



## FALL MEETING OF THE AERONAUTICS AND SPACE ENGINEERING BOARD

164<sup>th</sup> Meeting

September 25<sup>th</sup>-27<sup>th</sup>, 2019

Beckman Center — Huntington Room

100 Academy Way, Irvine, CA

### DAY 1 –SEPTEMBER 25<sup>TH</sup>

#### EXECUTIVE SESSION

Zoom Remote Access Information - Day 1 Closed Session 1

Phone: TBD

Link: TBD

Meeting ID: TBD

**7:30 AM** Working Breakfast Available in the Beckman Dining Room  
**8:30 AM** Committee Discussions  
**9:15 AM** Break

#### OPEN SESSION

Zoom Remote Access Information - Day 1 Open

Phone: TBD

Link: TBD

Meeting ID: TBD

#### Focus on Aeronautics Technology

<b>9:30 AM</b>	<b>Welcome and Introductions</b>	<b>Alan Epstein, ASEB Chair</b>
<b>9:45 AM</b>	<b>ARMD Program and Budget Update</b> (30 minute presentation & 15 minute discussion)	<b>John Montgomery, NASA<sup>1</sup></b>
<b>10:30 AM</b>	<b>Update from NASA ARMD Program Director</b> (20 minute presentation & 10 minute discussion)	<b>Jim Kenyon, NASA</b>
<b>11:00 AM</b>	<b>Break</b>	
<b>11:15 AM</b>	<b>(X-57 Program Project Manager Talk)</b> (20 minute presentation & 10 minute discussion)	<b>Sean Clarke, NASA</b>
<b>11:45 AM</b>	<b>Working Lunch in the Beckman Dining Room (informal discussions continue over lunch)</b>	

#### Focus on the Future of Aeronautics Technology

##### Advancing the Frontiers of Aviation Technology (2 Panels)\*

<b>12:45 PM</b>	<b>Advanced Low-Noise Aircraft Configurations and Their Assessment: Past, Present and Future</b> (45 minute presentation & 15 minute discussion)	<b>Zoltán Spakovszky, MIT</b>
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<sup>1</sup> Attendance Via Zoom

**1:45 PM Panel 1: Aircraft Noise Reduction and the Regulatory Environment**

(5 minute panel presentations followed by discussion)

**ISSUE: How can technological innovation, industry efforts, and FAA regulations further reduce the impact of aircraft noise on communities surrounding airports or on busy flight paths?**

**Moderator:**

*Alan Epstein, ASEB Chair*

**Panelists:**

*Becky Cointin, Deputy Director, Office of Environment and Energy, FAA*

*Fay Collier, Environmentally Responsible Aviation Project, NASA*

*Kalena Glover, Performance Engineer, Delta Airlines*

*Lourdes Maurice, Consultant, DLM Global Strategies<sup>1</sup>*

*Melinda Pagliarello, Senior Director – Environmental Affairs, Airports Council International*

**3:30 PM Break**

**3:45 PM Panel 2: The University Leadership Initiative: Results and a Reflection on the Program**

(5 minute panel presentations followed by discussion)

**ISSUE: How did the ARMD-ULI facilitate the development of new technologies and innovations that benefited the aviation community? Are there any improvements that can be made to the program?**

**Moderator:**

*Eileen Collins, ASEB Member*

**Panelists:**

*Mike Benzakein, Director, Propulsion and Power Center, OSU*

*James Coder, Professor, U. of Tennessee-Knoxville*

*John Civolowsky, NASA*

*Dimitris Lagoudas, Professor, Texas A&M*

*Yongming Liu, Professor, Arizona State*

*Helen Reed, Professor, Texas A&M<sup>1</sup>*

**5:15 PM Observations and Closing Discussion**

**All**

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**Reception and Dinner - All Members, Speakers, and Guests are invited to attend (please RSVP in advance)**

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**5:30 PM Reception – Beckman Center Patio**

**6:00 PM Working Dinner – Beckman Center Dining Room (adjourn after)**

**Dinner Speaker: Barbara Esker, NASA**

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**\* Details of September 25<sup>th</sup> Afternoon Panels**

**Focus on the Future of Aeronautics Technology**

Introduction: Due to its heavy reliance on high technology, aeronautics advances only as fast as the technology that supports it progresses. In recent years, that progress has been driven by a combination of regulatory standards and industry desires for more efficient (and therefore profitable) aircraft. At this moment, new technologies are being developed that may change aeronautics dramatically, potentially energizing the aeronautics industry in the process. The two panels today and one panel tomorrow will explore these opportunities and challenges, and discuss how the United States can continue to be a dominant force in innovating, producing, and exporting aeronautics technology.

**Panel 1: Aircraft Noise Reduction and the Regulatory Environment**

Noise pollution from aircraft has been an issue since the advent of routine commercial aviation. Residents near airports and on busy flight paths deal with daily disruptions due to the sound of aircraft. Multiple research efforts from new aircraft bodies to novel

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<sup>1</sup> Attendance Via Zoom

engine design are focused on reducing the noise produced by aircraft to mitigate the effect that aircraft has on communities surrounding airports and on flight paths. What are the current research efforts into aircraft noise reduction? How will the funding and regulatory environment support the development and deployment of such technologies? How can we ensure that the aviation industry minimizes the negative effects of noise on vulnerable communities?

## **Panel 2: The University Leadership Initiative: Results and a Reflection on the Program**

The Aeronautics Research Mission Directorate (ARMD) announced in 2017 a new initiative for university partners to achieve their Strategic Implementation Plan. The goal was to foster academia-NASA partnerships, encouraging academic research into fields critical to the success of ARMD. Additionally, the products of this program would be transitioned into benefiting the aviation industry as a whole. As the program enters its third year of awards, it would benefit the program to consider the results of the first awardees of the Initiative. How did the awardees utilize the initiative to pursue new research opportunities that benefited the ARMD? How successful were the research programs funded by ULI? What new technology or innovations arose from the ULI? From the viewpoint of the first awardees, how could ARMD improve the initiative for the next round of awardees?

## **DAY 2 – SEPTEMBER 26<sup>TH</sup>**

<b>EXECUTIVE SESSION</b>		
<i>Zoom Remote Access Information - Day 2 Closed Session 1</i>		<i>Phone: TBD</i>
<i>Link: TBD</i>		<i>Meeting ID: TBD</i>
<b>7:00 AM</b>	<b>Working Breakfast Available in the Beckman Dining Room</b>	
<b>8:00 AM</b>	<b>Committee Discussions</b>	
<b>8:15 AM</b>	<b>Break</b>	

<b>OPEN SESSION</b>		
<i>Zoom Remote Access Information - Day 2 Open</i>		<i>Phone: TBD</i>
<i>Link: TBD</i>		<i>Meeting ID: TBD</i>

<b>Focus on the Future of Aeronautics Technology</b>		
<b>8:30 AM</b>	<b>Welcome and Introductions</b>	<b>Alan Epstein, ASEB Chair</b>
<b>8:35 AM</b>	<b>Overview of Electric Aircraft and Introduction of Topic</b>	<b>Valerie M. Manning, ASEB Member</b>
<b>8:45 AM</b>	<b>Overview of NASA's Electrified Aircraft Propulsion</b> (30 minute presentation & 15 minute discussion)	<b>James Felder, NASA</b>
<b>9:30 AM</b>	<b>Break</b>	
<b>9:45 AM</b>	<b>Panel 3: Innovations in Electric Aircraft Propulsion</b> (5 minute panel presentations followed by discussion) <b>ISSUE: What technical advances and research priorities are required in the near future to see the advent of practical electrically propelled commercial aircraft?</b> <b>Moderator:</b> <b>Panelists:</b>	
		<b>Valerie M. Manning, ASEB Member</b>
		<b>Yet-Ming Chiang, Professor, MIT</b>
		<b>James Felder, Aerospace Engineer, Propulsion Division, NASA</b>
		<b>Ryan Miller, Air Force Research Laboratory<sup>1</sup></b>
		<b>Venkat Viswanathan, Professor, Carnegie Mellon</b>

<b>Focus on Space Technology</b>		
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<sup>1</sup> Attendance Via Zoom

<b>11:30 AM</b>	<b>Update on Gateway, Human Landing System, and Space Suits</b> (30 minute presentation & 15 minute discussion)	<b>Marshall Smith, NASA</b>
<b>12:15 PM</b>	<b>Working Lunch in the Beckman Dining Room (informal discussions continue over lunch)</b>	
<b>1:15 PM</b>	<b>Space Launch System Status Presentation</b> (30 minute presentation & 15 minute discussion)	<b>John Honeycutt, NASA</b>
<b>2:00 PM</b>	<b>Update on STMD</b> (30 minute presentation & 15 minute discussion)	<b>Jim Reuter, NASA</b>
<b>2:45 PM</b>	<b>Break</b>	

#### Focus on Space Technology Applications

<b>3:00 PM</b>	<b>Panel 4: Standing on the Shoulders of Giants: Lessons Learned and Derivative Technologies from Flagship Missions</b> (10 minute panel presentations followed by 30 minute discussion) <b>ISSUE: What lessons have been learned from flagship missions in both space project management and advanced technology development? How can we ensure that the management strategies and the space technologies of the flagships influence both the next generation spacecraft and the private sector at large?</b>  <b>Moderator:</b> Pamela Melroy, ASEB Member <b>Panelists:</b> David Bearden, Senior Lead of Strategy, NASA-JPL Steve Justice, Director – Integrated Systems, Lockheed-Martin Skunkworks John Mather, Senior Project Scientist, JWST, NASA <sup>1</sup> Daniel Neal, Research Fellow, Johnson & Johnson
<b>4:30 PM</b>	<b>Break</b>
<b>4:45 PM</b>	<b>Meeting Attendees Group Photo</b>

#### EXECUTIVE SESSION

Zoom Remote Access Information - Day 2 Closed Session 2		Phone: TBD
Link: TBD		Meeting ID: TBD
<b>4:45 PM</b>	<b>Committee Discussions</b>	
<b>6:15 PM</b>	<b>Adjourn for the day – evening free</b>	

#### \* Details of September 26<sup>th</sup> Panels

##### Panel 3: Innovations in Electric Aircraft Propulsion

Aviation accounts for roughly 2% of the world's carbon dioxide emission, and fuel was the single largest expense for most airlines in 2018. Both of these facts have led to the industry desire for more fuel-efficient aircraft. The next step would be an aircraft with either electrically assisted propulsion or even a fully electric aircraft. The United States is not alone in its desire for aircraft of this type. Internationally, other countries have expressed a desire for an all-electric fleet servicing domestic flights within the next 20 years. What is the current state of the development of electrical aircraft in the United States? What are the next necessary

<sup>1</sup> Attendance Via Zoom

technological advances to ensure the United States remains at the forefront of electric aviation technology? How do the federal government and agencies facilitate the development of electrically driven aircraft?

**Panel 4: Standing on the Shoulders of Giants: Lessons Learned and Derivative Technologies from Flagship Missions**

The hazardous environment of space requires a high degree of innovation, creativity, and organization to stage a successful project, especially for flagship missions. Mission planning and project management are essential to the success of these projects considering their ambitious science goals and the momentous engineering challenges. Each flagship mission improves our ability to manage and launch massive endeavors that can further our understanding of technology and science as well as capture the public imagination. However, the lessons learned in project management, mission planning, and facilitating derivative technology must be acknowledged and, more importantly, implemented to ensure the success of future missions. What lessons have been learned in the course of designing and deploying these flagships from both a project management perspective and technical perspective? What project management pitfalls can be avoided in the future to ensure that future flagship projects are successful in overcoming their challenges? How have the lessons learned in both management and technology from these programs be applied to future spacecraft programs? How can the federal government and its agencies ease the technology transfer of flagship missions to American industries?

**DAY 3 – SEPTEMBER 27<sup>TH</sup>**

EXECUTIVE SESSION		
DISCUSSION OF ONGOING ACTIVITIES & WRAP UP		
Zoom Remote Access Information - Day 3 Closed Session		Phone: TBD
Link: TBD		Meeting ID: TBD
7:30 AM	Working Breakfast Available	
8:30 AM	Committee Discussions	
12:00 PM	Meeting Adjourns – Working Lunch Available	