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

July 31, 2008

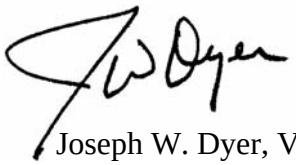
The Honorable Michael D. Griffin
Administrator
National Aeronautics and Space Administration
Washington, DC 20546

Dear Dr. Griffin:

The Aerospace Safety Advisory Panel held its 2008 Second Quarterly Meeting at NASA Headquarters on May 21-22, 2008. We greatly appreciate the support received from NASA subject matter experts, as well as the time you spent with us and your willingness to discuss our concerns open and candidly.

The Panel submits the enclosed Minutes with Recommendations resulting from this meeting for your consideration.

Sincerely,



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

Enclosure

Aerospace Safety Advisory Panel
2008 Second Quarterly Report
Minutes and Recommendations

ASAP Public Meeting
May 22, 2008, 1-3 p.m.
NASA Headquarters
300 E Street SW
Room 9H40
Washington D.C.

Aerospace Safety Advisory Panel Members Present
Vice Admiral Joseph Dyer, USN (Retired), Chairman
Dr. James Bagian
Major General Charles F. Bolden, Jr., USMC (Ret)
Mr. John Frost
Mr. John Marshall
Ms. Joyce McDevitt
Dr. Don McErlean

ASAP Staff and Support Members Present
Ms. Katherine Dakon, ASAP Executive Director
Ms. Susan Burch, ASAP Administrative Officer
Mr. Mark Bernstein, Meeting Reporter

Public
Ms. P. Diane Rausch, NASA
Mr. Garvey McIntosh, NASA

Opening Remarks

The public session of the 2008 second quarterly meeting of the Aerospace Safety Advisory Panel [ASAP] was held at NASA headquarters in Washington D.C., following two days of meetings on a range of topics. Adm. Dyer expressed appreciation for the support received from NASA subject matter experts, as well as the opportunity to spend significant time with NASA Administrator Dr. Michael Griffin and senior agency leadership.

Chief Engineer Introduction

The ASAP met with Dr. Michael Ryschkewitsch, appointed NASA Chief Engineer in August 2007. The discussion touched on various points, particularly Technical Standards and Technical Authority, with the Panel welcoming Dr. Ryschkewitsch's statement that NASA engineering was increasingly developing an agency-wide perspective. On Technical Standards, the Panel noted

Dr. Ryschkewitsch's intention to adopt established consensus standards [e.g. AIA or SAE] where appropriate, but to use NASA standards where no others existed. The Panel endorsed the Chief Engineer's stated policy to develop interim standards, and then beta test them for one year to gather information prior to their adoption. The Panel expressed satisfaction with the release of Document 7009 on Modeling and Simulation standards, the first mandatory NASA standard applicable to all simulations; that standard is now in beta testing. The Panel agreed the approach being taken would give program managers and chief engineers a consistent basis on which to compare and assess the risk of adopting results from simulations.

The ASAP, in previous meetings, has been attentive to the question of integration and alignment between centers. The Panel noted with approval the attention Dr. Ryschkewitsch has been paying to promoting overall program integration between centers, including the integration agreements that exist between centers to lessen the potential that various parts and components will fail to work as planned. Adm. Dyer said the movement to NASA headquarters of respected technical leaders from the centers, such as Dr. Ryschkewitsch, was a positive step.

Mr. Frost commented on the possible role that could be played by the NASA Safety Center [NSC] in standards development and suggested that they be added for coordination of standards when appropriate. He noted the ASAP discussion relative to how the lessons learned from both successes and failures were placed into 'golden rules': Goddard Space Flight Center [GSFC] had such a set; the Jet Propulsion Laboratory [JPL] had such a set. While he acknowledged that each NASA center at times dealt with matters unique to it, he believed it would be useful to create a mechanism for establishing 'NASA Golden Rules' to be shared agency-wide. Mr. Frost praised the work done on modeling and simulation, saying it was among the best he had seen: if one were to make 'life and death' decisions based on models, it was well to know what level of confidence could be assigned to them. The modeling and simulation proposal called for the creation of a matrix that would classify models as 'green,' 'yellow' and 'red.' Dr. McErlean said it 'extremely important' that common and universally accepted definitions be established as to what each matrix block meant; if an engineer at one center described a risk level as a '3,' this should conjure a shared image with engineers elsewhere.

In closing comments, Mr. Frost noted that the Panel had earlier selected two random examples of issues that had occurred in space flight to determine how these were turned into standards. That process, he said, was still in development; he urged the Panel to continue to monitor the matter to see how lessons learned are documented and applied to current programs in the form of new standards. Ms. McDevitt noted that the agency website on standards presented the consensus standards thus far completed by NASA. The Panel, she added, has been interested that linkage be established with the lessons learned, with those lesson tagged to the appropriate standards. She noted that connecting such things as the JPL work practices to the standards would bring them to a wider audience.

Technical Authority Update/Technical Standards Update

The ASAP was additionally briefed by Mr. Gregory Robinson, NASA Chief Deputy Engineers, on the promulgation of the Technical Authority policy. The Panel expressed satisfaction that NASA's Strategic Management and Governance Handbook [NPD 1000] had been changed: the Technical Authority roles regarding risk have been laid out such that decisions related to technical and operational matters that pertain to safety and mission success risk require the formal concurrence by the cognizant Technical Authority of engineering, safety and mission assurance,

health and medical. The Panel believed the Technical Authority program was being promulgated from headquarters and appropriately documented in management documents.

The Panel believed the adoption of the Technical Fellows program had been excellent; these Fellows are discipline experts, tasked with maintaining the competence of work done in their field and with serving as arbiters of technical issues. The Fellows work related to, but was different from, that of the Technical Authority, which was itself a decision node for determining the adequacy of the process followed and the appropriateness of the conclusions reached.

The Panel, however, expressed concern that wide variances existed in how the Technical Authority was being interpreted, both center-to-center and at varying levels within the organization. While the Panel believed there was high acceptance of the concept at the senior levels of the centers, engineers on the floor still required considerable learning. Concern was expressed that when the Panel visited various centers, the engineers at the working level appeared to have widely varying interpretations of what the program meant and to be uncertain how the Technical Authority related to their own daily practice. Further, it appeared that those in individual centers tended to call upon the most geographically accessible expert, as opposed to NASA's best expert.

Adm. Dyer identified the Technical Authority concept as critical, stating that it was the most important of the recommendations that had been made. Dr. McErlean stressed the importance of the Technical Authority program, noted that it had been supported and promoted by Administrator Griffin, and said the concept needed to be firmly in place to ensure its continuation in a new administration. Mr. Frost noted that a direct line of authority from a center's chief engineering and chief safety officer to their Headquarters counterpart might, or might not, be shown properly on various Center implementation charts. He stressed that this relationship of Technical Authority to headquarters needed to be clarified in such charts.

Ethics Briefing

Adm. Dyer noted the Panel had received its annual ethics briefing during the May 21 session.

Fall Protection Standards

The ASAP was briefed by Mr. Jonathan Mullin, Manager, Operational Safety, on steps and actions that followed from an accident that had occurred at Kennedy Space Center [KSC] in 2006, when a contractor fell from a roof and subsequently died from injuries received. Following the accident, NASA had aggressively convened an accident board, which undertook what the ASAP regarded as 'an excellent and timely' evaluation of the factors involved and then issued what the Panel regarded as a series of good recommendations. Subsequently, the KSC Director convened an inquiry into how similar accidents could be prevented in the future. The Panel had earlier recommended that all other NASA centers review the KSC actions. On May 21, the Panel reviewed the question of whether this activity should be undertaken agency-wide. No answer was as yet available, as questions of the needed capital investment and training remained. A decision on the question of agency-wide action is expected by January 2009. Panel members praised KSC for its efforts and NASA for looking to apply a center's action agency-wide. The Panel noted that the creation of agency-wide standards was valuable, as they would simplify the commonly occurring movement of personnel from center to center. Ms. McDevitt reported that, when the KSC recommendations were made, concern had been expressed that KSC contractors

might regard the safety recommendations as prohibitively costly. In practice, she said, they had not done so; this spoke well for the undertaking. The ASAP expressed regret that the policy decision would not come until 2009, and, further, that final implementation might not occur before 2011: the Panel believed a greater sense of urgency on implementation was merited.

Exploration: Review Update Of Optimization of Robotics Use To Support Human Exploration

The Panel discussed with Mr. William Gerstenmaier, Associate Administrator for Space Operations Mission Directorate [SOMD]; Mr. Douglas Cooke, Deputy Assistant Administrator, SOMD; and Mr. Geoffrey Yoder, Division Director, Directorate Integration Office, the status of robotic activities in support of human exploration. Specifically, the Panel sought to determine if a current policy existed on the best mix of human vs. robotic assets for a given mission. The Panel was informed that while no formal policy existed, the general policy was to undertake 'blue collar' tasks robotically with 'science' tasks done by humans. The three presenters agreed that a formal decision tree on the subject might be useful. Mr. Gerstenmaier commented that undertaking tasks robotically often took more time; the Panel recognized that in some cases this meant tradeoffs were made between safety and time. The Panel welcomed the statement that robotic missions would have as a primary objective the gaining of the data most needed to support human exploration; thus, such missions would be part of the risk reduction effort for subsequent human activity.

Safe Use of Limited Life Components On The Space Shuttle

The Panel had previously received a concern that certain safety critical limited life components might be in use on the Space Shuttle beyond their safe life limits. Mr. Gerstenmaier described to the Panel how such components are tracked and monitored and assured the Panel that a positive program was in place to prevent such an occurrence. He further explained that all such components are either within safe life limits at launch, or the risk of their use is evaluated and the risk is formally accepted as part of the FRR process. Based on this information, the Panel considers this issue closed.

Random Drug and Alcohol Testing Update

The ASAP held a discussion with, Ms. Faith Chandler, Manager, Mishap Investigation Program, on the status of work being done on testing for alcohol and illegal drugs. This data followed a 2006 ASAP recommendation made in the aftermath of an accident. That recommendation was that random pre-incident and post-incident testing for alcohol should be expanded to include both contractors and NASA civil service employees. In 2007, the Panel received a report on post-incident testing for illegal drugs; however, that report had made no reference to alcohol.

At the present meeting, the Panel learned that while NASA had a policy for the post-incident testing for illegal drugs, it had not had a policy for testing with regard to alcohol. The Panel learned that the initial effort put forth by the Office of Safety and Mission Assurance [OSMA] was to clarify and expand the policy on post-incident testing. That office had developed a draft NASA policy for a drug-free workforce and, further, had reviewed the requirements for contractors stated in the pertinent federal acquisitions regulation, strengthening these as well. The cost implications and effectiveness of this draft policy are currently being assessed through a pilot program at KSC; the policy itself has been tabled until the results of that pilot project are

known. In the interim, OSMA published in August 2007 a NASA policy letter clarifying post-mishap actions for NASA civil servants. The ASAP was informed of other steps being taken, including training for supervisory personnel to reemphasize the requirements in this area; testing undertaken in connection with Type A and Type B mishaps; and efforts to develop a NASA policy on alcohol use.

The ASAP noted the complexity of the task at hand. For example, NASA civil servants and outside contractors have different applicable authority documents, a circumstance that considerably affects the scope of NASA's ability to implement changes in this area. For civil servants, the authoritative documents are under the control of the Department of Justice; for contractors, the Federal Acquisition Regulations [FAR] apply: these require public review and comment.

The ASAP learned that, given these issues, NASA deemed it necessary to assemble an implementation plan to address these tasks; meetings have been held with the NASA Administrator, who approved the applicable parameters for policy development. OSMA is being supported in this activity by various NASA headquarter organizations, including health and medical, general counsel, capital management, procurement, security and program protection.

The ASAP said the presentation provided important clarification on the effort. Previously, the Panel had not understood why the effort was addressing illegal drugs, but not alcohol. The Panel now believed that considerable progress was being made, including the pilot program at KSC. While it had, the Panel noted, taken two years to reach this point, a plan had now been created, and the action team associated with that plan had the necessary momentum to create a standard that would apply across the agency.

Mr. Marshall praised the activity, saying he believed a superb job had been done on a process that was broadly applicable, standardized across the agency, and cost effective. Mr. Frost commended the process for involving both the 'brain trust' from headquarters and working groups from the centers. He noted that the ASAP was often told that, given the differences between centers, agency-wide policies were impractical. He believed a successful policy was being achieved in this instance, even with such complicating circumstances as the fact that first responders were civil servants at some centers and contractors at others.

Mishaps Report Update

The ASAP discussed the status of mishap reports with Ms. Faith Chandler, Manager, Mishap Investigation Program. The ASAP has expressed concern that if an investigation at an individual center uncovered a potential hazard, that this information be rapidly shared agency-wide. The Panel was informed that the former safety alert system had been revamped into a warning action response; the Panel regarded the new practice as appearing to be timely and distributed to the right people. The Panel described the process as very methodical: lessons learned were documented and implemented, with an action plan developed to track activities through completion. The Panel praised the fact that emphasis went beyond identifying the direct cause of the accident to investigating the underlying circumstances that made the accident possible. The Panel identified two concerns. First, thoroughness appeared to be being achieved at the expense of timeliness; for the years 2004 through 2008, only about one-fifth of Type A and Type B accidents had been through the entire process, with action plans distributed to all centers. The time delays, the Panel believed, were simply too long for the information they supplied to be of high use to management. Second, the data gathered was being insufficiently analyzed;

consequently, trends and underlying causes were not being identified in ways that would support focused safety efforts across the agency. Dr. McErlean urged that a strengthened effort be made to analyze data in ways that would help determine trends and systematic weaknesses.

Mr. Frost commented that, in most organizations, the highest level of an organization was briefed any time a serious accident occurred; NASA, he noted, is not currently doing this. He believed the expectation that such a review would occur would lead to a greater emphasis being placed on gathering the requisite data. Additionally, he noted that the findings of the very comprehensive investigations of orbital failures and deep space probes were not as yet being methodically turned into 'lessons learned' and corrective action plans. He believed this activity should be linked with the existing ground accident process so that lessons learned and action plans were automatically created and tracked. Dr. McErlean said the 'missing piece' was that corrective action plans were not being evaluated subsequent to their implementation to see if the recommended actions indeed corrected the problem.

The ASAP discussed the need for metrics in measuring safety. Adm. Dyer suggested creating an inclusive 'Uber' metric that would permit a ready answer to the question: was 2007 safer than 2006? No such metric currently existed. Mr. Frost said accident trend tracking was sufficiently important that the ASAP should request such information as a standard feature of its center visits. Mr. Marshall noted that for data to be meaningful, it must reflect a standard taxonomy and employ standard definitions. Mr. Frost commented that new software planned for installation this summer is said to include such definitions.

Meeting with Administrator Griffin

The ASAP met for two hours during its May 22 session with Dr. Griffin, NASA Administrator. Space Shuttle and safety concerns were 'front and center' in that discussion, with Dr. Griffin strongly sharing the Panel's view that the transition from the Shuttle program to the Constellation program presented a major opportunity to address safety concerns. The Panel believes that significant risk remained in the Shuttle program, which was now adding age to complexity. Given this and the resource requirements of the Constellation program, the ASAP was strongly of the view that the life of the Shuttle should not be extended: to do so would compound the safety implications and risks associated with that program.

Based on its conversations with Dr. Griffin, the ASAP concluded that the Constellation program safety related issues were on track, though it was experiencing signs of stress related to resource limitations at an earlier point than was common. The Panel reported that Dr. Griffin shared its view that the creation of a large program was a good opportunity to develop a culture; in the case of Constellation, safety was to be a central pillar of that culture. Further, the Panel noted, as an adverse trend, that due to financial constraints NASA aircraft were generally not equipped with the latest in life saving tools -- e.g. collision avoidance; ground proximity warning systems -- that are now common on military and civilian fleets.

The ASAP discussed with Dr. Griffin the question of resource constraints as they affected the agency, with Dr. Griffin reporting that the NASA appropriation was $3 billion less than that needed to execute its assigned missions, a statement Dr. Griffin had communicated to Congress. Dr. Griffin said this shortfall had implications on safety; for example, with the NASA fleet. Panel members expressed concern with NASA's budget constraints, particularly as they might affect safety. Adm. Dyer stated that, while organizations were generally inclined to claim they needed additional resources, NASA 'has a strong and compelling story that that was indeed the

case now.' Mr. Marshall expressed concern that, where NASA funding was concerned, the 'knee of the curve' would be crossed, with consequences that would be of great concern. Mr. Frost expressed the view that the financial pressure stemmed from the overlap of the Shuttle program that was ramping down and the Lunar/Mars initiative which was simultaneously ramping up. Normally, he said, such overlaps were eased through additional temporary funding, but in this case NASA had received no increase in resources. Adm. Dyer said the topic would be addressed in the ASAP report to Congress, which he anticipated would be completed in June 2008. The Panel, he said, would go beyond the submission of the report and seek to discuss it directly with members of Congress.

Additional matters:

The ASAP has been viewing the safety issues surrounding the Soyuz capsule and its associated recovery module with increasing concern. The Panel discussed the matter with Mr. Gerstenmaier, who shared that concern and who said that SOMD was 'focused like a laser beam' on the issue. Adm. Dyer said the Panel emerged from this discussion with no less concern, but encouraged by how competently NASA was approaching the problem.

The ASAP restated its concern with enterprise alignment; ASAP has described NASA as being more of a confederation of ten centers than a strong and united union. When, for example, ASAP visited a center, discussion often began with the statement, 'Yes, but we are different here.' The Panel was of the view that while diversity is a strength, the agency would benefit generally if good ideas from one center were quickly and broadly shared. The Panel regarded the sense of difference between centers as adding to the challenge of implementing such things as Technical Authority. Adm. Dyer noted that the fact that different badges were required to gain access to different NASA locations suggested that work on integration remained to be done.

The ASAP called attention to the importance of leadership continuity at a time when a change in administrations was in the offing. The Panel noted that NASA currently has a great many projects in progress; care is needed so nothing is dropped in the transition to a new administration. The Panel observed that Dr. Griffin had placed outstanding people in senior positions, and expressed the hope that these individuals would be carried forward into the next administration.

ASAP Recommendations, 2nd Quarter 2008

1. The ASAP recommended that the NSC be included in the NASA process for evaluating whether new standards are needed and the decision on whether to implement those standards.

2. The ASAP recommended that an agency-wide set of 'NASA Golden Rules' be established to assist in the sharing of knowledge between centers.

3. The ASAP recommended that on Modeling and Simulation, a NASA-wide matrix be created to classify models as 'green,' 'yellow' and 'red,' so that the statement 'high confidence' means the same thing from one center to another.

4. The ASAP recommended that NASA formulate a decision tree for optimizing the use of robotics in exploration, so as to diminish the risks to humans, with that decision tree including all criteria relevant to the decision.

5. The ASAP urged that NASA review the applicability of developing a policy that would formally add to appropriate NASA aircraft Traffic Collision Avoidance System [TCAS], advanced ground warning systems and other advanced avionics programs that have been embraced by the civilian and military worlds.

6. The ASAP recommended that, prior to contracting with a private charter operator, NASA consider requiring that all contractors be subject to an independent audit.

7. The ASAP urged that greater timeliness be achieved in completing accident reviews. The Panel also recommended that an organized and rigorous mishap trend analysis effort be undertaken agency-wide to identify causal trends at an Agency level as well as by Center. The results of this analysis should be briefed on a regular basis to senior Agency leadership. The Panel would like to see the Center analyses during their visits to field operations. The Panel recommended that a policy be implemented to brief senior leadership of initial causal analysis in a timely fashion after major mishaps. Finally, the Panel recommended that a closed loop management tracking system, similar to that used for ground mishaps, be developed to ensure implementation of lessons learned from flight failure investigations.

8. The ASAP recommended that the new NASA Fall Protection Standard resulting from a 2006 fatal accident be accelerated to take effect well before the 2010-2011 currently projected and that the key elements of this standard be mandatory (with waiver capability) NASA wide rather than advisory.