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Federal Aviation Administration

Commercial Space Transportation Advisory Committee
COMSTAC
May 19, 2010
Meeting Minutes

COMSTAC Chairman Will Trafton convened the Commercial Space Transportation Advisory Committee (COMSTAC) meeting at 8:31 a.m. The meeting was held at the National Housing Center Auditorium, 1201 15th Street, N.W., Washington, D.C.

Mr. Trafton announced that any votes taken by the Committee would be carried by a simple majority.

He introduced those sitting at the head table, Dr. George C. Nield, FAA Associate Administrator for Commercial Space Transportation and James Van Laak, FAA Deputy Associate Administrator for Commercial Space Transportation, from the Office of Commercial Space Transportation (AST). He also introduced COMSTAC Deputy Chair Chris Kunstadter, senior vice president, XL Insurance. He then asked each member to introduce themselves.

Mr. Trafton stated that recent events have made COMSTAC's role in the commercial space transportation industry more important than ever before. He then read the COMSTAC purpose from the bylaws. This committee "provides information, advice and recommendations to the FAA administrator on all matters relating to U.S. commercial space transportation industry activities. The committee undertakes information-gathering, as necessary to define issues for consideration by the committee; develops positions on those issues; and presents the committee's position to the Administrator. The committee evaluates economic, technological, and institutional developments related to commercial space transportation, and sends to the Administrator recommendations on promising new ideas and approaches for federal policies and programs. The committee serves as a forum for the discussion of problems involving the relationship between industry activities and federal government requirements." Mr. Trafton stated that this is the reason why COMSTAC is here. He encouraged members of the public to participate, stating that the Committee gains strength, information, and effectiveness by listening to the public and hearing their opinions.

Mr. Trafton continued to note that COMSTAC and AST for years were the only real advocates for commercial space transportation in the government. Working groups are where the real work gets done. If members of the public want to get into the middle of an issue, attend a working group meeting. These occur the day before the full Committee meeting. There the public can have a say and be a part of the solution.

Mr. Trafton noted Neil Armstrong's testimony on what the President has proposed and where people think commercial space transportation should be headed. Mr. Trafton advocated moving forward in a measured way to ensure the safety and reliability of vehicles, to ensure the public safety, and to get the commercial space industry moving forward. He expressed the need for NASA's experience and expertise to move crew and cargo safely back and forth to the International Space Station and the need to look hard at the business case for commercial space. Commercial space has been around a long time, but it's been a long time since anybody looked at how money is made in the commercial space industry. The companies that want to get into commercial space transportation need to be supported to make sure that they do it efficiently, effectively, safely, and profitably.

Mr. Trafton expressed his pleasure with the new venue for the COMSTAC meeting and concluded his opening remarks. He then introduced Dr. George Nield, Associate Administrator for Commercial Space Transportation.

Remarks by Dr. Nield

Dr. Nield highlighted events in commercial space that have occurred since the October 2009 COMSTAC meeting. With the launch in November of an Atlas V to carry an Intelsat spacecraft into orbit and in March of a Delta IV to place the GOES-P weather satellite into orbit, there have now been 201 FAA licensed launches. These have occurred without loss of life, serious injury, or major property damage.

Dr. Nield acknowledged NASA and the X Prize Foundation awarding Masten Space Systems the $1,000,000 prize for capturing first place in the Lunar Lander Challenge competition. Armadillo Aerospace received $500,000 for second place. He also noted the December 7 official rollout ceremony for SpaceShipTwo in California. SpaceShipTwo has since flown two captive flights under the WhiteKnightTwo carrier aircraft.

Dr. Nield called attention to a number of other developments in commercial space transportation.

- In December, Congress approved a three-year extension of the indemnification provision of the liability risk-sharing regime.
- AST has made significant progress on its new Center of Excellence for Commercial Space Transportation. Public meetings took place in February and the final solicitation was issued in March. AST hopes to make a selection by early June.
- Spaceport grants make up another new development. Congress appropriated $500,000 for a commercial space transportation grant program for FY 2010. The program was announced in the Federal Register on May 4. Grant applications are due July 6.

Dr. Nield praised the role NASA has played in space exploration. He noted that the FAA and NASA are tied together in a continuing partnership. Some of the FAA’s activities, though, are completely separate from NASA. As commercial entrepreneurs broaden

access to space for private citizens and for scientific research for business-related purposes, the FAA will be involved in regulating these activities.

Looking to the future, Dr. Nield explored two ideas for encouraging and improving commercial space.

- Idea No. 1. OMB sent out a memorandum on March 8 noting that the administration now has a policy to use prizes and contests to increase innovation and accomplishment of agency missions. Could there be a prize for launching small satellites into orbit quickly and inexpensively?
- Idea No. 2. There is a concern over the lack of emphasis on STEM education in our schools. With the advent of suborbital space tourism, a program for teachers might be instituted. It would involve classroom training, altitude chamber runs, simulator experience, parabolic aircraft flights and eventually a flight on a suborbital reusable launch vehicle. At $200,000 a seat, a $10 million program would enable 50 teachers, one from each state, to participate. Their students could be inspired by their teachers' experiences.

Dr. Nield noted that he has been appointed to NASA's Aerospace Safety Advisory Panel. This represents a practical example of the value of interagency partnerships and professional communications as the nation's space agenda unfolds.

Dr. Nield pointed out to COMSTAC members that the questions they ask, the judgments they make, the experience they bring, the work they do, and the vision they offer are under greater scrutiny than ever before. He went on to state that these are the same assets that are more valued and necessary than ever before. He thanked COMSTAC members for their service and asked for their continued help.

Dr. Nield then introduced the keynote speaker, NASA Administrator, Charlie Bolden.

Remarks by NASA Administrator Bolden

Mr. Bolden announced that he did not have a speech. Rather, he would make some remarks and then ask for questions. His remarks included these points.

1. All space flight is hazardous. Just because it's commercial doesn't mean it's more safe or more risky.

2. Commercial – means a different acquisition strategy.

3. NASA's approach. Begins with budget. Wording states "NASA will develop a commercial space industry." This is not NASA's responsibility. NASA's responsibility is to effect, to facilitate, to make possible, to support, to advocate for in strongest means possible a thriving commercial space industry for this nation.
To do this we need changes in the laws with reference to export control and ITAR. Modify those export laws to make it possible for commercial entities in the United States to once again become competitive.

4. We have to strengthen our hand by beginning to look at what will truly make us competitive again.

5. Mr. Bolden asked if anyone knew why the ISS is in 57 degree inclination orbit. Frank Culbertson responded that the Russians are partners, and that's the inclination they launch to in order to avoid China. Why isn't a station put over the equator? Or in polar orbit? If the only available destination is a place where NASA has something, there is no business. In order to be commercial, there needs to be a commercial target - a destination in low earth orbit. There needs to be a partnership to develop a second orbital network of structures that act as a destination to make this commercial industry viable.

Q&A:

Mike Lounge and Frank Culbertson raised the question of business objectives and what aspects of commercial enterprise do we support.

Mr. Bolden responded that the space industry needs to get the cost down. He challenged the commercial launch industry to identify ways to contain costs. NASA is trying to facilitate commercial launches to low earth orbit. Beyond low earth orbit costs need to be reduced. He stated he would not back off technological development; therefore the part that must be reduced is the cost to launch.

Patti Grace Smith asked, as NASA relies more on commercial companies for services, how would Mr. Bolden approach the multiple requirements NASA has today – in terms of oversight and cost – when making that transfer?

Mr. Bolden stated that NASA has a significant effort underway called Oversight Insight. It calls for reducing the level of oversight. NASA has too many boards and panels on its many programs. As the commercial crew program comes into existence, NASA will use a more streamlined approach to oversight.

Ms. Smith asked what is the right work force.

Mr. Bolden responded that he can reduce the contractor work force. However, if he reduces the career professionals, what does he do for expertise?

Ms. Smith noted that some at NASA are not with the President's program. This is a problem for the agency and the country. Mr. Bolden stated that he is responsible for that. Further, he does not believe in solving problems by changing the work force. He should not have to remove leadership within NASA to do what needs to be done. Ms. Smith asked what happens when a major or a sergeant does not do what the general asks. Mr. Bolden emphasized that they "get kicked into shape," but he would not put them out of the service.

Dr. Nield noted that the FAA and NASA have complementary roles and responsibilities, though different missions. He asked if there are things the FAA can do to help NASA to do the thing it is trying to do in terms of the industry, the COMSTAC, and the FAA.

Definitely, Mr. Bolden stated. Dr. Nield is on the NASA Aerospace Safety Advisory Panel. He brings a different insight to this panel and a necessary insight. NASA is about to send out a request for information on its Oversight Insight plan. He hopes that COMSTAC members would come back with solid ideas. NASA needs input from this community. Is a Space Act Agreement what industry wants - where NASA gives out a set amount of money and no more?

Mr. Holder commented that the strongest commercial space activity is communications satellites. The newest area is human space flight. The challenge is that the business case is hard and the technology is difficult. It hasn't been done in the commercial sector before and therefore the definition of what is commercial is still developing. How can we take the expertise NASA has built over the years and the desired business objectives that industry has and meld them into something? He believes NASA is in a position to be a catalyst for success because it has the experience base.

Mr. Lounge noted that it is really hard to get everyone to agree on a goal. He thinks the goal is to turn over routine transportation from Earth to low earth orbit to private enterprise. NASA can then concentrate on the exciting things beyond. The struggle is that this must be done one step at a time, not in one big step.

Mr. Bolden agreed. People demand that NASA does everything right now and in one step. This would be incredibly tumultuous and could get somebody killed. It has to be incremental. It can't take ten years. NASA has to speed up the way it does things, but it does take time.

Ms. Aldrich noted that NASA has some wonderful budget resources for research. How will NASA tie this research to real programs so that the research is linked with things that are really going to happen?

Mr. Bolden stated that NASA will tap the colleges and universities, as well as industry. He asked how we can continue to partner with the Russians.

Mr. Reed noted that it has been 26 years since the Commercial Space Launch Act. He feels there is a need for some urgency to develop commercial space. Mr. Bolden agreed. People may say the moon is there and it's going to be there; Mars is there and it's still going to be there. Why does it need to be done today? If it isn't done today, then it won't get done. Mr. Reed continued that NASA has been slow to make the transition to purchase services. The procurement of service is part of the definition of what commercial industry is. Mr. Bolden agreed. NASA has already led the way - they have two cargo resupply contracts out. If there needs to be a sense of urgency, it needs to be on the part of industry to produce, as well. NASA needs commercial entities to deliver cargo to the space station and they need it now. NASA is trying to load all it can onto the space station because they realize that there are developmental problems with the commercial industry. Mr. Reed noted that industry has to set up and produce. But this is a partnership and industry will work with NASA. They do need the guarantee of business purchase. Mr. Bolden stated that he felt the

guarantee is there. NASA pays for services it receives. It pays every time a milestone is reached. If NASA is not paying enough, the urgency of getting to milestones may not be there. He stated a need for a sense of urgency on everyone's part.

Mr. Culbertson noted that international partners and the term "critical path" had been mentioned. It is important to remember that the teammates in an endeavor, whether they are international partners, commercial industry, DOD, or different centers at NASA, they are part of the critical path. This is a good thing - having these entities on the critical path creates an enabling path allowing things not possible before. There is also a commitment to live up to one's level of dependence on them. They are expected to be on the critical path. That can help keep programs going.

Mr. Bolden emphasized that by taking Aries I off the table, he had demonstrated to the commercial sector that he has faith in their ability to perform. NASA has to have faith in American industry to achieve. "All of you are on my critical path".

Mr. Hughes noted that Mr. Bolden had started by saying that he is talking about a change in acquisition rather than a change in commercial. Mr. Bolden also asked about Other Transaction Authority (OTA) contracts. Mr. Hughes stated there is much to argue for other transaction authority contracts. They are more amenable to a smaller, more flexible company. In the OTA setting, OTA proposals can be developed in a shorter time period. With the emphasis on getting to the space station with crew carriage as rapidly as possible, time is of the essence on these contracts. The idea of what constitutes commercial should turn on the idea of changing the acquisition strategy. There must be multiple customers. NASA can be an anchor tenant customer, but not the sole customer for a truly commercial company.

Mr. Bolden indicated a strong sense of urgency about enabling industry to take over low earth orbit access. But it must be done safely. He has no question that industry is going to be able to do that. NASA employees are excited about doing this. Younger people must be found to mentor as the next generation of program managers to make this happen.

Ms. Lepore commented that small businesses and entrepreneurs do not have the same infrastructure that traditional contracts have.

Mr. Bolden responded that he wants to help the small companies mature and in the OTA environment. Sooner or later, they will have to move into the Federal government structure to survive. He noted that open communication is critical. Commercial entities need to know they can communicate with NASA and that someone will listen. He wants to establish a much more viable partnership than exists right now. Mr. Bolden stated that he is willing to return to COMSTAC for another dialogue.

Chairman Trafton thanked Mr. Bolden for his candor and leadership at NASA. Then he called for a ten minute break.

2010 Commercial Space Transportation Market Forecasts

2010 COMSTAC Commercial GSO Launch Demand Model

Mr. Trafton acknowledged Patti Grace Smith, former Associate Administrator for Commercial Space Transportation and thanked her for her questions and remarks.

Chris Kunstadter, XL Insurance, provided the briefing for the *2010 COMSTAC Commercial Geosynchronous Orbit (GEO) Launch Demand Model*. Mr. Kunstadter stood in for Kevin Reyes, Boeing Launch Services, who directed the research and report preparation.

Mr. Kunstadter described the methodology the working group followed. The working group contained a cross-section of industry people, some from the satellite and launch segment, and others from elsewhere in industry. One face-to-face meeting was held in California; one telecon was held to review the entire report.

Mr. Kunstadter noted the purpose of the Forecast is to report the number of launches for the previous year and attempt to calculate the demand for satellite launches for the coming year, three years and ten years into the future. This data assists the FAA with its planning and licensing process. In addition, this report helps industry estimate demand for services over the coming decade.

He reported that information was gathered by sending out surveys to approximately 90 organizations. Fourteen companies responded. The response was down from last year and the prior year. While the response was disappointing, Mr. Kunstadter noted that companies are busy and work in a very competitive environment. He noted the need to encourage a bigger response in the future.

The survey solicited two types of responses. One, an individual response, asked companies to identify where their organizations saw the launch forecast for the next 10 years. The second asked some organizations to provide information on where they saw the entire market over the next 10 years. The working group then sorted the satellites by mass category to establish the different categories for launch vehicles. Finally, they looked at the launch vehicles that could carry those satellites.

Mr. Kunstadter noted that the working group then applied a realization factor in order to assess the validity of its model and assumptions. The number of forecasted launches tends to be greater for the near term than for the out-years. The working group examined the historical record of its own forecasts to see how much was actually launched when compared to their forecasts. The result is the realization factor. He remarked that the following 24 hours could be a very exciting time with a possible four major launches going up.

Mr. Kunstadter summarized the report findings:

- Ten-year projected average annual demand of 20.7 satellites on 15.7 launches is stable, and consistent with prior years
- Global economic recovery provides encouraging sign of continued stable market
- New markets and new applications continue to emerge
- Forecast methodology is robust, but need to improve responsiveness from market
- GSO forecast is a useful tool and a respected source of market information

Mr. Kunstadter called attention to the small number of launch vehicles carrying out the launches this year. Of 20 addressable satellites scheduled for launch, 11 are on Ariane, 8 on Proton and 1 on Soyuz.

He compared this year's report to last year's and noted that the numbers were fairly consistent. This would show that the estimation of the business is fairly stable from year to year.

2010 Non-GSO Forecast

Dustin Kaiser of Futron Corporation provided the briefing on the FAA's *2010 Commercial Space Transportation Forecast for Non-Geosynchronous Orbits (NGSO).* He stated that this forecast looks forward 10 years to 2019 and covers anything that's non-geosynchronous. The commercial definition includes not only payloads that are internationally competed, but also those that are licensed by the FAA. This definition covers payloads such as the NASA commercial resupply services contracts.

Mr. Kaiser stated that the purpose of the NGSO Forecast is to assist the FAA to prepare for its licensing activities, and to raise public awareness of the direction and trajectory of this segment of the launch industry.

Mr. Kaiser described the methodology employed for this report. It started with publicly available information from entities that will be launching satellites. Then interviews were conducted with members of all parts of the industry. These interviews included financing and potential regulatory impacts. Independent analysts were consulted when information gaps arose. Finally, Futron staff sat down with the FAA to decide what to include.

Mr. Kaiser stated that they divided the demand for launch services into four categories: scientific and other types of satellites, remote sensing, communications and a category called orbital facility assembly and services (OFAS). This last category covers cargo and potentially crew transportation.

Satellite Forecast: 262 satellites for 2010 – 2019. These are broken into the four categories as follows.

Category	# of Forecast Launches	Percentage
Scientific	74	28
Remote Sensing	17	6
Communications		
Little LEO	18	7
Big LEO	96	37
Broadband	16	6
OFAS	41	16

Launch Forecast: 119 launches for 2010 – 2019. This number is lower due to multi-manifesting. The impact is greatest in the communications category.

Category	# of Forecast Launches	Percentage
Scientific	43	36
Remote Sensing	13	11
Telecommunications		
Little LEO	6	5
Big LEO	12	10
Broadband	4	3
OFAS	41	35

The scientific and weather category has been stable for the past ten years and the forecast is for continued stability from national space programs. It is the largest source of demand for small launch vehicles. There is quite a large uptake as telecommunications satellites are replenished. There was a replenishment in the 1990s. There will be another as the cycle recurs. Demand for commercial remote sensing continues to remain strong and grow steadily. By looking at the systems in existence, we can predict when there will be a need for replenishment. The orbital facility and assembly sector is new. The sources of demand are NASA, COTS, and CRS contracts. The initial flights are projected to occur this year. Demand has been extended beyond the forecast period. Development of a crew transfer vehicle could substantially increase the demand from this sector of the industry. Development of commercial human orbital space flights could also have an impact. Beyond the NASA demand, these are not included in this forecast. There are areas of uncertainty in financial, political, and technical areas.

Mr. Dickman asked if there was a sense of what the impact of DOD launches would be. These are competed but not licensed.

Mr. Kaiser responded that the report did not look at the DOD market, but it affects what is typically available for the commercial market in the future.

Mr. Dickman suggested to Chairman Trafton and to Dr. Nield that we might consider changing the parameters for the forecast. The DOD sector could end up being a dominant part, especially the NASA part of what the commercial providers will be looking at as a potential business base.

Mr. Trafton acknowledged Mr. Dickman's suggestion and indicated we should consider it for the next forecast.

COMSTAC Working Group Reports

Risk Management Working Group (RMWG)

Chris Kunstadter, senior vice president, XL Insurance, provided the report on risk management issues. He began by noting that about 30 people participated in the Risk Management Working Group that he and Janet Sadler co-chaired.

Mr. Kunstadter first drew attention to an accomplishment within the past six months - the extension of the CSLA indemnification regime. The working group had advocated strongly for the extension that passed Congress in late December 2009. He thanked everyone who contributed to the effort.

Mr. Kunstadter indicated that the working groups were tasked with creating a list of issues they feel are important to be addressed over the next two years. The Risk Management Working Group identified six issues.

1. *Barriers to commercial participation in the commercial space flight industry due to the uncertainty of liability to commercial space flight participants*. It's unclear how liability is to be allocated based on various contracts and relationships between parties. This is an important issue. The first hour of the working group meeting was spent on this issue alone.
2. *Reinforcement of FAA jurisdiction over crewed launches carried out by commercial operators, regardless of the customer*.
3. *Risk management implications of any significant differences between FAA regulations and NASA customer requirements in commercial space transportation*. There is some overlap between issues 2 and 3.
4. *Informed consent*. This issue has been addressed previously. This working group previously prepared a white paper on the issue. The issue is seen differently by different groups and still requires some attention.
5. *Legislative issues*. The extension of indemnification is for three years. By the end of 2012, COMSTAC will need to visit it once again. The prohibition on FAA regulation of the commercial space flight passenger will likewise expire in 2012. The working group re-emphasized that the FAA has jurisdiction over crewed launches. With the expiration date approaching, regulation needs to take place the right way.
6. *Risk management implications of orbital debris*. The working group was tasked to look into this issue last October. The working group is still working on it and hope to develop its positions in the near future.

Mr. Kunstadter asked for questions.

Mr. Alexander voiced his support, especially for issues 2 and 3.

Mr. Culbertson asked for a bit more on the issue of orbital debris. How did people feel this should be handled?

Mr. Kunstadter reminded the meeting that Nick Johnson from NASA had made a presentation at last October's COMSTAC meeting. The danger of upper stages that are left in orbit had been highlighted. Guidelines from different agencies require passivation and removal from orbit within 25 years to make sure there is no lingering danger to space activity. The working group was tasked to look at the issue of upper stages and the danger to LEO orbits. The working group has not yet come to a resolution.

Mr. Lounge asked if the working group anticipated bringing forward draft findings or recommendations on these topics.

Mr. Kunstadter noted that the full COMSTAC would probably discuss how to proceed with the lists of issues from all the working groups. It will be important to prioritize the issues.

Mr. Gomez asked for a summary of the discussion on informed consent as it relates to the states.

Mr. Kunstadter observed that the discussion centered on the aeromedical point of view. How does one make sure that someone is physically able to undertake space flight? Then the working group discussed informed consent of the individual participant. They did not discuss the issue on a state versus federal level.

Export Controls Working Group (ECWG)

Michael Gold, Director of D.C. Operations & Business Growth for Bigelow Aerospace, discussed recent developments in export controls, the ECWG meeting on Wednesday, and recommendations made by the working group.

Mr. Gold noted that NASA Administrator Bolden had highlighted ITAR as an important issue. NASA and the government have to struggle with ITAR just as industry must. As an example, ISS hardware is exempt from ITAR; however technical data related to that hardware is not.

Mr. Gold summarized the Administration's proposed Four Singles Plan. It highlights a single agency responsible for implementing America's export control regime, a single control list, a single IT system, a single licensing process. The Administration has divided this plan into three phases. Phase 1 is to harmonize, refine, and streamline the existing licensing process. Much of this has already been accomplished. Phase 2 would

actually restructure the list. This requires Congressional notification and buy-in by the relevant committees and committee staff. Phase 3 is the culmination of the Four Singles process and would require Congressional approval and legislation.

Mr. Gold thanked Michael Bevin from the Office of Space Commercialization for his briefing to the EDWG. He also thanked John Sloan and Doug Graham from FAA/AST for their briefings.

Mr. Gold reported that the ECWG developed three recommendations that uphold and support the Four Singles Plan.

1. The COMSTAC applauds the White House's efforts to reform America's obsolete and counterproductive export control regime. Specifically, the COMSTAC supports the White House's 'four singles' approach, which would create a single coordinating agency, a single list, a single licensing agency, and a single IT system.
There was some discussion about including the first sentence in the recommendation. Some members saw this sentence as potentially inflammatory. It was decided to remove the sentence so the recommendation now reads:

The COMSTAC supports the White House's 'four singles' approach, which would create a single coordinating agency, a single list, a single licensing agency, and a single IT system.

The membership voted in favor of the recommendation.

2. In the process of establishing a single list, the COMSTAC supports ensuring the list creates substantive reform by limiting or eliminating the licensing process for low-sensitivity items and services, and that a review process continues on an ongoing basis to keep pace with the evolution of technology and its commercial availability.
There was some refinement of the language.

The membership voted in favor of the recommendation.

3. As the export control review process proceeds, the COMSTAC would like to express its desire to serve as an ongoing resource by providing its unique industry perspective relative to the commercial space sector.
The important point in this recommendation is the importance of COMSTAC having input into the export control process.

The membership voted in favor of the recommendation.

The COMSTAC broke for lunch. Before the break Ms. Aldrich announced that on Thursday, May 20, at the Senate Visitors Center, AIAA would be conducting a panel on Assured Safety from 1:00 until 4:00. She urged people to attend.

Reusable Launch Vehicle Working Group (RLVWG)

Brett Alexander provided the report for the RLVWG. He reported two items on the RLVWG agenda. The first was a presentation by AST on the risk of triggered lightning at commercial space launch sites. The second consisted of two proposed policy statements supporting commercial crew and the FAA licensing of commercial crew.

Karen Shelton Mur of AST and Richard Walterscheid from the Aerospace Corporation presented the triggered lightning study. It provided data on lightning strikes with 100 kilometers of commercial launch sites. Then it looked at the difference between naturally occurring lightning and the condition common for triggered lightning. The object is to understand the risk of triggered lightning and how best to mitigate it's effects.

Mr. Alexander turned his attention to the proposed policy statements. The first one reads:

> The COMSTAC strongly supports the proposed Commercial Crew Development Program as contained in the FY2011 President's Budget Request for the National Aeronautics and Space Administration (NASA) to accelerate the development of commercial human spaceflight capabilities for access to low Earth orbit and to transition to private industry the transport of crew and logistics to the International Space Station. Working with the private sector, NASA can enable the development of safe, reliable commercial human spaceflight capabilities that will meet U.S. government needs, allow NASA to focus on exploration beyond low Earth orbit, and reap significant economic and other benefits to the nation's space industrial base.

There was a short discussion as to whether COMSTAC should make a statement supporting NASA Mr. Alexander stated that a number of the RLVWG members feel that commercial space transportation is at a fundamental pivot point. COMSTAC has discussed commercial human spaceflight for a long time. Now there is an opportunity to support it in a meaningful way. It was noted that COMSTAC often passes a resolution when something could be detrimental to the field. Now we are considering a resolution to support something positive.

Mr. Trafton called for a vote on the policy statement. The statement passed.
Mr. Alexander read the second proposed policy statement.

> The COMSTAC strongly supports FAA licensing of commercial human spaceflight activities, including those commercial activities conducted for government customers, such as the National Aeronautics and Space Administration (NASA). A single, consistent regulatory and licensing regime for both government and non-government customers is critical to the long-term success of commercial human spaceflight providers and to enable the development of new customers and markets for private human spaceflight capabilities. Like any customer, NASA can impose human rating requirements and approval processes by contract.

There was considerable discussion of this statement. This discussion centered on the need for the statement, since this is the current practice. Members expressed a concern that there is debate within NASA and on Capitol Hill about the roles NASA and the FAA will play. Members agreed that NASA and the FAA need to work together with a consistent approach. The CRS and COTS programs already follow a consistent approach and involve FAA licensing.

The object of the statement is to support a meeting of the minds between NASA and the FAA. It was noted that NASA and the FAA already have a continuing partnership. The members did some wordsmithing of the original proposed statement to capture the main points of the discussion. The final statement reads as follows.

> A single, consistent regulatory and licensing regime for both government and non-government customers is critical to the long-term success of commercial human spaceflight providers and to enable the development of new customers and markets for private human spaceflight capabilities. The COMSTAC strongly supports FAA licensing of commercial human spaceflight activities, including those commercial activities conducted for the National Aeronautics and Space Administration (NASA), as consistent with current practice under the COTS and CRS programs. Any customer, including NASA, can impose additional safety requirements and approval processes by contract.

Mr. Trafton called for a vote on the second policy statement. The statement passed.

Space Transportation Operations Working Group (STOWG)

Debra Facktor Lepore, president, DFL Space, provided the report for the STOWG. Mr. Trafton announced that Bob Davis had resigned from COMSTAC and as the chair of this working group. Ms. Lepore noted that the key topics under discussion were:

1. Roles and responsibilities of COMSTAC working groups
2. Top issues for STOWG to address
3. Actions to take and how to be more relevant

There has been some overlap with the RLV Working Group. Today, the RLV Working Group focuses more on policy, business, and market issues. STOWG looks at operations: everything that is accessed up into space, through space, and back from space, and any operations that happen during that time frame. Mr. Holder asked about in-space operations, noting that from a regulatory standpoint this is not covered by the FAA. Dr. Nield indicated that AST would consider any advice on that topic to be very helpful. Ms. Lepore noted that this has been discussed previously. She indicated that a presentation on the subject may be planned for October. STOWG will take that as an action item.

Looking at top issues for STOWG to address, Ms. Lepore stated that four issues came out of going around the room and asking each person to state why they chose to attend the working group meeting.

1. *Issues of commonality, standards, and definitions*

Spaceport commonality – will a red light mean the same thing at all spaceports, for example?

2. *Airspace management*
   There could be hundreds of suborbital flights in the near future. What does this mean? Should airspace be closed for these launches? How is commercial space integrated with all the commercial and private aircraft? In addition, there are issues of situational awareness. Finally, the working group discussed reentry debris. If there is an accident, who must be notified? What is the effect on commercial aircraft?
3. *Operations*
   This includes ground operations, launch licensing, in-space operations, fuel depots, etc.
4. *Market viability of commercial concepts*
   Many attendees came to find out if commercial space can really perform as advertised in various media. Others wanted to learn more about the market for commercial space systems.

Ms. Lepore reported on the special presentation by Megan Mitchell and Kelvin Coleman from AST about the issue of conops for the reentry debris or launch debris. They have prepared a draft report and asked the working group for comment.

The actions for STOWG are:

1. Examine the top issues and articulate what they mean and how STOWG wants to address them.
2. Look at five questions from last October on the cost impact of second stages complying voluntarily with orbital debris management. STOWG wants to complete this action.
3. Review the conops report.
4. Schedule two telecons in the next six months, one in late June and one in early September, to discuss these issues.

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Mr. Trafton opened up the meeting to public comment. Mr. Van Laak, Deputy Associate Administrator of Commercial Space Transportation moderated this portion of the meeting. Mr. Van Laak made some initial observations. He wants to see strong ongoing dialogue with COMSTAC members. The public comment period is part of that. Another initiative has been to challenge the working groups to identify top risk issues facing their areas of interest. He encouraged the COMSTAC members and the general public to take part in this process. Further, he asked the working groups to examine the issues they raised and discuss them over the next six months. In October, the working groups should be ready to propose a plan to move forward with the issues. Mr. Van Laak then asked for questions.

Mr. Oesterle spoke about Dr. Nield's raising the issue of STEM education and building a work force for the future. There's a lot of excitement for commercial space. He encouraged creating continued interest and support for this type of education.

Mr. Kelly noted that the interaction between COMSTAC and NASA Administrator Bolden was extraordinary. He asked if it would be possible to arrange for another session of this type.

Mr. Trafton responded that as Mr. Bolden was leaving, he said "I want to do this again and soon." Mr. Bolden has agreed to come back. There was some discussion as to whether this could be done before October. There was also a suggestion that if the Four Singles plan is adopted, would it be possible for the right person from the Administration to speak to COMSTAC. There was general agreement to invite Mr. Bolden back. There were no further questions.

Dr. Nield asked Brenda Parker to come forward. He noted that Ms. Parker has been the focal point of COMSTAC for many years. He presented her with a plaque that reads:

> To Brenda A. Parker, in grateful recognition of your services as the executive director of the Commercial Space Transportation Advisory Committee, 1995 to 2010. Your dedication, professionalism and superb administration have been instrumental to the success of COMSTAC, and its contributions to the United States, the Federal Aviation Administration and the commercial space transportation industry.

Dr. Nield thanked Ms. Parker for her service to COMSTAC.

Ms. Parker thanked the members of COMSTAC for their support. She has accepted a new challenge within AST. She encouraged everyone to continue the dialogue begun today. They should contact Susan Lender, the new executive director with their ideas.

Mr. Trafton adjourned the meeting at 2:35 p.m.

Signed by
Wilbur C. Trafton
Chairman, COMSTAC

COMSTAC Members Present

1. Wilbur C. Trafton, Will Trafton & Associates, COMSTAC Chair
2. Eleanor Aldrich, American Institute of Aeronautics and Astronautics
3. Bretton S. Alexander, Commercial Spaceflight Federation
4. Randall Clague, XCOR Aerospace, Alternate for Jeffrey Greason
5. Frank Culbertson, Orbital Sciences Corporation
6. Robert S. Dickman, American Institute of Aeronautics and Astronautics
7. Michael N. Gold, Bigelow Aerospace
8. Louis R. Gomez, New Mexico Spaceport Authority
9. Livingston L. Holder, Jr., Holder Aerospace
10. Timothy Hughes, Space Exploration Technologies Corporation
11. Michael S. Kelly, ATK Tactical Propulsion and Controls
12. Christopher Kunstadter, XL Insurance, COMSTAC Deputy Chair
13. Debra Facktor Lepore, DFL Space LLC
14. John M. Lounge, Cisneros Innovation Strategies
15. Dr. Billie M. Reed, Virginia Commercial Space Flight Authority
16. Janet Sadler, Chartis Insurance UK Limited
17. Berin M. Szoka, Space Frontier Foundation
18. John W. Vinter, Consultant

Federal Aviation Administration Representatives

Dr. George C. Nield, Associate Administrator for Commercial Space Transportation
James Van Laak, Deputy Associate Administrator for Commercial Space Transportation
Susan M. Lender, COMSTAC Executive Director, Federal Aviation Administration