Advanced Aviation Advisory Committee Public eBook

Public eBook
April 26, 2023 AAAC Meeting
FAA Headquarters
and Virtual

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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

Advanced Aviation Advisory Committee

April 26, 2023 AAAC Meeting

FAA Designated Federal Officer, Presenters, and Speakers

Name	Title	Org.
1. Brad Mims	Deputy Administrator (DFO)	FAA
2. Jeffrey Vincent	Executive Director, UAS Integration Office	FAA
3. Mitchell Bernstein	Innovate 28 Project Manager	FAA
4. Sean Cassidy	Director, Safety, Flight Ops & Regulatory Affairs, Amazon Prime Air	
5. Gary Kolb	UAS Stakeholder & Committee Officer, UAS Integration Office	FAA

FAA/DOT Observers and Stakeholders

Name	Title	Org.
1. Vinn White	Associate Director for Transportation Policy	DOT
2. Peter Irvine	Deputy Director, Office of Aviation Analysis	DOT
3. Hillary Heintz	Senior Advisor to Deputy Administrator	FAA
4. Tonya Coultas	Acting Associate Administrator, Security & Hazardous Materials Safety	FAA
5. Jodi Baker	Deputy Associate Administrator, Aviation Safety	FAA
6. Jessica Sypniewski	Deputy Assistant Administrator, NextGen	FAA
7. Christopher Loring	Chief of Staff, NextGen	FAA
8. Lorelei Peter	Deputy Chief Counsel for Strategic Operations	FAA
9. Tracy Edwards	Acting Deputy Director, UAS Integration Office	FAA
10. Sherita Jones	Acting Chief of Staff, UAS Integration Office	FAA
11. Jennifer Riding	Communications Outreach Specialist	FAA
12. Alexis Smollock	Executive Assistant, UAS Integration Office	FAA

Advanced Aviation Advisory Committee

April 26, 2023 AAAC Meeting • FAA Headquarters, Washington DC

Public Meeting Agenda
Time: 1:30 pm – 5:00 pm Eastern Time
Location: FAA Headquarters, Bessie Coleman Room

	Start	Stop	
1.	1:30 p.m.	1:35 p.m.	FAA – Greetings & Logistics
2.	1:35 p.m.	1:40 p.m.	FAA – Read Official Statement of the Designated Federal Officer
3.	1:40 p.m.	1:45 p.m.	FAA – Review of Agenda and Approval of Previous Meeting Minutes
4.	1:45 p.m.	1:55 p.m.	DFO/Chair – Opening Remarks
5.	1:55 p.m.	2:25 p.m.	FAA – Response to Task Group #13: Strategic Framework for Advanced Air Mobility Near-Term Operations Recommendations
6.	2:25 p.m.	2:55 p.m.	Chair – AAAC Task Group #14 BVLOS ARC Opportunities Recommendations
7.	2:55 p.m.	3:10 p.m.	BREAK
8.	3:10 p.m.	3:40 p.m.	Chair – AAAC Task Group #15 Community Engagement Lessons Learned Recommendations
9.	3:40 p.m.	4:25 p.m.	FAA – Innovate28 Information Briefing
10.	4:25 p.m.	4:50 p.m.	Chair – New Business/Future Agenda Topics
11.	4:50 p.m.	4:55 p.m.	FAA – Closing Remarks/Final Thoughts
12.	4:55 p.m.	5:00 p.m.	Chair – Closing Remarks/Final Thoughts
13.	5:00 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

Members
Designated Federal Officer - Brad Mims, Deputy Administrator, Federal Aviation Administration
Chair - Houston Mills, Vice President, Flight Operations and Safety, United Parcel Service (UPS)
Jaz Banga, Co-Founder and Chief Executive Officer, Airspace Systems, Inc.
Edward Bolen, Chief Executive Officer, National Business Aviation Association
Bob Brock, Director of Aviation and UAS, Kansas Department of Transportation
Adam Bry, Co-founder and Chief Executive Officer, Skydio
Dr. Catherine Cahill, Director, Alaska Center for Unmanned Aircraft Systems Integration (ACUASI)
David Carbon, Vice President, General Manger, Amazon Prime Air
Kevin Cox, Chief Executive Officer, Ferrovial Vertiports
Karthik Duraisamy, Professor of Aerospace Engineering, University of Michigan & Founder and Chief Scientist, Geminus.AI
Amit Ganjoo, Founder and Chief Executive Officer, ANRA Technologies
Todd Graetz, Director, UAS Program and Machine Vision Systems, BNSF Railway
David Greene, Bureau of Aeronautics Director, Wisconsin Department of Transportation
James Grimsley, Executive Director, Advanced Technology Initiatives - Choctaw Nation of Oklahoma
Brad Hayden, Founder and Chief Executive Officer, Robotic Skies
Dr. Paul Hsu, Founder and Chair, HSU Educational Foundation
Andrew LeBovidge, Executive Vice President, National Air Traffic Controllers Association (NATCA)
Michael Leo, Captain, New York City Fire Department
Lee Moak, Founder & Chief Executive Officer, Intrepid
Okeoma Moronu, Head of Aviation Regulatory and Legal Affairs, Zipline
Vic Moss, Owner, Moss Photography
Matt Parker, President, Precision Integrated Programs
Christian Ramsey, President, uAvionix Corporation
Robie Samanta Roy, Managing Director, Cerberus Capital Management

Advanced Aviation Advisory Committee

Members
Dr. Jaiwon Shin, Chief Executive Officer, Supernal
David Silver, Vice President for Civil Aviation, Aerospace Industries Association
Michael Sinnett, Vice President Product Development and Strategy, Boeing Commercial Airplanes
Kenji Sugahara, Chief Executive Officer and President, Drone Service Providers Alliance
Melissa Tomkiel, President and General Counsel, Blade Air Mobility
Brandon Torres Declet, Chief Executive Officer, Unusual Machines
James Viola, Chief Executive Officer, Helicopter Association International
Molly Wilkinson, Vice President, Regulatory Affairs, American Airlines
Yolanka Wulff, Executive Director, Community Air Mobility Initiative
Brian Wynne, President and Chief Executive Officer, Association for Unmanned Vehicle Systems International

ADVANCED AVIATION ADVISORY COMMITTEE

Federal Aviation Administration

Advanced Aviation Advisory Committee

April 26, 2023

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

April 26, 2023

Federal Aviation Administration

Official Statement

PUBLIC MEETING ANNOUNCEMENT

Read by: Committee Management Officer Gary Kolb

Advanced Aviation Advisory Committee

April 26, 2023

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:

April 6, 2023

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.

ADVANCED AVIATION ADVISORY COMMITTEE

Federal Aviation Administration

April 26, 2023

Agenda

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ADVANCED AVIATION ADVISORY COMMITTEE

April 26, 2023

Opening Remarks from Designated Federal Officer

Brad Mims

FAA Deputy Administrator

Designated Federal Officer

FAA Advanced Aviation Advisory Committee

Federal Aviation Administration

ADVANCED AVIATION ADVISORY COMMITTEE

April 26, 2023

Opening Remarks from AAAC Chair

Houston Mills

Chair

FAA Advanced Aviation Advisory Committee

Federal Aviation Administration

ADVANCED AVIATION ADVISORY COMMITTEE

Federal Aviation Administration

FAA Responses to AAAC Task Group #13 Recommendations

Jeffrey Vincent
Executive Director
UAS Integration Office
April 26,2023

Background

- On February 23, 2022 the FAA presented the following task to the Advanced Aviation Advisory Committee (AAAC):
  - **AAAC Tasking: Strategic Framework for Advanced Air Mobility (AAM) Near-Term Operations.**
    - **Opportunity:**
      - The AAAC to lead industry in informing the FAA as we prepare to respond to industry's near-term AAM plans.
    - **Tasking:**
      - The AAAC to provide comments on the FAA's draft Strategic Framework for AAM Near-Term Operations.
- On October 20, 2022 the AAAC presented the following recommendations to the FAA centered around five subgroups based on the different categories provided in the framework (**aircraft, airspace, operations, infrastructure, and community**). The FAA responses are provided after each recommendation that fell within the scope of the framework

Overview

- The FAA greatly appreciates the time and thought the AAAC applied to this task. We understand that AAM is a complex topic and was not defined at the time of this tasking. The FAA acknowledges the research and attention to detail the AAAC put into the recommendations.
- The FAA's mission is to provide the safest, most efficient aerospace system in the world. We strive to reach the next level of safety and efficiency and to demonstrate global leadership in how we safely integrate new users and technologies into our aviation system. To achieve this, we will need everyone to work together and would agree that a collaborative effort is needed to maintain safety in National Airspace System (NAS)

Aircraft

- **AAAC Recommendation 1:**
  - 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 Center for Emerging Concepts and Innovation (CECI) engaged after?
- **FAA Response:**
  - Staff across FAA are collaborating on AAM efforts and working closely with NASA, U.S. Air Force AFWERX core program Agility Prime, and industry.



Aircraft

- **AAAC Recommendation 2:**
  - The FAA has affirmed that the path for most AAM aircraft will be special class under 14 Code of Federal Regulations (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.
- **FAA Response:**
  - FAA Certification teams work closely with legal counsel on special class projects.



Airspace

- **AAAC Recommendation 3:**
  - What role should the FAA take with respect to third party service providers (PSU)? Monitoring agency or active participant (e.g., air traffic management (ATM))?
- **FAA Response:**
  - The role of the FAA with respect to PSUs will be shaped by the airspace rules and the maturity of industry technologies necessary to ensure safety and efficiency within the NAS.



Airspace

- **AAAC Recommendation 4:**
  - Should the FAA investigate safe integration over segregated airspace?
- **FAA Response:**
  - FAA must consider all users of the NAS and their public right of transit through navigable airspace.



Airspace

- **AAAC Recommendation 5:**
  - Are the present visual flight rules (VFRs) separation procedures (as mentioned in the document) sufficient for urban air mobility (UAM)/AAM operations or will they need to be adjusted?
- **FAA Response:**
  - VFR are established on the fundamental concept of pilot see-and-avoid, with additional policies and procedures applied when necessary to fulfil the FAA's mission.



Operations

- **AAAC Recommendation 6:**
  - The task group recommends the FAA solicit from AAM-related standards development organizations in laying the groundwork for standards development for future technologies.
- **FAA Response:**
  - FAA is working closely with the AVS's Air Certification Service organization, European Union Aviation Safety Agency (EASA), International Civil Aviation Organization (ICAO), industry organizations and AAM applicants for type certification to support their next steps of operational certification.



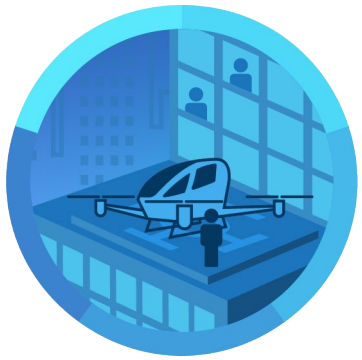
Infrastructure

- **AAAC Recommendation 7:**
  - It is recommended that the FAA conduct an internal review and then discuss anticipated bottlenecks in infrastructure reviews and approvals with the industry.
- **FAA Response:**
  - The FAA formed a cross-organizational team to identify policy gaps, process improvements, and a path forward for developing criteria and standards for vertiport documentation. The Team used real world and situation-based scenarios to analyze on and off-airport proposals. The Team then made numerous near and long-term recommendations for agency leadership consideration, many of which are in development today.



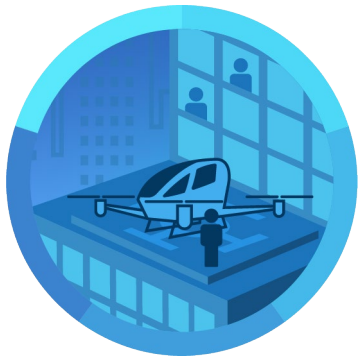
Community

- **AAAC Recommendation 8:**
  - 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.
- **FAA Response:**
  - The National Environmental Policy Act of 1969 (NEPA), its implementing regulations, and FAA Order 1050.1F require federal agencies to consider the significant environmental consequences of their proposed actions and disclose those effects to the public before a decision is made or an action is implemented.



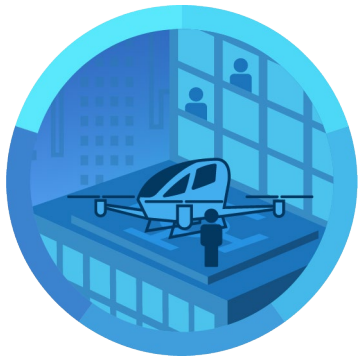
Community

- **AAAC Recommendation 9:**
  - How can the FAA incorporate science, technology, engineering, and math (STEM) educational outreach into its AAM community engagement plans to ensure workforce supply meets operational demand?
- **FAA Response:**
  - The FAA's hosts several educational outreach events to share information about drones and AAM with stakeholders and the general public. Additionally, the FAA, through the ASSURE Center of Excellence, conducts numerous UAS/AAM focused STEM events across the country focused on students in under-served/under-represented localities. The FAA's goal for these events is to highlight the societal, economic, and educational benefits for the general public, through a series of events focusing on different audiences including high schools, universities, and educators.



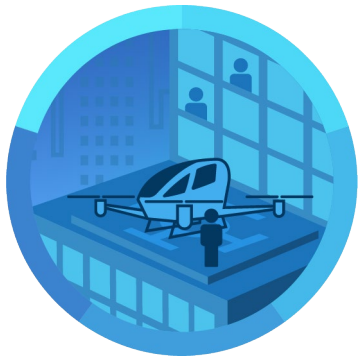
Community

- **AAAC Recommendation 10:**
  - What are the funding implications and opportunities for public airports interested in incorporating AAM into their operations?
- **FAA Response:**
  - In order to be eligible for programs like Essential Air Service (EAS), AAM carriers would have to provide regular scheduled service to locations desirable to particular communities, and meet all certification and regulatory requirements applicable to the aircraft, the pilot, the operator, and any supported destination.



Community

- **AAAC Recommendation 11:**
  - What strategies can a community/local government 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?
- **FAA Response:**
  - The FAA Regional Administrators (RAs) are the senior FAA officials in each of the geographic areas across the country. They are responsible for local, state, Tribal, and federal outreach initiatives.



Questions?

ADVANCED AVIATION ADVISORY COMMITTEE

Federal Aviation Administration

Task Group #14 - Accelerating Implementation of BVLOS Operations

David Carbon
Task Group #14 Chair
April 26, 2023

Task Group 14: Accelerating Implementation of BVLOS Operations

Opportunity:

Accelerating the implementation of BVLOS ahead of formal rules being enacted

Tasking:

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

Membership

Chair David Carbon, VP GM Amazon Prime Air

TG14 was composed of AAAC members and subject matter experts

Aero NowGen Solutions
Lorne Cass

Air Line Pilots Associations Int (ALPA)
Mark Reed
Shea Byom
Vas Patterson

Aircraft Owners & Pilots Association (AOPA)
Christopher Cooper

Amazon Prime Air
David Carbon
Sean Cassidy

Boeing
Benjamin Ivers
Hilary Fiorentino

Choctaw Nation of Oklahoma
James Grimsley

FPV Freedom Coalition
Dave Messina

Helicopter Association International (HAI)
Chris Martino
James Viola

Kansas Department of Transportation (KDOT)
Bob Brock

Moss Photography
Vic Moss

MultiGP
Alex Suarez

NATCA
Andrew LeBovidge
Jimmy Smith

RoboticSkies
Brad Hayden

Skydio
Jenn Player

Stealth Mode
Brandon Torres Declet

uAvionix
Christian Ramsey
Cyriel Kronenburg

UPS
Eric Bergesen

Wing
Dallas Brooks
James Ryan Burgess
Tony Nannini

Zipline
Okeoma Moronu

BVLOS ARC Objectives and Boundaries

- Make recommendations for performance-based regulatory requirements that normalize safe, scalable, economically viable, and environmentally advantageous UAS BVLOS operations that are not under positive air traffic control (ATC) in low altitude airspace, generally under 500 feet above ground level.

- The ARC's recommendations were limited to the following concepts of operation:
    - Long-line linear infrastructure inspections
    - Industrial aerial data gathering
    - Small package delivery
    - Precision agriculture operations, including crop spraying

- The ARC was not tasked with addressing aircraft or operations carrying passengers or crew, nor did it address the integration of operations for which Air Traffic Services (ATS) are provided. Accordingly, these items were deemed out of bounds of TG14's work activity scope.

Task Group 14 Ground Rules

- Focus only on ARC Recommendations.
- Operate as consensus driven body. Prioritize the items the TG members found consensus on and recommendations on those areas.
- We will provide a written report to the AAAC industry chair and Committee. This will be specific and actionable.
- Recommendations can cover more than one ARC item.
- Final disposition of TG14 recommendations is the responsibility of the FAA.

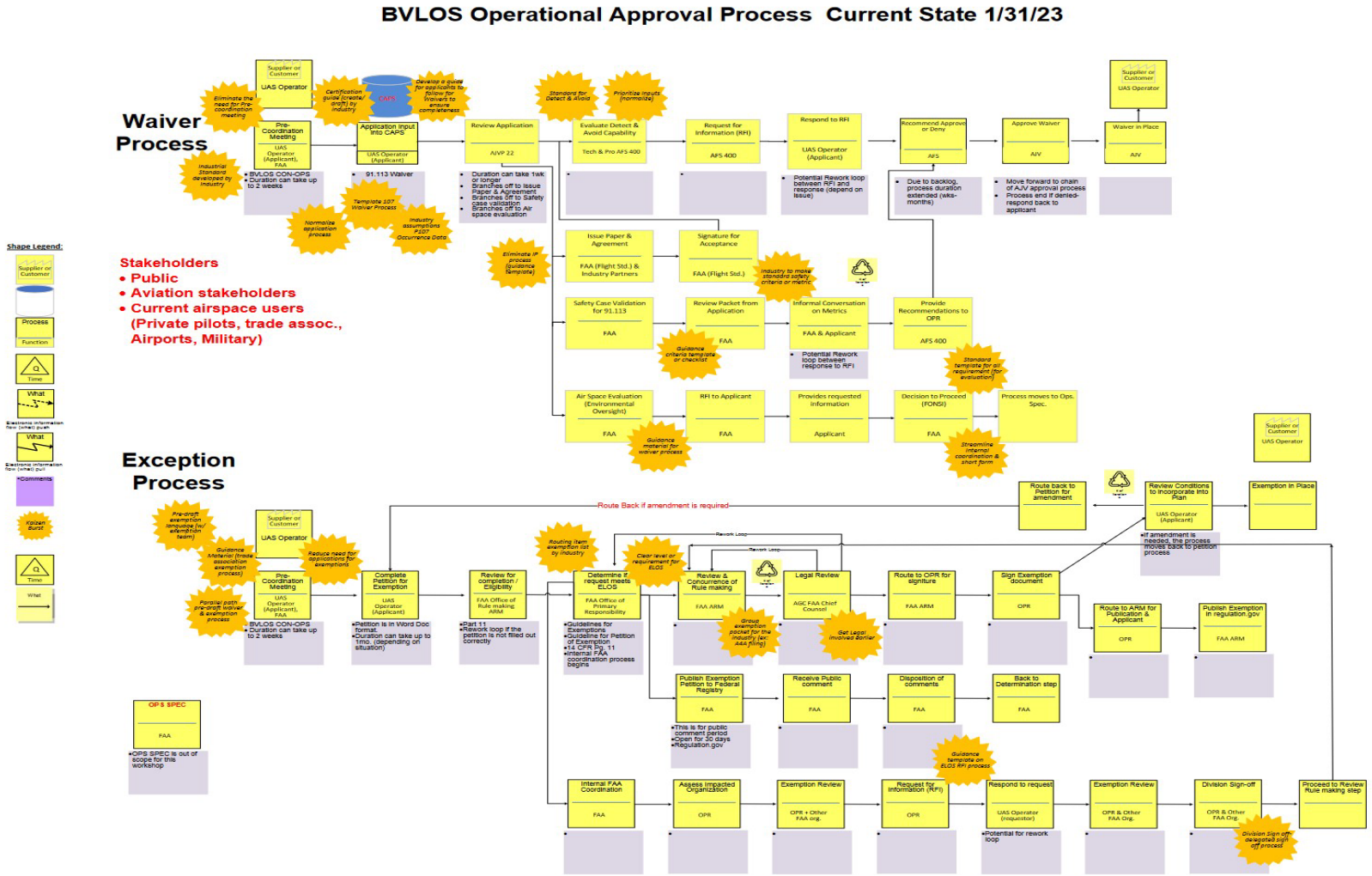
Task Group 14 Approach

Created four working groups tasked with deep diving:

1. Low Risk/Altitude BVLOS operations leveraging Part 107 rules
2. Detect and Avoid in excising environments leveraging existing technology
3. Flight over people
4. Process improvements for the interim implementation of BVLOS operations, leveraging current regulatory guidance

Formulize opportunity identification utilizing a Value Stream Mapping approach facilitated by a SME.

Value Stream Mapping



VSM Identified Opportunities

- Regulatory framework today measures all participants equally, when in fact participants have varying levels of capabilities
- Ambiguity in decision making authority
- Internal coordination and review process paths are opaque
- Critical steps in the approval process are not time-bound
- Changes in policy are not effectively communicated
- Current gaps in FAA policy include documented noise data collection guidance, specific language in agency NEPA Orders and Implementation Guidance related to drones
- The need for identification of drone-specific actions where a Categorical Exclusion (CE) may be prepared instead of an Environmental Assessment (EA) for use cases such as low volume commercial operations, infrastructure inspections, and sites within a defined industrial site
- The lack of documented NEPA procedures and guidance has created an inefficient process and ambiguity for operators

Recommendation #1

Implement checklist/standard derived from 107.31 & 107.33 waiver applications that includes:

1. Provision to support Geofencing and predetermined routes for enabled drones
2. Responsible crew identification of obstacles and operational boundaries
3. Make, model, maintenance log, licensing, and qualifications managed and provided when required
4. Confirmation of DAA capability before flight
5. Standard training, qualification, and operational guidance for VOs in support of BVLOS
6. Pre-draft exemption language to create a standard, avoid duplication, and eliminate confusion

Recommendation #2

Ensure acceptable safety levels are understood and met by streamlining Part 91.113 waiver process.

1. Leverage approved waiver applications to provide a standard to applicants
2. Issue guidance materials for applicants based on item 1
3. Normalize the waiver process, similar to what was done in Part 107
4. Issue guidance summarizing the basis of approval for BVLOS and finalize BVLOS Issue Paper
5. Work with industry groups to develop and finalize proforma BVLOS exemptions in lieu of individual submissions for common areas

Recommendation #3

Clarify how to meet 14 CFR 11 requirement that safety *not be adversely impacted* is equal to rule.

1. Issue clarification on safety criteria & requirements in support of BVLOS
2. Develop guidance template for applicants with focus on qualitative approach to operational mitigations (although quantitative analysis can be incorporated)
3. Leverage “SORA-like” process to quantify ground & air risks as a means to demonstrate applicants safety case
4. Align with international framework and current approvals (e.g. 14CFR Part 107/Part 91)
5. Implement a pre-defined risk assessment (PDRA) process

Recommendation #4

DAA systems should be evaluated as a component of an overall safety case.

1. Safety cases should be based upon the applicant demonstrating that the DAA system and other proposed mitigations meet a targeted level of safety no more restrictive than the accepted fatality rates of general aviation
2. The term “adequate separation” should be adopted as a performance benchmark for separation in DAA system evaluations, replacing the legacy terms “well clear” and “near midair collision”
3. The FAA should encourage and accept the extensive use of modeling and simulation to be used as a means of evidence supporting DAA performance
4. The FAA should continue their engagement with FFRDCs and other organizations to further model development that replicates the impact of DAA systems and share these with the industry
5. Reincentivize voluntary adoption and use of ADS-B at low altitudes

Recommendation #5

Streamline NEPA process as it relates to drone use utilizing categorical exclusion (CE) process for permissions.

1. Develop NEPA Implementation Guide for Commercial Drone Operational Approvals, as a supplement to FAA Order 1050.1F
2. Identify approval actions that qualify for a CE and document these to help applicants understand whether an extraordinary circumstance exists
3. Develop, document, and issue the process used by the FAA to coordinate with other federal, state, local, tribal, and government agencies
4. Develop procedures to facilitate geographic NEPA reviews that can apply to one or more applicants

Recommendation #6

Clarify and document an Acceptable Targeted Level of Risk Categorization

1. Make publicly available the methodology utilized (in current waivers & exemptions) to assess ground risk.
2. Any methodology utilized to assess ground risk should include:
    a. Quantitative and qualitative approaches should be supported by the methodology.
    b. Both components of risk - likelihood and severity - must be considered to determine if risks are sufficiently mitigated.
    c. Existing acceptable mitigations, acceptable inputs, and data sources should be clearly defined.
3. The Department of Transportation should define the ALR/TLS for ground-risk for drone operations, considering non-aviation modes of transportation that drones may supplement or replace per DAC TG11.
4. Provide templates (also known as standard scenarios or pre-defined risk assessments) to standardize the application process.
    a. These should take the form of checklists and based on previous granted waivers
    b. These should leverage the risk assessment methodology discussed above

QUESTIONS?

Break

ADVANCED AVIATION ADVISORY COMMITTEE

Federal Aviation Administration

Task Group #15 Community Engagement Lessons Learned/Best Practices Recommendations

Kenji Sugahara
President and Chief Executive Officer
Drone Service Providers Alliance
April 26, 2023

Members

- Alaska Center for UAS Integration
- ALPA
- AOPA
- AUVSI
- Boeing
- CAMI
- DPSA
- FDNY
- FPVFC
- UPS
- Wing
- Zipline

SMEs

- Lorne Cass
- Mark Colborn
- Eric Schwartz, FPL

Special Thank You

- James Burgess, Wing
- Dave Messina, FPVFC

Tasking

- Make recommendations on:
  - Specific aviation operating sectors and their community engagement methods.
  - Identifying key stakeholders and methods of communication.

The Cookbook

- Basic Approach
  - Consider your community stakeholders.
  - Meet or share information with stakeholders.
  - Listen and respond to feedback.
  - Ensure that your approach is tailored to the type of operation.

Key Principles

- Educate transparently and honestly.
- Listen with humility and empathy.
- Respond actively.

Key Concerns to Address

- Safety risk management.
- Privacy.
- Noise and environmental impact.
- Economic and public impact.

Building an Outreach Plan

- Define core operational attributes.
- Identify stakeholders.
- Create outreach content.
- Develop an outreach plan.
- Perform monitoring, assessment, and follow up.

Stakeholders to Consider

- Federal authorities.
- Local authorities.
- Community groups and organizations.
- General public.
- Aviation groups/Other airspace users.

Use Cases / Industry Specific Recommendations

- AAM
- Public safety
- Film and television
- First person view operations

Report Commentary

- Hosting this report.
- Availability and publishing.
- Updating.

Questions?

ANG The Future of the NAS Starts Here

Innovate 28 (I28)

Operationalizing an Advanced Air Mobility Ecosystem

Advanced Aviation Advisory Committee (AAAC) | April 26, 2023



Agenda

- Recent Engagement
- FAA Integrated Team
- Operation Goals at Key Site
- Implementation Plan Development
- Expected Implementation Activities
- Next Steps
- Questions

Ongoing Engagement

Federal Government and Workforce Partners

We work with partners across the federal government to implement the AAM Coordination and Leadership Act to and to coordinate policy for integrating AAM operations.

AAM Interagency Working Group

Office of Science and Technology Policy

Local Government and Community Organizations

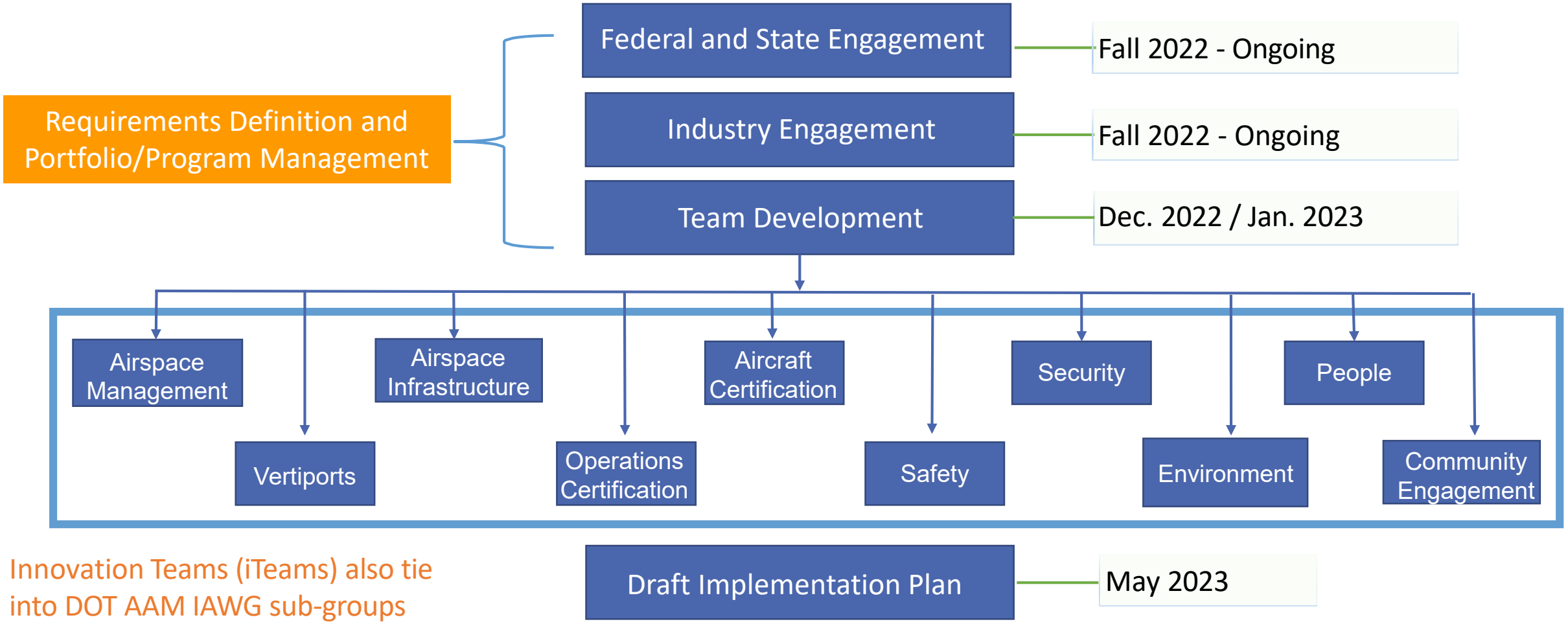
We encourage state, local, and tribal communities to be informed about AAM technology and how these new operations will affect them. These meetings help us to better understand local sentiment about AAM operations.

Industry

We engage with industry stakeholders, including aircraft manufacturers, operators, and airport/ vertiport companies to understand their vision and implementation plans. Our current priority is U.S.-based eVTOL piloted-passenger manufacturers undergoing FAA certification. Some examples include the following stakeholders

"Any and all trademarks, logos, and brand names used herein are the property of their respective owner and are used here for identification purposes only. Use of any names, trademarks, and/or brands does not imply endorsement by the FAA."

FAA Integrated Team



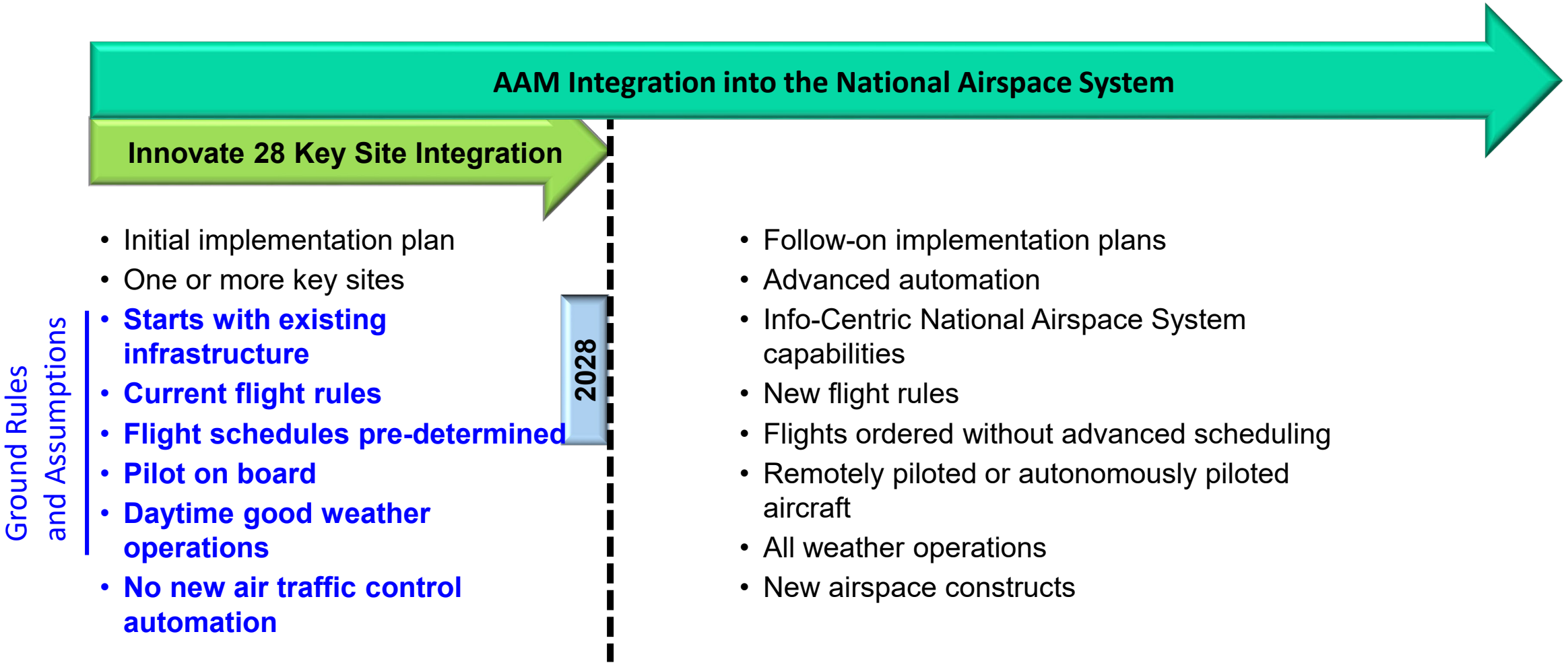
Innovation Teams (iTeams) also tie into DOT AAM IAWG sub-groups

Innovate28 Goals for Operations at Key Site

- Define the safest and most efficient routes with the least impact on air traffic facilities and area residents
- Consider original equipment manufacturer and operator capabilities
- Develop a repeatable process to allow ease of implementation in other locations
- Plan for leave-behind processes, procedures, and mechanisms to support continued AAM operations



I28 Draft Implementation Plan Boundaries



Strategy for Draft Implementation Plan

Two focal pieces

- **Concept of Use** or description of what the operation could look like at a key generic site in 2028
  - —**Define scope** using updated Architecture white paper to be discussed today
  - —**Narrative** based on work completed to date and gaps identified in white papers
- **Integrated Master Schedule** activities required to initiate operations by 2028
  - —Each activity has required durations and dependencies
  - —Based on gaps and activities identified in white papers, activities expected for local stakeholders and industry stakeholders
- **High-level strategy** of operational evolution to identify focus area topics and planning from near-term to mature state

Summary of Expected I28 Activities

- Site selection
- Concept of Use, local and general
- Aircraft Type Certification
- Part 135 operational certification
- Air traffic policy review and updates
- Procedure development
  - Scoping
  - Safety Risk Management process
  - Environmental review
  - Solution development
- Site-specific AAM forecasting
- National vertiport activities
  - Flight testing
  - National guidance
  - Rulemaking
- Local vertiport activities
  - Determine vertiport locations
  - Local zoning
  - Construction
  - Charging infrastructure
- Community engagement
- Local ATC activities
  - Controller training
  - Update SOPs and LOAs
- Crew preparation
  - Rulemaking for pilot training
  - Identify and train crew
- Hazardous materials
  - Cabin safety
  - Cargo requirements
  - Emergency training
  - Fire/Smoke procedures
- Wake separation requirements
- Physical security
- Cybersecurity



Questions?

ADVANCED AVIATION ADVISORY COMMITTEE

April 26, 2023

New Business/Future Agenda Items

Houston Mills

Chair

FAA Advanced Aviation Advisory Committee

Federal Aviation Administration

ADVANCED AVIATION ADVISORY COMMITTEE

April 26, 2023

Closing Remarks

Brad Mims

FAA Deputy Administrator

Designated Federal Officer

FAA Advanced Aviation Advisory Committee

Federal Aviation Administration

ADVANCED AVIATION ADVISORY COMMITTEE

April 26, 2023

Closing Remarks

Houston Mills

Chair

FAA Advanced Aviation Advisory Committee

Federal Aviation Administration

ADVANCED AVIATION ADVISORY COMMITTEE

April 26, 2023

Adjourn

Houston Mills

Chair

FAA Advanced Aviation Advisory Committee

Federal Aviation Administration

ADVANCED AVIATION ADVISORY COMMITTEE

April 26, 2023

Adjourn

Houston Mills

Chair

FAA Advanced Aviation Advisory Committee

Federal Aviation Administration

FAA RESPONSES TO TASK GROUP #13 RECOMMENDATIONS: Provide Feedback to the FAA's Strategic Framework for Advanced Air Mobility (AAM) Near-Term Operations.

On February 23, 2022 the FAA presented the following task to the Advanced Aviation Advisory Committee (AAAC):

AAAC Tasking: Strategic Framework for Advanced Air Mobility (AAM) Near-Term Operations.

Opportunity:

- The AAAC to lead industry in informing the FAA as we prepare to respond to industry's near-term AAM plans.

Tasking:

- The AAAC to provide comments on the FAA's draft Strategic Framework for Advanced Air Mobility (AAM) Near-Term Operations.

On October 20, 2022 the AAAC presented the following recommendations to the FAA centered around five subgroups based on the different categories provided in the framework (aircraft, airspace, operations, infrastructure, and community). The FAA responses are provided after each recommendation that fell within the scope of the framework.

Overview

The FAA greatly appreciates the time and thought the AAAC applied to this task. We understand that AAM is a complex topic and was not defined at the time of this tasking. The FAA acknowledges the research and attention to detail the AAAC put into the recommendations.

The FAA's mission is to provide the safest, most efficient aerospace system in the world. We strive to reach the next level of safety and efficiency and to demonstrate global leadership in how we safely integrate new users and technologies into our aviation system. To achieve this, we will need everyone to work together and would agree that a collaborative effort is needed to maintain safety in National Airspace System (NAS).

Aircraft

AAAC Recommendation 1:

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 Center for Emerging Concepts and Innovation (CECI) engaged after?

FAA Response:

AIR-700 and AIR-600 work closely together with AAM certification efforts in the FAA.

AIR-700 is working closely with NASA, U.S. Air Force AFWERX core program Agility Prime, and industry on AAM performance capabilities and testing. AIR-600 through AIR-650, CECI, continues to facilitate the safe introduction of new innovative products through EIE.

AAAC Recommendation 2:

The FAA has affirmed that the path for most AAM aircraft will be special class under 14 Code of Federal Regulations (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?

FAA Response:

AIR Certification teams work with FAA's Office of General Counsel (AGC) legal counsel on special class projects and include them early in the process to minimize the impacts of issues being raised late in the project.

Airspace

AAAC Recommendation 3:

What role should the FAA take with respect to third party service providers (PSU)? Monitoring agency or active participant (e.g., air traffic management (ATM))?

FAA Response:

The role of the FAA with respect to PSUs will be shaped by the airspace rules and the maturity of industry technologies necessary to ensure safety and efficiency within the NAS. For example, if industry technologies allow high volumes of operations to occur without introducing additional risks to the system, the Agency may play more of a monitoring role. The FAA reserves the right and may modify its plans and policies when required to serve public interest and to ensure the safety and efficiency of the NAS.

AAAC Recommendation 4:

Should the FAA investigate safe integration over segregated airspace?

FAA Response:

In fulfilling its responsibilities, the FAA must consider all users of the NAS and their public right of transit through navigable airspace. A successful integration strategy will investigate all options and only establish airspace rules that are necessary to fulfil the Agency's responsibilities. Where high density aircraft operations increase the likelihood for mid-air collision around busy airports, air traffic establishes airspace rules to mitigate risk and to ensure efficiency of operations. The volume and risk of AAM operations are expected to scale away from traditional airports. A rapid increase in aircraft operations within urban areas and routes between newly established vertiports, may mean that the FAA will need to rethink how our airspace is structured. This does not mean aircraft will be "segregated," but that operators within certain airspace areas will have to comply with the applicable rules in the interest of safety and efficiency. Additionally, the volume of operations and advancing technologies may mean that the FAA will have to consider alternative airspace rules than those traditionally applied.

AAAC Recommendation 5:

Are the present visual flight rules (VFRs) separation procedures (as mentioned in the document) sufficient for urban air mobility (UAM)/AAM operations or will they need to be adjusted?

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/instrument flight rules (IFR)?

FAA Response:

VFR are established on the fundamental concept of pilot see-and-avoid, with additional policies and procedures applied when necessary to fulfill the FAA's mission. As advanced aviation technologies mature, the policies and procedures must be reviewed and updated as appropriate. The FAA encourages research that supports the evolution of the FAA's flight rules. It is difficult to determine how rapidly the technology will mature and when future concepts will be viable.

Operations

AAAC Recommendation 6:

In support of performance-based operations in the future integrated NAS, the task group

recommends the FAA solicit AAM-related standards development from American Society for Testing and Materials (ASTM), Radio Technical Commission for Aeronautics (RTCA), The Society of Automotive Engineers (SAE), Aerospace Industries Association (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.

FAA Response:

The introduction of AAM aircraft and infrastructure presents opportunities and challenges for integration into the existing airspace system and Aviation Safety's (AVS) Flight Standards Service (FS) is moving quickly to adapt to the fast-changing environment. Our opportunity is the ability to define strategy and convergence, enhancing overall societal safety and efficiency, without stifling innovation. We aim to excel domestically and influence internationally while sharing with and learning from our international partners. FS is working closely with the AVS's Air Certification Service (AIR) organization, European Aviation Safety Agency (EASA), International Civil Aviation Organization (ICAO), industry organizations and AAM applicants for type certification to support their next steps of operational certification. FS is also supporting rulemaking to enable AAM operations and in the interim expects to use waivers, deviations, and exemptions as needed for initial operations. Within FS, the Office of Safety Standards (OSS) acts as the primary architect of how FS fulfills its authority and responsibility by setting standards, providing certification, and conducting oversight of regulated entities. Safety Standards will also support the development of operational rules, certification and oversight of simulators/aviation training devices, policy governing repair stations supporting AAM, and aircraft operational suitability. Safety Standards also works side-by-side with FS field organizations under the General Aviation Safety Assurance (GASA) and Air Carrier Safety Assurance (ACSA) organizations to ensure successful execution of FS responsibilities.

Infrastructure

AAAC Recommendation 7:

It is recommended that the FAA conduct an internal review and then discuss anticipated bottlenecks in infrastructure reviews and approvals with the industry.

FAA Response:

The FAA agrees that we need to review and adjust our processes. The FAA is committed to enabling the safe integration of new and emerging entrants, like AAM, into the NAS. To enable early AAM operations, FAA will leverage existing regulation and policy when possible. For example, as a new landing facility, the construction of a vertiport triggers notification requirements under 14 CFR part 157, Notice of Construction, Alteration, Activation, and Deactivation of Airports or 14 CFR part 77, Safety, Efficient Use, and Preservation of Navigable Airspace. An on-airport vertiport may also trigger updates to an airport's FAA-approved Airport Layout Plan and environmental documents.

While use of existing regulations like parts 157 and 77 were intended to expedite FAA decisions, the lack of agency guidance and policy used by FAA personnel for processing vertiport documentation has resulted in delays in Agency determinations. Recognizing that this approach was untenable, the Agency formed a cross-organizational team to identify policy gaps, process improvements, and a path forward for developing criteria and standards. The Team used real world and situation-based scenarios to analyze on and off-airport proposals. The Team then made numerous near and long-term recommendations for agency leadership consideration, many of which are in development today.

Most importantly, the Team did not recommend changes to existing intake and coordination processes. Vertiport proponents will use the same forms and points of contact as industry does for today's airport and heliport notifications. The FAA's Airports District Offices (ADO) or Regional Offices (RO) continue to be the point of contact for airports, heliports, and vertiports to submit the necessary documentation for the evaluation of the proposed construction and operation. As the FAA implements the Team's recommendations, industry will see improvements in the processing of proposed vertiports and timeliness of Agency determinations.

Community

AAAC Recommendation 8:

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.

FAA Response:

The FAA agrees that AAM operations will impact our environment and communities and we need to review these impacts. The National Environmental Policy Act of 1969 (NEPA), its implementing regulations, and FAA Order 1050.1F require federal agencies to consider the significant environmental consequences of their proposed actions and

disclose those effects to the public before a decision is made or an action is implemented. As the FAA approves these later state operations as part of our environmental review requirements, the impact categories you listed will be included in our review

AAAC Recommendation 9:

How can the FAA incorporate science, technology, engineering, and math (STEM) educational outreach into its AAM community engagement plans to ensure workforce supply meets operational demand?

FAA Response:

The Unmanned Aircraft Systems (UAS)-Collegiate Training Initiative (UAS-CTI) was created for workforce development for the UAS or drone industry. Many of the requirements for the program are applicable to the AAM industry as well as the drone industry. While AAM is not specifically called out in the program, many of the disciplines we see in drone courses are necessary for AAM, such as engineering, software and hardware development, and pilot courses. Additionally, many of the UAS-CTI participants collaborate with K-12 by hosting Drone Camps and offering credit courses for high school ages. The FAA presented on AAM at the March 23, 2023 UAS-CTI meeting and plans to present at a UAS-CTI Consortium* meeting later this year (TBD).

The FAA's UAS Integration Office hosts regional Droning On events to share information about drones and AAM with stakeholders and the general public. The FAA's goal for these events is to highlight the societal, economic, and educational benefits of drones for the general public, through a series of events focusing on different audiences including high schools and educators. AAM is part of the educational outreach, and we do highlight AAM on the day that is open to the public at these events.

The FAA's STEM Aviation & Space Education (AVSED) program creates aviation curriculum for 4th grade students through the "Adopt a School" program. Aviation education may contain more information about AAM, and most general aviation knowledge are applicable to AAM.

Through the Know Before You Fly partnership the FAA has worked one of the partners, the Academy of Model Aeronautics (AMA), to create and distribute drone kits to a number of schools across the country.

*UAS-CTI Consortium is made up of the 2 year and technical colleges in the program along with Industry, governments, associations, and others.

AAAC Recommendation 10:

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 (regional air mobility (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?

FAA Response:

There are underserved communities and airports across the country that would benefit from an increase in options to provide service and connect those communities with a wide scope of locations in the NAS. Short-to-medium range aircraft capable of transporting people and/or cargo to other airports and other points of interest have the potential to expand the number of options for a program like the Essential Air Service (EAS) program. If an AAM air carrier is willing and able to provide additional access to EAS airports it potentially reduces the consequence of larger carriers making decisions to reduce service there. If smaller airports have a larger number of entities providing service, they would be better able to maintain existing services and develop new services to more locations in a scalable fashion.

In order to reach this potential and be eligible for programs like EAS, AAM carriers would have to provide regular scheduled service to locations desirable to particular communities, and meet all certification and regulatory requirements applicable to the aircraft, the pilot, the operator, and any supported destination. AAM operators would need to price flights comparable to similar services, at a level that the average traveler at a small airport would be willing to pay. These are all significant hurdles to the broad application of AAM at smaller airports, whether or not those airports are supported by government programs. Nevertheless, the potential for AAM to increase the effectiveness, cost, and long-term viability of government programs supporting underserved communities is significant. The Department of Transportation and the FAA would be happy to work with established air carriers to provide more information about the eligibility requirements of these programs.

AAAC Recommendation 11.

Concerning the safe integration of AAM into 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? 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.

FAA Response:

The FAA Regional Administrators (RAs) are the senior FAA officials in each of the geographic areas across the country. They are responsible for local, state, Tribal, and federal outreach initiatives. The RAs are a main entry point for those looking for FAA assistance. The RA will provide local authorities the appropriate point of contact in their office or other offices in the Agency based on the assistance requested.

The community/local government should consider bringing the various stakeholders (industry, local officials, appropriate areas of the FAA to understand its regulatory role, etc.) together to understand community needs and desires, along with concerns.

RECOMMENDATIONS REPORT –Task Group #14: Beyond Visual Line of Sight (BVLOS) Aviation Rulemaking Committee (ARC) Opportunities

Executive Summary

In November 2022, the FAA's Advanced Aviation Advisory Committee (AAAC) commissioned a new task group comprised of AAAC members, supported by subject matter experts (see Appendix A for list of members and SMEs), with a focus on expediting the implementation of beyond visual line of sight (BVLOS) operations of drones, referencing the recommendations that were provided by the BVLOS Aviation Rulemaking Committee (BVLOS ARC) to the FAA in their final report in March 2022. AAAC member David Carbon of Amazon Prime Air was tasked with standing up what came to be known as Task Group 14 (TG14) to provide FAA with recommendations on how to accelerate the implementation of BVLOS as an interim measure in advance of when any BVLOS rules are enacted. This activity is particularly important in light of the critical need for a BVLOS pathway to drone operations, especially given the fact that the BVLOS rule will likely not be published for public comment until 2024 and put into effect in 2025 at the earliest. This report summarizes the TG14 draft recommendations, subject to review and approval by AAAC. A summary of BVLOS ARC recommendations that TG14 considered is found in Appendix B.

Mission Statement

TG14 was provided the following mission statement: "AAAC to examine BVLOS ARC recommendations and identify opportunities where industry can assist and accelerate implementation of BVLOS regulatory actions." The completion timeframe is for the TG14 chair to present recommendations to the AAAC plenary at their first meeting in 2023 (April 26, 2023).

BVLOS ARC Tasks and Objectives

The BVLOS ARC's objectives were 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) in low altitude airspace, generally under 500 feet above ground level. The ARC's recommendations were limited to the following concepts of operation, which are referenced from the BVLOS ARC charter:

- Long-line linear infrastructure inspections,
- Industrial aerial data gathering,
- Small package delivery
- Precision agriculture operations, including crop spraying

The ARC was not tasked with addressing aircraft or operations carrying passengers or crew, nor did it address the integration of operations for which Air Traffic Services (ATS) are provided. Accordingly, these items were deemed out of bounds of TG14's work activity scope.

TG14 Guidelines

We followed the AAAC provided guidelines to help focus the activity, ensure the work stayed within scope, and provide pragmatic, actionable recommendations. Key guidelines for this activity were:

- TG14's focus must be on areas derived from the overall list of ARC recommendations that can be leveraged for expedited implementation
- Efforts to expand the scope of the ARC activity beyond the use cases contained in the objectives is out of bounds
- Efforts to modify language contained in existing BVLOS ARC recommendations is out of bounds
- TG14 is a consensus driven body. It will prioritize those items the members of the AAAC find consensus on in the final recommendations provided to the AAAC industry chair
- Recommendations from TG14 will be provided in the form of a report provided through the AAAC industry chair to the AAAC leadership. They should contain specific, actionable guidance, and not be overly generic in nature
- Recommendations do not have to be specific to each of the ARC recommendations (a TG14 recommendation can cover more than one item), but they do need to be aligned with ARC guidance.

- TG14 recommendations are advisory in nature. Final disposition is the responsibility of the FAA.

TG14 Structure & Work Back Plan

TG14 was organized as a single advisory group, composed of AAAC members and subject matter experts (SMEs) brought in by members, and FAA partners. Members were tasked with deep diving specific items through informal working groups and then reporting back to the task group based on the following focus areas: 1) Low Risk/Altitude BVLOS (formerly known as "EVLOS) operations leveraging Part 107 rules, 2) Detect and Avoid (DAA) in existing environments leveraging existing technology, 3) Flight over people, and 4) Process improvements for the interim implementation of BVLOS operations, leveraging current regulatory guidance. All findings and recommendations were consolidated into a single TG14 report, provided through the TG14 chair to the AAAC. Full reports by subgroup can be found in Appendix D.

The workback plan to date has included the following TG14 working sessions:

- Tuesday, November 29th 2022 (1200 – 1400)
    - Review of TG14 scope and tasking from AAAC
    - Review of guidelines and member roles
    - Review of ARC recommendations
    - Construct of TG14 draft recommendation framework
- Wednesday, December 14th 2022 (1200 – 1400)
    - Review/discussion of TG14 draft recommendations
    - Ad-hoc member assignments, work progress, help needed
- Thursday, January 19th 2023 (1200-1400)
    - Review/discussion of TG14 draft recommendations
    - Ad-hoc member assignments, work progress, help needed
- Tuesday, January 31st-Thursday February 2nd
    - Value Stream Mapping (VSM) Exercise to review process path improvements (VSM can be found in Appendix C)
    - Review/discussion of TG14 draft recommendations
- Thursday, February 9th 2023 (1200 – 1400)
    - Review of VSM activities
    - Ad-hoc member assignments, work progress, help needed
    - Review first draft, TG14 recommendations
- Tuesday, February 28th 2023 (1200-1400)
    - Review draft interim TG-14 report & recommendations
    - Ad-hoc member assignments, work progress, help needed
- Tuesday, March 28th
    - Final group inputs received, final edits to document
- Monday, April 10th
    - Draft report provided to AAAC leadership
- Final Report: April 26th AAAC meeting

Challenges

While the FAA has expressed its desire to have a reasonable regulatory approach to BVLOS that ensures an acceptable level of safety without imposing an undue burden on market participants, a key consideration for the ARC was how to balance regulatory flexibility with the preference for a repeatable, predictable regulatory process that can be applied in lower risk BVLOS scenarios defined in the ARC's mission statement analysis. The challenges that nearly all commercial drone operators seeking to gain regulatory approval for BVLOS face generally come down to the need for clarity and consistency in requirements to demonstrate sufficient airworthiness for intended use cases, and a lack of understanding in what steps need to be taken in order to navigate the permissions path. TG14 consequently identified the following related challenges to industry applicants:

- Regulatory framework today measures all participants equally, when in fact participants have varying levels of capabilities
- Ambiguity in decision making authority; FAA Office of Primary Responsibility relies on inputs from multiple lines of business which have defacto “veto” power
- Internal coordination and review process paths are opaque. Applicants often get asked the same questions from multiple lines of business. Responses to those questions from the agency can vary and contradict each other, which delays progress.
- Critical steps in the approval process are not time-bound. Applicants cannot make key business decisions when timelines are indefinite.
- Changes in policy are not effectively communicated (e.g. BVLOS Operations Issue Paper process required for early applicants with no perceived benefit).
- Current gaps in FAA policy include documented noise data collection guidance, specific language in agency NEPA Orders and Implementation Guidance related to drones.
- The need for identification of drone-specific actions where a Categorical Exclusion (CE) may be prepared instead of an Environmental Assessment (EA) for use cases such as low volume commercial operations, infrastructure inspections, and sites within a defined industrial site.
- The lack of documented NEPA procedures and guidance has created an inefficient process and ambiguity for operators. Schedule clarity is essential to operators, yet there is no commitment to timelines as the FAA is still determining internally how to approach project-by-project reviews.

Recommendations

There is a significant amount of rulemaking action involved in creating a supportive regulatory environment for BVLOS operations, and this led to a comprehensive set of BVLOS ARC recommendations in key areas such as: operator qualifications, flight rules, airworthiness requirements for aircraft, training and qualification of operators, and third-party service providers. Because TG14’s guidance was to avoid redrafting any language already contained in the ARC report itself (and avoid anything that might suggest any de-facto rulemaking), the focus of the activity and recommendations was by necessity pointed towards leveraging current regulatory frameworks for waivers and exemptions enabling BVLOS operations.

Although the regulatory end-state for BVLOS is a normalized set of regulatory guidelines that enable operations by flying to rule, the most pragmatic path forward for the near term (one to two year) timeframe is to normalize to the greatest extent possible the manner in which waivers, exemptions, and categorical exclusions are applied as an interim step. Similar to how the Section 333 exemption process was normalized through, for instance, the use of blanket exemptions in advance of the Part 107 Small UAS rule, and the manner in which waivers have been normalized after the rule was issued. Accordingly, TG14 submits the following recommendations that leverage opportunities using existing technology and operational safety mitigations in low risk environments to maximize benefit of both crewed & uncrewed operations. The following recommendations address the areas where TG14 believes industry can partner with governmental partners to assist and accelerate implementation of BVLOS regulatory actions:

Develop checklist derivative of 107.31 and/or 107.33 waiver applications (based on existing waiver special provisions, not for BVLOS carriage of property for compensation or hire) to include (additional detail can be found in Appendix D):

1. Geofencing (when using a Geofence-enabled drone) and predetermined RTH routes
2. Pilot in Command (PIC) / Officer in Command (OIC) must identify obstacles, operational boundaries
3. Responsible person must ensure make/model/maintenance log of aircraft and licensing/qual info for PIC/OICs are maintained and provided where necessary in application
4. Confirmation of DAA capability before flight
5. Accepted training, qualification, and operational guidance plan for VOs used as a means to monitor airspace and surrounding operations in support of BVLOS permissions.

6. Create pre-draft exemption language to avoid duplication of exemption review and issuance process

Streamlined/expedited Part 91.113 waiver process to ensure *acceptable* safety levels met:

1. Leverage already approved waiver applications with focus on process path rather than specifics of the waivers (although they will be informative).
2. Develop guidance materials for applicants.
3. Obtain inputs from FAA on how they normalized waiver process- derivative of how they normalized the Part 107 waiver process.
4. Document and disseminate guidance from already approved Operational BVLOS Issues Papers.
5. Seek industry trade group hosts (HAI, AUVSI) to submit exemptions for BVLOS specific items on behalf of applicants that can then be referenced in lieu of individual submissions for common areas where applicants seek relief against rulesets.

Clarification on how to meet 14 CFR 11 requirement that safety *not be adversely impacted*/is equal to rule seeking exemption against:

1. Clarify safety criteria & requirements in support of BVLOS operations
2. Develop guidance template for applicants with focus on qualitative approach to operational mitigations (although quantitative analysis can be incorporated).
3. Leverage "SORA-like" process that quantifies ground/air risk as means to demonstrate safety case is met for low/medium risk BVLOS operations (e.g. SORA/SAIL)
4. Alignment with international framework and current approvals (e.g. 14CFR Part 107/Part 91)
5. Promote/support use of pre-defined risk assessment (PDRA) process

DAA systems should be evaluated as a component of an overall safety case that incorporates the following mitigations proposed by the proponent: Strategic: Pre-flight conditions and restrictions, such as "no fly" areas, altitude limitations, route planning, operating hour limitations, and shielded operations, which are being recognized as an effective mitigation; **and** Tactical/Technical: In-flight mitigations such as DAA, including ADS-B-In for cooperative mitigation, dynamic route deconfliction, or real-time flight restrictions (altitude, area or both) in alignment with ARC recommendations:

1. Acceptance of the safety case for current process waivers, exemptions and other authorizing instruments should be based upon the proponent demonstrating that the combination of proposed mitigations meets a target level of safety. The target level of safety should be no more restrictive than the accepted fatality rates of general aviation.
2. FAA should recognize that a range of variables contribute to "adequate separation," such as closure/divergence rates and geometries, size/wingspan, and avoidance performance and are <u>not adequately defined by a single minimum distance</u>. The term "adequate separation" should be adopted as a performance benchmark for separation in DAA system evaluations, replacing the legacy terms "well clear" and "near midair collision. *This recommendation is adoptable without rulemaking through the current practice of issuing CoAs for alternate means of compliance with 14 CFR 91.113*.
3. The FAA should encourage and accept the extensive use of modeling and simulation as evidence of the effectiveness of air risk mitigation measures, including DAA performance--particularly at high encounter volumes and over extended periods of time. FAA should provide access to relevant and appropriate air traffic data to support the development of safety cases for BVLOS operations to aerospace standards.
4. The FAA should continue their engagement with, and funding for, FFRDCs and other neutral organizations to further develop models of aircraft behavior and airspace risk for use in development of DAA systems and safety cases, and continually identify and share models, best practices, evaluation criteria and assumptions with industry.

5. To increase situational awareness and safety of flight at lower altitudes, and in alignment with recent safety research results[1], the FAA should reincentivize voluntary adoption and use of ADS-B.

Identify NEPA environmental review streamlining measures to facilitate reviews of drone operations and use of categorical exclusion (CE) process for permissions:

1. Develop NEPA Implementation Guidance for Commercial Drone Operational Approvals, as a supplement to FAA Order 1050.1F (until such time that the agency's NEPA Order is updated). At a minimum, this guidance should include:
2. Identify drone operational approval actions that should quality for a CE and document process to determine whether extraordinary circumstances exist
3. Develop and document the process for FAA coordination with other federal, state, local resource agencies and Tribal governments
4. Develop procedures for Programmatic NEPA reviews to facilitate reviews of drone operations by one or more operators in a broad geographic areas with similar environmental characteristics (including nationwide reviews, as appropriate) over a defined time period.

Clarify Acceptable/Targeted Level of Risk Categorization and Applicability

1. A publicly available, standardized methodology for addressing ground risk for current process waivers, exemptions and other authorizing instruments should be made available along the following guidelines:
    a. Quantitative and qualitative approaches should be supported by the methodology (e.g. MITER guidance for modeling risk based approach for UAS[2] .
    b. Both components of risk - likelihood and severity - must be considered to determine if risks are sufficiently mitigated.
    c. Existing acceptable mitigations and acceptable inputs and data sources should be clearly defined.
2. The Department of Transportation should define the ALR/TLS for ground-risk for drone operations, considering non-aviation modes of transportation that drones may supplement or replace as per DAC TG11 report.
3. To provide consistency to approved operations, templates-also known as standard scenarios or pre-defined risk assessments-should be made available to standardize waivers and exemptions to the current rules and to future waiverable rules.
    a. These should take the form of checklists and other guidance based on the existing effective mitigations accepted by FAA in previously granted waivers (e.g. C&Ls)
    b. These should leverage the risk assessment methodology to validate the acceptability for waiver operations (which may have different thresholds than operations by rule).

[1] Howell, Daniel and King, Jennifer (Regulus Group). "Measured Impact of ADS-B In Applications on General Aviation and Air Taxi Accident Rates." Paper presented at IEEE/AIAA 38th Digital Avionics Systems Conference, 08-12 September 2019

[2] "Modeling Risk-Based Approach for Small Unmanned Aircraft Systems" by MITRE Corporation: Modeling Risk-Based Approach for Small Unmanned Aircraft Systems (dtic.mil)

Appendix A: TG14 Membership			
TG14 Member	**Company**	**Title**	**Email**
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Benjamin Ivers	Autonomous Systems	Director	Benjamin.j.ivers@boeing.com
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Brad Hayden	RoboticSkies	CEO	Brad.hayden@roboticskies.com
Brandon Torres Declet	Stealth Mode	CEO and Chairman of the Board	brandon@meteor11.com
Chris Martino	Helicopter Association International (HAI)	Senior Director of Operations & International Affairs	chris.martino@rotor.org
Christian Ramsey	uAvionix	President	Christian@uavionix.com
Christopher Cooper	Aircraft Owners & Pilots Association (AOPA)	Sr. Director, Regulatory Affairs	Christopher.cooper@aopa.org
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Vic Moss	Moss Photography	COO/VP	Vic.mossphotography.biz

Appendix B: BVLOS ARC Recommendations Focus Areas

The ARC Recommendations below were the initial focus areas the team worked to.

Air & Ground Risk Recommendations

	Air & Ground Risk Recommendations	Recommendation Intent
AG 2.1	The acceptable level of risk (ALR) for UAS should be consistent across all types of operations being performed, and no more restrictive than the accepted fatality rates of general aviation.	The expectation is that operators will be able to meet the UAS ALR through qualitative or quantitative methods, or a hybrid approach. This is similar to existing Safety Management System constructs where a value is assigned and both qualitative and quantitative approaches can be used to demonstrate compliance.
AG 2.5	The rule should enable carriage of hazardous materials beyond the specified quantities (per OQ 2.19). Carriage of hazardous materials beyond the specified quantities of OQ 2.19 shall have appropriate mitigations, as established via a performance-based industry consensus standard that is proportionate to the risk of the operation.	To develop HAZMAT rules that reflect the specific characteristics of UAS BVLOS operations, including factors that mitigate risk, such as the relatively low quantities of HAZMAT that UA can carry and the absence of humans onboard, while incorporating sufficient protections to guard against relevant risks.
AG 2.7AG 2.5	The rule should be based on a minimum capability needed to safely perform the operation, not a minimum equipment list. The rule should enable carriage of hazardous materials beyond the specified quantities (per OQ 2.19). Carriage of hazardous materials beyond the specified quantities of OQ 2.19 shall have appropriate mitigations, as established via a performance-based industry consensus standard that is proportionate to the risk of the operation.	The rule should focus on identifying a minimum capability needed to safely perform UAS BVLOS operations rather than on establishing equipage requirements which may be prohibitive for some UAS.To develop HAZMAT rules that reflect the specific characteristics of UAS BVLOS operations, including factors that mitigate risk, such as the relatively low quantities of HAZMAT that UA can carry and the absence of humans onboard, while incorporating sufficient protections to guard against relevant risks.
AG 2.9AG 2.7AG 2.6	The FAA should incorporate uncrewed aviation into existing surveys or deploy a survey similar to the General Aviation and Part 135 Activity Survey. The rule should be based on a minimum capability needed to safely perform the operation, not a minimum equipment list. The rule should allow UAS to conduct transient flight over people. The rule should allow sustained flight over non-participants with strategic and/or technical mitigations applied.	To allow the FAA to capture safety information and develop a set of safety metrics, the ARC intends to ensure that data collected via the existing processes reflects uncrewed aviation activities. The rule should focus on identifying a minimum capability needed to safely perform UAS BVLOS operations rather than on establishing equipage requirements which may be prohibitive for some UAS.To allow transient flight over people and sustained flight over non-participants in circumstances that reflect mitigated risks, such as when people are sheltered, using PPE, or aware of the risks from the flight. The selection of risk mitigation methods (strategic, technical or a combination of both) used to meet the ALR

AG 2.8AG 2.7	The FAA should develop pathways to support innovation and accommodate emerging technology. The FAA should consider approvals for low-risk Research and Development initiatives. The rule should be based on a minimum capability needed to safely perform the operation, not a minimum equipment list.	To leverage R&D activities and provide the FAA with critical information in areas such as Detect and Avoid, UAS Communications, Human Factors, System Safety, and Certification, all of which will aid in the FAA's efforts to safely integrate UAS into the NAS.The rule should focus on identifying a minimum capability needed to safely perform UAS BVLOS operations rather than on establishing equipage requirements which may be prohibitive for some UAS.
AG 2.9AG 2.8	The FAA should incorporate uncrewed aviation into existing surveys or deploy a survey similar to the General Aviation and Part 135 Activity Survey. The FAA should develop pathways to support innovation and accommodate emerging technology. The FAA should consider approvals for low-risk Research and Development initiatives.	To allow the FAA to capture safety information and develop a set of safety metrics, the ARC intends to ensure that data collected via the existing processes reflects uncrewed aviation activities. To leverage R&D activities and provide the FAA with critical information in areas such as Detect and Avoid, UAS Communications, Human Factors, System Safety, and Certification, all of which will aid in the FAA's efforts to safely integrate UAS into the NAS.
AG 2.9	The FAA should incorporate uncrewed aviation into existing surveys or deploy a survey similar to the General Aviation and Part 135 Activity Survey.	To allow the FAA to capture safety information and develop a set of safety metrics, the ARC intends to ensure that data collected via the existing processes reflects uncrewed aviation activities.

Flight Rules Recommendations

	Flight Rules Recommendations	**Recommendation Intent**
FR 2.1	The FAA should amend Part 91.113 (b) to allow a range of sensing methodologies and clarify adequate separation.	To change 'see and avoid' to 'detect and avoid' to allow all aircraft to utilize technical or non- technical means to detect other aircraft. Replace 'see and avoid' with 'detect and avoid' and remove the phrase 'well clear' and replace it with 'adequate separation'.

Aircraft & Systems Recommendations

	Aircraft and Systems Recommendations	**Recommendation Intent**
AS 2.4	The new rules should include UA noise certification requirements appropriate to the operating environment. Compliance should be demonstrated through a simple testing methodology.	To address noise certification requirements for UA.
AS 2.5	The FAA should establish a new 'BVLOS' Rule which includes a process for qualification of the associated elements of an uncrewed aircraft system.	To establish a process for qualification of the associated elements of an uncrewed aircraft system.

AS 2.10	The FAA should consider allowing third party test organizations to audit compliance.	To develop a method of ensuring conformity and assessing compliance to standards. Audits should be commensurate with risk and not unduly burdensome.

Operator Qualifications Recommendations

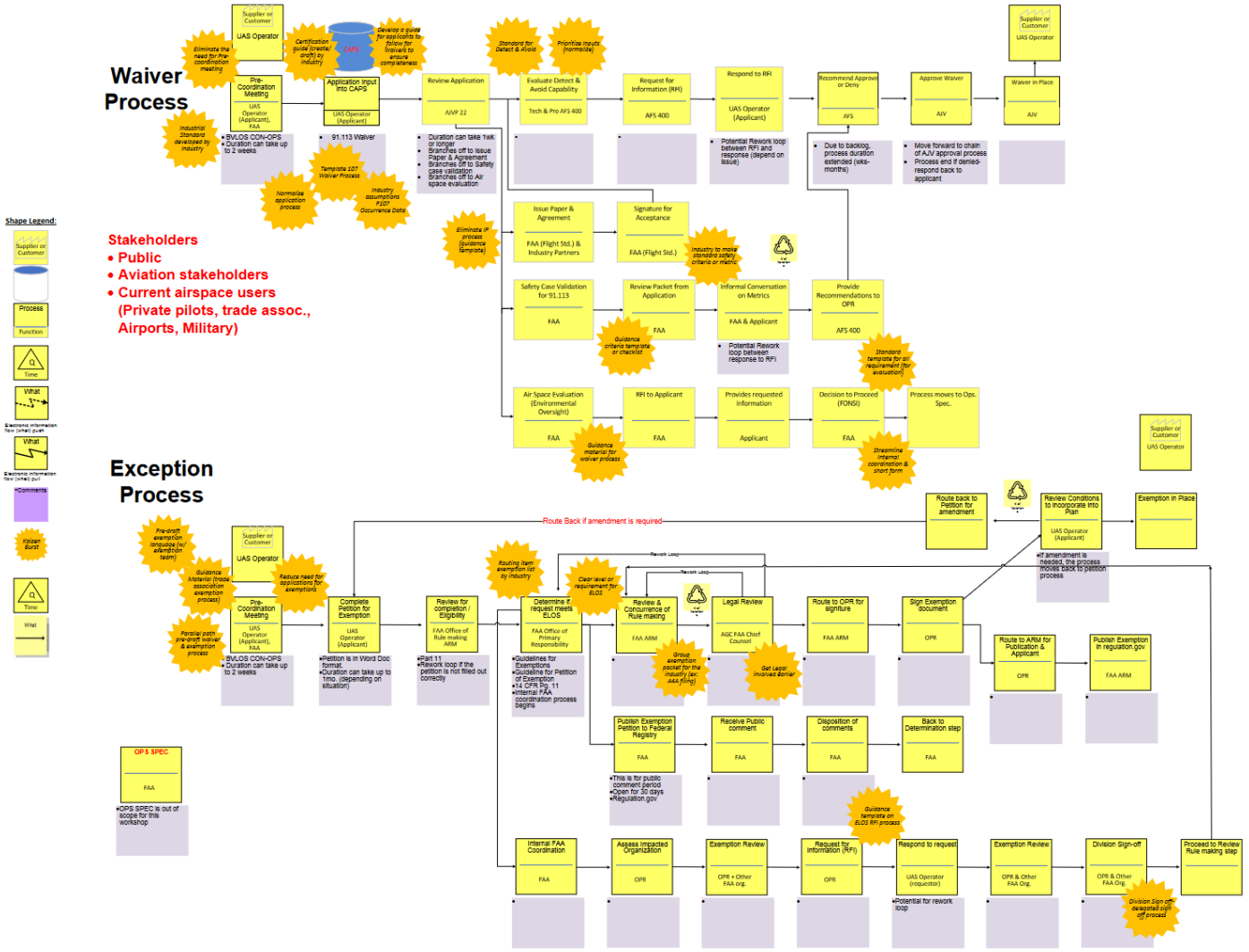
	Operator Qualifications Recommendations	Recommendation Intent
OQ 2.20	The FAA provide an exception to the restrictions and requirements for carriage of specified quantities of hazardous materials for delivery by holders of a Remote Air Carrier or Remote Operating Certificate.	To allow carriage of limited quantities of certain hazardous materials via UA by holders of a Remote Air Carrier or Remote Operating Certificate.

Environmental Recommendations

	Environmental Recommendations	Recommendation Intent
ER 2.1	As the FAA reviews the BVLOS Rule, the ARC recommends the FAA determine that the BVLOS Rule is unlikely to result in significant impact to the environment.	To avoid the undue delay, cost and burden associated with an extensive environmental review under NEPA for operations that do not have a significant impact on the environment. The ARC does not find it reasonably foreseeable that a BVLOS Rule would lead to significant impacts in any of the relevant environmental impact categories specified in FAA Order 1050.1F.
ER 2.2	NEPA review of the BVLOS rule must be timely and programmatic in scope.	In the absence of significant impacts to the environment, the facts support a streamlined environmental review. Process considerations support a similar result.
ER 2.3	Environmental reviews should not be required for individual BVLOS operations enabled by the Rule.	The ARC seeks to avoid any requirement that environmental reviews be required for individual BVLOS approvals conducted under the rule.
ER 2.4	The FAA should provide an interim pathway to enable BVLOS operations in the near term, pending finalization of the BVLOS Rule.	Promote the approval of BVLOS operations to expedite the realization of the environmental benefits while the rulemaking process remains ongoing.
ER 2.5	The FAA interpret NEPA in a way that expedites the BVLOS rulemaking. If the FAA concludes that it is required to implement NEPA in such a way that would substantially delay either the BVLOS rulemaking or BVLOS operations, the ARC recommends asking Congress to consider legislative actions.	To adhere to the purpose and requirements of NEPA while avoiding unnecessary delay in approving environmentally friendly UAS operations for the benefit of the American public.

Appendix C: Value Stream Current State Process Map

BVLOS Operational Approval Process Current State 1/31/23



Subgroup 1 – Low Risk/Altitude EVLOS/BVLOS

Key Assumptions

1) The use of unaided human vision for air risk mitigation is foundational to the Part 107 rule. The premise is that the remote pilot in command, the manipulator of the controls, and one or more visual observers are all physically present in the operating area.
2) The use of visual observers is an operating concept which either supplements or extends the visual line of sight of the remote pilot in command.
3) TG14 Subgroup 1 will focus on Extended Visual Line of Sight (ARC recommendations FR2.8 and FR2.9) and will examine:
   a) Existing rules & processes that can be leveraged, accelerated, and/or expanded.
   b) Existing templates, analyses, and datasets that can accelerate approvals and recommendations.

Relevant ARC Recommendations

FR 2.8	The FAA should amend FAR Rule Part 107.31 to include Extended Visual Line of Sight	This technical modification to Part 107 allows for operations where a RPIC does not see the UAS, but a trained crewmember has situational awareness of the airspace around the UAS.
FR 2.9	The FAA should amend FAR Rule Part 107.33 to allow a visual observer to assist and support BVLOS operations	To allow a visual observer to assist and support BVLOS operations and describe visual observer roles and responsibilities

Problem Definition

Key goals, desired outcomes

- Recommended best practices for developing an extended visual line of sight concept of operations and for mitigating the air and ground risks associated with the operation.
- Guidance on translating that concept of operations into a successful Part 107 waiver application.

Key challenges to overcome

- Rulemaking is a process which takes time.
- Information is publicly available but is not consolidated into a step-by-step process or set of best practices.

Background

The following content was reviewed as part of the work tasking of TG14 subgroup 1.

Current Part 107 Rules Related to Visual Line of Sight Operation and Visual Observer

§ 107.31 Visual line of sight aircraft operation.
§ 107.33 Visual observer.

Previous DAC Recommendations

The Drone Advisory Committee Tasking Group #3, 107 Waivers, the Tasking Group made seven recommendations to the FAA. The third recommendation (copied below) proposes the use of checklists to assist the approval process. The FAA's response, also below, pointed out the ways the FAA works to continuously improve the part 107 waiver process for its waiver reviewers as well as individuals or organizations submitting waivers. These improvements include FAA-waiver application meetings to discuss waiver process improvements as well as providing additional detailed information to be posted on the DroneZone website.

DAC Tasking Group # 3 recommendation (3rd of 7 recommendations):

Checklist of safety cases for complex waiver approvals FAA should create a checklist inventorying appropriate examples of satisfying safety cases for complex waiver approvals, like BVLOS, which is then used to provide constructive feedback to those applicants that do not meet the required thresholds pointing the applicant to specific examples that would have satisfied the requirement a. Additionally, the FAA should consider creating a testing procedure for 107.29, 107.39, 107.41 (above UASFM AGL), 107.31 that should be graduated (< 2SM w. clear view of airspace, >2SM or restricted view of airspace). By providing an online test and guidelines for automatic waiver approvals, waiver office personnel waiver quantity and workload would be significantly improved.

DAC Tasking Group # 3 FAA response:
Checklist of safety cases for complex waiver approvals The FAA continues to update its part 107 waiver website and will update disapproval letters by the end of third quarter FY20 to provide additional information and more constructive feedback to waiver applicants whose application did not result in the FAA issuing a certificate of waiver. In the meantime, the part 107 waiver team and UAS Support Center staff will engage in recurring meetings to address waiver applicants' questions and concerns and will provide additional details to applicants who contact the UAS Support Center for assistance with their waiver applications. The FAA makes detailed information available in DroneZone to UAS Support Center staff to provide insight to applicants who may have questions about pending waiver applications, disapprovals, or the provisions of an approved waiver. The FAA is currently developing a risk tool that will be made available to applicants to provide methods, methodologies, acceptable mitigations, and more responsive and direct feedback to applicants where their application did not mitigate risk to an acceptable level. This tool is planned to be made available to applicants in the first half of calendar year 2021. To assist applicants currently with the part 107 waiver application process, the FAA provides Waiver Safety Explanation Guidelines, examples of approved waiver applications. The FAA continues to evaluate the waiver application process and part 107 waiver approval information, with the intention of improving the process on a continuous basis.

FAA Pathfinder Focus Area 2
Extended Visual line of Sight (EVLOS) is defined as, "EVLOS is an Unmanned Aircraft System (UAS) operation whereby the Pilot in Command (PIC) and/or the observer maintains an uninterrupted visual situational awareness of the airspace in which the UAS operation is being conducted, for encroaching aircraft. The Aircraft may be operated out of sight of the PIC and the observer but must be kept in a defined area of operation, with control authority being maintained by the PIC at all times[3]."

The Pathfinder Focus Area 2 project also determined a nominal value for the distance of Visual Line of Sight and defined it as:

Primary[4] results indicate that an sUAS Pilot in Command (PIC) will be able to successfully detect and avoid any intruding aircraft 2.37 +/- 1.6 NM from the PIC or optional remote visual observer (RVO) provided the following conditions are met:

1) *Sun Position: Altitude of sun > 45 degrees above the horizon*
2) *VFR (Visual Flight Rules) meteorological conditions*
3) *Visual angle < 5 degrees in quadrant centered on UA location.*
4) *PIC location free of significant noise pollution (i.e. generators, farm equipment, trust)*
5) *PIC qualifications:*
    a) *Meets all Part 107 requirements.*
    b) *The following additional recommendation for PIC experience and training were made based on the Phase II research outcomes:*

[3] FAA Pathfinder Focus Area 2, September 12, 2017 presented to the REDAC/NAS Operations Subcommittee by FAA Pathfinder Program Manager, Rob Pappas.
[4] FAA Pathfinder Focus Area 2, 2018, Phase III Report, pp.5

i) *"Sufficient" VLOS flight time in desired operating environment on the specific UAS (both aircraft and GCS). This provides the PIC with the ability to selectively "tune out" distractions such as people, equipment, or animals. Our recommendation (based on pilot observation) is that 15 - 20 flight hours in VLOS should be required before BVLOS with visual surveillance of manned aircraft flight should be attempted.*

ii) *In-field flight training in BVLOS-VS operation from an experienced operator. This is especially important to avoid the PIC focusing exclusively on the specific direction taken by the sUAS as it flies outside the visual line-of-sight or on the Ground Control Station (GCS). Our recommendation (based on pilot observation) is that a single day of training comprising 2 to 3 short sorties and 2 to 3 longer ones is enough to establish the appropriate strategies necessary for BVLOS-VS flight.*

The Pathfinder project also investigated and reported on the beneficial use of technology to assist situational awareness in BVLOS-VS. The relevant Section 1.3.2 from the report is copied here:

Current 107.31 & 107.33 Waiver Analysis Data

Since April of 2019, 109 waivers have been issued.

Waiver Application Guidance and Best Practices (EVLOS Operations)

The following steps

1. Resources

Each of these resources is valuable in preparing a successful waiver application. Before developing a waiver application, read the following:

- Advisory Circular 107-2A - This provides more detail on how the FAA interprets the Part 107 rules.
- Waiver Safety Explanation Guidelines - These are questions you will need to answer in your waiver application/
- Waiver Specific Evaluation Criteria - This provides more detail on how the FAA will evaluate your waiver application, particularly your safety case.
- Preparing Risk Assessments - A webinar from the FAA on risk assessments.

2. Develop your Concept of Operations

A 'Concept of Operations' is basically just an overall plan. It is important to think through how exactly you are going to conduct an EVLOS operation. You should think through - who, what, when, where, and how. Considering the drone you will be using, you should document normal and emergency procedures for the operation. Outlines for developing a concept of operations can be found at JARUS - Annex A and in the Systems Analysis section in FAA 8040.6.

3. Consider Common Mitigations for EVLOS Operations

The table below describes several common mitigations.

Air Risk	Ground Risk
When the sUA GCS offers position, speed, and attitude information to the RPIC (ex. moving map and telemetry), with unaided vision the VOs must be able to continuously observe airspace for 2SM surrounding the sUA. RPIC and VOs do not need to maintain awareness of the position of the sUA through direct visual observation. Consider:	The RPIC, using real-time information of the overflown area, or the VO must be able to scan the immediate operating area to determine that the unmanned aircraft does not knowingly endanger the life or property of another. Consider:

• Location and spacing of visual	• Location and spacing of visual observers, proximity to roads/ paths of travel,
SOP for contingency if RPIC loss of link to sUA/ loss of state information (position, speed, attitude) on sUA. Consider: Backups/Redundancy Return to Home Behavior Land in Safe Area Behavior Land Now Behavior	SOP/planning so that the contingency behavior does not endanger the life or property of another. Consider: Ground collisions - Vertical obstructions/obstacles Flight routes with lowest risk - land use, where people are unlikely to gather, or sheltering is provided. Safe Landing Areas - clear areas away from people
VOs and RPIC must maintain effective communication with each other at all times. SOP for managing loss of voice comms and/or high latency -> SOP for contingency behavior under loss of voice comms	
Standard phraseology for collision avoidance with aircraft	Standard phraseology for collision avoidance with ground obstacles or persons or property on the ground
SOP for Collision Avoidance with Aircraft. Avoidance maneuvers appropriate for the sUA and the operating area.	SOP for Collision Avoidance with Ground Obstacles. Avoidance maneuvers appropriate for the sUA and the operating area.
Operating area is defined by collision avoidance timing analysis below. Ensure the extended operating area can be covered by control link.	
Emergency Procedures.	
Training on all EVLOS SOPs for RPIC and VOs	
Optional Additional Safety Layers:	
Visual Conspicuity of the sUA: 1 SM during daytime, 3 NM at night	
Inclusion of NOTAMs	

4. Develop a Collision Avoidance Strategy

For your specific concept of operation:

- Determine whether visual observers will maintain visual contact with the UA or whether they will scan the surrounding airspace.
- Determine how many visual observers are needed to provide coverage of your flight path or area.
- Select a voice communications technology/device. Will this device work in the operating area? Consider what you would use as a backup.
- Develop procedures for deploying and positioning VOs in the operating area.

- Establish the avoidance maneuvers you will make given encounter scenarios likely to occur for your operation. Consider making this as simple as possible.
- Develop standard phraseology for comms between VOs and the RPIC. Don't have a conversation - keep it simple. Use words and phrases that can't be misheard or confused.
- Assess the time it takes to communicate.
- Assess the time it takes to make an avoidance maneuver with your sUA.
- Analyze the Timing of you Collison Strategy: FAA Waiver Specific Evaluation Criteria

Use of Visual Observers - An applicant may request to use one or more visual observers (VO or VOs) to monitor the airspace during a BVLOS operation. Use of a VO or VOs could be considered an acceptable method to detect other aircraft. A waiver applicant should demonstrate the VOs are able to have an unobstructed view of the airspace from the surface of ground to above the intended operational altitude, throughout the proposed operational area. The operation must be able to demonstrate the VO(s) ability to detect other aircraft which may represent a collision hazard in sufficient time for the sUAS operation to successfully avoid and remain well clear of the other aircraft. Prior research and previously approved waiver applications have demonstrated a person is generally effective at detecting most other aircraft headed towards a person at a distance of 1.5 statute miles (SM). Aircraft on tangential trajectories are detected at distances between 2-2.5 SM. An evaluator will utilize these reference distances to determine if the proposed sUAS operation could maintain a sufficient view of the airspace surrounding the sUAS in flight to detect other aircraft. Previously 2 SM has been used as a blended distance of airspace as a performance-based limitation to view around the sUAS in flight.

The ability to view the airspace in flight is not the same as detecting another aircraft. Aircraft detection distances may vary significantly based on contrast, lighting conditions, prevailing visibility, apparent movement, aircraft size, and aircraft altitude. An evaluator will ensure the sUAS operation can detect aircraft which represent a potential hazard to the operation. A proposed operations ability to detect another aircraft operating at 1500' above ground level (AGL), which does not present collision hazard or loss of well clear distance from the sUAS, does not demonstrate a proposed operations ability to sufficiently detect other aircraft. The proposed sUAS operation should also demonstrate the ability to avoid other aircraft at the maximum operational distance from a direct participant. Detecting another aircraft does not necessarily ensure the other aircraft can be avoided or the sUAS flight path can be altered in sufficient time to remain well clear of the other aircraft. For example, if the sUAS cannot be rerouted in flight or has limited ability to change direction of flight, it may not be able to successfully avoid another aircraft, even if the operation can detect 100% of other aircraft operating in the intended fight area.

An example of one method and what is required of the applicant to determine the maximum operational distance from a VO:

- VO identifies another aircraft at 1.5 SM, applicant must identify the amount of time it takes for the VO to determine the track of the other aircraft and communicate this information to the RPIC. The applicant should provide a time in seconds reasonable for the communication system utilized in the proposed operations. Most available studies on this suggest it takes at least 10-20 seconds for a person to identify the aircraft, determine the direction of flight, and communicate this information to the RPIC.
- Identify the amount of time required for the RPIC to decide if an avoidance maneuver is needed to maintain well clear or not present a collision hazard, and to identify the desired avoidance maneuver. The applicant should provide a time in seconds reasonable for the situational awareness information presented to the RPIC.
- Identify the amount of time it would take the RPIC to maneuver, the applicant should provide a time in seconds reasonable for the maneuverability of their sUAS, the maneuver choices available to choose from, and how the entry of the commands into the ground control station is performed.

- Identify the amount of time the sUAS requires to complete the maneuver to remain well clear. The applicant should provide a time in seconds for each maneuver choice available to the RPIC or the time in seconds based on the performance of the sUAS. For example, if the sUAS is operating at 400' AGL, they applicant should present the amount of time it would take the sUAS to descend 400 feet to the ground, or the amount of time it would take the sUAS to travel to a well clear distance from a worst case scenario encounter geometry with another aircraft.
- All the above times should be added together to get a cumulative time in seconds the sUAS operation requires to detect and avoid another aircraft. This time, in seconds should be converted into linear distance using the average aircraft speed at the location, or a suitable source for average or mean aircraft speed for the class of airspace operations are proposed to occur in. For example, the average speed of aircraft below 400 feet in Class G airspace is about 120 knots. If the sUAS maneuver to avoid other aircraft is land, use the time provided by the applicant in seconds from detect to land.

  For this example, we will say the cumulative time to detect and avoid is 30 seconds. Use the following formula and solve for distance:

  Speed * Time = Distance, 120 knots * 30 seconds = 1 nautical mile (NM) Subtract 1 NM from the detect distance of 1.5 NM mile to determine the maximum operational distance of the sUAS from the RPIC or a VO.

  In this example, the maximum sUAS operational distance to be able to detect and avoid other aircraft from a direct participant in the operation is .5 NM.

5. Present Your Safety Case

Use FAA Order 8040.6 as your guide to assessing operational risk. ASTM F3178-16 Standard Practice For Operational Risk Assessment Of Small Unmanned Aircraft Systems (SUAS) is also a helpful guide.

6. Submit Your Application

For guidance on the application process:
Waiver Application Instructions
Where's My Waiver?

7. Comply with Waiver Provisions

Review typical provisions. These provide insight into how you will be able to operate under your waiver. Also consider these when preparing your application.

Typical Waiver Provisions

OPERATIONAL PROVISIONS

- All operations under this waiver must use one or more VO;
- Operations may not be conducted at night, as defined in 14 CFR § 1.1;
- Individuals directly participating in the operation of the sUAS must be easily identifiable visually (e.g., apparel, safety vests);
- The remote PIC must ensure sufficient VO(s) are used to identify any non-participating aircraft prior to their entry into the planned operational area. For the purpose of this Waiver, sufficient VO(s) is defined as the minimum number of VO(s) required to continuously observe at least a 2 statute mile radius of airspace surrounding the sUA in flight. The remote PIC must confirm VO(s) are physically located such that the remote PIC receives sufficient notice to ensure the UA remains well clear of all other aircraft;

- Communication between the remote PIC and VO must occur to facilitate, when necessary, the remote PIC taking action to maneuver the sUA with sufficient time to: ee. Give way to all other aircraft in accordance with § 107.37, ff. React to any unforeseen operational or mechanical failure without creating a hazard to other people, other aircraft, or property in the event of a loss of control of the sUA, and gg. Maintain compliance with this Waiver and the requirements of part 107;
- Operations subject to this waiver must cease as soon as possible in a manner that does not jeopardize the safety of human beings, property or other aircraft, if, at any time: hh. Safety of human beings or property on the ground or in the air is in jeopardy, ii. Any failure to comply with the provisions of this Waiver exists, jj. Full-duplex communications cannot be maintained between the remote PIC and any VO participating in the operation, kk. A non-participating aircraft enters the designated flight operating area, ll. GPS signal is lost, or mm. sUA GPS location information is degraded;
- No sUA flight that occurs under this waiver may carry the property of another for compensation or hire;
- Not less than 24 hours prior to conducting operations that are the subject of this Waiver, a Notice to Air Missions (NOTAM) must be filed. The NOTAM must include location, altitude, and/or operating area, and the time and nature of the activity;

TECHNICAL PROVISIONS

- Operations conducted under this Waiver may only occur with the make and model sUAS described in the waiver application proposed operations of any other manufacturer, make or model of sUAS will require a new waiver application or a request to amend this Waiver;
- All sUAS operations conducted in accordance with this Waiver must comply with all manufacturer recommendations and limitations for the sUAS;
- The sUAS ground control station must display in real time the following information: sUA altitude, sUA position, sUA direction of flight, and sUAS flight mode, as described in the waiver application. This information must be available at all times to the remote PIC;
- The sUAS must audibly and visually alert the remote PIC of degraded system performance, sUAS malfunction, or loss of Command and Control (C2) link between the ground control station and the sUA; 29. Prior to conducting operations under this Waiver, the remote PIC must determine all control links used in the sUAS, will maintain the ability to control the sUA at the maximum planned distance for the proposed operation. At all times during operations that are the subject of this Waiver, the remote PIC must maintain the ability to direct the sUA to ensure compliance with the applicable provisions of this waiver;
- If the remote PIC loses command or control link with the sUA, the sUA must follow a predetermined route to immediately reestablish command and control link. If command and control link is not immediately reestablished and the remote PIC no longer has the ability to direct the sUAS to ensure compliance with applicable provisions of part 107, the sUA must follow the loss of command and control procedure as described in the waiver application;
- If communication between the VO and the remote PIC will occur by electronic device: ww. The device must be continuous full-duplex, xx. The remote PIC must be able to use the device hands- free, and yy. There must be a reliable back-up communication method;

Waiver Checklist to P107.31 & P107.33

Checklist for 107.31 and/or 107.33 waiver applications (based on existing 107.31 "eVLOS" waiver special provisions)

- No night ops
- Geofencing (when using a GEOFence enabled drone)
- PIC must identify obstacles and operational boundaries
- Must include make and model of sUAS in application
- No carriage of property compensation for hire

- Maintenance log required
- Confirmation of DAA before flight
- Information & telemetry display requirement for ground control station
- Predetermined RTH route
- If VO is used, the communication system must be hands free and must have a redundancy plan.
- Responsible Person must maintain a list of UAS and RPICs who fly under the waiver
- Training for VO to when one is used (for 107.31)
- One or more "daisy chain" VO.
- Develop metrics for VO training for scanning airspace

Subgroup 2 - DAA in Existing Environments & Technology

Problem Definition

Key goals, desired outcomes

- Desire to see more BVLOS operations where safe integration can be maintained
- Leverage existing technology and environments to maximum benefit of both crewed & uncrewed operations
- Work to understand greatest opportunities for the above, as well as the limitations at present where accelerating BVLOS ARC Recommendations may not (yet) be possible

Key challenges to overcome

- Poor alignment between traditional aircraft rules/standards and drone application (thus the ARC)
- No clear and accepted threshold definition of level of safety/risk
- FAA has resisted assigning specific values to key terms ("well clear," "NMAC")
    - "Safe" distances may be highly dependent on the situation (converging, diverging, overtaking, etc.).
    - For smaller drones, collision severity is a favorable consideration
        - No first-party risk reduces the potential for injuries or fatalities
        - Consideration for reduced second-party collision risk between smaller, lighter drone & crewed aircraft (vs. two crewed aircraft) = reduced risk of injury/fatality
- ARC replacement term: "adequate separation"
    - Avoids confusion with historical terms that have "unofficial" definitions
    - Still needs defining (in terms of risk? Distance?) but does not carry the historical baggage of traditional terms
- ARC finding: risk is a more relevant measure than assigning fixed distances to terms.
    - ARC recognizes this in recommendation (AG 2.1): *The acceptable level of risk (ALR) for UAS should be consistent across all types of operations being performed, and no more restrictive than the accepted fatality rates of general aviation.*
- FAA has chosen not to share data with industry that would support quantitative analysis of collision risk
    - Historical ATC tracks (primary, secondary, ADS-B), coverage limitations (e.g. SWIM, other sources)
    - Characteristics of very low-level "masked" traffic
- Uncertainty around existing ADS-B operations (how much non-ADS-B traffic operates inside Mode-C Veil, at low altitude, etc.)
- Uncertainty around drone DAA performance (ADS-B reception, avoidance capability & reliability, etc.)
- Right-of-way proposals are often highly specific to different operating areas, levels of equipage, etc.

Final Recommendations

1. DAA systems should be evaluated as a component of an overall safety case that incorporates all of the potential mitigations proposed by the proponent:

a. Strategic: Pre-flight flight conditions and restrictions, such as "no fly" areas, altitude limitations, route planning, operating hour limitations, and shielded operations, which are being recognized as an effective mitigation;
b. Tactical/Technical: In-flight mitigations such as DAA, including ADS-B-In for cooperative mitigation, dynamic route deconfliction, or real-time flight restrictions (altitude, area or both);
c. Other mitigations as proposed.

2. In alignment with UAS BVLOS ARC recommendation AG 2.1, acceptance of the safety case for current process waivers, exemptions and other authorizing instruments should be based upon the proponent demonstrating that the combination of proposed mitigations meets a target level of safety. The target level of safety should be no more restrictive than the accepted fatality rates of general aviation.
3. In alignment with UAS BVLOS ARC recommendation FR 2.1, the term "adequate separation" should be adopted as a performance benchmark for separation in DAA system evaluations, replacing the legacy terms "well clear" and "near midair collision." These legacy terms have been adopted over time as indicators of potential collision risk or risk of a potentially unsafe condition between two crewed aircraft. These terms were not originally created to be reflective of the risk potential between a crewed aircraft and a UA, and in some cases have been *redefined* in attempts to apply them to UA. The use of these terms therefore is both inappropriate (from a risk standpoint) and confusing in application. *This recommendation is adoptable without rulemaking through the current practice of issuing CoAs for alternate means of compliance with 14 CFR 91.113*.
4. Also, in alignment with UAS BVLOS ARC recommendation FR 2.1, the FAA should recognize that a range of variables contribute to "adequate separation," such as closure/divergence rates and geometries, size/wingspan, and avoidance performance and are <u>not adequately defined by a single minimum distance</u>. The FAA should therefore allow proponents to define and demonstrate how their systems provide "adequate separation" for the environments in which they operate.
5. As assessing and predicting performance is a necessary component of DAA system evaluation, the FAA should encourage and accept the extensive use of modeling and simulation as evidence of the effectiveness of air risk mitigation measures, including DAA performance--particularly at high encounter volumes and over extended periods of time. Such industry-provided modeling and simulation data has the potential to support broader analyses of airborne collision risk of various types of systems by the FAA.
6. To facilitate the most accurate and robust traffic characterization, analyses, modeling and simulation, the FAA should provide access to relevant and appropriate air traffic data to support the development of safety cases for BVLOS operations.
7. The FAA should continue their engagement with, and funding for, FFRDCs and other neutral organizations to further develop models of aircraft behavior and airspace risk for use in development of DAA systems and safety cases.

8. As the FAA evaluates proposals for BVLOS operational approval, they should continually identify and share models, best practices, evaluation criteria and assumptions with industry.
9. To increase situational awareness and safety of flight at lower altitudes, and in alignment with recent safety research results[5], the FAA should strongly support efforts to encourage and incentivize voluntary adoption and use of ADS-B.

<u>Reference</u>

Recommendations on how to accelerate existing environments and technologies that support BVLOS/DAA, Specifically ADS-B / Mode-C Veil and related.
Could include things like:

1) Right of way and yielding (FR2.2) (FR2.3)

[5] Howell, Daniel and King, Jennifer (Regulus Group). "Measured Impact of ADS-B In Applications on General Aviation and Air Taxi Accident Rates." Paper presented at IEEE/AIAA 38th Digital Avionics Systems Conference, 08-12 September 2019

2) Define “adequate separation” (FR2.1)
3) Define and assess acceptable level of risk (the airborne part of AG2.1)
4) Include Datasets and Analyses for crewed aircraft presence and collision risk
5) Could build off work of TG11 for risk level

Subgroup 3 - Ground Risk

Key Assumption

This is a Part 108/Part 91 discussion, not a Part 107 OOP discussion. It is a ground risk discussion for Part 135 operational approval and Part 91 waivers/exemptions under 44807

Problem Definition

Despite feedback from industry over multiple years (DAC TG11, BVLOS ARC, etc.) the FAA has not published an accepted target level of safety applicable to BVLOS commercial operation of small UAS. This lack of clarity creates uncertainty and inefficiencies in the current process. Companies and standards bodies organizations lack guidance on design targets and demonstration of compliance. There is ample evidence that existing rules and the UAS type certification process and their implementation are unable to unlock scaled operations over people in a business viable way. Rulemaking and industry will continue to be hindered by the lack of an established acceptable level of risk (ALR) / targeted level of safety (TLS).

Additionally, the FAA’s current approval criteria and evaluation processes are not available to the public. Industry may submit applications that do not conform to the FAA’s internal expectations, requiring significant time and resources on both sides for iteration on the smallest of approvals. Also, without disclosed approval criteria and standardized process, industry receives highly variable feedback, which can be unrelated to safety or not risk appropriate and often seems to depend on the personal preferences of the individual’s assessors at the FAA. This slow and iterative process can last for many months or even years, and is unsuitable for an industry with many different use cases using rapidly advancing technology.

Key goals, desired outcomes:

- A publicly available standardized approach (quantitative and qualitative) to addressing ground risk to reduce FAA’s resource burden and expedite scalable BVLOS operational approvals by giving companies clear guidance on the FAA’s requirements.
- Identification of opportunities to align on data sources, guidance, or best practices (e.g. \how much credit can applicants get for sheltering)
- Leverage learnings from D&R to align on 44807 exemption applications.

Key challenges/considerations to overcome:

- Data - Industry not well positioned to provide and the FAA hasn’t been effective in the past in making it available for operators to use.
- Methodologies/calculations - Several frameworks and methods exist and have been used successfully by industry and other jurisdictions, but these haven’t been consistently applied to waiver decisions in the past.
- Templates and Standards - Are helpful to industry and can promote safe design and operation, but without clear acceptance guidance from the FAA, companies are hesitant to spend resources on something the FAA may or may not find acceptable.
- Resourcing - Competing resources for processing existing applications/requests v. creating policy/guidance/rules

Proposed Solutions

1. A publicly available, standardized methodology for addressing ground risk for current process waivers, exemptions and other authorizing instruments should be made available. This will reduce FAA's resource burden and expedite scalable BVLOS operational approvals by giving companies clear guidance on the FAA's requirements.
    a. Quantitative and qualitative approaches should be supported by the methodology.
    b. Both components of risk - likelihood and severity - must be considered to determine if risks are sufficiently mitigated.
    c. Existing acceptable mitigations and acceptable inputs and data sources should be clearly defined.
2. The Department of Transportation should define the ALR/TLS for ground-risk for drone operations, considering non-aviation modes of transportation that drones may supplement or replace as per DAC TG11 report.
3. To provide consistency to approved operations, templates-also known as standard scenarios or pre-defined risk assessments-should be made available to standardize waivers and exemptions to the current rules and to future waiverable rules.
    a. These should take the form of checklists and other guidance based on the existing effective mitigations accepted by FAA in previously granted waivers (e.g. C&Ls)
    b. These should leverage the risk assessment methodology to validate the acceptability for waiver operations (which may have different thresholds than operations by rule).

Background

Relevant ARC Recommendations

	Air and Ground Risk Recommendations
AG 2.1	The acceptable level of risk (ALR) for UAS should be consistent across all types of operations being performed, and no more restrictive than the accepted fatality rates of general aviation.
AG 2.6	The rule should allow UAS to conduct transient flight over people. The rule should allow sustained flight over non-participants with strategic and/or technical mitigations applied.

Previous DAC Recommendations

TG11 Final Report –
https://www.faa.gov/sites/faa.gov/files/uas/programs_partnerships/advanced_aviation_advisory_committee/previous_dac_meetings_and_materials/Public_eBook_10272021.pdf

Section 3.0 Proposed Approach to UAS Safety

DAC Task Group 11 asserts that a successful UAS Safety Framework should be:

1. Clear: Easy to understand, easy to implement, easy to measure.
2. Consistent: Key metrics remain stable and are applicable across the entire UAS industry.
3. Useful: Meeting metrics allows a broad range of use cases, operational environments and platforms.
4. Effective: Achieve a sufficient level of safety such that the public trust is honored and maintained.

Ground Risk: Risk posed by UAS operations to 3rd party persons on the ground (the general public). Participating ground stakeholders such as operators, customers, etc. are presumably aware of and accepting of the potential additional risk. Additionally, participants can mitigate risks in ways not expected of the public, such as personal protective equipment (PPE) and training. **Ground risk should be expressed as fatalities per flight hour**, with acceptable rates similar to:

1. The risk posed by GA aircraft to 3rd parties on the ground, as this an appropriate aviation-equivalent risk; and

2. Ground vehicle fatality rates, as this is a common risk society is familiar with and currently accepted on a large scale. This approach also provides the benefit of equivalent risk to the mode of transportation that the UAS operation is replacing for many use cases.

3.2 Proposed Ground Risk Target Level of Safety

As described above, the following two rates are the most appropriate and relevant measures of risk that should be accounted for:

1) The risk posed by GA aircraft to 3rd parties on the ground. This is the most directly comparable aviation risk, and most likely a conservative one, as UAS are expected to provide services and goods that directly benefit the communities they fly over in more convenient and tangible ways than GA aircraft have historically been able to provide. The historically accepted value is calculated to be around 1 ground fatality per 1,000,000 flight hours (1E-6), see Appendix 1 for details.

2) Ground vehicle fatality rates. As many UAS operations will replace ground vehicle trips or prevent or mitigate humans placing themselves at risk to perform certain tasks (such as inspecting bridges or towers), it is appropriate to compare the societally accepted levels of risk for ground vehicle operations. This value is calculated to be around one fatality per 1,000,000 "flight" hours (1E-6), see Appendix 1 for details.

Using these twin concepts of 3rd party risk and ground vehicle risk replacement, a value of one 3rd party ground fatality per 1,000,000 flight hours (1E-6) is a justifiable and appropriate target level of safety for all UAS operations.

As conservative assumptions will be used in the definition of standard scenarios and calculations of the target level of safety, and each UAS operation is expected to meet or exceed the TLOS, when aggregated across the industry, it is expected that the total safety rate for all UAS operations will exceed is better than the expressed TLOS. This phenomenon has been seen in traditional aviation and is how the current UAS industry is performing (0 fatalities in 10's of millions of flight hours). In addition, large volume Part 135 operators should track all UAS safety events (i.e. loss of control) in a Safety Management System (SMS) and compare the actual rate with the expected rate to verify they are at or better than the rate needed to meet the operation's TLOS.

3.3 A Proposed UAS Safety Framework

Risk assessments using these safety metrics must account for all the relevant factors, not just traditional aircraft metrics.

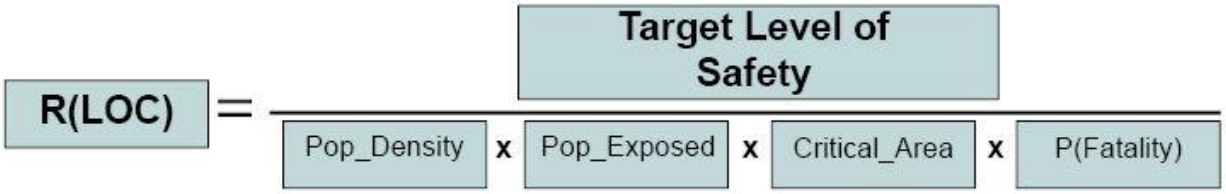
For Ground Risk this includes:

1. Probability of an impact in an uncontrolled area (loss of control)
2. Probability of contacting a 3rd party in the event of an impact (driven by factors such as population density, shelter factors)
3. Probability of fatality in the event of a collision with a person

By accounting for all the factors that make up these risks, operators can use unique and novel approaches to mitigate them, as long as the final "rolled up" risk value is equal to or less than the acceptable level. This approach supports minimizing additional mitigations where they are not necessary to achieve the target level of safety, such as flights in very low risk airspace (e.g., shielded areas) without the need for active DAA.

3.3.1 Ground Risked Based Approach

With an acceptable target level of safety (TLOS) determined, an overall operational loss of control rate, R(LOC), can be calculated using the below formula and taking into account the specifics of the aircraft and the operational environment. This loss of control rate includes both operational and technical reasons for the failure. See Appendix 1 for more details on the calculation. Notice that the ConOps purpose of the flight of the operation is not relevant to the ground risk calculation:



Where:

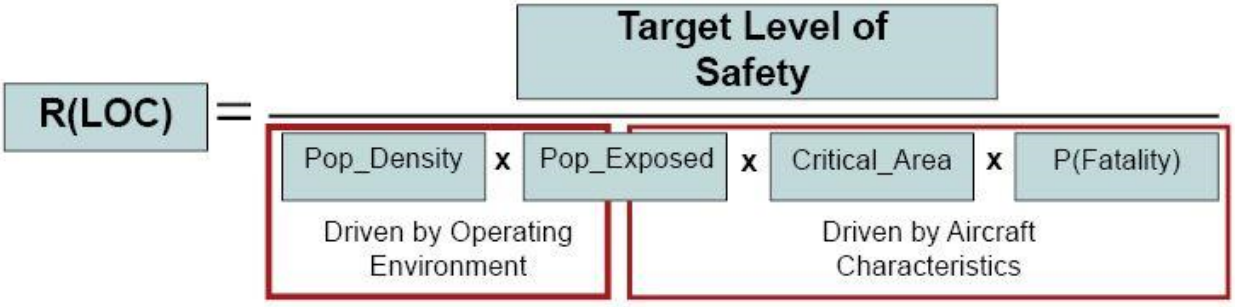
- **Pop_Density is the population density being overflown**
- Pop_Exposed is the proportion of the population exposed to a UAS impact and is equal to (1 - sheltering factor)
- Critical_Area is the size of the area on the ground of the UAS impact
- P(Fatality) is the probability that a person would be fatality injured if impacted by the UAS

Furthermore, the R(LOC) can be divided into operational and airworthiness components which can be attached to qualitative risk-based requirements based on their respective values, consistent with standard practices as is done in traditional piloted aviation (similar to the current FAA AC 23.1309 process and standards). This approach is currently used in the Joint Authorities for Rulemaking of Unmanned Systems' (JARUS) Specific Operations Risk Assessment (SORA) with high levels of success. See Section 3.3.1 for additional details on this process. The Task Group thus recommends the FAA adopt a US- customized, SORA-like approach to UAS approvals outside of 107 operations or new regulations. In addition, the task group recommends adopting a set of standard scenarios or pre-defined risk assessments (PDRA's) for common scenarios/operational characteristics. This numeric approach also allows for quantitative analysis to be used as an acceptable means of compliance for novel operations to show an equivalent level of safety.

Because there will be different acceptable loss of control rates, R(LOC), based on the aircraft type and environment, it is recommended to create a unique set of risk based regulatory requirements for these different levels. This process can be modeled off the Specific Assurance and Integrity Level (SAIL) and corresponding Operational Safety Objectives (OSO) concepts in the SORA.

3.3.2 Translating Ground Risk to Operator and UAS Requirements

The goal of this section is to show how an applicant and the FAA can use details of the operating environment and the aircraft to derive a risk-based set of requirements for the operation in an effective and straightforward way[6].



[6] This process has been simplified for illustrative purposes. The actual process would involve many more aspects of the flight operation and UAS, such as maintenance, design, external systems, etc. For a more detailed example of this process in use, reference the JARUS SORA.

In the loss of control equation above, the Target Level of Safety is a constant and the variables in the denominator can be broken apart to be functions of the operating environment and aircraft characteristics. The population density and what percentage of them that are exposed to the operation are related to what the UA is flying over. The size of the impact area, lethality of the aircraft and how well sheltering works are a function of the size, weight, and speed of the aircraft. For classification purposes, the aircraft characteristics can be represented by a top-level representative value such as wingspan, maximum cruise velocity, mass, or kinetic energy and the operating environment by population density modified by exposure/shelter factors.

A straightforward SORA- like matrix can then be created where the combination of population density (for the example we will use generic descriptors of Low, Medium, and High; and the representative aircraft characteristic (for the example we will use generic descriptors of: Small, Medium and Large) can be used to determine the acceptable rate of loss of control. An example matrix is shown below:

Sample SORA Like Matrix		**Aircraft Characteristic**		
		Small	**Medium**	**Large**
Population Density	**Low**	R(LOC) = 1E-1	R(LOC) = 1E-2	R(LOC) = 1E-3
	Medium	R(LOC) = 1E-2	R(LOC) = 1E-3	R(LOC) = 1E-4
	High	R(LOC) = 1E-3	R(LOC) = 1E-4	R(LOC) = 1E-5

Once the operator determines the final acceptable loss of control rate, qualitative requirements can be created that are commensurate with that rate, as shown in the example table below:

	"Level of Requirements"	
R(LOC) - Acceptable Loss of Control Rate	**Operator**	**Aircraft**
R(LOC) => 1E-1	Low	None
1E-1 > R(LOC) => 1E-2	Medium	Low
1E-2 > R(LOC) => 1E-3	Medium	Medium
1E-3 > R(LOC) => 1E-4	High	Medium
1E-4 > R(LOC)	High	High

A set of sample requirements could be:

- Operator
  - Low - Part 107 License
  - Medium - Part 107 License + Verified Procedures
  - High - Part 135 Operator
- Aircraft
  - Low - Self Declared Airworthiness + submission to FAA of key safety data
  - Medium - Special Airworthiness like process
  - High - Type Certified (TC) Aircraft

So as an example, if an operator wanted to fly over a "Medium" population density with an aircraft with a "Medium" aircraft characteristic, they would be expected to maintain a loss of control rate better than 1E-3 per flight hour, which would correspond to medium operator requirements (Part 107 License + Verified Procedures) and medium aircraft requirements (Special Airworthiness like process).

Having these quantitative loss of control rates allows standards organizations and the FAA to create guidance, standards, standard scenarios, and regulatory requirements that are risk appropriate for the operation. This is, similar to what has been done successfully in traditional aviation. If an operator has a novel operation that falls outside of this structure, the numeric loss of control values provides the operator with a target for a quantitative assessment as a means of compliance.

Current Operational Approval Ground Risk Conditions and Limitations

Current operational approval conditions and limitations prohibit overflight of certain buildings and locations. These seem to be driven by perception of risk versus actual real safety risk, leaving industry with the problem of how to best account for shelter factors and other mitigation measures in planning flights to minimize ground risk.

SORA

Industry also suggests the FAA consider adopting the SORA, a regulatory process developed by JARUS, in which the FAA is an active participant, for low and medium risk operations for waivers to current and future regulations (Part 108, Part 91, etc.). The SORA has been safely and successfully adopted in many nations and jurisdictions, resulting in scaled safe operations far beyond what the FAA is approving today. Industry believes the FAA could significantly advance the state of the US drone industry by leveraging what has been already proven in other jurisdictions. Additionally, adopting the SORA would dramatically improve the competitiveness of US companies internationally as they are able to use the same approval documentation worldwide. Finally, this should also result in resource savings for the FAA, as they will be able to partner with other nations to transfer airworthiness and operational approvals, as is done in crewed aviation.

Subgroup 4 - Rules/Regs and Process Definitions

Problem Definition

Key goals, desired outcomes

- Streamlined/expedited Part 91.113 waiver process.
- Clarification on how to meet 14 CFR 11 requirement that safety not be adversely impacted/is equal to rule seeking exemption against
- Streamlined/expedited BVLOS exemption process.
- FAA and other federal agencies need to adapt their NEPA policy and implementation procedures to address drone-specific actions.

Key challenges to overcome

- Ambiguity in decision making authority; FAA Office of Primary Responsibility relies on inputs from multiple lines of business which have defacto "veto" power
- Internal coordination and review process is opaque. Applicants often get asked the same questions from multiple lines of business, which delays progress.
- Critical steps in approval process are not time-bound. Applicants cannot make key business decisions when timelines are indefinite.
- Changes in policy are not effectively communicated (e.g. BVLOS Operations Issue Paper process required for early applicants with no perceived benefit).
- Current gaps in FAA policy include documented noise data collection guidance, specific language in agency NEPA Orders and Implementation Guidance related to drones, and identification of drone-specific

actions where a Categorically Exclusion (CE) may be prepared instead of an EA (e.g., low volume commercial operations, infrastructure inspections, sites within a defined industrial site)

- The lack of documented NEPA procedures and guidance has created an inefficient process and ambiguity for operators. Schedule clarity is essential to operators, yet there is no commitment to timelines as FAA is still determining internally how to approach project-by-project reviews.
- No objective criteria/basis for cert & airworthiness

Proposed Solutions:

1) Streamlined/expedited Part 91.113 waiver process to ensure ***acceptable*** safety levels met:
   a) Leverage already approved waiver applications with focus on process path rather than specifics of the waivers (although they will be informative).
   b) Develop guidance materials for applicants
   c) Obtain inputs from FAA on how they normalized waiver process- derivative of how they normalized the Part 107 waiver process.
   d) Capture guidance from already approved Operational BVLOS Issues Papers.
2) Clarification on how to meet 14 CFR 11 requirement that safety ***not be adversely impacted***/is equal to rule seeking exemption against:
   a) Clarify safety criteria & requirements in support of BVLOS operations
   b) Develop guidance template for applicants with focus on qualitative approach to operational mitigations (although quantitative analysis can be incorporated).
   c) Leverage SORA-"Like" process that quantifies ground/air risk as means to demonstrate safety case is met for low/medium risk BVLOS operations (e.g. SORA/SAIL)
   d) Alignment with international framework and current approvals (e.g. P107/P91)
   e) PDRAs
3) Streamline/expedite BVLOS exemption process:
   a) Develop guidance materials for applicants
   b) Pre-draft exemption language to avoid duplication
   c) Seek industry trade group hosts (HAI, AUVSI) to submit exemption for BVLOS specific items on behalf of applicants that can then be referenced in lieu of individual submissions for common areas where applicants seek relief against rulesets.
   d) New entrants to market- primer on standards (DOC/audit)
4) Develop a CE checklist specific to drone-related actions will help Flight Standards more efficiently review a proposed operation and determine if the action qualifies for a CE.
   a) FAA could also implement a short form EA to facilitate reviews in a more efficient manner.
   b) FAA could coordinate with federal resource agencies to consider the potential for impact to species and other resources and approaches to streamline their reviews (e.g., develop a repository to documents that may be referenced in future reviews such as USFWS concurrence letters related to a particular species).
   c) Recommend additional use of qualified consultant support to develop policy guidance, templates and tools for screening proposed actions/determining the appropriate NEPA class of action, and supporting FAA with documentation.

RECOMMENDATIONS REPORT –Task Group #15: Drone Community Engagement Lessons Learned/Best Practices

TG15 - Community Outreach Recommendations

Executive Summary

Introduction to Community Outreach

- What is Community Outreach
- Key Principles of Community Outreach
  - Educate Transparently & Honestly
  - Listen with Humility and Empathy
  - Respond Actively
- Key Concerns to Address
  - Safety and Risk Management
  - Privacy
  - Noise & Environmental Impact
  - Economic & Public Impact

Building an Outreach Plan

1. Define Core Operational Attributes
2. Identify Stakeholders
3. Create Outreach Content
4. Develop an Outreach Plan
5. Perform Monitoring, Assessment, and Follow Up

Stakeholders to Consider

- Federal Authorities
- Local Authorities
- Community Groups & Organizations
- General Public
- Aviation Groups / Other Airspace Users

Use-Cases / Industry Specific Recommendations

- AAM:
- Public Safety:
- Film and Television
- First Person View (FPV) Operations

Report Commentary

- Hosting this Report
- Availability and Publishing

Updating

Members

SMEs

Executive Summary

Task Group 15 was tasked to make recommendations on lessons learned and best practices related to drone and advanced aviation community engagement methods. The recommendations were to identify specific aviation operating sectors and their related community engagement methods. Task Group 15 created a recipe for operators to build an outreach plan to enable those operators to create a plan that can be tailored to their specific operations. The group also identified key stakeholders and methods of communicating with the stakeholders that may benefit from communication from the Federal Aviation Administration (FAA). Members also felt that it was important to outline some sample use cases, industry specific recommendations, to demonstrate the variety of stakeholders to consider.

Community outreach is an essential aspect of building positive relationships between aviation operators and the communities in which they operate. It can help to create a better understanding of the benefits and risks associated with these new technologies, and ensure that community concerns are addressed. The following are some of the common best practices for aviation operators to conduct community outreach:

Identify Stakeholders: aviation operators should identify key stakeholders in the community, such as local government officials, community leaders, and residents, and engage with them on a regular basis.

Develop a Communications Plan: A clear and concise communication plan should be developed to ensure that stakeholders are informed about the aviation operators' operations and plans.

Provide Education and Training: aviation operators should provide educational materials and training programs that explain the technology, operations, and safety procedures to the community.

Address Community Concerns: Aviation operators should address community concerns about privacy, safety, and noise pollution by providing transparent information and actively listening to feedback.

Collaborate with Local Organizations: Aviation operators can collaborate with local organizations such as schools, non-profits, and community groups to promote the benefits of drone technology and develop partnerships.

Promote Environmental Responsibility: Aviation operators should promote environmentally responsible practices by minimizing noise pollution and avoiding sensitive ecological areas.

By following these best practices included in the report, aviation operators can develop positive relationships with the communities they serve, build trust, and promote the benefits of aviation technologies while addressing concerns and mitigating risks.

Finally, Task Group 15 recommends that these best practices be updated on a regular basis as technology and societal perspectives change.

Introduction to Community Outreach

What is Community Outreach

Aviation technology and applications are developing rapidly. As with most new technologies and operations, a lack of understanding and awareness by community members can often lead to skepticism, fear, or rejection. However, aviation operators have tremendous opportunities to address these awareness gaps with proper outreach and information sharing. Community outreach is essentially starting a conversation with affected communities, where parties can listen and respond to questions, concerns, and developments – and this is what ultimately builds trust.

The most basic approach to community outreach is as follows:

1. Consider your community stakeholders. These can include:
    a. Those from whom you need formal permission;
    b. Those whose acceptance is needed (i.e., members of the general public);
    c. Those who will be impacted, whether on the ground or in the air; and
    d. Anyone else or other entities whose support is beneficial to your operation, such as community groups, business groups, or officials of the city/county etc.

2. Meeting or otherwise sharing information with your stakeholders and providing them the necessary awareness up front.

3. Listening and responding to feedback, and ensuring you can be contacted if needed.

Consider an example of a drone operator performing a house rooftop inspection for an insurance company. If a neighbor sees or hears the drone, they may be concerned and have questions. The situation can often be handled satisfactorily If the drone operator is prepared to say where they're from, what they're doing, what approvals/authority they have, and provide a business card or contact info for further questions.

In many smaller operations, this minimum example of “outreach preparedness” is sufficient. For larger operations, or operations that may persist over an extended time or affect a larger population, consider developing a more robust outreach strategy. If the operation’s impact on the community is larger, your outreach efforts should be larger as well. And since one single approach rarely works for everyone, it is best to use multiple methods to educate and inform while providing multiple sources for community members and stakeholders to ask questions along the way.

Key Principles of Community Outreach

While every operation is different and requires various levels and approaches to outreach, there are a few key principles that are common:

Educate Transparently & Honestly

The main goal of outreach is to bridge the gap in awareness and understanding. Therefore, a key principle of successful outreach is educating your stakeholders about the technology, its application, its potential impacts and the operation you intend to perform. When sharing information and answering questions, it is important to do so transparently. Honesty goes a long way to building trust and acceptance. This means you may have to admit when you don’t know an answer, or accept valid concerns or ideas raised by the community. You may even bring up potential negative impacts but outline how you plan on mitigating them. Outreach efforts are generally not concluded in a single conversation, so honesty and transparency is a better long term investment than guessing, speculating, or obscuring any particular bit of information. Remember that trust is an easy thing to lose but hard to gain.

Remember that in addition to educating about the technology and operation, it is also valuable to include the benefits a community may see from the technology. And beyond direct benefits, many drone and AAM operations have numerous secondary benefits, like reducing road congestion and being kinder to the environment.

Listen with Humility and Empathy

A goal of successful outreach is to build trust and acceptance, as well as to adjust to community concerns and needs as the operation progresses. This requires a proper two-way conversation between the operator and the community. So listening is just as important as speaking. When having direct conversations with members of the community, stay open to feedback and ensure time and space for comments and questions to be raised. Humility is another great attribute here, as there is often much to learn from the community about how to perform a successful operation that reduces negative impacts while providing the most value. Additionally, listening can continue outside direct conversations – consider sharing contact information or publishing a feedback form on a website so you can always be hearing from the community.

Respond Actively

With new technology and operations, one of the largest concerns by community members is simply that their voices and preferences will not be heard. Building trust and support with a community requires active effort and ensuring they see that their input is heard, understood and valued. To that end, it can be helpful to manage your outreach efforts somewhat formally, keeping track of any ideas, suggestions, and comments received, and keeping a record of any responses you send or follow-up meetings you hold. Actively highlight community suggestions that you have adopted.

As you engage with the community, you will find certain contacts and information channels will be a good source for sending regular updates and information about your operations. Remember that the more intensive and lengthy your operations, the more effort you should spend on engaging and responding to the community.

Language also matters. Make your communications easy to understand and relatable. Do not use acronyms or use technical speak. Your audiences will vary greatly and you want to ensure that as many people as possible understand.

Key Concerns to Address

Not all communities will be the same, and each may have particular concerns to discover and address. However, from the experience of the drone and AAM industries to-date, a few concerns are often raised and worth preparing for.

Safety and Risk Management

With drone and AAM activity increasing, the general public is understandably concerned about the safety and the risk of these new flying machines operating above them.

- Approaches to address:
    - Use your relational experience. Many people fear that a flying machine will come crashing down and hurt their loved ones. Come from a perspective of empathy in that you understand their fears and would have the same if you were in their shoes. Go onto explain what safety measures have been taken. Make sure not to write or speak in engineering or acronyms.
    - Where appropriate, you can lean on the reputation of regulators. If you had to earn specific operational approvals, mention that in your outreach, and talk about the high standards of aviation safety and risk assessments.
    - Emphasize safety as a priority in your general communications.
    - It can be helpful to communicate with comparisons to make concepts relatable. Commercial aviation is essentially the safest mode of transportation due to the high standards of aviation, and you can compare your system to existing aircraft your audience may be more familiar with.
    - Showcase your historical operational safety experience including testing.

Privacy

Privacy is one of the most often repeated concerns, perhaps second only to safety. To date, the closest exposure people have to aircraft is generally at an airport. Drones and advanced air vehicles are now bringing aviation right into neighborhoods and even people's backyards! This creates understandable concern about what imagery and data is being collected.

Start by taking privacy concerns seriously in your operation. Don't collect any more data than is necessary, and be sure to research and follow the privacy laws in your region.

Additionally, like most topics, it can help to shed light on the issue by not hiding your privacy approach, but being transparent about it. If applicable, create a privacy policy and have it posted and accessible on your website. If your operation does collect imagery or other data, it can be helpful to show examples of the type of information you're collecting, and how you protect any private information of residents and property.

Noise & Environmental Impact

In many cases, drones are operating in places that traditionally haven't been transited by vehicles. People are well familiar with noise from cars on a road. But a drone over their head is not just a new sound, but also a new *location*. It's important to be sensitive to noise and nuisance complaints. However this is also a challenging area because it can be quite subjective (one person may not mind or notice, whereas another may be bothered).

First, it's helpful to prepare by actually understanding what type of impact you will have. Measure the sound produced by your operations and have this data available when needed. Also check local noise ordinances and ensure you comply. Further, it can be useful to find some similar comparisons – maybe you have a small drone that is barely audible; or perhaps a larger one that sounds more like power landscaping equipment. Regardless, having some similar comparison points will help you understand the public's expectations. Louder operations need to be more sensitive to the usage duration and time of day.

Generally, in the aviation industry experience to date, noise and nuisance issues can be some of the most challenging to overcome, especially given the subjectivity of the issue. For this reason, for any operations over an extended period, be prepared to devote a significant portion of your efforts to addressing this issue. It can also be wise to incorporate this consideration when planning your operation – generally, choosing less noise-sensitive areas can be helpful.

Address issues of equity. There are concerns among some that there are disparate impacts on their communities. Ensure you are able to address these issues and concerns equitably and with dignity. Consider these issues when choosing sites for operations.

Economic & Public Impact

When launching a new operation, consider the economic and public impact. New technologies often bring immense value and positive impact, but also bring changes and adjustments to the

usual way of doing things people are familiar with. Some helpful ideas to consider for your outreach efforts are:

- Businesses who may be impacted positively or negatively by operations.
    - "Competing" forms of transportation - who may lose business? and/or what businesses could benefit from the service?
    - "Conflicting" forms of transportation - who may have operations impacted. For example, adding a vertiport to the top of a building may impact curbside activities outside the entrance including parking and bus transit lanes.
- Public agencies, including departments of transportation.
    - How does advanced aviation fit into a greater statewide or local transportation plan?
    - Are there impacts on infrastructure needs?

Building an Outreach Plan

Following is an outline to help you create an outreach plan matched to your intended operation.

1. Define Core Operational Attributes

First, define the core attributes of your intended operation. This information will help you decide how to approach community outreach, as well as form the basis of the information you provide your stakeholders.

a. Scope of the operation (timeline/duration, area and people impacted, frequency of flights, etc).
b. Your own goals/purpose of the operation (is this for commercial gain, research, trial/demo, etc)
c. What parts of your operation are flexible, vs which are not. This helps you be prepared to handle feedback and requests.

2. Identify Stakeholders

Next, assess the various stakeholders (i.e., anyone impacted/affected/related to the operation). For additional information on identifying possible stakeholders, please see the stakeholder section further below.

a. Authorities and policymakers– be sure to know what entities may have direct or indirect authority over your operation, and if any prior approval is necessary.
b. Spokespeople – anyone who may be called upon to speak about the operation (either intentionally or unintentionally! Example: local law enforcement agencies are often the ones who receive calls from citizens if they see an unfamiliar drone flying around – it is recommended to inform entities like local law enforcement so they have some understanding of your operation and can speak to any concerned citizens).
c. Interest groups- those who represent groups and may have influence with authorities and policymakers.

d. Those impacted directly from your operation, both:
    i. Possible detriment/concern (consider environmental/noise impact, as well as economic and other forms).
    ii. Possible benefit (those who realize value from your operation).
e. General public or wider community

3. Create Outreach Content

Next, prepare to outreach by creating the content & information you'll need.

a. **Required information**. At minimum, you should be prepared with the following:
    i. **Operator/Company information** – who you are, or the company you're representing. If you have any operational flight history or hours of experience, this can be helpful to share as well.
    ii. **Brief operation summary** – a description of the intended operation, i.e., what you will do.
    iii. **Purpose/Goals** – the reason behind the operation. It helps to focus on the benefits of your operation, including any positive value to customers or community.
    iv. **Authority/Permission** – What approvals/licenses you have, as well as additional permits/approvals you may be seeking (more on this in the stakeholder handbook).
    v. **Contact Info & Expectations** – How can someone get in touch with you/your company if needed, and when should they expect to hear updates from you on the operation?
b. **Additional information**. For many stakeholders and outreach efforts, it will be helpful to have the following additional information at hand:
    i. **Background contextual information** – this can include items to make the audience more familiar or comfortable with the operation. For examples, things like how many similar drone operations have occurred to date, as well as alternative methods that may not be as desirable (for example, many drone operations would otherwise be performed with larger crewed aircraft/helicopters).
    ii. **Benefits** – many drone operations have widespread benefits over the alternatives, from being safer and cheaper, to having less impact on the community and environment than larger vehicles/aircraft.
    iii. **Contingency Information** – Not all operations go as planned, and if you foresee any potential outcomes that could be concerning, it is helpful to prepare communication information and points of contact ahead of time so you're ready. This could include any operational or safety incidents, as well as disruptions in service or changes to the plan.
    iv. **Opportunities to showcase operations.** Seeing is believing. Demonstrating your drone operations will answer more questions than simply speaking about them; and seeing things first hand is another great way to build familiarity and awareness.

1. Invite the organization leaders and their members to tour the facility and/or have a visual experience with the technology.
   Example: consider hosting an “Open House” event for local community members to informally stop by the facility and create familiarity with the operations and meet the operators.

4. Develop an Outreach Plan

As you create an outreach plan, consider contacting stakeholders in the following order. Not only does this order help set everyone up for success, it also saves the more resource-intensive outreach to the broader general public until the end, when you have more certainty of your plans.

a. **Authorities and policymakers.** It’s often best to begin with stakeholders that have authority over your operation (either directly as an aviation regulator, or indirectly as an authority over the community/region of your operation). Not only does speaking with them first show due respect for their position, it also allows you to make any necessary adjustments to your operation before you finalize plans and make any other public commitments to others.
b. **Spokespeople.** Next, consider those who may be called on to speak toward/about the operation. This includes both intentional speakers (like partner organizations), as well as unintentional speakers (like local law enforcement, town councils, or community groups who may end up receiving phone calls and questions from the general public). By outreaching to these stakeholders up front, you are helping them be successful by providing necessary information, rather than potentially putting them in a tough spot if they don’t know who you are or what you’re doing.
c. **Directly affected parties.** This could include your customers, neighbors, communities being overflown or nearby the operation, etc. The general principle here is that these parties should “hear it from you first” before wider communication to the general public (if any). It’s also critically important that these directly affected parties know who you are and how to get in touch with you if any issues arise.
d. **General public / wider audience**. If needed, outreach to the general public or wider community at the end, after the above stakeholders are addressed.

5. Perform Monitoring, Assessment, and Follow Up

As the operation commences, it’s important to consider how you will maintain outreach and connection with the community. At minimum this can be done both reactively as new comments and questions arise. But you may also consider proactively sharing updates and additional information. Here are some tips for each:

a. **Reactive** – First ensure that you have communication channels in place and that you monitor them frequently. Maybe this was as simple as handing out a few business cards, or perhaps you set up a public webpage with a form for feedback and questions. Regardless, ensure you respond promptly and politely to any inquiries you receive. A quick response with adequate information goes a long way to build trust and acceptance.
b. **Proactive** – Especially for operations over a long duration, it is often helpful to provide proactive updates. This can take several forms, tailored to the specific stakeholder. For wider audiences and the general public, consider posting statistics of the operation on a webpage (for example, how many successful flights, what benefits have been realized, how many customers have been served, etc). For more targeted audiences, choose specific information that addresses their main concerns (examples: for aviation regulators concerned with safety, it's helpful to share the number of successful operations and any incidents or corrections needed. For town/city officials, they may be most concerned with the public acceptance rate, if there have been any complaints, and if that trend is increasing or decreasing, etc). If you have an operator on-site consider having the operator or a representative dress with a high visibility vest as an obvious contact person. During, and especially at the conclusion of the operation, be sure to thank the community and specific parties involved with the operation for their acceptance and the opportunity they provided.

Stakeholders to Consider

Below is a comprehensive list of possible stakeholders for community outreach. Not every operation will require engaging with every entity listed below. Consider your specific operation and the likely impact on the community, and use the information below to identify and prioritize which entities to engage.

Federal Authorities

Entities to Consider:

- FAA
- Federal agencies which the FAA works with and are relevant to your stakeholders.
- Tribal Authorities
- Congressional representatives

Reasons to Engage these Stakeholders:

- First and foremost, you must engage the controlling authority where permission is required. For UAS/AAM operations, this is often the FAA or land management agencies.
- Aside from any specific permission needed, it is often beneficial to engage and inform some federal authorities ahead of any large or new operation. Government representatives are often supportive when prepared with information ahead of time. By sharing details ahead of time, you can earn goodwill and support if any questions or issues arise in the future. In addition to relationship building and goodwill, many authorities will provide helpful suggestion and considerations for your operation. There is often a wealth of data and research that may support your operation directly, and/or be useful sources for your additional outreach efforts to other stakeholders. (examples: Independent testing, research, statistics, and governance rules on data handling).
- Effective public policy begins with open dialog, testing, and using data while addressing any concerns or questions being raised. Whether intentional or not, each aviation operation contributes to the overall sentiment and approach to future policy and regulations.
- Local Members of Congress can be helpful in dispelling myths about UAS, boosting local operations, and serving as a source to collect local sentiment and feedback
- Regional federal representatives will know the area you are operating in well, and can provide helpful introductions to community groups and potential partners
- DOD, DHS, and DOJ have many sensitive facilities. Communicating with them before operations can help alleviate any concerns about operations near these facilities.

When and how often:

- Engage the FAA and local FSDO before beginning or modifying any operations to ensure you have appropriate approvals; lay out your operating plan (Conops) and make clear that safety is the highest priority
- Communicate with Congressional representatives and other federal agency representatives before you launch operations, and then on a regular (monthly/quarterly) basis.

How to engage these stakeholders:

- Invite them to tour your operations and/or give them an opportunity to have a visual experience with the technology; emphasize your approach to safety and any Safety Management System (SMS) tenets you intend to employ.

- Maintain consistent communication with them and provide them with updates on new developments.

- Share press releases, local town hall/engagement opportunities, and news about your operations.

Local Authorities

Town/City/County leadership is a good place to start, as they will appreciate the awareness and also be able to direct you to other city offices that may require permits or approvals. Remember, while the FAA controls the airspace where drones fly, local governments often have authority over land use, especially if you're on public or commercial property for takeoff and landing.

- **Entities to Consider:**
    - Mayor's office
    - State and local transportation departments
    - Other Elected officials
    - State and local planning, zoning, and permit offices
    - Metropolitan Planning Organizations (MPOs)
    - Law Enforcement Agencies
- **How to contact:** Often a simple telephone call or e-mail will get things started, but if you have an extensive operation planned, it can be beneficial to meet face to face to better answer questions and explain your plans, as well as begin developing a relationship.
- **What to emphasize:**
    - For authorization/permits, focus on your operational goals, the value you bring to the community, as well as what justification you have for your operation (FAA approval, licensing, and prior experience, community desire, etc). If you're planning a larger operation, formal 3rd-party studies on impact and benefit can be a boost to engaging and earning the acceptance of local authorities.
    - Be prepared to address the usual concerns of safety, privacy, and noise, as well as additional concerns local authorities are sensitive to (equity and accessibility across community groups and regions, and any impact on existing community services and resources).
    - Speaking on your operation's behalf: with local authorities, not only might you be seeking permission to operate, you also may rely on city/county officials to speak about your operation. Local authorities often field questions from the general public, and if you adequately inform the authorities about your operation ahead of time, they can better handle inquiries and show their support.
        - This could be taken a step further. If the local authority is willing, they may be able to put up an informative page on their website to describe the operation and help field questions as well as publishing your organization's contact info. In general, the more channels and methods of visibility, the better.

Community Groups & Organizations

Community groups are an excellent source for direct outreach, as well as learning about other stakeholders, contacts, or particular issues and sentiments of the local residents. Often these groups have small-to-medium sized meetings and gatherings, which can be an excellent forum for presenting information and hearing from the community.

- **Entities to consider:**
    - Community Groups and representatives:
        - Rotary Club
        - Seniors/Retirement Community
        - STEM classrooms
        - Aviation-focused group meetings
        - Neighborhood/HOA meetings
    - Business/Economic Community Leaders
        - Chamber of Commerce
        - Economic Development Committee
    - Education
        - Schools, especially with partnership of local STEM-focused teachers
        - STEM-focused groups to advance the conversation around drones
        - Diversity-focused groups to ensure intentional communication to traditionally marginalized communities
        - Drone/robotics clubs
        - JROTC Programs, consider helping with their new drone curriculums
- **How to Outreach**
    - Consider presenting at local meetings and gatherings
    - Build web of connections by asking organization leaders to introduce you to their connections
    - Post information at gathering facilities, including local libraries, especially in underserved communities
    - Example: Local STEM teacher introduces Zipline to the local STEM Coordinator who can connect us to different events and fairs happening in the community.

General Public

- **When is outreach to the general public warranted?**
    - Broader outreach is useful when your operation will be broad, either across a wider region, or persisting over time. By operating in a community, you become a member of that community, and it is good practice to build relationships and communication channels to answer questions, address issues, and take feedback as the operation progresses.
    - In some cases, public outreach may be encouraged or mandated by other authorities (for example, city ordinances requiring public notice for new

operations). In this case, be sure to ask officials what they recommend for the most effective outreach.

- **Specific groups of the general public to consider targeting**
    - Neighborhoods and residents that will be most affected by overflights, noise, and the operation in general; consider local aviation community noise groups up front.
    - Residents that are best positioned to benefit from or participate with the operation
        - This could be region/area based, and/or
        - Groups that your operation is positioned to service (like commuters for AAM, or homeowners for drone rooftop inspections, as examples)
- **How to outreach:** There are many methods for reaching out to a wider public audience. Consider your operation and the level of impact and choose a method(s) that best fits. Make sure to keep messaging simple without acronyms or legalese. You will be engaging people with multiple viewpoints and educational levels. Below are suggestions from more targeted/personal to more widespread:
    - **Door knocking.**
        - Consider this method when your operation is small and will impact only a few people/houses. This is the most local method, where you can reach out to specific members of the public that you determine will most benefit from firsthand outreach.
        - **What to emphasize:** Observe local solicitation ordinances. If solicitation is welcomed, introduce yourself in a professional manner and what you'll be doing, and you want to inform them so they're aware and aren't surprised. It can be good practice to offer a business card or contact information if further questions arise. If your operation involves image gathering, also be ready to field questions about privacy and how that image data is handled.
    - **Targeted Mailers (or Digital Equivalent)**
        - This is less personal than a face to face approach, but still allows you to outreach to targeted areas, like a specific neighborhood or region. Consider this method when you will have light impact across a broader region, and/or if you need to solicit volunteers or customers to participate.
        - You can also use this method to send invites to local gatherings/events, described below.
        - In addition to mailing paper pamphlets, etc, many communities and neighborhoods have their own facebook pages or other online groups. Speak to community leaders to request permission to post information on these sites.
    - **Local gatherings.**
        - Consider setting up an information booth at local events or shopping centers. This doesn't directly target specific people/locations, but it is an often-preferred method of outreach since you allow those interested to approach you. It also shows you have a presence in the community, and

are willing to take questions and have conversations. This visible effort goes a long way to public acceptance.
    - **Mass broadcast.**
        - This is the least personal method, and is more useful if you're seeking wide approval or soliciting for participants or customers.
        - Check and see if there are any local newspapers or even neighborhood newspapers. There may be opportunities to have articles written about your operations that reach targeted neighborhoods.
        - In addition to traditional channels (TV/radio/etc), it is advisable to maintain an active social media account and interact with members of the public directly.
- **Additional notes:**
    - During engagement with the general public, it is helpful to keep records of what comments you've received, and how many positive vs negative. This allows you to monitor trends, and also share this data with city officials who will want to know how your operation is being received.
    - Collect feedback - it could be as simple as a Google Form or a small handout at the event - name, address, concerns, comments. Be proactive and ask for feedback and create a simple mechanism for collection of public input

Aviation Groups / Other Airspace Users

Entities to consider: the users of the National Airspace System, and the organizations that represent them, are diverse in size, speed, operations, equipment, and certifications. Due to the wide range of operators, it is important to know who, where, when, and how to engage and communicate with these important stakeholders.

- **Nearby airports**
    - **How to identify**: Everyone is familiar with large commercial airports, most of which can be found with a simple Google search. However, there are nearly 20,000 airports in the U.S., most of which are smaller airports and airfields (both public and private) that many people might not be aware of. FAA sectional charts, or searching an online maps program for airports, are a great first step in searching for airports.
    - **How to contact**: Often, contact information for an airport manager or owner will be listed directly on their websites. The next best source would be the FAA database, which provides the data to secondary resources such as www.airnav.com and the AOPA Airport Directory.
    - **What to emphasize**: Transparency and engagement is imperative. Operational plans and any effect on local and transient pilots and airport operations must be thoroughly discussed, and any risk mitigated.Determining the best methods to communicate and make airport users informed should be done closely with the airport manager/owner
- **Low altitude operators**

    - There are many different low altitude operations throughout the NAS. In a populated city or town, this can include news, military, police, and medical helicopters among others.
        - **How to identify:**
            - Start with the governing authorities and through them, identify public safety, medical helicopters as well as any unique-to-the-area low altitude operators helicopter training centers.
            - Include industry associations, regulator, training providers.
    - In rural areas, and less populated areas, this may include agricultural (crop dusters), and inspection aircraft (like power and oil lines).
        - **How to identify:**
            - Contact the National Agricultural Aviation Association https://www.agaviation.org or the Helicopter Association International https://rotor.org
            - Airport managers are also an excellent source of contacts for low altitude operators.
            - Outreach should also include regulator, training providers.
    - Additionally, in any low altitude airspace, consider if any recreational aviation activities occur nearby, such as general aviation, gliders, paragliders & hang gliders, hot air balloons, sky divers, etc. -
        - **How to identify:** Outreach to Industry associations, regulator, training providers (Aircraft Owners and Pilots Association, Experimental Aircaft Association, United States Hanggliding & Paragliding Association, United States Powered Paragliding Association)
            - Many of these organizations have local representatives. Check their website and start by contacting the national.
- **Industry Labor Organizations**
    - Important to bring in key front-line labor organizations who are very familiar with legacy aviation operating ecosystem.
    - Some examples include the Air Line Pilots Association, International, National Air Traffic Controllers Association, Allied Pilots Association, Airline Dispatcher Federation.
    - Having labor interests at the table from the beginning will allow for discussion and mitigation of concerns that will benefit long term operational goals.
- **Other drone users and hobbyists**
    - **How to identify:**
        - Low altitude drone users and hobbyists may be identified through
            - Contacting larger realtors to identify the leading drone real estate videographers. Also, the Drone Service Provider Alliance, https://dspalliance.org may have local contacts.
            - Contact local MultiGP clubs via https://www.multigp.com which has a national directory.
            - Contact local fixed wing or multirotor enthusiasts via FAA recognized Community Based Organizations including:

    - AMA, https://www.modelaircraft.org
    - Flite Test Community Association, https://ftca.flitetest.com
    - FPV Freedom Coalition, https://fpvfc.org
    - STEM+C, https://stemplusc.org
- sUAS over 250 grams manufactured after September 16, 2023 (deadline extended to December 16, 2023) are required to equip with Standard Remote Identification. All UAS over 250g flying in U.S. airspace (except in areas designated by the FAA as FRIAS) without Standard RID will be required to equip with a Broadcast RID beacon by September 16, 2023. Standard and Broadcast RID may be identified with mobile device apps such as AirSentinel.ai (Android, Windows), OpendroneID.org's app (Android only) or dronescanner by Dronetag (iOS and Android. iOS version does not receive Bluetooth 5, so the drone must be close).
- Local drone Facebook Groups, Discord Channels, Reddit Communities, and other social media sites. For Example: There is a hobbyist Facebook group called DMV Droners pilots with over a thousand local pilots who are not a group affiliated with sites like MultiGP, Drone Service Providers Alliance, or any of the CBOs.

Use-Cases / Industry Specific Recommendations

Most outreach efforts can be adequately crafted with the information presented above. However, certain specific use-cases and aviation applications have particular considerations beyond the more generic approach.

Captured in this section below are tips and suggestions for specific UAS/AAM applications:

AAM:

Advanced air mobility (AAM) is a broad concept focusing on emerging aviation markets and use cases for aviation in urban, suburban, and rural communities. AAM includes local use cases of up to about a 50-mile radius in rural or urban areas, and intraregional use cases of up to several hundred miles that occur within or between urban and rural areas. AAM enables consumer access to emergency and humanitarian services, air mobility, and goods delivery by dispatching or using larger aircraft and enabling technologies through an integrated and connected multimodal network. While the general principles of community outreach described above apply to AAM as well, this section considers the aspects of community outreach that are unique to commercial operations of these larger aircraft.

In general, AAM operations differ significantly from sUAS operations from the community's perspective. The aircraft are larger and more visible, the operations are ongoing, operations include (mostly) permanent physical infrastructure, and operations require significant amounts

of resources such as energy and data communications networks. Additionally, there will be larger numbers of community members that use AAM, either as passengers or as recipients of cargo delivery, and there will be larger numbers of community members who do not use the service but are impacted by it.

Though there may be some unique AAM operations that have limited impact on the community (e.g., corporate campus links, hospital-to-hospital transportation), the larger deployment of AAM will require long-range planning and extensive infrastructure such as a network of take-off and landing facilities; charging/fueling capabilities; funding; institutional support; and other enablers that will likely require public resources. While public outreach will be a necessary component of this planning effort, commercial AAM operators should begin by engaging the relevant public agencies before engaging the general public. The number and variety of stakeholders involved in, influenced by, or affected by AAM are greater than that of traditional aviation, and of the sUAS industry. Broadly, these stakeholders include federal, state, and local lawmakers and agencies; infrastructure owners and operators; emergency services; commerce and industry; mobility and app service providers; and the public (both users and non-users). These stakeholders can play a crucial role establishing strategies, policies, and regulations for AAM; integrating AAM into community planning and multimodal transportation networks; and providing AAM services, among others.

Common AAM stakeholders include the following:

- The Federal Aviation Administration (FAA) issues and enforces regulations covering manufacturing, operations, and maintenance of aircraft; certifies aircrew and airports; and researches and develops systems and procedures needed for safe and efficient air navigation and air traffic control.
- Other federal agencies could play an important role providing financial and technical assistance to state, regional, and local governments to support multi-modal transportation projects such as first- and last- mile connectivity to AAM facilities.
- State Departments of Transportation (DOTs) provide funding to plan, design, operate, and maintain aviation and surface transportation infrastructure. State DOTs also coordinate with other agencies that may have a role regulating or enforcing transportation safety, insurance, and standards.
- Metropolitan Planning Organizations (MPOs) are responsible for establishing regional priorities for federal transportation funding by implementing a continuous, comprehensive, and cooperative planning process. MPOs coordinate with state DOTs, local governments, public transit agencies, local elected officials, the public, and other stakeholders.
- Rural Transportation Planning Organizations (RTPOs) are multijurisdictional organizations of nonmetropolitan (rural) area local officials and transportation system operators that assist in non-metropolitan transportation planning processes.
- Local Governments are responsible for local planning, land use, building codes, environmental review and approval of development projects, economic development, local taxation, and collaboration with regional, state, and other government entities.

- Airports, Port Authorities, and Joint Powers Authorities are governmental or quasi-governmental public authority for a special-purpose district usually formed by a legislative body to operate ports and other transportation infrastructure.
- Emergency Services are responsible for ensuring public safety. This includes all the personnel who respond and are involved in preparing, managing, returning services, and cleaning up sites during and after an emergency.
- Air Carriers and Mobility Service Providers are responsible for providing AAM services. In some cases, AAM services may be integrated with other mobility services such as automated vehicles, carsharing, microtransit, public transportation, shared micro mobility, and transportation network companies (TNCs), among others.
- Apps, Mobile, and Data Service Providers include third-party information and communications technologies (ICT) that facilitate trip planning, booking/ticketing, payment, and navigation services. These can also include unmanned traffic management (UTM), providers of services for urban air mobility (PSUs), and other back-end services that help support operations planning, airspace management, and data sharing.
- Community Stakeholders include users of AAM, neighborhoods and non-users impacted by AAM, and community-based organizations that represent the interests of local interests and/or underserved communities and vulnerable populations.

As an emerging concept, AAM may present communities with an array of challenges such as concerns about safety and security; institutional readiness; sustainability; environmental impacts (e.g., noise, aesthetics, privacy, emissions, etc.); weather; infrastructure and multimodal integration; equity; and stakeholder and community engagement. In particular, a number of potential social equity concerns have been raised about AAM. For example, there are concerns that underserved communities and vulnerable populations may bear a disproportionate share of the negative environmental impacts of AAM, such as the impacts of flight paths on the communities overflown and concerns about gentrification and displacement around take-off and landing infrastructure. The public sector will play a key role in guiding equitable outcomes through community engagement and ensuring full and fair participation of all in AAM planning and decision-making.

It is important for commercial operators to familiarize themselves with the potential challenges that communities may face in incorporating AAM into their transportation system. Public agencies will need to identify the goals of an AAM implementation; plan and prepare for implementation; and evaluate plans and early demonstrations to assess whether AAM is achieving desired community goals. Because of the large array of institutional and public stakeholders, public agencies may undergo preliminary scoping for AAM that considers:

- A community's vision, goals, and objectives
- Goals that AAM can help meet
- Value AAM can add to a community; and
- Policies and resources that an agency has that can either support or impede the deployment of AAM.

Commercial operators should be prepared to work with public agencies to develop a community

outreach plan as part of the initial AAM planning process as well as an ongoing outreach plan once operations are established. This outreach should articulate the benefits that the operator's AAM service will bring to the community, as well as an understanding of potential challenges and how they will be addressed. It should include coordinated communications with public agencies; other transportation services; takeoff and landing facilities including airports, vertiports, and multimodal hubs; emergency services; and communication services. Below are some of the considerations and recommendations that are important to community outreach for passenger and cargo AAM operations:

- Engage community stakeholders and the public to understand the public's interests, goals, and concerns regarding AAM planning and implementation through focus groups, surveys, town halls, and other engagement methods.
- Engage historically underserved communities and vulnerable populations through focus groups, surveys, town halls, and other engagement methods and ensure inclusion through the planning and implementation of AAM.
- Host community conversations with transportation advocates, social justice-oriented community-based organizations, and community members to understand broader challenges and opportunities related to AAM.
- Employ techniques designed to increase participation, such as snowball sampling, providing free transportation to and from the research activities, conducting studies in the community that is convenient for the participants, and working with community leaders and/or bilingual and bicultural staff to help support recruitment and retention efforts.
- Incorporate community feedback in the planning, design, and implementation of AAM such as infrastructure siting, flight paths, and service characteristics.
- Conduct education and outreach, especially among underserved communities and vulnerable populations about AAM and its impacts.

Given the potential for AAM to grow over the next decade within the long-range planning horizons of many transportation agencies, communities will need to consider how AAM may connect with other modes (such as public transportation), and general planning considerations for access/egress to and from intermodal AAM facilities. As public agencies prepare for AAM, they may confront challenges deciding where to invest limited public resources and identifying funding to integrate AAM into existing and new transportation infrastructure. Public agencies and local communities are likely to be presented with multiple opportunities to consider the addition of AAM into their jurisdiction. There may be infrastructure and operational limitations that agencies will need to consider as they review these opportunities. Commercial operators that can understand these public concerns and assist in alleviating them through planning and outreach will provide public agencies with a valuable partner.

Public Safety:

- **Who and how Public Safety is using drones**
  - Drones will be used by not only by the Police, but Fire Rescue and other City infrastructure departments.
  - Police drones will not be used to gather incriminating information on citizens.

    - Since many public safety UAS are used for observation purposes, most UAS missions do not require the recording of photos or video, however, in jurisdictions that allow recording of UAS missions and the subsequent release of photos or video on social media, these media can significantly increase exposure to the public on the benefits of UAS for public safety and the community. For instance, refer to the on-line presence of the West Midlands and Lincolnshire Police, England ("WMP Eye in the Sky" and "Lincolnshire Police Drones") on Twitter.
    - Police use drones to look for critical missing persons and persons in danger.
    - Fire uses drones to assess burning buildings, look for survivors, and protect the safety of firefighters that are on-scene.
- **Safety to citizens from Public Safety drones**
    - Police drones are not a hazard to pedestrians or bystanders.
    - Strict protocols, in tiers, are used to help prevent accidents.
    - Safety, and minimizing risk, is always the priority for a pilot and a drone will be landed immediately if a situation becomes unsafe.
- **Guidance to Public Safety organizations**
    - Flight path information should always be recorded for transparency and accountability
    - Drones should never be used to investigate an incident for the purpose of developing probable cause (the necessary element for a warrant or an arrest).
    - Stress to the public that UAS will provide de-escalation tactics, transparency and increased officer and citizen safety during challenging situations.
    - Also stress that UAS missions will be accomplished efficiently and safely, with the minimum amount of risk, while respecting the law and privacy of the citizens being served.
    - Following Federal, State, and Departmental Policies are essential.
    - Take advantage of integrated safety and risk assessment settings technology of the drone you are using.
    - Work in partnership with the department community affairs and community engagement efforts of the department to deliver cohesive community policing to the citizens of the supported city.

Film and Television

The film and television vertical covers much of the media acquisition market including photos and video. While these recommendations are focused on narrative film and television as well as commercial filming, these recommendations are applicable across a wide range of 107 operations from construction progress, to real estate photography, to Youtube influencers. Operations can vary from a solo operation to a large Hollywood film production. In general, these operations are conducted within visual line of sight and can be conducted with or without permits depending on the type and scale of operation.

Common Film and Television stakeholders include the following:

Insurance Companies

Insurance companies are often called the secondary regulator. There are a wide variety of products that are applicable to operations. It is necessary to know which products are required for the type of operation. For example, production company insurance covers risk in production. Aviation insurance covers drone risk which can be separated into hull, payload, and liability.

Business owners insurance covers risk not associated with the drones themselves. Inland marine insurance can cover equipment that moves or is transported. Auto policies cover vehicles. Workers compensation insurance covers injuries on the job.

Drone pilots should take a close look at policies to ensure that drones are covered. Many insurance products exclude risks from drone use. Many drone companies and pilots use aviation specific liability insurance.

Insurance is critical to any operation in case anything bad happens. Permitting agencies, clients, and others often require insurance coverage. Insurance companies:

- Issue insurance certificates for operations
- Set coverage and operational limits
- Set costs for insurance

Insurance companies need a variety of information from a number of sources. From the FAA, insurance companies that issue aviation policies require information about laws and regulations. They require this information so they can better understand what operators are allowed to do. The FAA should strive to reach out to insurance companies on a half yearly basis to update them on developments on drone policy.
From the operator, insurance companies often require remote pilot information including number of hours of experience, claim history, number and type of drones, and required liability limits. To issue certificates, insurance companies require information about entities that need coverage.

There are a wide variety of aviation products. They can be purchased for a short duration or they can be purchased on an annual basis. Check with the requirements for your production or client. In some instances, clients or permitting agencies require special language for insurance that may take a few days for insurance companies to process.

Unions

In larger productions, drone pilots and camera operators (if applicable) are required to be part of a union or receive a “pass” from the union. For film, television, and commercials the union is the International Cinematographers Guild (ICG) Local 600. They are important as the organization sets safety requirements for many productions.

The FAA should reach out to the union on a half yearly basis to apprise them of new federal laws, regulations, waivers, authorizations, or rulemakings that may impact operations.

Permitting/Authorizing Agencies

Drone pilots should always be aware of permit requirements for drones. While in most instances, permitting/authorizing agencies do not control the airspace, they can restrict take-off and landing areas. Examples include the state film commissions, city film commissions, federal land management agencies, state parks, wildlife protection agencies and many municipalities.

Sometimes, these entities are unaware of federal airspace preemption. The FAA should reach out to these permitting/authorizing agencies on a half yearly basis to apprise them of new federal laws, regulations, and rulemakings.

For drone operators, these entities often require flight plans or plans of activities, a copy of Part 107 certificate, copies of waivers and/or authorizations, and an insurance certificate naming the entity as an additional insured. It is advisable to request a permit as far in advance as possible.

Production Companies

Production companies are responsible for pulling together all the resources to create a work, and can vary greatly in size and knowledge about drones.

- Small- often ignorant of rules and regulations, rely on pilots or internal stakeholders- looks to the internet.
- Medium- often has drone pilots they work with that are somewhat knowledgeable.
- Large- can have internal staff. Has a risk management group that may be familiar with drones. However, knowledge of airspace regulation is all over the place. Some large entities have an understanding, some do not.

Production companies often require insurance certificates from drone companies naming them as additional insureds on a primary and noncontributory basis with a waiver subrogation. In some cases, production companies require a form to be filled out by drone pilots in order for the production to obtain their own insurance coverage. This form usually requires information about the nature of the operation, the when, where, why, which drone, pilot information, and may include requirements for the aviation insurance.

Educating production companies is important as they are the ones who often hire drone pilots. Some do not care whether operations occur legally. For example, heavy lift FPV drones have been flown over crowds without waivers, drones over 55 pounds have been flown without the required exemptions, operations have occurred with a RPIC without a 107 certificate. It is imperative that the FAA distribute information to production companies about regulations and requirements on at least a half yearly basis. The challenge is that production companies vary in sophistication; there are no defined channels to communicate with them. A possible avenue is to work with other partners such as production insurance companies, aviation insurance companies, and permitting agencies to distribute information

Location Scouts

In the film and television industry, location scouts are a critical position. They seek out locations for productions, often interface with permitting agencies and also assist productions with requirements for drone operations. They are often responsible for interacting with local landowners and the general public on site.

Location scouts would benefit from a good knowledge of FAA regulations (primer) as well as airspace grids so they don’t provide locations where it is next to impossible to fly. Location scouts would also benefit from a twice a year update on regulations and requirements. This cohort is best approached through unions and location scout networks.

Drone Pilots

Drone pilots are important because they are the ones who fly the missions. They require correct information about laws, regulations, permits, and best practices to operate safely. It is suggested that they wear identifiable vests and use safety management systems and checklists. Outreach to pilots should occur twice a year, and insurance companies can facilitate distribution

of best practices as well as regulatory information. Social media is an option for communication but may not reach all operators.

General Public/Adjacent businesses

These stakeholders are important as they can cause issues with production either directly interfering with production shoots or can call law enforcement leading to delays in production. Location scouts or a representative should canvas the neighborhood before the shoot to provide;

- Reason for shoot.
- When and where the shoot will happen.
- What they can expect during filming.

The FAA should continue to educate the public about drones when and where possible through social media and mass media. They should be provided;

- Correct information on laws and regulations.
- General information about drones from local media outlets.

Traditional aviation

Traditional aviation stakeholders should be kept informed especially when operating near smaller airports. Location scouts or other representatives can provide;

- When and where the operations will take place.
- Contact information

The FAA should continue to provide education to airport operators as to drone operations and their authority. Make sure airport operators, FSDOs, and aviators know the correct regulations around drones. Keep it simple.

Local law Enforcement

Local law enforcement is always an important stakeholder. In most instances, larger productions will have notified law enforcement and in some cases utilize law enforcement for security and traffic control. However, if they are not involved in the operation, or it is a smaller operation, it is advisable to notify local law enforcement of operations or at least create a relationship with local law enforcement.

They are an important stakeholder as they could shut down operations. Communicating prior to operations will be helpful if there are complaints to the police. Law enforcement will know what is going on and can deal with it. It is useful to provide the following;

- Reason for drone operation.
- When and where the drone operation will happen.
- What they can expect during drone operations.
- Correct information on laws and regulations.

The FAA should continue to help law enforcement by providing periodic FAQ’s to law enforcement about drones on a more frequent basis.

First Person View (FPV) Operations

Some additional points for FPV Operations:

- Showing DVR video of the type of aircraft to be flown, and the type of movements to be made to demonstrate pilot capability and alleviate privacy/spying concerns
- Using published databases to show pilot skill such as the MultiGP Global Qualifier leaderboard for pilot ranking
- Offering a “Ride along” where the stakeholder is watching a live flight demonstration through another set of FPV goggles
- For indoor events such as tiny whoop races, send pictures of the size comparison such that they fit in the palm of one's hand to help alleviate concerns of damaging property
- Allow stakeholder to attempt flying on a simulator such that they can gain a better understanding of how the aircraft work
- Warn of the higher pitched noise from most FPV drones to better prepare for possible noise complaints (a ride along also helps with this as the stakeholder will hear the noise of the aircraft too)

Report Commentary

Hosting this Report

Access to this report is crucial for the successful advancement of the UAS and AAM communities such that it should be hosted by a neutral and applicable organization. This organization should have a substantial reach to the aviation community. Some of the organizations that meet this criteria could be:

- FAA
    - FAA Drone Zone
    - FAA Safety Team
    - A new dedicated site (explained in following section)
- Standards Body
    - Radio Technical Commission for Aeronautics
    - American Society for Testing and Materials
    - National Institute of Standards and Technology
- Other Aviation Organizations
    - Aircraft Owners and Pilots Association
    - Community Air Mobility Initiative
    - FAA recognized Community Based Organizations
    - Drone Safety Team
    - Drone Service Providers Alliance

To increase access to this document, the hosting of could be done on multiple sites and not just one site. The subgroup concluded the FAA would be the most appropriate site to host this information with other industry partners having a copy or version of it on their websites too.

Availability and Publishing

This report should be publically available to accommodate both entry level and experienced operators to enhance their community outreach initiatives. This report should be advertised by the FAA and operators through social media posts and email notifications on a bi-annual basis.

The publication could be accomplished by

- Creating a new website (or modifying an existing website)
    - This website could be designed to be interactive in which a user selects their use case through a list of drop downs to point them to information tailored for their operation. As well as use location information to provide a list of predicted contacts for that area, such as local law enforcement information, film office information, etc. A dedicated website would also be able to have a central location for organizations and operations to submit suggestions for new operations or update current operations. This allows for the lowest burden and increased ease of use for operators to access information needed to improve their community outreach initiatives. This also provides the operators a way to provide feedback on outreach initiatives to improve current recommendations
- PDF
    - A PDF is a simple way to host and distribute the publication of this report. However, it usually has an increased burden when trying to find information applicable to the user as opposed to a dropdown system. This also creates a large report which may discourage users from going through it because of the time commitment required to digest and determine applicability of information.
- A simple webpage
    - This is essentially copy and pasting what would be a PDF onto a website and have similar pros and cons as to the PDF method.

Updating

With the rapid evolution of the UAS and AAM Industry, it is key that this document be continually updated to keep up with the industry. Methods to accomplish this are as follows:

- Ability for Operators, Industry, and Communities to submit recommendations
    - This could be accomplished with the utilization of an email or online form/survey (such as Google Forms, Survey Monkey, etc). With the users and stakeholders able to submit their recommendations, it opens the number of resources available to improve this document. Information gathered from this can then be used by one of the review teams explained below.

- Maintain a review team
    - A review team could be a group of industry and community stakeholders (such as an AAAC Tasking Group) in which they would meet annually to review and update Community Engagement recommendations. This works for both an interactive website approach and a PDF or simple webpage approach.
- Have a live updating team
    - A group of people who are able to receive suggestions from people outside the team. This team can then use these recommendations to continuously update the document as suggestions seem fit to be added or removed from the document. This would work best for an interactive website based publication as this would lead to a confusion of PDF versions.

Members

Alaska Center for UAS Integration
Airline Pilots Association
Aircraft Owners and Pilots Association
Association for Uncrewed Vehicle Systems International
Boeing
Community Air Mobility Initiative
Drone Service Providers Alliance
New York City Fire Department
First Person View Freedom Coalition
United Parcel Service
Wing
Zipline

SMEs

Lorne Cass, Aero NowGen
Mark Colborn, Dallas Police Department
Eric Schwartz, Florida Light and Power

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.

Federal Aviation Administration



Bradley Mims

Deputy Administrator

In February 2021, Bradley Mims assumed his current position as the Federal Aviation Administration (FAA) Deputy Administrator. Mims has served as a transportation professional in government and the private sector for over 40 years. As a government relations specialist with a multi–modal transportation background, Mims holds a special affinity for the aviation industry.

In addition to working for a number of firms and organizations related to transportation/aviation, Mims served as the head of government relations for the FAA during the Clinton Administration. He served as a transportation staffer for members of Congress in his early career (representing Congressman John Lewis—GA and Julian Dixon—CA). Mims has also served as a congressional liaison for the Smithsonian Institution's National Air and Space Museum and the National Museum of African American History and Culture. Between 2001–2005, Mims served as a transportation specialist at Booz Allen Hamilton. In 2005, Mims joined Parsons Brinckerhoff, Inc., serving as the Aviation Markets Vice President until 2010.

As an appointee of the governor of Maryland, Mims joined the Washington Metropolitan Airports Authority Board of Directors in 2014 and has served as the co–chair of the Dulles Corridor and Finance Committees, as well as chair of the Nominations Committee. In addition, Mims served as the transportation subject matter expert with Laborers' International Union of North America (LIUNA) from 2014–2016. Prior to his appointment at the FAA, Mims served as the President/CEO of the Conference of Minority Transportation Officials (COMTO) from 2016–2021. He graduated from Allegheny College with a bachelor's degree in political science.



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.

Federal Aviation Administration



Jeffrey Vincent

Executive Director, UAS Integration

Jeffrey Vincent is the Federal Aviation Administration's (FAA) Executive Director for the Unmanned Aircraft Systems (UAS) Integration Office in Aviation Safety (AVS). He is responsible to safely integrate unmanned aircraft into the National Airspace System.

Prior to his current role, Mr. Vincent served as Vice President of Air Traffic Services responsible for providing safe and efficient air navigation services to more than 42,000 flights and 2.5 million airline passengers across more than 29 million square miles of airspace. Prior to the Vice President of Air Traffic Services, he served as the Vice President for Safety and Technical Training was responsible for the development of ATO's Safety Management System and the integration of safety and training standards into the provision of air traffic services.

Mr. Vincent was also the Director of Air Traffic Operations, Eastern Service Area providing strategic leadership and direction for ensuring the safety and efficiency of air traffic operations for Airport Traffic Control Towers, Terminal Radar Approach Control (TRACON) facilities, and Air Route Traffic Control Centers. He also served as Deputy Director as well as Senior Advisor to the Director of Air Traffic Operations. In addition, he worked as a Certified Professional Controller at Boston Logan and Charlotte Douglas International Airports. He began his leadership career as a Front-Line Manager (FLM) at Birmingham International Airport. He continued his leadership as a FLM at Houston Intercontinental Tower and TRACON.

Then in 1999, Mr. Vincent broadened his FAA experience by returning to the Southern Region (ASO) where he held positions as Quality Control Specialist and Acting Branch Manager of Airspace, in ASO-520. Additionally, he held several positions at Atlanta TRACON and Tower, to include; Operations Manager, Support Manager, and acting Tower Air Traffic Manager.

After completing a headquarters detail in the Terminal Mission Support office, Mr. Vincent was selected to lead the Quality Control Group for the Eastern Service Center in 2009. During his tenure there he worked closely with the Air Traffic Services Safety and Compliance Group in developing and implementing ATO's current Quality Assurance/Quality Control process in the Eastern Service Area.

Advanced Aviation Advisory Committee

October 20, 2022 AAAC Meeting

Detailed Minutes

Introduction

An Advanced Aviation Advisory Committee (AAAC) meeting was held at the Hilton Garden Inn in Arlington, VA on October 20, 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://youtu.be/fyw2LtaSE5U
Second session: https://youtu.be/_uKXv_G7zs0

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 June 30, 2022 meeting minutes. There were no objections and the motion passed.

Mr. Merkle then turned the meeting over to Mr. Vinn White from the Office of the Secretary of Transportation (OST) for his remarks.

View the DFO's remarks (link is timestamped for DFO Opening Remarks):
https://youtu.be/fyw2LtaSE5U?t=129

OST Remarks

Mr. White thanked the Committee and discussed the new Advanced Air Mobility Coordination and Leadership Act, which was signed into law by President Biden earlier in the week. He then explained the advantages of this new legislation before turning the meeting back over to Mr. Merkle.

Mr. Merkle turned the meeting over the AAAC Chair, Captain Houston Mills, for his remarks.

View the remarks from OST (link is timestamped for OST Remarks):
https://youtu.be/fyw2LtaSE5U?t=293

AAAC Chair Opening Remarks

Captain Mills began his remarks by welcoming all attendees and viewers to the meeting. He expressed his excitement for the Committee to have the support of the current administration. Capt. Mills then asked that the 11 new Committee members give a short introduction. Capt. Mills proceeded to welcome the new members to the Committee and thanked four departing members for their contributions to the AAAC.

Capt Mills commented that all of the members continued thought leadership will further enable the Committee to deliver consensus-based recommendations to the FAA and Department of Transportation (DOT), before sharing recent data and calculated projections demonstrating the growth of the small unmanned aircraft systems (sUAS) community, and the importance of the Committee's work. He proceeded to thank Mr. Terry McVenes and Mr. Brandon Suarez (RTCA) for their presence, before turning the meeting back over to Mr. Merkle.

Mr. Merkle turned the meeting over to the Deputy Administrator, Mr. Brad Mims for his remarks.

View the AAAC Chair's remarks: (link is timestamped for AAAC Chair Opening Remarks): https://youtu.be/fyw2LtaSE5U?t=440

Deputy Administrator Opening Remarks

Mr. Mims began by congratulating the 11 new members on their appointment to the Committee and thanked the four departing members for their service. Mr. Mims proceeded to speak from experience, stating how he has witnessed the industry move through deregulation, making flying more accessible to more people, and stated that today's innovations could make aviation even more accessible and beneficial. He acknowledged that the FAA is committee to enabling innovation, so long as the agency can ensure safety.

Mr. Mims then proceeded to make several announcements. He provided an update on the FAA's review of the Beyond Visual Line of Sight (BVLOS) Aviation Rule Making Committee (ARC) recommendations and written comments received, the release of an Advisory Circular that will recognize non-profit Community Based Organizations (CBOs) for recreational drone flyers, the recently passed Senate Bill 516 – the Advanced Air Mobility Coordination and Leadership Act, and the publishing of the NPRM for Powered Lift Special Federal Air Regulation.

Mr. Mims then thanked the Committee for their time before turning the meeting over to Mr. Merkle.

View the Deputy Administrator's remarks: (link is timestamped for Deputy Administrator Opening Remarks):
https://youtu.be/fyw2LtaSE5U?t=870

FAA Remote Identification Update

Presenter:
Dan Elgas, Deputy Director, Policy and Innovation Division, Aircraft Certification Service

Mr. Daniel Elgas began the presentation by providing an update on Remote Identification (RID) Means of Compliance (MOC) and discussing the Notification of Enforcement Discretion Policy for Production Requirements, published to the Federal Register on September 8, 2022. Mr. Elgas highlighted that the notification of enforcement policy stipulates the agency will exercise discretion in determining how to handle noncompliance until December 16, 2022. Lastly, Mr. Elgas provided an update on the current status of accepted declarations of compliance for Remote ID uncrewed aircrafts.

There was a brief discussion period following the presentation.

View the presentation and discussion (link is timestamped for FAA Remote Identification Update) https://youtu.be/fyw2LtaSE5U?t=1629

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

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

In continuation of the interim recommendations presentation given at the June 23, 2022 AAAC meeting, Mr. David Silver and Ms. Seleta Reynolds began the presentation by providing an overview of the Task Group membership and detailing the tasking provided to the group at the February 23, 2022 AAAC Meeting. The Task Group worked together to formulate their final recommendations in sub-groups: Aircraft, Airspace, Operations, Infrastructure, and Community.

There was a discussion period following the presentation.

The AAAC eBook provides the official report of Task Group #13: Strategic Framework for Advanced Air Mobility Near-Term Operations Final Recommendations.

View this presentation and discussion (link is timestamped for Task Group #13: Strategic Framework for Advanced Air Mobility Near-Term Operations Final Recommendations):
https://youtu.be/fyw2LtaSE5U?t=2199

RTCA Digital Flight Rules Briefing

Presenters:
Terry McVenes, President and Chief Executive Officer, RTCA
Brandon Suarez, Co-Chair, RTCA Special Committee SC-228

Mr. Terry McVenes and Mr. Brandon Suarez prefaced their presentation, stating that almost all of the work being presented was repackaged from NASA report(s). Mr. McVenes and Mr. Suarez then provided a brief overview on vehicle capability versus vehicle integration, common need for access to airspace, and the increasing commoditization of airspace coupled with increasing number of users. They continued to discuss significant events in industry that allowed the topic of digital flight (DF) rules to gain momentum, before explaining the need for DF rules, the benefits of DF rules, and what the Committee can do to support the topic.

There was a brief discussion following the presentation.

View the presentation and discussion (link is timestamped for RTCA Digital Flight Rules Briefing presentation):
https://youtu.be/fyw2LtaSE5U?t=5152

FAA Collegiate Training Initiative (CTI) Update

Presenter:
Diana Robinson, Project Manager, UAS Integration Office

Ms. Diana Robinson began the afternoon session of the meeting with an update on the Unmanned Aircraft Systems (UAS) Collegiate Training Initiative (CTI) program. Ms. Robinson began by detailing the purpose of the program and elaborating on the importance of providing drone programs at the college and university levels. She then detailed the program's curriculum requirements, application processes, and benefits. Ms. Robinson shared the number of Minority Serving Institutions (MSI) program schools involved, before providing an overview of the list of

grant recipients from fiscal year 2022. Lastly, Ms. Robinson discussed outreach goals for the remainder of the year and promoted attendance at upcoming events.

Following the presentation, there was a discussion period.

View the presentation and discussion (link is timestamped for FAA Collegiate Training Initiative Update): https://youtu.be/_uKXv_G7zs0?t=1

FAA Drone Safety Team Update

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

Mr. Abby Smith and Mr. Pete Dumont began their presentation by providing an overview of the Drone Safety Team (DST) history, mission, membership, and leadership. Mr. Smith and Mr. Dumont proceeded to discuss the value of collaboration with different facets of the drone community, and the DST working groups, which include: data analysis, safety assurance, safety mitigation, and strategic communication. They concluded the presentation by sharing information regarding The Recreational UAS Safety Test (TRUST) and the Aviation Safety Report System (ASRS).

Following the presentation, there was a discussion period.

View the presentation and discussion: (link is timestamped for FAA Drone Safety Team Update): https://youtu.be/_uKXv_G7zs0?t=1924

New AAAC Taskings

Mr. Merkle presented the Committee with two new taskings. AAAC Tasking #14 asks the Committee to examine the Beyond Visual Line of Sight (BVLOS) Aviation Rulemaking Committee (ARC) recommendations and identify opportunities where industry can assist and accelerate implementation of BVLOS regulatory action. AAAC Tasking #15 asks the Committee to make recommendations on lessons learned and best practices related to drone community engagement methods.

The AAAC Chair, Mr. Mills accepted the new taskings. The recommendations report(s) is scheduled to be presented at the next AAAC meeting in March 2023.

View the presentation and discussion: (link is timestamped for New AAAC Taskings):
https://youtu.be/_uKXv_G7zs0?t=3960

New Business/Agenda Topics

Mr. Mills opened the floor to Committee members to raise any new business or agenda items.

Topics for the FAA to consider for future taskings included:

- Mr. Vic Moss raised the topic that Temporary Flight Restrictions (TFRs) were originally put into place for traditional manned aircraft, however, as drones came about, they then received those same TFRs. Mr. Moss questioned the possibility of the AAAC or FAA working with other government organizations to allow for drones to receive less restrictions with TFRs.
- Mr. Brad Hayden suggested a future tasking to provide recommendations on how the FAA can provide a pathway for traditional aerospace personnel into the UAS/AAM ecosystem.
- With Task Group #13 in mind, Ms. Yolanka Wulff asked if there was a need for another tasking more specifically around community engagement and community integration beyond any fine tuning that comes out of Task Group #13. Ms. Wulff asked to rework the title of the new Task Group #15 tasking to reflect that it is not restricted specifically to small drones.
- Mr. Jaz Banga asked what the FAA or industry can provide to incentivize people to get certified and take testing.
- At the previous meeting, Mr. Paul Hsu mentioned that the Air Force asked him to develop and test fly %100 synthetic jet fuel. He revealed that they have since tested the synthetic jet fuel, approximately 2 months prior, and the test flight went well.

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

Closing Remarks and Adjourn

Mr. Merkle again welcomed the 11 new members to the Committee and thanked the four departing members on their contributions. He thanked all of the presenters, as well as those who help make the AAAC possible, before turning the meeting over to Capt. Mills, who thanked the AAAC for all of their hard work, thought, and leadership.

Capt. Mills asked for a motion to adjourn the meeting. The motion was approved and the meeting was adjourned.

View the closing remarks (link is timestamped for Closing Remarks and Adjourn): https://youtu.be/_uKXv_G7zs0?t=5248

Appendix A: FAA Meeting Attendees

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. Hillary Heintz	Senior Advisor to Deputy Administrator	FAA
2. Claudio Manno	Associate Administrator, Security and Hazardous Materials Safety	FAA
3. Winsome Lenfert	Deputy Associate Administrator, Airports	FAA
4. Jodi Baker	Deputy Associate Administrator, Aviation Safety	FAA
5. Vinn White	Senior Advisor, Office of the Secretary of Transportation	DOT
6. Peter Irvine	Deputy Director, X50	DOT
7. Ryan Steinbach	Aviation Policy Coordinator, Office of the Secretary of Transportation	DOT
8. Sabrina Saunders-Hodge	Director, Research, Engineering, and Analysis, UAS Integration Office	FAA
9. Leesa Papier	Executive Director, Office of National Security Programs and Incident Response	FAA
10. Adrienne Vanek	Director, International Division, UAS Integration Office	FAA

Name	Title	Org.
11. Genevieve Sapir	Attorney-Advisor, General Counsel	FAA
12. Martha Christie	Acting Director, Safety & Integration Division, UAS Integration Office	FAA
13. Elizabeth Forro	Special Assistant, UAS Integration Office	FAA
14. Kamisha Walker	Management Assistant, UAS Integration Office	FAA

No Public Comments Submitted Since Last Committee Meeting