Aeronautics Research and Technology Roundtable

Revolutionary Aerospace Engineering Methods

December 4, 2025

Hybrid Meeting

In Person at Keck Building Room 201, 500 Fifth Street, NW, Washington, DC 20001

THURSDAY, DECEMBER 4, 2025

OPEN SESSION

Eastern/Pacific

9:00 AM/6:00	**Welcome and meeting overview** *(15 minutes)*	**John Langford – ARTR Chair** **Robert Pearce** **Associate Administrator, ARMD/NASA**
9:15 AM/6:15	**NASA Revolutionary Engineering Methods Introduction** *(30-minute presentation)*	**John Cavolowsky** ***Director, Transformative Aeronautics Concepts Program*/NASA**
9:45 AM/6:45	**Setting the Stage** *(15 minutes)*	**John Langford – ARTR Chair**
10:00 AM/7:00	**State-of-the-art and future vision for engineering methods** *(60-minute discussion)* **Discuss the current landscape of engineering methods used across aerospace and related industries. Articulate a vision for a future, highly competitive US aviation community that incorporates forward-looking and transformative practices.**	**Discussion**
11:00 AM/8:00	*Break (15 minutes)*	
11:15 AM/8:15	**Barriers** *(45-minute discussion)* **Identify the barriers—technical or otherwise—that hinder the advancement or adoption of modern engineering methods. Discuss which concerns are most relevant to the aviation community.**	**Discussion**
12:00 PM/9:00	Working Lunch (30 minutes)	
12:30 PM/9:30	**Opportunities** *(90-minute discussion)* **Identify high-impact opportunities in aviation where improved engineering methods can significantly** • **Accelerate development or deployment timelines** • **Enable exploration of new designs or capabilities**	**Discussion**

- **Reduce cost or risk in any lifecycle phase**

Consider where cutting-edge technologies—such as AI, new computer architectures, advanced materials, or digital engineering—have in role revolutionizing engineering methods, if any. Suggest motivating challenge problems that could help focus efforts towards realization of the opportunities discussed.

2:00 PM/11:00 *Break (15 minutes)*

2:15 PM/11:15 **NASA's Role** **Discussion**
(60-minute discussion)
Discuss NASA's role in advancing engineering methods among industry, academia, and other government entities. Suggest possible partnerships that benefit the goal of US leadership. Suggest NASA-appropriate activities to build communities and leverage their effort towards impactful engineering methods advancement.

3:15 PM/12:15 Roundtable Discussion
(60 minutes)

4:30 PM/1:30 Meeting Adjourns

Aeronautics Research and Technology Roundtable
Statement of Task

The Aeronautics Research and Technology Roundtable (ARTR) convenes senior-most representatives from industry, universities and NASA to define and explore critical issues related to NASA's aeronautics research agenda that are of shared interest; to frame systems-level research issues; and to explore options for public-private partnerships that could support rapid, high-confidence knowledge transfer. This forum will be designed to facilitate candid dialogue among participants, to foster greater partnership among the NASA-related aeronautics community, and, where appropriate, carry awareness of consequences to the wider public.

Statement of Goals for the Discussion

Background: NASA Aeronautics is soliciting input from the community to help inform portfolio strategy for an emerging focus on Revolutionary Engineering Methods (REM). The engineering methods term is used to collectively refer to the computational simulations, ground facility experiments, scaled flight tests, and other mechanisms used in design and development of aerospace systems. The REM focus area includes methods applicable to any aviation use case (e.g. large commercial transport, AAM, novel propulsion) and system level (e.g. component, integrated system, system-of-systems).

Goals of NASA's REM investment include

- **Acceleration of aerospace design and deployment**
- **Efficient use of limited resources (e.g. facility and flight time, compute, expertise)**
- **Substantial improvement to current engineering methods practice**

While not a new investment area for NASA, the engineering methods domain will become a featured topic within the portfolio as other means of supporting the US aviation industry become more constrained. Emphasis is placed on pursuing paradigm-shifting opportunities that impact how engineering methods are executed and address recognized pain points in the aviation lifecycle. It is anticipated that the impact of REM investments will be fully realized in the far term, with an expectation of modest near and mid-term contributions.

Task: The National Academies of Sciences, Engineering, and Medicine (NASEM) will organize a one-day meeting of relevant experts from the aviation community and beyond to address the following:

• Describe the current state-of-the-art and associated pain points in aerospace engineering methods, including computational, ground, and flight test approaches. Discuss the associated design and development pain points, and explore the historical, institutional, or technical reasons why the field remains in this state.

• Describe the desired future state in aerospace engineering methods, including characteristics such as agility, scalability, automation, real-time feedback, and seamless integration across disciplines and phases of development.

• Survey and assess emerging technologies with the potential to revolutionize aerospace engineering.

Participants should consider a broad range of technologies, including artificial intelligence, machine learning, advanced materials, quantum computing, autonomy, robotics, and digital twin environments. The goal is to understand how these technologies could disrupt or enhance current engineering paradigms.

• Identify impactful opportunities for transformative improvements in computational, ground, and flight test methods.

The discussion should focus on identifying methods that are substantially better, faster, or more cost-effective than current practices. Particular attention should be given to how these methods can be integrated to create an efficient and effective engineering pipeline, from design to real-world operations. The group should articulate motivational challenge problems for NASA and the aviation community that highlight the identified opportunities.

• Explore opportunities to leverage NASA's unique capabilities and facilities for the benefit of the broader aerospace community.

The group should examine how NASA's assets—such as wind tunnels, simulators, and testbeds—can be made more accessible or better utilized to support innovation across

academia, industry, and government. Constructs for effective community engagement like canonical datasets, open-source tools, vision studies, and benchmark problems should be discussed.

• Discuss NASA's role in aerospace methods and tools development.

The group should examine how NASA can support or complement efforts in industry, academia, and government. Emphasis should be placed on how these efforts can enhance the global competitiveness of the U.S. aviation and aerospace sectors. Collaboration mechanisms like partnerships and working groups should be discussed where appropriate.

IMPORTANT NOTES

Presenters:

- **Please do not include ITAR-controlled or sensitive information in your presentation.**

ARTR Members and Presenters:

- **Remote access will be provided through Zoom. This will allow you to participate in the meeting even if you can't be physically present.**
- **Please note that Zoom allows audio and any materials exchanged or viewed during the session to be recorded and shared.**
- **By participating in this activity, you agree to let your voice, likeness, and any materials you provide be recorded for use and dissemination. This includes any language, format, or media now known or later devised.**
- **You release the National Academies of Sciences, Engineering, and Medicine from any and all claims, liability, or damages arising from any such use. If you disagree, please do not join the session.**

Members of the General Public:

- **This meeting is being held to facilitate dialogue among the participants. This roundtable will examine the information and material obtained during this, and other meetings, in an effort to inform its work. Although opinions may be stated and lively discussion may ensue, no conclusions are being drawn at this time and no recommendations will be made by the roundtable. Therefore, observers should not draw conclusions about the roundtable's work based on today's discussions.**
- **Furthermore, individual roundtable members often engage in discussion and questioning for the specific purpose of probing an issue and sharpening an argument. The comments of any given member may not necessarily reflect the position he or she may actually hold on the subject under discussion.**

Website: https://www.nationalacademies.org/our-work/aeronautics-research-and-technology-roundtable

Free parking is available in the Keck Building. Go to the parking entrance on 6th Street (opposite side of the main building entrance) and talk to the security guard, who will provide you a parking pass for the P1 level of the building.

Thank you all for your cooperation, and we look forward to a successful meeting.