

**NASA**  
**PROGRAM MANAGEMENT COUNCIL**  
**Meeting Summary, Decisions and Actions**

**VITAL MEETING DATA**

**Date:** 19 July 2017  
**Time:** 1:00 p.m. – 4:30 p.m. (EST)  
**Location:** NASA Headquarters (HQ), 8Q40 & ViTS  
**Agenda:** See attached.  
**Attendance:** See attached.

**Opening Comments**

Robert Lightfoot, National Aeronautics and Space Administration (NASA) Associate Administrator (AA), made the following brief opening comments:

- This is a big day for aeronautics related to how we are going to proceed with the governance approach for the Low Boom Flight Demonstrator (LBFD) project. I know there has been a lot of tailoring of our standard process and governance, and we are looking forward to members' comments related to this new approach.
- Also, we are looking forward to hearing thoughts about the International Space Station (ISS) going forward, including different perspectives related to traditional technology considerations.

**First Item of Business: New Aviation Horizons Governance Approach**

The New Aviation Horizons (NAH) initiative is focused on maturing and advancing aeronautics technologies through flight research for the benefit of domestic stakeholders. Today they are looking for concurrence from the Program Management Council (PMC) on their governance approach as well as on the delegation of Decision Authority for the LBFD project to the Aeronautics Research Mission Directorate (ARMD) AA based on plans to implement a management model in which the project reports directly to ARMD through the Integrated Aviation Systems Program (IASP) Office.

The centerpiece of the NAH initiative is an ambitious plan to build large-scale experimental aircraft, called X-planes, which will flight test new technologies, systems, and advanced aircraft and engine configurations. Other key elements of the NAH initiative include creating and maintaining partnerships with industry and academia, supporting the accelerated delivery of advanced design and analysis tools to the U.S. aviation community, enabling United States (U.S.) industry to implement flight-proven transformative technologies, and inspiring the next generation of scientists and engineers through education and outreach.

The U.S. industry is now at a point where it must develop the capabilities to reduce key technologies to X-plane scale. Why now? The industry needs to go through this transformation process in order to continue to be a leader going forward. The need and demand for their services exist, given the projected increase in passenger trips from 3.3 billion in 2014 up to 7 billion over the next 20 years. The U.S. is well positioned to be competitive in this enormous market with cutting-edge technologies and top-grade conventional configuration products. But the U.S. must win the future through transformative technologies and configurations that will deliver revolutionary performance, or international product competition will mature and pressure U.S. market leadership from below.

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### **Low Boom Flight Demonstrator Mission Overview and Status**

Barriers to commercial supersonic flight include sonic boom noise, economic viability, and operations in the National Airspace System (NAS). The vision of the supersonics community is a future in which fast air travel is available for a broad spectrum of the traveling public. Overland flight restrictions based on noise are viewed as the main barrier to this vision. There is evidence of private companies developing demonstrators. NAH is looking at this from a different perspective: the ability to fly over land would change possible applications for this capability.

Forty-plus years of NASA-led investment and technical progress has created an opportunity to overcome the sonic boom restriction. The LBFD will address three critical elements: validated hardware for overflight testing, a test methodology that allows community response to supersonic overland flight data to be gathered, and community response data that is fully representative of a demographically diverse, non-biased population. LBFD will demonstrate that noise from sonic booms can be reduced to a level acceptable to the population residing under future supersonic flight paths and create a community response database that supports an international effort to develop a noise-based rule for supersonic overland flight.

The project is challenging both NASA and the Federal Aviation Administration (FAA) to validate low boom acoustic sound demonstrators. The plan is to work with the regulators to get the rules changed to open up the marketplace. The human response to sonic boom in the future would be no more noise than thunder in the distance. The research is highly critical, with prediction methodology, to extend to commercial aircraft over the generalized community.

The LBFD life cycle and schedule status was presented. The project is finishing up preliminary design review and is scheduled for an August 1, 2017 release of the Request for Proposals (RFP). The first flight is scheduled for fiscal year (FY) 2021 to make sure signals received from the vehicle are as intended before moving into community response testing. LBFD will be ready for the testing and expects to hit the ground running in FY23.

### **Governance**

ARMD and the Office of the Chief Engineer (OCE) agreed that an X-plane governance model is needed to address nuances of aircraft flight test. In the summer of 2016, the ARMD AA charged the ARMD Chief Engineer (who is from the OCE) to develop a governance model, consistent with established agency guidance, for all flight demonstrator projects in collaboration with the IASP Director. Neither NASA Procedural Requirements (NPR) 7120.8 nor NPR 7120.5 are well suited to X-plane flight projects. As a result, best practices were evaluated, after which the Program and Project Management Board (PPMB) Tiger Team and NAH Governance Working Group (WG) made recommendations to inform an X-plane governance charter. An X-plane governance model was crafted to apply agency best practices to X-plane projects given the inherently unique requirements and constraints of these aircraft development and flight test efforts.

The LBFD instantiation of the X-plane governance has required some tailoring. The project has been tailored to Category 2 Project requirements and has evolved using an aircraft-type mission that best fits into the Type D category of the NPR8705.4 classifier tool.

NAH commented that there are lots of complexities to the way NASA classifies risk that are not well suited for classifying risks on aircraft, and there might be questions not being asked today that should be asked when assessing the risk of this type of ARMD program. For LBFD specifically, the project is far down the process: it may be a little late to have this discussion, but it should be evaluated.

Lightfoot agreed that the program risk classification usually revolves around risk tolerance and that applying it to ARMD programs might not fit. Lightfoot suggested that NAH, in conjunction with ARMD, understand what classifying the project as Category D means. Additional discussions should take place to figure out how this classification can be improved to make sure these types of programs are classified appropriately.

The LBFD project has adopted an Independent Review Board (IRB) that will persist throughout the life of the project. The IRB will be comprised of a Chair and a Deputy Chair, and supported by a multi-discipline Project Review Team (PRT). The IRB is using NASA Standing Review Board (SRB) and Armstrong Flight Research Center (AFRC) Flight Readiness Review (FRR) processes as guidance.

Members raised concerns that the current IRB membership consists primarily of technical subject matter experts (SMEs), with no programmatic SME representation. NAH said the IRB is still being put together and not all roles have been assigned. Lightfoot assigned a formal action to NAH to ensure he sees the independent review plan once it is available. In addition, he wants to see the cost and schedule SME membership that will provide an independent perspective.

The LBFD governance model was described, including its reporting methods and paths. The project will utilize the standard Technical Authority (TA) process for engineering, safety and mission assurance, and health and medical. The governance model includes an NAH Executive Board, LBFD Enablement Board, and LBFD virtual System Project Office (vSPO) structure, using a tailored approach to NPR 7120/7123 project guidance to ensure applicability of appropriate programmatic rigor in consideration of the unique nature of X-plane flight demonstrator projects. The NASA NPR is used to govern execution, with Key Decision Points (KDPs) embraced that are suited to X-plane projects, oversight from the IRB through the project life cycle, and a tailored approach to processes and plans. The X-plane governance is captured in the X-Plane Governance Charter, which provides guidance on utilizing agency processes and systems applicable to executing X-plane flight projects. Lightfoot raised a concern regarding the same individuals residing on multiple boards, and the complexities of board layers.

The decision memo was reviewed and approved, per language below:

*Summary:*

*ARMD requests delegation of Decision Authority for the Low Boom Flight Demonstrator project to the Aeronautics Research Mission Directorate (ARMD) Associate Administrator based on plans to implement a management model where the project reports directly to the Aeronautics Research Mission Directorate (ARMD) through the Integrated Aviation Systems Program (IASP) Office.*

*Delegation of decision authority is supported by implementation of governance process based on work over the past year by the Program and Project Management Board (PPMB) Tiger Team as well as the X-Plane Governance Working Group. These groups determined that current NASA Procedural Requirements (NPRs) for project execution, namely 7120.5 NASA Space Flight Program and Project Management Requirements and 7120.8 NASA Research and*

*Technology Program and Project Management Requirements, are not well suited to X-plane flight projects. As such, utilizing a tailored approach to implementing LBFD flight demonstrator project is proposed.*

*Decision:*

*The Associate Administrator concurs with ARMD proposal to implement the LBFD Governance model including virtual System Project Office (vSPO) structure using a tailored approach to NPR 7120/7123 project guidance to ensure applicability of appropriate programmatic rigor in consideration of the unique nature of X-Plane flight demonstrator projects. The Associate Administrator also delegates Low Boom Flight Demonstrator (LBFD) Project Decision Authority to the ARMD Associate Administrator.*

## **Second Item of Business: ISS Transition Discussion**

The 2017 NASA Authorization Act requires an “ISS Transition Report,” which is due on December 1. There are six pages of requirements and content to be included in the report, which necessitates input from the Center for Advancement of Science in Space (CASIS), ISS international partners, the scientific community, and commercial industry. This presentation is meant to help inform the drafting of the report and to solicit inputs and/or opinions across agency leadership. In general, NASA is working to develop a plan to transition in a step-wise approach from the current regime, which relies heavily on NASA sponsorship, to a regime in which NASA could be one of many customers of a low Earth orbit (LEO) non-governmental human spaceflight enterprise. The report is meant to outline all the considerations that stakeholders may find useful. NASA does not need an immediate decision on the ISS lifetime; however, the agency does need clarification in the very near term on the level and scope of commercialization activities going forward toward 2024, policy and budget coupling between LEO and NASA’s deep space efforts, and options for ISS and the International Partnership beyond 2024.

Through a series of meetings between the Human Exploration and Operations Mission Directorate (HEOMD), ISS Division, the Strategic Planning Office, and the Administrator’s Office, a broad set of capabilities that are enabled by the ISS in LEO were developed. This set of capabilities is not exhaustive but is probably representative of the considerations stakeholders may find useful. Overall, human presence in LEO via the ISS enables U.S. presence, leadership, commercial space support, achievement of deep space exploration objectives, and research and development.

The current state across all of these capabilities was reviewed. Continuous U.S. human presence has been sustained over the past 16-plus years. Current ISS Inter-Government Agreements (IGA) have been in place for nearly 20 years and provide treaty-level agreements between the U.S., Russia, Canada, Europe, and Japan, which solidifies the U.S. leadership position. Commercial space support includes cargo and crew already supplied by private industry (~52% cost of current ISS), and commercial crew and cargo support the commercial launch industry (~14% of the world launch market goes to ISS). Deep space exploration support includes requirements for human health and performance research and technology/system demonstrations for habitation systems, with other exploration systems currently planned for completion by 2024/2025.

Looking ahead to 2024, continuous U.S. human presence in LEO will have been sustained for over 24 years. At that point, China will be operating their newly completed space station, commercial crew will have increased U.S. crew member capacity from three to four on station at any time, exploration-related human research and technology/system demonstrations in LEO will be nearly complete, transportation costs will have been validated, and NASA will be conducting human spaceflight missions in cis-lunar space.

Some considerations include:

- **Transition** - ISS transition indicators should be considered, including completion of exploration-related research and technology development requiring use of the ISS, demand from government and private industry, and establishment of cis-lunar gateway capabilities and execution of missions beyond LEO.
- **Affordability in Human Spaceflight (HSF) context** - LEO and ISS play an important role in the larger HSF exploration context. ISS provides the platform and environment to mature industry partners so that they become able to operate and manage LEO activities on their own. LEO operations provide a complement to exploration development activities.
- **Foreign Policy** - With the addition of commercial crew, NASA has an opportunity to invite non-ISS international partners to partner with the U.S. NASA exploration missions to cis-lunar space are also expected to play a leadership role in human spaceflight. Other foreign government LEO platforms include China's plans to complete their space station by 2022. It is expected that Russia will continue to participate with the U.S.-led ISS through the 2020s as long as the U.S. maintains the platform and partnership.
- **Future of National Laboratory** - The 2005 Authorization Act that provided for creation of the ISS National Laboratory (NL) has been a bellwether change in the role of NASA and the ISS. The NL changed what has traditionally been a "NASA program for NASA purposes for the benefit of NASA" to an infrastructure for the benefit of the entire nation, including private industry, academia, and other government agencies.
- **Commercial Space Station Viability Assessment Summary** – NASA's Office of Science and Technology Policy (OSTP) initiated a study to evaluate the market case for a private space station or space stations that might follow the ISS. They found that for a commercial space station to be viable, two key elements need to exist: a demand for large scale in-space manufacturing and a three-fold decrease in crew and cargo transportation cost. Other commercial activities do not generate sufficient revenue to sustain operations and commercial space station customers would have to cover their own transportation cost.

Lightfoot commented that some of the assumptions used during this assessment are still being reviewed and refined.

- **Re-Use of ISS On-Orbit Elements** - As previously discussed, many ISS elements will have considerable structural life after 2028. One of the suggested outcomes of the ISS—instead of deorbiting the whole vehicle—is to make elements available to private industry for re-use.
- **Public-Private Partnerships** - There is a wide range of private partnership arrangements that could be considered.
- **Long-Term LEO Requirements and Utilization Needs** - NASA is currently assessing its long-term LEO requirements and utilization needs. As currently defined, projected long-term needs are similar in scope to current ISS research and utilization. This activity should be completed in the fall.

The human presence in LEO option space is still being explored. It includes ISS extension to 2030 under the status quo model, extension to 2030 under a public-private partnership model, ISS deorbit in 2024 (replacement by a private long-term LEO station that meets NASA needs), ISS deorbit in 2024 (replace by a private short-duration LEO vehicle that meets NASA needs), and a scenario in which the need for LEO is discontinued.

The signaling and timing of NASA's future plans will have an effect on private industry and the ISS international partners. Future ISS international partnerships and implications for deep space exploration initiatives will probably require discussion with other government entities outside of NASA. The ISS "*end of life*" may be a misnomer, given the considerations for re-use of on-orbit elements, the ISS international partnership, and the interdependence with activities for deep space exploration. Ultimately, ISS is playing a significant role in the legacy of human spaceflight international cooperation, scientific research, commercial industry development, and innovation that is unique within NASA and in the world.

**Actions:**

Lightfoot assigned two actions.

07-19-2017 (formal) Action 1:

ARMED - Low Boom Flight Demonstrator (LBFD) Governance Approach - AA to concur on independent review board members, including cost and schedule team experts, and review the independent review plan. Assigned to: Ed Waggoner, Due date: September 30, 2017.

07-19-2017 (informal) Action 2:

ARMED - Low Boom Flight Demonstrator (LBFD) Governance Approach- Discuss risk category and tolerance characterization, to understand what we are accepting. Assigned to: Robert Lightfoot/Steve Hirshorn, Due date: September 30, 2017.

**Closing**

Meeting was adjourned.

Prepared by (b) (6)

Stephanie Sowards

8/10/2017

APMC Executive

# Low Boom Flight Demonstrator (LBFD) Project Agency Program Management Council (APMC) Decision Memorandum

## **Summary:**

ARMD requests delegation of Decision Authority for the Low Boom Flight Demonstrator project to the Aeronautics Research Mission Directorate (ARMD) Associate Administrator based on plans to implement a management model where the project reports directly to the Aeronautics Research Mission Directorate (ARMD) through the Integrated Aviation Systems Program (IASP) Office.

Delegation of decision authority is supported by implementation of governance process based on work over the past year by the Program and Project Management Board (PPMB) Tiger Team as well as the X-Plane Governance Working Group. These groups determined that current NASA Procedural Requirements (NPRs) for project execution, namely 7120.5 NASA Space Flight Program and Project Management Requirements and 7120.8 NASA Research and Technology Program and Project Management Requirements, are not well suited to X-plane flight projects. As such, utilizing a tailored approach to implementing LBFD flight demonstrator project is proposed.

## **Decision:**

The Associate Administrator concurs with ARMD proposal to implement the LBFD Governance model including virtual System Project Office (vSPO) structure using a tailored approach to NPR 7120/7123 project guidance to ensure applicability of appropriate programmatic rigor in consideration of the unique nature of X-Plane flight demonstrator projects. The Associate Administrator also delegates Low Boom Flight Demonstrator (LBFD) Project Decision Authority to the ARMD Associate Administrator.

## **Action:**

- AA to concur on independent review board members, including cost and schedule team experts, and review the independent review plan. Assignee: Ed Waggoner, Sept 30, 2017



Concurrence and Commitments:

FOR RALPH ROE

(b) (6)

7/19/17

Assistant Administrator  
Office of Procurement

Date

(b) (6)

7/19/17

Chief Engineer

Date

(b) (6)

7/19/17

Chief Financial Officer

Date

(b) (6)

7/19/17

Chief, Safety and Mission Assurance

Date

(b) (6)

7/19/2017

General Counsel

Date

(b) (6)

7/19/17

ARMD Associate Administrator

Date

(b) (6)

7/19/17

IASP Director

Date

Approval

(b) (6)

7/19/17

Associate Administrator

Date

## Agenda

### **Agency Program Management Council July 19, 2017 1:00pm – 4:30pm ET NASA Headquarters, Room 8Q40 & ViTS**

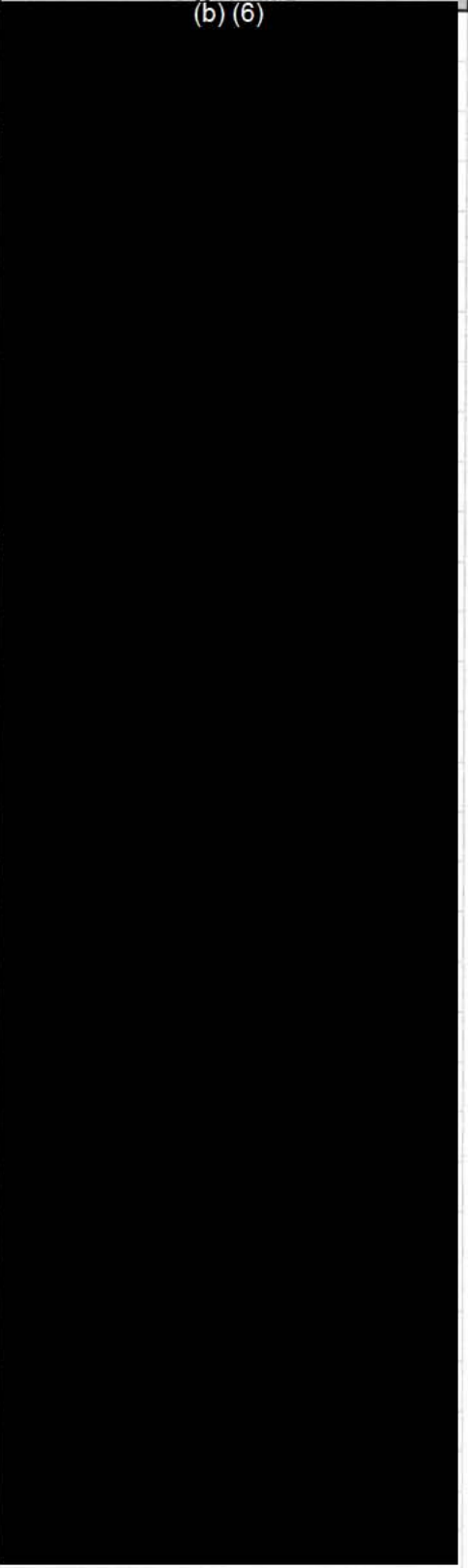
- 1:00 Roll Call and General Admin PMC Exec/Stephanie Sowards
- 1:05 Opening Remarks AA/Robert Lightfoot
- 1:10 **New Aviation Horizons Governance Approach**
- New Aviation Horizons Overview ARMD/Jai Shin/Bob Pearce
  - Low Boom Flight Demo Mission Overview ARMD/Ed Waggoner
  - Low Boom Flight Demo Mission Status ARMD/Ed Waggoner
  - X-Plane Governance ARMD/Ed Waggoner
  - Low Boom Flight Demo Mission KDP-C Strategy ARMD/Ed Waggoner
- 3:00 **ISS Transition Discussion** HEOMD/Sam Scimemi
- 4:20 Review Actions PMC Exec/Stephanie Sowards
- 4:25 Closing remarks and summary AA/Robert Lightfoot
- 4:30 Adjourn

**AGENCY PROGRAM MANAGEMENT COUNCIL**

**NASA Headquarters - 8Q40/VITS**

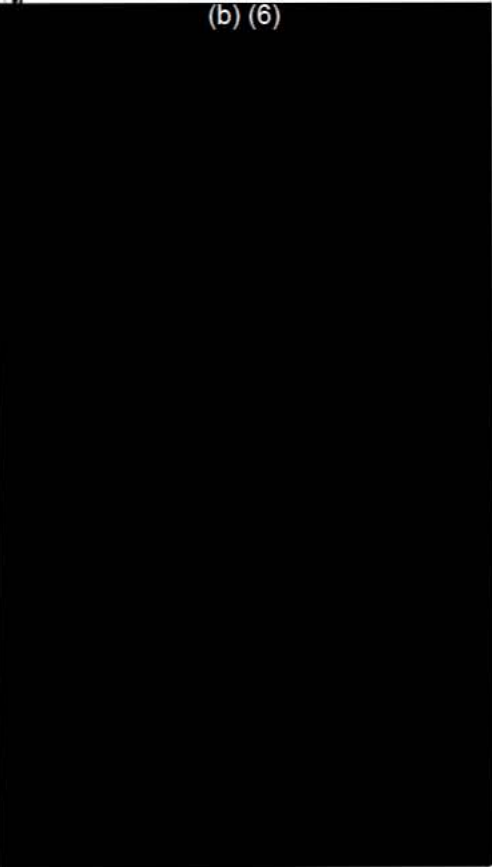
**19-Jul-17**

**MEMBERS**

Position	Name	Signature (b) (6)
Associate Administrator	Robert Lightfoot, Jr	
Deputy Associate Administrator	Lesa Roe	
Chief Financial Officer	Andrew Hunter, Acting	
- Director, OCFO/SID	Cristina Guidi	
Chief Information Officer	Pam Hanes (for)	
Chief Engineer	Steve Hirshorn (for) <i>RAULN POC</i>	
Chief Health & Medical Officer	Mark Weyland (for)	
Chief Safety & Mission Assurance	Peter Tschen (for)	
Chief Scientist	Gale Allen, Acting	
Chief Technologist	Vicki Crisp (for)	
General Counsel	Sumara Thompson-King	
Associate Administrator, ARMD	Jaiwon Shin	
Associate Administrator, HEOMD	Greg Williams (for)	
Associate Administrator, SMD	Greg Robinson (for)	
Associate Administrator, STMD	Steve Jurczyk	
Associate Administrator, Mission Support	Krista Paquin	
ARC Center Director	Steven Zornetzer (for)	
AFRC Center Director	David McBride	
GRC Center Director	Marla Pérez-Davis (for)	
GSFC Center Director	Bill Wrobel (for)	
JPL Center Director	Rene Fradet (for)	
JSC Center Director	Darryl Gaines (for)	
KSC Center Director	Janet Petro (for)	
LaRC Center Director	David Bowles	
MSFC Center Director	Todd May	
SSC Center Director	Rick Gilbrech/Randy Galloway	
Director, OACS	Dennis Boccippio	
APMC Executive	Stephanie Sowards	
<i>other</i>		
<i>NARC alternatives via VITS</i>		

**AGENCY PROGRAM MANAGEMENT COUNCIL  
NASA Headquarters - 8Q40/VITS  
19-Jul-17**

**INVITED & OTHER ATTENDEES**

Position	Name	Signature
Administrator	Robert Lightfoot, Acting	
Deputy Administrator	Lesia Roe, Acting	
Chief of Staff	Vacant	
Associate Administrator, Strategy and Plans	Tom Cremins	
Associate Administrator, Communications	Jen Rae Wang	
Associate Administrator, OLIA	Rebecca Lee, Acting	
Associate Administrator, Small Business	Glenn Delgado	
Assistant Administrator, Human Capital	Bob Gibbs	
Assistant Administrator, Procurement	Bill McNally	
Assistant Administrator, Strategic Infrastructure	Calvin Williams	
Director, NASA Management Office	Marcus Watkins	
Labor Management Liaison	Sharon Burks (Manually Invited)	
Dep AA OCFO/SID OLIA-AAMD	Brian Carra John Gann	

**AGENCY PROGRAM MANAGEMENT COUNCIL**

**NASA Headquarters - 8Q40/VITS**

**19-Jul-17**

**INVITED & OTHER ATTENDEES**

Position	Name	Signature
LBFD ICPT Deputy	Cathy Bahm	(b) (6)
Director, Integration Aviation, ARMD	Ed Waggoner	
ISS Commercial Space Utilization Office	Erin Skalak	
OCFO Director Quality Assurance Division	Frank E Petersen, III	
Deputy AA for Management, ARMD	Jon Montgomery	
Program Management, ARMD	Lee Noble	
Aerospace Vehicle Analyst	Pete Coen	
Deputy AA for Strategy, ARMD	Robert Pearce	
Deputy Director, ISSP	Robyn Gatens	
Director, ISSP	Sam Scimemi	
OLIA	RICK IRVING	
OACS Council Executives	Sarah Murray	
OACS Senior Analyst	Tim Warner	
OACS Analysts	Jeff Beyer	
Office of the Deputy Associate Administrator	Lisa Guerra	
Presidential Appointments Team	Brandon Eden	
Presidential Appointments Team	Rodney Liesveld	
Presidential Appointments Team	Jeff Waksman	
SR Advisor to AA	James ORTI	
OACS Valador Support	Ben Franzini	
OACS Valador Support	<del>Fatima Senghore</del> Diane Clayton	
OACS Valador Support	Benjamin Franzini	
OACS Valador Support	Thanh Dinh	
OACS Valador Support	Lisa Connell	

