

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

October 31, 2012

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

Dear Mr. Bolden:

The Aerospace Safety Advisory Panel (ASAP) held its Fourth 2012 Quarterly Meeting at Johnson Space Center on October 10-12, 2012. We greatly appreciate the participation and support that was received from the subject matter experts and support staff.

The Panel submits the enclosed Minutes and Recommendation resulting from this meeting for your consideration. As part of its response to our recommendation, we request that NASA provide an Agency Point of Contact (POC) and the expected completion or implementation date for the action(s).

Sincerely,

A handwritten signature in black ink, appearing to read "JW Dyer". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

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

Enclosure

**AEROSPACE SAFETY ADVISORY PANEL
Public Meeting
October 12, 2012
Johnson Space Center
Houston, Texas**

**2012 Fourth Quarterly Meeting
Report**

Aerospace Safety Advisory Panel (ASAP) Attendees

VADM (Ret.) Joseph Dyer (Chair)
Dr. James Bagian
The Hon. Mr. Claude Bolton
Capt. Robert Conway
Mr. John Frost
Dr. Donald McErlean
Dr. George Nield
Mr. Bryan O'Connor
Dr. Patricia Sanders

ASAP Staff and Support Personnel Attendees

Ms. Harmony Myers, ASAP Executive Director
Ms. Susan Burch, ASAP Administrative Officer
Ms. Paula Burnett Frankel, Technical Writer/Editor

NASA Attendees

Nigel Packham, NASA/NA
Vincent Watkins, NASA/S&MA
Bill McArthur, NASA JSC/S&MA
Scott Chandler, NASA/HEOMD
Doremus, Bob, NASA
Milt Heflin, NASA JSC

Other Attendees

Max Jones, Greater Houston Partnership
Anita Renteria, Barrios Technology
Jean M. Kranz, Office of Congr. Pete Olson-TX22

OPENING REMARKS

VADM Joseph Dyer called the ASAP's Fourth Quarterly Public Meeting of 2012 to order at 12:00 pm. He noted that the ASAP spent the first day (Wednesday, October 10) touring a number of Johnson Space Center (JSC) facilities, including Orion, the International Space Station (ISS) simulator, and robotics undertakings. The Panel was very pleased to see the energy and excitement exhibited by the NASA workforce.

For the entire day Thursday as well as Friday morning, the Panel was in a series of fact-finding sessions. VADM Dyer reported on the ASAP's opening conversations with the JSC Center Director, Mr. Michael Coats. He noted that the Center is well led and well supported by the senior leadership. JSC has 3100 civil servants and 11,000 contractors; its special expertise is in successful operation and management of high risk endeavors and environments. Major activities at the Center include ISS operations and Orion, which includes the Multi-Purpose Crew Vehicle (MPCV) for human transportation beyond low Earth orbit (LEO), the abort system, and crew and service modules. In terms of issues that were highlighted by the Center Director, the average age at JSC is beginning to exceed 45 years of age, and knowledge retention is a special focus.

EXPLORATION SYSTEMS DEVELOPMENT

Mr. John Frost reported on the ASAP's review of Exploration Systems Development (ESD) and the discussion with Mr. Dan Dumbacher, the senior manager for this keystone Agency program. Engineering Flight Test (EFT)-1 remains on schedule for September 2014. The pacing element for this flight is the surrogate launch vehicle; the capsule itself is well on the path to testing. That flight will be followed by the uncrewed Engineering Module (EM)-1 in the fourth quarter of CY2017. The ASAP received an extensive overview on the safety efforts for the ESD program. They are focusing on using three classical system safety tools: hazard analysis, which is a top down assessment of what can go wrong and what can cause it; a bottoms-up approach of failure modes and effects analysis, looking at failure modes of individual components and what they can affect at the top level; and a quantitative probabilistic risk assessment (PRA) to help determine if the desired safety levels can be met. They will include a separate integrated hazard analysis to look for problems that one subsystem can cause to another. A classic example of that situation was on Columbia—the foam came off one system and struck another. The integrated hazard analysis will be done by the government personnel.

There was a detailed discussion of the risk matrix that will be used. Unlike the Shuttle approach, they are not describing which risks are acceptable, but instead are establishing the organizational levels that will have the decision authority to accept the risk. This is in accordance with modern approaches. They are struggling with a way to resolve the lower categories of risk so that those risks do not encumber the entire system. In a program like this, hundreds or even thousands of risks could have to be adjudicated. The proposed approach is to use the developer (the contractor) to make the decision on risk acceptability for the government. The Panel discussed with Mr. Dumbacher the problems with that approach and proposed alternate ways of doing it. Mr. Dumbacher indicated that his team intends to “flesh” this out, look at ways the government is involved in deciding if the risks are acceptable, and brief the Panel again at a future meeting. The ASAP continued with discussion of a topic that came up in an earlier meeting—the Space Launch System (SLS) architecture. The ASAP learned at the last meeting that NASA had a choice between a liquid oxygen (LOX)/hydrogen propulsion system versus a LOX /RP (essentially kerosene) system. There were safety differences between those approaches. NASA chose the LOX/hydrogen configuration, even though it did not potentially offer as great a level of safety. The ASAP’s concern was that since NASA had not yet established the loss of crew (LOC) requirements, how could NASA decide on one versus the other? However, there was a notional concept for LOC of 1/700, which may or may not be close to the final number, and both systems met this LOC “requirement” so either was deemed acceptable. The LOX/hydrogen system has several other advantages, including availability and cost, and was therefore chosen by the NASA Administrator as the best overall approach.

The ASAP looked at technologies that present technical challenges to future human exploration missions. One of them is the heat shield. It is currently being optimized for the lunar mission, which has a return velocity of 11.2 km/sec. However, Mars return velocity will be about 12 or 13 km/sec, which is about three times the energy involved in the lunar mission. Since today’s technology for thermal protection systems cannot meet the Mars return velocity, NASA is designing for the lunar approach while working on developing new technology for the return from deep space. The ASAP was pleased to hear that current heat shield technology will provide for a return velocity capable of accommodating about one third of the asteroid targets that are being considered in addition to the Moon. The Panel learned that although the first test (EFT-1) will only be able to test at 8 km/sec velocity due to the booster that is being used for that flight, EM-1 will fully test the lunar speeds. The ASAP noted that there is also a heat shield limitation for entering the Martian atmosphere that will push the state of the art, and much work also needs to be done in these areas. Getting into space is hard; getting into deep space and back is really hard; however, ESD is working on all the right subjects. Dr. Don McElean added that the current heat shield technology will also be satisfactory for return from Lagrange points.

INTERNATIONAL SPACE STATION

Dr. James Bagian discussed the very thorough briefing that the ASAP received from the ISS Program Manager, Mr. Michael Suffredini. He reviewed what is happening and what is planned in Expeditions 33 & 34 and showed a video of the Cubesat deployment from the ISS. The productivity and utilization goal on orbit is 35 hours per week, and the current utilization is about 20 hours per week; however, it is early in the increment, and an increase up to the goal is anticipated. Mr. Suffredini discussed some of the challenges that they have had recently: electrical power supply issues, which are being worked with no problems anticipated; the main bus switching unit on which the extravehicular activity (EVA) was done a few weeks ago; and problems with one of the sublimators on the life support packs that go on the back of the suits. There are still three full-up Extravehicular Mobility Units (EMUs), and there should not be any mission impact.

Several enhancements are planned. To improve efficiency, the program is looking at pre-determining what is necessary for debris avoidance maneuvers so that the timeline can be substantially shortened. Debris avoidance maneuvers sometimes take up to five and a half hours from the time they are identified as being needed until execution, and a reduction in this timeline could enable more crew time for utilization. They are continuing to replace avionics equipment on board. The Obsolescence Driven Avionics Replacement (ODAR) will double the downlink capacity as well as give a tenfold increase in the onboard databus. With these enhancements, both lifetime on orbit and productivity are being increased.

The recent SpaceX docking was the first successful commercial delivery of cargo to the ISS under the Cargo Resupply Contract (CRS). Mr. Suffredini reported that there was good interaction between SpaceX and NASA all the way through the process. Orbital Sciences is moving forward with its launches, which are somewhat later than anticipated; however, the logistics support to the Station will not be impacted if everything goes as planned.

At the last meeting, the ASAP had put in a recommendation (2012-03-04) regarding the potential for Micrometeoroid and Orbital Debris (MMOD) damage to the Station and its possible impact on ISS end of life (EOL). As he had promised to do at the last meeting, Mr. Suffredini gave a very thorough briefing on what that looked like. The program has been continuing to harden the

ISS structure for MMOD, both the U.S. and Russian equipment. They are now predicting a 5.1 percent chance of LOC and a 13.7 percent evacuation risk over a ten year period. This is substantially below what it was just six to twelve months ago. Mr. Suffredini indicated that if there is a total Station deorbiting, the program would have a 180-day dwell time to determine what to do. This will add considerable flexibility. Dr. Bagian suggested that the ASAP's 2012-03-04 recommendation be closed. Mr. Suffredini has offered to come back periodically to the ASAP as these numbers are updated. VADM Dyer concurred that Mr. Suffredini had given a very professional briefing to the Panel.

Mr. Frost added that the EOL deorbit has been a major issue for the ASAP, but the program is making good progress. They have studied it extensively and are now looking at multiple Progress vehicles to reduce the impact footprint.

COMMERCIAL SPACE

Dr. George Nield reported on the briefings by Mr. Phil McAlister, Director of Commercial Space Flight Development at NASA Headquarters, Mr. Ed. Mango, Program Manager of the Commercial Crew Program (CCP) at KSC, and Mr. Brent Jett, Deputy Program Manager of the CCP at JSC. Mr. McAlister began with an update on commercial cargo. The first supply mission is underway now; SpaceX has a launch vehicle, spacecraft, and launch pad that is ready to begin services. Orbital Sciences is a little further behind, but they have completed 25 out of 29 milestones and have received \$276M out of \$288M in payments. Orbital Sciences expects to have their first test flight later this year with a demonstration mission to ISS about three months after that.

The next topic was the CCP. The ASAP was reminded that the objective of that program is "to facilitate the development of a U.S. commercial crew space transportation capability with the goal of achieving safe, reliable, and cost effective access to and from low-Earth orbit and the International Space Station (ISS)." This is a different way of doing business for NASA. According to Mr. McAlister, one of the most important reasons for trying the new approach is to reduce cost. He referenced studies that estimated using traditional NASA and Air Force cost models, the effort would range from \$7B to \$10B. It is hoped that with this new approach, it can be done for considerably less. To date, NASA has provided approximately \$500M in direct funds to private industry for commercial crew development activities. In terms of the programmatic efforts, the Commercial Crew Development 2 (CCDev2) effort had four companies: Blue Origin, Boeing, Sierra Nevada, and SpaceX. That activity has resulted in some great effort by the teams, and most of the CCDev2 milestones are now complete. The next effort was Commercial Crew Integrated Capability (CCiCap). Those awards were announced in August and represent a 21-month effort from three companies: Sierra Nevada, Space X, and Boeing. The goal there is to end up close to a Critical Design Review (CDR)-level of maturity. The CCiCap agreements also include a set of optional milestones in which the companies lay out how they would plan to actually conduct an orbital, crewed-flight demonstration mission. There has been some concern raised by the ASAP on how that would work and under what circumstances that would be an appropriate thing to do. NASA stressed that the optional demonstration mission is not the current plan, although the information that was provided by NASA was helpful to the Panel. The program is currently planning to use a different approach for certification in order to ensure NASA that safety standards have been met. The current plan involves a two-phase effort. The first phase is a Certification Products Contract (CPC) wherein the companies will provide data to NASA on alternate standards, hazard analyses, verification/validation and how they would propose to conduct a certification. That effort will be under a set of \$10M fixed-price contracts. It will be followed by phase two—the certification contracts. The certification contracts are where one will see the verification, validation, test, and final certification efforts.

Some of the questions and concerns that ASAP has had in the past include: how do the companies know what is important for the final selection? Is it based on cost? Is it based on best value? In the draft that has been shared with the companies, the order of importance of evaluation factors is: mission suitability and past performance together would be roughly equal in importance to cost and price. Mr. Mango mentioned that the number one program risk right now is budget uncertainty for the CCP. In terms of organizational structure, the Partner Integration Teams (PITs) have changed. Each now has two deputies—one for the Space Act Agreement (SAA) efforts and one that will focus on the certification efforts. The ASAP has also had some questions about the experience level of the NASA team in terms of operating in a commercial environment. The program looked at that question and reported that about 22 percent of the people have been directly involved in commercial aerospace programs. Mr. Mango mentioned that they are looking into training, best practices, shared data, and other ways that the government can be a smart buyer and participant in this new type of acquisition process. Dr. Nield noted that while there are still challenges, there has been a lot of progress.

VADM Dyer agreed that there has been good progress. The Federal Acquisition Regulation (FAR)-contract phase proposes to answer the question from the ASAP: How do you certify? Although it is not yet answered, there is a plan to get it answered. He acknowledged that the requirements were developed later than some of the ASAP would have liked, but they are coming into place. The source selection criteria are now much clearer than before. There are still some topics of concern.

The Hon. Claude Bolton commented that NASA is doing a very good job in blending political decisions, commercial aspects, and the government way of doing business. Having the right people on both sides of the endeavor is key to making it work. This will probably become a model for other parts of the federal government that want to go this route. The bottom line is: How are we going to do this safely, effectively, and efficiently?

Mr. Nield noted that the ASAP had an open recommendation (2012-01-04) on the commercial crew certification process. Based on the briefing that the ASAP received, he proposed that the recommendation be closed, recognizing that the ASAP will need to see the details as the program moves forward. With regard to the certification contract, Mr. Bryan O'Connor commented that while NASA has decided on the first phase, they are still discussing how to carry out the second phase. The ASAP has had some insight into the pros and cons on the various ways of doing that. In VADM Dyer's testimony to Congress, it was noted that the first phase will be fixed-price. That is somewhat unusual for government people who have been involved in high-risk systems, especially where the requirements may not be well-validated and can have much iteration. NASA has a good plan, however, so that if there are issues that come up in the first phase, they can be pushed into the second phase. It puts a little pressure on the team to think about how to do the second phase in a way that gives NASA the contractual flexibility to deal with uncertainties and issues that arise from potential requirements issues. The program appears to be having the right kinds of discussions around these questions.

Mr. Frost added that another topic that he found interesting outside of the two-phase approach to certification is the option that exists under the SAA for what would be a crewed flight using commercial crew. That would be a different approach to approval than the certification for NASA crew. It would be difficult to arrange, but if that option becomes realistic, there should be advance planning on how to do it. Dr. Bagian noted that not only planning should be addressed, but a timeline for it. As the ASAP noted, the criteria for commercial crew were developed later than the Panel thought they should have been. The advance planning for any optional approach for certification should be undertaken sooner rather than later.

VADM Dyer noted that there has been some good discussion about the purpose of commercial flight and the clarity therein, including some discussion about the dialogue with Congress where he testified a few weeks ago. The purpose clearly remains to develop a commercial capability for transport to space, and the government is making significant investment there. It was quoted as 90 percent government investment; 10 percent commercial investment. There have been discussions on the Hill about the early days of airmail where government support for airmail and aviation gave birth to a robust consumer aviation market. In addition, transport to LEO remains important. Both are laudable undertakings, and NASA is managing both very well. The option alluded to for a contractor flight is being discussed as a potential cost-saving option. That gives rise to the question of whether there will be two standards of safety process and verification/validation en route to first flight. Since the program represents such a significant investment by the taxpayers, it is hoped that there will not be a dual standard of safety. Those opportunities and options are all under discussion, and the ASAP will stay tightly engaged over the weeks and months to come.

Technical Authority

Dr. Don McErlean continued the discussion on Technical Authority (TA), which has been a very important topic to the Panel. TA has its roots in the Columbia Accident Investigation Board (CAIB), where there was a determination by that group and subsequent implementation by the Agency for separate programmatic and technical lines of communication so that people would not feel hampered to bring forward safety concerns or disagreements with programmatic decisions. That concept has been protected; however, it appears to be morphing somewhat and continues to be a Panel concern. TA is covered by the NASA 7120 document that outlines the duties, responsibilities, and organizational flow-down of TA. Clearly, there are subjects for which engineering has a view or opinion; those are places where the technical arm of the Agency would provide advice or counsel, and those ebb and flow throughout the course of any program. However, in an area where the TA entity is the authority, that gives that arm of the Agency veto power, and any unresolved issue needs to go higher into the Agency for adjudication. That is a distinction that needs to be kept in mind. There has been a change from 7120.5D to 7120.5E, which is the current version. It has to do with the role or inclusion of the host Center Director in the line of TA. Mr. Michael Ryschkewitsch, NASA's Chief Engineer, showed the ASAP that during days of the Shuttle and Constellation, the integrated flight/ground systems were called "programs" with activities at multiple Centers. In that era (under 7120.5D), for the programs, the line of TA went from the Chief Engineer to the discipline Center leads directly; it did not pass through the Center Director. For projects, such as Orion or Ares, the TA line did pass through the Center Director. What NASA has done at this point is settle on the latter model in 7120.5E for all technical acquisitions, whether they are projects or programs. The TA line today goes from the program Chief Engineer to the Engineering Directorate through the Center Director and then to the Office of Chief Engineer (OCE). In his briefing, Mr. Ryschkewitsch stated that he felt that this was a good thing because it eliminated the confusion on what subjects had a pathway through the Center Director and what ones did not. He felt that it had been a problem because the

Center Directors, all of whom have been selected and put in place in terms of their technical capability, were always considered to be the lead TA at the Center as well as the Center's manager. They felt that there were instances where the Center Director was "dropped" from the discussion, and they did not feel that was appropriate.

Mr. Ryschkewitsch provided the ASAP with a list of things that were changed. Dr. McErlean recapped those talking points. What has not changed is a strong matrix from the Center technical organization for staffing programs and projects. If there is a decision by the program to downscale the technical staff, the TA is required to agree with that decision. Dr. McErlean felt that this was a very strong perspective and was glad to see this in place. In addition, the TA does go through the respective Center Directors. This is important. The Center Director, in this regard, has had some additional duties and responsibilities levied on him by 7120.5E. If there is a large, multi-Center program, the Center Director is directed to be responsible for convening an integrated Center Management Council (CMC), which includes the TAs of all the Centers involved, to address key decisions and recommendations. That integrated TA council is programmatically advisory, but technically authoritative. This means that if there is an issue that is under TA, that CMC's decision stands.

The ASAP has a remaining concern about the wording concerning the role and responsibility of the TA itself. It is the ASAP's view that the previous wording clearly stated that the TA had both a charter and an imposed obligation to bring problems and technical issues to the program's attention. The new wording appears to imply that the obligation is everyone's job. As most know, there is an old saying "if it is everybody's job, then it is nobody's job." The ASAP will continue to monitor this subject and continue its discussions with Mr. Ryschkewitsch. Dr. McErlean emphasized that this is a process issue; it is not an issue with the current staff. Mr. Ryschkewitsch is constantly in contact with his Chief Engineers and is very active and involved. The process is working very well now. However, The ASAP is interested in seeing general processes put in place that do not depend on the personalities of the people involved. The Panel will continue monitor this subject.

Office of Safety and Mission Assurance (OSMA) and Office of Chief Engineer (OCE) Budget Process

VADM Dyer noted that this topic was in response to a request from the ASAP. NASA addressed both budget trends as well as organization. The Hon. Bolton reported on the ASAP's discussion with the Chief of NASA's Office of Safety and Mission Assurance (OSMA), Mr. Terry Wilcutt, and NASA's Chief Engineer, Mr. Ryschkewitsch. Mr. Wilcutt reviewed the OSMA mission and overarching goals and summarized the OSMA activities. What the ASAP gleaned was that the things that they were doing to further their mission statement and goals were in alignment with the Center and NASA goals. More importantly, they have data and metrics that indicate how well things are working in the safety area.

The ASAP spent some time discussing the budget, and looked primarily at the FY 2013 budget for both offices. One thing that was interesting was that OSMA and OCE, as well as the Office of the Chief Health and Medical Officer (OCHMO), are in a line item called "cross-agency support and construction." That budget line item is managed at NASA Headquarters by a Cost Account Manager (CAM) who is in the Mission Support Directorate. The ASAP observed that this CAM does not have program responsibility for safety, nor do those two offices (OSMA and OCE) report to the Mission Support Directorate. The ASAP questions how well that CAM understands the implications of the budget cuts that have to be made. The ASAP recommends that NASA review and determine the appropriateness of having OSMA and OCE in a non-safety-aligned budget line item and office. The ASAP also observed that what was presented was the budget for those two particular offices; however, this is not the total picture for safety. There are other things, such as facilities and plant safety activities, that are not included. The ASAP suggests a look across the entire safety picture to see what the total budget status on safety is; in other words, look at the complete budget for 2011 to 2013 and the notional budgets to 2017, look at trends across safety over the years and what might provide a better perspective on possible impacts. Comparing the NASA data and metrics to national standards, NASA is doing quite well. The only Panel concern is that as NASA goes through the coming years and the budgets get tighter, the Agency needs to be proactive and ensure that it does not fall into a trap. Overall, it was a good briefing.

VADM Dyer noted that as a matter of best practice, one should see the alignment of budget with line authority, and the ASAP believes that realigning the OSMA and OCE budget with line authority would be a good process step and makes good management sense.

Integration of Robotics

Dr. Patricia Sanders reported on the briefing by Dr. Robert Ambrose, Chief of JSC's Software, Robotics and Simulation Division. Recognizing the potential of robotics to minimize the risk to humans, the ASAP has emphasized this technology area and noted in a 2009 recommendation that there seemed to be a lack of an integrated focus on it across NASA. At this meeting, the ASAP received an excellent presentation from Dr. Ambrose, who is NASA's Principal Investigator for robotics technology, as well as an impressive tour and demonstration in the JSC Robotics Laboratory. It is clear that much has improved since 2009 when the

ASAP recommended a more integrated program. NASA has now made this a focus area. There is a roadmap that is tied to projected missions and a program that is managed and resourced as an integrated entity across the Agency. There is a balance between technology push and mission pull that is resulting in robotic technology successes in operational roles, such as Mars Exploration vehicles and the Robonaut that is now onboard the ISS. Robotics technologies are proving to be sufficiently effective to do real work and safe enough to work side by side with humans. The ASAP commends the leveraging of partnerships with industry as well as with other agencies through the National Robotics Initiative and cooperation with the academic world. The Panel believes that NASA has met the intent of recommendation 2009-03-04 and looks forward to hearing about future challenges and successes.

Dr. Nield added that the briefing was very interesting and showed a lot of progress and accomplishment. The structure of many of the efforts were non-traditional in terms of government programs—there were a lot of partnerships, collaborations, lead by other agencies, and work with industry and other federal agencies. It seemed to be a very successful approach in this area. It might be useful to think about whether this kind of approach could be used in other areas. The Hon. Bolton agreed that the briefings clearly indicate that NASA is creating a world class robotics activity. Mr. Frost noted that one change that the ASAP has appreciated seeing is the movement from “humans versus robots” to “humans plus robots.” There has been a clear, philosophical shift that is very positive.

JSC Safety and Mission Assurance

Capt. Robert Conway reported on the ASAP’s discussion with the Director of JSC SMA, Mr. William McArthur, who gave a good briefing on the status of the Directorate and SMA challenges and successes. The ASAP was impressed with the case incident rate, which is well below that of industry and other federal government agencies. Good communication is the lifeblood of any safety program, and it is evident that JSC SMA has this and is enjoying the benefits. They have a good system of checks and balances with NASA Headquarters, and there is alignment of Center goals with those of the Agency.

The organization has three primary challenges: Technical Authority, workforce migration, and technical responsibilities. The basic theme of all of these is that while the current level of staffing and funding seem to be adequate, there may be increasing demands in the future. Budgets are uncertain, so there is a need to keep a close watch on what is transpiring.

There was some ASAP concern about the practice of the “dual hatting” of Chief Safety Officers (the title given to the SMA Technical Authority) and the SMA manager for the program, but current mitigations, including personnel selection process and other practices, seem to be adequate. However, vigilant caution needs to be exercised in the long term to avoid crossing lines of authority or creating conflicts of interest. The question that needs to be constantly asked is: Does the model still suffice as the circumstances change, or does a different model need to be used? There was some discussion about bringing on a Deputy Chief Safety Officer instead of dual-hatting one person, so there seems to be available manpower to divide the Technical Authority and SMA Manager duties if need be.

It was good to hear about the ISS vigilance with regard to the SMA work, as current conditions can lead to complacency with moving from ISS’ construction phase to a more routine operation of the station.

The ASAP heard more about how SMA is trying to cut costs and reduce mishaps. The organization is looking for ways to do more with less as constraints set in. The ASAP cautioned against using the words “removing redundant systems,” and instead suggested using the words “unneeded systems.” An example of that is the fire protection system, where there were unneeded or excess items that could be removed without degradation of fire protection. The SMA strategy for high-consequence systems paying off, notably the reduction of damage mishaps from 80 percent in 2010 to 20 percent in 2012. Bottom line, JSC SMA has a healthy approach to doing business, and the ASAP encourages the organization to keep up the great work and continue the vigilance.

VADM Dyer noted that since the last quarterly meeting, the ASAP has conducted fact-finding visits to Blue Origin and Sierra Nevada. Those meetings were informative and provided the background necessary for the ASAP to accomplish its mission to advise NASA and the Congress. VADM Dyer also mentioned that Mr. Robert Lightfoot, the NASA Associate Administrator, joined the ASAP for the entire previous day in its fact-finding session at JSC. The Panel appreciated Mr. Lightfoot’s participation and found it to be very helpful. Mr. Lightfoot has replaced Mr. Chris Scolese, with whom the ASAP had a close relationship; the Panel expects to continue the same positive relationship with Mr. Lightfoot.

There were no other comments, and the meeting was adjourned at 1:00 pm.

ASAP RECOMMENDATIONS, FOURTH QUARTER 2012

2012-04-01 Alignment of Technical Authorities' Budgets with Line Authority [ASAP point of contact: Claude Bolton]

Finding: The budgets for the technical authorities—the Office of Safety and Mission Assurance (OSMA), the Office of the Chief Health and Medical Officer (OCHMO), and the Office of the Chief Engineer (OCE)—are included under “Safety and Mission Success” in a budget line item called “Cross-Agency Support and Construction.” That budget line item is managed at NASA Headquarters by a Cost Account Manager (CAM) who is in the Mission Support Directorate. This CAM is only responsible for institutional safety, which is only a small fraction of the entire SMA activity of the agency, and the technical authorities do not report to the Mission Support Directorate.

Recommendation: NASA should review and determine the appropriateness of having the technical authorities—OSMA, OCHMO, and OCE—in a non-safety-aligned budget line item and office.

Rationale: As a matter of best practice, one should have alignment of budget with line authority, and the ASAP believes that realigning the technical authorities' budgets with line authority would be a good process step and makes good management sense.

Updates to existing recommendations:

2009-03-04 Integration of Robotics

Closed.

2012-01-04 Commercial Crew Safety Certification Process

Closed.

2012-03-04 Revised Estimate of Loss of Crew (LOC) and Loss of Mission (LOM) for the International Space Station (ISS)

Closed.

2012-01-02 ISS De-Orbit Capability [ASAP point of contact: Jim Bagian]

The EOL deorbit has been a major issue for the ASAP, but the program is making good progress. They have studied it extensively and are now looking at multiple Progress vehicles to reduce the impact footprint. The ASAP would like to receive updates as the plan matures.