

**NASA Advisory Council**  
**Space Operations Committee**

Doubletree Hotel, Cocoa Beach, Florida

May 3, 2011

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## NAC SPACE OPERATIONS COMMITTEE

Cocoa Beach, Florida  
May 3, 2011

### Space Operations Committee Members

#### *Present*

*Chair:* Col. Eileen Collins

*Vice-chair:* Dr. Pat Condon

Ms. JoAnn Morgan

Mr. Bob Sieck

*Executive Secretary:* Mr. Jacob Keaton

#### *Absent*

Dr. Leroy Chiao

Dr. John Grunsfeld

Mr. Tommy Holloway

### Other Attendees

Jeff Gernand, SAIC/NASA LX

Scott Henderson, SpaceX

Michael Horkachuck, JSC [by phone]

Dale Ketcham, SRTI/UCF

Kathy Lueders, JSC [by phone]

Ed Mango, KSC

Toni Mumford, SOMD [by phone]

Scott Thurston, KSC

Sherry Smith, Boeing

Lee Solid, EDC

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Mr. Keaton opened the meeting at 8:05 AM and explained that this is a FACA meeting, subject to FACA regulations, and is open to the public.

## SPACE OPERATIONS MISSION DIRECTORATE (SOMD) FISCAL YEAR 2012 BUDGET OVERVIEW

### *Toni Mumford, SOMD [via telecon]*

Because of Congress' continuing resolution for the FY2011 budget, and consistent with NASA authorization, no new activities could be started until the budget was approved in March. Now NASA has a 4-year extension on the Authorization Act, and are focusing on STS-134, working with the commercial space industry on the Cargo Resupply Service (CRS) flight, and continuing with the SOMD programs. The plan to merge SOMD and Exploration Systems Mission Directorate (ESMD) is being finalized. The new directorate will manage the human spaceflight program, including transition from the Shuttle and Constellation, streamline international services, and establish commercial services.

Although the financial plan is not yet complete, the FY2012 budget will decrease overall by \$1794.9M from the FY2010 budget, and \$547.9M will be redirected to the Space Shuttle Program (SSP) for prime contractor pension liability and to re-phase transition and retirement. This realignment will result in decreases for International Space Station (ISS) operations and functionality, the 21<sup>st</sup> Century Space Launch Complex (CSLC), and Tracking and Data Relay Satellites (TDRSS). Space Shuttle flights STS-133 and STS-134 are funded, and an additional mission, STS-135, has been authorized and preparations are underway. FY2012 plans are to increase transition and retirement activities and fund United Space Alliance (USA) pension liability (all defined pension benefit plans were terminated as of December 31, 2010). Based on

the latest actuarial estimates, the Agency has budgeted \$547M for this liability and will amend as appropriate. If funds remain after the pension plan termination, they will be used to defray Space Shuttle closeout costs.

The ISS Program is making progress with commercial cargo transport systems and has scheduled a visiting vehicle for 2011. The ESMD budget provides funds to facilitate development of US commercial crew transportation capability to ISS. Nearly a third of the budget is allocated to biological and physical research, and the rest to Multi-User System Support (MUSS), including enabling technologies and separate from operations and transportation. NASA has Memoranda of Understanding with five federal agencies and nine Space Act Agreements with companies and universities. The National Institutes of Health (NIH) awarded the first three grants for space research in August 2010, and the National Science Foundation (NSF) funded a study using ISS as platform for deploying CubeSats to study the upper atmosphere. ISS functionality/enabling funding is provided to support upgrade activities that have the potential to lower costs or increase the efficiency of ISS operations in space or on the ground, reduce demand on crew time, improve ISS safety, or benefit future explorations programs or capabilities. The International Docking System Standard (IDSS) Working Group should complete definition of the interface characteristics and requirements by April 2011. *Col. Collins*: This would be the LIDS Docking System for Orion. The robot Dextre completed its checkout and activation, and Robonaut-2 has been launched. A spacecraft servicing demonstration project was recently released by the Goddard Satellite Servicing Study, and a robotic refueling mission technology demonstration is planned to launch on STS-135 (June 2011).

Space Communications and Navigation (SCaN) awarded a contract for the first set of antennas to replace the 70-m Deep Space Network in December 2010. Other 2011 plans are a System Requirement Review for Space Network Ground Segment Sustainment (SGSS); TDRS K and L; and turnover of communications navigation, and networking reconfiguration test bed to Japan Aerospace Exploration Agency (JAXA). Human Space Flight Operations (HSFO) is awaiting the results of a National Research Council (NRC) study, and SOMD is continuing to study activities for inclusion in HSFO. Launch Services Program (LSP) has been assigned responsibility for understanding the full range of civil space launch needs. For FY2011 and FY2012, nine launches of NASA payloads have been planned. NASA will continue to provide low-level Alpha Magnetic Spectrometer (AMS) housekeeping flight operations support, the Rocket Propulsion Test (RPT) Program resources will be maximized to merge current and future requirements, and commercial rocket propulsion testing will continue with NASA test facilities.

#### *Discussion*

- *Dr. Condon* summarized: the underfunding by \$500M to \$600M is a NASA liability for which \$547M was budgeted at last count.
- *Ms. Morgan* asked for clarification: The non-profit organization (NPO) under discussion will take control at the beginning of September, once the funding has been awarded. NPO responsibilities include overseeing all research of all organizations other than NASA and transferring current NASA biological and physical research to NPO in future years.

- *Col. Collins* would like more information on the robotic refueling mission; *Ms. Mumford* will send it to Mr. Keaton for distribution.
- *Mr. Sieck* and *Col. Collins* sought more specific information on the likely impacts of a prolonged Continuing Resolution, in light of the dire consequences the budget briefing predicted. *Ms. Mumford*: For Space Operations this year, the Continuing Resolution had a minimal impact. They anticipate getting an operating plan and expect a Continuing Resolution for FY2012. As long as they can get the 21<sup>st</sup> Century Program started this year, they will continue work on ongoing programs in 2011 and 2012. Therefore, they expect a minimal impact. The Authorization Act permits continuation of programs contingent on funding, and funding was based on the FY2010 budget, a higher number. Eventually they got to a point of no return with STS-135. I.e., if they did not start processing in March, they would not be able to launch in June, so they got approval assuming full funding. It was decided in late February to start work on STS-135. The other area was the 21<sup>st</sup> Century Program for which they have the plans, so everything is ready and can begin as soon as funding is made available. They need to get an exception to the limitation on how much can be transferred in and out of an account (10% out and 5% in). In sum, the 21<sup>st</sup> Century Program is getting off to a very slow start, but the Station is in good shape. The key impact for 2011 was STS-135 and the 21<sup>st</sup> Century; for FY2012 it will be the 21<sup>st</sup> Century and the Pension Fund.

## COMMERCIAL CREW PROGRAM (CCP)

### *Ed Mango, KSC*

The CCP goal is to facilitate development by late 2016 of commercial crew transport and rescue services that are safe, reliable, and cost effective to lower Earth orbit (LEO) and for the ISS. This will reduce reliance on foreign systems, and free NASA's resources for beyond LEO capabilities. To achieve this, NASA is using a nontraditional acquisition and partnering approach in which competition is fundamental. When complete, NASA will not own the rocket or the spacecraft, but will have rights to all data for the design, will be able to buy services for its crew, and will be the anchor tenant among other users. Commercial Crew Development (CCDev) 1 was formed to mature subsystems and capabilities, awarding \$50M to five companies. CCDev2 continues CCDev1, but with the companies driving the system. The four companies selected for CCDev2 are Blue Origin, Boeing, Sierra Nevada, and SpaceX.

The initial phase of CCDev2 has elicited design concepts. Certification is expected in 2014, demo flights between 2014 and 2015, and missions through 2020. NASA's efforts are focused on closing the gap and getting an American-made system. The mission is to launch four NASA astronauts to stay on ISS 180 days and bring people home; the vehicle must also be capable of rescue services to the station following this year's retirement of the space shuttle fleet. To achieve this, the flight crew must be involved from the beginning.

With a familiar organization structure, they are trying to function in a much leaner and more refined way. The supporting functions will be done by only about 50 people vs the hundreds in past programs. Meanwhile, Exploration Systems Mission Directorate (ESMD) and the Space Operations Mission Directorate (SOMD)—each bringing different functions to the table—will

combine later this year to become the Human Exploration and Operations Directorate. The 15-person Commercial Crew Program (CCP) deals the Commercial Crew and Cargo Program (C3PO), the ISS Program, and the Launch Services Program (LSP). ISS is key; flight analysis, using rockets already flying, comes through LSP. To get the desired standardized ISS docking system, they will give NASA's design to partners for them either to use or to build their own. Many of the engineers are the same ones helping partner teams, so there is cross-fertilization. All vehicles will be FAA-licensed, which involves daily collaboration between CCP and the Federal Aviation Administration (FAA) and exchange of employees to work through their regulations. Human spaceflight regulations should be ready after December 2012. The goal is for NASA to buy a ticket on a flight (like an airplane), so we need central controls.

CCP has several divisions. The Systems Engineering and Requirements office will consist of eight to ten people here in Florida and in Houston. Systems—composed of Launch Vehicle, Spacecraft, Launch & Recovery Systems, and Mission Planning & Integration—will have six to eight people each—rather than having each be a separate, large program. Systems owns the certification of hardware for each. Partner Integration is the heart of the organization and interfaces with the four contractor partners (Sierra Nevada, Boeing, SpaceX, Blue Origin). Both bring money to the table and plan. They are trying to drive industry to the point where NASA can buy a service on a system; NASA does not want to own the system. The partners own their hardware and their design, and the partners constitute the vast majority of the structure (i.e., some 200 engineers, health and safety, and supporting crew); the program portion has only about 20 people. Program Control and Integration (PCI) is all budget, documentation, and program integration. CCP Program Boards (PCB) and CCP Technical Review Board (TRB) have been established to create a lean and more agile system to get requirements moved through to approval. These boards' meetings are the only meetings partners are required to attend. TRB is a technical board chaired by Systems Engineering and Requirements; PCB handles budget and milestones.

CCP is trying to combine all commercial crew requirements found in seven documents into the 1100 series at a level-2; then the contractor takes them to level 3, 4, 5, and 6. CCT-PLN-1120 and CCT-STD-1140 are a departure from NASA's past requirements in giving the rationale, e.g., for a launch abort or effectiveness, rather than exact instructions. CCT-REQ-1130 discusses verification that NASA thinks proper (i.e., "this is what we're thinking"); then the partner brings in his own plans for how to do it and we discuss it and make a recommendation. Part of the issue is the numerous standards NASA imposes on contractors, some of which conflict with each other. A tailoring process is needed. The contractor brings plans to "meet the intent of." CCT-STD-1140 gives the key nuggets that are important within that standard, the things to focus on. It is the most radical of the requirement documents because it forces engineers to pick out the most important parts of the standard. CCT-STD-1150 lists expectations for minimum criteria and practices for operations. CCT-PLN-1120 summarizes technical management processes that support certification. The only design reference mission (DRM) we now have is ISS, but CCT-DRM-1110 is a place-holder for other potential DRM in LEO.

Blue Origin has a bi-conic design; the company functions differently from NASA. Boeing is the opposite and uses classical design approaches. Sierra Nevada is using HL20, which Langley subjected to reverse engineering. Because theirs is a winged vehicle, it is more complicated to

fly, so they have to work through avionics integration. SpaceX has the Falcon 9 launch vehicle and Dragon spacecraft. They need to focus on a launch abort system. They too think differently from NASA, but not as differently as Blue Origin.

### *Discussion*

- *Dr. Condon* observed that certification used to come about after the demo, and asked whether the demos will be manned or unmanned. *Mr. Mango* expects one or two of each.
- *Dr. Condon* asked whether a partner proposes how they plan to validate and verify capability, or whether the document specifies the means of validation. *Mr. Mango*: The partner determines his own means of validation.
- *Mr. Sieck*: NASA owns the mission and the crew/astronauts, and manages requirements for safety and certification of a commercial rocket, spacecraft, and launch pad. So the contractor owns those and all requirements associated with processing hardware and procedures associated with that; therefore NASA does not own the equivalent of SOMD and the interface control document (ICD). *Mr. Mango* agreed. Now NASA has to sign off on every revision. The big change here is ensuring that they achieve the top-level requirements rather than doing it themselves. It's seeing the common electrical interfaces (CEI) specifications vs approving the CEI specifications.
- *Col. Collins*: Crew training will be crucial. *Mr. Mango*: One of the constructs is taxi vs rental car. Which model depends on the contractor. NASA's mission is to work on ISS and the model is slowly evolving. All vehicle models have six or seven seats. Some contractors say NASA will fly it; some that NASA will dock it, etc. The primary mission is to bring astronauts up and back, a total of about a week. Some companies are considering one or two commercial people in the extra seats. But, this brings in accountability and liability.
- *Ms. Morgan*: The ISS program has to be coordinated. *Mr. Mango*: The taxi mode would present an extra crew member for four or five days—who will support him or her and bring and pay for clothes and food?
- In response to *Col. Collins*, *Mr. Mango* said all but Blue Origin propose to meet the requirements NASA gives them. They may complain privately, but publicly they say they are here to meet NASA's requirements. Last week some requirements were posted on the Web, and another series will be posted next week. In addition, a public workshop will be held at the end of May to explain reasoning on requirements.
- In response to *Dr. Condon*, *Mr. Mango* explained that the last proposed awards were not ratio-based on technical aspects, but on what the company asked for. Blue Origin differs from the other three companies in that their leader proposes to get to System Requirements Review (SRR) stage [a portion of this sentence was redacted due to proprietary commercial concerns].
- *Mr. Mango* assured *Col. Collins* that the companies have to perform in order to get paid.

- *Dr. Condon* asked for a projection downstream when development was finished and the systems proven. *Mr. Mango* thought the budget would dictate a single survivor although he would like more than one. All NASA needs today is one or two missions per year. Partners could involve other countries.
- *Col. Collins* liked keeping the organization small (although it may have to grow eventually) and she liked the open-mindedness, e.g., with Blue Origin. But, what about the working relationship between Kennedy and Johnson? *Mr. Mango* said people at KSC and JSC are working well together; they understand it. The hard part is getting Centers that are not used to this to not become too parochial. But, they must remain small; they cannot have 800 full-time employees. Pricing of seats will likely be high, but with more than one partner the price might decrease.

## **PROPOSED COMBINED C2/C3 MISSION ASSESSMENT**

### ***Kathryn Lueders, JSC [via telecon]***

SpaceX proposed combining its C2 and C3 missions. The impact is under discussion, and currently Commercial Crew and Cargo Program (C3PO) does not plan to modify the Space Act Agreement (SAA) to delete a flight. It will do that only if a combined mission would accomplish all objectives. It is important that we understand SpaceX design and jointly agree to a combined C2/C3 mission profile and objectives. Assessments are anchored to ISS integration payment milestones. Through May 30, they will have five more assessment and mitigation reviews, and NASA and SpaceX are identifying key technical areas for additional testing. SpaceX is dynamic and they can respond quickly, but their environment is different from NASA's. We have to understand where they are in design and make sure NASA is in sync. It challenges NASA to think about how to get the work done in a flexible way. C2 objectives, benefits, and current mitigation actions have been identified, as well as where no mitigation is available.

Meanwhile, NASA wants to find a way to do these things cheaper and bring down the overall cost of parts. SpaceX adds redundancy, so we have become comfortable with their overall architecture to meet safety requirements; they are now working on safety for critical factors. The strategy has started to pull together over the last two or three months, and is a good test case. January and April Joint Quarterly meetings have been convened. The profile combines C2 and C3 objectives with minimal changes to the original mission plans and objectives. SpaceX also provided a detailed consumables assessment showing positive margins.

The C2/C3 Combined Mission Profile Assessment Plan has been delineated. A combined mission would shorten the time available when the missions were separate, similar to the ATV and HTV strategy, which was used as a model. SpaceX provided the C1 post-flight review February 14, 2011, and the post-flight assessment of both the Dragon and launch vehicle performance during the flight. Overall the mission was very successful. They are continuing to track to the Combined Mission Assessment Plan and to key milestones tagged to the 75% ISS Integration Payment and Cargo Augmentation plan.

*Discussion*

- *Col. Collins:* This committee is here to help you speed up the process, and you have answered questions raised in previous meetings. She was impressed with the work they have done here.
- *Ms. Morgan* echoed her opinion. In the post-flight assessment, how many anomalies were there? *Michael Horkachuck* said [via telephone] that there were about 20 on the launch system, but many were very minor. A few were on the ground system. All the C1 anomalies were corrected and NASA is looking for trends in the data and will report later. *Ms. Lueders:* From the launch perspective, things worked out; from the Dragon perspective, they flagged their issues. We're working with them to see systems and understand their process, and they have done several reviews with us. It is important to ensure that continues and important that we see the data, understand what it is, and fix it before the next flight. SpaceX can make changes and fix things fairly quickly.
- *Col. Collins* asked whether the C2/C3 Mission Assessment had gotten help from the Crew Office. *Ms. Lueders* assured her that they have had Crew Office support and are getting ready to do this Friday (May 6). *Col. Collins* asked if the flights are combined, and they have a major anomaly, might it be necessary to add a flight? *Ms. Lueders:* The C3 would not be deleted until after a successful C2/C3 combined flight was completed.

## 21<sup>ST</sup> CENTURY GROUND SYSTEMS PROGRAM: PROGRAM PLANNING STATUS

### **Jennifer Kunz, KSC**

After the President's proposed his budget a year ago, the 21<sup>st</sup> Century Program partnered with Joyce Riquelme's office at Kennedy Spaceflight Center (KSC) and released a request for information (RFI), which received 17 replies from industry. They have now done one full planning, programming, budgeting, and execution (PPBE) assessment and five architecture reviews with updates. Their primary focus began as enabling commercial space flight, while not precluding Heavy Lift, and became (with Senate authorization), a Space Launch System (SLS) and enabling commercial space flight.

The 21<sup>st</sup> Century Ground Systems Program seeks to transform the Florida Launch and Range Complex and other NASA flight facilities by creating the spaceport of choice while aligning with the needs of civil, national security, and commercial enterprises and ultimately the international space community. Key concepts are: a common infrastructure, stakeholders offsetting vehicle costs, reducing operations and maintenance (O&M), and enabling multi-use capability. Dr. James Brown led a workshop to develop criteria to evaluate the program. Most important are realized savings and cost avoidance, and benefits to multiple customers. In addition, current technology would be injected, reducing obsolescence while addressing urgency and project risk and providing environmental improvements. The President's high-level vision gave the impetus for NASA to partner with the Air Force and the commercial industry. They are now try to understand what range modernization means to all parties. In the process, NASA is deriving requirements and has identified 308 projects. Using ARC 5.0 as the point of departure, they have inventoried vehicles.

The five product lines are: Florida Launch Modernization Infrastructure; Environmental Remediation and Technologies (for which they can do some R&D); Offline Manufacturing, Processing, and Recovery Systems; Range Interface and Control Services; and Mission-focused Modernization. While enabling commercial space, the primary focus of the Space Launch System (SLS) and the Multi-Purpose Crew Vehicle (MPCV; formerly known as the Orion Crew Exploration Vehicle) will be continuing development projects, reducing the facilities footprint, and creating opportunities for excess capabilities to be used by others. KSC Shuttle Launch Pads (39A/B) can be used to launch bigger, heavier vehicles. The flexible launch pad will accommodate commercial providers at least for early flights, reducing marginal costs, converting legacy equipment, and reducing requirements, assessing policy, and pursuing collaboration with the Air Force and other space industry partners. Infrastructure and repurposing it have generated considerable interest.

In summary, 21<sup>st</sup> Century has aggressively moved on implementation of the FY2011 President's budget request, establishing strong and continuing collaborations with DoD, industry, the State of Florida, and others. Cost savings and avoidance and benefits to multiple customers have been primary considerations. The NASA Authorization Act of 2010 changed the primary focus to SLS/MPCV: 21<sup>st</sup> Century is teaming with both to minimize associated ground costs and is continuing modernization planning to facilitate a multi-user architecture that could minimize O&M costs.

#### *Discussion*

- *Col. Collins* asked for clarification: Dr. James Brown worked for NASA as a consultant; he has advanced degrees in industrial and systems engineering. "AHP" is an analytical hierarchy prioritizing method.
- *Dr. Condon* asked whether long-range planning includes continuing modernization and upgrades as technology advances, and whether a budgeting item specifies modernization. *Ms. Kunz*: These issues have engendered much discussion and cannot be done when starting. They have an engineering partner on the team who has been trying to make sure the technology that has been developed is infused into the designs; that was made part of the second project call. In areas of frequent change, that is part of their objective and they have focused on those opportunities. Budgeting for modernization was their intention. It is part of the proof brought forward.
- *Dr. Condon* wondered how significantly the footprint has been reduced and whether that applies to government programs. *Ms. Kunz*: To accomplish today's goals, all KSC facilities could be demolished, except for three buildings. They are engaged in extensive modeling to do the same with less and be as robust as possible. The process does apply to government programs. They hope these investments will make these facilities much more efficient to operate. *Joyce Riquelme* noted that KSC has FY2012 funding to support the three buildings, but not the rest. The Ground Processing Directorate requested support four for the other buildings. *Ms. Kunz* added, they published a notice of availability for FY2013.

- *Mr. Sieck:* Enough funding is available for the 21<sup>st</sup> Century Launch Complex. But, once the 2012 budget is approved and they get new money and can start new initiatives, what does that do to the proposed facilities map? *Ms. Kunz:* What is marked on the map is funded and needed to accomplish the 21<sup>st</sup> Century non-SLS work. But, we have O&M funding only for facilities we are using for active development. Otherwise our investment budget is for modernization, not O&M. The remaining buildings are available for commercial or other partners. She thinks that by synthesizing and prioritizing the projects, they will require only the buildings marked.
- *Mr. Sieck* was concerned about the milestones in the next fiscal year. How will another continuing resolution affect these goals? *Ms. Kunz* admitted that it would be a hindrance. They have been able to do much because a number of programs have been legally determined to be continuations and not new starts. Now they have designs and are in a posture to proceed as soon as money becomes available.
- *Col. Collins* asked whether there is a specific objective to decrease the time between vehicles on Air Force range interface. *Ms. Kunz:* In FY2011, there is a project to consider architecture of the range. Part of the issue is how responsive they want the systems to be. It is not a high priority because they have many other ways to deal with it, but they are trying to understand it because customers bring it up. It could be made a requirement for capacity with multiple partners.

## **KSC FACILITY PLANNING IN SUPPORT OF COMMERCIAL CREW AND CARGO PROVIDERS AND OTHER FUTURE USERS**

### ***Joyce Riquelme, KSC***

The Center Planning and Development Office (CPDO) was formed in 2008: to plan a flexible framework for spaceport development; to develop and manage Center agreements for non-programmatic, commercial, and other government partnerships; to increase economic diversity of the Center; to provide consistent, integrated processes for partnerships; and to make the most effective use of KSC's underutilized capacity. Immediately after the decision to retire the Shuttle (2005), this office sought ways (via RFI) the buildings could be repurposed. They have assessed commercial vertical launch capability and identified KSC as a multi-purpose facility. To find out the commercial space view of how KSC could be repurposed, they held a workshop in March 2010 to highlight KSC capabilities and invited input. They recently received the first RFI for use of LC-39 launch capabilities.

To achieve a high degree of industry and public awareness, NASA issued a Facility Notice of Availability (NOA), indicating NASA's intent and providing the widest possible notice of the some 20 available facilities. In addition to real estate, they included non-real property assets such as mobile launch platforms and mobile launchers. They received 30 responses in four categories: qualified for priority consideration; technically, operationally compatible; not compatible; and did not meet NOA purpose or scope. Most targeted particular facilities; seven were interested in the Orbiter Processing Facility High Bay 3 (OPF3); three in Processing Control Center (PCC); and one in the Space Shuttle Main Engine Processing Facility (SSMEF). Responses ranged from commercial entities wanting to operate the facility for the government or a commercial customer,

to wanting to share the use of the facility, to wanting to own and operate the facility to develop a product.

KSC is in the process of updating its Master Plan (held in Ms. Riquelme's office) for KSC facilities and equipment. Architecture investments will do a lot, but then it comes to a question of how facilities are to be repurposed, and how involved NASA gets with industry. Commercial industry could provide a product, share a capability, or provide a service. Office of Management and Budget (OMB) concerns also aim at reducing facilities. The exploration part would be an enhanced use lease (with which NASA has experience), but other variations are possible, e.g., working with the Government Services Administration (GSA) to allow them to abandon a facility and turn it over to the state while they retain a use lease to the land.

### *Discussion*

- *Dr. Condon:* Industry participants are predominately from the US, but what about international interest in partnering in technology? In addition to facilities outside the gate, *Ms. Riquelme* referred to areas inside the gate, e.g., Exploration Park, in which they hope to have first facility in 18 months, to facilitate international collaboration. And, some are for non-space applications.
- *Dr. Condon* noted that the F-104 Star-Fighters used for spaceflight training for tourism clients.
- *Col. Collins* concluded that good progress has been made. It is a new way of thinking for the government, but usual for the business world.
- *Ms. Morgan* added the historical perspective: KSC never had authorization from Washington to open.

## **DISCUSSION & RECOMMENDATION PREPARATION**

The committee agreed to have a telecon at the end of June, and to meet Tuesday, August 2, before the August NAC meeting at Ames. The committee agreed to take one finding and one recommendation to the full NASA Advisory Council for consideration:

### **Finding Title:**

–Human Spaceflight Mission Beyond Low Earth Orbit

### **Space Operations Committee Finding:**

–We are impressed with the way Program and Center officials are dealing with the current budget environment; however, the lack of a well-defined human spaceflight mission beyond low Earth orbit appears to be creating inefficiencies in the way that limited budget dollars are being spent.

–We believe that a focused mission with a specific end objective, as has been the case for over 50 years, would also greatly benefit the NASA workforce, current and future domestic and international partners, and the general public.

### **Short Title of the Proposed Recommendation:**

–Communication Strategy on NASA Websites

### **Short Description of the Proposed Recommendation:**

–NASA websites convey mixed and inconsistent messages about the future direction of human

exploration programs. The website needs to be reviewed and changed to ensure that the messages about the future direction of human exploration are consistent.

**Major Reasons for Proposing the Recommendation:**

–Committee members noted that it is difficult to determine the current course of human spaceflight programs via nasa.gov, as there are readily accessible pages dedicated to outdated and canceled human spaceflight programs.

**Consequences of No Action on the Proposed Recommendation:**

–Continuing confusion among both the NASA workforce and the general public on the state and direction of NASA’s human spaceflight programs.

**ADJOURNMENT**

Mr. Keaton adjourned the meeting at 2:05 PM.

## AGENDA

### NASA Advisory Council

May 3, 2011

Kennedy Space Center

<b>Space Operations Committee Members</b>	<ul style="list-style-type: none"><li>• Chair: Col. Eileen Collins</li><li>• Vice-chair: Dr. Pat Condon</li><li>• Dr. Leroy Chiao</li><li>• Dr. John Grunsfeld</li><li>• Mr. Tommy Holloway</li><li>• Ms. JoAnn Morgan</li><li>• Mr. Bob Sieck</li></ul>
<b>Executive Secretary</b>	<ul style="list-style-type: none"><li>• Mr. Jacob Keaton</li></ul>

**TUESDAY, May 3, 2011 - Doubletree Hotel, Cocoa Beach, FL**

- 7:45 – 8:00** Arrive/Convene Meeting – Saturn/Vanguard Room
- 8:00 – 9:00** **SOMD FY2012 Budget**  
- Toni Mumford/SOMD (via telecon)
- 9:00 – 10:00** **CCDev Status**  
- Ed Mango/KSC
- 10:00 – 10:15** **Break**
- 10:15 – 10:45** **SpaceX Flight Combination Status Update**  
- Kathy Lueders/JSC (via telecon)
- 10:45 – 11:45** **21<sup>st</sup> Century Launch Complex**  
- Jennifer Kunz/KSC  
- VAB platforms, Heavy Lift, Business Office, Facilities for Commercial
- 11:45 – 12:15** **Lunch**
- 12:15 – 2:00** **Discussion / Recommendation Preparation**
- 2:00** **ADJOURN**