

NASA AEROSPACE SAFETY ADVISORY PANEL
National Aeronautics and Space Administration
Washington, DC 20546
VADM Joseph W. Dyer USN (Ret.), Chair

November 9, 2010

Mr. Charles F. Bolden, Jr.
Administrator
National Aeronautics and Space Administration
Washington, DC 20546

Dear Mr. Bolden:

The Aerospace Safety Advisory Panel held its Fourth 2010 Quarterly Meeting at the Johnson Space Center, Houston, Texas, on October 21-22, 2010. We greatly appreciate the participation and support received from the subject matter experts and support staff.

The Panel submits the enclosed Recommendations and Minutes resulting from this meeting for your consideration. We especially want to draw your attention to a time-critical issue concerning STS-135. STS-134, the last planned Shuttle launch, is currently scheduled for a February 27, 2011, launch. This would mean issuance of the required workforce layoff notification to contractor employees in January 2011, followed by rescission of the notice if STS-135 is later approved. This would increase the anxiety of the workforce right before the launch of STS-134 as well as have potential negative impact on future plans to fly an STS-135 mission.

The Panel encourages NASA to reach a decision before the end of the calendar year on whether or not to launch an additional mission to the International Space Station. We feel that a timely decision is essential to avoid potential safety risk associated with Shuttle workforce anxiety and disruption.

Sincerely,

A handwritten signature in black ink, appearing to read "JW Dyer". The signature is fluid and cursive, with a large initial "J" and "W" and a distinct "Dyer" at the end.

Joseph W. Dyer, VADM, USN (Ret.)
Chair

Enclosure

ASAP RECOMMENDATIONS, FOURTH QUARTER 2010

2010-04-01: Workforce Wellness

Finding: Over several mishap reporting reviews, the Panel has seen a preponderance of ergonomic-related injuries. A number of steps are being taken to improve ergonomic and human factors. Another effective countermeasure is the wellness of the workforce. To some extent, the ASAP has discussed ways of improving wellness. There are opportunities for encouraging workers to participate in an exercise regimen.

Recommendation: NASA should consider the alternatives that are available within the legal and personnel system and examine the best efficiencies to encourage a regular exercise regimen among the workforce.

Rationale: Exercise has been shown to be a positive factor in health and wellness. Wellness of the workforce can be an effective countermeasure to ergonomic-related injuries. Industry has found that exercise incentives can pay for themselves.

2010-04-02: Commercial Transportation Documents

2010-04-02(a): Expression of Loss of Crew (LOC) Limits

Finding: NASA has published some LOC requirements and given them to industry. The key number is LOC on the overall mission, which is 1/270--the same number that was to have been applied to Constellation. NASA is looking at a threshold LOC number for a 210-day mission to the International Space Station (ISS) as 1/150. Beyond that requirement, the Agency proposed to adopt a goal for eventual reliability (1/750).

Recommendation: NASA should publish threshold limits, objective limits, and goal limits to let commercial providers know what the ultimate number is. The goal limit should be put into the contract documents and agreements.

Rationale: It would be helpful to the design team to know what the threshold, objective, and goal limits are when safety factors are being chosen.

2010-04-02(b): Safety Language

Finding: Many potential commercial providers appear to want to use different language on the definitions of safety. It should be noted that safety language has been carefully developed. For example, "hazard" has specific components of severity and probability in terms of risk.

Recommendation: NASA should specify the safety words to be used and their definitions, or at least show the correlation between industry and NASA terminology.

Rationale: It appears that some of the potential commercial providers want to mix the safety words around, and there is potential for miscommunication.

2010-04-03 – NASA Alcohol Use and Testing Policy

Finding: An Office of Inspector General (OIG) audit team reviewed NASA's actions to implement recommendations from three reviews (two internal and one external) relating to astronaut medical health, and issued its report on July 6, 2010. The audit team found that NASA had not addressed the recommendation on alcohol testing, but noted that NASA was already working on an employee alcohol testing policy in response to ASAP recommendation 2006-03-04, "Random Drug and Alcohol Testing," and felt that this policy would satisfy the intent once completed. While NASA has reported to the ASAP several completed actions that strengthen its policy on illegal drug use for employees and contractors, the one area reported as still open concerns developing the alcohol use and testing policy. The ASAP has not received a formal status report in recent months.

Recommendation: The lead Headquarters organization responsible for developing the alcohol policy is requested to provide a formal briefing on the status of the policy at the ASAP's first quarterly meeting in 2011. The OIG should be invited to participate in the briefing. The status report should include a schedule showing a targeted completion and implementation date for the policy.

Rationale: Without an alcohol use and testing policy, safety and flight critical systems could be at risk, as well as the safety of the workforce in general.

2010-04-04: Timely Decision on STS-135

Finding: The Worker Adjustment and Retraining Notification (WARN) Act requires a 60-day notification for employees who will be terminated or separated. STS-134, the last planned Shuttle launch, is currently scheduled for a February 27, 2011 launch. This would mean issuance of a WARN notification in January 2011, followed by rescission of the notice if STS-135 is later approved. This will increase the anxiety of the workforce right before the launch of STS-134 as well as have potential negative impact on future plans to fly an STS-135 mission.

Recommendation: The decision on STS-135 should be made as soon as possible, and no later than the end of the calendar year.

Rationale: The lack of a timely decision on STS-135 could distract the Shuttle workforce and increase the safety risk on the STS-134 mission.

**AEROSPACE SAFETY ADVISORY PANEL
2010 Fourth Quarterly Report
Minutes and Recommendations**

**Aerospace Safety Advisory Panel (ASAP)
Public Meeting
October 22, 2010
Johnson Space Center (JSC)
Houston, Texas**

ASAP Members Present

Vice Admiral Joseph W. Dyer, USN (Retired), Chair
Dr. James Bagian
Dr. Donald McErlean
Mr. John Frost
Ms. Deborah Grubbe, P.E.
Ms. Joyce McDevitt, P.E.
Mr. John Marshall
Dr. George Nield

ASAP Staff and Support Personnel Present

Ms. Katherine Dakon, ASAP Executive Director
Ms. Susan Burch, ASAP Administrative Officer
Ms. Paula Burnett Frankel, Reports Editor

Attendees, Public Session

Loretta Atkinson, NASA IG
Sam Boyd, A2B Solutions
Mark Carreau, *Aviation Week & Space Technology*
William Bihner, NASA HQ
Philip Sloss, NASASpacflight.com
Kelly Kabiri, NASA HQ
J. Milt Heflin, NASA/JSC
Vincent Watkins, NASA/JSC

WELCOME/OPENING REMARKS

Vice Admiral Joseph Dyer, ASAP Chair, called the ASAP Fourth Quarterly Public Meeting to order at 12:30 pm. After introductions of the attendees, he made some overall comments. He noted that the knowledge gained at this meeting was a mix of both encouraging and concerning elements. The ASAP is encouraged by the product of good leadership as evidenced by improved process development and significantly improved safety metrics and trending analysis, the progress in commercial space, surveying and measuring NASA culture, and the focus, continuity, and dedication of the Space Shuttle workforce. However, NASA must continue to monitor the workforce situation, which is a high priority issue.

The ASAP still has several areas of concern, first and foremost of which is the clarity of planning and consistency of purpose among NASA, Congress, and the White House. We are seeing the end of the Shuttle, the effective termination of Constellation, budget authorization but no appropriation yet for a new plan whose implementation is not yet clear, and on top of all that, the challenge of operating under a Continuing Resolution. There is a need for NASA, Congress, and the White House to work constructively together. This is key to both safety and efficiency, and without it, risk will rise.

A question that the Panel has long dealt with has been: How safe is safe enough? The Panel remains concerned about communicating an acceptable probability number for Loss of Crew (LOC) to commercial

providers who will design and cost the next system. The Panel notes that although there has been progress, this is still an area of continuing concern. Another area of concern is acquisition strategy vis-à-vis safety. The Panel is not yet comfortable with the harmony between technical readiness level and a fixed-price contracting approach. A lack of compatibility between these elements can often increase risk as funding runs short and time runs out.

Vice Admiral Dyer noted that there is an important human resources management issue. The Worker Adjustment and Retraining Notification (WARN) Act requires that the contractor workforce receive notice 60 days prior to any layoff action (which would be in January 2011), pursuant to the planned Shuttle fly-out schedule. If STS-134 is indeed the last flight, then this is right and proper; however, if there is to be an additional flight (STS-135), then the workforce would receive a notification before the STS-134 launch that would later have to be rescinded. A timely decision regarding STS-135 would avoid workforce anxiety and distraction and potential risk to STS-134 and would be in the best interests of both the workforce and NASA.

INDUSTRIAL SAFETY TRENDS, NEW INITIATIVES, PROACTIVE APPROACHES

Ms. Deborah Grubbe spoke on two key sections: (1) the JSC Safety and Mission Assurance (S&MA) work; and (2) the NASA Safety Center (NSC) metrics that were presented to the Panel. The Panel learned about the JSC S&MA organization's activities in three major areas: safety metrics and trends; mishap status and improvements; and new initiatives and proactive approaches. The JSC management and workforce, including contractors, are to be commended for their continued leadership and diligence in maintaining JSC's OSHA Voluntary Protection Program (VPP) status. JSC injury rates continue to be below the overall rates for both the federal government and private industry. The JSC team has plans in place to reduce the top categories of injuries—falls and ergonomic-related injuries. It was noted that over the past year, 40 roofs were replaced without a major injury, and the Center is to be commended on this accomplishment. The Panel looks forward to hearing more from S&MA on how to prevent ergonomic injuries.

In the mishap reporting area, the ASAP continues to see reduction in investigation cycle time, and congratulates the NASA leadership for attention to faster dissemination of reports and lessons-learned; however, more work can always be done in this area. The Panel applauds JSC for its attention to reporting close calls.

With respect to facility safety risk assessments, JSC remains challenged to ensure that its hardware and infrastructure is rugged enough to avoid incidents and injuries. The Center has identified and ranked its key facilities as those that fall into one or more of the following categories: those that host hazardous operations; those that are critical to JSC's overall mission; and those that host very complex operations. Eighty percent of the recent mishaps have fallen into one or more of these categories. This type of analysis helps focus valuable maintenance dollars and will help reduce the rising rate of property damage mishaps. Progress has been made; however, everyone acknowledges that budgets will remain tight.

With respect to overall NSC metrics, the ASAP continues to see metrics rolled up together at a summary level. The Panel believes that a Center-by-Center breakdown would help management do a better job, and encourages NASA to provide Center-by-Center comparison statistics for management information and best practice sharing and implementation.

Mr. John Marshall agreed that JSC is doing a good job identifying deteriorated facilities or facilities that have deficiencies that if not repaired could result in an employee or visitor injury or loss of mission. Nevertheless, he noted that despite having the ASAP repeatedly identify the need to develop a systematic approach to categorize facilities and labs requiring repairs and harmonizing funding to facilitate the necessary repairs, the Agency still has not done so. This has been a concern of the ASAP's for some time and was noted in Mr. John Frost's testimony before the Senate earlier this year. The ASAP continues to wait for the NASA Associate Administrator of the Mission Support Directorate to give the Panel a

methodology that would be used to identify the most critical areas in the Agency and provide a plan that would minimize risk.

Mr. John Frost noted that over several reviews, the Panel has seen a preponderance of ergonomic-related injuries. A number of steps are being taken to improve ergonomic and human factors. Another effective countermeasure is the wellness of the workforce. To some extent, the ASAP has discussed ways of improving wellness. There are opportunities for encouraging workers to exercise more and NASA Headquarters will be looking into that area. The ASAP formally recommends that NASA consider the alternatives that are available within the legal and personnel system and examine the best efficiencies to provide opportunities for workers.

NASA SAFETY CULTURE

Dr. James Bagian addressed the discussions regarding safety culture. During the Return-To-Flight (RTF) timeframe, an examination of safety culture was performed by an outside contractor. After that timeframe, the activity lost scrutiny for a couple years, but it was regenerated in August 2009, through a Safety Culture Working Group, led by Dr. Tracy Dillinger. The ASAP is pleased that the NASA leadership has taken the initiative to own this internally and have this as a continuing program. Dr. Bagian briefly described the survey questionnaire, which consisted of 15 questions (three identical questions in each of five categories) with a free-text capability for comments. In addition, the questionnaire allowed each Center to add two to five Center-specific questions. The Working Group is still in the “test” mode on the survey questionnaire. To date, four Centers have completed the survey and analysis has been done on that data. Over the next year, the remaining NASA Centers will complete the survey. The Working Group will evaluate these to see if enough information has been obtained. Because of the survey load on employees, NASA has opted to go with a rather abbreviated questionnaire. One question that the ASAP has is: With the limited number of questions, can the Agency get a sufficient level of granularity into the issues to understand how to intervene if necessary? The Safety Culture Working Group understands this, and the Panel looks forward to seeing further evaluation. NASA intends to do a survey on an ongoing basis every two years, because it is important to look at trends.

Vice Admiral Dyer added that students of the Columbia Accident Investigation Board (CAIB) report know that the cultural climate was often addressed and highlighted as an important issue. With this new initiative, there is now an answer to the question: What is the culture climate and how do you know? Ms. Grubbe agreed that it is very important that this work be continued because the real learning in culture work comes with assessing the changes over time. The Agency needs to know where more emphasis is needed. NASA is off to a good start in this endeavor. There may be an issue with “survey fatigue,” and upper management may need to place some attention on which survey should take priority. Ms. McDevitt observed that because the culture surveys provide for dialogue, they are generating 3000 to 4000 comments, and there is an analysis effort that needs to take place in examining each of the comments.

COMMERCIAL CREW TRANSPORTATION SYSTEM (CCTS) CERTIFICATION

Dr. Donald McErlean discussed the update that the Panel received on CCTS certification. There has been significant progress along establishing a certification process, and NASA is engaged in activity to release to industry the necessary requirements that the Agency will demand in order to fly its astronauts under a commercial services agreement. This has been a subject of interest to the ASAP for the past two years, and the Panel is very pleased with the progress over the last six months. The Panel is especially impressed with Mr. Edward Mango’s efforts. The certification requirements as they are currently envisioned are tailored for the International Space Station (ISS) mission, which is the most likely near-term destination. NASA has put together a tailored requirement that includes fault tolerance. It covers all phases of the mission, including ascent, abort, post-landing, search and rescue, etc., as well as setting out requirements for expected crew health and medical/human factors. It is a system level set of requirements to make the transportation process safe, covering all aspects, not just the vehicle engineering design. Although NASA is taking a fault tolerance approach, it is using a process that the ASAP has encouraged—integrated design

and safety analysis where safety analysis is built into the design process from the beginning such that the design moves forward with safety as a primary requirement. All potentially catastrophic hazards that can be controlled by using failure tolerance have been discussed. There is acceptance that hazards can be mitigated in other ways.

NASA has published some LOC and Loss of Mission (LOM) limits. Currently, they are basic goals. The ASAP believes that NASA should publish threshold limits, objective limits, and goal limits to let contractors to know what the ultimate number is. Setting a threshold is a viable and acceptable approach. Fault tolerance does not necessarily just mean a redundant system. One must do a system level analysis to assure a particular output. Ultimately, the safety of the system is what matters. Redundancy can be met by having two similar systems, two dissimilar systems that can perform the same critical function, cross-strapping systems, or functional interrelationships. The overall system reliability remains important. Where fault tolerance cannot be used (e.g. a wing on an airplane), robustness, high margin, and factors of safety must be designed into things like primary structure. NASA has started to put together an integrated system design analysis process that has four classic steps, starting with integrated design review, technical interchange meetings, preliminary design reviews, critical design reviews, and finally, a review of the validation process.

There is a suite of program documents, most important of which is the new Crew Transportation Technical Standards. What is most interesting is that NASA has published the document with not just the requirement, but also the rationale for why requirement is important. This allows the design team to look at the outcome that is expected. If the team has another way to create that same outcome, it opens that subject up to innovation and new ideas. NASA has published some LOC requirements and given them to industry. They are looking at a threshold of LOC for a 210-day mission to the ISS as 1/150. The objective is 1/270; the lifetime goal is 1/750. The important thing is that NASA is trying to communicate the requirements, objectives, and goals to the contractor design community. The ASAP is pleased with progress in this area.

Vice Admiral Dyer noted that this goes to the issue of how safe is safe enough and how to communicate it to someone designing and building a follow-on system. He noted that his opening remarks spoke to the nexus of acquisition strategy and safety. He provided an example: if the acquisition strategy is for NASA (who holds fundamental knowledge about manned space flight in the U.S.) to be hands-off, then there is risk that the needed knowledge is not transferred. On the other end of the continuum, if NASA is hands off but is going to make the determination on whether or not the system is sufficiently safe after it is designed and built, it would be good if NASA communicated to the contractor whether or not the team is coming along successfully before spending billions of dollars. Somewhere between hands-off and the kind of intimate communication that lets one know every step of the way how it is going, there is a "sweet spot." NASA is making progress at figuring out how to do that, but it is an impressive challenge and one that will continue to be developed.

Mr. Frost noted that there are a number of metrics that have been discussed: LOC, LOC on ascent, LOC on descent—they are all slightly different numbers. The key number is LOC on the overall mission, which is 1/270--the same number that was to have been applied to Constellation. Beyond that minimum requirement, the Agency proposed to adopt a goal for eventual reliability (1/750). The ASAP believes that it would be advantageous to put that goal into contract documents, so that as safety factors are chosen, the eventual target is known. The Panel recommends this approach.

The LOC number was discussed in July 2010, and at that time the ASAP recommended that NASA relook at the number to determine if it is as high as it should be. The ASAP would like to see more vetting of the number with interested parties. That same recommendation would apply to the number for commercial providers as well. On a separate point, it was interesting that many potential vendors wanted to use different language on the definitions of safety. The safety language has been carefully developed. "Hazard" has specific components of severity and probability in terms of risk. It appears that some of the contractors want to mix those words around, and there is potential for miscommunication. The ASAP recommends that either NASA specify the words to be used, or at least map the commercial terminology to NASA's.

Vice Admiral Dyer revisited the topic he noted earlier—the harmony between acquisition strategy and safety. NASA wants and needs the follow-on system to be affordable and achievable, but at the same time, in the discussion that Panel has had relative to the “design to” safety numbers, there has been some discomfort. The design-to safety statistics are better than the Space Shuttle, but not impressively so. The question is: Is this the right point of departure for a system that will be with us at least as long as the Space Shuttle? Dr. Nield added that a good question to ask is: What about the other pieces of trade space? If we come up with a decision on “how safe is safe enough,” then we want to make sure that we are not being too prescriptive so that we can capture some other improvements as we go to our next generation transportation system. Mr. Frost commented that that trade is hard for everyone developing these kinds of systems.

Ms. McDevitt noted that in the development of the documentation, the plan is to issue the draft documents to industry. This is only a few months away. Industry will have an opportunity to see the results of NASA’s work. Although the documents may not be published in final form until a year from now, they will be “tailorable” documents. A negotiation process between NASA and industry will need to be put in place. JSC, in conjunction with the AIAA, had a symposium last week to acquaint industry with JSC’s capabilities that could be made available to them, and also to tell them about expertise and lessons-learned from the human space flight programs conducted to date. The ASAP was pleased to hear about this.

Dr. McErlean noted that CCT 1140 is the standard, but with each program, the validation agent negotiates with the design team and identifies the data products that he expects to review. This is codified in a memorandum of agreement between the two entities and signed by the program managers on both sides. This takes away the risk of getting to the end of process and having a surprise—it prevents a lot of failure at the eleventh hour.

WORKFORCE TRANSITION

Mr. Marshall discussed workforce transition. He noted the ASAP has followed this important issue for a number of years. Last month at Kennedy Space Center (KSC), it was one of the areas of greatest interest. The Panel has followed the progress made at KSC, Marshall Space Flight Center (MSFC), and JSC in easing the burden on the workforce and is pleased with the overall results. Universally, the partnership between civil servants and contractors is unprecedented. JSC is moving from having three major, active programs (the Space Shuttle, Constellation, and the ISS) to one. A lot of people will either transition to new work or may no longer be in the workforce here. It is in everyone’s best interest to (1) fly out the Space Shuttle properly and make sure that the emphasis on safety continues to receive the highest priority, and (2) preserve aerospace talent and maintain our leadership nationally and internationally. It is a difficult time; thousands of people will no longer be employed in this particular arena. It is critically important to do whatever is possible. The ASAP received a good status briefing and is encouraged by the processes that JSC is using to facilitate, partner, and assist in every way. This is a tough situation because of the current job market, the economy, and other competing requirements, but JSC appears to be doing the best that it can. The Panel believes that the Shuttle is still getting the attention it needs, from both civil servants and contractors. It was noted that the impact on the civil servant workforce is not as severe as that on the contractor workforce, and it is rated as “green;” the contractor workforce issue is “yellow.”

As noted by Vice Admiral Dyer in his opening comments, the WARN Act requires a 60-day notification for contractor workforce who will be terminated or separated. Mr. Marshall agreed that the lack of a timely decision on STS-135 will increase the anxiety of the workforce right before the launch of STS-134. Because the potential distraction will increase the risk on the STS-134 mission, the ASAP recommends that the decision on STS-135 be made as soon as possible, and no later than the end of the calendar year.

CONTINGENCY PLANS FOR EVACUATION AND DE-ORBIT OF ISS

Dr. George Nield reviewed the ASAP’s discussions with Mr. Michael Suffredini, Manager of the ISS Program at JSC. The Panel received a good briefing on the plans for End-Of-Life (EOL) for ISS. As part of the environmental impact statement for the ISS, NASA was required to look at various options for EOL,

and a controlled reentry was judged as the only viable option. Up to this point, the planning had assumed a Crew Exploration Vehicle (CEV) to perform the de-orbit burn. With uncertainties surrounding the schedule on that type of vehicle, NASA has been looking at other options, including the Automated Transfer Vehicle (ATV) in combination with the Progress vehicle as well as a single modified Progress vehicle. NASA has started discussions with the European Space Agency (ESA) about designing a dedicated vehicle. Each approach has its pros and cons. The ATV and Progress option is relatively straightforward, but has less capability than a modified Progress option. However, NASA has not yet completed discussions with the Russians on how that could be done. In terms of execution of the orbit itself, there are different phases. Starting about one year before the de-orbit, there is a plan to maintain propellant reserves. The vehicle would be allowed to undergo natural decay to set up the proper ground track. About four days before entry, burns would begin to set up the orbit altitude. The final burn would be executed to de-orbit the vehicle within one orbit period. The ground track would have ISS enter the ocean between Africa and Australia—well away from any populated areas.

The ISS may be required to have an early de-orbit before 2020 if the ISS crew is required to evacuate. This would most likely be caused by rapid decompression from MicroMeteoroid and Orbital Debris (MMOD); another cause could be a serious medical condition of one or more crew. Even with depressurization, NASA feels it would still be possible to maintain control of the ISS from the ground after the crew is evacuated. If for some reason NASA is not able to retain control or to have additional vehicles dock with the Station, it might be necessary to go forward with an early termination and de-orbit of the Station. The first action would be to boost the ISS to a higher altitude so that NASA could have more time (up to one year) to assess the situation and analyze options. The ASAP was pleased to see that there are a number of options under consideration, and that procedures are in place to allow an orderly de-orbit.

Mr. Frost noted that the biggest threat is MMOD; in orbit, that environment gets worse year by year. NASA needs to continue to closely watch this situation over the remaining ISS life.

INSPECTOR GENERAL (IG) STUDY: ASTRONAUT HEALTH & PERFORMANCE

Ms. McDevitt reported on the briefing that the ASAP received from Dr. Mark Weyland, Deputy Chief of the JSC Space Medicine Division, on a recent IG study assessing NASA's actions in implementing recommendations that came out of three reviews related to the Lisa Novak incident. Those three reviews were: the JSC internal review; the outside astronaut health care system committee review; and the NASA Headquarters S&MA review. This has been an area of interest to ASAP. The Panel reviewed the status of the outside astronaut health care system committee review in June 2008, and reported no issues or concerns. The IG assessment report was issued on July 6, 2010. It indicated that the intent of 36 of the 39 review recommendations had been met. At that time, there were three actions on recommendations that were not complete, and one on which NASA was not able to comply. Since that time, one of those recommendations has been closed.

The one recommendation that NASA has not addressed is the recommendation concerning alcohol testing. This recommendation was based on testing all employees, including astronauts, in safety-sensitive, security, and post-mishap areas, as well as testing based on reasonable suspicion for all flight-safety-critical employees. The IG reported that NASA was already working on an employee testing policy in response to an earlier ASAP recommendation issued to NASA in 2006. Based on that, the IG felt that this new policy would satisfy the intent of its recommendation once it was completed, and left the recommendation open pending issuance of the policy. This is of some concern to the ASAP. The Panel has made some headway in getting this recommendation implemented. The recommendation was developed in 2006 and reported in the 2006 and 2007 ASAP annual reports. NASA has taken actions that address certain parts of the recommendation, which concerned both drug and alcohol testing. In many areas, the NASA policy has been strengthened for illegal drug use for both civil servants and contractors, although there are still some open issues with regard to compliance verification. NASA took the recommendation one step further and developed contractual language so that requirements pertaining to illegal drug use could be put into contracts, primarily to support post-mishap investigation. However, the one area that is still open (and NASA has recorded it as open) concerns developing the alcohol use policy. The ASAP has had one

briefing on the subject, and a working group had been established with participation from the various offices at NASA Headquarters—human resources, legal, and procurement. Outside of that, the ASAP has only had informal discussions with Headquarters on where the policy stands, and there are still hurdles that need to be overcome. To bring this to head, the ASAP recommends that the lead Headquarters organization responsible for developing the NASA Alcohol Use Policy provide a formal briefing to the ASAP at its first quarterly meeting in 2011. The IG should be invited to participate. The ASAP will continue to carry this as an open action item.

The IG found that NASA was unable to address the recommendation concerning the effectiveness of psychological testing evaluations in the final selection process of astronauts. NASA has done psychological testing evaluations for the nine candidates hired in May 2009; however, a period of time is required in order to assess the performance of the new astronauts and gain intelligence on whether this is a worthwhile evaluation. The IG has agreed and has no further recommendations in this area.

Major changes have taken place at JSC regarding organization and business practices associated with space medicine. This briefing was given by Dr. Polk, Chief of the Space Medicine Division at JSC. Over this period of time, JSC has updated and modernized how NASA is handling the medical care of astronauts. It has established a Quality Assurance committee to guide actions and efforts that are necessary, and has established safety and quality metrics that are being reported through to NASA Headquarters. They have fully integrated all the work locations (e.g., Russia, White Sands, and KSC) into electronic medical records. They have also done a finance and legal overhaul and review, and now have the appropriate authority to implement medical care processes as common business practices. Much good work has been done and more is ongoing.

The long-term effects of space flight on astronaut health are still a concern. The Department of Energy and Department of Defense have legislative authorization in place to provide employee compensation for cases where there are adverse health effects that occur long after exposure to a work-related hazard. NASA does not have this authority. When astronauts are separated from the Agency, they are on their own. NASA has been unsuccessful to date in getting similar authorization, but is still working with Legislative Affairs to try to make this happen. Several areas that could pose a long-term risk have been identified, e.g., radiation and bone loss (early fractures).

Dr. Bagian agreed that this coverage is necessary, and added that without an ability to reliably look at long-term health and countermeasures, NASA is working blind. The Agency should have a more reliable and robust mechanism to do long-term surveillance. He also agreed with the recommendation on an alcohol policy. In addition to a status briefing, the ASAP needs to have a statement from NASA on when the policy will be completed and implemented. With regard to psychological testing, this will take some time to get done; however, this needs to be tightened up.

NASA ENGINEERING AND SAFETY CENTER (NESC) REPORT ON STS-135

Mr. John Frost summarized the discussion on the STS-135 report. Since RTF, the Space Shuttle has flown with a requirement by the Agency to have a second Shuttle that could be rapidly launched in event there was a problem on orbit that endangered the crew during return. In that event, the Shuttle crew would go to Station and have “safe haven” while awaiting the “rescue” Shuttle. The only exception since RTF has been the Hubble servicing mission, which had its own set of special requirements. On the last planned launch (STS-134), NASA will have a fully serviced vehicle (STS-335) standing by with no function except launch on need. The Agency has been considering whether to add an extra launch and use that vehicle for additional supply to the Space Station. There are benefits associated with that additional Shuttle launch, but there are also risks. The Panel looked briefly at those risks and came to its own conclusion several months ago. Since that time, the Space Operations Mission Directorate (SOMD) asked the NESC to take a separate, detailed look at flying STS-335 (renumbered as STS-135) as a logistics mission. Dr. Nancy Currie and Mr. John Casper from the Shuttle Program Office discussed the findings. This independent study focused on the change in risk by using an alternate rescue technique in event rescue would be required. They have conceptualized a technique that uses scheduled Soyuz launches to gradually bring the

crew down. This would replace the Shuttle Launch-on-Need (LON) approach. Although there have been preliminary discussions, this approach has not been fully vetted with the Partners, and there is more work to be done in that arena. The plan would be to use the two versions of Soyuz that will be available. As with any safe haven situation, there will be more people on Station than there are “lifeboats;” that will be true here, but it will be true for a longer period of time.

Seven areas were evaluated. Mr. Frost summarized the findings in each of those areas:

- retention of critical personnel—there is no significant impact provided the decision is made early enough;
- vehicle processing—there are no life-limited components;
- supportability—the consumables are adequate, but there were some recommendations that the program could implement;
- medical—the extended time in space does not pose significant risk;
- probabilistic risk assessment (PRA), or likelihood of events happening—they looked extensively at this and assigned a “worst case” scenario; the values were not unlike a Shuttle rescue;
- crew selection – there were specific recommendations on training, and the crew office has implemented those that are feasible;
- crew rescue and return – there are issues with more people on board than there is immediate evacuation capability, but there are steps that can be taken. There was an extensive discussion of rescue contingency plans.

The NESC’s conclusion was much like the ASAP’s—it appears to be a reasonable approach if the Nation decides we need this flight.

Dr. Bagian reiterated the WARN issue. A decision on STS-135 needs to be made before the end of this calendar year.

At this point, Vice Admiral Dyer invited comments or questions from the public attendees.

There was a question regarding the timely decision for STS-135. Mr. Marshall noted that the issue is to prevent WARN notices (required 60 days prior to termination) from going out and then having to be rescinded. It is important to get a decision one way or another so the workforce has a clear understanding of what will transpire. With no action on STS-135, the WARN notices for workforce termination after STS-134 (scheduled for launch February 27, 2011) must go out prior to the New Year. Vice Admiral Dyer emphasized that it is a morale issue as well as an administrative issue. The ASAP is greatly relieved by the tremendous dedication of the Shuttle workforce. Their strength in standing by the program to the end is exemplary; however, don’t make it any harder on them.

There was another question regarding who has authority for the decision on STS-135—NASA Headquarters? Congress? The White House? Vice Admiral Dyer noted that there are three legs on that stool.

The meeting was adjourned at 2:00 pm.