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August 4-5, 2011

Ames Research Center
Moffett Field, California

MEETING MINUTES

P. Diane Rausch
Executive Director

Kenneth M. Ford
Chair

NASA ADVISORY COUNCIL
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MINUTES

Thursday, August 4, 2011

Call to Order, Announcements

Ms. Diane Rausch, Director, NASA Advisory Committee Management Division, Executive Director, NASA Advisory Council (NAC or Council), called the meeting to order and welcomed the NAC members and attendees to the Ames Research Center (ARC) in Moffett Field, California. She stated that the NAC is a Federal advisory committee established under the Federal Advisory Committee Act (FACA). The meeting is open to the public. A dial-in capability is available for members of the public to listen to the meeting. WebEx is also available to the public. Meeting minutes will be taken by Mr. David Frankel and will be posted to the NAC website, www.nasa.gov/offices/nac, soon after the meeting. Each NAC member has been appointed by the NASA Administrator, Mr. Charles F. Bolden, Jr., based on the member's expertise. Each member is a Special Government Employee, subject to ethics regulations, and must recuse himself or herself from discussions on any topic in which there could be a potential conflict of interest. All presentations will be part of the public record. Time has been set aside at the end of each day for public comments.

Remarks by Council Chair

Ms. Rausch introduced Dr. Kenneth Ford, Council Chair, who presided over the meeting. He welcomed everyone to the Council's public meeting. It is the eighth meeting since the restructured Council first met in October 2009. The Council's last meeting was at NASA's Glenn Research Center in Cleveland, Ohio, and was very productive. Yesterday, the Council toured ARC's outstanding research laboratories and facilities. Dr. Ford thanked ARC's Director, Dr. Simon "Pete" Worden, and his excellent staff for arranging the tour. It is very clear that this Center is on the forefront of truly cutting-edge research and technology development. Its "green building" project continues to impress. ARC's Associate Director, Dr. Steven Zornetzer has provided superior leadership in that effort. Perhaps due to its location in Silicon Valley and being surrounded by outstanding research universities, ARC has always been a thought leader and an important source of innovation at NASA.

Dr. Ford reminded everyone that the Council is a Federal advisory committee reporting directly to the NASA Administrator, providing advice and recommendations across the full-breadth of the U.S. civil space program. He noted that the NASA Administrator, Mr. Charles Bolden, was present and would be joined by the President's Science Advisor, Dr. John Holdren, Director of the Office of Science and Technology Policy (OSTP). Mr. Lars Perkins was welcomed to the Council as the new Chair of the Education and Public Outreach Committee, replacing Mr. Miles O'Brien. NASA's Chief of Staff, Mr. David Radzanowski, had been invited to speak but will be unable to attend the meeting due to illness. At Dr. Ford's request, the Council members introduced themselves. He noted that they are an outstanding collection of distinguished experts and expressed his appreciation at their willingness to serve.

Welcome to NASA Ames Research Center

Dr. Ford introduced Dr. Pete Worden, Director, NASA ARC. Dr. Worden welcomed the NAC members to the Center. He asserted that "we are in Silicon Valley and Silicon Valley is in us." ARC was founded in 1939 and is NASA's second oldest research center. It is NASA's most diverse research center, and its work is divided equally between aeronautics and technology development. The Center's challenge is to figure out unique things to do and it has done well at that. It has focused on innovative partnerships with other government agencies, industry, universities, and other nations. ARC leads NASA's efforts in NextGen and advanced aeronautics research. ARC operates a powerful supercomputer on site and uses it for calculation, modeling and simulation across all areas of NASA R&D.. Science is represented at ARC in every area. The Center is working towards breakthroughs on significant discoveries, including the "Are we are alone?" question. Programs at ARC have been on budget and on time. He explained that it helps to focus on small projects. ARC leads in autonomous robotic work and in human factors work. He quipped "If you want to get into space, talk to the Marshall Space Flight Center; if you want to get home, talk to us." ARC is a leader in fundamental biology. One initiative is in synthetic biology, which will be critical to long-term space missions. ARC is working with the new space companies: the SpaceX Dragon capsule uses a heat shield developed at ARC. A Carnegie Mellon campus is located on site and the University Of California plans to develop a 5000 person campus here. Every summer, the Singularity University brings in students from around the world. ARC has pioneered partnering with states and has agreements with Alaska, Hawaii, and Colorado. Dr. Worden invited the Council members to contact him if they were interested in learning more about the ARC's facilities.

Dr. Ford thanked Dr. Worden for his comments and for graciously hosting the NAC meeting.

Remarks by NASA Administrator

Dr. Ford introduced Mr. Charles Bolden as the next speaker. Mr. Bolden thanked Dr. Worden for his hospitality in hosting the NAC meeting. He noted that the NAC had been reduced in size from approximately 35 members to the chairs of the specific committees, and that the counsel he has received from the NAC has been invaluable. Mr. Bolden then awarded NASA's Exceptional Public Service Medals to three departing NAC committee chairs: Ms. Esther Dyson, Mr. Brett Alexander, and Col. Eileen Collins. He announced that Dr. Ford would be departing as the NAC chair at the end of his term on September 25, 2011.. Dr. Ford had previously been awarded the NASA Distinguished Public Service Medal for his outstanding leadership of the NAC in August 2010 at NASA's Jet Propulsion Laboratory. Mr. Bolden presented Dr. Ford with a personal letter thanking him for his exceptional service to NASA. He announced that Mr. Lars Perkins had agreed to serve as chair for the NAC Education and Public Outreach Committee, and he provided Mr. Perkins with his official appointment letter.

Mr. Bolden observed that it has been a spectacular year for the Agency. The MErcury Surface, Space ENvironment, GEochemistry, and Ranging (MESSENGER) spacecraft began orbiting Mercury a few months ago. At the Johns Hopkins Applied Physics Laboratory, thousands attended in the middle of the night when MESSENGER's orbital insertion burn occurred. Dawn, which is another satellite, inspired people around the world by visiting the asteroid Vesta and producing incredible images. NASA's Wide-field Infrared Survey Explorer (WISE) mission has helped map much of the cosmos. We unexpectedly learned that WISE can help NASA fulfill its congressionally-mandated assignment to map Near Earth Objects. The Aquarius satellite measures the ocean's salinity. NASA's Summer of Innovation 2011 engages students in science, technology, engineering and mathematics (STEM). NASA's Glory, an Earth-observing satellite, had an unsuccessful launch. . It was a tragic loss that was devastating to the people who had spent years working on it. The year's highlight was the successful closeout to the Space Shuttle Program. The last Shuttle mission, STS-135, provisioned the International Space Station (ISS) with supplies that will last for a few years. The Nation owes a debt of gratitude to the entire incredible Space Shuttle team. The legacy of the Space Shuttle is the ISS, which America should be proud about. Building the ISS using the Shuttle has been a 10-year labor of love. We have had American astronauts aboard the ISS around-the-clock. It is a beacon for human spaceflight, because it is the brightest object that can be seen with the naked eye as it moves across the sky. It represents the perfect model for international cooperation. Our partners on the ISS include the Russians, the Japanese, the Canadians, and the European Space Agency (ESA). We should study it and make its legacy the future for exploration.

There will be a robust effort towards commercialization for bringing cargo and crew into low Earth orbit (LEO). Space X has two more qualification flights before NASA will certify it to carry cargo to the ISS. NASA will likely allow the two flights to be combined. Orbital Sciences has two more flights to fly before it is certified. In early 2012, one of these companies will launch cargo to the ISS. This will be an American capability using American expertise. With commercialization, NASA will pay a fee for service, and this will save taxpayers money. Next year, NASA will issue a Request for Proposal (RFP) for a company to carry humans to the ISS, which will occur between 2014 and 2017. Boeing has indicated it can do this by 2015. NASA is developing an exploration system that will include a Multi-Purpose Crew Vehicle (MPCV). The plan is for a human visit to a yet-to-be-selected asteroid by 2025, followed by a human mission to Mars in the 2030s. In between, there will be a human journey to the lunar surface. That work will be begun very soon. Mr. Bolden acknowledged surprise over the difficulties that have been encountered in the James Webb Space Telescope (JWST) project, which is NASA's next-generation successor to the Hubble Space Telescope. Changes have been made to the project's management and scope to allow launch in the 2018 timeframe. The project is vitally important to the international science community. He recently visited the European Organization for Nuclear Research, known as CERN, which is an international organization that is now the world's center for high energy physics studies. This is an area where the U.S. has lost its leadership. Mr. Bolden does not want to see that repeated for space. JWST will be an international mission launched on the Ariane rocket. It is an important initiative for the Agency, not simply an astrophysics mission. In the past few months its cost and schedule have been on target. Mr. Bolden emphasized that while international collaboration is important, leadership is most important, and America will remain the leader in space flight.

Dr. Ford thanked Mr. Bolden for his kind words and leadership.

Space Operations Committee Report

Dr. Ford introduced Col. Eileen Collins, Chair, Space Operations Committee. She announced that this would be her last report as chair of the Space Operations Committee, and expressed her appreciation for the opportunity to lead it over the past several years. She described the Committee's membership. The Committee is merging with the Exploration Committee and the memberships will also merge. The two committees recently held a joint meeting. Slides were presented showing the ISS's components and its size relative to the Space Shuttle. A chart was presented giving an overview on the ISS flight program. It is

used by the Flight Operations Working Group and shows, among other things, how the ISS crews rotate and overlap. The crew overlap allows future commanders to work as a crew member on the ISS before taking command. There are seven docking ports on the ISS. Too much activity could interfere with the science work being performed on the ISS. Recent on-orbit highlights were discussed. The Alpha Magnetic Spectrometer (AMS) was delivered by STS-134. The Expedition 28 crew was launched on Soyuz 27S, the second of the new digital Soyuz vehicles. The European Automated Transfer Vehicle (ATV) 2 departed after a flawless mission. Prior to departing, its remaining propellant was used to re-boost the ISS to a higher orbit. The last Space Shuttle flight, STS-135, delivered the Robotics Refueling Mission and a Multipurpose Logistics Module containing food, supplies, and critical spare parts. Col. Collins discussed the ISS National Laboratory Cooperative Agreement that had recently been signed. The 2005 NASA Authorization Act designated the U.S. segment on the ISS as a national laboratory. The Act directed NASA to develop a plan to increase the ISS's utilization by other Federal entities and the private sector. To accomplish this, NASA recently selected the Center for the Advancement of Science in Space, (CASIS) as an independent, nonprofit research management organization to develop and manage the U.S. segment on the ISS. Col. Collins extended congratulations to the Space Shuttle Program for successfully and safely flying out the program. A chart was presented showing how the Space Shuttle Program workforce has been reduced over time. Most Shuttle contractor employees have been laid off, and civil servants have been moved to other areas of expertise. Using the ISS as a Mars analog and as an Exploration test bed was discussed. The ISS provides crew durations that mimic the approximately six-month Mars transit phase. Col. Collins explained that ground support commonly provided to the ISS would not be readily available on a Mars mission due to the eight minutes required each way for communications. She advised that in the current budget environment, it is unlikely that the U.S. would be able to accomplish a Mars mission without international cooperation

Col. Collins presented for the Council's consideration a proposed Finding on using the ISS as a Mars Analog. The Council approved the Finding as follows:

The Council is pleased with the initiative that the International Space Station Program has taken with the Mars Analog project. We feel that the project requires a sense of urgency. We request a briefing on the prioritization of the Mars Analog objectives and NASA's plan to provide metrics.

Col. Collins discussed the Commercial Resupply Services (CRS). A chart was presented showing consumable availability on the ISS through 2013 without CRS.

Dr. Ford thanked Col. Collins for her presentation.

Exploration Committee Report

Dr. Ford introduced Mr. Richard Kohrs, Chair, Exploration Committee. He described the Committee's membership and reviewed the agenda from the recent joint meeting with the Space Operations Committee. The NASA Exploration Systems Mission Directorate is merging in the near future with the Space Operations Directorate and will probably be called the Human Exploration and Operations Mission Directorate. A chart was presented showing the organizational structure for the new directorate. It will be headed by Mr. William H. Gerstenmaier, currently the Associate Administrator for the Space Operations Mission Directorate. Mr. Kohrs discussed the guidance provided in the NASA Authorization Act of 2010 for the MPCV and the Space Launch System (SLS) Heavy Lift Launch Vehicle (HLV). NASA will develop the MPCV using the current Orion plan and contract. The MPCV must be able to provide an alternative means for delivering crew and cargo to the ISS in the event other vehicles are unable to perform that function. The HLV must have an initial capability to lift payloads weighing between 70 and 100 tons into LEO and be able to serve as a backup system for supplying and supporting ISS cargo and crew delivery requirements. A chart showing three SLS concepts was presented and the SLS analysis approach was discussed. The modular system has been rejected. The liquid oxygen/liquid hydrogen Reference Vehicle Design is the most likely solution. There are 15 Space Shuttle Main Engines (SSMEs) available from the current orbiter fleet. The first uncrewed test flight for the HLV may be feasible in late 2017, followed by a crewed flight in the early 2020s. Procurement strategies are being evaluated. NASA is assessing all trades against cost estimates, affordability measures, schedule estimates, and adherence to the Authorization Act.

Dr. Ford thanked Mr. Kohrs for his presentation.

Remarks by President's Science Advisor

Mr. Bolden introduced the President's Science Advisor, Dr. John Holdren, Director, Office of Science and Technology Policy (OSTP), Executive Office of the President. Dr. Holden expressed his respect and affection for Mr. Bolden and the senior management at NASA. He discussed President Obama's views on NASA and science. In this extraordinary budget

environment, funds are not adequate to do everything we want to do. The President wants to "restore science to its rightful place." This does not mean that science will win or prevail in every argument; however, policy should not be made without knowing what science and technology offer. One issue that the President pays attention to, along with his other senior advisers, is how to retain graduates from other countries. The President understands what we need to do regarding science and technology. He came into office understanding how important science and technology are to every challenge we face nationally as well as globally. He understands how information technology and science are important for finding answers to environmental questions and preserving homeland security. President Obama was the first president since President John F. Kennedy to address the National Academy of Sciences (NAS). The important thing to do is "lift the game." The Strategy for American Innovation, which was rolled out in 2009-2010, has three elements. The first element is investing in science and technology. This is important because our strength is in our universities and national laboratories. The second element is emphasizing STEM. The third element is developing the necessary infrastructure for computing, space exploration, and communications. Even if it is decided that Exploration should not go forward—and that decision will not be made—it is necessary as a matter of national security to continue in space. The President's appointments demonstrate how he is putting science in its rightful place. Those appointments include five Nobel Laureates and 30 members from the NAS. Dr. Holdren chairs the President's Council of Advisors on Science and Technology (PCAST). President Obama has requested more studies from PCAST than any other President, and he has embodied the recommendations from those studies into national policy.

The President's proposed science and innovation budget for 2012 will be difficult to realize in the aftermath of the recent budget deal worked out with the House of Representatives. Historically, this has been bipartisan; however, it is harder now due to the somewhat poisonous political environment, where it seems that whenever the President is for something, the House is against it. The President will not sacrifice our investments in science and education infrastructure. A particular challenge going forward will be maintaining the budget in some domains that Congress does not love. There will be some challenges in NASA's budget and NOAA's budget. Earth observation gaps are a problem, particularly with respect to polar satellites. It is a difficult job persuading Congress that those eyes are important. Another challenge will be the big science and technology experiments. Finding funds for JWST will be a challenge. That is crucial, however, to maintain leadership in peering deeper into the universe. There will be a fusion challenge in the Department of Energy. It will be hard to maintain agriculture adaptations. We are going to have a great struggle to maintain and expand the funds we need for environmental adaptation. Congress is splicing funds for adaptation from every agency's budget. People in the House do not believe that climate change is an area where we must make investments in adaptation. The science underpinning the regulatory environment will be hard to maintain. The squeeze is on all the agencies and the agencies will start to back away from interagency efforts. It will be hard to protect international cooperation. That is a narrow and incorrect view. Costs, risk, and capabilities for energy, climate change, nuclear safety, etc., must be shared.

NASA has an enormous array of important responsibilities. Historically, it has been difficult to fund these responsibilities with the budgets available to NASA. The Augustine Committee (Review of U.S. Human Spaceflight Plans Committee) observed that NASA needed $3 billion more than was provided in the 2010 budget. We were not able to find that money. President Obama, in his 2010 speech at Kennedy Space Center, made clear that there were three priorities in the human spaceflight program: first, extend the ISS to 2020, rather than fly it into the ocean in 2016; second, support Commercial Crew as the main means to transport astronauts to the ISS; third, invest in the advanced technologies that will make deep space exploration a reality. The President also announced visionary goals: visit an asteroid by 2025, and visit Mars by the mid-2030s. We have a destination and we have a plan. We need the funds to accomplish this. We need better propulsion, better shielding, and better refueling technology, and investing in those technologies is one of the pillars. Another challenge is that Congress has not wanted to invest as much in Commercial Crew as the President wanted. At Congressional hearings, we are asked if NASA will do everything required in the NASA Authorization Act. The response is that we will do so to the extent that there is funding. The President remains committed to NASA's missions as we work through a severely budget-constrained environment.

Col. Collins spoke about STEM's importance, and observed that one weakness is teachers' training and experience. Dr. Holdren explained that one STEM initiative is to produce 100,000 good math and science teachers over the next decade. Many teachers in the current math and science teacher corps do not have the necessary background. He described the Educate to Innovate program, which seeks to get scientists and engineers into classrooms to help teachers to improve and to give students hands-on training. Dr. Charles Kennel observed that there is a perception that NASA is in a "going out of business" mode. He suggested it would be helpful for the Administration to issue a statement, sooner rather than later, that NASA is staying in business and moving forward to the next step. Dr. Holdren responded that it is difficult to get this message out. They are developing a major presidential speech that will cover space. In response to a question from Mr. Robert Hanisee, Dr. Holdren noted that statistics are maintained on the number of foreign national students studying in the U.S. The U.S. government doesn't make it easy for them to remain in the U.S., so many must return to their native countries. That is not a total loss, however, because we want to collaborate internationally. Nevertheless, we should not discourage those who want to stay from doing so. The problem has not been solved due to the debate over immigration reform. Ms. Esther Dyson expressed the need

for the President to use the "bully pulpit" to show that science is important for everybody. Dr. Lawrence Smarr counseled that there are other things to do besides returning to the Moon; for example, the ISS demonstrates a capability to continue to conduct large-scale engineering in space. Dr. Holdren agreed that this deserves more consideration. He asserted that Congress' mandate for a heavy lift rocket and crew capsule must be pursued in a way that does not foreclose developing other technologies. Ms. Marion Blakey expressed her appreciation to Dr. Holdren for his emphasis on Aeronautics. Dr. Holdren observed that most people do not think about NextGen as a fuel-saving measure.

Dr. Ford thanked Dr. Holdren for sharing his thoughts and insights.

Information Technology (IT) Infrastructure Committee Report

Dr. Ford introduced Dr. Lawrence Smarr, Chair, IT Infrastructure Committee. Dr. Smarr updated the Council on the Committee's activities since the last meeting. Dr. Smarr reviewed the Committee membership, and noted that although there are very good people serving, it is somewhat understaffed; he will be talking with Dr. Ford further on this subject.

Much work is being done at ARC on distributive collaboration; in fact, the Lunar Science Institute (LSI) and the NASA Astrobiology Institute (NAI) were born as "virtual institutes." They work with hundreds of researchers around the country and have been very successful in using commercially available technologies. The real challenge for the IT Infrastructure Committee is to understand why everyone in NASA isn't using this technology. There should be a huge productively gain. What are the barriers? Dr. Smarr described a few excellent examples of distributive collaboration at the NAI and at the Jet Propulsion Laboratory (JPL). ARC/LSI has also been an excellent partner in collaborative research. Satellite data is increasing exponentially. With increases in sensor capabilities, the data output will go even higher. The issue is how to handle all the data from the new observatories. Graphics processing units (GPUs) are able to speed up tasks by a factor of 100 and are becoming more widely used for NASA. Today, the data that defines the object is as much as the former supercomputer's entire output. Data-driven simulations are becoming a major high-performance-computing driver.

Although we are moving into the "cloud" area, there are issues about the cloud for NASA, and his Committee is investigating an appropriate way for the Agency to move forward on cloud activities. ARC provides Nebula cloud services to the Goddard Space Flight Center (GSFC); however, these are NASA private clouds. One question is: Should the cloud be outsourced? The answer depends on what you are trying to do. The cloud enables much greater security than what is available in most institutional clusters. Other questions are: How and when should the organization migrate to the cloud? What research investments should be made? The Agency has an opportunity to customize the cloud and consider how it would work from a policy perspective. Dr. Smarr cited some success examples at the Marshal Space Flight Center (MSFC) and on WISE. The question is: Is it worth the investment? Dr. Smarr's briefly addressed cybersecurity at NASA. He noted that this is not just IT; it is IT and people and the way things are done. There is a huge opportunity for improvement, and GSFC and ARC are interested in leading by example. For cybersecurity at NASA, there is a recognized need to separate mission, science, and administrative computing. NASA is learning more from other agencies about how to lower risks.

Dr. Smarr presented the Committee's work plan for FY 2012, which will be focused in four areas: (1) examine the ongoing and planned efforts for the IT infrastructure and mission areas; (2) investigate the state of NASA's high performance networks, computing and visualization systems, and data intensive computing and storage systems; (3) examine NASA's data and communications environment for its aerospace operations and point out areas needing attention to improve efficiency and reliability; and (4) examine the Office of the Chief Information Officer (OCIO) role and IT governance across NASA.
In response to a question from Mr. Kohrs, Dr. Smarr indicated that his organization at the University of California San Diego exchanges data in many different fields and so far, has not run into issues with the International Traffic in Arms Regulation (ITAR). It is a long discussion on whether ITAR-like activities are useful or effective. The Committee would like to look further into policy issues that interfere with the right way to go. In terms of network bottlenecks, the real bottleneck is on the campuses themselves. All the networks get to the gateway at the campus, and that is where the problems are. Dr. Kennel expressed some surprise that the cloud would be more secure than other data. He asked how data is archived in the cloud and whether NASA has a role. Dr. Smarr noted that this is a research area that his institute is looking into. Whose job is it to make data available? It's really nobody's job. This is an important policy issue that the country faces and is one reason some commercial clouds look promising—they back-up data. The issue is not just archiving—there is an entire issue about curation and comments on the data that are included in the metadata. The Committee will be looking at what NASA is doing about this in several subareas, and whether there are any recommendations. In response to a comment from Dr. Kennel, Dr. Smarr agreed that NASA could show leadership in this area by developing some broad standards for archiving, particularly for scientific data.

Commercial Space Committee Report

Dr. Ford introduced Mr. Brett Alexander, Chair, Commercial Space Committee. The Committee met on August 2. Topics covered included commercial crew and cargo (in a joint meeting with the Space Operations and Exploration Committees), the Commercial Reusable Suborbital Research (CRuSR) Program, the Innovative Lunar Demonstrations Data (ILDD) Program, and hosted payload activities.

The CRuSR Program focuses on suborbital, reusable launch vehicles; it was authorized by Congress last year to leverage commercial vehicles for scientific gain. Most payloads will come from the NASA Office of Chief Technologist (OCT), NASA, and non-NASA Federal programs. First flight awards were made in August 2010 to Armadillo Aerospace and Masten Space Systems. The second round of awards will be made shortly. The Committee agreed that the CRuSR Program is a good thing for NASA to be engaged in. The ILDD Program involves data purchase from private lunar landing missions and complements the Google Lunar-X prize. To stimulate the private sector to get robots to the Moon, it provides up to $10M to three companies each. Data is purchased for design, critical component demonstrations, and flight hardware ground tests. The funds are used mostly for in-flight activities. To date, the competition has been held, and six companies were selected (all U.S.-based) for component demonstration. The Committee thought this was a positive, innovative approach, and it is progressing well.

The Committee looked at "hosted payloads," which are government payloads that are put on someone else's commercial satellite. This has only been done within the last five years, mostly by the Air Force/DoD and the FAA. NASA is looking specifically at one program, an Earth observation sensor, to be a hosted payload on a commercial geostationary (GEO) comsat. There are obvious benefits, but in the past, it has been difficult to figure out how to work with commercial agencies and time the schedules right. NASA is incorporating lessons learned from FAA experience. The Committee is looking at whether NASA should be doing more in this arena, and what issues are involved.

Together with the Exploration and Operations Committees, the Commercial Space Committee looked into the Commercial Cargo Program and reviewed SpaceX and Orbital Sciences Corporation (the providers) progress. The committees also received a briefing from Mr. Mike Suffredini on the ISS integration activities leading to the CRS missions. The Space Shuttle STS-135 mission resupplied enough consumables to provide considerable margin, however, the ISS needs CRS by the end of 2012 before operations are impacted. The three Committees also looked at the Commercial Crew Program (CCP). Mr. Alexander noted that the Commercial Space Committee has had findings and recommendations on this subject in the past. The Program has gone through two phases over the last two years; however, the way forward was not clear until this past July 20, when NASA rolled out the acquisition strategy for the next phase. The strategy switches from Space Act Agreements (SAAs) to a modified Federal Acquisition Regulation (FAR)-based contracting approach. NASA expects to make awards for the Integrated Design Phase before the end of FY 2012 and is considering extending the current SAAs with the existing providers. The major concern is the overall budget for the Program. The original Program was proposed at $5.8B over five years with $1.2B in FY12. The NASA Authorization Act provided $500M per year over the next two years; the President's FY 2011 Budget Request was for $4.5B over six years ($850M per year). The House Appropriations markup last month only appropriated $312M in FY 2012. This is disturbing, because the Program will be the primary way to get astronauts to the ISS in the future. At some point, the squeeze on the funding will affect the delivery.

Mr. Alexander presented for the Council's consideration a proposed Finding on funding for the CCP. The Council approved the Finding as follows:

The Council appreciates NASA's efforts to develop an acquisition strategy for the Commercial Crew Program that addresses industry concerns with traditional FAR-based contracting approaches. The Council is concerned, however, that the proposed Commercial Crew Program may not be able to achieve its stated goal of developing one or more commercially viable crew transportation systems in a timely manner. Funding for the Commercial Crew Program as authorized by the Congress does not appear to be sufficient to meet the timetable laid out by NASA, making the business case more difficult for commercial companies to achieve.

Col. Collins noted that, the presenter at the joint meeting had stated that the budget at $850M per year would be a challenge, but if only $312M was proposed, they wouldn't be able to do it. In response to questions regarding the providers, Mr. Alexander noted that both SpaceX and Orbital have Commercial Orbital Transportation Services (COTS) and CRS agreements and although both bid on CCDev2, Orbital was not an awardee. Anyone can bid on the next phase. In response to a question on whether the current providers would be going after manned services without government funding, Mr. Alexander indicated that SpaceX has stated that it plans to go forward with human spaceflight. He didn't know about Orbital. With respect to the X Prize, the program has rules that limit government involvement, but each team is allowed to go directly to NASA and have SAAs or obtain free advice, within the limits of the rules.

Education and Public Outreach Committee Report

Dr. Ford introduced Mr. Lars Perkins, Chair, Education and Public Outreach (EPO) Committee. Mr. Perkins briefly reviewed the Committee membership and some recent activities. This week, the Committee met at ARC and the NAC toured N-232, the sustainable "green" building, and was introduced to preliminary science results from Kepler, a remarkable planet-finding mission with technology, and the Stratospheric Observatory for Infrared Astronomy (SOFIA), which teachers can ride on and that has capabilities rivaling suborbital flights. The Committee learned about synthetic biology. All these stories were remarkable, and none of them have anything directly to do with spaceflight. The public believes that NASA equals the Space Shuttle; however, there is much more to NASA that the public is not aware of. The challenge for Committee is to work to convince the public that NASA is bigger than any single program. Part of the problem is that the press abhors a vacuum, and there is uncertainty due to Administration and budget changes. However, NASA astronauts are continuing to fly without interruption, and NASA is continuing manned spaceflight, albeit through a commercial role.

Mr. Perkins stated that the public outreach issue is that NASA's "story" doesn't tell itself anymore – the mission has changed; it is not the number one national priority. Also, the world has changed – there are many information sources. The public cannot be expected to have the cognitive framework to understand everything that is NASA. The message must be unified so the public can understand NASA's value. Putting up a website is not enough. To tell the story, everyone at NASA must believe the story; everyone must evangelize the story within; and everyone must communicate the story. Press releases (broadcast from the top) are not the answer today. The only way to communicate is from the bottom up. Effective public messaging is clear, concise, consistent, and in context. The EPO Committee's role is to help NASA organize to find and tell its story, and the challenge is how to organize to support consistent messaging. The command and control approach is no longer possible. The Committee will work with NASA to help prioritize education and public outreach programs by asking the following questions about each: How expensive is it? How many does it reach? How measureable is its impact? How much better can NASA do it than others? The challenge will be to have a paper that enumerates NASA's 60+ programs and answers these questions.

Moving forward, the Committee priorities are: to add new members (leaders in communication, design, and inspirational education); to work with Mr. Leland Melvin, Associate Administrator for Education, to prioritize the programs; to meet with Mr. David Weaver, Associate Administrator for Communications, to talk about communicating; and to help with the exciting opportunity being managed out of the office of Mr. Alan Ladwig, the Deputy Associate Administrator for Communications. It is called the Participatory Exploration Program. Participatory Exploration is a way to let the public discover NASA programs that interest them and pitch in to help. Ideally, Participatory Exploration is integrated into mission planning. It leverages web and mobile platforms and gives a new front end to nasa.gov resources that turns it from a research library into an interactive science playground.

Dr. Smarr commented that there are dozens of NASA Twitter sources. This has been one of the biggest changes. People are excited over astronaut twitters because it allows them to share in the excitement. However, it doesn't appear that this is something that "corporate NASA" has its arms around, and Mr. Larson encouraged the IT Infrastructure Committee to look into this. He agreed with Dr. Smarr; in fact, it should be taken to the next level – connect to the mission, follow tweets, look at data, etc. The information is there, but at the present, it is in different places. NASA needs to bring it together in a way that "it finds you" rather than the other way around. Ms. Dyson noted that NASA tried an experiment with a recent "tweet-up" " around a Shuttle launch and asked how NASA could do this better. Col. Collins agreed with the comment regarding the NASA website, and suggested that the Committee may want to look at whether something similar could be done with the Space Station and the Mars Science Laboratory (MSL), which is an exciting mission that will launch near the end of this year. Ms. Blakey agreed with Mr. Perkins that there is a problem with how NASA is viewed by the public, and she concurred with his comments regarding distilling down NASA's story down to three fact-based messages.

Science Committee Report

Dr. Ford introduced Dr. Byron Tapley, Vice Chair, Science Committee, who was acting for the Chair, Dr. Wesley Huntress, in his absence. Dr. Tapley briefly reviewed the Committee membership. He discussed recent science results. The Dawn spacecraft entered orbit around the asteroid Vesta in July, and recent images from the German-provided camera were remarkable. The Mars rover Opportunity is approaching the Endeavor crater. Images from the Mars rover were released today, showing seasonal flows of what appears to be surface water on a warm Martian slope. On June 7, 2011, heliospheric spacecraft observed a giant solar eruption. There is conjecture, based on some preliminary results on decreased sunspot activity, that we may have an unusual solar cycle 25. Data from the Voyager spacecraft suggest magnetic bubbles reside at the solar system's edge. A recent study indicates that the decline in Arctic Sea ice has an impact on winter snowfall in Europe and the northeastern and mid-west U.S. SOFIA provided imaging from the Pluto occultation on June 23, 2011.

Earth Science completed its Senior Review on operating missions and found that a large number of missions are providing important data. Aquarius was launched on June 10, 2011; the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP) will be launched on October 25, 2011. The Nuclear Spectroscopic Telescope Array (NuSTAR) is scheduled for launch in January 2012. Three important planetary missions – Juno, Gravity Recovery and Interior Laboratory (GRAIL), and MSL—are scheduled for launch this calendar year. At the Committee meeting, the Planetary Protection Subcommittee (PPS) gave a report on its activities. The Subcommittee has been looking at NASA involvement in launches by non-governmental organizations. Looking ahead, the PSS will be focusing on planetary protection issues raised by future missions as identified in the Decadal Survey, technology development for planetary protection, and the overall adequacy of support for planetary activities. The Astrophysics Subcommittee (APS) continues to closely monitor the progress on JWST. This is the top mission in the 2001 Decadal Survey, and the APS has asked for detailed background data prior to its fall 2011 meeting. The Committee discussed the Decadal Surveys and the lessons learned from NASA's perspective. Concerns were expressed about the costing analyses on the Earth Science missions. Because the Decadal Surveys are extremely important documents, the Committee formulated a recommendation to solidify the dialogue between NASA and the Space Studies Board (SSB). The Science Subcommittees conducted independent assessments on progress toward annual performance goals, in accordance with the Government Performance and Results Act (GPRA) requirements. Three of the four assessments have been completed, and all are rated "green." The last one, Earth Science, will be done at a telecon later in August 2011.

The Science Committee discussions led to four Recommendations. Dr. Tapley presented for the Council's consideration a recommendation on Capturing Decadal Survey Lessons Learned. The Council approved the Recommendation as follows:

NASA should request a formal examination by the National Research Council (NRC) of the lessons learned, from the perspective of the National Academies, from recent NASA-related decadal surveys. Planning for this examination should be initiated after the release of the Heliospherics Decadal Survey in early 2012, and this examination should make recommendations about the next cycle of decadal surveys, which will begin circa 2015.

Dr. Tapley presented for the Council's consideration a Recommendation on Evaluating Science Budget Options:

The Science Committee supports the intention of the Science Mission Directorate (SMD) to task the relevant NAC Subcommittees with evaluating possible division-level budget options, once the FY 2012 budget process results in an SMD appropriation or year-long Continuing Resolution. The Science Committee and its Subcommittees have a key role to play in this difficult process, especially in the event that major changes result from the budgetary process. The Science Committee stands ready to meet to provide SMD the desired results.

In response to a question from Dr. Ford, Dr. Tapley indicated that the purpose of the recommendation was to put forth the Committee's position on the best way to react to potentially major changes in SMD's budget appropriation. After a short discussion, Dr. Tapley agreed with the Council that this was a recommendation for the SMD Associate Administrator rather than the NASA Administrator.

Dr. Tapley presented for the Council's consideration a Recommendation on NASA Press and Outreach Programs. The Council approved the Recommendation as follows:

NASA's ongoing program of scientific challenges and exciting science missions (those launched in the coming year, in development, and planned over the rest of the decade) will provide outstanding results and new discoveries. The NASA Advisory Council encourages NASA's press and outreach programs to strengthen their focus on science missions and stands ready to help formulate, facilitate, and champion these activities.

Dr. Tapley presented for the Council's consideration a Recommendation on Planetary Science Subcommittee Analysis Groups. The Council approved the Recommendation as follows:

NASA should revise the Terms of Reference (TOR) for the Lunar Exploration Analysis Group (LEAG), the Mars Exploration Analysis Group (MEPAG), and the Small Bodies Assessment Group (SBAG) to reflect the recommendations contained in the Task Group of the NAC Science Committee (TagAG) final report. Specifically:

(1) Add explicit tasking authority for the Exploration Systems Mission Directorate (ESMD) and relevant Committees of the NAC;

(2) Add language concerning the appointment of the Chair (and in the case of LEAG, Co-Chairs) that has appointment be made by the Associate Administrator (AA) for Science after consultation with the AA for Exploration Systems;
(3) Update language to capture revisions in the topic areas covered by the respective Analysis Groups;
(4) Acknowledge the uniqueness of LEAG by:
   a. Establishing a LEAG Co-Chair for Science (appointed by the AA for Science after consultation with AA for Exploration Systems) who would replace the current LEAG Chair as a member of the NAC Science Committee's Planetary Science Subcommittee;
   b. Establishing a LEAG Co-Chair for Exploration (appointed by the AA for Exploration Systems after consultation with AA for Science) who would be added to the membership of the NAC Exploration Committee; and,
   c. Incorporating language that the LEAG Executive Secretary should be appointed by AA for Science after consultation with AA for Exploration Systems;
(5) Refine the wording concerning the role of the Designated Federal Official (DFO)/Executive Secretary to ensure consistency with the Federal Advisory Committee Act (FACA) Final Rule and NASA Policy, while recognizing the value of a close working relationship between the Executive Secretary and the Chair.

In response to a question from Dr. Ford regarding whether the Groups are operating as FACA entities, Dr. Jens Feeley stated that the Analysis Groups report to the Planetary Science Subcommittee; however, their memberships are not vetted in same way as the Committees and the Council. He added that he has been working with NASA's legal office on how these will operate; the proposed recommendation specifically relates to the integration of science into exploration. In response to another question, he confirmed that the LEAG, MEPAG, and SBAG were the only Groups that were considered by the TagAG, which has been active in working with the Planetary Science Division. In response to a question from Dr. Colladay on whether a recommendation to the Administrator is needed, Dr. Feeley indicated that the Administrator put together the Task Group and gave it its charge. The final report recommends changes to documents that the Administrator must sign.

Aeronautics Committee Report

Dr. Ford introduced Dr. Ilan Kroo, who gave the report for the Chair, Ms. Marion Blakey, who was not able to attend the Aeronautics Committee meeting earlier in the week. He briefly reviewed the Committee's membership. He explained that the global aeronautics environment is changing. European research is much more focused and coordinated. Non-traditional partners will play important roles in future aviation research. Other countries are making aviation a national priority. The Aeronautics Research Mission Directorate (ARMD) is evolving a more proactive international strategy that will seek out important collaborations, foster global information exchange, and continue working with other governmental organizations. Places all over the world represent opportunities for NASA to collaborate on aeronautics work.

Dr. Kroo presented for the Council's consideration a proposed Observation regarding international collaboration. The Council approved the Observation as follows:

The Council encourages ARMD efforts to establish deeper collaborations with the international community. The U.S. needs to understand what is happening in the rest of the world, including capabilities of emerging economies – proactive intelligence. Need to understand competitive issues but work together strategically and in those areas of mutual benefit (e.g., air traffic management inter-operability, understanding high ice-water content weather phenomenon).

The Verification and Validation for Flight Critical Systems (VVFCS) seeks to provide tools and techniques to ensure safe and rapid deployment of flight critical systems, particularly NextGen technologies. The program also seeks to develop cost-effective techniques for verification and validation of complex civil aviation systems, e.g., software and avionics, for ground-based and airborne systems.

Dr. Kroo presented for the Council's consideration a proposed Observation on verification and validation. The Council approved the Observation as follows:

Research in verification and validation is a critical national need and this is an important area of work for NASA. The work needs to be clearly connected with applications – e.g., how will a new approach help in certification? This is a very challenging problem and it is important to show incremental progress along with ideas for more comprehensive solutions.

The aeronautics research community at NASA intends to think more strategically about its research and development (R&D) approach. The Strategic Architecture and Analysis activity will connect ARMD goals and technology challenges to the NASA

Strategic Plan, the National Aeronautics Research and Development Plan, NextGen planning documents, and the NRC Decadal Survey NIA Aviation Plan. One of the ways this is being done is through organizing an Aeronautics Community Roundtable to provide a forum for discussion of national needs and system-level research opportunities in aeronautics.

Dr. Kroo presented for the Council's consideration the following proposed Observation on systems analyses and trade studies:

It is important to capture the results of systems analyses and trade studies/sensitivity analysis. This can be used to help defend and prioritize the ARMD research and to build advocacy. Dissemination of results internally and externally can be done in several ways, including conventional publication with knowledgeable summaries and accessible databases with more detailed information. NASA's aeronautics program is pursuing these approaches.

In response to a question, Dr. Colladay noted that the international collaboration has not been neglected; rather, the ARMD recognized a need to re-focus in this area because it is becoming a different world and a different kind of collaboration is needed – it must be more than "business as usual." There are new partners, and there is more sensitivity about competitive interests. Dr. Kennel questioned whether this should be a recommendation to ARMD rather than an observation to the Administrator. Dr. Ford opined that it would be appropriate let the subject take its course with ARMD. The Aeronautics Committee is dealing with the topic the right way; however, as the approaches mature, it might be appropriate to deliberate on a recommendation. Dr. Colladay congratulated NASA for taking action on earlier recommendations that the Council has made regarding outreach to partners and stakeholders in the Aeronautics program. The Roundtable is a mechanism by which ARMD can have a group of people come together and that represents all the partners in the NASA Aeronautics Program.

Public Input

Dr. Ford gave the public an opportunity to make comments. Mr. Gary Marx, representing himself, stated that he is a big fan of the changes that are going on. He thanked NASA and the Council for making something for his children in the future a reality. However, there is danger: NASA is losing his generation—most of them don't know what is going on. This issue was addressed earlier in the EPO presentation. He posed the question: What good does it do to have STEM if there is no application for the disciplines or opportunities for the people? Mr. Robert Zimmerman, from Symbiotek, thanked everyone for the thoughtful discussions. He noted that in particular, Space Operations and Exploration had very substantive presentations not generally seen outside NASA. It is important to get the messages across. He expressed some concern about the Human Exploration and Operations structure—mission operations, including the development of new launch vehicles, could swamp the life sciences and physical sciences research areas. Many improvements in society come from these activities. He hopes that the new Committee will discuss the proportion of resources available for research.

Adjourn

The meeting was adjourned for the day.

Friday, August 5, 2011

Call to Order

Ms. Rausch called the meeting to order.

Announcements

Dr. Ford thanked the Council members for a productive first day. Excellent briefings and timely recommendations were received. He presented a slide showing an historic document: the 1959 NASA Long Range Plan. It was a three-page document and has a bullet for "Beyond 1970" which says simply, "Manned flight to the moon." Dr. Ford remarked that the document was remarkable for clarity of purpose as well as brevity.

Technology and Innovation Committee Report

Dr. Ford introduced Ms. Esther Dyson, Chair, Technology and Innovation Committee. Ms. Dyson noted it would be her last presentation as the Committee chair, and that she has enjoyed the opportunity to serve. The Committee will be substantially reconstituted under a new chair. She described the briefing that the Committee received on the status of the OCT. Space

Technology is funded at approximately $350 million and is transitioning from formulation to implementation. Award announcements have been issued for several Space Technology Programs. An excellent briefing was received from Ms. Courtney B. Graham, Associated General Counsel in the NASA Office of General Counsel. Ms. Graham reviewed a plan that had been proposed in 1993 during the Clinton Administration. The plan, which was not adopted, included recommendations calling for technology transfer training for all employees, partnerships with industry, improved metrics to measure technology transfer performance, infusing technology into the private sector through mission objectives and grant proposal evaluation, requiring technology transfer plans in NASA contracts, and amending NASA's Vision-Mission-Values document to state that technology transfer is a major mission objective. A chart was presented showing a steady decline in the number of patents awarded to NASA from 1969 through 2009. One factor for the decline is that NASA has only 18 lawyers available to work on patents and most are busy on other matters. It was Ms. Graham's opinion that NASA would never again reach the level of technology contributions it made during the Apollo era. Ms. Dyson noted that the Strategy for American Innovation published in 2009 by the President's OSTP does not include NASA as an element of the strategy. She described two briefings that the Committee received on new technology projects. One project involves robotic satellite servicing, and the other project involves deep space optical communications.

Ms. Dyson reported that the Office of the Chief Financial Officer (CFO) was acting favorably on the Committee's recommendation that senior Agency leadership address issues surrounding delays in funding Small Business Innovation Research and Small Business Technology Transfer awardees. Ms. Dyson described suggestions offered by individual Committee members. Dr. Alain Rappaport believes that NASA should focus on hard problems that have strategic importance, and that leadership is needed to create and sustain an innovation culture. Mr. Gordon Eichhorst believes that NASA's policies for monitoring its own technology and for intellectual property (IP) would benefit from clarification. Ms. Dyson advised that proper IP portfolio management can generate substantial revenues for NASA; however, she cautioned that this is not a simple issue. NASA is required to disseminate technology widely in the U.S., and there is a question over whether that is best accomplished by licensing the technology or giving it away. She believes that it will not be used if it is given away because investors are only interested in technology that can be patented, leveraged, and exploited. Patenting also motivates employees by providing recognition, which will help NASA attract and retain the people it needs. Dr. Ford concurred. Mr. Robert Hanisee observed that some NASA Centers encourage IP development more than others, and reward Principal Investigators with a financial interest in those developments. He noted that this is done best by JPL. Dr. Ford counseled that these results depend upon the leader, the reward mechanism, and the culture in the group. Ms. Dyson asserted that the heart of the IP question is whether NASA is viewed as a "technology" organization. It does not appear that NASA is getting much credit for creating solutions that make the world a much better place. She explained "It's the culture, stupid!" and recommended that NASA fly early and often, move people, and that NASA Centers recruit from beyond their home state. Dr. Kennel observed that the technology office at the University of California is often regarded as a barrier to technology development. The argument that licensing will pay for its own lawyers has only led to generating an income stream sufficient to pay for the lawyers and risk avoidance. He asserted that nobody has figured out how to do technology transfer right. Ms. Dyson noted that the Central Intelligence Agency has its own venture capital firm, and suggested that NASA might want to have one also.

Dr. Ford thanked Ms. Dyson for her presentation.

Broadening the Employment Base for NASA Centers

Dr. Ford presented for the Council's consideration a proposed recommendation, drafted by Dr. Wesley Huntress, for broadening the geographic diversity of employment at NASA Centers. The Council has been examining this issue for the last three years and has been provided a series of briefings that depict a situation in which the Centers tend to hire new employees almost exclusively from local colleges and universities. Dr. Ford explained that each NASA Center does its own recruiting and that most hiring of new graduates is accomplished through cooperative programs that tend to disproportionately draw from a local population base. Dr. Colladay agreed that it was a problem, but opined that it would be a mistake to centralize hiring. Dr. Ford concurred. Dr. Colladay then described a procedure whereby Center directors would exchange local co-op opportunities without requiring centralized management at NASA Headquarters. Mr. Lars Perkins noted that while the recruiting function should not be centralized, a common pool could be utilized. Col. Collins explained that NASA would miss opportunities to hire the most talented and creative scientists and engineers and miss out on innovations if the proposed recommendation was not acted upon favorably. Dr. Ford concurred, noting that it is not intended to criticize current employees or local universities. Ms. Dyson counseled that the intent is to obtain diversity itself, not necessarily people who are diverse. Mr. Zimmerman, a public attendee, informed the Council that the current NASA Academy Program at ARC does recruit nationally. The Council adopted the Recommendation to read as follows:

The Council recommends that NASA Centers further broaden recruitment for new engineers and scientists beyond their local colleges and universities to increase the diversity and quality of the workforce.

Audit, Finance and Analysis Committee Report

Dr. Ford introduced Mr. Robert Hanisee, Chair, Audit, Finance and Analysis Committee. Mr. Hanisee described the Committee's membership. They met with the Agency's new auditing firm, Price, Waterhouse, Coopers (PWC). No new issues were raised by the accountants. The Committee was informed that the U.S. Army will be transferring 163 buildings to NASA's John C. Stennis Space Center in the near future. The Committee was assured that all environmental and remediation liabilities associated with those buildings have been accounted for. Mr. Hanisee presented charts on the FY 2011 financial statement audit. A graph on the typical audit timeline was reviewed. He discussed the status and results from a review conducted pursuant to the Improper Payment Illumination and Recovery Act (IPERA). NASA is in compliance. Improper payments that were identified amounted to only $2,343.87. An old issue, asbestos remediation, is being revisited. The Federal Accounting Standards Advisory Board (FASAB) requires Federal agencies to estimate asbestos-related cleanup costs. Assumptions may be used where there is no actual data. NASA has developed an algorithm for estimating its cleanup costs. The algorithm is based on data collected at MSFC and on an assumption that only property constructed prior to 1981 is reasonably likely to contain asbestos requiring remediation. A chart was presented showing that the total FY 2011 asbestos cleanup cost estimate total for the entire Agency is just under $178 million.

Mr. Hanisee discussed the campaign to cut waste from every agency in government, mandated by the September 2010 Accountable Government Initiative and a June 2011 Executive Order on Delivering an Efficient, Effective and Accountable Government. The Office of Management and Budget (OMB) has directed NASA to identify $100 million as targeted savings from NASA's "administrative" accounts. This represents approximately one-half of one percent of NASA's overall budget and five percent of NASA's budget for administrative functions. OMB has allowed NASA to exclude from these calculations the accounts for "transportation of things," which would cover the costs to deliver cargo and crew to the ISS. Mr. Hanisee presented a chart comparing NASA's funding under the Authorization Act, the President's Proposed Budget for FY 2012, and the House's approved budget for FY 2012. He noted that the House mark for the FY 2012 budget, at $16.8 billion, is almost $2 billion less than the President's proposed budget. The near to long-term Federal budget reduction portends evermore difficult budget challenges. The Committee believes that NASA must be prepared to implement its programs with reduced funding and to make hard choices; otherwise, others will make those choices for NASA. A three to four-month Continuing Resolution (CR) is anticipated as the government transitions from FY 2011 to FY 2012. A chart was presented on the NASA ARC Chief Financial Officer Workforce Profile. The Committee suggests that a task force be appointed to make sure that all utilities, phone lines, terminal seats, and software licenses (being paid for by NASA) related to the Space Shuttle Program are terminated.

Dr. Ford complimented Mr. Hanisee on his ability to present audit reports in an interesting manner and thanked him for his presentation.

NASA Advisory Council Future Plans and Roundtable Discussion

Dr. Ford thanked the nine committee chairs for a job well done and expressed appreciation for the findings and deliberations that were brought forward. He noted that all Federal advisory committees operate on two-year cycles, and that Mr. Bolden intends to renew the NAC's Charter when it comes up for renewal in October. The renewed NAC Charter will reflect the merger between ESMD and SOMD. There will be a new NAC chair. There may be fewer meetings and a different meeting structure. Dr. Ford expressed his appreciation for being given the honor to serve as the NAC's chair and for the opportunity to work with the Council members as colleagues. He noted that this would be the last NAC meeting for Ms. Dyson, Col. Collins, and Mr. Alexander. Each has made outstanding contributions. Ms. Dyson and Mr. Alexander will consider continuing to serve on their respective committees. Dr. Colladay, speaking for himself and the entire Council, explained that it has been a privilege to serve on the Council under Dr. Ford's leadership. Mr. Alexander noted that he has enjoyed the opportunity to serve on the NAC and that he has brought the lessons learned here to another Federal advisory committee on which he serves. He complimented Ms. Rausch on how well the NAC has been administered. Ms. Dyson stated that she hopes to help NASA from a different perch in the future, and that she believes she has gained more from her service on the NAC than NASA has received. Col. Collins remarked that she is often asked whether NASA listens to the advice given, and that her response is yes.

Dr. Ford announced that the next Council meeting will be November 2-4, 2011, and that the probable location will be NASA's Goddard Space Flight Center in Greenbelt, Maryland, near Washington, D.C. Dr. Ford encouraged the committee chairs to focus more on committee attendance. He explained that it is an honor to serve on the NASA Advisory Council and that

participation is to be expected. . Some people rarely attend their NAC committee meetings and changes should be made where that is identified.

Public Input

Dr. Ford gave the public an opportunity to make comments. Mr. John Emond, NASA Executive Secretary for the Commercial Space Committee, expressed his appreciation for the opportunity to work with the Committee and especially with its chair, Mr. Alexander. Mr. Zimmerman expressed frustration over the time it has taken to change NASA's patent culture. He said that he had observed students' disappointments with regional hiring patterns at NASA's Centers. He continued that, in his view, this has been greatly improved at ARC by Dr. Worden. He noted that NASA used to have more funds available for low Technology Readiness Level (TRL) development, which created a greater critical mass for technology across the Agency. He believes that new technology is enabling and should not be viewed as being disruptive.

Dr. Ford thanked Mr. Emond and Mr. Zimmerman for their comments.

Adjournment

Dr. Ford thanked the Council, Ms. Rausch, and the Council's support staff for their assistance. He thanked ARC for hosting the meeting. He expressed appreciation to Dr. Worden and Ms. Rosemary Christensen for their efforts in making the meeting a success. The meeting was then adjourned.

NASA ADVISORY COUNCIL

NASA Ames Conference Center - Ballroom
NASA Ames Research Center
500 Severyns Avenue
Moffett Field, CA 94035

PUBLIC MEETING
August 4-5, 2011

Agenda

Thursday, August 4, 2011

8:00 – 8:03 am	Call to Order, Announcements	Ms. Diane Rausch, Executive Director NASA Advisory Council, NASA HQ
8:03 – 8:10 am	Remarks by Council Chair	Dr. Kenneth Ford, Chair NASA Advisory Council
8:10 – 8:30 am	Welcome to NASA Ames Research Center	Dr. Simon "Pete" Worden, Director NASA Ames Research Center
8:30 – 9:15 am	Remarks by NASA Administrator	Mr. Charles F. Bolden, Jr. NASA Administrator
9:15 – 10:00 am	Space Operations Committee Report	Col. Eileen Collins, Chair
10:00 – 10:45 am	Exploration Committee Report	Mr. Richard Kohrs, Chair
10:45 – 11:00 am	Break	
11:00 am – 12:00 pm	Remarks by President's Science Advisor	Dr. John P. Holdren, Director Office of Science and Technology Policy Executive Office of the President
12:00 – 1:00 pm	Lunch	
1:00 – 1:45 pm	IT Infrastructure Committee Report	Dr. Lawrence Smarr, Chair
1:45 – 2:30 pm	Commercial Space Committee Report	Mr. Brett Alexander, Chair
2:30 – 3:15 pm	Education and Public Outreach Committee Report	Mr. Lars Perkins, Chair
3:15 – 3:25 pm	Break	
3:25 – 4:05 pm	Science Committee Report	Dr. Byron Tapley, Vice Chair *(for Dr. Wesley Huntress, Chair)*
4:05 – 4:45 pm	Aeronautics Committee Report	Ms. Marion Blakey, Chair
4:45 – 5:00 pm	Public Input	
5:00 pm	Adjourn	

Friday, August 5, 2011

8:00 am	Call to Order	Ms. Diane Rausch, Executive Director NASA Advisory Council
8:00 – 8:03 am	Announcements	Dr. Kenneth Ford, Chair NASA Advisory Council
8:03 – 9:00 am	NASA Governance and Budget	Mr. David Radzanowski NASA Chief of Staff
9:00 – 9:45 am	Technology and Innovation Committee Report	Ms. Esther Dyson, Chair
9:45 – 10:30 am	Audit, Finance and Analysis Committee Report	Mr. Robert Hanisee, Chair
10:30 – 10:45 am	Break	
10:45 – 11:45 am	NASA Advisory Council Future Plans & Roundtable Discussion	Dr. Kenneth Ford, Chair NASA Advisory Council
11:45 am – 12:00 noon	Public Input	
12:00 noon	Adjourn	

NASA ADVISORY COUNCIL MEMBERS

August 2011

Role	Council Members
Chair – NASA Advisory Council	**Dr. Kenneth M. Ford**, *Founder and Director, Florida Institute for Human and Machine Cognition*
Chair – Aeronautics Committee	**The Honorable Marion Blakey**, *Chief Executive Officer, Aerospace Industries Association*
Chair – Audit, Finance, and Analysis Committee	**Mr. Robert M. Hanisee**, *CFA, Managing Director, Trust Company of the West*
Chair – Commercial Space Committee	**Mr. Bretton Alexander**, *Aerospace Consultant*
Chair – Education and Public Outreach Committee	**Mr. Lars Perkins**, *Entrepreneur*
Chair – Exploration Committee	**Mr. Richard Kohrs**, *NASA (Ret.)*
Chair – Information Technology Infrastructure Committee	**Dr. Lawrence Smarr**, *University of California, San Diego*
Chair – Science Committee	**Dr. Wesley T. Huntress, Jr.**, *Director Emeritus, Geophysical Laboratory, Carnegie Institute of Washington*
Chair – Space Operations Committee	**Col. Eileen M. Collins, USAF (Ret.)**, *NASA Shuttle Pilot and Commander (Ret.), Aerospace Consultant, President of Space Presentations, LLC*
Chair – Technology and Innovation Committee	**Ms. Esther Dyson**, *EDventure Holdings*
Ex-Officio Members	**Dr. Raymond S. Colladay**, *Chair, Aeronautics and Space Engineering Board, National Academies* **Dr. Charles F. Kennel**, *Chair, Space Studies Board, National Academies*

NASA ADVISORY COUNCIL
Ames Research Center
Moffett Field, California
August 4-5, 2011

MEETING ATTENDEES

NASA Advisory Council:

Ford, Kenneth, Chair	Director, IHMC
Rausch, P. Diane, Executive Director	NASA Headquarters
Alexander, Brett	Aerospace consultant
Blakey, Marion	Aerospace Industries Association
Colladay, Raymond	ASEB, National Academies
Collins, Eileen	Space Presentations, LLC
Dyson, Esther	EDventure Holdings
Hanisee, Robert	Trust Company of the West
Kennel, Charles, Ex-Officio	SSB, National Academies
Kohrs, Richard	NASA (Ret.)
Perkins, Lars	Entrepreneur
Smarr, Lawrence	University of California, San Diego
Tapley, Byron (for Wesley Huntress)	University of Texas, Austin

NASA Attendees:

Beasley, Dolores	NASA
Bolden, Charles	NASA/Headquarters
Boyd, Jack	NASA/Ames
De Leon, Grace	NASA/Ames
Emond, John	NASA/Headquarters
Feary, Michael	NASA/Ames
Feeley, T. Jens	NASA/Headquarters
Gillis, Jason	NASA/Headquarters
Girton, Bev	NASA/Ames
Hoyt, Diana	NASA/Headquarters
Keaton, Jacob	NASA/Headquarters
King, Marla	NASA/Headquarters
Langhoff, Stephanie	NASA/Ames
Longchamps, Sylvia	NASA
McConnors, Mary	NASA/Ames
Melita, Unmeel	NASA/Ames
Minor, Susan	NASA/Headquarters
Pilcher, Carl	NASA/Ames
Pittman, Bruce	NASA/Ames
Quinn, Cheryl	NASA/Ames
Robinson, Shawalda	NASA/Headquarters
Shackelford, Keith	NASA/Ames
Shafto, Mike	NASA/Headquarters
Siegel, Bette	NASA/Headquarters
Sims, Michael	NASA/Ames
Smith, Heather	NASA/Ames
Tu, Eugene	NASA/Ames
Vick, Erika	NASA/Headquarters

Watson, Val	NASA/Ames
Williams, James	NASA/Ames
Worden, S. P.	NASA/Ames

Other Attendees:

Frankel, David	Zantech/P B Frankel, LLC
Frankel, Paula	Zantech/P B Frankel, LLC
Gagliardi, Vince	BSA
Garg, Hari	National University of Singapore
Grady, Jim	GEI
Holdren, John	White House
Kroo, Ilan	Stanford University
Liaw, Hwee Choo	National University of Singapore
Marx, Gary	[self]
McPherson, Clayton	[self]
Yeo, Swee Piy	National University of Singapore
Yu, Haoying	National University of Singapore
Zimmerman, Robert	Symbiotek

Remote (Offsite) Attendees (Teleconference and WebEx):

Bale, Stuart
Campbell, Paul
Hom, Michael
Janitri (did not identify last name)
Jih-Fen-Lei
Keisner, Alan
Kirven-Brooks, Melissa
Lebacqz, J.V.
McFarland, Scott J.
Murphy, Lisa
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NASA ADVISORY COUNCIL
Ames Research Center
Moffett Field, California
August 4-5, 2011

LIST OF PRESENTATION MATERIAL

1) NASA Advisory Council Space Operations Committee [Collins]
2) NASA Advisory council Exploration Committee [Kohrs]
3) Information Technology Infrastructure Committee [Smarr]
4) Commercial Space Committee [Alexander]
5) Education and Public Outreach [Perkins]
6) Science Committee Report [Tapley]
7) Aeronautics Committee Report to the NASA Advisory Council [Blakey, Kroo]
8) Technology and Innovation Committee Report [Dyson]
9) Audit, Finance, and Analysis Committee [Hanisee]
10) NASA Long Range Plan, 1959