If astronauts have been conditioned to view emotional problems as weaknesses to be suppressed and compartmentalized, of if they perceive that disclosing personal problems could derail their careers, they will understandably be reluctant to seek psychological counseling. How do you foster a supportive, trusting relationship between the astronauts and the behavioral health specialists?

A1. No data exists to suggest that astronauts are conditioned to view emotional problems as weaknesses to be suppressed. In fact, the behavioral medicine patient numbers provided to your committee covering the past several years highlights the availability of these specialists and the extensive use of them by our astronauts and their families.

Several approaches are used to foster a supportive, trusting relationship between the astronauts and the behavioral health specialists. First and foremost, our approach relies on respecting medical privacy policies and procedures. In addition, biweekly meetings between space medicine and astronaut office management continue to take place to help ensure regular and effective communications. NASA is also in the midst of conducting an anonymous survey of our astronauts and flight surgeons to provide additional feedback, and suggestions for improvement, in a variety of areas including level and quality of communications and trust.

Q2. The Committee's Report states that NASA has to grapple with many cultural and structural issues, some of which have existed since the earliest days of the astronaut program. Do you agree with this assessment? If yes, what steps will you take to change such deeply ingrained behaviors?

A2. In performing their jobs each day, astronauts provide input into all aspects of operations and development activities including readiness for flight, both within their chain of command, and throughout human space flight program forums. It has not been my experience that astronauts are reluctant to speak up, nor is there any evidence to support that there is a culture that inhibits communication. Nonetheless, Flight Crew Operations leadership is committed to following up on the comments in the report, and a major objective of the survey currently underway is to understand any potential concerns in raising or responding to issues with flight safety or crew suitability for flight or any barriers that might exist to raising concerns.

ANSWERS TO POST-HEARING QUESTIONS

Responses by Bryan D. O'Connor, Chief, Safety and Mission Assurance, National Aeronautics and Space Administration

Questions submitted by Chairman Mark Udall

Q1. Your testimony notes that "Some or all of the reported incidences could possibly have happened during earlier times in the countdown where there are fewer witnesses and, if so, they would represent ground safety and flight schedule threats." *If such incidences were occurring at earlier times in the countdown, what are the implications for ground safety? What measures are in place to detect such threats to ground safety and flight schedule?*

A1. This statement is meant to distinguish a flight safety issue (flying an impaired crew member) from a ground safety issue (impaired crew member hurts himself the day before launch requiring first aid or other medical help), and a schedule issue (crew member injures himself so seriously as to cause the flight surgeon to withdraw his certification for flight). In the Soyuz operation, a crew injury would result in the backup crew member being assigned to fly, and there would be no affect on schedule. For the Shuttle operation, where there are no backups, a grounded crew member would necessarily cause a launch slip. NASA would then have to wait until the crew member has recovered from the injury, or train a substitute crew member.

Flight surgeons live in crew quarters with the crew members in the United States and Russia. They are available for addressing any health-related issue that might constitute a concern to ground or flight safety. Further, examinations are conducted ten days and two days before launch, and the flight surgeons are present on launch morning including crew suit up.

In addition, the Johnson Space Center has a policy which requires that assigned crew members abstain from high risk activities when they are assigned to missions. Examples in the policy are skydiving, volunteer firefighting, air racing, and (newly added since the study) excessive use of alcohol.

Q2. Your testimony notes that "some whom I interviewed admitted that it is possible that someone could have inadvertently violated the 12-hour rule by a small amount at some time in their military or NASA flying career." *Was this point included in your Safety Review? If not, why not? Could you please describe how someone could have inadvertently violated the 12-hour rule? Would that mean that someone was unaware of the 12-hour policy?*

A2. I did not record these verbal references (from long retired pilots) in my report because they were not about space flight. One reference was offered as a hypothetical: an airplane pilot could violate the rule concerning the 12-hour period before launch, during which astronauts are required to abstain from consuming alcohol, not because he was unaware of the rule, but because he lost track of the time at the restaurant or officers club the night before a scheduled morning flight. The other was a general reference to military flying in the 1960s and 1970s where people sometimes bumped up against the 12-hour rule due to sloppy time management, and peer pressure. The purpose of both of these references was to compare the past and current cultures. The message I took from these non specific references was that alcohol and flying was a bigger issue 30–40 years ago than it is today, and that today's airplane pilots, including those assigned to NASA, are much better about separating alcohol from flying than their predecessors were in the "old days."

Q3. How often are the appeals processes and the Health and Medical Technical Authority being used and for what types of issues?

A3. The Health and Medical Technical Authority reviews all health and medical waivers and exceptions for all three programs, the Space Shuttle, International Space Station (ISS) and Constellation. Programmatic issues have been addressed to date at the local Johnson Space Center (JSC) level without needing to elevate an appeal or waiver decision to the Chief Health and Medical Officer. All individual medical waiver issues for astronauts are reviewed by the Chief Health and Medical Officer, and permanent waivers for medical conditions are also approved by the Chief Health and Medical Officer. Medical disqualification of individuals is extremely rare, and over the last 10 years the appeals process for individual medical disqualification has only been used twice. Active communication takes place between the JSC Chief Medical Officer and the Headquarters Chief Health and Medical Officer weekly for programmatic and aerospace medicine issues and quarterly summaries are provided as well. In 2003, a minority opinion was developed for ISS

flight readiness concerning the availability of exercise equipment and environmental monitoring; this was presented at the Flight Readiness Review and all aspects of the issue were considered by senior management. All participants were very satisfied with the discussion and communication. This outcome is discussed within the Health and Medical Technical Authority as an example of effectively raising and addressing flight safety issues to senior management.

Questions submitted by Representative Ralph M. Hall

Q1. How should NASA deal with an astronaut's natural reluctance to raise health or behavioral issues that they believe may jeopardize their selection for future missions or assignments? Based on your experience, are members of the Astronaut Corps confident that they can raise health issues, or emotional or family problems without fear of jeopardizing their NASA careers?

A1. The behavioral medicine patient numbers provided previously to the Committee covering the past several years highlight the availability of these specialists and the extensive use of them by our astronauts and their families.

In order to continue to encourage astronauts to raise and address behavioral health issues, several approaches are being pursued to foster a supportive and trusting relationship between the astronauts and the behavioral health specialists as outlined below:

1) The behavioral health clinic is separate from the flight medicine clinic to maintain privacy.
2) Privacy Act requirements are followed to ensure the privacy of behavioral health visits.
3) The behavioral health clinic is available for the astronaut dependents as well. Thus, the whole family can get the appropriate psychological support.
4) New processes are being developed to include an annual behavioral health exam for astronauts that should make behavioral health encounters routine and foster more communication between care providers and the astronauts.
5) NASA is conducting an anonymous survey of our astronauts and flight surgeons to provide additional feedback, and suggestions for improvement, in a variety of areas including level and quality of communications and trust.

Q2. In the aftermath of the Challenger *and* Columbia *accidents NASA has tried very hard to ensure that there are open, independent communication paths to raise safety concerns. Would you please discuss policies and/or procedures that are now in place to ensure employees are encouraged to report any safety of flight issues, and would you please discuss how, if at all, you are changing or revising those policies as a result of the NASA Astronaut Health Care System Review Committee report?*

A2. NASA has many paths for communication and these paths are described in NASA policy and NASA Procedural Requirements (NPR) such as NPR 8715.1 regarding NASA Occupational Safety and Health Programs. These include:

1) reporting to Center or Component Facility Safety/Health Official(s), as appropriate;
2) reporting to supervisory personnel or management;
3) reporting to Center Director;
4) reporting through the Safety and Mission Assurance (SMA) organizations;
5) reporting through the Designated Agency Safety and Health Official (DASHO);
6) anonymously reporting through the NASA Safety Reporting System (NSRS);
7) anonymously reporting through Center hotlines such as the Johnson Space Center (JSC) Hotline;
8) reporting to the Inspector Genera; and,
9) reporting directly to the Administrator.

NASA also recognizes that employees have external reporting options including the Office of Federal Agency Safety and Health Programs—Occupational Safety and Health Administration (OSHA)/Department of Labor.

Following the *Columbia* Accident Investigation Board (CAIB) recommendations, NASA instituted three technical authorities, one for each of the following disciplines: engineering, safety, and health and medical. Employees may bring their

concerns to the technical authority. If they are not satisfied with the way in which their concerns are dispositioned, there is a reclama process by which all decisions are elevated to the highest levels of NASA management.

Since the NASA Astronaut Health Care System Review Committee report, the flight surgeons and astronauts also received refresher briefings of these available pathways, and their use is encouraged and supported. The Administrator and the Director, Johnson Space Center, reemphasized their encouragement that any employee can communicate with them directly for issues of concern.

ANSWERS TO POST-HEARING QUESTIONS

Responses by Michael D. Griffin, Administrator, National Aeronautics and Space Administration

Question submitted by Chairman Bart Gordon

Q1. Col. Bachmann's testimony noted that "organizations as diverse as the military, the Federal Aviation Administration (FAA) and the Veterans Administration (VA) have made great progress, with active supervisory and peer involvement, in changing cultural attitudes towards safety, accountability, empowerment, and alcohol." *What plans, if any, does NASA have for exploring and considering other federal agency approaches to these types of issues?*

A1. NASA is actively benchmarking against many organizations to improve organizational effectiveness. Benchmarking for specific issues such as those raised in the report with the Federal Aviation Administration, Veterans Administration, and the Department of Defense will be added to this process that is already underway.

NASA has initiated an activity to explore other federal agencies' and non-government organizations' approaches to analyzing cultural attitudes towards safety, accountability and empowerment and employ techniques to improve safety climate across the Agency.

Recognizing the importance of safety culture, over the past two years NASA's Office of Safety and Mission Assurance (OSMA), has developed and maintained contacts with several faculty members of the Naval Postgraduate School (NPS) and the University of California at Berkeley (UCB) who have developed a web-based safety climate survey tool for the Naval Aviation School. Recognizing the difficulty inherent in measuring safety culture, this tool uses safety climate metrics as an indicator of cultural strengths and weaknesses. After several exchanges of information and views between the OSMA and the NPS/UCB faculty, it was decided that a proof-of-concept should be undertaken to demonstrate the feasibility of using a similar tool at NASA. The Goddard Space Flight Center (GSFC) volunteered to participate in the first pilot study just completed. On August 24, 2007, the preliminary results of this pilot project were presented to OSMA. OSMA is currently evaluating the results of this study and is planning to conduct a series of additional pilot studies. These studies will allow OSMA to incrementally arrive at an Agency-wide safety culture shaping and measurement process that will be effective for both design and operational environments at NASA. OSMA is also investigating whether this process will allow NASA on-site contractors to participate on a voluntary basis; contractor participation may be dependent on the specific contract. To this end, the activities outlined below are being pursued by OSMA.

- Examine the results of the GSFC study and past safety culture assessment and shaping processes performed at NASA as well as in other government and non-government organizations to determine best practices and analyze what practices could be adapted for NASA use.
- Develop a safety culture assessment and shaping process, or adapt/refine a currently employed process for NASA use that incorporates the applicable government and industry best practices. This process will include methods to educate Center leadership on the process, measure safety climate, analyze the survey data, and advise NASA Headquarters and Center leadership as to the results and recommended strategies to strengthen safety culture.

NASA is pursuing a multi-faceted approach for improving safety climate across the Agency. This approach is based on:

- integration of safety management with programmatic and engineering decision processes; and
- achieving technical excellence in safety and mission assurance activities.

The former is being implemented through NASA's governance model. The latter is being addressed by establishing the NASA Safety Center to expand and strengthen the safety training element of NASA's safety program.

Questions submitted by Representative Ralph M. Hall

Q1. The NASA Astronaut Health Care System Review Committee Report states that NASA has to grapple with many cultural and structural issues, some of which have existed since the earliest days of the astronaut program. Do you agree with

this assessment? If yes, what steps will you take to change such deeply ingrained behaviors?

A1. NASA has made many cultural and structural changes based on the *Columbia* Accident Investigation Board (CAIB) report recommendations. To determine if there are other specific cultural or structural issues that need to be changed, NASA is first pursuing an anonymous survey to further characterize issues related to cultural and structural issues within the Astronaut Corps and within the cadre of flight surgeons. The survey is focused on communication, trust and decision-making. Results of this survey will be utilized to guide any needed changes to address issues of concern with the astronaut and medical communities.

From an Agency perspective, it is widely recognized that improvement in safety culture can be derived from improvements in the safety climate through active supervisory and peer involvement. The safety climate of an organization is defined by many factors including technical knowledge and behavior of its members with regard to safety. This includes opportunities for personnel exposure to safety principles and practices, dissemination of safety lessons learned, the ease of safety communication up and down the organization, and the consideration of safety in management decisions.

NASA is pursuing a multi-faceted approach for improving safety climate across the Agency that will include the Astronaut Corps. This approach is based on:

- Integration of safety management with programmatic and engineering decision processes.
- Achieving technical excellence in safety and mission assurance activities.

The former is being implemented through NASA's governance model. The latter is being addressed by establishing the NASA Safety Center (NSC) to expand and strengthen the safety training element of NASA's safety program. Each approach is briefly discussed below:

NASA Governance Model—Over the past several years, NASA has been defining and implementing an overall governance model that is based on: (1) responsible decision-making; (2) a balance of power; and, (3) the establishment of checks and balances. These elements and the practices are a direct outgrowth of the CAIB findings and establish a framework for a safety culture to grow and thrive. These three elements permit ongoing lively discussion and debate to occur unfettered at all levels within the NASA organization. The NASA Administrator has set the overall tone for these discussions and debates by consistently challenging decisions and established policies looking for new ways to answer questions, and NASA has codified a formal process for dissent in NASA Procedural Requirements 7120.SD, NASA Space Flight Program and Project Management Requirements. The visibility and clear definition of the overall decision process along with the examples of these processes set at the highest level of the Agency in the Program Management Council and other top level councils establishes the benchmark for the rest of the Agency to follow. Even so, NASA recognizes that even with these concepts documented and regularly exercised, there will be people that remain uncomfortable even in the most open of organizational safety climates. Some of that lack of comfort might be attributed to a lack of technical competency or standing among one's peers or from lack of confidence in the openness of management. As discussed in the following paragraphs NASA is taking steps to increase the competence (and confidence in the competence) of the NASA workforce relating to safety and mission assurance disciplines through the Technical Excellence activities, and we are also developing the capability to measure the overall climate with respect to safety.

Achieving Technical Excellence in Safety and Mission Assurance—NASA is committed to increase the awareness and concern for safety at all levels beginning with system safety in design and facility operations to astronauts and flight operations. Increased excellence and awareness in safety are necessary ingredients for strengthening our safety culture. The Technical Excellence Program being developed at the NSC will conduct educational programs to raise safety awareness, disseminate safety lessons learned, and increase the safety emphasis of NASA management and staff. Safety engineering and management courses that are being planned will address not only safety in the operational and design environment but also philosophy and doctrine that influence the various management and technical levels at NASA. We believe that the envisioned Technical Excellence Program will not only increase the safety competency of our workforce but will also increase management's awareness of the benefits that derive from sound safety management and safety engineering principles and processes being applied uniformly across the Agency.

Measuring and Communicating Safety Culture Using a Standard Process—Recognizing the importance of safety culture, our Office of Safety and Mission Assurance (OSMA), over the past two years, has developed and maintained contacts with several faculty members of the Naval Postgraduate School (NPS) and the University of California at Berkeley (UCB) who have developed a web-based safety climate survey tool for the Naval Aviation School. Recognizing the difficulty inherent in measuring safety culture, this tool uses safety climate metrics as an indicator of cultural strengths and weaknesses. After several exchanges of information and views between the OSMA and the NPS/UCB faculty, it was decided that a proof-of-concept should be undertaken to demonstrate the feasibility of using a similar tool at NASA. The Goddard Space Flight Center (GSFC) volunteered to participate in the first pilot study just completed. On August 24, 2007, the preliminary results of this pilot project were presented to OSMA. OSMA is currently evaluating the results of this study and is planning to conduct a series of additional pilot studies. These studies will allow OSMA to incrementally arrive at an Agency-wide safety culture shaping and measurement process that will be effective for both design and operational environments at NASA. OSMA is also investigating whether this process will allow NASA on-site contractors to participate on a voluntary basis; contractor participation may be dependent on the specific contract. To this end, the following activities are being pursued by OSMA:

- Examine the results of the GSFC study and past safety culture assessment and shaping processes performed at NASA as well as in other government and non-government organizations to determine best practices and analyze what practices could be adapted for NASA use.
- Develop a safety culture assessment and shaping process, or adapt/refine a currently employed process for NASA use that incorporates the applicable government and industry best practices. This process will include methods to educate Center leadership on the process, measure safety climate, analyze the survey data, and advise NASA Headquarters and Center leadership as to the results and recommended strategies to strengthen safety culture.

Together, these efforts will allow NASA to address many cultural and structural issues, some of which have existed since the earliest days of the astronaut program.

Q2. What can you do as the NASA Administrator to verify that there is no stigma associated with an astronaut seeking psychological counseling, particularly for common emotional, or family related issues?

A2. Several approaches are being pursued. The behavioral health clinic is physically separate from the flight medicine clinic to maintain privacy. Privacy Act regulations are assiduously followed to further maintain the privacy of behavioral health visits. The behavioral health clinic is available for both astronauts and their dependents providing the whole family with appropriate psychological support. New processes are being developed to include an annual behavioral health exam for astronauts that should make behavioral health encounters routine and foster more communication between care providers and the astronauts.

The NASA aeromedical certification boards would only consider a health related issue if it represented a potential flight safety issue; even in this circumstance, all efforts are made for any medical or behavioral health issue, to restore or maintain the astronaut's health. Behavioral and medical issues are considered equally and no stigma is attached to any health care issue. NASA has also put in place more frequent communication between the space medicine providers and Astronaut Office so that any aeromedical certification issues are clearly communicated including expected outcomes and resolution of the problem.

Q3. Has the Aerospace Safety Advisory Panel (ASAP) been involved in the findings of the report or made any recommendations to guide NASA with implementation of the recommendations?

A3. The Aerospace Safety Advisory Panel (ASAP) is working with NASA, at multiple levels, to better understand the issues highlighted and the recommendations that were made. The ASAP has stated that their most important contribution will be to provide the NASA Administrator with independent counsel regarding changes implemented in response to the report. The Panel has indicated to NASA that they believe the report highlights both process issues and communication challenges that should be taken to heart and expeditiously addressed. The Panel has also indicated to NASA that they trusts the Agency's "improving culture of openness" will enable the Agency to also take aboard the subtle, yet important, messages contained in the report.

It should be noted that Dr. James Bagian, who served on the Bachman Panel, is also a member of the ASAP.

Questions submitted by Chairman Mark Udall

Q1. NASA has focused an investigation on the incidents of alcohol mentioned in the external review. Col. Bachmann's testimony notes that these incidents were examples of bigger issues of "human factors concerns with significant safety implications [that] had been disregarded when raised to local on-scene leadership." *What are NASA's plans for probing these larger human factors concerns and potential safety implications?*

A1. NASA has developed a comprehensive response plan that addresses all recommendations in the NASA Astronaut Health Care System Review Committee Report. Recommendations for addressing human factors concerns are being developed by both the medical and astronaut groups and final recommended changes will be presented to the Medical Policy Board (MPB) early next year. The MPB will oversee the entire report implementation including the human factors issues noted.

NASA is probing these larger human factors concerns related to open communication and safety climate by pursuing a multi-faceted approach for improving safety climate across the Agency. This approach is based on:

- Integration of safety management with programmatic and engineering decision processes.
- Achieving technical excellence in safety and mission assurance activities.

The former is being implemented through NASA's governance model. The latter is being addressed by establishing the NASA Safety Center (NSC) to expand and strengthen the safety training element of NASA's safety program. Each approach is briefly discussed below:

NASA Governance Model—Over the past several years NASA has been defining and implementing an overall governance model that is based on: (1) responsible decision-making; (2) a balance of power; and, (3) the establishment of checks and balances. These elements and the practices are a direct outgrowth of the *Columbia* Accident Investigation Board findings and establish a framework for a safety culture to grow and thrive. These three elements permit ongoing lively discussion and debate to occur unfettered at all levels within the NASA organization. The NASA Administrator has set the overall tone for these discussions and debates by consistently challenging decisions and established policies looking for new ways to answer questions, and NASA has codified a formal process for dissent in NASA Procedural Requirements 7120.513, NASA Space Flight Program and Project Management Requirements. The visibility and clear definition of the overall decision process along with the examples of these processes set at the highest level of the Agency in the Program Management Council and other top level councils establishes the benchmark for the rest of the Agency to follow. NASA recognizes that, even with these concepts documented and regularly exercised, there will be people that remain uncomfortable even in the most open of organizational safety climates. Some of that lack of comfort might be attributed to a lack of technical competency or standing among one's peers or from lack of confidence in the openness of management. As discussed in the following paragraphs, NASA is taking steps to increase the competence (and confidence in the competence) of the NASA workforce relating to safety and mission assurance disciplines through the Technical Excellence activities, and we are also developing the capability to measure the overall climate with respect to safety.

Achieving Technical Excellence in Safety and Mission Assurance Activities—NASA is committed to increase the awareness and concern for safety at all levels, beginning with system safety in design and facility operations to astronauts and flight operations. Increased excellence and awareness in safety are necessary ingredients for strengthening our safety culture. The Technical Excellence Program being developed at the NSC will conduct educational programs to raise safety awareness, disseminate safety lessons learned, and increase the safety emphasis of NASA management and staff. Safety engineering and management courses that are being planned will address not only safety in the operational and design environment, but also philosophy and doctrine that influence the various management and technical levels at NASA. We believe that the envisioned Technical Excellence Program will not only increase the safety competency of our workforce but will also increase management's awareness of the benefits that derive from sound safety management and safety engineering principles and processes being applied uniformly across the Agency.

Measuring and Communicating Safety Culture Using a Standard Process—Recognizing the importance of safety culture, our Office of Safety and Mission Assurance (OSMA), over the past two years, has developed and maintained contacts with several faculty members of the Naval Postgraduate School (NPS) and the University of California at Berkeley (UCB) who have developed a web-based safety climate survey tool for the Naval Aviation School. Recognizing the difficulty inherent in measuring safety culture, this tool uses safety climate metrics as an indicator of cultural strengths and weaknesses. After several exchanges of information and views between the OSMA and the NPS/UCB faculty, it was decided that a proof-of-concept should be undertaken to demonstrate the feasibility of using a similar tool at NASA. The Goddard Space Flight Center (GSFC) volunteered to participate in the first pilot study just completed. On August 24, 2007, the preliminary results of this pilot project were presented to OSMA. OSMA is currently evaluating the results of this study and is planning to conduct a series of additional pilot studies. These studies will allow OSMA to incrementally arrive at an Agency-wide safety culture shaping and measurement process that will be effective for both design and operational environments at NASA. OSMA is also investigating whether this process will allow NASA on-site contractors to participate on a voluntary basis; contractor participation may be dependent on the specific contract. To this end, the following activities are being pursued by OSMA:

- Examine the results of the GSFC study and past safety culture assessment and shaping processes performed at NASA as well as in other government and non-government organizations to determine best practices and analyze what practices could be adapted for NASA use.
- Develop a safety culture. assessment and shaping process, or adapt/refine a currently employed process for NASA use that incorporates the applicable government and industry best practices. This process will include methods to educate Center leadership on the process, measure safety climate, analyze the survey data, and advise NASA Headquarters and Center leadership as to the results and recommended strategies to strengthen safety culture.

Q2. Deputy Administrator Dale noted during the press conference on the external health care review report that NASA has "explicitly extended" *the T–38 policy on alcohol use to space flight.*

a. Ms. Dale referred to it as an "interim policy." *Could you please discuss how and when NASA will establish a final policy?*

b. Has the T–38 policy that currently applies to space flight been considered by NASA medical officials as to the medical basis of the policy? If not, will medical officials be consulted?

c. The Space Flight Safety Review identifies and makes recommendations to strengthen policies related to alcohol use and abuse. What are NASA's plans for making actual changes to those policies?

A2a,c. Ms. Dale stated that NASA "explicitly extended" the T–38 policy on alcohol to include all spacecraft. Due to the urgent nature of the policy clarification, NASA quickly issued this policy via an interim policy memorandum to all astronauts signed by the Director, Flight Operations Crew on July 27, 2007. (At NASA, interim policy is issued when there is an urgent requirement that must be quickly conveyed, and interim policy expires 12 months from the date of issuance. This allows policy developers one year to integrate the new policy into a formal policy directive or procedural requirement.) Prior to the expiration of this interim policy, NASA will refine its policies related to alcohol use across the Agency civil service and contractor work force and will codify the revised policies and procedures in permanent NASA directives.

The original policy, the Johnson Space Center document Aircraft Operations Division (AOD) 09295: Aircraft Operations and Training Procedures: T–38 Operating Procedures Volume 1 documented the general practices that apply to the entire Flight Crew Operations Directorate (all astronauts), but was titled Training Procedures for the T–38. To prevent any confusion, on July 27, 2007, an interim policy memorandum was generated to extend the 12-hour bottle-to-throttle policy to the Space Shuttle. In addition, other efforts are underway to extend NASA's policy on alcohol use. NASA has formed an Agency-level team to clarify procedures and requirements for drug and alcohol testing of civil servants, contractors, and subcontractors. This team is also working to ensure supervisory and employee training addresses the policy, procedures, and requirements. The team is evaluating the best method to evaluate compliance with contract. This effort will include a process to review the status of contractor drug and alcohol-free workplace plans and their asso-

ciated metrics to establish whether a contractor is compliant with existing NASA requirements. The policy, procedure, and training changes will be Agency-wide, ensure that NASA is compliant with all applicable laws, and strengthen our efforts to ensure alcohol use and abuse does not affect the safety of our missions. Any changes related to alcohol use are governed by laws; therefore NASA's new policies and requirements must be created and then circulated through Health and Human Services and the Department of Justice. NASA anticipates this entire process will not take more than 18–24 months until completion.

A2b. The T–38 policy had previously been accepted by NASA medical officials and will be reviewed by the Office of the Chief Health and Medical Officer's Medical Policy Board advisory group.

○