

NASA AEROSPACE SAFETY ADVISORY PANEL

National Aeronautics and Space Administration

Washington, DC 20546

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

November 13, 2009

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

Dear Gen. Bolden:

The Aerospace Safety Advisory Panel held its 2009 Fourth Quarterly Meeting at the Kennedy Space Center (KSC) on October 21-22, 2009. We greatly appreciate the participation and support received from KSC subject matter experts and support staff.

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

Sincerely,

A handwritten signature in black ink, appearing to read "J W Dyer". The signature is fluid and cursive, with a large initial "J" and "W" followed by "Dyer".

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

Enclosure

**Aerospace Safety Advisory Panel
2009 Fourth Quarterly Report
Minutes and Recommendations**

Aerospace Safety Advisory Panel (ASAP)
Public Meeting
October 22, 2009
Kennedy Space Center Visitor Complex
Cape Canaveral, Florida

ASAP Members Present

Vice Admiral Joseph W. Dyer, USN (Retired), Chair
Dr. James P. Bagian
Mr. John C. Marshall
Ms. Joyce A. McDevitt, P.E.
Ms. Deborah Grubbe, P.E.

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

James Dean, Florida Today
Tiffany Alexander, KSC
Jessica Williams, KSC
Chris Torres, KSC
David Frankel, self

OPENING REMARKS

The Aerospace Safety Advisory Panel (ASAP) held the public session of its 2009 fourth quarterly meeting at the Kennedy Space Center (KSC) Visitor Complex at Cape Canaveral, Florida. Admiral Joseph Dyer opened the session by noting that the ASAP has lost two members recently: Mr. Brock Stone, who has retired, and Gen. Charles Bolden, who has left the Panel to become Administrator of NASA. In the near future, two new members will be replacing them.

Immediately prior to this meeting, the Panel had an opportunity to visit the Ares 1-X launch site at KSC, Pad 39A. The NASA workforce exhibited obvious pride and excitement with this first new rocket in over three decades.

The ASAP had a successful meeting over the past two days with the KSC leadership. The first discussions were with KSC Director Robert Cabana. The prime topic on the

minds of the KSC management as well as most of the people on the Space Coast concerns jobs and the transition from the Shuttle Program to the Constellation Program. In this regard, the Panel shares their concerns and commends the Center's leadership and its contractors in working diligently to ease the transition. There has been considerable attention to detail, and Mr. Cabana and his team are working with state and federal authorities to be able to place as many as individuals as possible. Admiral Dyer noted that there are currently some 2200 to 2300 civil servants and some 13,000 contractor employees working at KSC. The contractor workforce will bear the brunt of the downsizing, but both NASA and the companies involved are working hand in hand to do the best possible job on the transition.

The series of discussions focused on the remaining flights in the Shuttle Program. Some contingency work is being done on the potential of doing one additional flight if necessary, but the preponderance of effort is concentrated on flying out the program safely. The Ares 1-X activity is ongoing and the planning that has gone into that program is evident. The first launch of the Ares 1-X booster is scheduled for 8:00 a.m. on October 27. The workforce is confident of a good launch, as well as launch of STS-129 on November 16.

Other discussions centered on KSC's organizational structure, which is providing appropriate checks and balances during this transitional period. While achieving the right workforce skill mix is probably the biggest worry—the demographics of age are supportive of a transition to a lay off, but the issue in this case has to do with the economy and probability of people desiring to work longer. Recognizing that, NASA is working with several agencies that are looking into building an exploration park and technology center. There is great interest and some uncertainty associated with the Augustine panel's report which has been out in summary fashion but is scheduled for official release shortly. Many have been awaiting the report as well as NASA and White House leadership on the direction and consensus on space exploration.

Mr. John Marshall commented on the challenges facing KSC in the transition. There is no bigger challenge from a safety perspective than to have distractions from concentration, attention, and focus. At KSC, there is a keen effort to provide alternatives and positive reinforcement to keep the management and workforce focused. The leadership is very "hands on" and understands the need to focus on the basics and safety. They merit high marks for commitment and empathy. Admiral Dyer noted that over a year ago, the ASAP had significant worry about the workforce staying together to support the Shuttle Program until its end; however, the workforce has proved its dedication and people are staying. The civil servant workforce fares very well during the transition. It is the contractor resources that will have challenges. The ASAP has been very impressed by the commitment, proactive nature, and supportability that they have shown thus far.

SAFETY AND MISSION ASSURANCE (S&MA) UPDATE

Ms. Deborah Grubbe shared her observations from the S&MA discussion. Ms. Shannon Bartell, Director of S&MA, briefed the Panel on the work of her organization. Currently,

it includes 240 civil servants and 100 contractor employees. The briefing focused on how the workload balance is being achieved with the necessary skill set during transition as the workload changes. S&MA works with the Shuttle Program, the International Space Station (ISS) Program, the Launch Services Program, the Constellation Program, and other projects and organizations. The important piece of their work is to evaluate and maintain the skill sets and transition from the Shuttle type of work to the Constellation type of work. Some great work is going on by the S&MA leadership team to evaluate and maintain the skill sets. The “independent voice” is not only allowed but encouraged. From a safety culture standpoint, this is extremely important. Progress is being made in the right direction. The governance process and interface with the Independent Technical Authority is good. One can ask the question: What else can be helpful? What they could put in place and would serve them well would be an internal governance process for their own operation. There will be some important questions: Are we replacing our skill sets in kind? How do we know that we are replacing our skill sets? How are we measuring our skills? What are the benchmarks? A formal governance process for S&MA would be very helpful. Therefore, the ASAP recommends that the KSC S&MA organization put into place an internal management process that includes clear and transparent metrics with respect to skill sets required for current shuttle and future Constellation, ISS, COTS and “other program” support. Additionally, there needs to be established a “quick feedback” process that reaches into each of the current near misses and mishaps to examines the role that “lack of right skill at the right time and right place” has on each incident.

Dr. James Bagian mentioned that Commercial Orbital Transportation Services (COTS) was also discussed. The KSC S&MA organization recognizes that there are some challenges and that there is not an Agency-wide system on how to deal with COTS. This is still a task that needs to be addressed. Admiral Dyer added his compliments to Ms. Bartell—she is not only working hard but also very effectively.

SAFETY METRICS AND TRENDS

Safety Metric and Trends is of special interest to the ASAP. Mr. Marshall reported on the Panel’s discussion with Mr. Dave Barker, Chief of Institutional S&MA. Mr. Barker provided an excellent briefing on safety trends and metrics. Measurement is the key—if there are no measureable metrics that provide hard data, it is a subjective world. KSC trends three OSHA rates: lost time injury rate (LTIR); days away, restricted or transferred rate (DART); and total case incident rate (TCIR). They also look at vehicular damage and property damage in general. Although the data goes back eight years, the ASAP was primarily looking at recent trends that have changed the workplace environment. The last three years have seen no appreciable changes in LTIR, with most incidents associated with slips, trips, and falls. In the last year, the rate has been steady. The DART rate (primarily from lifting and twisting injuries) has shown a slight decrease, which is to be acknowledged. TCIR shows a noticeable trend downward, which the ASAP applauds. In terms of vehicular or property damage, there was one substantial incident in 2009—a contractor vehicle fell into the river and was declared a total loss. The investigation has been completed and corrective actions have been put into place. In

comparing rates with others, KSC rates are favorable although not overwhelmingly better. The Panel was pleased with KSC's metrics.

In terms of the Executive Safety Forum, one of the issues discussed is how senior management is involved in investigations and what is being done about closing open cases. The KSC investigation processes are mature, comprehensive, and serve what needs to be done. Leadership involvement in terms of recognizing the problems that need to be solved is right on.

Despite this positive trend, the ASAP continues to be disappointed by the continued slow response with regard to the reporting and closeout of reports from NASA Headquarters. The ASAP has made recommendations in the past to review the processes used to accelerate dissemination of information and implementation of corrective actions yet the Panel universally agrees that this requires further attention and action to get the word out more quickly for ALL centers, not just uniquely at KSC. Admiral Dyer added that a recurring theme of ASAP has been to observe many "best practices" at individual centers, but be disappointed with the homogeneous distribution of those practices across the Agency. This is where NASA could and should do better.

MISHAP STATUS AND IMPROVEMENTS & OSHA COMPLIANCE AND ANALYSIS

Ms. Joyce McDevitt reported on the discussions on Mishap Investigation Board (MIB) status and improvements. The discussion was directed to the efforts at KSC, although this has been recognized as an Agency-wide and Headquarters-level problem. The ASAP first highlighted the need to correct this problem about two years ago. It further followed up at other centers and elevated its concerns about the need for correcting all of the different phases of the process to shorten the timeline for accomplishing the investigation, the development of the investigation report, the NASA Headquarters endorsements, the center approval, the development of the corrective action plan and implementation thereof, and verification so that the case can be closed. KSC is involved in the investigation and development of the report and providing approval after Headquarters endorsement. NASA Headquarters has been a problem in terms of the number of endorsements required before the Center can follow through with the latter phases of the process. The current process resulted from a NPR change in 2000, which strived to improve the quality and consistency of reports and identify true root causes as well as improve recommendations. In doing so, it resulted in a significant increase in the number of required formal mishap investigations. This, in turn, required increases in the level of effort required to complete the investigation as well as increases in the supporting efforts required to close out the reports. The KSC improvements have been in response to Headquarters actions, and they have reduced some of the timelines, e.g., the investigation timeline from 75 days to 30 days. KSC has accomplished this by providing a readiness for kicking off the preliminary aspects of investigations. They also have a secure and dedicated mishap investigation room, so that when the Board convenes, it can move out quickly. Additional dedicated resources have been provided, e.g. technical writers, video support, etc. Also, a NASA Safety Center mishap representative is actively involved. To improve communication, KSC has implemented a Mishap

Warning-Action-Response (WAR) process which provides preliminary notification to other centers with as much information about the event as possible so they can be alerted.

There have been fourteen completed MIB investigations, with four active investigations at present. The Center Director conducts a monthly review of the status report. In reviewing the status, the ASAP observed that the overall progress that was described is not yet evident—e.g., the corrective action plan for the fatality that occurred in 2006 has just now been completed, and it still has two more steps to go before closeout can occur. There are similar instances like that. The centers are doing what they can under their areas of control, but it will take more effort before an overall improvement is seen in this area. Recommendations made at the last ASAP quarterly requested the Agency to put together the data so that the Panel can see evidence of when improvements take place. This has not yet been done.

The other subject discussed with Mr. Barker was OSHA compliance and analysis. One very specific area concerned a ladder that was involved in a mishap. Although the ladder was not a contributor to the mishap, KSC used this incident as an impetus for looking across the board at fixed ladders at Launch Complex 39. Investigation revealed that over 50 percent of the fixed ladders were not in compliance with OSHA requirements. This led to a subsequent effort to do a center-wide inspection to document OSHA non-compliances. The finding was about 20 percent of systems were non-compliant, although only a small percentage were classified “high risk.” When it came to correcting and resolving the non-compliances, a risk-based analysis was used. In the case of ladders, those things that were high risk (red) were tagged out (i.e., not to be used, or not to be used without fall protection), as well as actions assigned to correct the design wherever KSC could. Low risk compliances will be candidates for additional funding. This is an example of something that should be asked of other centers: When was their last OSHA compliance survey? These types of surveys were thought to have been done in the past, but there is no record if it at the Center. The ASAP recommended that NASA pose the question to other centers on where they stand on inspections in this area.

Admiral Dyer observed that if you can’t measure something, you can’t manage it. At the Agency-wide level, NASA is struggling with having a passing grade. In January 2008, the ASAP recommended that NASA reevaluate the mishap investigation process. This was reemphasized again in February 2008—that not only senior leadership be briefed, but a closed-loop tracking system be implemented. When there is a serious incident, it is important to understand it and evaluate it, but it is also important to communicate about it. The ASAP is confident that critical information is getting shared, but it seems to be via workarounds on behalf of good people who are trying to make the system work. NASA and the S&MA Office should be more responsive to the ASAP recommendation. It should be able to answer the following questions: How many investigations are open? How long have they been open? One can see this at each individual center, but not NASA-wide.

Ms. Grubbe noted that the trend around mishap investigation also bleeds over into collection of data around incidents. The ASAP has asked for additional information and

there has been difficulty getting that information. Admiral Dyer emphasized the importance of highlighting this problem. He noted that things like the Columbia Accident Investigation Board (CAIB) report get a lot of attention and are driven to resolution. However, it is the tier below that, e.g., where the conduct of test and evaluation is done, where the industrial work is done, etc., where NASA needs attention. One good proactive example was the work at KSC in improving lab safety.

LAB SAFETY IMPROVEMENTS

Dr. Bagian reported on the briefing by Mr. Greg Clements about lab safety improvements. One of KSC labs was performing pressure testing of a composite tank and the vessel unexpectedly burst. No one was seriously injured, but this alerted everyone to a problem regarding non-routine, hazardous lab testing. A number of actions came out of that investigation: enhanced management awareness of hazardous operations and an education on what constitutes hazardous testing and approval; assignment of someone from S&MA to each lab to help with hazardous operations; implementation of a working group to deal with issues like this on a routine basis; and a basic, consistent plan for how non-routine hazardous testing is done across the center. KSC took exemplary action, but the sharing of this across NASA is non-existent. This illustrates the issue regarding dissemination of information.

SHUTTLE WORKFORCE MANAGEMENT

The Shuttle workforce topic deserved deeper discussion, and the ASAP received an excellent update from Ms. Rita Willcoxon, Director of Launch Vehicle Processing. Ms. Grubbe reported on the briefing and the discussion. The ASAP learned about how wonderful the KSC workforce truly is. They are committed to bringing safe closure through to the very last Shuttle flight. Ms. Willcoxon reviewed in great detail the workforce composition and the skill retention that is needed to do the work. She discussed workforce development, how KSC is helping people who are leaving, employee morale initiatives, and how KSC is working with its major contractor partners. Ms. Grubbe noted that while the internal KSC effort is very good, there is some external work that could be pursued with other industries that are looking for the skills that are present here at the Center. She encouraged KSC management to pursue any and all kinds of options for their workforce, and is confident that they will be doing that. Ms. Willcoxon and her team continue to look for early warning signals that they are not doing the right thing. One such approach would be to look at the incidents and mishaps that occur and dissect the “people” aspects of those incidents. Ms. Grubbe encouraged KSC to inquire into the “softer side” of incident investigations for warning signals in order to make course adjustments. At this point in time, KSC is doing an excellent job in managing the shuttle workforce. It is important to the local area, the Agency, and the Nation. Admiral Dyer added that the ASAP is very impressed with Ms. Willcoxon, who appears to be a very capable and caring manager.

CONSTELLATION GROUND PROJECTS UPDATE

Mr. Marshall reported on the ASAP tour of the Ares 1 rocket pad and ground facilities. Ms. Ruth Gardner provided the ASAP with a status report on the facilities that are being modified or constructed to accommodate the Constellation Program. She was enthusiastic and took great pride in the efforts thus far. It has been a tremendous undertaking, and everyone should have an appreciation for the aggressive action that is being taken to get Ares operational as quickly as possible. Design has been completed. The fabrication Request for Proposal (RFP) has been out on the street and is getting ready to be awarded. Ares 1 requires a new mobile launcher to erect the vehicle, and construction is about 60 percent complete. The critical design review should be completed by June next year, on track and on target. The lightning protection system affords much better protection than was previously available. The towers are very impressive. Ground support equipment is about 60 to 70 percent complete. On its previous visit, the ASAP visited the launch communications facility. It is about 92 percent complete and will be used for the October 27 launch. The Orion recovery and retrieval system reviews have been completed. There is good, solid work and continued progress.

The ASAP has been following the debate underway regarding the ultimate vehicle for the follow-on to the Shuttle. The proactive thinking and effort on the Constellation Program is impressive, and several ASAP members commented that it is hard to understand how anyone could walk away from this. The Panel was very impressed with the effort to transition from Shuttle to Constellation.

Admiral Dyer noted that in the future, the Panel intends to take a look at the letter and spirit of funding for safety personnel working on NASA programs. The CAIB recommended independent funding. That was established, but the organization has regressed to the point where now only about 10 percent of the total safety personnel are independently funded; the rest are funded by programs. This issue is worthy of more research and discussion going forward.

MITIGATING COMPOSITE OVERWRAPPED PRESSURE VESSEL (COPV) RISK

Ms. Grubbe reported on the status briefing about the ongoing work on COPV risk. The effort is being led by the KSC engineering and S&MA organizations. COPVs are rather light, metal pressure vessels encased (overwrapped) with high strength epoxy. Currently, there are ongoing studies to fully understand the failure modes of the vessel. Ms. Grubbe noted that even in the industry, there is not a lot of understanding about COPVs. The ASAP may want to follow up on this topic in the future. It may become more important as the world moves to alternative energy sources in more common applications, e.g., cars. The progress of the initiative and the questions being asked are all in the right direction. Ms. McDevitt added that this area was an example of the types of analysis that the KSC S&MA office has to perform in order to define the risk associated with the systems that it has to certify. In this case, there are COPVs on the Shuttle and COPVs are planned for Orion, which has a number of vessels that are specified for the higher pressures. Dr. Bagian noted that one of the issues is that KSC really doesn't have good data on COPV's.

Even in auto applications with natural gas, there have been tank explosions. COPV risk is another issue for COTS. There is the possibility that something could be missed.

LAUNCH SERVICES PROGRAM OVERVIEW

Ms. McDevitt reported on the Launch Services Program briefing and discussion. The ASAP received an excellent overview from Mr. Bill Wrobel. The ASAP had asked for this type of discussion because of concern over NASA losing its medium-class launch service provider. The Panel was also interested in finding out about the technical management approach for launch services. The Launch Services Program has enjoyed an excellent reputation as a very competent team. Since 1998, the Program has achieved a launch success rate of 98.3 percent. The technical management approach is built around the Space Commercialization Act of 1996—it provides for each fleet to be directly owned, managed, and operated by a commercial operator. The Program maintains a robust review process to positively confirm flight readiness, and has contract clauses that enable NASA to have full technical insight. The Program retains the “go/no go” authority for the launch.

The briefing provided valuable information that puts these things into perspective vis-à-vis COTS. NASA has a contract for launch services that expires in 2010. Under that contract, ULA, Orbital, and SpaceX are the current providers and compete through a task order process for specific missions. NASA plans to extend the contract through 2020, and has a “ramp-on” provision for other launch services providers to be considered. In order to take advantage of the efforts on-going under the COTS and Commercial Resupply Service (CRS) activities, the Launch Services Program has been providing requested support on how the Program might be able to assist the COTS and CRS. Program members have also been assigned to workgroups to develop human-rating requirements for COTS. The ASAP agreed that the Launch Services Program people have a decade of experience that should be put to good use.

INTERNATIONAL SPACE STATION COMMERCIAL RESUPPLY SERVICES

Mr. Marshall summarized the discussion on ISS CRS. CRS is a continuation of the exploitation of a similar, new capability—providing cargo capability to the ISS. While lots of threats impact the safety of the astronauts and safety of ISS in general, one of biggest challenges is resupply and sustainability. Shuttle missions have been incorporated into the manifest. There have been other opportunities such as the Automated Transfer Vehicle (ATV) and the H-II Transfer Vehicle (HTV), which offered some resupply capability. Soyuz also presents some capability.

Because of this important need, a major initiative has involved: to use commercial providers and develop a new capability. The ASAP received an informational briefing from Ms. Kathy Leuders on this program. The Panel was impressed by the innovative structure to which the program is evolving—launch services and cargo delivery services, structured in a two-phase approach: (1) demonstrate a vehicle in orbit; and (2) provide

commercial delivery. Today, NASA has two contracts that were awarded in December 2008: Space X for twelve flights, and Orbital Sciences for eight flights. The process has begun. NASA is working very closely to provide support and oversight, but the transition is left up to contractor to guarantee mission delivery under a firm fixed price contract.

ARES 1 THRUST OSCILLATION UPDATE

Dr. Bagian reported on the last topic: the Ares I thrust isolation issue. He noted that thrust isolation is an issue that has been discussed in the past and is an issue during the final 20 seconds of the first stage. Initially, concern was with crew during this phase as well as the potential after effects when the crew might need to take some actions after engine cut-off. A few months ago, some of the tanks aboard the service module on Orion started to show some issues with thrust isolation. There are several mitigation methods, and the one that is being pursued for Ares I is dual plane isolation, which will “tune” the way the vehicle resonates. The project is very confident that this solution can do what is required for both the service module tank and crew related concerns. There is also a recent innovation to use the Lox tank as a damper, wherein an additional chamber is added to damp out the vibration. This approach is in the early stages of development and it remains to be seen if it can be used successfully. There is high degree of confidence that the thrust oscillations effects can be adequately mitigated. The project has taken a prudent and conservative approach. The ASAP will await the outcome and future reports.

Admiral Dyer summarized the ASAP’s working session examining a plan for developing commercial human rating requirements for astronaut transport aboard COTS rockets. He noted that NASA has made a start at achieving the progress that this Panel has been recommending—specifically, to more clearly communicate the standards necessary if astronauts are to be transported on COTS vehicles. However, this is only half of the challenge. After there is an agreed upon a process and criteria for what needs to be accomplished, there must be a process and criteria for how to validate the accomplishment and certify it. In the past, NASA has possessed the knowledge and control. How NASA will accomplish the human rating of commercial vehicles has been advanced in terms of communication, but the certification question is still open.

Ms. Grubbe added that the ASAP has learned a lot about the “what;” however, it still need to know who will decide what, and who will have input into the decision. This aspect is still open. We may become so focused on the ‘what’ (the products), that we may forget about the essence of who is going to be accountable. Mr. Marshall noted that the issue goes back to much of the political discussion in Washington, DC. The ASAP now has a sense of comfort that the right level of effort and the right approach is being used, although NASA is behind where it should be at this point in time. The ASAP is confident that NASA now has the right priorities and can get this done if it can deliver on what it has told the Panel. For the first time, the ASAP is encouraged by the progress, commitment, and understanding of what is necessary.

Ms. Grubbe cautioned that the job is easier to say than do. Studies have shown that in organizations that were not prepared for role changes, there were lots of missteps, e.g., Human Resources (HR) outsourcing. These lessons need to be learned. Although he is optimistic, Mr. Marshall agreed that a lot of work needs to be done.

CLOSING COMMENTS

Admiral Dyer noted that the ASAP has selected its quarterly meeting dates and sites for 2010:

- 1) February 4-5 at Marshal Space Flight Center, Huntsville, AL
- 2) April 29-30 at NASA Headquarters, Washington, DC
- 3) July 15-16 at Langley Research Center, Hampton, VA
- 4) October 21-22 at Johnson Space Center, Houston, TX

Admiral Dyer announced that word had just been received that the Review of US Human Spaceflight Plans report (the Augustine report) has been officially released. It will be a topic of discussion around the space community. While the official report will not have a lot of news over the summary report that has already been provided to the Congress, it will enlighten some of the views that are resident within the panel. Admiral Dyer noted that he represented the ASAP, along with Mr. Augustine and Dr. Griffin, in providing testimony to the Science Committee on the report. The ASAP has two prime positions: (1) it is not in support of a further extension of the Shuttle; and (2) it believes that any alternative to the Constellation Program must be both significantly better and demonstrably so.

The ASAP observed two significant changes at KSC: (1) a transition and recognition of Shuttle coming to an end; and (2) the leadership and workforce standing up to support Constellation. Across all centers, the design activities undertaken by NASA are reminiscent of the Apollo Program: excitement, commitment, and intensity. With Ares I, there is a similar high rate of experienced and bright people standing up to be leaders in space for another generation. Mr. Marshall echoed Admiral Dyer's message. He said that he could not overemphasize the thrill of standing on the launch tower and talking with the people about what they envision and the efforts for the future. While they are a small group of people, they are on the threshold of a new program and a new era. The workforce has done superb work over the last decade and they take great pride in seeing the Shuttle Program come to a successful close. They deserve heartfelt thanks for what they have done for the Nation.

ASAP RECOMMENDATIONS, FOURTH QUARTER, 2009

2009-04-01: Formal Governance Process for KSC S&MA and Shuttle Workforce Management

Finding: In the face of transition from Shuttle to Constellation, the KSC S&MA leadership team is doing good work in evaluating and maintaining the skill sets. Progress is being made in the right direction. The governance process and interface with the Independent Technical Authority is working well. What would serve the KSC S&MA organization well would be an internal governance process for their own operation.

Recommendation: The ASAP recommends that the KSC S&MA organization put into place an internal management process that includes clear and transparent metrics with respect to skill sets required for current shuttle and future Constellation, ISS, COTS and “other program” support. Additionally, there needs to be established a “quick feedback” process that reaches into each of the current near misses and mishaps to examines the role that “lack of right skill at the right time and right place” has had on each incident.

Rationale: By putting a formalized process into place, there will be more overall attention paid to inherent skills as the workload changes occur, and corrections can be made in a timely manner. This will hopefully prevent repeat incidents with similar cause, and will highlight skill gaps that need to be quickly closed.

2009-04-02: Center-Wide OSHA Compliance Surveys

Finding: KSC is undertaking a center-wide OSHA compliance survey after finding that 50% of the fixed ladders at Launch Complex 39 were OSHA non-compliant.

Recommendation: The ASAP recommends that NASA Headquarters S&MA assures that other centers are current in performing OSHA compliance inspections and that there is a sharing of results among the Centers.

Rationale: As part of the Federal Government, NASA is a model workplace and needs to provide a safe work environment for all employees and contractors. Knowing where all centers are on maintaining compliance with Federal regulations is an important part of the oversight function. The safety findings can also be helpful to NASA leadership in determining priorities for capital expenditures on infrastructure.