

**National Aeronautics and Space Administration
Washington, DC**

NASA ADVISORY COUNCIL

February 8, 2007

**Holiday Inn Capitol
Washington, DC**

MEETING MINUTES



**Christopher C. Blackerby
Executive Director**



**Harrison H. Schmitt
Chair**

**NASA ADVISORY COUNCIL
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**Meeting Report
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General Discussion

Senator Harrison H. Schmitt, Chair of the NASA Advisory Council (the Council) called the meeting to order at 8:00 a.m. and welcomed members and meeting attendees to the Council's sixth meeting. He reminded everyone that the full Council meeting is open to the public and held in accordance with the Federal Advisory Committee Act (FACA). He requested that the public attendees refrain from questions and comments unless requested by the Chair.

Sen. Schmitt introduced the new member to the Council, Dr. Byron Tapley, Director of the Center for Space Research and Professor of Aerospace Engineering at the University of Texas. Dr. Tapley will serve on the Science Committee and add valued experience and knowledge to the Committee's consideration of issues in the Earth Sciences.

The minutes and all of the background from the last meeting, including the Council Charter and previous recommendations, are available on the Council's website, www.hq.nasa.gov/office/oer/nac, which has been recently updated. Sen. Schmitt noted that the Administrator, Dr. Michael Griffin, has been greatly appreciative of the recommendations provided to NASA.

Aeronautics Committee Report and Discussion

Mr. Neil Armstrong reported on the Aeronautics Committee. He noted that the Committee received a comprehensive review of the National Aeronautics Research and Development (R&D) Policy document as well as a report on the ongoing work in the Aeronautics Research Mission Directorate (ARMD).

The National Aeronautics R&D Policy was released on December 20, 2006. Dr. Raymond Colladay reviewed the new R&D policy and discussed the committee's observations on the progress of the ARMD concerning external relations. The Committee is very encouraged by the policy statement and the content. Together with the restructuring of the program, the policy should be a firm basis to address the aeronautical needs of the country. Not only does the policy scope out the broad principles for Aeronautics R&D, it also was released with the weight of an Executive Order. This policy is broadly enabling. It articulates why aeronautics is important to the country, scopes the broad principles of why R&D is performed, and provides guidelines for R&D that defines appropriate roles for the federal government versus those for industry. It emphasizes an important cornerstone of policy—stability. This has been lacking over the last ten years or more. It is important to note the next step: development of program plans with milestones and funding levels that establish the pace of the program. The program plans will be delivered to the coordinating council within the next year. The Office of Management and Budget (OMB) will then balance the requests for funding against those plans. This will provide a foundation that will address the strengths

and weaknesses in the aeronautical research and development area. The Committee is encouraged that this process will provide the foundation for Aeronautics R&D that it has been looking for.

With respect to stakeholder outreach and collaboration, the Committee has been concerned about some of the fractured relationships with industry, universities, and other government agencies. The Committee noted last summer that it was encouraged that NASA was working effectively with its government partners in the restructured program. This positive aspect is continuing; however, the Committee has been critical of NASA's relationship with industry. At its meeting yesterday, the Committee spent a great deal of time with the Associate Administrator of ARMD, Dr. Lisa Porter, on this issue. Without partnerships and collaborative relationships, many of NASA's R&D accomplishments would soon become irrelevant. The Committee was very encouraged at this point in time with the outreach efforts by NASA towards industry and universities; however, the rebuilding of relationships will take time. With the size of the Aeronautics budget, NASA cannot purchase involvement from industry. The past dynamic in which NASA and industry work together must change. The Agency is on the right track to build the kind of relationship to work with industry in a different paradigm than in the past. In response to a question from Sen. Schmitt regarding a return to the National Advisory Committee on Aeronautics (NACA) paradigm employed prior to 1958, Dr. Colladay indicated that there are a number of differences today. The industry is mature. In order to recreate the NACA paradigm, NASA must have something to offer that industry needs. The Committee believes that NASA can be a facilitator to bring industry, academia, and the research centers together to produce the kinds of things that industry and universities find valuable.

In response to a question from Gen. Lyles regarding authority and responsibility for bringing the parties together, Dr. Colladay observed that there are a number of organizations that are responsible. It rests first with the Office of Science and Technology Policy (OSTP), and OSTP and NASA are co-chairs of the existing coordinating group. Very few people beyond the current government players know about the policy and the executive order. Someone needs to make sure that the policy becomes broadly disseminated and understood. Congress will no doubt have hearings on the policy, since it was instrumental in calling for it. Gen Lyles noted that he would check with the Chief Scientist of the Air Force to see what he intends to do with this document throughout the Air Force and report back to the Committee.

Dr. Colladay stated that the components of industry are strong and the civil air transport industry is healthy. However, the R&D underpinnings that the country needs for the future have suffered over the past decade. With the restructuring of the program and this policy, the Committee believes that the program has started to turn that around. In response to a comment from Mr. Maddox concerning Europe, Dr. Colladay noted that the Europeans made a real commitment to get into Airbus and its underpinning technology, and they are formidable competitors. It is NASA's responsibility to look into the future and work in aeronautical R&D for the needs in ten to twenty years. Dr. Covert provided a brief historical perspective on how the program got to where it is today. Aeronautics in the United States has never had a formal policy. During the Reagan Administration, the

Heritage Foundation wrote a report in which it said that the aircraft industry was a “sunset” industry and there was no need for the government to make additional investment in R&D. It since has been difficult to convince people that this is not the case. This policy is recognition of a need that has been unsatisfied for the last twenty-five years. The Committee is very encouraged by this, but it is a first step. Dr. Porter has done an excellent job of fashioning a NASA program that is compatible with what is described in the document itself.

Sen. Schmitt asked the Committee if the overall policy and budgets are compatible with the recent decadal study. Dr. Colladay indicated that there is a great deal of overlap with the technology challenges identified in the decadal survey. The policy, the survey, and the program are all stitched together with a high degree of consistency. There is a clear message that aeronautics is not a “sunset” industry, and a great deal of quality research is necessary to meet future needs.

The Committee does have a continuing concern about the in-house/out-of-house balance in the R&D program. At present, the balance is 10% to 12% out of house (primarily universities), and very little research is available for industry. This emphasizes the importance of finding ways to work with industry without the transfer of R&D dollars. The Committee believes that the balance is skewed—more of the funding needs to go out-of-house. NASA has expressed intent to grow the out-of-house piece to 20%. This direction is correct, but the Committee feels that the balance out-of-house should be even greater. In response to a question from Sen. Schmitt, Dr. Colladay speculated that in the heyday of the 1950’s, the out-of-house R&D was probably 30%-40%, and the challenges today are probably harder than the ones in the 1950’s. Today’s Aeronautics budget is about half what it was in the 1980’s. Gen. Lyles commented that in the Air Force, the balance is about 60% out-of-house. Dr. Covert observed that the resources for research that will be needed in the future will be greater than the resources available today.

Dr. Sullivan discussed the Fundamental Aeronautics Program, which includes hypersonics, supersonics, subsonic fixed wing, and subsonic rotary wing. There is a strong overlap between the Aeronautics Program and the Exploration Program. One of the important remaining areas of research is Mars re-entry. At the present, there is no architecture or clear concept for Mars entry, descent and landing, and this is an area that will need to be addressed in the future. (Note: ESMD's development of a Mars Architecture has been initiated early this year.) At the last meeting, the Committee recommended that NASA work with other agencies to address research in thermal protection systems (TPS). A TPS working group has been established and is looking at the possibility of establishing collaborative roadmaps for future work. Industry will be invited to a major meeting in November to review all outside projects.

Sen. Schmitt indicated that the meeting would move forward to the next speaker, but that the Council would try to find additional time to come back to the aeronautics discussion.

Human Capital Committee Report and Discussion

Dr. Gerald Kulcinski reported on the Human Capital Committee meeting. He noted that the Committee had no major issues or recommendations to present to the Council at this

time. The Committee received three presentations: one from the Chief of Strategic Communications, one from the Assistant Administrator for Communications Planning, and one from the Assistant Administrator for Education.

Dr. Kulcinski highlighted some of the Committee's activities since the last meeting. Some of the members have met with the Assistant Administrator for Education a couple of times, and several of the members have been giving talks in a variety of venues. Dr. Kulcinski stated that the Committee discussed and accepted Sen. Schmitt's recommendations for what it should be doing for 2007.

Dr. Kulcinski reported on the Committee's observations from the fact-finding presentations. Regarding communications, the Committee agreed that there needs to be one message from NASA, not eleven, for the purposes of outreach and public relations, and commended the Chief of Strategic Communications for his initial efforts to reorganize the NASA infrastructure to develop a single message from the Agency. One small but important issue is web access. The Committee applauds the attempt of the Office of Strategic Communications to create a single web portal and to make it accessible and searchable. The Committee strongly supports this initiative. The Assistant Administrator for the Office of Communications Planning has put together a commendable Strategic Communications Framework to present a clearer image of NASA to the country. This organization has worked to summarize the market research analysis and has developed a plan on how to reach target audiences. Dr. Kulcinski showed a few of the slides from the Strategic Communications Framework presentation. An Agency wide workshop was held in October 2006 to develop the framework for NASA. The workshop participants (the Team) perceived two target audiences as top priorities for NASA—Congress and young adults—and identified what is working and what is not working from a communications perspective. The Team determined that the key promise or benefit that NASA provides to the public is *knowledge acquisition*. For the market research analysis, the Team looked at over fifty studies, presentations, etc. and distilled the picture of NASA from the outside. Next, it developed a "message architecture," and, among other key messages, a short "elevator speech." NASA plans to roll out the implementation plan for the Strategic Communications Framework in April, and the Committee will continue to follow this activity.

The Committee was encouraged that the Office of Education, as previously recommended, will focus more resources on attracting the "best and brightest" students.

In the coordination area, the Committee was made aware of some concerns raised by the Aeronautics Safety Advisory Panel (ASAP) regarding NASA's human capital planning. The Committee suggested that it, NASA's Office of Human Capital Management, and the ASAP work together to resolve the issues highlighted in the report. It has some concerns about maintaining institutional memory in light of the impending shift to the Moon-Mars initiative and will focus more on this area in the future.

The Committee suggested that the Teacher Training Pilot Program should be expanded nationwide. Dr. Milgram briefly described the Program for the Council and noted that it is extremely important to get NASA content into this Program.

A future activity for the Committee is to get a status report from the Office of Institutions and Management (the Office of Small and Disadvantaged Business Utilization in particular) about NASA's plan for inclusion of small business in NASA's future missions. Additional future activities will include working with the Strategic Communications Framework and the Office of Communications Planning; continue the dialog on the coordination of national and international education programs; and hopefully, have a joint meeting in April with the Space Operations Committee on the manpower issues related to the transition in the 2010 timeframe. In addition, planning for the public outreach efforts for the Lunar Science Workshop will continue.

Gen. Abrahamson noted that from the Exploration Committee's perspective, the transition planning appears to be complete and effective. NASA needs to find a way to share this with industry—as a management case study of a unique problem. Dr. Kulcinski observed that the ASAP appears to be at odds with the Exploration Committee's findings. Sen. Schmitt requested that Dr. Paul Robinson and the Space Operations Committee also be involved in the discussions on this topic.

Continuation of Aeronautics Committee Report and Discussion

At the conclusion of the Human Capital Committee Report, Dr. Covert continued with the Aeronautics Committee report. The aeronautics safety research program is one of the four elements of the research program. Dr. Covert reviewed the safety research program goals in four areas: integrated vehicle health management; integrated intelligent flight deck; aircraft aging and durability; and integrated resilient aircraft control. He was surprised that there were not more human factor elements in the program. NASA has attempted to tie all of the four items together in a feedback loop. Gen. Abrahamson commented that he was part of the Commission on Airline Safety and Security after the TWA 800 accident, and the issue was aging wiring. Gen. Lyles observed that no one has looked at this area in about 10 years. Dr. Robinson commented that the Sandia Laboratory is doing some work in this area today. There is good reason to look at aging in different ways. Dr. Covert did not know whether this was included because the Committee did not delve that deeply into the program. In response to a question from Sen. Schmitt regarding materials and embedded diagnostics, Dr. Covert indicated that there is an effort in this area. Sen. Schmitt noted that this is an area where there might be a synergism with long-term space operations. There are efforts looking at the reasonable lifetimes of Space Station components. Dr. Covert agreed that it would be useful for the Committee to talk with the Space Operations people. Sen. Schmitt noted that the Space Operations Mission Directorate is now instrumenting structures on Space Station with gauges to gather information on stresses and strains of the structure in the orbital environment. Dr. Sullivan added that the aviation safety research program has projects on prognostics and diagnostics that would also tie in with the Space Operations activity. Dr. Lyles commented that DOD is also putting more emphasis on the lifetime of space platforms.

Mr. Armstrong discussed the Next Generation Air Transportation System. It is NASA's responsibility to develop and demonstrate future concepts that will enable the capacity of the next generation systems. There are two principal components: the ground system

(air portals) and the air space side. NASA, FAA, DOD, and other agencies are members of the Joint Planning and Development Organization (JPDO). The Committee took a detailed look at the organization chart to try to understand the responsibilities. The actual delegations of authority and responsibilities are not yet well defined. NASA's "box" in the proposed budget is about \$100 million. As this program grows to maturity, the demands on the budget and resources will be very large and not necessarily possible with the kinds of budget projections the Committee has been shown. The Committee will be looking at this in substantial detail in the future. In response to a question from Sen. Schmitt regarding urgency, Mr. Armstrong indicated that the pressures are immense to start solving the throughput problem. Gen. Lyles agreed that there is urgency for NASA and DOD to perform the necessary R&D.

Dr. Covert discussed the Aeronautics Test Program. The Committee had a very good briefing on the test facilities. The program has an excellent set of goals. Intelligent divestment of facilities is particularly important, and NASA is doing an outstanding job in this area. The Committee reviewed the elements of the Aeronautics Test Program—the aeronautics ground test facilities and the flight operations and test infrastructure. The Committee recognizes the importance of this program and will continue to follow it.

Mr. Armstrong noted that the most innovative and creative aeronautical researchers did their best work on their own. The Committee wondered if that kind of individual would be welcomed and nurtured under the new policy. It was pleased to find in section 3 a few statements relative to providing long term stability for innovative research. The government should cultivate a R&D environment that promotes creative and innovative work because bright people need an environment that is conducive to creativity. For that reason, the Committee has been focusing on the facilities area. It is an important component of future success in research.

Before introducing the next presentation, Sen. Schmitt noted that the Council has been receiving information relating to the International Traffic in Arms Regulation (ITAR) and has been conducting its fact-finding on this topic with the full membership.

Science Committee Report and Discussion

Dr. Edward David reported on the Science Committee meeting. The Committee discussed the FY 2008 budget and what that means to upcoming flights and other activities. Dr. Bradley Jolliff provided an update on the status of the planning for the Lunar Workshop in Tempe Arizona, February 25-March 2, 2007. {"NOTE: The Workshop on Science Associated with the Lunar Exploration Architecture was held on the dates noted. Information regarding the workshop, including plenary presentations, white papers, and a synthesis report, can be found at the following site: <http://www.hq.nasa.gov/office/oer/nac/>"} }

Dr. Mark Robinson discussed the following topics: the responses from NASA Headquarters on past recommendations; the Science Mission Directorate (SMD) update on programs; the first Earth Decadal Survey; and an update on the upcoming Lunar Science Workshop.

The Committee was pleased that NASA is taking strong steps to implement Council recommendations and address issues. Feasibility studies on missions to moons of other planets have been started in order to better understand and control costs. The SMD and the Exploration Systems Mission Directorate (ESMD) are cooperating and have shared responsibilities on the Lunar Precursor Robotic Program. A presentation by Dr. Hartman provided an update on current SMD programs and the FY 08 budget request.

There was much discussion on the budget. The Continuing Resolution (CR) makes it difficult to predict what will happen next year. Dr. Robinson briefly summarized Dr. Hartman's highlights from Earth Science, Heliophysics, Planetary, and Astrophysics. Dr. Hartman reviewed her current issues and concerns: the impacts of the FY07 Continuing Resolution; instrument and mission cost growth; additional funding for the slip in Hubble Space Telescope (HST) Servicing Mission (SM)-4; the requested schedule slip in the Juno mission (resulting in extra run-out costs); mission launch profile dips in 2010 and 2012; and removal of sensors from the National Polar Orbiting Environmental Satellite System (NPOESS). The biggest concerns involved work force continuity over the 2010-2012 timeframe. Some of this will be resolved by continuing operations. The Committee is looking more deeply into this issue and discussing possible solutions.

Dr. Tapley discussed the NPOESS issue. NPOESS was revamped by NOAA for cost reasons, and NASA has to assume responsibility for flying the sensors or losing the continuity. The problem with the 2010 mission dip (in addition to workforce continuity) is the loss of continuity in some of the decadal measurements. In response to a question from Dr. Longnecker about the reasons for the gap, Dr. Hartman noted that the adjustments to the budget to fly Shuttle and assemble the Space Station reduced the number of Space Science missions. In addition, there is a lot of activity in operating the missions launched a year or two before the gap. Dr. Robinson emphasized that there are ten NASA launches and nine other missions (reimbursable, joint missions, etc.) in 2008-2009. The Committee did not have enough information at this time to fully understand the ramifications of the profile. Sen. Schmitt agreed that the Committee needs to continue to watch the workforce issue and the planning that NASA is doing to minimize the impact of the transition.

Dr. Robinson briefly reviewed the results of the Earth Science Decadal Survey. This was a major accomplishment to bring together many diverse fields into a common voice. The Study was organized along seven themes. One of the major points from the study was the need for a focused set of long baseline measurements (30 years or more). Dr. Tapley noted that one of the climate variability areas is global sea level. The satellite taking these measurements is correlated with ongoing tidal measurements. A sensor that takes these types of measurements has been taken off NPOESS. Dr. Fisk added that there is a follow-on study that will deal with issues, e.g., the consequences of NPOESS that could not be addressed in the Decadal Survey due to the timeline for release. Multi-decades duration has always been characteristic of the long-term measurements. After development and launch, NASA turns the measurement missions over to the operational agency, NOAA, and continuity of measurements over a multi-decade timescale has always been an issue. NASA has developed a detailed list of seventeen missions to meet the science goals in the Decadal Survey. The cost of implementation is high and will be a

challenge to implement under NASA's current budget. About \$500 million more is needed for the program. Dr. Jolliff added that a lot of effort has gone into how to deal with the costs. OSTP has recognized that this is a key issue and needs to be elevated in policy discussions.

Sen. Schmitt queried whether historical geological records are being integrated into the space measurements to assess risk of hazards. Dr. Tapley noted that both ground-based and satellite processes are being used to try to understand coastal risk. Dr. Robinson added that the prediction of future earthquakes for a given area using GPS and strain rates has been very controversial. Determining the risk of a hazard would be very useful. Sen. Schmitt expressed an interest in a broader connection or non-connection between the detection of hazards and the determination of risk. Dr. Fisk noted that one of the things that concerns scientists is the risk of global climate change, and a lot of emphasis is put on this societal impact of such change and policy options to deal with it. The community is aware of records that provide some measure of climate change. With respect to funding, it was noted that the additional \$500 million would bring the funding back to the level that was spent in 2000. A vibrant Earth Science program that serves the national needs does not require an enormous perturbation in the budget process.

Dr. Robinson discussed the planned Workshop on Science Associated with Lunar Exploration Architecture in Tempe, Arizona, Feb 27 – March 2, 2007. This Workshop is sponsored by the Council's Science subcommittees, ESMD, and SMD. The overarching goal is to ensure that NASA's exploration strategy, architecture, and hardware development enable the best and appropriately integrated science priorities. Dr. Jolliff emphasized the importance of this Workshop, which is part of coordinated effort by NASA and the Council. The Science Workshop will also address outreach issues and will include participation from the science community. The result should be a good sense of the high priority science objectives involved with returning to the Moon and should feed back into the Lunar Architecture development effort. The Science Committee will report on the results of the Workshop at the next Council meeting. Sen. Schmitt noted that a similar Workshop was held in 1965 and the results were embraced by NASA for the Apollo program. He encouraged Council members to attend the workshop. At this time, twelve members plan to attend.

Audit and Finance Committee Report and Discussion

Mr. Robert Hanisee reported on the Audit and Finance Committee. He noted that at the last meeting, some optimistic statements were made, and the Committee has since taken a realistic look at progress and is not as positive. He started with the Corrective Action Plan – a shopping list of items that needed remediation. The Plan had articulated four reportable conditions from recent audits, three of which were cited as material weaknesses: financial systems oversight; fund balance with treasury; and property, plant, and equipment (PP&E) management. The fourth weakness, environmental liabilities (the easiest to resolve), was tackled first. In addition, the plan identified other challenges: resource constraints, management change, and external support. Improvements in areas such as PP&E require a significant portion of NASA's workforce to change the way daily activities are performed.

Mr. Hanisee provided a progress report on each weakness. In financial systems and analysis, weaknesses were identified in three control areas: access control; system software; and segregation of duties. During FY06, some progress was made but there is still a long way to go. In fund balances with treasury, NASA ended the year pretty much in balance. This was one of the success stories. However, PP&E continues to be a significant weakness. In 2005, NASA implemented a new tracking tool for PP&E that is up and running, but still has problems. The Defense Contract Audit Agency (DCAA) reviews of PP&E are being moved closer to year-end to make them more useful. Based on the letter received from the auditors, there was no measurable improvement in PP&E management achieved this year. An end-to-end solution is needed. For environmental liabilities, NASA developed and distributed to the Centers procedures for estimating environmental liabilities. Even though there was significant improvement here this year, the auditor believes that the library needs further evaluation.

Mr. Hanisee discussed the audit report for FY06. Ernst and Young did not really perform an audit—it gave a disclaimer. Material weaknesses were still found in financial systems, analysis and oversight and PP&E. PP&E has not been integrated with the core financial system. Because of costs, NASA never bought the PP&E module, and “home grown” systems have not been able to be well integrated. The auditors found non-compliance with certain provisions of the Anti-Deficiency Act and the Improper Payments Information Act. This mainly pertained to grants, where spending continued on old obligations. NASA made significant progress in correcting two of the four deficiencies. PP&E is the issue that most troubled the auditors and the Office of Inspector General (OIG). This is in some measure a legacy problem, and there is a large portion of it in which it will not be possible to have proper accounting. The good news is that these items will eventually drop off and cease to be an issue. The most important thing is to do PP&E right going forward. One element is theme assets; another element is contractor-held assets; and the third element is facilities. One of the ongoing efforts is to try to narrow down the zone of “unauditability” to as small a number as possible. Theme assets are things like satellites going to distant planets. A proposal has been made that these assets be expensed at the time they are launched. In order to implement this change, the Office of the Chief Financial Officer (OCFO) went to the Financial Accounting Standards Advisory Board (FASAB) in June/July 2006. The Board assigned the action to a subcommittee, which found NASA’s proposal reasonable. However, the OIG asked for a “technical release” from the FASAB. Such a release must go through a “comment period” by other entities, and NASA is currently in that process. For non-theme assets, the accounting methodology has been to write things off as dollars were spent, then decide at the end how much to capitalize. The auditor, Ernst and Young, was very unhappy with this methodology. An audit trail for capitalization must start at the beginning of the procurement cycle. NASA will start to do this with the new programs—Ares I and V and the Commercial Orbital Transfer System (COTS). Contractor-held property is tracked by DCAA, but it is probably low on the priority list for DCAA auditors. This is not helpful for closing the books. There are still problems with getting mission people at the Centers on board—they feel that it is a burden on them and contractors as well as an added cost to the project. This correction requires leadership from the Administrator’s office, and Dr. Griffin has indicated that he is determined to do whatever he needs to do to meet the objective. Mr. Hanisee noted that for future

programs, NASA will implement the SAP Property Module. Gen. Lyles added that DOD has some lessons learned that might be useful to NASA concerning how to account for assets that have already been launched.

Mr. Hanisee provided an update on the other issues. The SAP accounting system has been updated to the newer version, but some glitches have been discovered. The SAP people are working on a patch to resolve the problem. If the SAP can be made to function properly and people are trained to use all of its features, it will go a long way towards resolving the financial control issues. With respect to manpower, the OCFO is down approximately 20 FTE's, although the turnover rate has been cut in half from FY05 to FY06.

The Committee met with Ernst and Young and emphasized that at the end of this year, both the Audit and Finance Committee and NASA want an audit, even if it is a qualified one, not a disclaimer. Actions have been identified to remediate the remaining material weaknesses. Even on the "passing mark" items, NASA must ensure that it tracks errors from the beginning and closes out old contracts. Basically, environmental liability is under control.

Mr. Hanisee reviewed the topics that Sen. Schmitt asked the Committee to work on. One item on the list was a review of NASA's financial and cost risk for Ares I and V, Orion, and the COTS and the International Space Station (ISS) programs. The Committee had a fact finding session with the Constellation Program Executive and the Manager of the Program Planning & Controls Office. The Committee plans to attend the next NASA quarterly financial review. Mr. McPherson discussed the NASA Shared Services Center—an operations center that consolidates certain financial processing activities, procurement, and some elements of information technology. The Center has opened at Stennis Space Center, and the Committee met with its top executives. The purpose of the Center is to relieve NASA field Centers of high volume transactions and save money—about \$100 million on a cumulative basis. However, the savings can come about only if the positions at the Centers are eliminated. The initiative has attractive rates of return on a full cost basis. By the end of 2008, it should have 500 people, 340 of which are contractor (Computer Science Corporation). The Center has already gone live with some activities. The Committee suggested very close monitoring of the financial functions by the OCFO, and to only transfer those functions at a pace where there is capability to handle them. This is a good opportunity to build a strong administrative asset, but it must be managed effectively from the start or it will cause operating risk or political risk. The Committee was encouraged that the management of the operation had a refreshingly customer-oriented attitude. They have put together a sophisticated monitoring and tracking system for customer satisfaction. This could be a big win for NASA. The risks are that as the Shared Service Center takes over the functions, the field Centers don't or can't get rid of the Center personnel that had performed the functions there. There will need to be some strong direction and Congressional initiative from the Administrator to make sure this happens. The "owner" of the center is the Assistant Administrator for Institutions and Management. In response to a question from Dr. Covert concerning the location, Mr. McPherson stated that the Shared Services Center does have an emergency plan and a disaster recovery plan.

Space Operations Committee Report and Discussion

Dr. Paul Robinson reported on the Space Operations Committee. He noted that all of the members of this Committee, with the exception of Dr. Longnecker, are new to the Council. As a result, this Committee has presented a set of “fresh eyes” on space operations. Some of the tasks from the October meeting were to follow up on ISS utilization, the HST servicing plan, COTS, the ITAR issue, the National Laboratory designation for ISS, and orbital debris. Two of the issues were shared with the full Council—ITAR and the “National Laboratory” designation for ISS. End of life of Space Station elements is one of the serious issues to examine.

The Committee held a fact finding meeting at the Johnson Space Center (JSC) on December 4, 2006. It got deeply into the operations that were curtailed in the U.S. Laboratory. The limiting factor has been bringing elements to orbit. The Committee received an early look at the planning for the Hubble servicing mission. Orbital debris evaluation is a capability that is well in hand. The risk assessment tools are now highly developed and the data correlate with the “witness plate” of the Shuttle and ISS.

Practically everyone will be involved in the ITAR issue. As a country, we are on a road that is paved with good intentions—everyone is desirous of limiting arms traffic, but it appears to have now led to bureaucratic barriers to activities with indeterminate timescales for resolution of those barriers. The people who carry out the reviews of licenses are overworked and undermanned, and the turnaround times are excessive. If this isn't fixed, it will become increasingly difficult for any international collaborative work to be done. ITAR must come to the top of the list of things that cause problems for the agency. (The Council has appointed an ad hoc committee to continue fact-finding on ITAR issues.)

Dr. Jones discussed the budget briefings from the Space Operations Mission Directorate (SOMD). NASA is facing a very daunting decade to fit into the operational budget. Two big challenges in the space operations budget are transition from use of the Space Shuttle and its retirement and providing future ISS crew and cargo transportation services. Beyond 2010, there must be alternate methods of supplying the station and handling spares. The crisis is exacerbated by the delay of the delivery of the new Constellation systems until at least 2014. Another challenge is preserving and transitioning the highly skilled workforce to other productive activities, particularly at the Kennedy Space Center (KSC). NASA is beginning to work on a plan for logically dispositioning or transferring all of the Shuttle facilities and equipment across the country to other uses. Between 2007 and 2011, NASA has the challenge of maintaining the Station with the Shuttle, and there is a budget shortfall currently projected to do this. Mr. Gerstenmaier, the Associate Administrator for SOMD, identified his biggest concern for NASA--workforce transition.

There are 13 missions remaining for the Shuttle to assemble the ISS, plus a flight to service HST in late 2008. There are also two contingency ISS logistics flights budgeted but not yet manifested for FY 2010. The SOMD has established a joint operations control board. Because of safety concerns with HST servicing, the program agreed to put a “launch on need” rescue capability (a fully stacked Shuttle on pad 39B), and the

Committee heard about this plan. This also has implications for the budget—pad 39B must be held in Shuttle readiness while still being modified for use by Ares. In the Space Communications area, the Tracking and Data Relay Satellite System (TDRSS) capacity is starting to wind down with the aging of satellites and ground system. Around 2011, the capability will be surpassed by demand, and a pair of new TDRSS satellites will be launched to provide the required capability. The 70m dishes of the deep space network will last until 2015, and then be replaced by phased arrays. In terms of launch services, there is a dearth of launchers in the medium class arena, and in 2010, the lack of launchers will be expensive if SOMD is dependent on international sources. COTS may be a hopeful solution.

Dr. Jones shared the Committee's observations. The Committee believes that the final two ISS contingency missions to launch spares are crucial to realizing the ISS research potential, especially in light of an extended gap in human spaceflight capability. The Committee recommends that NASA maintain reserves to execute these flights to protect extensive national investment in ISS. The ISS program already has some records on the performance of ISS hardware, and the program feels that it can make a good estimate of spares needed. The Committee believes that it will be difficult to preserve and motivate the workforce with the lengthening low Earth orbit (LEO) access gap. Personnel and budget impacts are currently unpredictable. The Committee will meet in April with the Human Capital Committee to discuss this topic. The SOMD believes that a 4-year gap is "tolerable" to the workforce, but a gap of 6-8 years presents a high opportunity cost to the workforce to stay, and the most skilled people will start to bail out.

With respect to the ISS, the result of the budget shortfall this year and the cuts to future years is that operations flexibility is becoming a casualty and the logistics margins are constrained. NASA will have limited ability to respond to serious system failures or program perturbations. With respect to COTS, the Committee feels that NASA needs to closely monitor the progress. The future ISS research capability hinges on COTS until Constellation is online. This is the only currently foreseen alternative to extended reliance on partner systems.

The Committee found that the Shuttle transition, Orion/Ares development, and ISS utilization programs as outlined are highly dependent on flawless performance at every stage, with limited flexibility to deal with unexpected situations. This could lead to growth in the 4-year human spaceflight hiatus and threaten ISS operations and maintenance, workforce and skills maintenance, and NASA's ability to respond to operational crises. In response to a comment from Dr. Mark Robinson, Dr. Jones agreed that NASA is already on the edge concerning whether they can meet the 2014 CEV availability. ESMD Deputy Associate Administrator Doug Cooke noted that the COTS approach is the baseline and NASA is looking at alternatives if that doesn't work. Dr. Fisk suggested that a solution could be mid-range Expendable Launch Vehicles (ELV) to work as a back-up plan in case COTS fails. Dr. Fisk further noted that someone has to solve the mid-range launcher problem for science payloads, and this might also be a back-up plan in the event COTS fails. Dr. Jones indicated that he would make sure that the NASA people would get this feedback. One of the COTS boosters may be suitable for a mid-range launcher role. In response to a question from Mr. Maddox, Sen. Schmitt

indicated that the obligations that the US has on the ISS are to finish assembly and provide those components that it committed to in the international agreements. Dr. Logsdon added that the international agreements require the US to be responsible for operation and maintenance of the common elements. Gen. Lyles noted that there may be an opportunity for the new United Launch Alliance (ULA) between Boeing and Lockheed to address the launch alternatives issue.

When the Committee meets in April, it will look into the lunar outpost concept of operations, what NASA has learned from other agencies about major transitions, COTS progress, and the ESMD ground, flight test and operations plan. The issue of launch capacity and launch alternatives will be pursued. The COTS contractors may have some ideas for alternatives themselves.

Exploration Committee Report and Discussion

Gen. Abrahamson reported on the Exploration Committee. He noted that his Committee will have some overlap with the Space Operations Committee, and coordination will be important. The Exploration Committee has moved discussion of the ITAR issues to the full Council, and a Council ad hoc committee, led by Mr. Howard Stanislawski, has been created to work on ITAR. Mr. Stanislawski reviewed the results of some recent discussions involving Gen. Lyles and Mr. John Hall, and discussed a variety of approaches. The ad hoc committee is awaiting receipt of a recent presentation by the Administrator on this topic. They will review the President's statement on exploration and also look at the language in the Act. There are some ideas from different members. The group should have some recommendations at the next Council meeting. Mr. Stanislawski indicated that he would keep the Council Chair and Executive Director informed along the way.

With respect to transition, the Exploration Committee started with the universal concern of safety, timeliness, and foundation funding for Exploration. The transition can be made very difficult by Congressional actions. Some examples of transitions for lessons learned are Apollo, Titan and other ICBM programs, various aircraft programs, and the B-1 bomber. The Committee requested a transition briefing from the two "hand-off" organizations. Gen. Abrahamson emphasized that this is still in the fact finding stage, but he made some comments that reflect the initial reaction of the Committee. There is outstanding leadership creating the transition imperative, policy, schedules, management processes, tools, etc. The depth of planning has now graduated to a point where it is truly unprecedented. The cooperation and communications is incredible. The transition team studied industrial examples and their work was reviewed by the National Academy of Public Administration. They have created a Human Spaceflight Transition Plan. The team has established a work breakdown structure. Gen. Abrahamson indicated that he was puzzled by the ASAP letter that outlined concerns with workforce transition. While those may be fair concerns in some areas, the Committee sees tremendous momentum towards establishing a system to make the transition work.

The Committee will continue to support the ITAR ad hoc activity. It will work with operations and others on transition. This is so important and is underway so effectively that NASA should employ an historian or other effective writer to prepare a "case study

for American industry” that could be distributed to colleges, Congress, etc. This is an example of NASA working on the frontier of outstanding technical management.

Gen. Abrahamson reviewed the assignments from the Council Chair: contractual reviews and attendance at key design reviews and similar NASA management meetings. The Committee has started the contractual review process. There was some fact-finding at this meeting and the Committee received some contract summary briefings. The next step will be to assign members to review the contracts and the procurement activities. The Committee has asked for recommendations from ESMD on where the members could best use their time in attending key reviews and NASA meetings. Committee members will be assigned to attend these events as part of their fact finding efforts. Summaries will be distributed to everyone.

In response to a suggestion from Gen. Lyles, Gen. Abrahamson indicated that the Committee would try to get in at the front of some of the contract activities. Gen. Lyles commented that something to look for is how NASA has incentivized the contractor. Gen. Abrahamson noted that he has looked at how Boeing has used “stretch” requirements—setting a goal that starts from a requirement but that is such a jump ahead that something totally different, out of the paradigm, is needed. Boeing is still in the process of looking at how stretch requirements could be applied to existing contracts as well as contracts in the next phase. As a result, some dramatic ideas have begun to flow into the process. In response to a question from Dr. Covert, Mr. Doug Cooke indicated that NASA is looking at how to factor incentives for stretch requirements into the contract. The program has been working hard to put good processes into place for the Requests for Proposals (RFPs). The program was very proud about how the Crew Exploration Vehicle (CEV) came together and was selected in a relatively short period of time. NASA is getting people in with lessons learned and wants to continuously improve the process to get a very reliable way of selecting industry teams. Currently, the program is working off of letter contracts. By end of March, NASA hopes to have full contracts in place. Mr. Cooke indicated that he would be happy to share this information with the Committee along the way. Gen. Abrahamson added that how stretch goals can be implemented and rewarded is an interesting challenge.

Sen. Schmitt asked if Council members had anything that should be personally discussed with the Administrator they should let him know.

The next public meeting is April 19, 2007 at KSC. The Council will be given a pre-meeting tour of the Center facilities.

Sen. Schmitt adjourned the meeting at 2:45 p.m.

**NASA Advisory Council Meeting
Washington, DC
February 8, 2007**

Meeting Location

Columbia Ballroom
Holiday Inn Capitol
550 C Street SW
Washington, DC 20024
(202) 479-4000

Thursday, February 8th

8:00 a.m.	Aeronautics Committee Report and Discussion	Mr. Neil Armstrong
9:00 a.m.	Human Capital Committee Report and Discussion	Dr. Gerald Kulcinski
10:00 a.m.	Break	
10:15 a.m.	Science Committee Report and Discussion	Dr. Edward David
11:15 a.m.	Audit and Finance Committee Report and Discussion	Mr. Robert Hanisee
12:15 a.m.	Lunch	
1:30 p.m.	Exploration Committee Report and Discussion	Gen. James Abrahamson
2:30 p.m.	Space Operations Committee Report and Discussion	Dr. C. Paul Robinson
3:30 p.m.	Council Discussion and Agreement on Recommendations	
4:00 p.m.	Adjournment	

**NASA Advisory Council Members
February 8, 2007**

Chair	<ul style="list-style-type: none"> • Hon. Harrison H. Schmitt, Apollo 17 Astronaut and Scientist
Aeronautics Committee	<ul style="list-style-type: none"> • <i>Chair: Mr. Neil Armstrong, Apollo 11 Astronaut</i> • General Lester L. Lyles, USAF (Ret.), Consultant, The Lyles Group • Dr. Eugene Covert, T. Wilson Professor of Aeronautics, Emeritus, Department of Aeronautics and Astronautics, Massachusetts Institute of Technology • Dr. John Sullivan, Professor of Aeronautics and Astronautics Director of the Center for Advanced Manufacturing, Purdue University
Audit and Finance Committee	<ul style="list-style-type: none"> • <i>Chair: Mr. Robert M. Hanisee, Trust Company of the West</i> • Hon. Edward R. "Ted" McPherson, Chief Executive, Intersolve Group, Inc. • Mr. Howard J. Stanislawski, Partner, Sidley Austin, LLP
Exploration Committee	<ul style="list-style-type: none"> • <i>Chair: Lieutenant General James A. Abrahamson, USAF (Ret.)</i> • Dr. John M. Logsdon, Director, Space Policy Institute, George Washington University
Human Capital Committee	<ul style="list-style-type: none"> • <i>Chair: Dr. Gerald L. Kulcinski, Associate Dean of Research, College of Engineering, University of Wisconsin-Madison</i> • Ms. Joann DiGennaro, President, Center for Excellence in Education (Human Capital) • Ms. Kay Coles James, President, The Gloucester Institute • Mr. Wendell Maddox, President and Chief Executive Officer, ION Corporation • Dr. R. James Milgram, Professor, Department of Mathematics, Stanford University
Science Committee	<ul style="list-style-type: none"> • <i>Chair: Dr. Edward David, President, EED, Inc.</i> • Dr. Owen Garriott, Astronaut (ret.) • Dr. Bradley Jolliff, Research Associate Professor, Department of Earth and Planetary Sciences, Washington University • Dr. Mark S. Robinson, Research Associate Professor, Department of Geological Sciences, Northwestern University • Dr. Alan Stern, Executive Director, Space Science and Engineering Division, Southwest Research Institute • Dr. Byron Tapley, Director, Center for Space Research, Professor, Aerospace Engineering, University of Texas, Austin
Space Operations Committee	<ul style="list-style-type: none"> • <i>Chair: Dr. C. Paul Robinson, Former President and Director, Sandia National Labs (Ret.)</i> • Col. Eileen Collins, Astronaut (ret.) • Dr. Pat Condon, Chairman of the Board, Air Force Association (ret.) • Dr. Thomas Jones, Astronaut (ret.) • Dr. David Longnecker, Institute of Medicine, National Research Council • Adm. Benjamin Montoya, DEO, SmartSystems Technologies
<i>Ex-Officio</i>	<ul style="list-style-type: none"> • Dr. Raymond S. Colladay, Chair, Aeronautics and Space Engineering Board, National Research Council • Dr. Lennard A. Fisk, Chair, Space Studies Board, National Research Council
Unable to Attend	<ul style="list-style-type: none"> • Dr. Wanda M. Austin, Senior Vice President, National Systems Group, The Aerospace Corporation • Capt. Rick Hauck, USN (Ret.) • Dr. Stephen I. Katz, M.D., Ph.D., Director, National Institute of Arthritis and Musculoskeletal and Skin Diseases • Hon. Michael Montelongo, Senior Vice President, Strategic Marketing, Sodexo Inc. • Dr. Neil DeGrasse Tyson, Frederick P. Rose Director, Hayden Planetarium, Department of Astrophysics, American Museum of Natural History

**NASA ADVISORY COUNCIL
Holiday Inn Capitol
Washington, DC
February 8, 2007**

ATTENDEES

<i>Council Members</i>	NASA Attendees
Abrahamson, James	<i>Allen, Marc</i>
Armstrong, Neil	<i>Billings, Linda</i>
Blackerby, Christopher (<i>Executive Director</i>)	<i>Brown, Kris</i>
Colladay, Raymond (<i>Ex-Officio</i>)	<i>Cleave, Mary</i>
Collins, Eileen	<i>Cooke, Doug</i>
Condon, Pat	<i>Dakon, Kathy</i>
Covert, Eugene	<i>Dunwoody, Cathy</i>
David, Ed	<i>Edgington, Stacey</i>
DiGennaro, Joann	<i>Feeley, T. Jens</i>
Fisk, Len (<i>Ex-Officio</i>)	<i>Fong, M.</i>
Garriott, Owen	<i>Green, John</i>
Hanisee, Robert	<i>Hertz, Paul</i>
Jolliff, Brad	<i>Krezel, Jonathan</i>
Jones, Tom	<i>McCuistion, Doug</i>
Kulcinski, Jerry	<i>Nelson, Robert</i>
Logsdon, John	<i>Ostrach, Louis</i>
Longnecker, David	<i>Palacios, Tina</i>
Lyles, Lester	<i>Parham, Jane</i>
Maddox, Wendell	<i>Pellis, Neal</i>
McPherson, Edward	<i>Petersen, Frank</i>
Milgram, James	<i>Rausch, Diane</i>
Montoya, Ben	<i>Reese, Terry</i>
Robinson, Mark	<i>Schaffer, Audrey</i>
Robinson, Paul	<i>Shortz, Donna</i>
Schmitt, Harrison H. (<i>Chair</i>)	<i>White, John</i>
Stanislowski, Howard	<i>Williams, Greg</i>
Stern, Alan	<i>Winterton, Joyce</i>
Sullivan, John	
Tapley, Byron	

Other Attendees:

Alport, Laurence	Intelsat
Beyer, Brian	Space News
Boyce, Nell	National Public Radio
Brumfiel, Geoff	Nature Magazine
Cowing, Keith	NASAWatch
Eckardt, Derrick	Boeing
Ellis Heid, Rosalind	<i>[not affiliated]</i>
Gibbs, Graham	ESA
Golburt, Yaning	GAO
Hammond, Neal	US Alliance
Harrison, Steve	Northrop Grumman
Hauser, Michael	STSI
Hinds, Emma	GWU SPI
Karaoglanorg, Lina	AAAS
Kunder, Joydip	OMB
Kuntiz, Chris	GAO
Ladwig, Alan	WBB
Malay, Jon	Lockheed Martin
McNamara, Deaglan	CSIS
Pastuhov-Purdie, Masha	GAO
Quinn, Anthony	ASME
Ramos, Jose	GAO
Reed, Cheryl	JHU/APL
Richardson, Bruce	Space Science
Schaefer, Ryan	OMB
Scott, Amy	AAU
Shibukawa, Kiwao	JAXA
Turner, Ron	Anser/NIAC
Webber, Derek	Spaceport Associates
Yamada, Misuzu	<i>[not affiliated]</i>
Zaneth, Larry	JHU/APL