Advanced Aviation Advisory Committee

Public eBook

Public eBook
October 20, 2022 AAAC Meeting
Hilton Garden Inn Reagan National Airport
and Virtual

Advanced Aviation Advisory Committee

October 20, 2022 AAAC Meeting

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AAAC Meeting Logistics

- We ask that everyone remain muted during the presentations. After each briefing, there will be an opportunity for the AAAC members to engage in discussion and ask questions.
- Because of the large size of the group we ask that you first raise your hand using the Zoom command on your dashboard. An FAA moderator will be monitoring the dashboard and call on you to begin speaking.
- This AAAC meeting is being livestreamed and recorded. It will be made available for future viewing on the FAA's YouTube channel.
- To access the livestream links, go to either of these websites: https://www.facebook.com/FAA or https://www.youtube.com/FAAnews

FAA Designated Federal Officer, Presenters, and Speakers

Name	Title	Org.
1. Brad Mims	Deputy Administrator	FAA
2. Jay Merkle	Executive Director, UAS Integration Office (DFO)	FAA
3. Terry McVenes	President, Chief Executive Officer (CEO)	RTCA
4. Karina Perez	Director, Uncrewed and Emerging Aviation Technologies	AIA
5. Abby Smith	Deputy Executive Director, UAS Integration Office	FAA
6. Pete Dumont	Chief Executive Officer, Rare Air Solutions	
7. Daniel Elgas	Deputy Director, Policy and Innovation Division, Aircraft Certification Service	FAA
8. Diana Robinson	Project Manager, UAS Integration Office	FAA
9. Gary Kolb	UAS Stakeholder & Committee Officer, UAS Integration Office	FAA

FAA/DOT Observers and Stakeholders

Name	Title	Org.
1. Laurence Wildgoose	Assistant Administrator, Office of Policy, International Affairs and Environment	FAA
2. Shannetta Griffin	Associate Administrator, Airports	FAA
3. Hillary Heintz	Senior Advisor to Deputy Administrator	FAA
4. Claudio Manno	Associate Administrator, Security and Hazardous Materials Safety	FAA
5. Winsome Lenfert	Deputy Associate Administrator, Airports	FAA
6. Jodi Baker	Deputy Associate Administrator, Aviation Safety	FAA
7. Vinn White	Senior Advisor, Office of the Secretary of Transportation	DOT
8. Peter Irvine	Deputy Director, X50	DOT
9. Ryan Steinbach	Aviation Policy Coordinator, Office of the Secretary of Transportation	DOT
10. Sabrina Saunders-Hodge	Director, Research, Engineering, and Analysis, UAS Integration Office	FAA
11. Leesa Papier	Executive Director, Office of National Security Programs and Incident Response	FAA
12. Adrienne Vanek	Director, International Division, UAS Integration Office	FAA
13. Genevieve Sapir	Attorney-Advisor, General Counsel	FAA
14. Martha Christie	Acting Director, Safety & Integration Division, UAS Integration Office	FAA
15. Elizabeth Forro	Special Assistant, UAS Integration Office	FAA
16. Kamisha Walker	Management Assistant, UAS Integration Office	FAA

Advanced Aviation Advisory Committee

October 20, 2022 AAAC Meeting

Public Meeting Agenda
Time: 10:00 am – 2:30 pm Eastern Time
Location: Hilton Garden Inn, Arlington, VA

	Start	Stop	
1.	10:00 a.m.	10:05 a.m.	**FAA – Greetings & Logistics**
2.	10:05 a.m.	10:10 a.m.	**DFO – Read Official Statement of the Designated Federal Officer**
3.	10:10 a.m.	10:15 a.m.	**DFO – Review of Agenda and Approval of Previous Meeting Minutes**
4.	10:15 a.m.	10:20 a.m.	**FAA/Chair – Opening Remarks**
5.	10:20 a.m.	10:25 a.m.	**FAA – Deputy Administrator Opening Remarks**
6.	10:25 a.m.	10:45 a.m.	**FAA – Remote Identification Update**
7.	10:45 a.m.	11:15 a.m.	**Task Group #13 – Strategic Framework for Advanced Air Mobility Near-Term Operations Final Recommendations**
8.	11:15 a.m.	11:35 a.m.	**RTCA – Digital Flight Rules Briefing**
9.	11:35 a.m.	12:50 p.m.	**LUNCH BREAK**
10.	12:50 p.m.	1:10 p.m.	**FAA – Collegiate Training Initiative (CTI) Update**
11.	1:10 p.m.	1:40 p.m.	**FAA – Drone Safety Team Update**
12.	1:40 p.m.	2:00 p.m.	**FAA – New Taskings**
13.	2:00 p.m.	2:20 p.m.	**Chair – New Business/Future Agenda Topics**
14.	2:20 p.m.	2:25 p.m.	**FAA – Closing Remarks/Final Thoughts**
15.	2:25 p.m.	2:30 p.m.	**Chair – Closing Remarks/Final Thoughts**
16.	2:30 p.m.	2:30 p.m.	**Chair – Adjourn**

Questions/Comments: Contact Gary Kolb, UAS Stakeholder & Committee Officer (gary.kolb@faa.gov or 202-267-4441).

Advanced Aviation Advisory Committee

AAAC Membership – As of 10/13/2022

Stakeholder Group	Members
Designated Federal Officer	**Jay Merkle**, Executive Director, UAS Integration Office, Federal Aviation Administration
Chair	**Houston Mills**, Vice President, Flight Operations and Safety, United Parcel Service (UPS)
Airports and Airport Communities	**Seleta Reynolds**, Chief Innovation Officer, Los Angeles Metro **Dr. Paul Hsu**, Founder and Chair, HSU Educational Foundation **Jeffrey Brown**, Aviation Chief Operating Officer, Port of Seattle
Labor (controllers, pilots)	**Andrew LeBovidge,** Executive Vice President, National Air Traffic Controllers Association (NATCA) **Joseph DePete**, President, Air Line Pilots Association (ALPA)
Local, State, Tribal and/or Territorial Government or Appropriate International Entity	**David Greene**, Bureau of Aeronautics Director, Wisconsin Department of Transportation **Bob Brock**, Director of Aviation and UAS, Kansas Department of Transportation **Michael Leo**, Captain, New York City Fire Department
Navigation, Communication, Surveillance, and Air Traffic Management Capability Providers	**Amit Ganjoo,** Founder and Chief Executive Officer, ANRA Technologies **Matt Parker**, President, Precision Integrated Programs **VACANT**
Research, Development, and Academia	**Robie Samanta Roy**, Chief Operating Officer, Electra.aero **Karthik Duraisamy,** Associate Professor of Aerospace Engineering/ Co-Founder and Chief Scientist, University of Michigan/ Geminus.AI **Dr. Catherine Cahill**, Director, Alaska Center for Unmanned Aircraft Systems Integration (ACUASI)
Traditional Manned Aviation Operators	**Mark Baker**, President and Chief Executive Officer, Aircraft Owners and Pilots Association **Molly Wilkinson**, Vice President, Regulatory Affairs, American Airlines **James Viola,** Chief Executive Officer, Helicopter Association International
UAS Hardware Component Manufacturers	**Brad Hayden**, Founder and Chief Executive Officer, Robotic Skies **Christian Ramsey**, President, uAvionix Corporation
UAS Manufacturers	**James Burgess**, Chief Executive Officer, Wing (an Alphabet company) **Michael Sinnett**, Vice President Product Development and Strategy, Boeing Commercial Airplanes **David Carbon**, Vice President, General Manger, Amazon Prime Air **Adam Bry**, Co-founder and Chief Executive Officer, Skydio
Corporate UAS Operators	**Greg Agvent**, Senior Director of National News Technology, CNN **Todd Graetz**, Director, UAS Program and Machine Vision Systems, BNSF Railway

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Stakeholder Group	Members
Citizen UAS Operators	**Kenji Sugahara**, Chief Executive Officer and President, Drone Service Providers Alliance **Vic Moss**, Owner, Moss Photography
UAS Software Application Manufacturers	**Jaz Banga**, Co-Founder and Chief Executive Officer, Airspace Systems, Inc.
Agricultural Interests	**Brandon Torres Declet**, Chief Executive Officer, Meteor **James Grimsley,** Executive Director, Advanced Technology Initiatives - Choctaw Nation of Oklahoma
Advanced Air Mobility	**Dr. Jaiwon Shin**, Chief Executive Officer, Supernal **Melissa Tomkiel,** President and General Counsel, Blade Air Mobility **Kevin Cox**, Chief Executive Officer, Ferrovial Vertiports **VACANT**
Community Advocate	**Yolanka Wulff,** Executive Director, Community Air Mobility Initiative **Okeoma Moronu,** Head of Aviation Regulatory and Legal Affairs, Zipline
Industry Associations or other specific areas of interest as determined by the AAAC DFO	**Brian Wynne**, President and Chief Executive Officer, Association for Unmanned Vehicle Systems International **Edward Bolen**, Chief Executive Officer, National Business Aviation Association **David Silver**, Vice President for Civil Aviation, Aerospace Industries Association **Lee Moak**, Founder & Chief Executive Officer, Intrepid

Task Group 13

Feedback on FAA's AAM Near-Term FAA Strategic Framework for AAM Near-Term Operations

Final Report

10-20-2022

Task Group 13 Feedback on FAA Strategic Framework for AAM Near-Term Operations

In February 2022, the Federal Aviation Administration (FAA) tasked the Advanced Aviation Advisory Committee (AAAC) with providing feedback on their Strategic Framework for AAM Near-Term Operations. The FAA did not identify "near-term" as a specific timeline but sought to describe the "near-term operations" envisioned for the operation of piloted advanced air mobility (AAM) aircraft that have been type-certificated using existing processes.

To provide regulators with a clear picture of Task Group 13's feedback on the provided Strategic Framework for AAM Near-Term Operations, five subgroups around the different categories provided in the framework (aircraft, airspace, operations, infrastructure, and community) were created. Each took input from AAAC members and non-members on their respective topics and determined if the FAA is asking the correct questions in their pursuit of rulemaking for near-term AAM operations.

Task group 13 operated under the understanding that near-term operations were within the timeline of 2024-2028 to help inform the agency's discussion about how to prioritize engagements identified in the near-term concept. Additionally, the group utilized the following definition of AAM as it thought through these questions: AAM is the umbrella term referring to a range of emerging innovations in aviation, including urban and regional air mobility (UAM and RAM), passenger and cargo operations, and a range of electric and autonomous technologies. This includes but is not limited to eVTOL and uncrewed aircraft, that promise to increase the safety, and expand the utility of aviation in our daily lives. The sections below contain each subgroup's recommendations for additional inquiry.

Aircraft Subgroup

The aircraft subgroup raised several questions in response to the FAA Strategic Framework for AAM Near-Term Operations and made recommendations regarding the process of certifying new and novel aircraft for service in future UAM airspaces.

Common interest was found in identifying how the FAA's Center for Emerging Concepts and Innovation (CECI), in coordination with applicants, can develop a clear path for certification of new and novel technologies when one doesn't exist yet, as well as how CECI would coordinate and confirm such a path with AIR-600. Looking forward, the subgroup is interested to know what mechanisms are in place to commit to such a path throughout the certification process, including:

- Is it through signed documentation?
- How does AIR coordinate and obtain senior-level commitment so aircraft, once certified, can operate and integrate safely into the National Airspace System (NAS)?
- How is the FAA utilizing the internal AAM Integration Executive Council, and how can industry help provide input and feedback to them?

The subgroup also asks that the FAA determine which lines of business are needed to coordinate its efforts and how it plans to bring in all lines of business early and often through the formation of the G1 process.

Regarding Early Innovation Engagement (EIE) steps, the subgroup asks if AIR-700 should be engaged prior to project integration and if it would be appropriate/useful to have CECI engaged after? The group also seeks clarification as to whether these steps are "unlocked" or run parallel with each other.

The subgroup notes that existing projects have taken several years—some over a decade—from initial application to the FAA until expected entry into service. How will the FAA provide and commit to a path to certify AAM aircraft, and how will the FAA ensure timelines for aircraft type certification are not unduly long, especially under the new special classification policy framework?

The FAA has affirmed that the path for most AAM aircraft will be special class under 14 CFR 21.17(b). Will the FAA assign a small team of lawyers that understand performance-based rules to review all airworthiness criteria for standardization and efficiency, including aspects related to Simplified Vehicle Operations (SVO) and autonomy, so that they can review and modify existing rules (e.g., Part 23 and 64)? Is it possible for applicable legal counsel to be part of the G1/G2/AMOC discussions early, and can counsel be added to the roster of specialists?

The subgroup found interest in whether the FAA would be able to publish a policy that defines the path to certification that includes generic G1 language that has been shared with applicants for the past two years. Additionally, there is a way for applicants to understand better where they are in the process and the status of each step. As the certification process progresses, does the FAA have a formal process for transitioning from CECI to the Aircraft Certification Office (AIR)?

Airspace

The airspace subgroup agreed with the original 11 questions and added an additional 21 questions. To organize the set of airspace questions, the subgroup divided the questions into four groups. The detailed original questions and new questions can be found in Appendix A. Below are the four question categories under airspace and highlights from the subgroup's analysis.

PSU Structure and Governance

The subgroup added four new questions in this section on Providers of Service (PSU) as detailed in Appendix A. The airspace questions build on the operations section and should investigate efficiencies in cost, how part 135 air carriers work with third parties and the role of the FAA with respect to PSUs.

PSU Scope and Responsibilities

The subgroup added nine new questions to the existing 8 in the framework as detailed in Appendix A. The initial question in the framework, "Why divide the airspace?" created significant discussion within the subgroup and was changed to, "Should the FAA investigate safe integration over segregated airspace?". This was deemed important as the division of airspace is a contentious issue which merits investigation and should not be assumed.

AAM Airspace Rule-timing and Deployment

The subgroup added three questions to the existing one in this section. These questions are detailed in Appendix A. The subgroup suggests timing while focusing on the near-term, can consider a phased approach to speed the process. The subgroup also suggests broadening the scope of software used for airspace management to include commercially available offerings.

CNS/Spectrum Management

The subgroup added five questions to the existing two in this section. The detailed questions are in Appendix A. The subgroup's new questions sought to incorporate standards organizations which have documented the current status of spectrum management as well as Mandates to the FAA and Federal Communications Commission (FCC).

Operations

The Operations Subgroup includes additional questions and clarifications on the FAA's Strategic Framework for AAM Near-Term Operations.

Safety Considerations/Questions

Safety is always at the center of the FAA and industry's operations. There are areas where further clarification is needed to ensure safety.

As an example, the subgroup inquires about how to mitigate a medical emergency and its requirements when conducting uncrewed operations versus piloted operations. Additionally, in the context of operator authorizations, pilots and operators should understand the classification of dangerous goods. Should pilots have a basic understanding of microclimate conditions within the operating environment?

Standard and Industry

The subgroup recommends new standards and industry guidance be created to support the AAM industry (current examples include the "ASTM F46.06 – Guide for Advanced Air Mobility Maintenance Technician Qualifications" and "General Aviation Manufacturers Association (GAMA), Electric and Hybrid Propulsion Hazards and Mitigations" which acts as guidance for ground crew handling electric aircraft and is estimated for publication in 2022).

Pilot Training Considerations

As pilot training requirements evolve, the subgroup believes it would be beneficial to determine what a migration to systems management would look like for pilots and how it could be implemented. Delving into current 14 CFR Part 61 requirements for pilot certification and qualification, including for air carriers, the subgroup seeks additional information regarding whether or not there should be deviations for emerging technologies and if the existing system of pilot qualifications suffices. If the current system is insufficient, the subgroup expressed interest in investigating why. In near-term operations, the subgroup recommends determining how pilots will remain current and what the continuing training "flight time" requirements will be. Should pilots be trained on basic aircraft servicing requirements?

Other Questions

Other considerations the subgroup identified as important include what considerations should be given to the entire uncrewed aircraft operations ecosystem with respect to other personnel, e.g., dispatchers?

- What workforce is required to support the system, including training?
- What are the applicable standards?

Recommendations

The subgroup recommends the FAA consider establishing requirements that operators employ Safety Management System (SMS) principles in the near term (2024-2028) in a manner pursued for other air carriers based on the size and complexity of the operation. Regarding workforce operations, the FAA should determine what changes, if any, are required to the current 14 CFR Part 65 Certification: Airmen Other than Flight Crewmembers training and qualification requirements to enable operations, including whether there is a need to advance the existing draft Powered Lift ACS documents to support near-term operations.

To this end, the unique and evolving 'system management' requirements for crewed and uncrewed operations should also be considered. The subgroup also recommends the FAA modify or develop new operational control requirements for AAM operations, including NAS status (NOTAMS), weather minima as appropriate, flight rules, and legacy 'VFR/IFR.'

In support of performance-based operations in the future integrated NAS, the task group recommends the FAA solicit AAM-related standards development from ASTM, RTCA, SAE, AIA, etc. in laying the groundwork for standards development for future autonomous technologies, the subgroup recommends the FAA avoid the simplified “levels of autonomy” approach adopted by the automotive industry for autonomy and leverage the more tailorable framework that the ASTM AC377 industry group has proposed. Additionally, the subgroup recommends consideration of vehicle to vehicle (V2V) collision avoidance redundancies for the safety of Command and Control Vehicle (C2V) operations, should ground control links lose their ability to communicate with aircraft.

TG 13 recognizes and fully supports the FAA's development of a Special Federal Aviation Rule (SFAR) to handle pilot licensing and operating rules for initial AAM operations. The Task Group looks forward to working with the FAA to ensure that the SFAR is completed in a timely manner, as well as working to use the operational data from early operations to inform future rules and industry consensus standards.

Infrastructure

The infrastructure subgroup recommends the FAA prioritize near-term (2024-2028) policy and regulatory activity on entry to service AAM operations while ensuring the decisions account for longer-term AAM operations. The following are general recommendations from the subgroup that center around the approaches the FAA can take.

The FAA should brief industry and community stakeholders on the applicability of environmental reviews, processes, and timelines. Building on community engagement, the FAA could actively engage with local governments, agencies, and stakeholders to clarify the role of those entities on land use and restrictions on AAM infrastructure. Example: organizations include state and local government agencies that oversee aviation infrastructure, fire protection, law enforcement, and community groups. The subgroup believes it would benefit the FAA to work with Original Equipment Manufacturer (OEMs) and industry stakeholders to address downwash and structural integrity concerns (as noted in Vertiport Engineering Brief) that may limit access to existing infrastructure. Additionally, it is recommended that the FAA conduct an internal review and then discuss anticipated bottlenecks in infrastructure reviews and approvals with the industry. For example, if Part 77 reviews increase, what resources will the FAA need to accommodate infrastructure buildout?

To aid in finalizing infrastructure policy and standards definitions, the subgroup recommends that the FAA consider a partnership with NASA to deploy a demonstrator project to generate relevant data. In gathering information, it is recommended the FAA research, test, and define requirements for technologies that enable SVO and autonomous takeoff/landing capabilities, after which a certification plan can be developed, and the process can begin.

Within the scope of near-term operations, the subgroup has identified several regulatory objectives it is interested in exploring and recommends the FAA take action. The FAA may wish to develop guidance on joint VTOL-helicopter takeoff/landing facilities and acknowledge that many vertiports will be permanent locations but that some may be temporary (e.g., cultural or sporting events - though FAA may wish to

reevaluate any existing definition of "temporary facility") and should encourage state and local permitting agencies to follow FAA guidance, with limited exceptions to accommodate the location specifics. The subgroup recommends the FAA create flexible means of compliance for such facilities, and where possible, applicable National Fire Protection Association (NFPA) standards should be accepted as sufficient for vertiport infrastructure.

To better enhance the implementation of infrastructure and operational standards, the subgroup recommends implementing performance-based standards that will accept innovative technology to enhance highly localized weather reporting data to meet applicable operational regulations. Sharing and utilizing data will be crucial to AAM operations. The FAA should assess the gaps in data infrastructure needed by PSUs and other stakeholders and seek to understand CNS needs for AAM operations, as the ground components are often long lead and a key piece of infrastructure. The subgroup recommends the FAA consider tasking the NextGen Office and NextGen Advisory Committee to assist.

Community

Environmental Review

The subgroup seeks additional clarity around the NEPA process, and any additional environmental review(s) need to be provided so that they can be coordinated with state and local environmental impact, noise, and privacy laws. There needs to be clarity around which jurisdiction has a say over which operations. Duplicative or conflicting environmental review processes between different levels of government should be avoided. It is also recommended that for initial operations, FAA leverages existing environmental review processes that are already in place (e.g., for helicopters) and/or explore a categorical exclusion for initial low-volume AAM operations due to their anticipated low environmental impact. As operations mature and flight volumes increase, the community subgroup suggests adding a review for these later state operations around wildlife impacts, environmental justice, equity, and noise/visual/vibration impacts.

Community Engagement

The subgroup felt that the document as written was missing several critical areas of focus. These included Local Awareness and Coordination, Funding, and Roles and Responsibilities.

Questions

How can the FAA incorporate STEM educational outreach into its AAM community engagement plans to ensure workforce supply meets operational demand? In terms of operational applications of community engagement, it is recommended data sharing roles and responsibilities should be clearly defined. The subgroup was interested in investigating what information must be shared for each flight between the FAA and local governments. The group would also like to know how the FAA guides community engagement around private infrastructure investment can. (Both private and public airport facilities exist today.)

Recommendations

Community engagement, not just passive and potentially reluctant, and acceptance must be paramount, considering the noise and vibrations that will be added to communities. The community subgroup highly recommends more than notification; the FAA needs to approach communities with a collaborative mindset. Additional FAA efforts must be grounded in federal regulatory authority and not conflict with local jurisdiction authority (See suggested Roles and Responsibilities section). While the subgroup agrees that it is the applicant's responsibility to comply with local regulations, there must be a collaborative effort to minimize potential conflicts with state and local law.

Market Survey

The task group can appreciate the need for forecasting data, but it seems like a duplicative use of resources with efforts that have already been done. It seems more fruitful to have a procedure that allows for a gradual, organic implementation of AAM. Given that unconstrained vertiport, placement is not realistic, and given that local jurisdictions have the best information about those constraints, resources would be better deployed to local planners to provide demand forecasting for their areas using a provided methodology.

Funding

Questions

The subgroup found interest in investigating the following questions concerning funding: What are the funding implications and opportunities for public airports interested in incorporating AAM into their operations (RAM and/or UAM)? How can AAM (esp. RAM, Regional Air Mobility) improve the efficiency and effectiveness of programs like the Essential Air Service? Additionally, what public funding is available for vertiport and other infrastructure construction, and how can the FAA support equipping regional and local airports to facilitate RAM adoption and electrification more broadly?

Recommendations

One of the most common questions for AAM integration into communities is what funding sources are available for planning and infrastructure development. As the federal-level aviation voice in the conversation and the entity that provides funds to public airports, the FAA has a role in this conversation. There needs to be clarity around which entities at which levels of government are responsible for what. As the federal authority with most areas of preemption, it makes sense for the FAA to take a lead role in providing this clarity. There needs to be accessible information about what the FAA regulates and how it interacts with state, local, and tribal authorities.

Local Awareness and Coordination

Questions

Concerning the safe integration of AAM to the NAS, the subgroup found interest in investigating what strategies a community/local government can use to influence the integration of AAM? Furthermore, what specific lines of business within the FAA are responsible for interfacing with local authorities and on which topics? And how can all stakeholders get clarity over very low airspace considerations and usage?

Recommendations

In addition to answering the questions above, FAA is encouraged to coordinate with local authorities around the implications of AAM from the perspectives of multi-modal transportation integration and equity considerations. These may impact the solutions for vertiport placement and airspace integration beyond what would have been determined based on a traditional aviation-only assessment of the situation. It is also important that local authorities are aware of the efforts that are underway at the FAA to address the needs of AAM: without visibility into ongoing efforts, there is a tendency for local authorities to attempt to fill a perceived vacuum, causing jurisdictional overlap and duplicated effort at best and introducing safety concerns at worst.

Roles and Responsibilities

If the FAA wishes to retain its preemption in the regulation of much of AAM (which the subgroup believes that it should), it would be extremely useful to the FAA to provide a clear explanation to state and local authorities of the respective roles of the FAA, State DOTs, local zoning commissions, etc. Education on these roles and responsibilities would be valuable to decision-makers and the general public. Additionally, identifying the strategies that communities can use to influence the integration of AAM that are not in conflict with the FAA's jurisdiction would save confusion and conflict in the future. (For example, the FAA regulates and controls all airspace, even low-altitude airspace, but communities can specify land use for vertiports.)

Path Forward

The subgroup believes that there needs to be a collaborative effort between the FAA and industry to determine the certification, safety, and jurisdiction regulations over areas that AAM aircraft fly over. In future frameworks, TG 13 recommends the FAA better define its vision of AAM, SVO, autonomy, and pilot requirements. The FAA identifies several groups, including "industry" and "AAM stakeholders." It is important that these groups also be properly defined so that future discussions are centered around - and include - the correct people. Subsequent to language, "unmanned" prefixes could be changed to "uncrewed."

Acronyms

AAAC: Advanced Aviation Advisory Committee

AAM: Advanced Air Mobility

AIA: Aerospace Industries Association

AIR: Aircraft Certification Service

ASTM: American Society for Testing and Materials

ATC: Air Traffic Control

CECI: Center for Emerging Concepts and Innovation

C2V: Command and Control Vehicle

CNS: Communication, Navigation, and Surveillance

DAC: Drone Advisory Committee

EIE: Early Innovation Engagement

FAA: Federal Aviation Administration

FCC: Federal Communications Commission

FMS: Flight Management System

GAMA: General Aviation Manufacturers Association

IFR: Instrument Flight Rules

NAC: NextGen Advisory Committee

NAS: National Airspace System

NEPA: National Environmental Policy Act

NOTAMS: Notice to Air Missions

NTIA: National Telecommunications and Information Administration

OEM: Original Equipment Manufacturer

PBN: Performance-Based Navigation

PSU: Provider of Services for UAM

RAM: Regional Air Mobility

RTCA: Radio Technical Commission for Aeronautics

SAE: Society of Automotive Engineers

SMS: Safety Management System

SVO: Simplified Vehicle Operations

TBO: Trajectory-Based Operations

UAM: Urban Air Mobility

V2V: Vehicle to Vehicle

VFR: Visual Flight Rules

Members and Subgroup Leads

Leads

David Silver, Aerospace Industries Association

Seleta Reynolds, Los Angeles Metro

Support

Karina Perez, Aerospace Industries Association

Subgroups

Aircraft
David Oord, Wisk (Subgroup Lead)
Max Fenkell, Joby Aviation (Subgroup Lead)
Ben Ivers, Boeing
Lorne Cass, Aero NowGen Solutions
Cathy Cahill, ACUASI
Anna Dietrich, AUVSI
Brad Hayden, Robotic Skies Inc.
Jonathan Freye, Supernal
David Messina, FPV Freedom Coalition
Danielle Rinsler, Amazon
Jens Hennig, General Aviation Manufacturers Association

Airspace
David Messina, FPV Freedom Coalition (Subgroup Lead)
Heidi Williams, NBAA (Subgroup Lead)
Alex Suarez, MultiGP
Ben Ivers, Boeing
Lorne Cass, Aero NowGen Solutions
Cathy Cahill, ACUASI
Chris Cooper, Aircraft Owners and Pilots Association
Anna Dietrich, AUVSI
Mark Colborn, Dallas Police Department
Max Fenkell, Joby Aviation
David Oord, Wisk
Clint Harper, LADOT
Tamara Casey, Aura Systems
Andrew Giacini, Skyports
Danielle Rinsler, Amazon

Operations
Jeffrey Brown, Chief Operating Officer, Seattle-Tacoma International Airport (Subgroup Lead)
Lorne Cass, Aero NowGen Solutions (Subgroup Lead)
Ben Ivers, Boeing
Cathy Cahill, ACUASI
Anna Dietrich, AUVSI
Brad Hayden, Robotic Skies Inc.
Jonathan Freye, Supernal
Heidi Williams, NBAA
Max Fenkell, Joby Aviation
David Oord, Wisk
Clint Harper, LADOT
Tamara Casey, Aura Systems
Andrew Giacini, Skyports
Danielle Rinsler, Amazon
David Messina, FPV Freedom Coalition

Infrastructure
Ben Ivers, Boeing (Subgroup Lead)
Jonathan Freye, Supernal (Subgroup Lead)
Lorne Cass, Aero NowGen Solutions
Cathy Cahill, ACUASI
Anna Dietrich, AUVSI
Brad Hayden, Robotic Skies Inc.
Mark Colborn, Dallas Police Department
Heidi Williams, NBAA
Alex Suarez, MultiGP
Max Fenkell, Joby Aviation
David Oord, Wisk
Clint Harper, LADOT
Tamara Casey, Aura Systems
Andrew Giacini, Skyports
Danielle Rinsler, Amazon

Community
Anna Dietrich, AUVSI (Subgroup Lead)
Alex Suarez, MultiGP (Subgroup Lead)
Lorne Cass, Aero NowGen Solutions
Max Fenkell, Joby Aviation
David Oord, Wisk
Clint Harper, LADOT
Andrew Giacini, Skyports
Danielle Rinsler, Amazon

Appendix A

Blue bold text represents original questions from Strategic Framework for AAM Near-Term Operations

PSU Ecosystem Questions:

AS1. Do we need PSUs [Providers of Services]?

PSU Structure and Governance

Ops1. What level of training and certification will be required for PSU personnel (e.g., dispatcher-level)? [suggest move this to operations subgroup]

AS2. What are the efficiencies in cost, coordination of rules across the United States and Territories, and speed to delivery of new services of a centralized versus decentralized PSU?

AS3. How will operators (part 135 air carriers) work with third-party organizations that can offer these services for a reduced cost via several Business-to-Business contracts?

AS4. What role should the FAA take with respect to PSUs? Monitoring agency or active participant (e.g., ATM)?

PSU Scope and Responsibilities

~~**Why divide the airspace?**~~ [TG13 Airspace subgroup recommends replacing, "Why divide the airspace?" with question, AS6]

AS5. Should the FAA establish corridors for UAM?

AS6. Should the FAA investigate safe integration over segregated airspace?

AS7. Should PSU managed higher density corridors be considered a new form of controlled airspace requiring authorization and/or entry procedures?

AS8. What are the basic principles of the PSU and the different subcomponents?

AS9. What component pieces of the PSU ecosystem require certification?

AS10. Can PSUs offer a mix of airspace integration services (traffic flow management ledgers, strategic deconfliction, in-flight separation provision, etc.) as well as classical dispatcher services (route planning software, basic fleet optimization) through client applications to Direct Air Carriers? Can this approach enable cost efficiencies for Air Carriers and by extension the flying public? (Similar to how Google offers basic word processing service to anyone with an internet connection, and yet other companies offer additional "bells and whistles" for a premium?)

AS11. Can PSUs services begin to offer minor speed adjustment and path stretching services with the containment of authorized PBN NavSpecs and 4D Required Time of Arrivals (having them work on a more granular level than legacy ATC)? Can this build on the capabilities of concepts like Advanced Interval Management, where an aircraft's FMS and operator-to-operator information exchanges, are used within the broader context of TBO.

AS12. How might the current Collaborative Decision-Making process be extended for AAM?

AS13. Who is positioned to manufacture the technology?

AS14. At what point in the lifecycle is the technology (R&D, testbed, etc.)?

AS15. What technical details and requirements are known today?

AS16. What are the cyber security, supply-chain, and non-friendly actor implications?

AS17. Are the present VFR separation procedures (as mentioned in the document) sufficient for UAM/AAM operations or will they need to be adjusted?

AS18. Should research on flight rules tailored to AAM to progress from VFR on a new set of flight rules, tailored to AAM be started now to ensure progression from the existing, traditional frameworks under VFR/IFR?

AS19. What is a safe and efficient path to integrate AAM in context of the FAA Modernization and Reform Act of 2012 as it relates to airspace integration and traffic management?

AAM Airspace rule timing & deployment:

AS20. Can trial periods be defined for certain routes where these services work in an "assistive" shadow) mode, while ATC controllers and systems retain the ultimate responsibility (serving in a "responsible" mode) for oversight.

AS21. What companies/ organizations are developing this technology?

AS22. Can commercially licensed software, that is rerouting IFR aircraft based on air traffic awareness input, serve as a starting point for certified PSU software? For example, Alaska Airlines has advertised its use of commercially licensed software that is based on NASA's Traffic Aware Strategic Aircrew Requests (TASAR) software."

AS23. What policy and guidance changes are needed in order for AAM to utilize existing low-level instrument helicopter airspace routes (e.g. TK routes)? Are efforts to modernize those routes considering the safe integration of new entrants like UAM, AAM, RAM?

CNS/Spectrum Management Questions:

AS24. What is the industry's level of engagement with the Federal Communication Commission (FCC) and the National Telecommunications & Information Administration (NTIA) to address spectrum usage?

AS25. What are industry's needs and plans regarding CNS equipment to enable AAM operations beyond the near-term, and to address spectrum allocation?

AS26. What other industry groups and standards development organizations should the FAA engage with (e.g., RTCA SC-242)?

AS27. How might the FAA expand on its report to Congress in response to Section 374 as referenced in the February 24, 2021 FAA DAC meeting materials?

AS28. The FAA has been supporting both C-Band and L-Band for global use by UAS for aeronautical radio and navigation services, and continues to promote adequate protection from interference for all aviation-spectrum. This activity has included collaborating with standards development organizations, industry, academia, and the FCC.[1] Beyond this work which the FAA will document, what additional feedback from industry and stakeholders could be made available to the FAA to accelerate the creation of AAM rules?

AS29. As the FAA meets regularly with the FCC and the National Telecommunications and Information Administration as well as relevant stakeholders of UAS C2, what is an appropriate forum to expand these discussions to incorporate industry and stakeholder views of AAM regarding C2 and Spectrum issues and concerns?

AS30. What does the FAA need to do to facilitate the FCC's and NTIA's progress on spectrum usage policy?

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[1] FAA response to DAC Tasking Group#6, February 2021

ADVANCED AVIATION ADVISORY COMMITTEE

Federal Aviation Administration

Advanced Aviation Advisory Committee

October 20, 2022

Housekeeping

- Meeting is being livestreamed on the FAA's YouTube, Twitter and Facebook pages.
- Meeting is also being recorded and will be made available for future viewing.
- Please remain muted during the presentations.
- After each briefing, there will be an opportunity for the members to engage in discussion and ask questions.
- Please raise your hand using the Zoom command on your dashboard and an FAA moderator will call on you to speak.
- FAA team is monitoring the livestream, if you have any problems during the meeting, please reach out in the comments.

ADVANCED AVIATION ADVISORY COMMITTEE

October 20, 2022

Federal Aviation Administration

Official Statement of the DFO

PUBLIC MEETING ANNOUNCEMENT

Read by: Designated Federal Officer Jay Merkle

Advanced Aviation Advisory Committee

October 20, 2022

In accordance with the Federal Advisory Committee Act, this Advisory Committee meeting is OPEN TO THE PUBLIC. Notice of the meeting was published in the Federal Register on:

September 22, 2022

Members of the public may address the committee with PRIOR APPROVAL of the Chair. This should be arranged in advance.

Only appointed members of the Advisory Committee may vote on any matter brought to a vote by the Chair.

The public may present written material to the Advanced Aviation Advisory Committee at any time.

Agenda

	Start	Stop	
1.	10:00 a.m.	10:05 a.m.	**FAA – Greetings & Logistics**
2.	10:05 a.m.	10:10 a.m.	**DFO – Read Official Statement of the Designated Federal Officer**
3.	10:10 a.m.	10:15 a.m.	**DFO – Review of Agenda and Approval of Previous Meeting Minutes**
4.	10:15 a.m.	10:20 a.m.	**FAA/Chair – Opening Remarks**
5.	10:20 a.m.	10:25 a.m.	**FAA -- Deputy Administrator Opening Remarks**
6.	10:25 a.m.	10:45 a.m.	**FAA – Remote Identification Update**
7.	10:45 a.m.	11:15 a.m.	**Task Group #13 – Strategic Framework for Advanced Air Mobility Near-Term Operations Final Recommendations**
8.	11:15 a.m.	11:35 a.m.	**RTCA – Digital Flight Rules Briefing**
9.	11:35 a.m.	12:50 p.m.	**LUNCH BREAK**
10.	12:50 p.m.	1:10 p.m.	**FAA – Collegiate Training Initiative (CTI) Update**
11.	1:10 p.m.	1:40 p.m.	**FAA – Drone Safety Team Update**
12.	1:40 p.m.	2:00 p.m.	**FAA – New Taskings**
13.	2:00 p.m.	2:20 p.m.	**Chair – New Business/Future Agenda Topics**
14.	2:20 p.m.	2:25 p.m.	**FAA – Closing Remarks/Final Thoughts**
15.	2:25 p.m.	2:30 p.m.	**Chair – Closing Remarks/Final Thoughts**
16.	2:30 p.m.	2:30 p.m.	**Chair – Adjourn**

ADVANCED AVIATION ADVISORY COMMITTEE

October 20, 2022

Opening Remarks from DFO

Jay Merkle

Designated Federal Officer

FAA Advanced Aviation Advisory Committee

Federal Aviation Administration

ADVANCED AVIATION ADVISORY COMMITTEE

October 20, 2022

Opening Remarks from AAAC Chair

Houston Mills

Chair

FAA Advanced Aviation Advisory Committee

Federal Aviation Administration

ADVANCED AVIATION ADVISORY COMMITTEE

October 20, 2022

Remarks from Deputy Administrator

Brad Mims

Deputy Administrator

FAA

Federal Aviation Administration

ADVANCED AVIATION ADVISORY COMMITTEE

Federal Aviation Administration

FAA Remote Identification Update

Daniel Elgas
Deputy Director, Policy and Innovation Division
Aircraft Certification Service

Remote ID Updates

- Means of Compliance
- Enforcement Discretion Policy for Production Requirements
- Current Status

Means of Compliance

- All Standard Remote ID UA and broadcast modules must be produced in accordance with an **FAA-accepted means of compliance** (MOC)
- Any RID UA MOC must address the minimum performance requirements in Part 89, Subpart D
- Any person can submit an MOC, though FAA expects industry consensus standards organizations (such as ASTM) to be typical developers
- When FAA accepts an MOC, a notice will be posted in the Federal Register
- On **August 11, 2022**, the FAA published Notice of Availability (NOA) of the American Society for Testing and Materials (ASTM) standard F3586-22 with additions (next slide)

ASTM F3586-22

- On August 11, 2022, the FAA published a Notice of Availability (NOA) that the FAA accepts the American Society for Testing and Materials **(ASTM) F3586-22**, "Standard Practice for Remote ID Means of Compliance to Federal Aviation Administration Regulation 14 CFR Part 89", with additions identified in NOA as an acceptable means, but not the only means, of demonstrating compliance with the requirements

- ASTM Standard F3586-22 is available online at https://www.astm.org/f3586-22.html

  - ASTM International copyrights these consensus standards and charges the public a fee for standards. Individual downloads or reprints of a standard (single or multiple copies, or special compilations and other related technical information) may be obtained through www.astm.org

- The FAA maintains a list of accepted means of compliance on the FAA website at https://uasdoc.faa.gov/listMOC

Enforcement Discretion Policy for Production Requirements

- **May 13, 2022** – First viable part 89 Means of Compliance (MOC) was submitted by the American Society for Testing and Materials (ASTM) to the FAA
- **August 11, 2022** – less than three months after receiving ASTM's MOC submission, the FAA published a **notice of availability** announcing the acceptance of an MOC consisting of both ASTM Standard F3586-22 and the additions specified in that notice of availability

  Note: Given the short, 5-week timeframe between the pending RID UA production compliance deadline (September 16, 2022) and the FAA's publication of the corresponding MOC in August, the **FAA acknowledged that some manufacturers may not have sufficient time** to complete the steps to show their products are compliant on or before September 16, 2022

- Accordingly, on **September 12, 2022**, the FAA published a **notification of enforcement discretion policy** stipulating that the FAA will exercise discretion in determining how to handle noncompliance until **December 16, 2022**
  - This exercising of discretion includes the option of the FAA not taking enforcement action

Status: Declarations of Compliance

- As of **October 6, 2022**, AIR's Policy and Innovation Division (AIR-600) had accepted declarations of compliance for **19** Remote ID UAs
- The US DOT/FAA website "UAS Declaration of Compliance" provides a public list of compliance with Operations Over People (OOP) and Remote ID rules
  - https://uasdoc.faa.gov/listDocs

Timeline for RID Compliance

- **September 16, 2022 –** UAS manufacturing / **production compliance** date
- **December 16, 2022 –** The FAA notice of enforcement **discretion ends** (after its three-month extension) for production compliance
- **September 16, 2023 – operational compliance** date

Questions?

ADVANCED AVIATION ADVISORY COMMITTEE

Federal Aviation Administration

Task Group #13: Strategic Framework for Advanced Air Mobility Near-Term Operations Final Recommendation

David Silver, Vice President for Civil Aviation,
Aerospace Industries Association
Seleta Reynolds, Chief Innovation Officer,
Los Angeles Metro

Task Group 13 Membership

Co Leads: David Silver, AIA & Seleta Reynolds, LA Metro

Cathy Cahill, ACUASI
Lorne Cass, Aero NowGen Solutions, LLC
Karina Perez, AIA
Mark Reed, ALPA
Vas Patterson, ALPA
Danielle Rinsler, Amazon
Chris Cooper, AOPA
Tamara Casey, Aura Systems
Anna Dietrich, AUVSI, CAMI, & AMD Consulting LLC
Drake Berglun, Boeing
Ben Ivers, Boeing
Dave Messina, FPV Freedom Coalition
Jens Hennig, GAMA
Dr. Paul Hsu, HSU Educational Foundation
Max Fenkell, Joby
Chris Anderson, Kittyhawk
Gabriela Juarez, LADCP
Clint Harper, LA DOT
Janna Smith, LA DOT
David Reich, LAWA
Alex Suarez, MultiGP Drone Racing
Heidi Williams, NBAA
Jeffrey Brown, Port of Seattle
Timothy Toerber, Port of Seattle
Mark Colborn, Retired Reserve, Dallas PD
Brad Hayden, Robotic Skies, Inc
Andrew Giacini, Skyports
Jonathon Freye, Supernal
Nathan Trail, Supernal
David Oord, Wisk

Task Group 13 Overview

- Provide feedback to the FAA's Strategic Framework for Advanced Air Mobility (AAM) Near-Term Operations
  - Is FAA asking the right questions?
  - Scope: near-term operations only (2024-2028)
  - TG 13's feedback will help inform FAA on a work plan
- TG 13 Operated under the following AAM definition
  - Advanced Air Mobility (AAM) is the umbrella term referring to a range of emerging innovation in aviation. It includes Urban and Regional Air Mobility (UAM and RAM), passenger and cargo operations, and employs a range of electric and autonomous technologies, including but not limited to eVTOL and uncrewed aircraft, that promise to increase the safety, expand the utility of, aviation in our daily lives.
- TG 13 met three times
  - Expanded membership to non-AAAC members after the first meeting
  - Sought clarification from FAA on the scope of the task group
  - Assigned subgroups to respond to each section
- TG 13 requested additional time to finish the final report
  - However, we recommended that FAA start work on the areas covered in interim report

Aircraft

Recommendations

The TG13 Aircraft Subgroup made several comments, suggestions, and recommendations around –

- Role and engagement of the FAA's Center for Emerging Concepts and Innovation (CECI);
- CECI's Early Innovation Engagement (EIE) steps and gates;
- FAA Line of Business (LOB) coordination; and
- The FAA's decision point to produce a defined approach to establish AAM aircraft certification.

Airspace

Observations

- Safe integration over segregated airspace is the appropriate direction of the Framework.
- The governance and business model structure of the Providers of Service (PSU) will be important for the FAA to specify to ensure the PSU holds safety as the leading imperative for AAM integration in the NAS.

Recommendations

- Training and certification of AAM pilots should be proportional to operational risk.
- The FAA should continue its cooperative work with the FCC and National Telecommunications and Information Administration to provide protected spectrum for drones, including AAM.

Operations

The aviation ecosystem is evolving with the introduction of the Advanced Air Mobility (AAM) systems. As operations begin, it is imperative that near-term integration into the NAS proceeds with safety, efficiency, and equity as underpinnings required for success in order to ensure the public trust.

Operations Subgroup focused on the following key areas:

- Safety Standards with SMS as foundational
- SVO / V2V / C2V
- Industry Evolution to AAM
- Workforce Requirements / Training
- Standards Development
- Applicability of 14 CFR

Recommendations

- **Consider** requirements that operators employ Safety Management System (SMS) principles in the near-term and guidelines created by the Drone Safety Team (DST).
- **Support** development of SFAR requirements to handle pilot licensing and operating requirements for initial AAM operations; consider what changes, if any, will also be required for legacy training and qualification requirements and the unique, evolving ‘system management’ environment for crewed and uncrewed ops.
- **Develop or modify** operational control criteria needed for crewed and uncrewed AAM operations including NAS status (NOTAMS), weather minima and, as appropriate, new ‘digital’ flight rules to complement legacy ‘VFR/IFR’ requirements.
- **In support** of performance-based operations in a future integrated NAS, solicit AAM-related standards development from ASTM, RTCA, SAE, AIA, etc. An example includes the tailored framework as proposed by ASTM AC377.
- **Consider** V2V collision avoidance redundancies for the safety of C2V ops, should ground control links be disrupted.

Thank you to the TG13 Operations Subgroup Members

Port of Seattle
Jeffrey Brown
Tim Toerber

FPV Freedom Coalition
Dave Messina

Aero NowGen Solutions, LLC
Lorne Cass

Alaska Center for Unmanned Aircraft Systems Integration
Catherine Cahill

Dallas Police Department
Mark Colborn

Aircraft Owners & Pilots Association
Chris Cooper

AUVSI
Anna Dietrich

Joby Policy & Government Affairs
Max Fenkell

Robotic Skies
Brad Hayden

Boeing
Ben Ivers

Wisk Aero
David Oord

Air Line Pilots Association, International
Vas Patterson

GAMA
Jens Hennig

Supernal
Paul McDuffee
Jonathan Freye

NBAA
Heidi Williams

LA City
Clint Harper

Skyports
Andrew Giacini

Infrastructure

Recommendations

- **Brief** the industry on the applicability of environmental reviews, process, and timelines.
- **Collaboration** with industry should address downwash and structural integrity concerns (as noted in Vertiport Engineering Brief) that may limit access to existing infrastructure.
- **Identify** and discuss possible bottlenecks (e.g. Part 77 reviews).
- **Implement** performance based standards that will accept the use of innovative technology to enhance highly localized weather reporting data for the purpose of meeting applicable operational regulations.
- **The FAA** should assess the gaps in data infrastructure needed by stakeholders and seek to understand CNS needs for AAM operations.
- **Recommend** the FAA consider tasking the NextGen Office and NAC to assist.

Community

Recommendations

- **Topics that were omitted from the Framework:**
  - Local Awareness and Coordination
  - Funding Sources (e.g., AAM studies and infrastructure)
  - Roles and Responsibilities for FAA and other jurisdictions
- **Remember that AAM includes UAM and RAM**
- **Env. Review:** minimize for low volume initial operations
- **Community Engagement:** engagement is more than notification; need coordination and dialogue
- **Market Survey:** focus on organic scalability; don't redo industry forecasts for AAM

Next Steps

- TG13 is open to answer further questions on the report
- TG13 is open to future taskings

Questions?

ADVANCED AVIATION ADVISORY COMMITTEE

Federal Aviation Administration

RTCA Digital Flight Rules Briefing

Terry McVenes
President and Chief Executive Officer
RTCA

Digital Flight

Prepared for FAA Advanced Aviation Advisory Committee

Terry McVenes, President, RTCA
Brandon Suarez, Co-chair, RTCA Special Committee SC-228

Disclaimer: Almost all of this work is NASA's, we are just repackaging and presenting as advocates

Introduction

- Focus on Vehicle Capability vs. Vehicle Integration

- Common Need – Access to Airspace

- Increase Commoditization of Airspace Coupled with Increasing Number of Users
  - Differing rules to access airspace will be necessary
  - Cloud clearance and visibility requirements based on aircraft capabilities

Gathering Momentum for Digital Flight (DF)

- FAA Advisory Rulemaking Committees (ARC)
  - 2019: “UAS in Controlled Airspace”: Research Gap #1 – New set of flight rules
  - 2022: UAS Beyond Visual Line of Sight (BVLOS): Recommendations for “Autonomous Flight Rules (AFR)”
- Industry Signals, for example
  - 2019: Boeing/Airbus: A Path Forward for Airspace and Traffic Management[1]
  - 2022: Wisk UAM CONOPS[2]
- NASA has been very active in pursuing DF
  - 2020: New Flight Rules To Enable The Era Of Aerial Mobility In The National Airspace System[3]
  - 2022: Convergent Aeronautical Solutions (CAS) Workshops and Use Cases[4]
- RTCA DO-304A identifies a gap between VFR and IFR that needs addressing (See RTCA DO-304A § 2.4.3)

Scan for NASA Report

1: https://www.airbusutm.com/a-new-digital-era
2: https://wisk.aero/news/press-release/uam-conops/
3: https://ntrs.nasa.gov/citations/20205008308
4: https://ntrs.nasa.gov/api/citations/20210025961/downloads/NASA-TM-20210025961.pdf

Need for Digital Flight Rules

- AAM is an umbrella term encompassing many use cases and technologies/capabilities (NASA TR[1])
  - Adding each use case to the NAS through separate rulemaking will take decades
  - Without long term vision, near-term parochial interests will result in conflicts

- The need for DFR lies in the gap between VFR and IFR
  - VFR provides operational freedom but limits low visibility operations
  - IFR allows low visibility operations but limits operational freedoms
  - Both significantly rely on human decision-making to cover everything not explicit in rules

- Operating Rules can form the framework for these operations to integrate, not just be accommodated
  - A wide variety of use cases and operations exist under VFR and IFR today, so everyone should be able to see their use case in the DFR concept

1: https://ntrs.nasa.gov/citations/20220006225

Benefit of Digital Flight Rules

- Aircraft operating under DFR is proposed to
  - operate like VFR without natural human vision on board
  - would greatly increase the number of missions able to be conducted by UAS and AAM

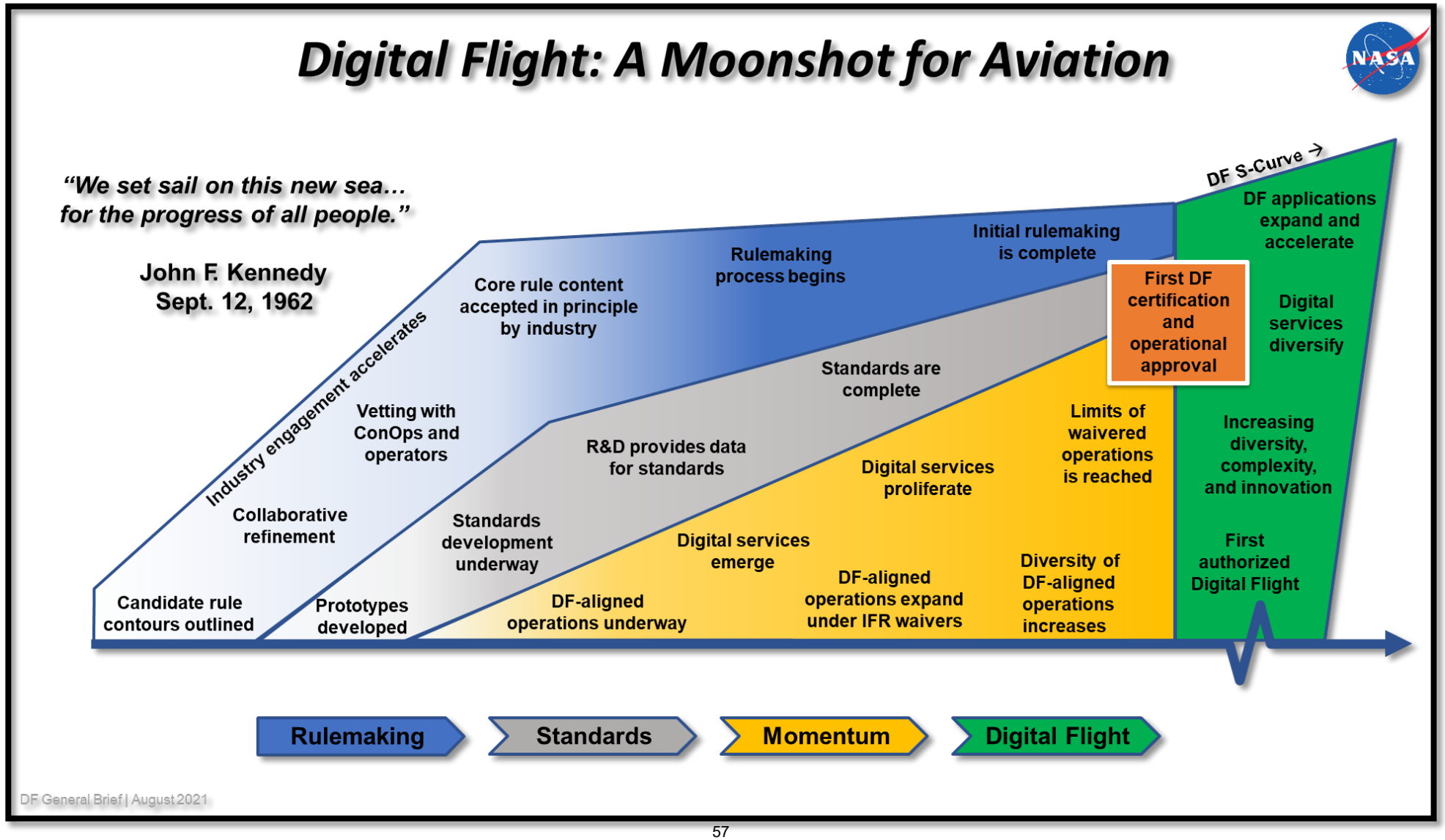
- Enabling Technologies and Capabilities, examples
  - High Quality Navigation* – GPS/WAAS, VOR/DME/ILS, Coupled INS
  - Digital NAS Information* – Databases for Flight Management, etc…
  - Digital Autopilots – High accuracy and integrity ensure intent is achieved
  - Intent Sharing* – V2V (and to a lesser extent ADS-B) provide means
  - Detect and Avoid (DAA)* – Remain well clear and collision avoidance
  - Cooperative Operating Practices – Community-based rules enable predictable behavior
  - Third Party Service Providers (TSPs) – Safety-critical services approved independent of operator [encompasses USS and PSU concepts]

* Areas where RTCA is contributing to technical standards

Great idea … but why now?

- Safety … Security … Efficiency
- Technology convergence of classic CNS/ATM technology with
  - automation,
  - mobile connectivity,
  - information access, and
  - supporting services [UTM, ETM, xTM concepts]
- Operational convergence of legacy aircraft operations and new use cases
  - Technically Advanced Aircraft (TAA) with Simplified Vehicle Operations (SVO)
  - Helicopter/Heliport with eVTOL/Vertiport (UAM)
  - Low altitude operations with sUAS BVLOS
  - Personal aviation with Regional Air Mobility (RAM)

The NASA Vision



What Can the AAAC Do?

- The AAAC can provide endorsement of the Digital Flight Rules (DFR) Concept to FAA and NASA
  - Each use case has to see itself operating under DFR
  - Make a new set of flight rules in all airspace the ultimate goal of the advanced aviation community

- The AAAC can establish a group to provide stakeholder feedback to NASA (Sky for All[1]) and FAA (Info-Centric NAS[2])

- The AAAC can continue to show interest in the topic, requesting briefs from NASA, FAA, R&D, and industry proponents

1: https://nari.arc.nasa.gov/skyforall/
2: https://www.faa.gov/about/office_org/headquarters_offices/ang/icn


RTCA

Questions?

Lunch Break

ADVANCED AVIATION ADVISORY COMMITTEE

Federal Aviation Administration

FAA Collegiate Training Initiative (CTI) Update

Diana Robinson
Project Manager
UAS Integration Office

What is the UAS-CTI?

The Unmanned Aircraft Systems Collegiate Training Initiative (UAS-CTI) is a program designed for the FAA to recognize and connect institutions that prepare students for careers in UAS (drones).

UAS
FAA UAS-Collegiate Training Initiative

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Market Growth and Job Opportunities

- $16 billion by 2025; $29 billion by 2030
- 361,000 certified remote pilots by 2026
- ~100,000 new jobs by 2025

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Why Do We Need University/College Level Drone Programs?

- AAAC's finding on the number of drone technicians and drone pilots needed to enter the U.S. workforce.
- This year (2022) we'll need 56,000 new workers to keep pace in this emerging industry. That's 1.5% of this year's entire graduating high school class across the United States!
- By 2030, the AAAC projection grows to 85,000 new workers (2.3% of graduating class).
- In global aviation more broadly, Boeing projects 602,000 new pilots and 610,000 new maintenance technicians will be needed over the next 20 years.

Who Needs A Drone Pilot And Why Prepare Them?

- Drones in real estate
- Drones in construction / mining / aggregates
- Drones in filmmaking
- Drones in public safety
- Drones in insurance
- Drones in journalism
- Drones in GIS / survey
- Drones in agriculture
- Drones in transportation
- Drones in energy
- Drones in telecommunications
- Drones in education
- Dull, dirty, dangerous jobs
- Drones save money, time, and increase efficiency

FAA Reauthorization Act of 2018 - Requirements

Section 631	Section 632
Train students for career opportunities in industry and government service related to the use of sUAS	Prepare students for careers involving UAS
Establish a process to designate consortia of 2 year schools	Establish a UAS collegiate training initiative program

Curriculum Must Include:

1) Training on UAS platforms - multirotor and fixed-wing
2) Flight systems, radio controllers, components, and characteristics of UAS
3) Maintenance, uses, applications, privacy concerns, safety, and insurance
4) Hands-on flight practice using UAS and simulator training
5) Use of UAS in various industry applications
6) Federal policies concerning UAS
7) Training related to flying with sensors and processing the data collected

What Happens If Schools Are Not Eligible

- Some schools may not have full UAS programs established yet
- If you don't have a program yet, we can provide resources (including curriculum examples) to help you get started!
- We are happy to work with schools by providing:
  - Resources
  - Fostering connections with other schools
  - Fostering connections with industry

Application Process

- **Schools send in a request to participate with basic information to the UAS-CTI email address**
- **An initial questionnaire is sent to schools to complete and return**
- **Eligibility includes:**
  - **School type:** Not-for-profit, two- or four-year, post-secondary educational institution, either public or private.
  - **Accreditation:** Must be institutionally accredited by an agency recognized by the U.S. Secretary of Education.
  - **Degree/Certification:** Currently offer a bachelor's or associates degree in UAS or a degree with a minor, concentration in UAS, or a certificate in UAS.

NOTE: New or growing programs: Must teach at least 2 UAS courses, cover 7 curriculum areas, and be working towards a degree/certificate program (even if not fully implemented yet).

Benefits of the UAS CTI Program & Consortium

- Recruiting and marketing opportunities for school's UAS programs
- Access to FAA resources and materials
- Recognition of participation on FAA's website
- Technical support from FAA regarding UAS programs
- Networking with industry, local governments, schools, others!
- Opportunities for other engagement with the FAA, through webinars and teleconferences
- Development and sharing of best practices with other participating schools

UAS-Collegiate Training Initiative

- 95 participating schools across 44 states
  - 4-year, 2-year and technical colleges
  - Accredited by US Secretary of Education Agency
  - Courses that are tied into a degree or certificate program
  - Consortium of 2-year and technical colleges was formed
- Actions
  - Repository and ESRI StoryMap created (DronePro Map in the StoryMap)
  - Five job classifications modified
  - Diversity, Equity, Inclusion AND Accessibility
  - Created a list of FAA Safety Team DronePros who have volunteered to serve as adjunct professors/guest speakers at schools
  - Regional UAS events hosted at UAS-CTI schools

Diversity!

- Outreach
- MSI Students – Including Cohort project addressing diversity in the UAS Integration Office

Minority Serving Institute Schools in the UAS-CTI

- THREE – Historically Black Colleges and Universities (HBCUs)
- SEVENTEEN – Hispanic Service Institutes (HSIs)
- SEVEN – Asian American and Native American Pacific Islander (AANAPISI)
- TWO – Predominantly Black Institutions
- ONE – Native American – Serving Nontribal Institution (NASNTI)
- One – Alaska Native and Native Hawaiian (ANNH)

FY22 Grant Recipients – Aviation Workforce Development

Recipient	Location	Description	Grant Amount
Florida State College at Jacksonville	Jacksonville, FL	This program will provide for the creation of a Drone Racing League and professional development workshops to high school teachers throughout Florida and Georgia.	$498,000
Northwestern Michigan College	Traverse City, MI	Project will consist of three distinct components designed to prepare secondary teachers to introduce Unmanned Aircraft Systems (UAS) applications into their high school programs or develop standalone UAS programs, including a two-day train-the-trainer course.	$90,000
Elizabeth City State University	Elizabeth City, NC	Project will adopt the Aircraft Owners and Pilots Association, the FAA Aviation Career Education, and grade-appropriate National Aeronautics and Space Administration (NASA) curriculum and integrate virtual reality simulation, Unmanned Aerial Vehicle (UAV) operation, flight simulator experience, sensor-based measurement systems, and discovery flight to enhance authentic and experiential learning experiences.	$269,000
University of North Dakota	Grand Forks, ND	Project will hold Teach the Teacher events in eight locations across the region during the academic school year, preparing teachers to become Part 107 certified, followed by summer professional development workshops for STEM high school educators focused on the implementation of Aviation, UAS, and engineering principles.	$488,000

FY22 Grant Recipients – Aviation Workforce Development

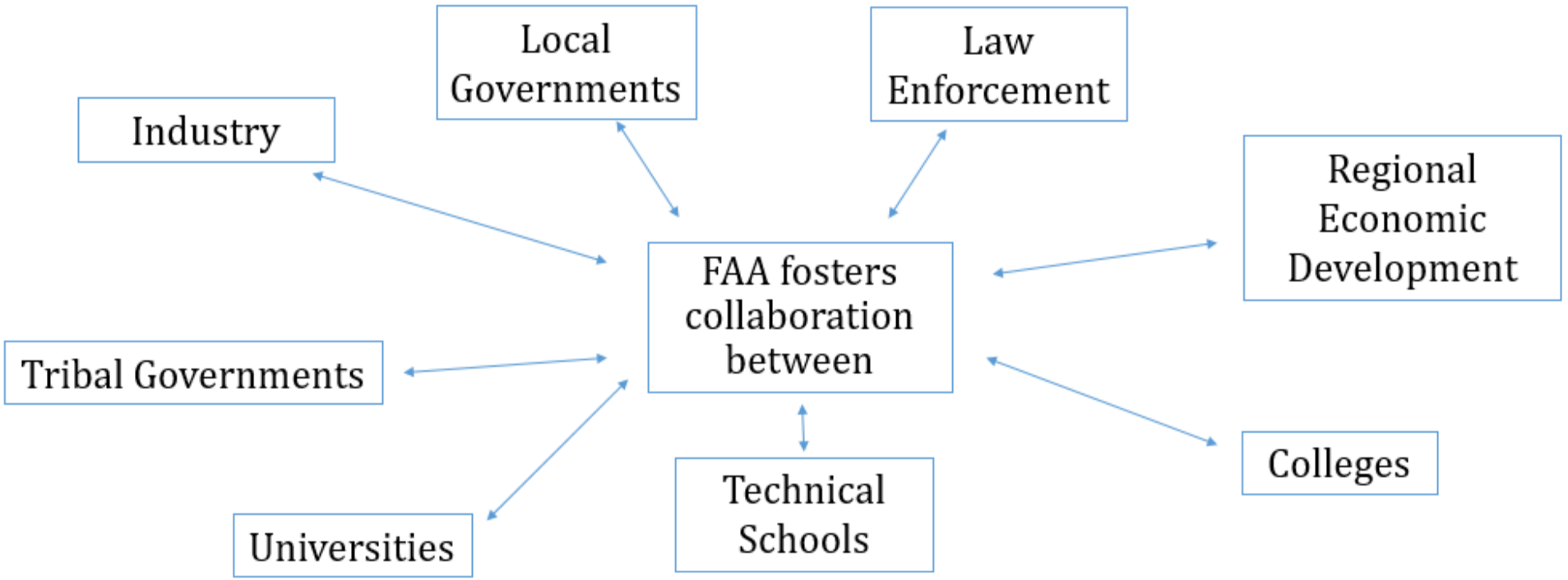
Recipient	Location	Description	Grant Amount
County of Scottsbluff School District #16	Gering, NE	Project will provide Gering student aviators with Unmanned Safety Institute drone curriculum, to acquire their FAA Part 107 Remote Pilot Certificate, UAS Safety Certification Program, and other project elements.	$500,000
Vaughn College of Aeronautics and Technology	Flushing, NY	Project will provide a tuition-free early college experience for high school students that enables them to complete the majority of credits in the UAS certificate program while still enrolled in high school.	$498,000
Oklahoma Aeronautics Commission	Oklahoma, OK	Project will launch a statewide program that includes the training of teachers and the delivery of the "You Can Fly" Pilot and UAS Pathway High School Curriculum to students, and other project elements.	$491,000
Harrisburg University of Science & Technology	Harrisburg, PA	Project will administer a program to aid in the acquisition of FAA Part 107 Certification for students that will include supplies and equipment.	$135,000

FY22 Grant Recipients – Aviation Workforce Development

Recipient	Location	Description	Grant Amount
Spartanburg County School District #5 (James F. Byrnes High School)	Duncan, SC	This program will provide in-depth studies that will result in students earning their FAA Part 107 certificate, and other project elements.	$31,000
South Carolina Department of Education	Columbia, SC	Project will develop sustainable UAS operation education programs to school districts in South Carolina counties throughout middle schools, high schools, and Career and Technical Education Centers.	$425,000
Crowley Independent School District #912	Crowley, TX	Project will launch two (2) new programs of study (Aviation Flight and Unmanned Autonomous Vehicles and Systems), and other project elements.	$139,500
Utah State University	Logan, UT	Project will create three (3) high school courses including lesson plans, online and in-person teacher curriculum and seminars for building/maintaining drones and other project elements.	$238,500

FY22 Grant Recipients – Aviation Workforce Development

Recipient	Location	Description	Grant Amount
Randolph Macon Academy	Front Royal, VA	Project will implement the use of two virtual reality simulators in conjunction with a training syllabus to provide an immersive experience for all Randolph-Macon Academy students. In addition, the project will hire an additional unmanned instructor and offer flight scholarships for discovery flights, solo, and scholarships to students pursuing their pilot certification	$307,000
North Orange County Community College District	Anaheim, CA	Project will establish new educational programs that teach technical skills used in aviation maintenance, develop a UAS Technician Certificate program, and other project elements.	$250,000


Local Governments
Law Enforcement
Industry
Regional Economic Development
FAA fosters collaboration between
Tribal Governments
Colleges
Technical Schools
Universities

New Initiative This Year: Regional Drone Outreach Events

- Partnership: FAA's UAS Integration Office (HQ), our nine Regional Administrators, and UAS Collegiate Training Initiative schools as host locations across the country. Free events, open to any local stakeholders, 2-3 days typically.
- Outreach event goals:
  1. Promote safety and safety culture in drone operations, both commercial and recreational operators.
  2. Foster greater public acceptance and greater understanding of UAS operations.
  3. Build strong working relationships across: FAA, state and local government agencies, businesses and industries using drones, and academia.

Upcoming Schedule: Regional Drone Outreach Events

- Great Lakes Region, Oct. 13 – 15,
  University of North Dakota, Grand Forks
- Southern Region, Oct. 20 – 21,
  North Carolina State University in Raleigh
- Eastern Region, April 27 – 29, 2023
  Warren Community College, Washington, NJ
  - *Completed regional events:*
    - *Central Region, May 12 – 14,*
      Univ. of Nebraska – Omaha
    - *New England Region, Sept. 29 – Oct. 1, University of Maine in Brunswick*

Program details can be found here:
https://www.faa.gov/uas/educational_users/collegiate_training_initiative/

Repository: UAS CTI – NCAT (ncatech.org);
Grant funding: https://ncatech.org/expanding-grant-funding/

For more information, contact 9-FAA-UAS-CTI@faa.gov

Thank You!

UAS-CTI Program Administrator
Diana.Robinson@faa.gov

Yes that's me

Questions?

ADVANCED AVIATION ADVISORY COMMITTEE

Federal Aviation Administration

FAA Drone Safety Team Update

Abby Smith, Deputy Executive Director
UAS Integration Office
Pete Dumont, Chief Executive Officer
Rare Air Solutions

DST Mission and History

- Chartered in 2016 by FAA Administrator Michael Huerta, the Unmanned Aircraft Safety Team (UAST), now called Drone Safety Team (DST), is an industry-government partnership committed to ensuring the safe operations of drones in the national airspace system. The DST supports the safe integration of drones with data-driven safety enhancements and collaboration among members of the drone industry.
- DST has adopted the same collaborative model as the General Aviation Joint Steering Committee (GAJSC) & Commercial Aviation Safety Team (CAST).

DST Member List

- American Association of Airport Executives (AAAE)
- Airavat Solutions
- Airborne Public Safety Association
- AlarisPro
- Aloft
- Airline Pilots Association (ALPA)
- Academy of Model Aeronautics (AMA)
- Amazon
- American Tower
- Anzen Unmanned
- Aircraft Owners and Pilots Association (AOPA)
- American Petroleum Institute (API)
- Alliance of Systems Safety for UAS through Research Excellence (ASSURE)
- Bihrle Applied Research
- Boeing
- Cognizant
- Commercial Drone Alliance
- DJI
- DroneUp
- Experimental Aircraft Association (EAA)
- Federal Aviation Administration (FAA)
- Flight Safety Foundation (FSF)
- First Person View (FPV) Freedom Coalition
- International Association of Fire Chiefs (IAFC)
- Mid-Atlantic Aviation Partnership*
- MissionGo
- National Aeronautics and Space Administration (NASA)
- NASA Aviation Safety Reporting System (ASRS)
- National Air Traffic Controller's Association (NATCA)
- National Association of Tower Erectors (NATE)
- National Agricultural Aviation Association (NAAA)
- National Council on Public Safety UAS*
- Northern Plains UAS Test Site
- National Transportation Safety Board (NTSB)
- NUAIR Alliance
- Praxis
- Aerospace
- Quantum AI
- Rare Air Solutions
- Resilient Solutions
- Skydio
- Spright/Air Methods
- Technology Exploration Group
- UASidekick
- University of California University Aviation Association (UAA)
- Unmanned Safety Institute (USI)
- United Parcel System (UPS) Flight Forward
- Volpe
- Wing
- Zipline
- European Union Aviation Safety Agency (EASA) (Observer)

Leadership

Co-Chairs

Abigail Smith
FAA UAS Integration Office

Pete Dumont
Rare Air Consulting

Executive Secretary

Greg Deeds
Technology Exploration Group

Government Secretary

April Stone
FAA UAS Integration Office

Steering Committee

Greg Deeds
Technology Exploration Group

Jon Hegranes
Aloft

Suzanne Lemieux
American Petroleum Institute

Ken Krantz
Cognizant

Tony Nannini
Wing Aviation

Fred Stein
Anzen Unmanned

Collaboration

- Industry
- Government (FAA, NAC, AAAC, NASA, NTSB)
- International Entities
- Unions
- Associations
- Trade Shows and Events

DST Working Groups

Data Analysis

Safety Assurance

d

Safety Mitigation

Strategic Communication

Data Analysis

Areas and audiences

- Recreational
- Commercial
- Advanced Operations
- Advanced Air Mobility
- State/Local Agencies
- General Public

Leverage actionable data with purpose

- Opportunities to educate
- Opportunities to engage
- Opportunities to empower

Safety Mitigation

Focus Areas

- Develop education, outreach, and possible credentialing products
- Develop technology safety features to prevent unauthorized incursions/ excursions
- Develop consensus design standards for Return To Launch (RTL) implementation in drones
- Provide education / outreach for RTL setup during mission planning & pre-flight

Strategic Communication

- Planning For Success Campaign
- DST Website Redesign
- Tuesday Tweet Campaign
- Communications for DST Safety Enhancement (SE) Documents
- Drone Safety Day
- Ongoing FAA Tasking Follow-up
  - Increase awareness about registration and re-registration requirements
  - Promote The Recreational UAS Safety Test (TRUST)
  - Continue safety culture messaging

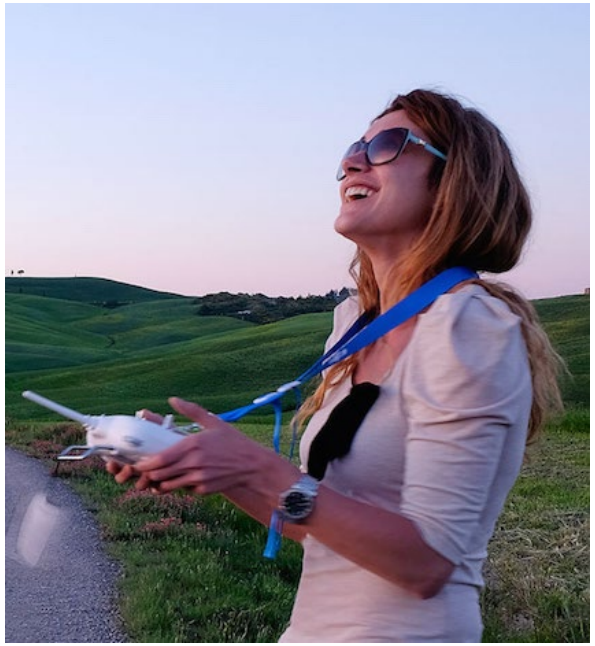
The Recreational UAS Safety Test (TRUST)

TRUST was developed in collaboration with drone stakeholders to determine content and how it would be administered.

Aviation Safety Report System (ASRS)

- Aviation Safety Reporting System (ASRS) offers a reporting form tailored to the drone community.
- Anyone involved in drone operations can file an ASRS report.
- ASRS welcomes reports describing close calls, hazards, violations, and safety related incidents such as:
  - Near Mid Air Collision
  - Equipment Issues
  - Lost Link / Fly Away
  - Un/controlled Descent
  - Airspace Incursions
  - Environmental Hazards
  - Miscommunication
  - Procedural Issues
  - Human Error / Mistakes
  - Injuries

Promote Safety Culture



Safety culture is a mindset—how we think about safety so that it permeates every organizational layer while influencing behaviors. It engages and empowers everyone at every level and reaches across the entire drone community—individual operators, manufacturers, industry, government, and the public.

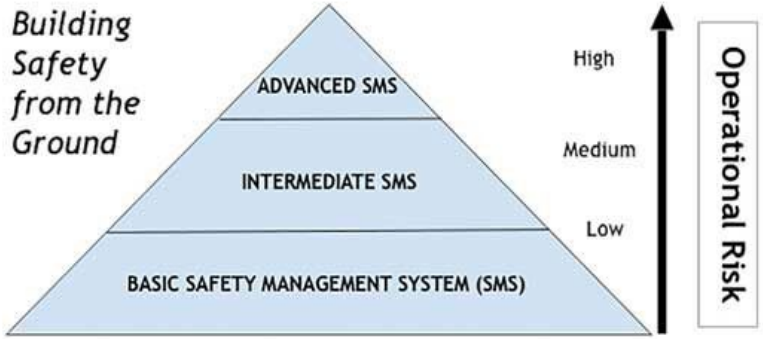
- Single Pilot or Team
- Team Growth
- Team Expansion

Campaigns 2022-2023

Safety Management Systems (SMS) in Drone Operations

A safety management system is composed of four functional components

1. Safety Policy & Objectives
2. Safety Risk Management
3. Safety Assurance
4. Safety Promotion



- Define Safety Goals
- Develop Processes To Achieve Safety
- Document & Data Control

- Measure Risk
- Accept Risk
- Build A Positive Safety Culture
- Communicate & Promote Safety

- Identify New Hazards
- Evaluate Risk Control Strategies
- Assign 1 of 3 Levels Of Complexity

Questions? Secretary@DroneSafety.org

Website DroneSafetyTeam.org

Twitter @DroneSafetyTeam

Apply to DST dronesafetyteam.org/apply

Questions?

ADVANCED AVIATION ADVISORY COMMITTEE

Federal Aviation Administration

FAA New Taskings to the AAAC

Jay Merkle
Designated Federal Officer
Executive Director
UAS Integration Office

Background

The Beyond Visual Line of Sight (BVLOS) Aviation Rulemaking Committee (ARC) presented their final report on March 10, 2022.

BVLOS ARC was chartered to make recommendations to the FAA for performance-based regulatory requirements to normalize safe, scalable, economically viable, and environmentally advantageous UAS BVLOS operations that are not under positive air traffic control (ATC).

BVLOS ARC recommendations were grouped into seven categories with each category containing multiple sub-groups.

AAAC Tasking #14: BVLOS ARC Opportunities

FAA Tasking: AAAC to examine BVLOS ARC recommendations and identify opportunities where industry can assist and accelerate implementation of BVLOS regulatory actions.

Timeline: AAAC recommendations presented to the FAA at the next AAAC meeting tentatively scheduled for early March 2023.

Background

Drone operations are continuing to expand within a variety of industry sectors.

As these operations continue to grow it is vital to capture lessons learned and best practices in order to assist future drone stakeholders in establishing and conducting operations.

Community engagement methods is one area that can be scalable across the drone industry and then adapted to each specific drone industry sector and community.

Establishing a repository of lessons learned and best practices saves time and resources.

AAAC Tasking #15: Drone Community Engagement Lessons Learned / Best Practices

FAA Tasking: AAAC to make recommendations on lessons learned and best practices related to drone community engagement methods.

AAAC recommendations should identify specific drone industry sectors and their related community engagement methods.

Timeline: AAAC recommendations presented to the FAA at the next AAAC meeting tentatively scheduled for early March 2023.

ADVANCED AVIATION ADVISORY COMMITTEE

October 20, 2022

New Business/Future Agenda Items

Houston Mills

Chair

FAA Advanced Aviation Advisory Committee

Federal Aviation Administration

ADVANCED AVIATION ADVISORY COMMITTEE

October 20, 2022

Closing Remarks

Jay Merkle

Designated Federal Officer

FAA Advanced Aviation Advisory Committee

Federal Aviation Administration

ADVANCED AVIATION ADVISORY COMMITTEE

October 20, 2022

Closing Remarks

Houston Mills

Chair

FAA Advanced Aviation Advisory Committee

Federal Aviation Administration

ADVANCED AVIATION ADVISORY COMMITTEE

October 20, 2022

Adjourn

Houston Mills

Chair

FAA Advanced Aviation Advisory Committee

Federal Aviation Administration

Charter of the Advanced Aviation Advisory Committee
U.S. Department of Transportation

1. **Committee's Official Designation.** The Committee's official designation is the Advanced Aviation Advisory Committee (AAAC).

2. **Authority.** The Committee is established under the authority of the U.S. Department of Transportation (DOT), in accordance with the provisions of the Federal Advisory Committee Act (FACA), as amended, Pub. L. 92-463, 5 U.S.C. App. 2. The Secretary of Transportation has determined that the establishment of the Committee is in the public interest.

3. **Objectives and Scope of Activities.** The objectives of the AAAC are to provide independent advice and recommendations to the Department of Transportation (DOT) and the Federal Aviation Administration (FAA) and to respond to specific taskings received directly from the FAA. The advice, recommendations, and taskings relate to improving the efficiency and safety of integrating advanced aviation technologies-- including unmanned aircraft systems (UAS) and advanced air mobility (AAM), into the National Airspace System (NAS) -- while equipping and enabling communities to inform how UAS, AAM, and other technologies may operate in ways that are least impactful to those communities. In response to FAA requests, the AAAC may provide the FAA and DOT with information that may be used for tactical and strategic planning purposes.

4. **Description of Duties.** The AAAC will act solely in an advisory capacity and will not exercise program management responsibilities. Decisions directly affecting the implementation of transportation policy will remain with the FAA Administrator and the Secretary of Transportation. The AAAC will:

    a. Undertake only tasks assigned by the FAA

    b. Deliberate on and approve recommendations for assigned tasks in meetings that are open to the public.

    c. Respond to ad-hoc informational requests from DOT and the FAA and/or provide input to DOT and the FAA on the overall AAAC structure (including the structure of subcommittees and/or task groups).

5. **Agency or Official to Whom the Committee Reports.** The AAAC reports to the Secretary of the U.S. Department of Transportation (DOT) through the FAA Administrator.

6. **Support.** The FAA will provide support, including funding for the Committee. The UAS Integration Office is the primary entity within the FAA responsible for supporting the AAAC.

7. **Estimated Annual Operating Costs and Staff Years.** The FAA's annual operating costs to support the AAAC for the period and scope specified by the charter is approximately $460,000, which includes 2.0 full-time equivalent salary and benefits at $413,000, plus $47,000 for meeting, travel, and miscellaneous expenses.

8. **Designated Federal Officer.** The FAA Administrator, on behalf of the Secretary of Transportation, will appoint a full-time or permanent part-time Federal employee to serve as the AAAC Designated Federal Officer (DFO). The AAAC DFO will ensure that administrative support is provided for all activities. The DFO will:

    a. Ensure compliance with FACA and any other applicable laws and regulations.

    b. Call and attend all the committee and subcommittee meetings.

    c. Formulate and approve, in consultation with the Chair, all committee and subcommittee agendas.

    d. Notify all Committee members of the time, place, and agenda for any meeting.

    e. Maintain membership records.

    f. Ensure efficient operations, including maintaining itemized contractor invoices.

    g. Maintain all AAAC records and files.

    h. Adjourn any meeting when doing so would be in the public interest.

    i. Chair meetings when directed to do so by the FAA Administrator.

9. **Estimated Number and Frequency of Meetings.** AAAC estimates meeting three times per year to carry out its responsibilities. AAAC meetings will be open to the public, except as provided under Section 10(d) of FACA, as implemented by 41 CFR part 102-3, and DOT Order 1120.3C.

10. **Duration.** Continuing, subject to renewal every two years.

11. **Termination.** The charter will terminate two years after its effective date unless renewed in accordance with FACA and other applicable regulations. If the AAAC is terminated, the FAA will give as much advance notice as possible of such action to all participants.

12. **Membership and Designation.** AAAC shall comprise members appointed by the U.S. Secretary of Transportation upon recommendation by the FAA Administrator. All AAAC members serve at the pleasure of the Secretary of Transportation. To the extent practicable, the membership of the AAAC shall include persons with lived experience and knowledge of the needs of underrepresented and underserved groups in race, ethnicity, religion, disability, sexual orientation, and gender identity.

    a. The AAAC will have no more than 41 members. Members represent airports and airport communities; pilot and controller labor groups; local, state, and tribal governments; navigation, communication, surveillance, and air traffic management capability providers; research, development, and academia; agricultural interests, traditional piloted aviation operators; UAS hardware component manufacturers; UAS manufacturers; corporate UAS operators; citizen UAS Operators; UAS software application manufacturers; advanced air mobility; community advocates; and industry associations or other specific areas of interest as determined by the FAA Administrator or Secretary of Transportation.

    b. Members will serve without charge and without government compensation. Members who represent a particular interest of employment, education, experience, or affiliation with a specific aviation-related organization will serve as representatives. Members appointed solely for their expertise serve as Special Government Employees (SGEs).

    c. Member representatives and SGEs are appointed for a two-year term but can continue to serve until their replacement is chosen or they are reappointed.

    d. Members shall not preference or otherwise utilize their membership on the Committee in connection with public statements in their personal capacities without a disclaimer that views expressed are their own and do not represent the views of the Committee, the Federal Aviation Administration, or the Department of Transportation.

13. **Subcommittees.** The FAA Administrator has the authority to create and dissolve subcommittees as needed. Subcommittees must not work independently of the AAAC. They must provide recommendations and advice to the AAAC, not the FAA, for deliberation, discussion, and approval. Subcommittees are comprised of subject matter experts from multiple stakeholder groups to include traditional, pilotless, and advanced aviation

communities, and they will include experts on a range of policy matters, including security, safety, and privacy.

14. **Recordkeeping.** The records of the AAAC are handled in accordance with the National Archives and Records Administration (NARA) General Records Schedule 6.2 or other approved agency records disposition schedules. Subject to the Freedom of Information Act, 5 U.S.C. § 552, the records, reports, transcripts, minutes, and other documents that are made available to or prepared for or by AAAC will be available for public inspection at https://www.faa.gov/uas/programs_partnerships/advanced_aviation_advisory_committee/.

15. **Filing Date.** This charter is effective June 10, 2022, which is the filing date of this Charter

Advisory Committee Member Roles and Responsibilities

Advisory committees have played an important role in shaping programs and policies of the federal government from the earliest days of the United States of America. Since President George Washington sought the advice of such a committee during the Whiskey Rebellion of 1794, the contributions made by these groups have been impressive and diverse.

Through enactment of the Federal Advisory Committee Act (FACA) of 1972 (Public Law 92-463), the U.S. Congress formally recognized the merits of seeking the advice and assistance of our nation's citizens to the executive branch of government. At the same time, the Congress also sought to assure that advisory committees:

- Provide advice that is relevant, objective, and open to the public;
- Act promptly to complete their work;
- Comply with reasonable cost controls and recordkeeping requirements; and
- Had government oversight through creation of the Committee Management Secretariat.

Participation in a FACA such as the Advanced Aviation Advisory Committee (AAAC) provides the Federal Government with essential advice from subject matter experts and a variety of stakeholders. The FACA requires that committee memberships be "fairly balanced in terms of the points of view represented and the functions to be performed." Selection of committee members is made based on the particular committee's requirements and the potential member's background and qualifications. AAAC members assume the following responsibilities:

- Attend ¾ of all AAAC public meetings during membership term.
- Provide oversight, deliberation, comments and approval of the AAAC activities.
- Contribute respective knowledge and expertise.
- Participate as a member on a working group, if desired.
- Coordinate with the constituents in his or her Uncrewed Aircraft System and aviation sector.
- Review work plans, if requested.
- Review the AAAC and any subcommittee or working group recommendation reports.
- Inform the AAAC Chair and the DFO when he or she can no longer represent his or her organization/association on the AAAC.
    - Members may continue to serve until a replacement has been appointed or removed.

Jay Merkle
Executive Director, Unmanned Aircraft Systems Integration Office

Prior to being named the new Executive Director of the Unmanned Aircraft Systems Integration Office, Peter “Jay” Merkle was the Deputy Vice President (DVP) of the Program Management Organization (PMO) within the Air Traffic Organization (ATO). The PMO is responsible for all NextGen program activity; all National Airspace System (NAS) communications; navigation, weather, surveillance and automation modernization programs; and all service life extensions to legacy NAS sensors, communications and navigation aids. Given the tight coupling between successful automation program delivery and current system operation, the PMO also leads and manages all second-level automation engineering efforts. Lastly, the PMO works with FAA operations and aviation users to ensure globally interoperable solutions for NextGen.

Prior to that position, Merkle was the Director of Program Control and Integration, AJM-1, in the PMO for the ATO. In that capacity, he led the PMO in developing effective, timely, and innovative solutions to evolving business needs. The focus areas were program control, cross-cutting analysis and integration, and special initiatives.

Since joining the FAA, Merkle has served as the Manager of Systems Integration for Portfolio Management and Technology Development within the NextGen organization. He also has held positions as the Lead Engineer for tower, terminal, and en route automation systems, as the Chief System Engineer for En Route and Terminal Domains, and as the Chief Architect for NextGen at the Joint Planning and Development Office.

Merkle has over 30 years of extensive experience in engineering and program management. He started his career as an engineer working in cockpit and crew station design on several aircraft, including the C-17 large transport aircraft. Merkle holds a Bachelor’s degree in Psychology from the University of Central Florida and a Master's degree in Industrial Engineering and Operations Research from the Virginia Polytechnic Institute and State University.

Captain Houston Mills
UPS Vice President Flight Operations & Safety

As Vice President of Flight Operations & Safety, Captain Mills has global oversight of and responsibility for UPS Airline Flight Operations, Training, Regulatory Compliance and Airline Safety.

Prior to his current position Houston served as Global Aviation Strategy & Public Policy Director, where he advocated for federal and international aviation policy and collaborated with domestic and international industry groups to harmonize aviation safety standards and sustainability rules. He was also responsible for aggregating aviation strategy issues under one umbrella within UPS to help maximize safety and reliability for the company, as well as service to UPS's growing global customer base.

Houston also served as UPS's Director of Airline Safety and Compliance where he was responsible for ensuring safe and regulatory compliant Flight, Maintenance, and Ground support operations, Emergency Response preparedness, and interaction with government regulatory and safety organizations worldwide. Under his leadership UPS became one of the first U.S. airlines to have a certified Safety Management System (SMS). He also served as the UPS International Chief Pilot, where he was responsible for crew-related international flight operation activity and as the Director of Flight Training where he was responsible for the UPS Advance Qualification Program (AQP) for all crewmembers.

Houston currently serves as Chairman of the FAA Drone Advisory Committee, where as one of 35 executive stakeholders he brings a traditional aviation perspective to a group of other transportation and technology leaders as they explore policy considerations for unmanned aerial systems (UAS) integration into the National Air Space system. He also serves as the Chairman of the Cargo Airline Association Board of Directors, Board of Governors for the Fight Safety Foundation, Board of Advisors of RTCA and is a member of the IATA Safety Flight Ground Operations Advisory Council, and the Airlines for America (A4A) Safety and Operations Councils.

A native of Indianapolis, Houston received a bachelor's in English literature from Wabash College and an MBA from Webster University. He also holds a Professional Human Resources (PHR) designation.

Houston began his aviation career in 1985 as a Marine Corps officer and F/A-18 fighter pilot where he was certified as an air combat tactics instructor (ACTI). He served the United States in Operations

Desert Shield, Desert Storm, Restore Hope and Southern Watch. He has more than 100 aircraft carrier landings to his credit. He has previously served as an FAA designated check airman and is currently an international qualified Captain on the Boeing 757/767.

In step with UPS's commitment to the community, Houston has served on numerous Boards to include: Washington Aero Club, Marine Toys for Tots Foundation, Association for Unmanned Systems International, Center for Women & Families, Hospice, and many others. He currently serves on the Board of Directors of the National Center for Families Literacy, RTCA Board of Advisors, Flight Safety Foundation Board of Governors, The Organization of Black Aerospace Professional Board of Advisors, and is president of the Marine Corps Coordinating Council of Kentucky.

Married and the father of three, Houston particularly enjoys motivational speaking, golf, and has coached various youth sports for many years.

Advanced Aviation Advisory Committee

June 30, 2022 • Virtual Meeting

Detailed Minutes

Introduction

An Advanced Aviation Advisory Committee (AAAC) meeting was held at the William F. Bolger Center in Potomac, MD on June 30, 2022, from 10:00 AM to 2:30 PM EST. This meeting was held in a hybrid format and livestreamed across FAA social media for the general public. The full meeting is archived on the FAA's YouTube channel and is broken up into two sessions. Both sessions can be found here: First session: https://www.youtube.com/watch?v=lIplu0xRID8. Second session: https://www.youtube.com/watch?v=ss7RLW0ZP4s.

Designated Federal Officer Opening Remarks

Mr. Jay Merkle began the morning session of the meeting by welcoming the audience and reading the Designated Federal Officer (DFO) opening statement. After reading the opening statement, Mr. Merkle then discussed the agenda for the meeting. Mr. Merkle proceeded to ask for a motion for approval of the February 23, 2022 meeting minutes. There were no objections and the motion passed.

Mr. Merkle then turned the meeting over to the AAAC Chair for his remarks.

View the DFO's remarks (link is timestamped for DFO Opening Remarks): https://youtu.be/lIplu0xRID8?t=131

AAAC Chair Opening Remarks

AAAC Chair, Captain Houston Mills, began his remarks by welcoming all attendees and viewers to the meeting. Capt. Mills expressed that the continued work of the Committee, under the new Charter, will help us to better achieve full integration of drones and advanced air mobility (AAM) vehicles into the National Airspace System (NAS). He then provided examples of recent data and calculated projections related to the growth of the small UAS community to demonstrate the impact and importance of the Committee's work.

After thanking the scheduled presenters for their hard work in preparing their recommendations, Capt. Mills turned the meeting over to Abby Smith, Deputy Executive Director for the Unmanned Aircraft Systems (UAS) Integration Office to present the first briefing.

View the AAAC Chair's remarks: (link is timestamped for AAAC Chair Opening Remarks):

https://youtu.be/llplu0xRID8?t=318

FAA Initial Response to Task Group #12: Recommendations for Integrating Uncrewed Aircraft Operations into K-12 Curriculums

Presenter:
Abby Smith, Deputy Executive Director, FAA UAS Integration Office

Ms. Abby Smith began the presentation by providing a brief background on Task Group #12's Recommendations for Integrating Uncrewed Aircraft Operations into K-12 Curriculums, which were provided to the FAA at the February 2022 AAAC Meeting, and thanking the Committee for their thoughtful and thorough recommendations. Ms. Smith specified that at this time, the FAA would be providing an initial response to the Committee. The FAA concurred with all recommendations and revealed that the agency intends to dedicate resources to each.

There was a brief discussion following the presentation.

The AAAC eBook provides the official initial report of the FAA's response to Task Group #12: Recommendations for Integrating Uncrewed Aircraft Operations into K-12 Curriculums.

View the presentation and discussion (link is timestamped for FAA Initial Response to Task Group 12: Recommendations for Integrating Uncrewed Aircraft Operations into K-12 Curriculums):
https://youtu.be/llplu0xRID8?t=589

Advanced Air Mobility Infrastructure Update

Presenter:
Keri Lyons, Technical Advisor, FAA Office of Airports

Ms. Keri Lyons began the presentation by explaining what AAM is and providing examples of notional use cases. Ms. Lyons proceeded to discuss the FAA's expectations and plans regarding initial and future AAM operations, before providing the Committee with a brief introduction into the FAA Office of Airports. She then addressed vertiport standards and the agency's plans to develop them, including describing the FAA's approach to vertiport research, partnerships, and early adopters.

Lastly, Ms. Lyons explained that a draft Engineering Brief (available for viewing on the FAA website) will serve as interim guidance as the agency continues to work towards a performance based advisory circular. The FAA plans to issue a final Engineering Brief later this summer.

There was a discussion period following the presentation.

View this presentation and discussion (link is timestamped for AAM Infrastructure Update presentation):
https://youtu.be/lIplu0xRID8?t=2474

Task Group #13: Strategic Framework for Advanced Air Mobility Near-Term Operations Interim Recommendations

Presenters:
David Silver, Vice President, Civil Aviation Aerospace Industries Association
Seleta Reynolds, General Manager, Los Angeles Department of Transportation

Mr. David Silver opened the presentation by providing an overview of the tasking provided to the group at the February 23, 2022 AAAC Meeting and explaining how the task group worked together to formulate their interim recommendations in sub-groups: Aircraft, Airspace, Operations, Infrastructure, and Community. Mr. Silver specified that the task group would need to request additional time to complete the final report.

There was a brief discussion following the presentation.

View the presentation and discussion (link is timestamped for Task Group #13: Strategic Framework for Advanced Air Mobility Near-Term Operations Interim Recommendations presentation):
https://youtu.be/lIplu0xRID8?t=5204

Remarks from the FAA Deputy Administrator

FAA Deputy Administrator, Mr. Brad Mims, began the afternoon session of the meeting with welcoming remarks to the Committee and audience. Mr. Mims acknowledged some of the major milestones that have taken place since the last AAAC meeting, including the publishing of the Beyond Visual Line of Sight (BVLOS) Aviation Rulemaking Committee (ARC) report, the publishing of the draft interim guidance on vertiport standards, and the issuing of new airworthiness criteria for special class category drones.

The meeting was then turned over to Capt. Mills to introduce the next presentation.

View the Remarks from the Deputy Administrator (link is timestamped for Remarks from the Deputy Adminstrator):
https://youtu.be/ss7RLW0ZP4s?t=25

NASA Programs Update

Presenter:
Robert Pearce, Associate Administrator, NASA

Mr. Robert Pearce began his presentation by providing a broad overview of NASA aeronautics, sharing some of NASA's significant achievements for both UAS commercial missions and UAS traffic management. He then continued with his presentation by providing a brief introduction into AAM, describing NASA's role in addressing AAM related challenges, before moving on to discuss NASA's national campaign objectives and partnerships.

Mr. Pearce then went on to discuss the agency's approach to noise research, advanced concepts for wildfire managers in the field, and the success of the agency's university leadership initiative.

Following the presentation, there was a discussion period.

View the presentation and discussion: (link is timestamped for NASA Programs Update):
https://youtu.be/ss7RLW0ZP4s?t=697

New Business/Agenda Topics

Mr. Mills opened the floor to Committee members to raise any new business or agenda items. Capt. Mills cataloged all new business items received ahead of the meeting and discussed each individually.

Topics for the FAA to consider for future taskings included:

- Mr. Vic Moss brought up UAS and AAM operator security measures, citing instances where drones and/or drone operators are being attacked in both recreational and non-recreational operations.
- Mr. Mills raised a question regarding the priorities of tasks remaining from the 2018 FAA Reauthorization Act. Mr. Merkle stated that the FAA will provide an update at the next AAAC meeting.
- Mr. Mills raised a question regarding what the FAA can do to speed up the rulemaking process. Mr. Merkle stated that the FAA is interested in possibly taking an approach that

would allow for the community to provide feedback that would be taken into consideration to improve the rulemaking process.

- Ms. Cathy Cahill raised a question regarding how drones can operate in Class E over Class A airspace. Mr. Merkle took an action item to think about a tasking and determine where the FAA, NASA, and ICAO are with this item.
- Mr. Hsu raised a discussion regarding alternative fuel, as his team is working with the military to produce 100% synthetic jet fuel. He would like to see if the FAA and AAAC could play a bigger role in this carbon neutral fuel solution.

Lastly, Capt. Mills raised the possibility of an FAA tasking that focused on the Committee reviewing the FAA five-year plan for integrating UAS into the NAS and assessing the document for root causes of successes, shortfalls, and future opportunities for this sector, with recommendations for the FAA to adjudicate accordingly. Capt. Mills also raised the possibility of an FAA tasking that focused on the Committee conducting an analysis of the short-term BVLOS ARC recommendation to determine what can be put into place as rules within the next 12 months.

View the discussion (New Business/Agenda Topics):
https://youtu.be/ss7RLW0ZP4s?t=3978

Closing Remarks and Adjourn

Mr. Merkle began his closing remarks by thanking all of the presenters, as well as those who help make the AAAC possible, and praised the Committee for their work with gender-neutral language and the K-12 tasking. Mr. Merkle iterated that by the next Committee meeting, he expects there to be new members joining in the conversation.

He then turned the meeting over to Capt. Mills, who thanked the AAAC for all of their hard work, thought, and leadership, before turning the meeting over to Mr. Gary Kolb.

Mr. Kolb, UAS Stakeholder & Committee Officer, asked for a motion to adjourn the meeting. The motion was approved and the meeting was adjourned.

View the closing remarks (Closing Remarks and Adjourn):
https://youtu.be/ss7RLW0ZP4s?t=5120

Appendix A: FAA Meeting Attendees

FAA Designated Federal Officer, Presenters, and Speakers

Name	Title	Org.
1. Jay Merkle	Executive Director, UAS Integration Office (DFO)	FAA
2. Bradley Mims	Deputy Administrator	FAA
3. Robert Pearce	Associate Administrator, Aeronautics Research Mission Directorate (ARMD)	NASA
4. Abby Smith	Deputy Executive Director, UAS Integration Office	FAA
5. Keri Lyons	Technical Officer, Airports	FAA
6. Gary Kolb	UAS Stakeholder & Committee Officer, UAS Integration Office	FAA

FAA/DOT Observers and Stakeholders

Name	Title	Org.
1. Laurence Wildgoose	Assistant Administrator, Office of Policy, International Affairs and Environment	FAA
2. Shannetta Griffin	Associate Administrator, Airports	FAA
3. Claudio Manno	Associate Administrator, Security and Hazardous Materials Safety	FAA
4. Marc Nichols	Chief Counsel	FAA
5. Tim Arel	Acting Chief Operating Officer, Air Traffic Organization	FAA
6. Winsome Lenfert	Deputy Associate Administrator, Airports	FAA
7. Tonya Coultas	Deputy Associate Administrator, Security and Hazardous Materials Safety	FAA
8. Vinn White	Senior Advisor, Office of the Secretary of Transportation	DOT
9. Ryan Steinbach	Aviation Policy Coordinator	DOT
10. Sabrina Saunders-Hodge	Director, Research, Engineering, and Analysis, UAS Integration Office	FAA
11. Leesa Papier	Executive Director, Security and Hazardous Materials Safety	FAA
12. Jessica Orquina	Acting Manager, UAS Integration Office	FAA
13. Adrienne Vanek	Director, International Division, UAS Integration Office	FAA
14. Martha Christie	Deputy Director, Safety & Integration Division, UAS Integration Office	FAA

Name	Title	Org.
15. Elizabeth Forro	Special Assistant, UAS Integration Office	FAA
16. Kamisha Walker	Management Assistant, UAS Integration Office	FAA
17. Deandra Brooks	Senior Communications Specialist, UAS Integration Office	FAA

Public Comments Submitted Since Last Committee Meeting

Washington Progress Group LLC

5649 John Barton Payne Road
Marshall, Virginia 20115-2529
540 364 3470
www.safeaccess4uas.com

September 27, 2022

Advanced Aviation Advisory Committee
c/o Federal Aviation Administration
800 Independence Avenue SW
Washington DC 20005

Re: Comments of Washington Progress Group to AAAC Meeting October 20, 2022

Gentlepersons:

The Washington Progress Group LLC (WPG) hereby requests that the attached paper "NAS Transformation: The Whole is Greater than the Sum of Its Parts," published this past week in the Fall 2022 Issue of the Air Traffic Control Association *Journal of Air Traffic Control*, be distributed to members of the AAAC in advance, and for consideration of and discussion by the Committee in its October 20, 2022 public meeting. This paper was prepared by WPG principals Frank Frisbie and Suzette Matthews.

The paper, which discusses insufficiency of the current FAA approach to integrating UAS and other advanced innovative vehicles into the NAS, advocates for a comprehensive gap analysis and comparative evaluation of alternative NAS-wide ATC infrastructure and operating paradigms that could provide safe, fair, and equal access for all users and vehicles. WPG submits this discussion is directly pertinent to the mission of AAAC.

Respectfully,

Suzette Matthews
Principal

NAS Transformation: The Whole is Greater than the Sum of Its Parts

by Frank L. Frisbie and Suzette Matthews[1]

A tidal wave of unprecedented new entrant aircraft is threatening to overwhelm the National Airspace System (NAS) as we know it. FAA predicts explosive growth in UAS operations, even in the near term.[2] The global commercial drone marketplace is predicted to grow at a 23.7% compound annual rate, to $21.69 billion by 2030.[3] Revenue of $319 billion globally was attributable to the commercial space industry in 2019.[4] Even today commercial space launches are contributing to troublesome localized airspace congestion, and their number is predicted to double as soon as 2025.[5] Aerospace industry innovators are already manufacturing an entirely new category of Jetson-like personal flying cars—Vertical Takeoff and Landing (VTOL)-capable, electric-powered, and automated for non-pilot operations--that could flood the skies with garage-to-destination itineraries.[6]

Today's NAS is unprepared to accommodate this volume and diversity of new traffic. Look skyward on any day, even in suburban localities, and wide-open airspace can be seen in all directions. Human operated--especially passenger carrying--aircraft are routed into fixed or ATC approved flight paths, and any other air vehicles which might cross their paths are either forced into positive ATC control, or prohibited from flying altogether. The largest volume of airspace is completely unoccupied, and going to waste. UAVs and automated personal aircraft, which could take advantage of this open space, are relegated to specific altitudes or segregated airspace, subjected to unique restrictions (no flying over people), and burdened or foreclosed by certification regimes and flight rules designed for licensed pilots only.

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[1] Frank Frisbie and Suzette Matthews are Principals of Washington Progress Group LLC (WPG), https://www.safeaccess4uas.com/policy-and-government-relations.html. WPG is twice the recipient of the Air Traffic Control Association Small and Disadvantaged Business Award, 2016 and 2020.

[2] *See* FAA Aviation Forecasts Years 2021-2040, Unmanned Aircraft Systems, https://www.faa.gov/sites/faa.gov/files/data_research/aviation/aerospace_forecasts/Unmanned_Aircraft_Systems.pdf

[3] https://www.bloomberg.com/press-releases/2022-02-24/commercial-drones-market-to-reach-21-69-billion-globally-by-2030-at-23-7-cagr-allied-market-research

[4] https://www.euroconsult-ec.com/press-release/space-economy-valued-at-385-billion-in-2020-with-commercial-space-revenues-totaling-over-310-billion/

[5] Space launches and private jet operations are already causing troublesome congestion in Florida airspace. *See* Hetzner, "Private jets and billionaire space launches are crippling Florida airspace" (2022), *https://fortune.com/2022/05/04/private-jets-and-billionaire-space-launches-are-crippling-florida-airspace/. See* also FAA Aviation Forecasts Years 2021-2040, https://www.faa.gov/sites/faa.gov/files/data_research/aviation/aerospace_forecasts/Commercial_Space.pdf

[6] "The global flying cars market is expected to grow from $52.2 million in 2021 to $84.39 million in 2022 at a compound annual growth rate (CAGR) of 61.7%. The market is expected to grow to $488.56 million in 2026 at a compound annual growth rate (CAGR) of 55.1%," "Flying Cars Global Market Report 2022," https://www.reportlinker.com/p06280935/Flying-Cars-Global-Market-Report.html . *See* also https://simpleflying.com/flying-cars-2022/; https://www.reuters.com/business/autos-transportation/joby-receives-faa-nod-start-air-taxi-services-commercially-2022-05-26/; *Cf*, Goldstein, "It's 2022: Where are the Flying Cars We Were Promised?", https://www.forbes.com/sites/michaelgoldstein/2021/12/30/its-2022-where-are-the-flying-cars/?sh=1fca59483f7b

Nor does anything in today's NextGen future planning take us where we need to go. What is on the books in the NextGen architecture[7] perpetuates the current approach of applying technical and operational patches, often only in segregated airspace, to address the complaints of operator constituencies.[8] Or it simply polishes decades old "innovations" whose potential are pretty much already exhausted.[9] The fundamental weakness of this approach is that it embraces, and even enhances, balkanization of the airspace without any real construct for resolving incompatibility and performance issues at the boundaries, or for integrating the various airspace puzzle pieces into a seamless, cohesive continuum.

There is a chasm between the well-documented requirements of the growing number and increasing sophistication of new aircraft, versus what can be safely handled by today's ATC system, even assuming improvements underway and on the boards of NextGen. Despite endlessly iterative testing projects, analyses, proposed rulemakings, and individual authorizations by exception, *we simply are not getting there from here*. Mere motion should not be confused with real progress. We need to be honest with ourselves, and with new entrant proponents. There cannot be universal accommodation of large numbers of new and innovative aircraft types without a complete transformation of the existing air traffic system, not only its equipment and procedures, but its foundational operational paradigm.

This transformational new paradigm must encompass the entire volume of National airspace. It must open equal access for all operators, both legacy and newcomers, without discrimination by class of aircraft. And it must be capable of maximizing utilization of airspace, while still safely separating (deconflicting) those aircraft, in real time (not just strategically), in a fair, economic, and efficient way. This expansive role is a tall order, and certainly not one into which the legacy ATC system can gracefully evolve and grow, which seems to be the current collective delusion.[10]

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[7] https://www.faa.gov/nextgen/programs/; *see*, e.g., FAA's version of NextGen TBO, https://www.faa.gov/air_traffic/technology/tbo/

[8] For example, the UAS con ops provides a construct for widespread operations, but only under 400 feet. https://www.nasa.gov/sites/default/files/atoms/files/2020-03-faa-nextgen-utm_conops_v2-508_1.pdf. Similarly, although the commercial space con ops call for regular integration into the NAS, current operations accommodate those aircraft only by sanitizing airspace in TFOs, and nothing on the books in the NextGen architecture changes that. https://www.faa.gov/space/airspace_integration/media/Final_CSINAS_ConOps.pdf; https://www.faa.gov/space/airspace_integration/ As noted above, fn. 4 herein, this approach is already eliciting complaints from commercial carriers that space launches are becoming frequent enough to cause congestion and delays for regular air service. And improvements suggested in NASA's Urban Air Mobility con ops are still only in the "visioning" stage, and have not yet made their way into the NextGen Architecture, even though many such vehicles are beyond the conceptual stage into manufacturing and certification. https://ntrs.nasa.gov/api/citations/20205011091/downloads/UAM%20Vision%20Concept%20of%20Operations%20UML-4%20v1.0.pdf. ; [cite press releases showing personal cars]

[9] E.g., Data Comm, https://www.faa.gov/newsroom/data-communications-data-comm-0?newsId=21994; Collabortive Decision Making CDM), https://cdm.fly.faa.gov/

[10] "The AAM [Advanced Air Mobility] market is here and growing. The complexity, scope, and dynamic nature of operations forecast will stress the ATC system beyond anything seen in ATC history. The FAA's NextGen efforts offering the foundation to support his new market are well underway. However, technology still has *at least a decade to go* before it is mature enough to allow the more robust sub-set of AAM, UAM to truly 'take flight.'" [Emphasis added]. Johnson, "ATC in

The good news is that the FAA Acquisition Management System (AMS) does articulate a policy, and establishes a procedure for identifying, analyzing, and addressing just such *whole-NAS* deficiencies. FAA's Service Analysis and Strategic Planning (SASP) process[11] begins with a "Shortfall Analysis and Report", which describes both the shortfall and the legacy case,[12] and defines "the difference between future service need and current capability."[13]

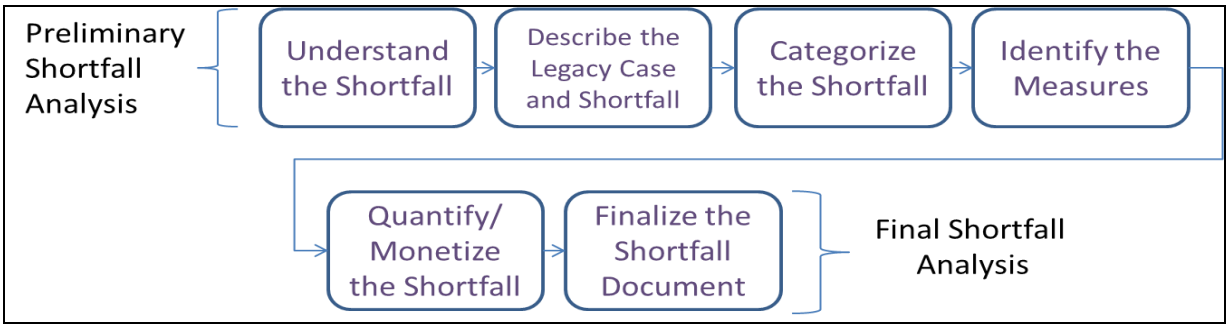

Figure 1: Shortfall Analysis Process

Source: FAA Shortfall Analysis Report Guide, v.2, March 2022, p. 4, download at https://fast.faa.gov/NFFCA_ServiceAnalysis_StrategicPlanning.cfm .

Once a shortfall is identified and described, the benefits of various alternatives for improving NAS performance are competitively analyzed and quantified:

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the Era of Advanced Mobility," Air Traffic Control Association Journal of Air Traffic Control, p. 24, Summer 2022, http://lesterfiles.com/pubs/ATCA/journal/2022/summer/#p=26.

[11] SASP [Service Analysis and Strategic Planning] is the evaluation of how well FAA legacy assets satisfy existing needs and emerging demands for new services." FAA Guidelines for Service Analysis & Strategic Planning (SASP) and Concept & Requirements Definition (CRD), March 2022, p.7, download at https://fast.faa.gov/NFFCA_ServiceAnalysis_StrategicPlanning.cfm

[12] "The legacy case description *does not* include any additional investment (e.g., technology refreshment) beyond what is already included in its investment segment baseline as approved by the Joint Resources Council." Shortfall Analysis Report Guide, March 2022, p. 8, download at https://fast.faa.gov/NFFCA_ServiceAnalysis_StrategicPlanning.cfm

[13] "A key step in the AMS lifecycle management process is understanding and articulating the service shortfall. This step is part of Service Analysis and Strategic Planning (SASP) (terminology and context found in FAST section 2.3) as well as Concept and Requirements Definition (CRD) (terminology and context found in FAST section 2.4). At a high level, Service Analysis and Strategic Planning determine what capabilities must be in place now and in the future to meet Agency goals and the service needs of customers. Concept and Requirements definition, among other things, quantifies the service shortfall in sufficient detail for the definition of realistic preliminary requirements and the estimation of potential costs and benefits during Investment Analysis.
FAST section 2.3.1 states 'The shortfall is the difference between future service need and current capability. A service shortfall is usually addressed by a sustainment action for existing assets or a new service delivery idea, including cloud services, for predicted gaps. A new idea or concept should deliver existing services more efficiently or provide new services of value to the FAA and aviation industry.'" FAA Shortfall Analysis Report Guide, p. 2, *ibid*.

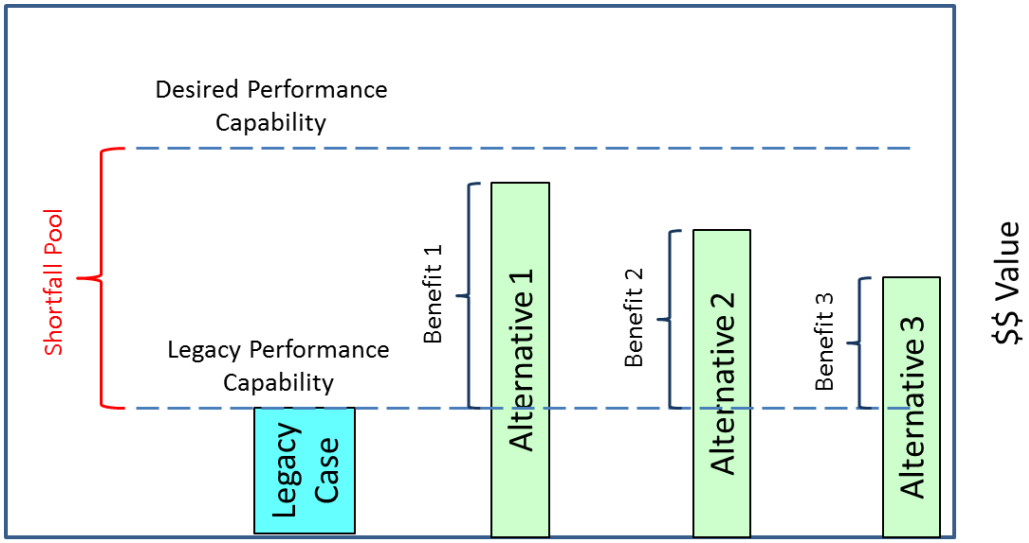
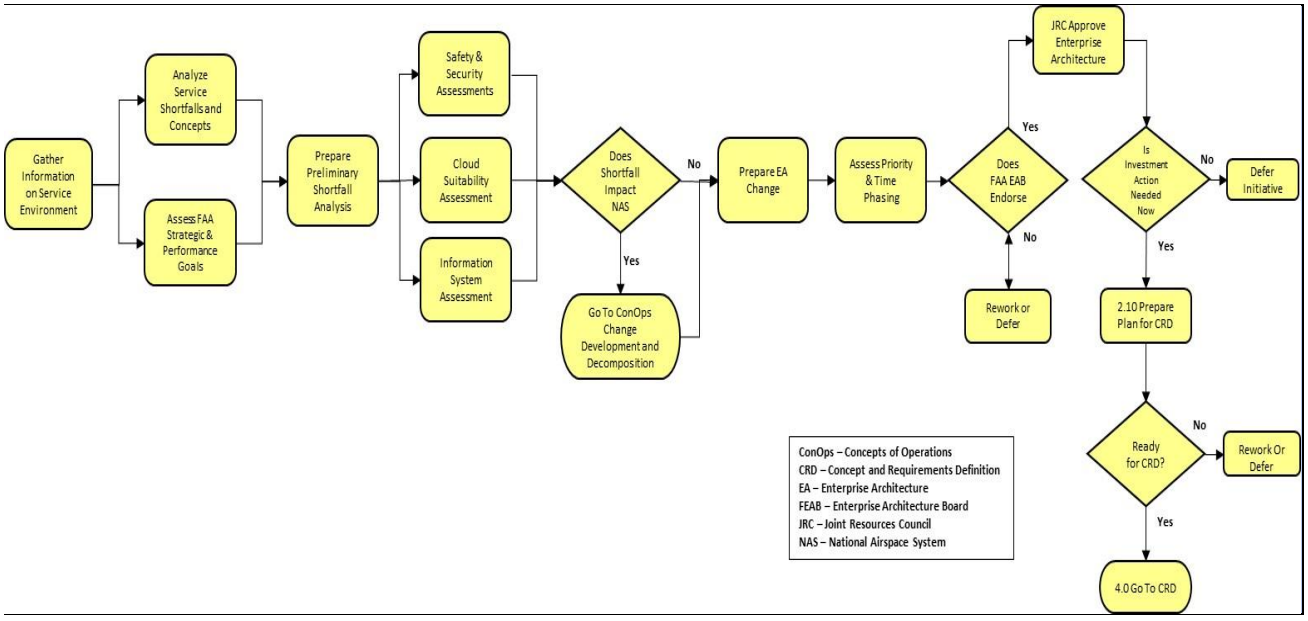


Figure 2: Shortfall vs. Benefits

(Notional, not to scale)

Source: FAA Shortfall Analysis Report Guide, p. 5, *ibid*.

The SASP analysis then proceeds to additional phases:



Source: FAA Guidelines for Service Analysis & Strategic Planning (SASP) and Concept & Requirements Definition (CRD) v.9, March 2022, p.9, download at https://fast.faa.gov/NFFCA_ServiceAnalysis_StrategicPlanning.cfm

The authors assert that the herein recommended entire-NAS shortfall analysis should be unbounded and wide ranging. Too often, NextGen future planning begins by setting boundaries and narrowing the scope of inquiry by accepting pre-existing assumptions, many of which are artificial or unwarranted. For example, the whole of navigable airspace, not just selected volumes or altitudes, should be considered for transformation. Existing limitations on aircraft or ATC performance, or historic reservations of airspace according to aircraft class or mission, should not be allowed to limit our thinking about what volumes of airspace can or should be shared. Assumptions about government budget "realities", or aircraft operators' financial ability or willingness to retrofit or upgrade their aircraft should not be allowed to contract the range of technical options under consideration.[14] And revolutionary change-out of the entire legacy NAS ATC operating system, versus evolutionary upgrade only, should be considered within the realm of the possible.

There are at least three potential alternative operating constructs that should be considered for resolving the shortfall: Free Flight (universal self-separation), universal Four Dimension Trajectory (4DT) air traffic control, and a hybrid version[15] of those constructs. The authors have previously discussed the comparative merits and drawbacks of Free Flight versus universal 4DT.[16] Without prejudging the outcome of a comprehensive shortfall analysis, universal 4DT seems most likely of all alternatives to meet future needs, safely, with least cost and disruption to operators and the system.

Although analyses of the costs and financial feasibility of performance-enhancing improvements are properly the province of later phases in NextGen planning, it is fair to say that whatever the cost of a comprehensive new NextGen paradigm, it will be dwarfed by the opportunity costs of delaying or denying access to new and future entrants rushing at the floodgates of the NAS. Granted, there are myriads of people and companies, including legacy aircraft operators, who are financially and professionally invested in the NAS status quo and its "measured" evolution. But to achieve a necessary and true transformation that can fully exploit the navigable airspace and open access to everyone, some institutionalized projects will have to be scrapped, not just revised, "re-baselined", and perpetuated.

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[14]An increased cost burden on operators is not necessarily fatal to NAS transformation. Whatever the approach, it might make sense for the government to incentivize or subsidize aircraft equipage, and there are ways to do that. *See* Frisbie and Matthews, "The second time around there ought to be a law…", https://www.safeaccess4uas.com/paper-avionics-equipage--second-time-around.html.

[15] This appears to be the path we are on, by default. Whether this hybrid approach can evolve technically to the point of being able to fully and economically satisfy the operational and business objectives of all aircraft operations, and at what cost to them as well as to the ATC system, has yet to be systematically and fully explored and analyzed. To be considered an acceptable alternative to Free Flight or universal 4DT, the hybrid construct would have to include a fully matured architecture for providing safe and equal access to all volumes of airspace, to all operators, and a realistic way for ATC to provide seamless operations across diverse airspace boundaries.

[16]For a comparative analysis of the advantages and drawbacks of Free Flight (self-separation) versus universal 4DT ATC, *see* Frisbie and Matthews, "To 4DT or Not 4DT, is there Really a Question?"(2021), https://www.safeaccess4uas.com/paper-to-4dt-or-not-4dt.html ; Frisbie and Matthews, "FAA: Tear Down That Airspace Wall!" (2022), https://www.safeaccess4uas.com/paper-faa---tear-down-airspace-walls.html .

It is almost *thirty years* since FAA Administrator J. Lynn Helms introduced the NAS Modernization Plan featuring the Advanced Automation System, the first version of systemwide 4DT air traffic management. And yet we're still here, waiting for real modernization to start. It's way past time to venture forward into today's understanding of what the future will be, not what we envisioned three decades ago. We have no choice. Let's get on with it.

The authors:

Frank L Frisbie, Aviation consultant, former FAA and industry NAS Senior Executive. Frank has 55 years of experience in ATC/ATM spanning the full design, development, implementation, sustainment and replacement cycle of all NAS infrastructure elements, including a professional career in FAA culminating in the position of NAS Program Director and Acting Associate Administrator of Development and Logistics. Frank also served as a senior executive of Northrop Grumman. Frank holds a Bachelor's Degree in Electrical Engineering (BEE) from Manhattan College, NY and a Master's Degree in Business Administration from American University, DC. An Honorary Member of ATCA and recipient of the Glen Gilbert Award, Mr. Frisbie is a frequent contributor to the Journal of Air Traffic Control.

Suzette Matthews, Principal, Washington Progress Group LLC, an aviation attorney. She represented major foreign and domestic airlines before the CAB, FAA, DOT, and Federal Courts. She has served as Executive VP and General Counsel, and Director of the Air Traffic Control Association (ATCA), and Editor of ATCA's *Journal of Air Traffic Control;* was a Senior Subject Matter Expert to the FAA Joint Planning and Development Office (JPDO). She is the author of numerous published articles on aviation law, technology policy, unmanned aircraft issues, and public-private partnerships. She received the *Aviation Week and Space Technology* Laurel Award (2001), the Air Traffic Control Association Clifford Burton Award (2004) and Chairman's Citation of Merit (2012). Her company Washington Progress Group LLC was recipient of the ATCA Small and Disadvantaged Business Award (2016) for thought leadership on UAS issues. Ms. Matthews holds a B.A. With Distinction and Phi Beta Kappa from Cornell University, and a Juris Doctor degree from Cornell Law School. She is a Member of the Bars of Virginia and the District of Columbia.

*The forgoing paper first appeared in the Fall 2022 Issue of the Air Traffic Control Association, Inc.'s *Journal of Air Traffic Control.*