NASA Advisory Council Aeronautics Committee Meeting
25-26 June 2024
DFW Airport Department of Public Safety Headquarters Building
Euless, Texas

Welcome

Dr. John-Paul Clarke, committee chair, called the meeting to order. Introductions were made and members of the Committee were welcomed. 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 Dallas-Fort Worth International Airport (DFW)'s Department of Public Safety building in Texas and others attending virtually.

Unmanned Aircraft Systems Traffic Management Key Site Operations

Mr. Sultan gave a presentation on the Unmanned Aircraft Systems Traffic Management (UTM) endeavor between NASA, the FAA, and industry – particularly related to operations at the key site located in North Texas where real-world, multi-party Beyond Visual Line of Sight (BVLOS) flights are occurring.

He spoke at great length about the various NASA/FAA/Industry collaborations going back into the last decade. He mentioned how UTM was made possible through these collaborations – as well as how its development is continuing through them.

Mr. Sultan noted the successes seen thus far at the Key Site and laid out some of the overall challenges going forward. He discussed regulations surrounding UTM and BVLOS complicating the evolution of the technology and its entry into the market, covering subjects such as roles and responsibilities between providers, operators, and regulators.

Discussion

Mr. Peter Bunce broached the subject of aircraft not equipped with Automated Dependent Surveillance—Broadcast (ADS-B). He emphasized that unless drones are able to "read" them in the airspace outside of a detect-and-avoid capability, UTM and BVLOS are unlockable, and the community seems to have reached an impasse in solving the challenge.

Continuing this point, Ms. Lisa Ellman discussed the criticality of solving this issue and how the lack of a standard can lead to contested, non-cooperative environments non-conducive to BVLOS flights. She proposed the potential use of low-power ADS-B or

similar technologies to make otherwise-unequipped aircraft more conspicuous, along with subsidies or reimbursements to enable widespread use.

Mr. Bunce noted how some crewed general aviation aircraft fly only with low-power handheld radios for communication, which have a similar power level to low-power ADS-B. He mentioned how no one seems to be addressing this issue or informing future decisions on it, but there are several options that could satisfy the general aviation community. He pointed out that ADS-B is incentivized continentwide in Australia with the purpose of unlocking UTM.

Ms. Ellman gave a caveat that mandating ADS-B is not being suggested, rather, a solution for more electronic conspicuity – and that NASA's input would be welcome in this area.

Dr. Hassan Shahidi also suggested some low-cost equipage solution and questioned whether NASA's scope includes providing one. He brought up the larger policy issues and suggested a multi-party, multi-agency approach to informing and resolving the challenge.

An ensuing discussion occurred between Dr. Clarke, Mr. Sultan, and Ms. Shivanjli Sharma, manager of NASA's Air Traffic Management – eXploration project, on NASA's roles and relationships with third-party operators and overall policy.

Dr. Shahidi expressed NASA is well within its role to provide insight and input to future policies and operators via its vast expertise in simulation and analyzing risk benefits and thresholds.

Dr. Clarke stated the question is along the lines of how NASA can do things differently to support the FAA and the community in terms of making sure all the capabilities arising are validated correctly – in that, NASA could validate whether a capability is sufficient or needs more work.

He elaborated that NASA taking on a similar role with third parties, and such activities involving the International Civil Aviation Organization, could be productive and worthwhile. He gave as an example the previously discussed conspicuity problem.

Mr. Robert Pearce, NASA's associate administrator for Aeronautics, characterized the discussion as an expansion to the larger community of the roles NASA has already taken. He stated that examining the role NASA plays as this landscape changes, and how NASA provides benefits, are questions that could be learned from.

Dr. Michael Winter and Dr. Shahidi suggested NASA could inform these potential solutions by assessing risks and benefits through simulations or models such as digital twins.

Dr. Shahidi added leveraging NASA's ability to conduct excellent concepts of operation has had high value, and bringing experts together to liaise around future concepts of operations and having the right assumptions is a powerful role that should be continued.

As the discussion circled around conversations held in other committees some of the members sit on, Mr. Bunce proposed the idea of having more coordination between the various advisory committees addressing UTM to establish a more cohesive approach to aligning goals and solutions. Specific committees he had in mind include, but are not necessarily limited to, the FAA's NextGen Advisory Committee and Management Advisory Council.

Ms. Ellman praised NASA for its work thus far in these areas and its responsiveness to the community. She thanked NASA for its contributions and noted NASA's help is still needed.

Findings:

1. The Committee finds there is a need to address the issue of crewed aircraft that are not equipped with ADS-B or do not have electrical systems as it pertains to enabling UTM.

    - Supporting discussion: Though drones are equipped with Detect-and-Avoid capabilities, the full value of commercial drones cannot be unlocked without a way to incentivize aircraft equipage across the National Airspace System. NASA could consider whether it could in the near term (i.e., relative to the timeline of proposed rulemaking) inform effective low-cost solutions to make unequipped aircraft more conspicuous.

2. The Committee finds that NASA has an opportunity to inform policy decisions and tradeoffs on the risks and opportunities for future airspace management through its work in North Texas.

    - Supporting discussion: By creating a digital twin of the airspace using gathered data and injecting new situations, NASA could quantify these risks and identify further opportunities to provide capabilities.

3. The Committee finds that the current approach NASA is taking in the UTM BVLOS effort alongside the FAA and industry is excellent and commends the

management team for its engagement and support.

- Supporting discussion: The Committee observed multi-party BVLOS flight operations in North Texas and received presentations from NASA demonstrating great progress and value.

4. The Committee finds value in furthering the coordination between various advisory committees between NASA and other agencies.

    - Supporting discussion: Having this connective tissue can help leverage the strength of collaborative relationships and advance the pace of UTM.

Sustainable Flight National Partnerships Operations in North Texas

Mr. Sultan gave another presentation on NASA's Sustainable Flight National Partnership (SFNP) Operations, which are part of the government-wide U.S. Aviation Climate Action plan to achieve net zero greenhouse gas emissions from aviation by 2050. He was assisted by Ms. Sharma in explaining the details of the efforts, which are occurring largely between NASA, the FAA, and airline collaborations.

In particular, he focused on NASA's SFNP efforts pertaining to delivering a digital-oriented service framework to enable safe and sustainable flight operations in the future airspace envisioned by NASA and the FAA – which can substantially reduce carbon emissions by reducing the consumption of jet fuel. He explained the planned expansion of these tools to other areas outside the DFW Terminal Radar Approach Control.

Discussion

Ms. Susan Pfingstler explained how in a fast-changing environment such as now, the issue of equipage poses a question, in that by the time a new technology such as Controller Pilot Data Link Communications is advanced and implemented into an airline's fleet, the successor technology has been developed, and the question of whether to retrofit poses a risk and challenge to airlines. She suggested being mindful of the environment surrounding equipage concerns.

Dr. Winter added to this point using hybrid-electric technology as an example. He estimated that hybrid-electric aircraft of the type NASA envisions may not be brought to market in meaningful numbers until the 2040s and running a calculation from the standpoint of new product development, the return on investment must be considered, because by that time, a new technology may have arisen.

Dr. Clarke suggested considering the time value of money regarding the scenario Dr. Winter described. He emphasized a need to understand the value of the benefits of the SFNP technologies over time and the nonlinear benefits they accrue – especially in the context of a future retrofitting scenario and highest return on investment for the technology.

He continued elaborating on how different activities in the portfolio provide benefits of different timescales, which in turn, have different impacts or have different benefits to the overall climate change problem.

Findings:

1. The Committee finds there is value in NASA understanding the benefits of its sustainable aviation portfolio from a time value perspective.

    - Supporting discussion: The various activities in the NASA sustainable aviation portfolio will provide benefits at different times. Earlier benefits have non-linear impact with respect to tackling the climate change challenge. Understanding the relative benefits of different activities would be instrumental in better understanding the return on investment.

Public Comments

A public comments period was offered as required. No public comments were received.

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 (Chair)
2. Mr. Peter Bunce
3. Dr. Todd Citron
4. Ms. Lisa Ellman
5. Mr. Billy Nolen (Virtual)
6. Ms. Susan Pfingstler (Virtual)
7. Dr. Helen Reed (Virtual)
8. Ms. Dorothy Reimold (Virtual)
9. Dr. Hassan Shahidi
10. Dr. Michael Winter

NASA:

11. Paul Borchers
12. Al Capps
13. Carol Carroll
14. John Cavolowsky
15. Douglas Christensen
16. Jeremy Coupe
17. Shawn Engelland
18. Barbara Esker
19. John Gould (FedWriters)
20. Parimal Kopardekar
21. John Koudelka
22. Paul Krasa
23. Maureen Kudlac
24. Samantha Magill
25. Kate McMurtry
26. Jon Montgomery
27. Robert Pearce
28. Bryan Petty
29. Cheryl Quinn
30. Joseph Rios
31. Irma Rodriguez
32. Shivanjli Sharma
33. Christopher Silva
34. Akbar Sultan
35. Angela Surgenor
36. Huy Tran
37. Colin Theodore

External (affiliation identified if provided):

38. Kara Graves
39. Ed Hahn (Engineering & Air Safety)
40. Matthew Johnson
41. Tahlieah Sampson
42. Steve McMahon
43. Karl
44. Yohan