

NASA Advisory Council Aeronautics Committee Meeting
March 22, 2023
NASA Armstrong Flight Research Center, Building 4825
Edwards, California

Welcome

Dr. John-Paul Clarke, committee chair, called the meeting to order. Introductions were made and information regarding the purpose and scope of the Committee's discussions, findings, and recommendations were described. This meeting was conducted in a hybrid style, with some attending in person at NASA's Armstrong Flight Research Center in California and others attending virtually.

Sustainable Flight Demonstrator

Mr. Lee Noble, director of NASA's Integrated Aviation Systems Program, introduced aircraft and flight research projects the Aeronautics Research Mission Directorate (ARMD) manages.

He provided specific focus on the acquisition of the Sustainable Flight Demonstrator (SFD) aircraft. He outlined project goals for the SFD, including reducing the impact on climate, improving U.S. competitiveness in the single-aisle aircraft market, and informing technologies to be used in aircraft in the 2030s.

He described the funded Space Act Agreement (FSAA) process by which the SFD is coming to fruition and how partnering with industry via the FSAA is a cornerstone of the SFD effort. In specific, he explained how NASA's industry partner, Boeing, is taking the lead on the effort with NASA as a contributing partner.

He elaborated on how the proposal and selection process worked and the benchmarks by which the selection occurred, also stating programmatic and funding details along with giving an overview of the SFD schedule.

Mr. David Silver asked Mr. Noble to provide more details on the airworthiness certification process, specifically how NASA is including the Federal Aviation Administration (FAA) in the process.

Mr. Noble responded that NASA and Boeing teams are in close lockstep to achieve airworthiness certification even now, just as the project is beginning, and are including the FAA in the process. He applauded Boeing for seeking to do airworthiness early.

Mr. Brent Cobleigh, NASA's manager for the Sustainable Flight Demonstrator project, added details on how the teams are going about the airworthiness process, including

how they sought to actively include the FAA in the testing processes leading to airworthiness certification rather than waiting until after testing, especially because a presence during the testing period could help the FAA in certifying truss-braced wing configurations in the future.

Mr. Noble explained how, in a way similar to a fixed-price contract, the FSAA model pays industry partners on completion of predetermined milestones negotiated up front, giving industry more “skin in the game,” and thereby helping NASA better manage the timeline and potential risks, among other details.

Mr. Robert Pearce, NASA’s associate administrator for ARMD, added how unlike other FSAs, NASA is comparatively bringing more to the table in this effort because there is an intention to have more than a partnership. Though Boeing is largely leading the effort, NASA is providing an abundance of technical capabilities and expertise.

Discussion

Mr. Silver suggested there be a written document, such as a memorandum of understanding, between NASA and the FAA relating to airworthiness certification and the opportunity to use this data as part of any future certification efforts undertaken by industry, which would put the onus on the FAA to do the work instead of NASA.

Dr. Clarke refined Mr. Silver’s suggestion, elaborating how the opportunity exists for the FAA to use such data in the future.

Dr. Nicole Key asked Mr. Noble if he could explain why there was a drought between FSAs awarded by ARMD. Mr. Noble did not have the history, but a subsequent discussion ensued between Mr. Steven Clarke, Dr. Key, Mr. Jon Montgomery, Mr. Noble, Mr. Pearce, and Dr. Edgar Waggoner on the use of FSAs and the benefits.

Dr. Helen Reed applauded NASA for the SFD’s FSA, mentioning the agreement and its structure look promising for NASA especially by its partnership with Boeing and early addressal of airworthiness.

Findings:

1. The Committee finds there is an opportunity to include the FAA where appropriate in the Sustainable Flight Demonstrator development and airworthiness discussions, thereby providing early insights into technical aspects of this configuration and considerations, and access to subject-matter experts, that may be beneficial for future FAA certification assessments.

2. The Committee finds the Funded Space Act Agreement for the Sustainable Flight Demonstrator is an exemplar mechanism for collaboration with industry, especially because it enables industry to have “skin in the game.” The Committee also commends NASA and Boeing for considering airworthiness certification early in the process.

ARMD Budget Overview

Mr. Pearce gave an overview of budgetary and programmatic plans and details included in the fiscal year 2024 budget request.

He spoke on the Quesst mission timeline and the intention to have community response data for the Committee of Aviation Environmental Protection (CAEP) of the International Civil Aviation Organization (ICAO) in a timely manner, especially given the CAEP convenes only once in a three-year period.

Mr. Pearce explained aspects of NASA’s Advanced Air Mobility activities and goals, including FAA certification. He discussed how the NASA/FAA relationship can be optimized. NASA also is looking at the near term so the FAA can enable the beginning of scalability. As an example, he stated automated corridors for high-density flight areas would not seek to change the current rules, just add automation. The overall intention, Mr. Pearce said, is to address some near-term goals while long-term goals are in the works, and so forth.

Mr. Pearce also pointed out NASA is continuing to strengthen relationships with multiple offices of the FAA, and there is recognition that finding ways to move the certification process along faster is important. He added NASA is providing tools to the FAA to provide support in these areas and mentioned prior situations in which subject matter experts also aided in the certification process.

He also brought up a promising new alloy developed as part of NASA’s Transformative Aeronautics Concepts Program, GRX-810, resulting from innovation on NASA’s part, which would be discussed during the following presentation and discussion.

Discussion

Mr. Silver pointed out that due to U.S. sanctions on Russia, there are new issues related to sharing data and information with ICAO – of which Russia is a member. He encouraged NASA to learn more about this issue as it could affect the Quesst mission. Dr. Reed concurred with Mr. Silver.

Dr. Clarke encouraged NASA to look more broadly than just developing certification tools for the FAA, but also bringing in subject matter experts to the FAA to assist. He elaborated how once certification is underway, tools cannot be overlaid, and providing subject matter expertise is the only way to further support the process.

Ms. Susan Pfingstler brought up delays the airlines are experiencing due to airspace restrictions. She gave an example of one weekend during which there was a rocket launch at Cape Canaveral, military flight training over the Florida panhandle, and several thunderstorms all in close proximity. The airlines were left with little airspace, and the resulting flight delays rolled through the entire National Airspace System, affecting hundreds of thousands of passengers.

She added challenges like these are growing in frequency, the obstacles require more fuel to steer around, and asked whether NASA had any tools not just for the FAA, but also for the airlines to enable better flight planning.

A discussion ensued between Dr. Clarke, Mr. Pearce, and Ms. Pfingstler on various solutions to constraint issues, including making Temporary Flight Restrictions more dynamic not only spatially, but also temporally; whether more collaborative methods of traffic management could be explored opposed to just responsive ones; and creating more idealized flight plans.

Dr. Reed emphasized the importance of specifically providing airlines with more insight into, and including them in, these conversations.

Findings:

1. The Committee finds there is an opportunity for more collaboration with airlines and other airspace users to quantify constraints placed on airspace operation by the absence of certain technologies as well as the growing need for airspace use by traditional and new entrants, and to determine how greater coordination might alleviate the inefficiencies that are introduced by these constraints.
2. The Committee finds that NASA should more closely examine how issues with respect to the reporting of data to the International Civil Aviation Organization (due to US sanctions on Russia) could interfere with the Quesst mission.

University Leadership Initiative Round 6 Selections

Dr. John Cevolowsky, director of NASA's Transformative Aeronautics Concepts Program, presented an overview of the University Leadership Initiative (ULI), the University Student Research Challenge, and the Gateway to Blue Skies competition.

During the discussion of ULI, Dr. Cavolowsky walked the Committee through how each ULI award relates to ARMD's six strategic thrusts, as well as the special topics for ULI such as zero emissions. He discussed the status of several of the ULI awardees and their technologies, also detailing the Round 6 solicitations and awards.

Dr. Clarke asked if ARMD's six thrusts are still the right six thrusts for ULI, given ULI has operated by them for some time now. He also wondered whether there could be more or different special topics for ULI and how often NASA examines those.

Dr. Cavolowsky answered the strategic plan is reviewed on a regular basis, and though the thrusts haven't been specifically addressed, small adjustments have been made along the way into the six existing thrusts to keep up with various interests in the industry.

Discussion

Dr. Clarke pointed out there is some incongruity between the six strategic thrusts and the four transformational areas of NASA Aeronautics, especially when presenting them side by side. He wondered if this has been considered and how to rationalize the thrusts into something easier to explain. He pointed out ULI could be a mechanism to explore new speculative areas, and universities could help define the research to tackle them.

Mr. Pearce replied that though the six thrusts have been useful, there is a consideration to consolidate them or explore additional ones, and that the four transformational areas best represent what the priority transformations are today, and that they are not intended to last forever.

Dr. Clarke added the context of the NASA Research Announcements being too prescriptive, and that universities sought an avenue to harness the creativity of all the young minds, which the University Innovation project arose from. He suggested NASA continue to explore that mindset of universities leading research avenues.

He also asked if there is an opportunity to look at ways for some of the maintenance requirements for designs to flow back upwards into the design process, because in many four-year universities, maintainability is not always accounted for. He suggested NASA could frame this idea to solicit requirements for a design.

There was a discussion between Dr. Cavolowsky, Dr. Clarke, and Dr. Reed on being more deliberate about finding the "seedlings" with potential to grow outward, with the specific example of the GRX-810 alloy. They explored the idea of figuring out how ULI could encourage communication between agency and non-agency people that could lead to high impacts.

Finding:

1. The Committee finds there is potential for the University Leadership Initiative to serve as a mechanism for exploring ideas and concepts beyond those defined in the six ARMD thrusts.

Public Comments

A public comments period was offered as required.

Mr. Paul Krasa of NASA congratulated Dr. Clarke for being the chair of the committee.

Igor Alvarado asked about the role of the NASA Innovation Core and Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) in the innovation strategy and stated there is an opportunity to create a continuum between K-12 programs, university programs, and academic research by designing bridge programs in between.

Mr. Pearce responded he was unfamiliar with the details of the Innovation Core, but provided a brief explanation of SBIR and STTR and how ARMD relates to them.

Mr. Krasa added that the NASA Minority University Research and Education Project encouraged the solicitation of K-12, community colleges, and university partnerships with industry.

Conclusion

The meeting of the Committee was concluded with discussions on the timeline and plans for future meetings.

MEETING ADJOURNED

List of Attendees

Committee Members:

1. Dr. John-Paul Clarke
2. Dr. Naveed Hussain
3. Dr. Nicole Key
4. Mr. Natesh Manikoth
5. Ms. Susan Pfingstler
6. Dr. Helen Reed
7. Mr. David Silver

NASA

8. Carmen Arevalo
9. Vanessa Aubuchon
10. Brian Barmore
11. Tracie Contreras
12. John Cavolowsky
13. Steven Clarke
14. Brent Cobleigh
15. Koushik Datta
16. Shannon Eichorn
17. Bradley Flick
18. Michael Gibson
19. Laurie Grindle
20. Lori Losey
21. Robert Pearce
22. Abigail Osborn-Pineda
23. Tim Peters
24. Sherilyn Brown
25. James Heidmann

26. Sharon Jones
27. Paul Krasa
28. Samantha Magill
29. Jon Montgomery
30. Lee Noble
31. Cheryl Quinn
32. Irma Rodriguez
33. Steve Velotas
34. Sarah Waechter
35. Edgar Waggoner
36. Wendy Yang
37. Eddie Zavala

External (Affiliation Identified if Provided)

38. Dan Kaplan (Collins Aerospace)
39. Gene J. Mikulka
40. Igor Alvarado
41. Mary Lombardo
42. Mike Krenz (Collins Aerospace)
43. Ray Kamin (Collins Aerospace)
44. Megan Rae Rosia (Collins Aerospace/RTX)
45. Yeshani Wijeseka

FedWriters (NAC Meeting Support):

46. John Gould