National Aeronautics and Space Administration
Commercial Space Committee
of the
NASA Advisory Council

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NASA Headquarters
Washington, DC

Meeting Minutes

Thomas W. Rathjen Executive Secretary Commercial Space Committee	Patti Grace Smith Chair Commercial Space Committee

Meeting report prepared by
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Proceedings

Members present

Ms. Patti Grace Smith, *Chair*
Gen. Donald G. Hard (via telecom)
Dr. Bernard A. Harris, Jr.
Mr. Lon Levin
Mr. Stephen S. Oswald
Ms. Franceska O. Schroeder (via telecom)
Mr. Wilbur C. Trafton (via telecom)
Mr. Thomas W. Rathjen, *Executive Secretary*
Ms. Shawanda Robinson, *Administrative Officer*

Call to Order and Opening Remarks

Mr. Thomas Rathjen, Executive Secretary of the NASA Advisory Committee (NAC) Commercial Space Committee (CSC), welcomed those present. He noted that the agenda provided time for public comments at the end of the day.

Ms. Patti Grace Smith, Chair of CSC, then welcomed the CSC members.

Status of NASA Plans for Commercialization

Ms. Lori Garver, NASA Deputy Administrator, spoke to the Committee about NASA management's thoughts in the area of commercialization of space.

Commercial space is an area of focus for the NASA Administrator, Charles Bolden, and for Ms. Garver personally. Commercialization is part of the Agency's effort to provide value for taxpayers, because it supports NASA's goal of focusing on what is uniquely governmental and sharing the costs of other activities with the commercial sector. She and Administrator Bolden want CSC's input in this area.

They are also concerned about process. It is critical for the private sector to have NASA guidance, and it may be necessary to adjust NASA's structure in order to better provide such guidance. Similarly, there is a need to communicate better with stakeholders and the public about what NASA is doing and why.

The policy basis for NASA's commercial space program comes from the Agency's founding documentation, in which NASA is charged with seeking and encouraging the fullest commercial use of space, including government use of commercial capabilities. More recently, the Agency has been charged to support a commercial space sector, to seek private sector partnerships to transport cargo and crew, and to purchase and use commercial capabilities to the extent possible while refraining from competition with the private sector. Ms. Garver sees the recent election results as confirming NASA's ongoing implementation efforts in the area of commercial cargo and crew. However, on a

percentage basis, the commercial space program has received the deepest cuts of NASA's programs (relative to the President's budget requests).

Use of the International Space Station (ISS) is a cornerstone of the U.S. space program, and the ability to travel there with commercial capabilities is critical. NASA also wants the private sector involved in moving beyond low-Earth orbit (LEO). Reducing the costs of space flight through commercial efforts will serve both Human Exploration and Operations (HEO) and science, as transportation accounts for one-third or more of the cost of those missions. The United States must also recover its lead in the commercial market for launches, which is crucial for an innovation economy.

NASA's Human Exploration and Operations Mission Directorate (HEOMD) has made some interesting commercial arrangements for the ISS, and Ms. Garver wanted to bring more opportunities forward, providing incentives for more experimentation on ISS. Organizations like B612 and Planetary Resources are helping to further non-governmental capabilities as well. In science, NASA hopes to have more commercial involvement in such areas as hosted payloads. Ms. Garver gave an example of a high-priority Earth Sciences Division (ESD) project that will launch much sooner due to commercial involvement.

Aeronautics has the tightest bond with the private sector, and that is another area where CSC members could be of assistance. NASA would like the Committee's advice on setting consistent criteria for purchasing and pricing as well. Intellectual property is yet another area in which Ms. Garver saw room for innovation and change, so that NASA and the private sector can work through these negotiations more quickly and consistently. Another issue is how best to structure NASA to support commercial space activities.

Finally, there is the question of how best to communicate to stakeholders and the public about the benefits that commercialization of space can bring. NASA would like to do better in this area in order to garner more support. It is not productive to have misinformation floating around. The public needs to know that NASA's commercial programs allow the Agency to return the best value to taxpayers while also contributing to innovation. With the retirement of the Space Shuttle, many people think the space program is over. NASA needs to communicate that America's space program is moving forward, and not keep repeating what the Agency has done. To accomplish this, NASA needs CSC's advice.

Discussion

Ms. Grace Smith pointed out that NASA lacks some skill sets and cannot seem to hire people with the needed business skills. The Agency must also communicate business perspectives to the existing workforce. It is not clear where or why the communication is ineffective. Congress sees NASA as only concerned about the budget, so other messages are not getting to that critical audience.

Ms. Garver explained that NASA was not allowed to let workers go after the Shuttle program ended. It is important that the Agency's employees work on those efforts that are unique to NASA. Yet there are budget cuts in the commercial crew and technology areas.

Some reassigned employees find themselves managing contracts, which makes the private sector more attractive to them.

There was concern that NASA is using career civil servants to do business work for which they do not have the skills. Ms. Grace Smith said that some newer companies bring to NASA a different ways of doing things, and that NASA should have a greater appetite to capture these innovations beyond just retraining people in those areas. Ms. Garver agreed and said that she would take that to the Administrator. NASA needs to acknowledge where its shortcomings are. NASA has restrictions on how it can implement Reductions in Force (RIFs). There is a constant tension in terms of projects and personnel placement. She is concerned about overburdening commercial programs and is watching to see that it does not happen. This is all under HEOMD now. Mr. Stephen Oswald noted that similar transitions have shown that this redirecting of personnel can reduce an organization's flexibility to hire the right people.

Dr. Bernard Harris observed that people seemed rather surprised when Curiosity Rover landed on Mars over the summer, because they had not realized that NASA was still active. He would like to see data showing that the Agency is going in the right direction with its commercial space program. That would help craft a better message. Ms. Garver said that she has tried a number of different approaches with Congress. NASA has a $17.7 billion budget. All other worldwide space budgets together come to 75 percent of that. However, NASA also has a status quo, and along with that are people who are upset because they do not like change. There is an Education and Public Outreach (EPO) Advisory Committee that CSC might work with on this, along with an excellent NASA communications office.

The Agency knew that the Space Shuttle retirement would be an issue. People think of the Shuttle as being NASA. This makes the publicity from the successes of the SpaceX Dragon and Curiosity Rover that much more important. Some people within the media do not really understand NASA's current activities and therefore do not explain them well, if at all. However, especially compared to other Federal agencies, NASA communicates well. The Agency often makes the news, and employee job satisfaction is amazing. The challenge is to use communications to generate even more excitement among the public.

Regarding the budget and NASA's restrictions on reducing the civilian workforce, Ms. Garver explained that the President requested increased funds. Where there might be cuts, the number of contractors will be reduced. The civil service workforce will remain, along with NASA's infrastructure. Delays to programs actually increase long-term costs, which is another reason for greater private sector involvement.

Mr. Lon Levin observed that while a success in one area of NASA might translate to success in other areas, it never seems to be understood that way. Ms. Garver said that the Agency has established a détente of balance among science, HEO, and aerospace, which has remained quite consistent through NASA's history. This is hard to do, given the existing constituencies. Science remains at about 30 percent of the budget, and within that there is balance among various disciplines, for example. Shifting the balance is difficult but possible. Not only are there established communities built up around what NASA does,

there are also around 18,000 Federal employees and 40,000 private sector employees involved. There is not another market for many them. Taking those communities down would have repercussions. Balance is not a bad thing, but the Agency wants to pursue the activities of higher value within the balance. That is what excites her about Planetary Resources and the Google Lunar venture, the latter of which has re-energized the lunar community.

Ms. Garver suggested that the CSC look at the area of satellite servicing. NASA has funding and the needed expertise for this area, and hopes to advance it further. Another area in which she would like to see greater commercial involvement is hosted payloads, especially in the area of earth science. ISS utilization is also ripe for commercial involvement in light of the newly established capability of the private sector to travel to and from the Station. Finally, weather is part of the National Oceanic and Atmospheric Administration's (NOAA's) responsibility, but it may be possible to do some of this in the private sector for less.

Overview of NASA's Facility Utilization and Disposition Planning

Mr. Calvin Williams, Acting Director, Technical Capabilities and Real Property Management Division, NASA Mission Support Directorate, discussed the Division's management of real property assets and how the Agency makes those assets available for commercial use.

Within NASA's strategic plan are two goals of particular importance in this area:

- Ensure that vital assets are ready, available, and appropriately sized to conduct NASA's missions; and
- Ensure the availability to the Nation of NASA-owned strategically important test capabilities.

The authorities for this activity come from the Space Act, Enhanced Use Leasing Authority, and the Commercial Space Launch Act. The Division has looked at various assets and facilities over the last year in an effort to identify assets the NASA centers could offer to the private sector. A study on how to best make assets available to the commercial side will be available in March of 2013.

In answer to a question, Mr. Williams explained that NASA is leasing out parts of the Ames Research Center (ARC) facility. Both the Army and Air Force have a presence there alongside NASA, and they are working with the General Services Administration (GSA) on the leasing of Moffett Field. NASA is also studying possibilities at the Johnsons Space Center (JSC). Some air fields are considered excess, but some centers are bringing in commercial entities to use them.

Most NASA assets are very technical. Master planning is used to look at centers in depth and identify areas for commercialization. Some of the centers are opening development offices. NASA is also thinking of the long term in regard to what capabilities belong with the

Agency and which belong in the commercial sector. During master planning, new arrangements can occur; it is a living document that projects where the Agency wants to go.

Part of the disposition process is determining which assets NASA does not need now but might need in the future. In these cases, the Agency examines its options for another entity to use the assets now. The agreements for leases take various forms, but Space Act Agreements (SAAs) account for about half of the total. Kennedy Space Center (KSC) has advertised its assets to the commercial sector, and also turned over a facility to the state.

The Technical Capabilities and Real Property Management Division conducts the following tasks in order to enable commercial space activities:

- Maximizes use of Agency funding for mission-related work;
- Attracts commercial entities to NASA centers to utilize multi-use infrastructure and shares costs;
- Reduces NASA's cost for maintaining and operating under-utilized assets;
- Reduces NASA's assets without diminishing NASA's assets; and,
- Maintains infrastructure for future use.

Mr. Williams presented a case study in which KSC sought and promoted commercial engagement. As part of this effort, the center held industry workshops and issued a Request for Information (RFI) that generated 17 responses from private organizations. KSC also sent out a Notice of Available Assets (NOA), which resulted in competition for some of the facilities. The price of the facilities is determined locally, based on an evaluation of costs in the area. The agreements go to NASA headquarters for review. This is not a standard competition, and there are other, alternative options and mechanisms for using NASA facilities. NASA received responses for almost all of the facilities listed, and each real property asset had more than one offer. Noteworthy success stories at KSC include the Space Life Sciences Laboratory, Operations and Checkout Building Renovation, Florida Power and Light Solar Energy Site, Starfighters Inc., and SpaceX.

Discussion

Mr. Williams confirmed that Launch Complex 40 was an asset. Although it is on the Air Force side of Moffett Field, NASA built it. Mr. Rathjen noted that CSC had previously found that KSC is an excellent model, and asked if the Agency is trying share its lessons learned with other centers. Mr. Williams said that the other centers already know about it and are visiting KSC in order to learn more.

Mr. Levin asked how NASA corrects situations in which an asset transfer becomes problematic. He also wanted to know how long the adjustment takes. Mr. Williams replied that his Division has identified some bottlenecks. One involves transferring equipment, which falls under different regulations from facilities transfers. The ongoing commercial study is examining that as part of the effort to identify roadblocks and determine what authorities the Division needs.

Deliberate Findings and Recommendations

Workforce skills recommendation

Ms. Grace Smith said that the NASA Administrator had responded to workforce skills recommendation that CSC sent forward at the last NAC meeting. She spoke to the NAC Chair, Dr. Steven Squyres, about the response, and he supported the idea of requesting a further, more explicit response. Mr. Oswald agreed that the Administrator's response lacked sufficient detail to give a sense of the magnitude of the challenge or the tools that NASA has. It was very general.

Dr. Harris said it seemed that CSC's comment that NASA lacks depth in some areas was rejected. He wondered how a technical organization can make the transition toward commercial space without bringing in appropriate business expertise. The response was generic, with no details on how NASA will address the specific workforce issues identified. He would like to see a plan that notes the current workforce, states what NASA might need beyond that, and commits to seeking outside help if needed. Mr. Wilbur Trafton added that CSC members have all heard that some of the commercial activities regarding SAAs are being delayed because NASA lacks personnel with the necessary skills. He therefore completely disagreed with the Administrator's first sentence, which stated the opposite.

It was noted that NASA does not have enough patent attorneys to manage the SAAs alone. Mr. Oswald wanted to know how many civil servants were working on the Space Shuttle and what those workers are doing now. It is important to get an idea of what the current workforce looks like. There should have been a personnel transition plan. It may be easy to train younger people for other work, but he was concerned about those who had spent 15 or more years working on the Space Shuttle.

Mr. Levin suggested that NASA may lack the skills to continue transforming past the initial effort. He read the Administrator's statement as meaning that NASA does have the skills to transition to commercial space work, but that there will be retraining because the Shuttle personnel are still transitioning into new areas. Ms. Grace Smith thought that was plausible. However, she also saw evidence that NASA does not have the skill mix it needs to move into this new world. Mr. Levin said that he had heard that some NASA personnel said they lacked the authority to evaluate business plans, in which case he wondered why they would get the skills to do so in the first place. There was inconsistency present.

Ms. Grace Smith thought that NASA should have a sense of what is in the business plans. Congress has also mentioned this as an issue. The Federal government is changing. For example, the Federal Aviation Administration (FAA) is now hiring economists, which is new. Mr. Oswald said that the transition presents an opportunity that will last only 2 or 3 years. It would be a good idea to retrain former Shuttle workers in order to augment their former skills. They need to be able to add value. General Hard added that NASA must be able to gauge the business process with evaluators who understand it. This is complicated by members of Congress insisting that NASA not drop jobs in their districts.

Ms. Grace Smith said that she and Mr. Rathjen would develop a response on the sense of the Committee, stating the following:

- CSC wants more information on the transition plan;
- The recommendation is based on what CSC members have heard and what they know of business;
- CSC does not believe that NASA personnel have all of the necessary skill sets;
- The consequence of no action is that NASA will continue to lag, with the commercial program failing to move forward as efficiently as it could; and
- CSC therefore wants further consideration of its recommendation.

She added that Dr. Squyres will take the recommendation for reconsideration to the full NAC to see if they will send it forward as a NAC recommendation.

Acceptance of commercial approaches finding
Mr. Rathjen suggested the Committee next look at Mr. Trafton's finding that CSC has found greater acceptance of commercial approaches across NASA. Mr. Trafton said that the question remains how best to identify metrics and other ways of measuring NASA's commercial approaches. He thought it was CSC's place to say this to the Agency, and believed the Administrator should know how they felt about the commercialization efforts. Mr. Rathjen added that the Administrator sought something like this statement when he asked them to talk to all 10 centers. It was agreed to edit the finding further, replacing a quote on management sentiments about commercialization with a summarizing sentence, and shortening a sentence on metrics.

Mr. Levin thought it was a good idea to present a positive finding about the centers trending in the right direction. He noted that some at NASA embrace commercialization, while others support it because they must. He wondered about the finding's focus on former astronauts, and pointed out that some aerospace companies are challenging commercialization along with some high-profile NASA personnel. Ms. Grace Smith observed that the former astronauts have an impact with Congress and have been very vocal. Dr. Harris, who is a former astronaut, stated that the former astronauts in question did not speak for him or Mr. Oswald, another former astronaut. He thought the finding should make the point that former astronauts are not all of one mind on this issue. Dr. Harris also wanted the finding to make a statement about the lobbying against commercialization. Mr. Oswald added that people come to NASA to work on big projects, not supervise contractors. Mr. Rathjen said that he would incorporate those comments.

Improve SAA process recommendation
Ms. Franceska Schroeder and Mr. Levin proposed a recommendation on improving the SAA process from a business perspective. Dr. Harris advised editing it to make a positive statement suggesting that NASA improve the process to encourage the private sector to work with the Agency. Mr. Levin thought the issue required more reflection. He and Ms. Schroeder were still not certain whether they were observing or recommending. They wanted to identify the problems they saw, which led to the negative tone. He wanted to revise it as a result of what they had heard in the meeting, mentioning a point person and

giving centers timelines. The revision would focus on the centers that implement the process in the right way and are still dissatisfied. Ms. Grace Smith suggested that a revision be brought to the next CSC meeting. She suggested advising NASA to consider having a single point of contact at each center, who would work with a single point of contact at headquarters. It was also suggested that NASA consider increased use of Cooperative Research and Development Agreements (CRADAs), which should be available along with SAAs. Mr. Levin and Ms. Schroeder have the action to work on the revision before the next meeting.

Other findings and recommendations
Mr. Oswald wondered about the status of inter-governmental test stands and other elements like vacuum chambers. Mr. Levin said that there is a notion that the centers have some reluctance to discuss the available facilities, because they are concerned that if they talk about them, they will be taken away. This creates tension among some of them. Mr. Rathjen pointed out that this was taken to NAC a few months previously, where it was agreed to be a legitimate finding. The NAC tabled it for later because the members thought it was a broader issue than just commercial space. Mr. Levin suggested that Ms. Grace Smith take it to NAC again, as the problem is stifling the use of facilities. Ms. Grace Smith said that part of the point she made to NAC was that there are inconsistencies across the centers, which speaks to the need to align them. She said that she would remind NAC of this issue.

Mr. Levin agreed to add a piece about NASA having an internal advocate for commercial ventures to contact to the Space Act Agreement draft recommendation. Ms. Grace Smith brought up the issue of the centers being "stove-piped," and noted that this is typical of government operations. In discussion, it was noted that the centers perceive themselves as powerful and independent, but they are also changing in the direction of commercialization. To achieve consistency among them, it might be a good idea to present best practices to them. It is important that lessons learned, like those at KSC, are translated to other centers. A dialogue among center directors is therefore necessary. They need to learn from each other and reduce the barriers, and while they are sharing information, it is not clear how that has been institutionalized. Headquarters could make sure this occurs fully rather than episodically. Mr. Rathjen will add this to the list of potential findings.

Public Comments

Mr. Rathjen asked for comments from the public. There were no comments from those in the room or those participating via WebEx.

Closing Remarks

Ms. Grace Smith observed that CSC had had a very productive year. The Committee met the Administrator's request to visit the centers. She appreciated all of the open responses from the center management, and their willingness to entertain CSC's questions. She thanked the Committee members and NASA staff for their hard work and support. While the slow

process of commercialization has been frustrating at times, the incremental steady changes constitute progress.

Adjourn

The meeting was adjourned at 3:53 p.m.

Appendix A, Attendees

Committee Members

Ms. Patti Grace Smith, Chair
Gen. Donald G. Hard (via telecom)
Dr. Bernard A. Harris, Jr.
Mr. Lon Levin
Mr. Stephen S. Oswald
Ms. Franceska O. Schroeder (via telecom)
Mr. Wilbur C. Trafton (via telecom)
Mr. Thomas W. Rathjen, Executive Secretary
Ms. Shawanda Robinson, Administrative Officer

NASA Attendees

Devin Bryant, NASA Headquarters
Courtney Graham, NASA Headquarters
Phillip McAlister, NASA Headquarters
Trent Perotto, NASA Headquarters

Non-NASA Attendees

S. Bednarek, SpaceX
John Limpers, Aerojet
C. Schenewertz, SpaceX
Elizabeth Sheley, Zantech

WebEx

Michael Braukus
Paul Campbell
A. C. Charina
Stephen Clark
Nicholas Cummings
James Dean
Eric Goode
Don Hard
Shari Kamm
Irene Klotz
Ted Kronmiller
Dan Leone
Lisa Manrique

James Miller
Katherine Nelson
Trent Perrotto
Richard Rogers
Jillian Sandler
Lauren Worley

Appendix B, Meeting Agenda

1:00p.m.	Call to Order and Opening Remarks
1:00	Status of NASA Plans for Commercialization
1:45	Overview of NASA's Facility Utilization and Disposition Planning
2:30	Break
2:40	Deliberate Findings and Recommendations
3:50	Public Comments
3:55	Closing Remarks
4:00	Adjourn

Appendix C, Committee Membership

Ms. Patti Grace Smith, Chair
Patti Grace Smith Consulting

Mr. Thomas W. Rathjen, Executive Secretary
NASA Headquarters

Major General Donald Hard
U.S. Air Force (retired), independent consultant

Dr. Bernard Harris
CEO, Vasalius Ventures

Mr. Lon Levin
Co-founder, XM Satellite Radio and other satellite businesses

Mr. Stephen S. Oswald
Founder and President, Syzygy Enterprises, LLC

Ms. Franceska O. Schroeder
Principal Attorney, Fish & Richardson

Mr. Wilbur C. Trafton
President, Will Trafton and Associates