



Drone Advisory Committee Public eBook

October 22, 2020 DAC Meeting • Virtual



Drone Advisory Committee

October 22, 2020 DAC Meeting • Virtual

Public eBook Table of Contents

| | Page |
|--|-------------|
| 1) Virtual Meeting Logistics | 3 |
| 2) Confirmed FAA/DOT Attendees | 4 |
| 3) Meeting Agenda | 5 |
| 4) DAC Membership Roster | 6 |
| 5) Tasking #8: Safety Culture – Discussion & Recommendations | 8 |
| 6) FAA – Response to Task Group #5 Recommendations – Facility Maps | 36 |
| 7) FAA – Response to Task Group #7 Recommendations – UTM | 43 |
| 8) Master Slide Deck | 47 |
| 9) DAC Charter | 115 |
| 10) Fact Sheet: Advisory Committee Member Roles and Responsibilities | 118 |
| 11) Biography: Dan Elwell, Deputy Administrator and DAC DFO | 119 |
| 12) Biography: Jay Merkle, Executive Director of the FAA UAS Integration Office | 120 |
| 13) Biography: Michael Chasen, Chairman of the DAC, Chairman PrecisionHawk USA, Inc. | 122 |
| 14) Meeting Minutes – June 19, 2020 Meeting | 123 |



Drone Advisory Committee

October 22, 2020 DAC Meeting • Virtual

Virtual Meeting Logistics

- We ask that everyone remain muted during the presentations. After each briefing, there will be an opportunity for the DAC 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 DAC meeting is being livestreamed and recorded. It will be made available for future viewing on the FAA's YouTube channel.
- This is a public meeting and there may be members of the media viewing the livestream.
- To access the livestream links, go to either of these websites:
<https://www.facebook.com/FAA> or <https://www.youtube.com/FAAnews>



Drone Advisory Committee

October 22, 2020 DAC Meeting • Virtual

Confirmed FAA/DOT Attendees (on camera)

| Name | Title | Org. |
|------------------------|---|------|
| 1. Dan Elwell | Deputy Administrator and DAC Designated Federal Officer | FAA |
| 2. Angela Stubblefield | Chief of Staff | FAA |
| 3. Jay Merkle | Executive Director, UAS Integration Office | FAA |
| 4. Bill Crozier | Deputy Executive Director, UAS Integration Office | FAA |
| 5. Arjun Garg | Chief Counsel, Office of General Counsel | FAA |
| 6. Kirk Shaffer | Associate Administrator, Airports | FAA |
| 7. Tonya Coultas | Deputy Associate Administrator, Security and Hazardous Materials Safety | FAA |
| 8. Timothy Arel | Deputy Chief Operating Officer, Air Traffic Organization | FAA |
| 9. Brianna Manzelli | Assistant Administrator, Office of Communications | FAA |
| 10. Teri Bristol | Chief Operating Officer, Air Traffic Organization | FAA |
| 11. William Stanton | UAS Integration Lead, Air Traffic Organization | FAA |
| 12. Gary Kolb | UAS Stakeholder & Committee Liaison, UAS Integration Office | FAA |
| 13. Alex Zektser | Attorney Advisor | DOT |

Confirmed FAA/DOT Observers

| Name | Title | Org. |
|-----------------------|--|------|
| 1. Adrienne Vanek | Director, International Division, UAS Integration Office | FAA |
| 2. Michael McCrabb | Foreign Affairs Specialist, UAS Integration Office | FAA |
| 3. Christopher Swider | International Specialist, UAS Integration Office | FAA |
| 4. Rico Carty | Deputy Executive Director, Flight Standards | FAA |
| 5. Genevieve Sapir | Senior Advisor, Security and Hazardous Materials Safety | FAA |
| 6. Robert Sweet | Senior Advisor, Air Traffic Organization | FAA |
| 7. Elizabeth Forro | Special Assistant, UAS Integration Office | FAA |
| 8. Alison LePage | Digital Communications Manager, Office of Communications | FAA |
| 9. Alison Duquette | Digital Communications Team Lead, Office of Communications | FAA |
| 10. Jessica Orquina | Lead Communications Specialist, UAS Integration Office | FAA |
| 11. Khurram Abbas | Communications Specialist, UAS Integration Office | FAA |
| 12. Gretchen Tressler | Technical Writer, UAS Integration Office | FAA |
| 13. Jennifer Riding | Program Analyst, UAS Integration Office | FAA |



Drone Advisory Committee

October 22, 2020 DAC Meeting • Virtual

Public Meeting Agenda

Time: 11:00 a.m. to 2:55 p.m. Eastern Time

Location: Virtual Video Conference

| | Start | Stop | |
|-----|------------|------------|--|
| 1. | 11:00 a.m. | 11:01 a.m. | FAA - Greetings & Logistics |
| 2. | 11:01 a.m. | 11:05 a.m. | DFO - Read Official Statement of the Designated Federal Officer |
| 3. | 11:05 a.m. | 11:10 a.m. | DFO - Review of Agenda and Approval of Previous Meeting Minutes |
| 4. | 11:10 a.m. | 11:20 a.m. | DFO - Opening Remarks |
| 5. | 11:20 a.m. | 11:30 a.m. | Chair - Opening Remarks |
| 6. | 11:30 a.m. | 12:30 p.m. | Chair - Tasking #8: Safety Culture – Discussion & Recommendations |
| 7. | 12:30 p.m. | 1:00 p.m. | FAA - Response to Task Group #5 Recommendations - Facility Maps |
| 8. | 1:00 p.m. | 1:15 p.m. | Break |
| 9. | 1:15 p.m. | 1:45 p.m. | FAA - Response to Task Group #7 Recommendations - UTM |
| 10. | 1:45 p.m. | 2:15 p.m. | FAA - Discuss & Deliver New Tasking to DAC: Low Altitude Remote ID Operations |
| 11. | 2:15 p.m. | 2:35 p.m. | FAA - Discuss: A Standing Operations and Technology Subcommittee |
| 12. | 2:35 p.m. | 2:45 p.m. | Chair - New Business/Future Meeting Agenda Topic Suggestions |
| 13. | 2:45 p.m. | 2:50 p.m. | DFO - Closing Remarks/Final Thoughts |
| 14. | 2:50 p.m. | 2:55 p.m. | Chair - Closing Remarks/Final Thoughts |
| 15. | 2:55 p.m. | 2:55 p.m. | Chair - Adjourn |

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



Drone Advisory Committee

October 22, 2020 DAC Meeting • Virtual

DAC Membership – As of 8/24/2020

| Stakeholder Group | Members |
|--|--|
| Designated Federal Officer | Dan Elwell , Deputy Administrator, Federal Aviation Administration |
| Chair | Michael Chasen , Chairman of the Advisory Board, PrecisionHawk USA, Inc. |
| Airports and Airport Communities | Vacant Vacant |
| Labor (controllers, pilots) | Trish Gilbert , Executive Vice President, National Air Traffic Controllers Association Joseph DePete , President, Air Line Pilots Association (ALPA) |
| Local Government | David Greene , Bureau of Aeronautics Director, Wisconsin Department of Transportation Wade Troxell , Mayor of Fort Collins, Colorado, and the National League of Cities Bob Brock , Director of Aviation and UAS, Kansas Department of Transportation Mark Colborn , Senior Corporal, Dallas Police Department Michael Leo , Captain, New York City Fire Department Steve Ucci , Senior Deputy Majority Leader, Rhode Island State Assembly |
| Navigation, Communication, Surveillance, and Air Traffic Management Capability Providers | George Kirov , Vice President and General Manager, Commercial UAS Solutions, Harris Corporation Vacant Mariah Scott , President, Skyward (a Verizon company) |
| Research, Development, and Academia | Robie Samanta Roy , Vice President of Technology, Lockheed Martin Corporation |
| Traditional Manned Aviation Operators | Mark Baker , President and Chief Executive Officer, Aircraft Owners and Pilots Association Houston Mills , Vice President, Flight Operations and Safety, United Parcel Service (UPS) Lorne Cass , President, Aero NowGen Solutions, LLC Vacant |
| UAS Hardware Component Manufacturers | Vacant Christian Ramsey , President, uAvionix Corporation |
| UAS Manufacturers | James Burgess , Chief Executive Officer, Wing (an Alphabet company) Michael Chasen , Chairman, Advisory Board, PrecisionHawk USA Inc. Gur Kimchi , Founder, GOEXA, LLC Brendan Schulman , Vice President of Policy and Legal Affairs, DJI Technology Michael Sinnett , Vice President Product Development and Strategy, Boeing Commercial Airplanes |
| UAS Operators | Greg Agvent , Senior Director of National News Technology, CNN Todd Graetz , Director, Technology Services, UAS Program, BNSF Railway |
| UAS Software Application Manufacturers | Jaz Banga , Co-Founder and Chief Executive Officer, Airspace Systems, Inc. Chris Anderson , Chief Executive Officer, 3DR Vacant |



Drone Advisory Committee

October 22, 2020 DAC Meeting • Virtual

| Stakeholder Group | Members |
|-------------------|---|
| Other | <p>Rich Hanson, President, Academy of Model Aeronautics</p> <p>Brian Wynne, President and Chief Executive Officer, Association for Unmanned Vehicle Systems International</p> <p>Thomas Karol, General Counsel, National Association of Mutual Insurance Companies</p> <p>David Silver, Vice President for Civil Aviation, Aerospace Industries Association</p> <p>Lee Moak, Founder & Chief Executive Officer of The Moak Group</p> |

**TASK GROUP 8: SAFETY
CULTURE – DISCUSSION
AND
RECOMMENDATIONS**

EXECUTIVE SUMMARY

DAC CREATION OF TASK GROUP 8 SAFETY CULTURE

DAC Meeting, February 27, 2020

At the February 27, 2020, meeting of the Federal Aviation Administration's (FAA) Drone Advisory Committee (DAC), the designated federal officer established Task Group #8 (TG-8) led by Capt. Joe DePete from the Air Line Pilots Association, Int'l to develop recommendations and ideas to assist the drone community in adopting an aviation safety culture.

Restatement of Tasking Group 8 Action and Scope— Safety Culture for Drone Operators:

Tasking Question: What are ways we can help the drone community fully adopt the safety culture that is so engrained in manned aviation?

Tasking Summary: Develop recommendations and ideas to assist the drone community in adopting an aviation safety culture. This includes ideas for motivation and suggestions for industry involvement.

Justification: The manned aviation community has a very strong safety culture. This culture is not just rules and regulations; aviators live and practice it every day. This culture has been one of the drivers of the strong safety record we have today. While recreational UAS operators have been safely sharing the airspace for over a century, there is an emerging group of new UAS operators not familiar with aviation. Having them learn and adopt this culture will greatly assist in the safe and efficient integration of drones into the national airspace system (NAS).

Developmental Process

Following the February 27 DAC meeting, Capt. DePete sent an e-mail to the DAC membership at large requesting volunteers to support the Safety Culture Task Group. Over 25 members replied and additionally submitted SMEs to take part in the developing recommendation in response to the FAA tasking. See Appendix A for the task group membership list.

It was determined that due to the large cross section of DAC members with diverse backgrounds, subgroups should be established to better represent differing user groups' views and response to the tasking.

Description of Subgroups

1. **Traditional (Manned) Aviation:** This subgroup evaluated the traditional aviation community's experience in developing a safety culture and how its lessons learned during that process could benefit the unmanned community.

Tasking Group 8, Safety Culture, 2020

2. **Recreational/Community Operators:** This subgroup represents all recreational UAS operators regardless if they operate within the programming of a community-based organization.
3. **Small Commercial Operators:** The small commercial subgroup defined the subject operators as companies with fewer than 500 employees who utilize UAS as part of their business.
4. **National UAS Operators:** National UAS Operators subgroup defined the subject operators as companies with greater than 500 employees who utilize UAS around the world.

Over the course of the 45 days, the COVID-19 pandemic overtook the task group's planned activities. In April 2020, the TG-8 established a leadership composed of one or more members from each subgroup to meet virtually via telecom. It was determined that the first task should be to develop a list of safety culture tenets that would be used to focus the task group's high-level principals and would additionally be used to guide the subgroups in their development of recommendations to address the FAA tasking.

Subgroup Development Processes

1. **Traditional (Manned) Aviation:** The Traditional (manned) aviation subgroup focused on the evolution of safety in commercial manned aviation, with specific emphasis on the attributes and programs that have most contributed to the robust safety culture that has generated unprecedented safety records for U.S. passenger and cargo airlines.
2. **Recreational/Community Operators:** The Recreational/Community Operators subgroup met regularly tackling different topics such as identifying safety risks, reviewing successful safety programs already in place, and discussing achievable safety goals. The group consolidated their efforts into a final document, at times collaborating with other subgroups and subject-matter experts.
3. **Small Commercial Operators:** The Small Commercial Operators subgroup researched safety culture extensively. Key documents which informed this work are listed in the reference section of the subgroup narrative. In addition, the group invited a guest speaker from AOPA to present and the team created a primary research survey with 123 responses. The team drew on the deep experience of the subgroup in manned and unmanned aviation.
4. **National UAS Operators:** The National UAS Operators group met via multiple telecons/e-mail exchanges to ensure that the overall safety tenets met their vision and made sure our recommendations aligned with the overall leadership. Like other groups, the National UAS Operators group was made up from of and unmanned aviation subject-matter experts and drew heavily on the experience of BNSF's Pathfinder 3 and 44807/CRADA efforts since 2015.

Tasking Group 8, Safety Culture, 2020

Subgroups Meeting Schedule

1. Traditional (Manned) Aviation:
 - a. The Traditional (Manned) Aviation subgroup met approximately 10 times over 13 weeks and concluded on 7/27/2020.
2. Recreational/Community Operators
 - a. The Recreational subgroup met 13 times between April and July, often weekly or as needed.
3. Small Commercial Operators:
 - a. The Small Commercial Operators subgroup met weekly for 13 weeks concluding on 7/23/2020.
4. National UAS Operators:
 - a. The National UAS Operator group met 8 times concluding on 8/10/20.

Safety Culture Tenets, the Guiding Principles for Safety Culture Recommendations

As a starting point, the Task Group developed a set of guiding principles, or tenets, that were considered common and foundational in strong safety cultures. These tenets are broad and adaptable to any size organization—even individual pilots or operators¹. They can serve both as building blocks from which to build a safety culture and guideposts that organizations can use to improve upon existing safety programs.

Safety Culture Tenets

Tenets: A shared principle, belief, or doctrine generally held to be true.

1. **Safety Ownership:** Empowering each individual across all groups with a share of the collective responsibility to learn, understand, advocate, and participate in best safety practices and behaviors for the intended activity. Safety modeled by leadership—safety culture is driven throughout the aeronautical community from the operator to executive level management. Leaders should model safe practices (walk the talk) and reinforce the critical importance of safety as the top priority in the community.
2. **Organizational Values:** A safety culture reflects the values, principles, and normal behavior of an individual engaged in an activity that presents risk to the life, safety, or property of others and must be scalable to the organization. Organizations can promote and enhance a culture of safety by modeling behavior, educating individuals, and emphasizing the importance of safety during activities that present heightened risks to people or property.
3. **Learning Culture:** An organization with a positive safety culture will always continue to learn from its own, and others', experiences and develop; individuals can adapt and change. Few operations in the NAS are error-free, but operators learn from failures

¹ In this document, we will use the term “operator,” which could be interchangeable with “pilot.”

Tasking Group 8, Safety Culture, 2020

going forward and utilize risk management tools (knowledge) to improve the safety and quality of operations or products with the power of data sharing both internally and within the communities to which they belong.

4. **Systemwide Approach:** Those who set and promote safety rules and parameters must share the responsibilities of systemwide safety by the creation of risk-based rules that are reasonable and proportionate in light of the relative risk of the operation. It is also important to promote a voluntary nonpunitive environment where the sharing/reporting of unintentional unsafe experiences (events) is fostered and supported by an educational approach to continuously improving safety in the NAS.
5. **Trust:** A strong safety culture is enhanced by trust—a firm belief in the honesty, reliability, and ability of others. Trust is a two-way street and assumes all stakeholders (individual and organizations) are committed to doing the right thing to ensure safe and successful operations. Operators/stakeholders must trust that regulators and authorities will transparently act on and implement constructive input from operators/stakeholders and support best practices and constructive measures to address safety concerns, while regulators must trust that operators/stakeholders will adhere to prescribed safety standards and operational norms. Trust promotes confidence amongst operators, stakeholders, and regulators and leads to a cooperative environment for the sharing of safety-related information, data, and ideas.

DAC Meeting June 19, 2020

At the virtual DAC meeting held June 19, 2020, Capt. DePete and Capt. Steve Jangelis presented a progress report of the task groups activities and reviewed the safety culture tenets. The DAC leadership accepted the report and first deliverable and scheduled the final task group report for the third quarter of 2020 DAC meeting.

Recommendations from the Four Subgroups

The four subgroups, Traditional (Manned) Aviation, Recreational/Community Operators, Small Commercial Operators, and National UAS Operators created recommendations which had commonalities and differences. Each group discussed “one size does not fit all” in terms of recommendations and processes. Each group worked to achieve an appropriate and proportionate set of recommendations based on operational risk of the individual community.

The commonalities across the four subgroups were most apparent in three areas. These areas included all subgroups’ recommendations reinforced and reflected the five safety tenets presented earlier in this paper. And within the tenets, trust surfaced again and again as a critical element of a safety culture. As trust is a two-way street, the bilateral relationship most often cited was between the FAA the cohort of each subgroup. Another area of commonality across the four subgroups was education, continuous learning, and a learning culture as a foundational characteristic of all operators and stakeholders in UAS. This learning culture is definitely an attribute identified in manned aviation and within existing UAS communities. Recommendations

Tasking Group 8, Safety Culture, 2020

relating to continuing education are in all the subgroups' recommendations. Finally, operator ownership and accountability surfaced as a recurring theme across all four subgroups.

The areas of differences across the subgroups emerged as each focused on their respective community or constituencies. The overall approach differed in how to promote a safety culture. Since a safety culture is a psychological aspect of aviation, the Recreational and Small Commercial groups recommended initiatives that foster and promote a safety culture and mindset and to introduce newcomers to aviation. The National UAS Operators subgroup proposed more legacy and procedural safety focused recommendations, whereas the Traditional (Manned) Aviation subgroup focused on recommendations for implementing safety culture driven by their experiences and associated risk of operations.

SUBGROUP REPORTS

1. TRADITIONAL (MANNED) AVIATION

Introduction

The Legacy Carrier Subcommittee submits three recommendations to encourage and grow a positive UAS safety culture. These recommendations are intended to be scalable and nimble enough to be applied to a variety of UAS operations, but are founded on decades of airline experience in managing risk. We believe that these recommended behaviors will positively contribute to the safety of all UAS operations, and, just as importantly, offer safety benefits to all those who are affected by UAS operations on the ground and in the air.

In order to illustrate the various tenets from which these recommendations were created, the legacy aviation group developed the following storyboard for review. The storyboard illustrates important elements of an evolution that has fostered unprecedented and sustained safety levels within the U.S. airline industry, and could be adapted to the UAS community.

Tasking Group 8, Safety Culture, 2020

| | | |
|--|--|--|
| <p>Tenet: Safety Ownership Foundational Audience: UAS Operators</p>  <p>Individual responsibility</p> <p>For the system to maintain a high level of safety, each individual within the system must commit to operate within the regulations, rules, best practices, and good behaviors set forth by the operating environment. This allows each participant to protect one another while operating in the environment.</p> | <p>Tenet: Learning Culture Foundational Audience: UAS Operators</p>  <p>Initial Education/Certification to include:</p> <ul style="list-style-type: none"> • Safety culture principles • Safety attributes • Hazard identification • Risk management • Lessons learned • Interaction between UAS operations and the NAS • Power of data sharing | <p>Tenet: Learning Culture Foundational Audience: UAS Operators</p>  <p>Continuing Education</p> <ul style="list-style-type: none"> • Seminars • Online classes • Certificates/awards/designations |
| <p>Tenet: Trust Foundational Audience: UAS Operators</p>  <p>A system is “a set of principles or procedures according to which something is done; an organized scheme or method.” The foundation of a positive safety culture begins with a common understanding of acceptable and unacceptable behaviors and trust that those behaviors are exhibited among all participants.</p> | <p>Tenet: Systemwide Approach Foundational Audience: UAS Operators</p>  <p>Encourage and support a voluntary reporting system</p> <ul style="list-style-type: none"> • Utilize NASA/ASRS • Leverage “if you see something, say something” • Consider recognition for witnessing/reporting unsafe acts | <p>Tenet: Systemwide Approach Foundational Audience: UAS Operators</p>  <p>Encourage mentorship through online community groups (with manned aviation participation)</p> <ul style="list-style-type: none"> • Facebook group • Snapchat • Slack • Future |

Tasking Group 8, Safety Culture, 2020

| | | |
|--|---|--|
| <p>Tenet: Systemwide Approach Foundational Audience: UAS Operators</p>  <ul style="list-style-type: none"> • Partner with manned operators to share best practices • Invite UAS operators to FAA Infoshare • Build UAS breakout group at Infoshare • Encourage adoption of SEs from UAST | <p>Tenet: Executive Level Leadership Development Opportunity Audience: UAS Operators</p>  <ul style="list-style-type: none"> • Leadership starts with a set of policies (SMS-like) • Scalable to the organization • Growth opportunity for operators, OEMs, MROs | <p>Tenet: Organization Values Development Opportunity Audience: UAS Operators</p>  <ul style="list-style-type: none"> • Values can be applicable to the smallest organizations • Provides a set of “rules” for how organizations operate |
|--|---|--|

Recommendation #1

The FAA should develop and adopt a UAS integration strategy that encourages “safety ownership” and a “learning culture” throughout the UAS community.

Safety ownership and a learning culture are foundational elements to the success of manned aviation. Each person in the industry, whether a pilot, dispatcher, mechanic, controller, ground worker, or other enter the legacy carrier industry with the knowledge that safety is a core value. Training and testing are extensive. Procedures are precise. Poor performance or mistakes are addressed through additional training. There is zero tolerance for intentional unsafe behavior. There is an expectation that each participant will have adequate knowledge of the rules and regulations that govern their responsibilities, be proficient in their duties, and act in a safe manner. By having the same mental model of safety, stakeholders can focus on their duties with the conviction that other stakeholders are working conscientiously to maintain safe operations for all users.

Safety ownership begins with the individual. During normal airline operations, hazards are encountered during each flight. These could be routine hazards such as weather or airport construction, or they could be new hazards not yet identified by the airline. Each person at the airline takes ownership of not only their own safety, but the safety of others and of the airline by observing various hazards and reporting safety concerns associated with the hazards. The success lies in the fact that every person in each employee group contributes to identify hazards. This allows the airline the opportunity to address concerns systemwide. Through this collaborative effort, the entire airline achieves the safety benefit. This type of mindset in which individuals not only address the hazards they encounter, but share their experience with others, is beneficial to all.

In addition, legacy carriers have an extensive continuing education program to ensure each individual is proficient in the regulations, procedures, and techniques that will support safe

Tasking Group 8, Safety Culture, 2020

operations. Employees are taught to think of what-if scenarios and to expect the unexpected while performing their normal duties. Each day at the airline can be different, and it is imperative to have the ability to recognize and react appropriately to threats. Education is continuous through various classroom sessions, evaluations, and testing. This process requires that each person remain proficient in safety-related duties. It further drives individual safety ownership and develops a learning culture. And although this learning is more structured at legacy carriers, the safety ownership mindset and continuous learning are scalable to any size organization and can be applied by individual operators.

There are several tools that foster safety ownership and a learning culture. First is the ability for operators to share their experiences. Today, pilots, dispatchers, mechanics, ATC, and cabin crew use the Aviation Safety Action Program and the NASA Aviation Safety Reporting System (ASRS) program to report noncompliance with FAA regulations and general safety issues, including proactive self-reporting. This is an invaluable tool to allow operators to share identified hazards with fellow operators. For example, any operator can query the ASRS database today for information related to a variety of parameters, including location and types of events. This knowledge could keep an operator from committing the same error. ASRS could easily be leveraged and adopted by the UAS community.

From a learning perspective, additional knowledge of safety culture principles, hazard identification, and risk management in the certification process could further enhance the personal responsibility of safety. The FAA should create or sponsor the types of courses described in the document and provide guidance and other resources regarding establishing safety ownership within an organization, with an emphasis on smaller organizations, including membership organizations and individual operators. Lastly, various offerings of seminars or safe operations awards could provide an environment of learning which could foster a positive safety culture.

We recognize that the UAS community must be involved in designing both the content and the mediums through which continuous safety learning is disseminated to all operations. With industry innovation and FAA encouragement, we foresee generations of self-aware and self-critical operators who strive on every flight to understand what they could do better or differently; who are voracious consumers of post-incident analyses and best practices information; who conscientiously evaluate risk before each flight and create a plan on how to best mitigate the risks present for that specific flight; and who are motivated to continuously learn and improve. The success of this effort is critical to improving safety among UAS operations, and in having UAS operations accepted by the public and, in busier airspace, by the manned aviation. This trust will be critical to industry growth.

Recommendation #2

The FAA should develop and adopt a UAS integration strategy that fosters the safety culture tenets of “trust” and facilitates a “systemwide approach” toward ensuring UAS safety.

Tasking Group 8, Safety Culture, 2020

Trust and a systemwide approach are two foundational elements needed to grow a positive safety culture. Trust begins with a common understanding of acceptable and unacceptable behaviors. When flying in the NAS, there is trust that all participants in the NAS will operate in accordance with the regulations and best practices that have kept us all safe. In addition to fellow aviators, the legacy airlines have also developed trust with the regulator. Several successful programs have been created to allow the airlines to partner with the FAA to enhance safety. Two of the most successful have been the Aviation Safety Action Program (ASAP) and the Flight Operational Quality Assurance Program (FOQA). The concept of both programs is that participants can openly and honestly share safety-related information with their employer and the regulator without fear of punishment or certificate action if certain criteria is met. These two programs have written agreements with the regulator to describe in detail which data will be collected, how it will be used, and what benefits operators have for participating. These agreements paved the way to build trust between the airlines, individual pilots, and the FAA. As a result, legacy airlines now see the regulator as a partner in safety rather than an adversary. This evolution has changed the typical interaction from a transactional, or even sometimes adversarial, exchange to one where the common goal is understanding why a situation occurred and what the most effective way is to ensure it does not reoccur. In order for this trust to be successful, it must be fostered systemwide. Each participant in the NAS must work together to find common ground, and individually and collectively strive for what is the best interests of safety.

Legacy carriers have over the years been successful in sharing information on a large scale with other carriers. Several carriers have informal subgroups that meet on a regular or as-needed basis to share information. These subgroups could be for ASAP issues, technical issues, or other threats to safety. In addition, most carriers participate in a biannual FAA “Infoshare” – an effective way to not only share safety insights and operational information with other carriers, but also meet and interact with regulators to build trust.

The FAA should work proactively with drone operators, associations, and OEMs, particularly those who have not yet had a “seat at the table,” to help develop trust in the utility of gathering operational safety data that is appropriately protected and used for continuous evaluation and risk mitigation. The FAA should consciously work to grow awareness and faith among UAS operators in the NASA ASRS program, and ensure that operators know that participation will not be detrimental to them. Similarly, the FAA should work with OEMs and associations to identify useful programs that could lead to better, FOQA-type insight based on large pools of appropriately protected data, which should be used to drive understanding of common risks and the development of solutions to those risks.

Lastly, a system-wide approach could be enhanced by the safety enhancement process, similar to those developed by CAST, could be an effective method to build a positive safety culture.

Tasking Group 8, Safety Culture, 2020

Recommendation #3

The FAA should create a UAS integration strategy that helps to grow the safety culture tenets of “executive level leadership” and “organizational values” into the DNA of the UAS community.

Executive level leadership begins with understanding the organization’s values. These values drive the role that safety plays in the organization. From these values, a set of policies by which the organization follows can be formed. In the air carrier world, these policies are outlined in one of the four pillars of the safety management system, otherwise known as the safety policy. The safety policy defines the value of safety in the business and operational framework of the organization. The safety policy confirms the organization’s commitment to safety and clearly indicates the priority safety has in the all aspects of the operation. Policies may include providing proper resources to perform safety-related duties, supporting employee reporting, or supporting good safety behavior while addressing unsafe behavior. These policies are clear and unambiguous and are supported by all levels of the organization. It provides the organization insight into priorities of the leadership and where the leaders stand on production versus protection. And while executive level leadership may only apply to larger MROs, OEMs, and Part 135 operators, the principles based in a commitment to safety are applicable to every organization and individual UAS operators.

Organizational values describe the core ethics or principles that an organization will abide by no matter the circumstances. In legacy carrier aviation, this normally begins with the safety policy. The safety policy, as defined by safety management system in Part 5 of the FAA’s regulations, must contain at a minimum the organization’s safety objectives, a commitment to fulfill those objectives, provision of necessary resources, definition of acceptable and unacceptable behavior, and an emergency response plan. These elements are scalable to any size organization, even individual operators. Each aviator should have the ability to commit to operate in accordance with certain principles that keep themselves and the public safe. As an organization grows, these values can be supported by executive level leadership through example.

In the UAS community, these concepts begin in the manufacturing of the vehicle and extend to the operator. Each vehicle manufacturer has a responsibility to design products that are safe for operations in the environment they operate within. What redundancies do the vehicles possess? How are updates to the software administered? What if the vehicle loses a signal? These are the types of questions executive-level leadership should be asking to ensure the safety of the community is at the forefront. Likewise, UAS operators can integrate these concepts into their operations evaluating factors such as preventative maintenance, and the operational risks associated with a particular location, type of flight, or weather conditions.

Organizational values can be developed through learning and implementing a SMS-like system for UAS manufacturers and operators. At a minimum, UAS manufacturers and operators should have basic principles from which they operate on a daily basis. These principles could be outlined in a company/operator safety policy. These could include weather minimums, population density

Tasking Group 8, Safety Culture, 2020

minimums, recency of experience requirements, and the like. A preflight risk assessment could also be a successful tool to ensure safe operations and build a positive safety culture. An important aspect of scalable risk management is that risk management ultimately is good business. By adhering to a few simple risk-management techniques, a UAS operator can avoid damaging or destroying their UAV, causing injury to persons on the ground or damage to property.

Focused guidance material, similar to Advisory Circulars (AC) and produced by the FAA, would help promote these organizational values. The challenge is how to reach the smallest UAS operators. Small UAS operators may not proactively interact with the FAA, such as by subscribing to the FAA's AC mail list or other agency resources. The FAA will need to find new ways to reach each segment of the UAS operator population; even if it doesn't exist today. We recommend the FAA look to other industries for examples. For example, like UAS, jet skiing was a new and relatively accessible entrant to the boating industry. Jet ski safety principles are published on various boating websites. Motorized scooter safety is published in car magazines and insurance websites. Social media groups may also be effective in highlighting UAS best practices. In short, a consistent message across multiple venues will help to produce buy-in from the majority of the community, including those who turn to resources other than those provided by the FAA, general aviation, and commercial aviation.

Thank you for the opportunity for the legacy air carrier group to provide the recommendations above. The successes of the airline industry in the development of safety programs are the result of several years of working together to find solutions to improve safety.

2. RECREATIONAL/COMMUNITY USERS

Introduction

Beginning in April 2020, individuals representing the recreational unmanned aircraft system (UAS) community, UAS manufacturing, educators, general manned aviation, and commercial manned aviation² participated in multiple virtual meetings and brainstorming exercises to address the tasking question, "What are ways we can help the drone community fully adopt the safety culture that is so ingrained in manned aviation?" The Recreational subgroup was asked to provide three recommendations to the FAA specific to the recreational community.

The Recreational subgroup began looking for data and safety issues to influence recommendations. The subgroup recognizes varying levels of risk with existing UAS operations and the importance to educate new and existing users on how to safely share the NAS. Aside from nefarious acts, outlier incidents, or the drone-sightings report that the FAA and Unmanned Aircraft Safety Team (UAST) determined were not credible³, the subgroup could not identify a

² Academy of Model Aeronautics, Air Line Pilots Association, Aircraft Owners and Pilots Association, DJI, The Global Air Drone Academy, FPV Freedom Coalition

³ <http://unmannedaircraftsafetyteam.org/wp-content/uploads/2018/01/UAST-Sightings-Executive-Summary-2017.pdf>

Tasking Group 8, Safety Culture, 2020

repeatable history of significant safety issues to mitigate. Therefore, the subgroup's recommendations focus on how the FAA can educate, reduce potential risks, and build rapport and trust with recreational operators while integrating in the NAS.

Manned aviation's culture of safety required decades to develop. Fostering a similar safety culture within the recreational UAS community, described by the FAA as "mostly new to aviation,"⁴ could likewise take years to implement. To expedite this effort, the Recreational subgroup does not recommend the FAA "reinvent the wheel," but instead build upon efforts that have been successful in the manned community. The subgroup also recommends the FAA leverage the successful safety programs that have been demonstrated with over a century of safe recreational UAS operations.

The FAA forecast estimates today's population of recreational UAS community to be over a million and growing⁵. This means there will be more recreational UAS than commercial for the foreseeable future. Given the importance of recreational UAS and the anticipated growth of the UAS industry as a whole, the Recreational subgroup recommends the FAA strive to put recreational UAS communities on an even footing with the leading organizations of the FAA DAC, FAA Safety Team, and UAST. The recommendations below strive to articulate the FAA should reach out to recreational operators as well as integrate them within FAA-related organizations which influence UAS policies and regulations.

Recommendation #1

The FAA should work with the community, influencers, events, and grassroots efforts to build trust among the drone community.

Tenets

Trust, safety ownership, safety modeled by leadership, learning culture, systemwide approach

Recommendation Summary

The DAC TG8 Safety Culture Recreational subgroup recognizes the ongoing efforts by the FAA to help educate and promote UAS safety through "Know Before You Fly" and incorporating educational elements within the DroneZone registration portal. To amplify and lend credibility to FAA's safety message, the Recreational subgroup recommends the FAA more closely partner with UAS community influencers and participate at UAS industry-led events. Equally important, the FAA does not have the resources to educate and enforce, therefore should look to the community to foster a safety culture.

1. Work with UAS Community Influencers

While the FAA continues to work with the UAS community, the Recreational subgroup recognizes a lack of trust between the operator and FAA. While trust is being established, the

⁴ FAA Tasking to DAC February 27, 2020

⁵ https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=23575

Tasking Group 8, Safety Culture, 2020

FAA should work with well-respected, trusted, and influential UAS operators to champion a safety culture. Influencers within the UAS community include those with a large following in social media, event coordinators, community-based organizations, hobby shops, and retail outlets.

The FAA should seek and assist these influencers with safety messaging while allowing each influencer to maintain their own tone and persona. UAS influencers must remain compelling and genuine to create safety ownership and allow safety to be modeled by leadership. In the manned and unmanned communities, both the Aircraft Owners and Pilots Association (AOPA)⁶ and the Academy of Model Aeronautics⁷ successfully look to influencers to foster a safety message.

The FAA should provide positive safety messaging and not a long list of “thou shall nots.” The FAA should also provide influencers with the most important and critical messaging instead of overwhelming audiences with a long list of guidance and regulations. The Recreational subgroup recommends topics include identifying safe airspace, educating UAS operators they are part of a larger aviation community, and promoting continuing education that is successful in the manned community such as the WINGS Pilot Proficiency Program.

2. Participate in UAS Industry Lead Recreational Events

This recommendation mirrors FAA’s successful efforts to build trust and create a learning culture in the recreational manned community. The FAA and FAA Safety Team members regularly participate in commercial UAS⁸ and recreational manned events such as EAA’s AirVenture or Sun N’ Fun⁹ to positively engage with operators and conduct educational workshops. The Recreational subgroup strongly recommends FAA’s participation at UAS recreational events to foster a learning culture. The FAA should attend events with the primary intent to educate and build trust and not to impose their authority on regulatory and policy matters.

The Recreational subgroup is concerned the FAA does not yet fully understand the diversity of the UAS community, compromising trust between UAS operators and the FAA. The safety mindset of a Fédération Aéronautique Internationale AMA F3A model aircraft hobbyist is likely different than a casual recreational drone photographer. By attending recreational UAS events, the FAA can learn more about the diversity of the UAS community, witness successful mitigation efforts that are already enhancing safety, and allow operators/stakeholders to provide constructive input. This allows the FAA to be more effective in safety messaging as the FAA will better understand the diversity of the recreational UAS community as well as it understands the diverse manned community.

⁶ <https://www.aopa.org/news-and-media/all-news/2019/july/26/the-aviation-stars-have-aligned>

⁷ <https://www.youtube.com/watch?v=Ay7iKzN5Pxs>

⁸ https://www.faa.gov/news/speeches/news_story.cfm?newsId=21654

⁹ https://www.faa.gov/news/speeches/news_story.cfm?newsId=22956

Tasking Group 8, Safety Culture, 2020

Recommendation #2

The FAA should further integrate recreational UAS manufacturers, community-based organizations, and recreational stakeholder leaders into its advisory and policy processes, so that this long-standing and evolving segment of recreational aviation has an equivalent “seat at the table” comparable to segments of manned aviation. More robust bidirectional collaboration is crucial to building trust and helping the drone community “fully adopt the safety culture that is so ingrained in manned aviation.”

Tenets

Trust, safety modeled by leadership, organizational values, learning culture, systemwide approach

Recommendation Summary

The Recreational subgroup appreciates the FAA’s work with stakeholder leaders through the Drone Advisory Committee (DAC), UAS Symposium, and the UAST. The FAA has also established the FAA Unmanned Aircraft Systems Integration Office to continue collaboration between stakeholders. The Recreation subgroup asks the FAA to actively seek meaningful input, celebrate accomplishments, and recognize diversity within these efforts.

1. Actively learn and implement stakeholder guidance from those who have successfully created a safety culture and record, and recruit recreational operator stakeholders to participate in FAA UAS engagement efforts such as the DAC, UAST, UAS Symposium sessions, LAANC, Remote ID and UTM cohorts, etc.

FAA collaborative efforts seem to be focused on commercial UAS integration with the occasional effort to solve perceived issues with the recreational community, such as this DAC tasking. While these are valuable exercises in fostering safety in the NAS, the Recreational subgroup asks the FAA to also seek and implement safety recommendations from stakeholders as outlined in the trust tenet. Implementing stakeholder input is also mandated to the FAA by Congress. Congress has directed the FAA to coordinate with community-based organizations to establish a set of safety guidelines¹⁰ and to consult with stakeholders to periodically update operational parameters¹¹.

The FAA should identify and collaborate with community-based organizations as other Civil Aviation Authorities (CAA) in England, Canada, and Australia have done. These CAAs look to community-based organizations to safely integrate recreational users and promote a culture of safety. A key initial step is for the FAA to define the organizational criteria and identify community-based organizations with a commitment to safety.

2. Recognize safety modeled by leadership and celebrate recreational achievements.

¹⁰ FAA Reauthorization Act of 2018 § 44809 (a) (2)

¹¹ FAA Reauthorization Act of 2018 § 44809 (d) (1)

Tasking Group 8, Safety Culture, 2020

The FAA regularly celebrates the safety record and achievements in the manned community and should do the same for the recreational UAS community. While perhaps unintentional, the FAA reinforces a negative perception of the recreational UAS community by regularly seeking information to publish quarterly drone sighting reports¹² and producing videos of “Buzzy the Drone” spying on neighbors.¹³ FAA’s recent news feed on recreational UAS also reinforces a negative perception that many drones are operated with “minimal training or knowledge of aviation rules or safety practices”¹⁴ and even imply it’s a crime to simply fly a drone anytime during the Independence Day holiday.

While the incidents thus far between manned aircraft and UAS have not caused any fatalities, we acknowledge and accept that they may have been performed by recreational users; the FAA should also recognize the great safety record in the recreational community and stop reinforcing a perception that recreational users are careless, clueless, or criminal. In the United Kingdom last year, a comment during parliamentary testimony by a NATS official referring to drone users as “clueless, careless or criminal” triggered much outrage from the UAS community and led to an apology by the official¹⁵. Terminology that characterizes drone operator behavior in these types of blunt and derogatory ways undermines trust and impedes the development of a safety culture. All six safety tenets will be addressed by showcasing successful safety enhancements and programs implemented by stakeholders in the recreational community.

3. One size does not fit all.

As noted in Recommendation 1, while the FAA continues to learn about the recreational UAS industry, it should adopt messaging and guidelines specific to the diversity of the hobby. The FAA should lean on subject-matter experts to accomplish this recommendation. In the manned community, the FAA regularly seeks input through public private partnerships. Recognizing the diversity within the manned community, the FAA co-chairs with industry in the General Aviation Joint Steering Committee and the Commercial Aviation Safety Team. Similarly, the FAA should consider less one-size-fits-all government-industry UAS collaborations. For example, the current Unmanned Aircraft Safety Team (UAST), similar to manned aviation, could be divided into a recreational safety team and a commercial safety team.

Recommendation #3

The FAA should extend its safety information outreach and messaging to the general public through the use of public service announcements (PSAs) embedded in commercial media, social media, and within the content on popular streaming channels. This messaging should promote

¹² https://www.faa.gov/uas/resources/public_records/uas_sightings_report/

¹³ <https://www.youtube.com/watch?v=XOkRdUQBCUw>

¹⁴ <https://www.faa.gov/news/updates/?newsId=94805>

¹⁵ See <https://www.businesstraveller.com/business-travel/2019/06/28/nats-apologies-for-calling-drone-users-clueless-careless-and-criminal/> and https://www.theregister.com/2019/06/27/drone_fliers_clueless_careless_criminal_nats/

Tasking Group 8, Safety Culture, 2020

the social, cultural, and economic benefits of UAS while promoting the safe and responsible operation of UAS.

Tenets

Organizational values, learning culture, systemwide approach, safety modeled by leadership.

Recommendation Summary

The Recreational subgroup believes recommendations one and two will capture a large portion of the recreational community; moreover, the subgroup believes the FAA must also reach individuals outside those communication channels. In addition, the FAA should educate the general public to help promote a culture of safety through a greater understanding and acceptance of UAS.

1. Safety should always be the underlying message in all communication.

Similar to the manned community, safety must drive all messaging from the FAA. Recreational UAS messaging should not be heavily focused on the negative actions or risks caused by outlier operations. Rather, the FAA should promote recreational UAS safety while celebrating successful efforts to inspire operators to adopt the safety ownership tenet. This will lessen the general public's negative drone stigma, in particular for commercial operations. Studies indicate the general American public is "more broadly accepting of drone use by private citizens"¹⁶ or operations by "hobbyists"¹⁷ and are more concerned about commercial or surveillance operations. The FAA is not only harming the tenuous trust between recreational operators and itself but could inadvertently harm commercial integration with messaging aimed to mitigate outlying nefarious operations.

2. Avoid negative training; the tone should be positive as it is in the manned community.

The FAA has established a great safety record and culture within the manned community through ongoing partnerships with other organizations such as the European Aviation Safety Agency, the International Civil Aviation Organization, and Transport Canada Civil Aviation. They have also established training such as the WINGS program and active collaboration with stakeholders such as AOPA. Likewise, the FAA should incorporate more positive messaging in the FAA's recreational UAS messaging. Other recreational entities have adopted safety messaging¹⁸ that focus on simple and easy tips to conduct safe operations instead of negative messaging to foster a safety culture.

3. Partner with existing platforms and other educational entities.

¹⁶ <https://www.pewresearch.org/fact-tank/2017/12/19/8-of-americans-say-they-own-a-drone-while-more-than-half-have-seen-one-in-operation>

¹⁷ <https://www.forbes.com/sites/stephenrice1/2019/02/04/eyes-in-the-sky-the-public-has-privacy-concerns-about-drones/#3bb3ed236984>

¹⁸ <https://www.check3gps.com/>

Tasking Group 8, Safety Culture, 2020

The FAA regularly collaborates with industry organizations like EAA, ALPA, and AOPA as well as manufacturers. Likewise, the FAA should work more closely with UAS recreational entities to influence the safety ownership, safety modeled by leadership, and organizational values tenets.

The FAA should also look outside the aviation industry such as other transportation organizations like the National Highway Traffic Safety Administration's active efforts to produce public service announcements and purchase ad space to disseminate safety messaging in broadcast, streaming channels, and display ads¹⁹.

The FAA and stakeholders should encourage youth to become deeply involved in UAS. Members of the Recreational subgroup recognize that at first youth generally think of UAS as toys. However, this view is quickly dispelled once children and young adults are involved in the design, construction, and operation of UAS. After attending a drone camp at the Global Air Drone Academy²⁰ one of the students shared, "I learned that drones are not just some toy and there's way more ways to use them." Parents support the education of their children in new technology as one parent shared, "Kids need to have a wealth of knowledge and it [is] good to be exposed to different technologies." Educators have incorporated Aeromodelling into the classroom for decades as a means of teaching STEM curriculum. The FAA should consider working with curriculum writers and educators to encompass UAS safety messaging into the syllabus. Mason Hutchison Design Engineer for the Stratolaunch²¹ and Aerospace Engineer Burt Rutan²² point to UAS as vital to the development of their careers and key to their passion in aviation. AMA Life member astronaut Neil Armstrong stated, "My model building and flying activities significantly contributed to my interest in aeronautics and was a primary force in directing my education toward aeronautical engineering."²³

3. SMALL COMMERCIAL OPERATORS

Introduction

The Small Commercial subgroup was composed of a diverse team with representation from manned and unmanned aviation with representatives from Aerospace Industries Association, Air Line Pilots Association, Aircraft Owners and Pilots Association, Academy of Model Aeronautics, Boeing, BNSF Railway Company, Dallas Police Department, Da-Jiang Innovations, DRONERESPONDERS, First Person View Freedom Coalition, Influential Drones, and The National League of Cities. It met weekly 13 times between April and July of 2020 and has researched safety culture including hosting a guest speaker from AOPA. One academic paper²⁴

¹⁹ <https://www.nhtsa.gov/>

²⁰ <http://globalairdroneacademy.org>

²¹ Smith, Jay. "I Am The AMA" *Model Aviation*, June 2019 p. 144

²² Rutan, Burt. Keynote speaker. AMA Expo 2010.

²³ Haughn, Rachelle. "One Small Step with Model Aviation" *Model Aviation*, June 2019, p. 18

²⁴ Safety Culture: An Integration of Existing Models and a Framework for Understanding its Development. T. Bisbey, et al, July 2019, Rice University, Department of Psychological Sciences

Tasking Group 8, Safety Culture, 2020

resonated with the group in studying safety culture as a study in psychology and cited seven factors required to transform a safety culture include:

1. Leader commitment and prioritization of safety;
2. Policies and resources of safety;
3. Group cohesion;
4. Psychological safety;
5. Safety knowledge;
6. Employee/member sense of control; and
7. Individual commitment to safety.

This paper underscored the importance of transforming culture as a psychological effort. The paper also reflected the six tenets all the subgroups of TG8 created.

The Safety Culture Small Commercial subgroup created recommendations in support of the TG8 safety culture tenets and agreed its recommendations must incorporate reasonable and proportionate rules relative to risk of operation²⁵. All the recommendations created by the Small Commercial subgroup include specific suggestions not to be overly prescriptive but to share the insight of the subgroup.

The Safety Culture Small Commercial subgroup also evaluated a self-assessment used by municipal fire companies to measure safety capabilities. The subgroup concluded this type of assessment may be applicable to UAS safety measurement.²⁶

The team also conducted a five-question survey on 12 popular Facebook groups and gathered 123 responses. While this number is not viewed as sufficiently large to be able to extrapolate the responses to all Part 107 operators in the USA, the survey provided primary research and surprised a number of members on the Small Commercial subgroup with some answers. The assertions from the survey²⁷ include:

1. UAS commercial operators have a predisposition that the FAA prefers a nonconfrontational approach when first addressing minor or inconsequential safety violations.
2. UAS commercial operators have evolved their perception of UAS. As they gain experience, they view a drone as a serious aircraft.

²⁵ From DAC TG8 Safety Tenets, Systemwide Approach

²⁶ Commission on Fire Accreditation International. Interpretation Guide for the 9th Edition of the Fire and Emergency Services Self-Assessment Manual (FESSAM), September 2015

²⁷ We drafted a five-question survey and posted on 12 popular Facebook groups which represent the several hundred thousand recreational and commercial UAS operators in the USA. We received 123 responses from the commercial groups and 174 from the recreational groups.

Tasking Group 8, Safety Culture, 2020

3. When offered the choice, the survey respondents expressed a preference in receiving educational material on significant subjects such as emergency procedures over more customary topics such as safe battery use and propeller precautions.

TG8, UAS Safety Culture—Small Commercial subgroup

Recommendation #1

UAS Education utilizing the existing FAAS Team

The DAC TG8 Safety Culture Small Commercial subgroup recommends the creation of UAS safety education program using the existing structure and organization of the FAA Safety Team (FAAS Team)²⁸. The mission of the FAAS Team is to promote aviation safety. Within the current structure, a national FAAS Team Performance plan (NPP) would be provided to each Flight Standards District Office (FSDO) in the country. A FAAS Team program manager (FPM) at each FSDO would then distribute and assign the goals to their teams within the FAAS Team program. Content would be created by FAAS Team lead representatives and industry members following the NPP. Once approved by the FPM, seminars and webinars will be available to the community and shared between FSDO FPMs.

In addition to utilizing the FAAS Team structure, the Small Commercial subgroup also recommends using the existing WINGS program which is a pilot proficiency program. The recommendation of the subgroup is to incent current Part 107 certificate holders to take Safety and relevant courses recognized by the FAA as maintaining Part 107 proficiency and negating the need for an individual to take a Part 107 renewal test. In other words, current Part 107 certificate holders would have the choice of renewing their Part 107 certificate by taking a renewal test or by passing an FAA-determined number of safety or safety-relevant courses offered via WINGS. This rapid accommodation for the aviation community by the FAA demonstrates the FAA's interest in the safety and health of all aviators. By developing the FAAS Team and WINGS program, the FAA could extend their reach while promoting safety in a unified way. As of September 2020, there were 191,570 Part 107 certificate holders, of these, only 67,590 have faasafety.gov accounts.²⁹ The subgroup asserts it is probable that the number of Part 107 certificate holders using faasafety.gov would increase if offered this renewal incentive. This program may also encourage recreational UAS operators to seek Part 107 certification. This program may also promote the NIST and ASTM Standard Test Method for Small UAS as this set of tests becomes popular³⁰.

The Small Commercial subgroup agreed the following type of information provided in WINGS courses would be of use to Part 107 UAS operators:

²⁸ Information on FAAS Team may be found at <http://faasafety.gov>

²⁹ FAASAFETY.gov

³⁰ Measuring and Comparing Small UAS capabilities and Remote Pilot Proficiency, version 2020B, website: RobotTestMethods.nist.gov

Tasking Group 8, Safety Culture, 2020

- a. Primer on creating emergency planning, drawn from manned aviation experiences
- b. Preflight planning training including the use of a flight risk assessment tool and the importance of situational awareness
- c. Prevention of injury to operator and spectators
- d. Links to Preflight guidance including propeller and battery safety (videos)
- e. Links to preventing property damage (videos)

Tenet Coverage

Safety ownership, safety modeled by leadership, learning culture, systemwide approach

Recommendation #2

Safety Culture Self-Assessment

The DAC TG8 Safety Culture Small Commercial subgroup recommends the creation of a safety culture self-assessment tool for small commercial UAS operators to measure their safety culture and identify areas of improvement. A self-assessment tool should consider the relatively low risk presented by sUAS operations and reflect the fact that there have been zero fatalities due to electric-powered commercial sUAS in the U.S. Small UAS operators have a predisposition to the FAA's educational approach to enacting policies which has created a self-assessment climate that stresses the proportionality of risk to regulations within UAS flight and flight preparation. The self-assessment tool should use all available resources and data to help the small UAS commercial operator maintain the highest levels of safety that the electric powered UAS community currently cite within the U.S. This will help communicate a self-assessment as an ongoing process of continual improvement. Extending beyond utility or use of aircraft, this process creates a community beyond the individual small business model. Small UAS business could compare themselves with other communities across the NAS.

The idea of a self-assessment is to share subject-matter expertise on these important aspects of safety and to introduce other ways to improve safety in a company or community (e.g., leadership, safety guidelines which the company or community practice, and a penalty-free zone for discussing how to improve safety).

Tenet Coverage

Safety ownership, learning culture, systemwide approach, trust

Recommendation #3

Flight Risk Assessment Tool

The DAC TG8 Safety Culture Small Commercial subgroup recommends the addition of a flight risk assessment tool (FRAT) matrix to LAANC and B4UFLY. A presentation of FRATs at the 2019 Police Aviation Conference by PublicSafetyAviation.org presented FRATs as a critical element in any SMS program. In addition, the FAA has supported FRATs for manned aviation repeatedly in

Tasking Group 8, Safety Culture, 2020

at least three publications.³¹ FRATs frequently use an acronym of “PAVE” (pilot, aircraft, environment, external pressures) to delineate the sections of the FRAT. Using a subset of topical categories commonly used under each section of PAVE would enable the FAA to use general aviation terminology with UAS, which would create a common safety language between UAS and general aviation.

The recommendation for this FRAT would be a simple reminder for UAS operators and would not be a record of an operator’s “fit for duty” status. Rather, this information would display within a LAANC application. Today, AirMap and Skyward both use a FRAT and the information is significantly more detailed than the brief PAVE elements suggested here. The Small Commercial subgroup felt it is important to keep this simple and absolutely not transmit a pilot’s assessment of “fit to fly” to an LAANC application provider and B4UFLY. The objective as described above is to begin to teach the UAS operator a common safety language for the NAS.

The Small Commercial subgroup researched a number of FRATs including those used in AirMap and Skyward and suggest these elements as a good starting point to trigger the UAS operator to think about flight risk assessments.

Pilot-in-Command (P)

- Illness
- Fatigue
- Flight experience

Aircraft and Equipment (A)

- New or upgraded equipment
- Performance and aircraft weight
- Flight duration

Environment (V)

- Weather: Visibility and wind
- Terrain: Urban, rural, remote, mountainous
- Ground obstructions: e.g. power lines, tall trees, cell phone towers
- Time of day

³¹ Risk Management Handbook https://www.faa.gov/news/safety_briefing/2016/media/SE_Topic_16-12.pdf

Information for Operators memo:

https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2007/inF007015.pdf

FAAST (FAA Safety Team) document:

https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/media/FAA-H-8083-2.pdf

Tasking Group 8, Safety Culture, 2020

External Pressures (E)

- Budget or time pressure to complete flight for client
- Ground personnel expectations
- Organizational openness to cancel flight due to safety risks
- Understand local regulations and requirements

Tenet Coverage

Safety ownership, safety modeled by leadership, organizational values, learning culture, systemwide approach, trust.

Tasking Group 8, Safety Culture, 2020

Assumptions

Manned aviation has made jumps in safety progress as a reaction to tragedies costing many lives. While the Safety Culture Small Commercial subgroup recognizes the inherent risks of integrating UAS in the NAS, it is important to note Small Commercial UAS operations have had zero deaths in the U.S. This data point is significant in there are tens of millions of flight hours by UAS each year. While the topic is beyond the scope of this effort, the subgroup spent significant time discussing appropriate safety metrics for UAS. The group concluded UAS related fatalities should be one of the metrics of UAS safety.

Small Commercial UAS operations are primarily interested in

- UAS ground and flight operation without operator or spectator injury
- UAS flight operation without damage to property
- UAS flight operation without impacting a manned or unmanned aircraft

Small Commercial UAS operations consider much of safety overhead as unnecessary

- Having to report safe operations or self-report a safety infraction
- Having to take formal UAS safety training without understanding the benefit
- Seeing a cost benefit of instilling a safety culture across the company

Issues

1. Representation and access to small commercial operations. There are different views on if the small UAS commercial operators exist as a community. Also, does the DAC have access to this cohort? And, is this cohort adequately represented on the DAC?
2. Small commercial operations do not trust the FAA. Within manned aviation, there is a good level of trust between pilots and the FAA. This does not exist between UAS operators and the FAA. The subgroup feels the UAS small commercial community is at an early stage today—we are where manned aviation was 40 years ago.
3. Aviation mindset. There is concern that small commercial operations have a view that UAS are a tool rather an aviation is a vocation and that UAS are aircraft with all the responsibilities of piloting an aircraft in the NAS.
4. Small commercial operations are sensitive to expenditures. As the benefit of a safety culture is unknown, small commercial operations don't see the need to invest in nurturing a safety culture.

Tasking Group 8, Safety Culture, 2020

Reference Documents

1. Facebook surveys
2. FAA Part 107 exam (prep docs)
3. FAA Safety Management System Manual, April 2019
4. ICAO Global Aviation Safety Plan, 2020-2022
5. Helicopter H-SE 19A: Safety Culture. H-SE-19A is described in the USHST LOCI UIMC LALT Final Report
6. "What Is a Safety Culture?" November 18, 2018, AOPA Safety Staff Institute
7. "What Is a Safety Culture and How Do I Get One," January 20, 2019, AOPA Safety Staff Institute
8. "Safety: What's Your Club's Safety Culture," August 19, 2018, AOPA Safety Institute staff
9. UAST "Unmanned Aircraft Safety Team (UAST) Recommendations for using Safety Management Systems (SMS) in UAS Operations," UAST SMSGuidance_rev1.1.121419
10. Risk Management Handbook, US Department of Transportation, 2009, FAA-H-8083-2
11. AirMap
12. Skyward

4. NATIONAL UAS OPERATORS

Introduction

The National UAS Operators subcommittee focused primarily on the safety tenets the larger committee group provided and how they fit with a national operator.

Typically, national operators are larger/mature companies that utilize UAS in support of their regular business and have a significant quantity of flights using a variety of aircraft and manage operations in varying conditions (day, night, challenging weather etc.). Use cases include reducing the safety risk by providing an alternate means of completing tasks such as security overflights, surveying, incident response, difficult inspection (bridges over canyons), etc. In many cases, national operators will have well founded, highly focused safety teams, processes and procedures, and safety is a key part of the culture. This will include the expected safety manuals, employee safety rules, and general organizational oversight that match well with aviation risk reduction policies and procedures. It is assumed that the policies and procedures are complimentary with any UAS specific FAA SMS, FAA Part 107 and related rules.

Recommendations

For complex BVLOS operations, utilize the existing manned FAA Safety Management System policies and procedures—including some of the policies that have been adapted for UAS BVLOS operations in the NAS.

- As part of this recommendation, the general assumption is that a great many of the scaled operators utilize active commercial/general aviation pilots with instrument ratings/experience and that at least at current time, larger-scale BVLOS operations would benefit from closely aligning with existing FAA SMS policies and procedures.

For operations that require less complex BVLOS and/or LOS, yet might not utilize more complex aircraft, especially when the aircraft are less than 55 pounds, then a more graduated approach as outlined by other task groups and by the TG8 safety tenets should be followed.

Risk-based/performance-based safety policies should be leveraged so that observance of the safe operating requirements are a “natural fit” with the overall operation and the established safety culture of the organization.

Ensure that national UAS operators provide training, governance, and continuing education opportunities for its UAS pilots.

- Where possible, elements of the larger operator’s programs should be shared with regional/local operators to establish mutual best practice collaboration.
- The information sharing outlined will also help align with other TG8 subgroups’ concerns that a broad-brush, one-size-fits-all approach will overly burden smaller

Tasking Group 8, Safety Culture, 2020

operators and could also inhibit the gradual progress of reducing complexity from all UAS operations (large and small) without minimizing safety.

- Complex safety requirements could lead to reduced compliance by operators large and small

Ensure national UAS operators adhere to the safety tenets provided by Task Group 8.

Assumptions

National UAS operators are aware and operate under both federal and state rules, regulations, and requirements for UAS operations.

Tasking Group 8, Safety Culture, 2020

Appendix A: Task Group 8 Safety Culture Leadership Team

| Coleaders | |
|------------------|---------------------------------|
| Traditional | Houston Mills / Lorne Cass |
| Recreational | Rich Hanson / Chad Budreau |
| Small Commercial | Dave Messina / Brendan Schulman |
| National | Todd Graetz / Catherine Self |
| ALPA | Steve Jangelis / Mark Reed |

Appendix B: Task Group 8 Safety Culture Membership

| Name | Company |
|--------------------|---------------------------|
| Brendan Schulman | DJI |
| Brian Wynne | AUVSI |
| Catherine Self | BNSF |
| Chad Budreau | AMA |
| Charles Werner | DRONERESPONDERS |
| Christopher Cooper | AOPA |
| Christopher Julius | AA |
| Dan Dalton | Airspace |
| Dave Krause | Influential Drones |
| Dave Messina | FPV Freedom Coalition |
| Duane Pifer | UPS |
| Diana Cooper | HATCI |
| Houston Mills | UPS |
| Jim Ackerson | UPS |
| Joe DePete | ALPA |
| Lorne W. Cass | AA |
| Mark Aitken | DJI |
| Mark Bair | Aviation Manuals |
| Mark Colborn | Dallas PD Helicopter Unit |
| Mark Reed | ALPA |
| Max Fenkell | AIA |
| Nick Dryer | BNSF |
| Randy Kenagy | ALPA |
| Rich King | AUVSI |
| Richard Hanson | AMA |
| Stella B Weidner | Boeing |
| Steve Jangelis | ALPA |
| Steven Hansen | NATCA |
| Todd Graetz | BNSF |
| Tony Nannini | Google |
| Tony Walsh | NATCA |
| Vas Patterson | ALPA |
| Wade Troxell | Mayor Fort Collins CO. |

FAA RESPONSES TO
TASK GROUP 5
RECOMMENDATIONS –
FACILITY MAPS



Drone Advisory Committee

October 22, 2020 DAC Meeting • Virtual

DAC UAS Facility Maps Tasking Group Problem Statement:

The FAA DAC UAS Facility Maps Tasking Group has determined the UAS Facility Maps should be refined. Three years have passed since the initial creation of the UAS Facility Maps. Technology has evolved and data now exists to support a refinement to more precisely define appropriate safety margins of UAS flying near airports in controlled airspace. The UAS Facility Maps Tasking Group acknowledges that some airports have zero, or unnecessarily low, AGL UAS limits where UAS may be allowed to fly safely. Similarly, there are some airports with grid squares with allowable altitudes that may conflict with common manned aircraft flight routes.

Recommendations include the topics of:

- Grid square refinement, proposed changes from grid square size and treatment today
- Pilot Program, using data and experience, proposals to prioritize and roll out refinement of UAS Facility Maps
- Greater stakeholder input will be essential in the UAS Facility Maps refinement
- Reassessment of UAS Facility Maps within Class E airspace

DAC Recommendation – UAS Facility Maps Grid Refinement:

The Tasking Group recommends the FAA utilize manned aircraft airspace protection surfaces, air traffic surveillance data, Obstacle and Obstruction data as well as experience gained from the three years use of UAS Facility Maps, to provide more precise guidance to Facility Management. The Tasking Group recommends that the refinement process ultimately be applied to all classes of controlled airspace (Class B, C, D and E) in proximity to airports.

The current UAS Facility Maps are comprised of grid squares that are rectangles of one minute of longitude by one minute of latitude (roughly one mile square). The initial recommendation is to refine the standardized grid spacing to 30 seconds of latitude by 30 seconds of longitude, creating four rectangles where one was initially defined. This recommendation will allow greater UAS utilization of airspace immediately by reducing the amount of area covered by a single number.

It is recommended that further refinement of UAS Facility Maps should incorporate a standardized approach when reviewing and assigning grid squares altitude ceilings around airports. This will help ensure consistency, where appropriate, across the NAS. Utilizing an existing standard such as those found in TERPS or Part 77, intended to protect manned operations, or modifying such a standard to fit the UAS use case, would help by establishing a more formulaic approach to use when determining separation requirements for UAS.

Using a standard like this should in most cases allow a consistent formula to be applied as the baseline.

For example, the lateral areas to the sides of runways have aircraft operating at higher altitudes than areas aligned with approach departure paths. Known alternate routes, such as those routinely used by helicopters, should be protected based on established routes or customary altitudes.



Drone Advisory Committee

October 22, 2020 DAC Meeting • Virtual

Working from this baseline, other considerations can then be evaluated to customize the UAS Facility Maps to reflect local conditions:

1. Surveillance Data – It is possible that protection surfaces are provided for existing procedures and or traffic patterns however, due to lack of use or other considerations, these procedures and/or traffic patterns are not used. Reviewing surveillance data can allow theoretical protections to be adjusted to reflect actual utilization, however, it is understood many areas, particularly at low altitude, do not have adequate surveillance data to make a determination on manned operations.
2. Shielded Operations - The UAS Facility Maps Tasking Group recommends the FAA establish a process to facilitate Shielded Operations in the NAS as soon as practicable because Shielded Operations will have an easy-to-understand explanation and will convey a positive sentiment to new recreational Fliers. Shielded Operations will convey an acceptance of recreational UAS Fliers and at the same time reinforce the critical safety requirements of flying below the top of obstacles and structures when flying under Shielded Operations.

Shielded Operations could be defined as flight within close proximity to existing obstacles and not to exceed the height of the obstacle. This should be considered to enhance access to the NAS for both Part 107 and recreational UAS pilots. This is already partially contemplated in 14 CFR 107.51(b)(1) and New Zealand uses a similar concept. This model could be implemented in a number of ways. FAA could use a data driven approach and map existing survey or other obstacle data for reference on UAS Facility Map grid squares or could use a case by case approval mechanism for shielded operations. Both of these approaches seem to have challenges including high workload and limited returns in terms of enhanced access to airspace. The Tasking Group recommends a blanket rule-based approach that includes automated approvals via the LAANC system as this removes the need to make case by case determinations or to try and define these altitudes on UAS Facility Map grid squares. One key aspect of this recommendation is the incorporation of shielded operations into the LAANC system, this may also serve to facilitate UAS manufacturer geo fence unlocking. This could be a simple button or switch that can be utilized when making a LAANC request. If a request for a shielded operation is made, the LAANC system would automatically generate the approval without respect to the grid square altitude. The system would explicitly state and gain confirmation from the pilot that the flight would be entirely flown within the confines of the shielded operation requirements or the existing grid square altitude. Grid squares should be coded in metadata by FAA as either eligible or ineligible for this automated shielded operation approval and this would be critical in ensuring the safety and security interests of airports and other facilities where such limitations might be warranted. As stated in the stakeholder recommendations, the Airport Operator/Sponsor should be included in all discussions about restrictions in the immediate airport area due to security and other operational concerns.



Drone Advisory Committee

October 22, 2020 DAC Meeting • Virtual

For potential future consideration, Shielded Operations in New Zealand, provides for approved night flying and has eliminated the requirement for prior authorization. The DAC UAS Facility Map Tasking Group proposes the FAA consider these two features of Shielded Operations separately from Shielded Operations incorporation in UAS Facility Map refinement as proposed in the preceding paragraph.

3. Gained Operational Experience – Over the last three years UAS activity has been allowed in controlled airspace. Reviewing the “approvals” and “denials” for UAS flights in these controlled airspace environments can help in the refinement process (i.e. If UAS flight requests above the existing grid altitude is consistently approved that would suggest the altitude in that grid could be increased).
4. Low Altitude Operations - Low altitude operations are a consideration in the assumptions of defining UAS Facility Maps, however, certain manned operations have not been fully considered in multiple instances. For example, the New York South Shore route near JFK is flown by helicopters at altitudes below 500’ AGL but the UAS Facility Maps approve UAS operations up to 400’ AGL, which creates a conflict with charted and routinely utilized manned flight route. Additionally, private airports in surface areas are not always fully considered. It is important the FAA provide additional guidance on other types of low altitude operations, like helicopter routes and private airports, to ensure safe integration.

The Tasking Group also recommends that the FAA investigate the possible use of dynamic grid maps which may be adopted by the local team wherein the grid square altitudes change based on the utilization of specific runways.

DAC Recommendation – Pilot Program:

The DAC UAS Facility Maps Tasking Group recommends a process of refining UAS Facility Maps across the Country incorporating a criterion to determine prioritization of the modification rollout. Within that prioritization, the first airports participating in the UAS Facility Maps refinement form a pilot program (approximately 10 airports) including a broad cross-section of airport size and airspace complexity (Class B, C, D and E) to identify best practices and establish procedures for subsequent UAS Facility Maps refinement at the remaining airports.

The primary purpose of the pilot program is to assemble the data described in the UAS Facility Maps Grid Refinement section and determine which information is useful and which is not for the roll-out of the UAS Facility Maps refinement to other airports beyond the group within the pilot program.

The prioritization of airports subsequent to the pilot program should utilize a study considering the number of zero altitude grid rectangles to locate UAS Facility Maps where overly restrictive decisions may have been made. As an example, airports which are in the top quartile of airports with zero grid rectangles will be considered first in priority for refinement followed by airports in successive quartiles. Another indicator of required grid refinement prioritization would be high levels of LAANC further coordination requests (i.e. requests for flight above grid altitude level) and/or LAANC denials.



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October 22, 2020 DAC Meeting • Virtual

DAC Recommendation – Stakeholder and UAS Facility Maps Grid Refinement Team:

From a time line perspective, from the sections above, the Tasking Group has identified the refinement of grid squares and have suggested ideas to vet and prioritize airports where the UAS Facility Maps should be refined. Also the Tasking Group has proposed a pilot program. Next, the Tasking Group proposes the individuals responsible for this refinement effort comprise the following team and stakeholders:

- Air Traffic Management, team lead
- National Air Traffic Controllers Association (NATCA)
- Airport Facility Operator and Management
- Manned aircraft stakeholders
- UAS stakeholders

HQ and Local participation:

The tasking group recommends FAA HQ Air Traffic Management manage the roll-out of the program and empower local, Air Traffic Management, working collaboratively with NATCA, to take the lead in each UAS Facility Maps refinement effort. As Air Traffic Management led the initial UAS Facility Maps creation, the Tasking Group proposes the FAA go back to this team to ensure their experience and insight is leveraged for the refinement program. However, it is further recommended that other key stakeholders have the opportunity to provide input into the refinement process.

Key Stakeholders:

The Airport Operator and Management staff is considered by the Tasking Group a key stakeholder due to their local management as well as experience working with UAS over the last three years.

The Airport and Management Staff's input is especially important because the airport has unique issues that should be considered in assigning UAS altitude limits around the airport facility. These issues may include low altitude helicopter transition routes between runways or transition routes under arrival/departure runways, such as the Highway 183 and Spine Route transitions at DFW International Airport; or local security concerns that are not public knowledge and can't be exposed to the public.

To ensure the refinement project incorporates voices by manned and UAS stakeholders, the Tasking Group proposes the local team issue an application form for interested stakeholders to submit a request for invitation.

Reassessment of Class E airspace:

The stakeholder UAS Facility Maps refinement team should include analysis of Class E airspace, to reconsider the approach originally used to define facility map altitudes for Class E airspace. For example, some class E airports have zero altitude grid squares located two miles laterally from a single runway while some Class B airports have 50' above ground level (AGL) grid squares located 2,000' laterally from the runway. The original approach highlights the importance of including stakeholder groups, particularly the airport operator, local manned aircraft operators, and local UAS



Drone Advisory Committee

October 22, 2020 DAC Meeting • Virtual

operators to help fill in the knowledge gap created by the lack of a local on airport FAA Air Traffic Facility.

FAA Response Tasking 5:

The FAA greatly appreciates the time and thought the DAC applied to this task. We acknowledge and welcome the DAC's recommendation that the UAS Facility Maps should be refined. The FAA response to the DAC UAS Facility Maps Tasking Group's specific recommendations as follows:

Refine the standardized grid spacing to 30 seconds of latitude by 30 seconds of longitude

- The FAA agrees that refining the standardized grid spacing to 30 seconds of latitude by 30 seconds of longitude will increase the access of airspace to UAS operators.
- The FAA formed an internal working group that is meeting regularly to discuss and plan for the related policy, process, and system updates that will be required to implement this recommendation.
- One of the major complexities the FAA must address is the UAS Facility Maps' utilization as a key dataset to the FAA's Low Altitude Authorization and Notification Capability (LAANC). LAANC facilitates the sharing of airspace data between the FAA and UAS Service Suppliers (USSs). USSs are companies approved by the FAA to provide LAANC services, who develop mobile and desktop applications that provide LAANC service to the drone community via FAA UAS Data Exchange.
- Refinements to the UAS Facility Maps will require significant development work for the FAA and USSs. [LAANC USS Performance Rules](#) is the key document that outlines technical requirements for the USSs. It is updated on annual basis as more LAANC functionalities are developed (example, in 2019 LAANC had implemented Section 44809 Recreational Flyers capability). USSs are obligated to comply with Performance Rules per the Memorandum of Agreement (MOA) with the FAA. Upcoming requirements are communicated to USSs well in advance of the annual Performance Rules update to allow USSs adequate development time.
- The FAA has begun initial discussions with USSs and is planning to implement the recommended grid spacing refinement as part of the FY21 LAANC upgrade cycle. The FY21 LAANC upgrade cycle is currently planned for completion in late fall 2021.

Incorporate a standardized approach when reviewing and assigning grid squares altitude ceilings around airports

- The FAA acknowledges the recommendation and recently formed an internal concept development workgroup to establish a scalable, quantitative, risk-based approach for determining grid square altitudes.
- The workgroup developed a risk-based algorithm that generates the optimal altitude for each grid based off of multiple data sources, including surveillance data, mitigations for certain encounters, and existing airspace restrictions.
- The algorithm's criteria is under refinement and will be thoroughly reviewed and tested by appropriate FAA and National Air Traffic Controllers Association (NATCA) representatives. When complete, the algorithm will be tested in an operational demonstration prior to application to all UAS Facility Maps.
- Implementation is targeted for mid-2021.



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October 22, 2020 DAC Meeting • Virtual

Pilot Program

- The FAA is currently planning to conduct an internal beta test as part of the implementation plans for the grid spacing refinement and altitude algorithm.
- The FAA expects the beta test to include approximately 10 air traffic facilities with a broad cross-section of airspace complexity.
- Details on the scope of the beta test are under discussion but the FAA will collect valuable data and analyze the potential benefits that result from the UAS Facility Map refinements.

Stakeholder and UAS Facility Maps Grid Refinement Team

- As referenced in the responses above, the FAA formed working groups with appropriate internal stakeholders to discuss and plan for UAS Facility Map refinements.
- The working groups' memberships include representatives from FAA and NATCA.
- The FAA views grid square altitude assignments as a core air navigation service provider (ANSP) responsibility. Grid square altitude assignments are the equivalent of issuing an airspace clearance and therefore it is not appropriate to introduce external stakeholders into this process.
- The altitude algorithm that's currently under development and described above includes the appropriate criteria to address the concerns mentioned in this section of the DAC's recommendation.
- The FAA is planning to review the algorithm periodically, with the purpose of making refinements as necessary. Once operational, continual refinements are intended to lead to more dynamic and responsive updates to the UAS Facility Map grid altitudes to maximize airspace efficiency and usage.

FAA RESPONSES TO
TASK GROUP 7
RECOMMENDATIONS –
UTM



Drone Advisory Committee

October 22, 2020 DAC Meeting • Virtual

Background:

At the October 17, 2019 meeting of the Federal Aviation Administration's (FAA) Drone Advisory Committee (DAC), the Designated Federal Officer (DFO) established Task Group #7 (TG7), led by David Silver from the Aerospace Industries Association, to review "UTM CONOPs 2.0" and determine industry performance capability priorities for "UAS Traffic Management" (UTM).

While the tasking specifically referenced CONOPs 2.0, that version of the draft was not released during the 90-day duration of the task group. Therefore, the group worked off UTM CONOPs 1.0 and information obtained from early drafts of CONOPs 2.0. Because the group was unable to review CONOPs 2.0, the task group primarily focused on the prioritization of UTM capabilities.

At the February 27, 2020 meeting of the DAC, the DFO asked TG7 to continue its work to provide industry comments for the FAA's UAS Traffic Management (UTM) CONOPs 2.0 document, released on March 6, 2020.

Task Group 7, UTM ConOps:

Over the course of the first 90-day tasking, TG7 met five times to build out two main deliverables:

1. A definition document describing the performance capabilities in the subsequent matrixed document (Note: these definitions are not meant to be set in stone, but merely used for context in describing a capability);
2. A matrixed document that breaks down each specific performance capability by responsibility (e.g. FAA or UAS Service Supplier ["USS"]), the type of resource required to make that performance occur (e.g. industry standard), the current status of that capability, and the industry's priority level for that performance capability in the next 12-24 months.

Over the course of the second 90-day tasking, TG7 met seven times to build out this report as well as provide updates to the previous two deliverables.

As part of the ConOps review, TG7 also provided:

- 1) 12 Areas Where More Discussion is Needed
- 2) Matrix of Comments

DAC Recommendation:

TG7 submitted the following recommendations to the DAC in its initial report out.

1. TG7 recommended that the FAA and relevant UAS Stakeholders work to put a timeline together in advance of the next Drone Advisory Committee meeting that includes dates of when the FAA and industry believe that the task will be accomplished.
2. TG7 asked the FAA to allocate resources based on the priority levels contained in this report.
3. TG7 recommended that it remain in existence to address CONOPs 2.0 when available.



Drone Advisory Committee

October 22, 2020 DAC Meeting • Virtual

- TG7 was granted an extension, in February and presented its updated findings at the June DAC meeting.

FAA Response Tasking 7:

The FAA recognizes the incredible amount of effort the task group put into developing this positive and constructive feedback, and the FAA thanks TG7 for all their effort and hardwork. In reviewing the DAC's recommendations, the FAA recognized a very distinct sentiment: *"the FAA and industry must work together prior to version 3.0 being published to ensure that clarity occurs."*

The FAA concurs with TG7's recommendation to develop a timeline collaboratively. The FAA also agrees with TG7's assessment of prioritization and commitment of resources.

However, as noted by the Task Group, we must work together, so we have to adjust the timeline for this request accordingly. The FAA will collaborate with industry on the ConOps. We are taking steps to set up a series of interactive discussions to address specific areas highlighted by the DAC. The FAA is also adjudicating comments the DAC provided on the ConOps.

Interactive Discussions

The FAA is working with NASA's Aeronautics Research Institute (NARI) to set up a venue for collaboration:

- Utilizing experience of FAA's work with NASA on initial Concept and Research Transition Team
- Desiring broader industry engagement – FAA and NASA will work with industry associations
- Expected to begin in Q4 of CY2020

The format will consist of structured sessions, on a regular cadence, and will address all 12 areas identified by the DAC. We expect that some areas may be combined or broken apart, to facilitate constructive dialogue. We plan to leverage the anonymized comments from the report provided by the DAC to further seed discussion.

Update to CONOPS

Through its collaboration with industry, the FAA work toward publishing a third version of the UTM ConOps, designated UTM ConOps 3.0. The ConOps 3.0 will include:

- Synthesis of discussions with industry around DAC identified topic areas
- Adjustment from stylistic and individual comments provided by DAC
- General adjustment/updates for
 - Recreational Operations
 - Airspace Constraints (e.g. UVRs)
 - Message/Information Security



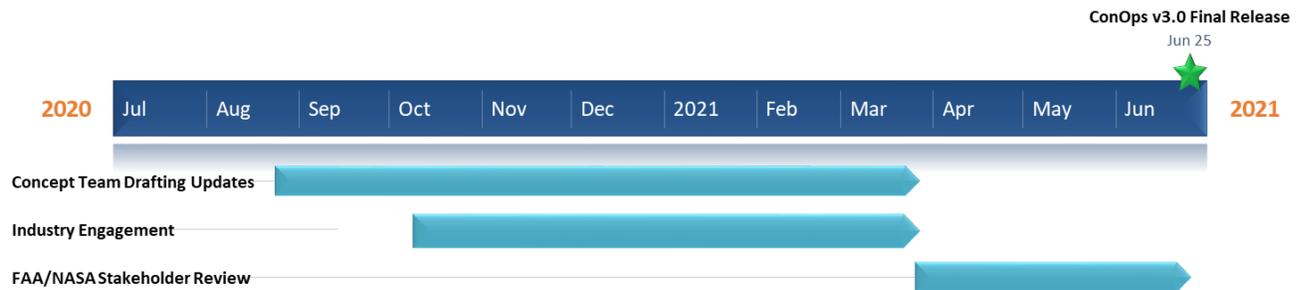
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October 22, 2020 DAC Meeting • Virtual

- Public Safety/Security Operations
- Security Stakeholder Information Requirements
- UTM Services Updates

The FAA is targeting a release of UTM CONOPS 3.0 in the second quarter of 2021.

Path to UTM ConOps 3.0





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DRONE ADVISORY COMMITTEE

October 22, 2020



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.



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October 22, 2020

Official Statement and Opening Remarks

Dan Elwell

Designated Federal Officer,
FAA Drone Advisory Committee
Deputy Administrator, FAA

Official Statement of the DFO



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**DRONE
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October 22, 2020

PUBLIC MEETING ANNOUNCEMENT

Read by: Designated Federal Officer Dan Elwell

Drone Advisory Committee

October 22, 2020

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

September 11, 2020

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

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

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



Agenda

| Start | Stop | |
|------------|------------|--|
| 11:00 a.m. | 11:01 a.m. | FAA – Greetings & Logistics |
| 11:01 a.m. | 11:05 a.m. | DFO – Read Official Statement of the Designated Federal Officer |
| 11:05 a.m. | 11:10 a.m. | DFO - Review of Agenda and Approval of Previous Meeting Minutes |
| 11:10 a.m. | 11:20 a.m. | DFO - Opening Remarks |
| 11:20 a.m. | 11:30 a.m. | Chair - Opening Remarks |
| 11:30 a.m. | 12:30 p.m. | Chair - Tasking #8: Safety Culture – Discussion & Recommendations |
| 12:30 p.m. | 1:00 p.m. | FAA - Response to Task Group #5 Recommendations - Facility Maps |
| 1:00 p.m. | 1:15 p.m. | Break |
| 1:15 p.m. | 1:45 p.m. | FAA - Response to Task Group #7 Recommendations - UTM |
| 1:45 p.m. | 2:15 p.m. | FAA - Discuss & Deliver New Tasking to DAC: Low Altitude Remote ID Operations |
| 2:15 p.m. | 2:35 p.m. | FAA – Discuss: A Standing Operations and Technology Subcommittee |
| 2:35 p.m. | 2:45 p.m. | Chair - New Business/Future Meeting Agenda Topic Suggestions |
| 2:45 p.m. | 2:50 p.m. | DFO - Closing Remarks/Final Thoughts |
| 2:50 p.m. | 2:55 p.m. | Chair- Closing Remarks/Final Thoughts |
| 2:55 p.m. | 2:55 p.m. | Chair- Adjourn |



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COMMITTEE**

October 22, 2020

Opening Remarks from DAC Chairman

Michael Chasen

Chairman, FAA Drone Advisory Committee

Chairman, Advisory Board, PrecisionHawk USA Inc.



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October 22, 2020

Task Group 8 Safety Culture

Lead: Captain Joe DePete

Presenter: Captain Steve Jangelis



Sub-Groups

Task Group 8 established four focused sub-groups to examine current and historical viewpoints of safety cultures:

1. Traditional manned (Lorne Cass & Houston Mills)
2. Recreational unmanned (Rich Hanson)
3. Small (scale) commercial UAS operators (Dave Messina)
4. National (large scale) commercial UAS operators (Todd Graetz)



Membership

| | | | |
|--------------------------|---------------------------|---------------------------|-------------------------|
| Brendan Schulman* | Brian Wynne* | Bryan Lesko | Catherine Self |
| Chad Budreau | Christopher Cooper | Christopher Julius | Dan Dalton |
| Dave Messina | Dewan Pifer | Diana Cooper | Houston Mills* |
| Jim Ackerson | Lorne W. Cass* | Mark Aitken | Mark Bair |
| Mark Colborn* | Mark Reed | Max Fenkell | Nick Dryer |
| Randy Kenagy | Rich King | Richard Hanson* | Stella B Weidner |
| Steve Jangelis | Steven Hansen | Todd Graetz* | Tony Nannini |
| Tony Walsh | Vas Patterson | Wade Troxell* | |

*DAC Member



Task Group 8: Safety Culture for Drone Operators

- **Tasking Question:** What are ways we can help the drone community fully adopt the safety culture that is so engrained in manned aviation?
- **Tasking Summary:** Develop recommendations and ideas to assist the drone community in adopting an aviation safety culture. This includes ideas for motivation and suggestions for industry involvement.
- **Justification:** The manned aviation community has a strong safety culture—not just rules and regulations, but a culture aviators live and practice every day. This culture has been one of the drivers of today’s strong safety record. The drone community is mostly new to aviation, and having them learn and adopt this culture will greatly assist in the safe and efficient integration of drones into the national airspace system (NAS).



Document Structure

TG8 leadership established the following document structure to inform the FAA of the shared visions of Safety Culture recommendations from each user groups perspective:

- Executive Summary
- Sub-Group reports and recommendations
 - Traditional manned
 - Recreational unmanned
 - Small (scale) commercial UAS operators
 - National (large-scale) commercial UAS operators



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October 22, 2020

Goals

- Establish fundamental truths/tenets across aviation communities addressing the values of a safety culture.
- Develop recommendations and ideas to assist the drone community in adopting an aviation safety culture. This includes ideas for motivation and suggestions for industry involvement.

Timing: October DAC meeting.



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October 22, 2020

Executive Summary

- As a starting point, the task group developed a set of guiding principles, or tenets.
- These safety tenets are broad and adaptable to any size organization—even individual pilots or operators.

Note: In this document, we will use the term “operator,” which could be interchangeable with “pilot.”



Safety Tenets

- **Safety Ownership**
 - Empowering individuals across groups with a share of the collective responsibility to learn, understand, advocate, and participate in best safety practices and behaviors for the intended activity.
- **Safety Modeled by Leadership**
 - Safety culture is driven throughout the aeronautical community from the operator to executive level management. Leaders should model safe practices (walk the talk) and reinforce the critical importance of safety as the top priority in the community.
- **Organizational Values**
 - A safety culture reflects the values, principles, and normal behavior of an individual engaged in an activity that presents risk to the life, safety, or property of others and must be scalable to the organization.
 - Organizations can promote and enhance a culture of safety by modeling behavior, educating individuals, and emphasizing the importance of safety during activities that present heightened risks to people or property.



Safety Tenets (continued)

- **Learning Culture**

- A positive safety culture will always continue to learn and grow; individuals can adapt and change. Few operations in the NAS are error-free, but operators learn from failures going forward and utilize risk management tools to improve the safety and quality of operations or products with the power of data sharing both internally and within their communities.

- **Systemwide Approach**

- Those who set and promote safety rules and parameters must share the responsibility of systemwide safety by creating risk-based rules that are reasonable and proportionate.
- Promote a voluntary, nonpunitive environment where the sharing/reporting of unintentional unsafe experiences (events) is fostered and supported by an educational approach to continuously improving NAS safety.



Safety Tenets (continued)

- **Trust**

- A strong safety culture is enhanced by a firm belief in the honesty, reliability, and the ability of others.
- Trust is a two-way street and assumes all stakeholders (individual and organizations) are committed to ensuring safe and successful operations.
 - Operators/stakeholders must trust that regulators and authorities will transparently act on and implement constructive input from operators/stakeholders and support best practices and constructive measures to address safety concerns.
 - Regulators must trust that operators/stakeholders will adhere to prescribed safety standards and operational norms.
- Trust promotes confidence amongst all parties and leads to a cooperative environment for the sharing of safety information, data, and ideas.



Executive Summary

- The four sub-groups each developed recommendations with ***commonalities*** and ***differences***.
- Each group discussed “***one size does not fit all***” in terms of recommendations and processes.
- Each group worked to achieve an appropriate and proportionate set of recommendations based on operational risk of the individual community.



Executive Summary

The ***commonalities*** across the four sub-groups were most apparent in three areas that all reflected the six safety tenets:

- Trust repeatedly surfaced as a critical element of a safety culture.
- Education, continuous learning, and a learning culture.
- Operator ownership and accountability.



Executive Summary

The ***differences*** across the four sub-groups emerged as each group focused on their respective communities and constituencies.

- To introduce newcomers to aviation, the recreational and small commercial sub-groups recommended initiatives that foster and promote a safety culture and focused on the ***psychological*** aspects of ingraining safe behaviors.
- The traditional and national sub-groups recommendations leveraged their extensive experience and focused on ***procedural*** safety.



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October 22, 2020

Recommendations: Traditional Manned Aviation Sub-Group

- Recommendations based on decades of airline experience in the development of safety programs, safety communication, and managing risk.
- The recommendations will positively contribute to the safety of all UAS operations and offer safety benefits to all those who are affected by UAS operations on the ground and in the air.

Presenter: Houston Mills



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October 22, 2020

Traditional Sub-Group Recommendation #1

The FAA should develop and adopt a UAS integration strategy that encourages “safety ownership” and “a learning culture” throughout the UAS community.

- Each person must take ownership of not only his or her own safety, but the safety of others and of the UAS organization by observing various hazards and *reporting safety concerns* associated with the hazards.
- Initial and continuing education is critical to develop a learning culture.



Traditional Sub-Group Recommendation #1 (continued)

- Tools available to foster safety ownership and a learning culture
 - Aviation Safety Action Program (ASAP)
 - NASA Aviation Safety Reporting System (ASRS)
 - Educational programs in the certification process and continuing education
 - Safety culture principles (certification)
 - Hazard identification (certification)
 - Risk management (certification)
 - Seminars (continuing education)
 - Safety operations awards (continuing education)



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October 22, 2020

Traditional Sub-Group Recommendation #2

The FAA should develop and adopt a UAS integration strategy that fosters the safety culture tenets of “trust” and a “systemwide approach” toward ensuring safety.

- Trust begins with a common understanding of acceptable and unacceptable behaviors within the National Airspace System (NAS).
- Partnership with the regulator is a key element to trust.



Traditional Sub-Group Recommendation #2 (continued)

- System-wide approach allows all UAS operators to benefit from the information gained from each participant.
- Tools available to develop trust and a system-wide approach.
 - Information sharing agreements with the regulator (e.g., ASAP, FOQA).
 - Informal sub-groups that include regulators, OEMs, and other operators.
 - System-wide seminars similar to the FAA Aviation Infoshare.
 - Participation in a Commercial Aviation Safety Team (CAST)-like safety group.



Traditional Sub-Group Recommendation #3

Create a UAS integration strategy that helps to grow the safety culture tenets of “executive level leadership” and “organizational values” into the DNA of the UAS community.

- Begins with understanding the core mission of the organizational and the value it places on safety.
- These values form policies that can be supported by leadership and followed during UAS operations (in traditional manned aviation, these policies are clearly stated in the Safety Management System Safety Policy).



Traditional Sub-Group Recommendation #3 (continued)

- The policies, which outline acceptable and unacceptable safety behavior at a minimum, are scalable to all sizes of organizations.
- Tools available to develop executive level leadership and organizational values.
 - UAS operators and manufacturers to establish basic principles by which they operate (i.e., weather minima, recency of experience, etc.).
 - Preflight risk assessment to avoid damage to the UAS and injury to the community.
 - Promotion of an Safety Management System (SMS)-like system for UAS operators.
 - Focused guidance materials, similar to Advisory Circulars (AC) to promote organizational values.



Recommendations: Recreational Sub-Group

- This subgroup represents all recreational UAS operators regardless if they operate within the programming of a community-based organization.
- The subgroup recognizes varying levels of risk with existing UAS operations and the importance of educating new and existing users on how to safely share the NAS. Aside from nefarious acts and outlier incidents, the subgroup could not identify a repeatable history of significant safety issues to mitigate. Therefore, the subgroup's recommendations focus on how the FAA can educate, reduce potential risks, and build rapport and trust with recreational operators while integrating in the NAS.
- The sub-group recommends that the FAA leverage existing safety programs that have been successfully demonstrated with over a century of safe recreational UAS operations.



Recreational Sub-Group Recommendation #1

The FAA should work with the community, influencers, events, and grassroots efforts to build trust among the drone community.

- The FAA should work with well-respected, trusted, and influential UAS operators to champion a safety culture. Influencers within the UAS community include those with a large following in social media, event coordinators, community-based organizations, hobby shops, and retail outlets.
- The subgroup strongly recommends FAA's participation at UAS recreational events to foster a learning culture. The FAA should attend events with the primary intent of education and trust building and not to impose their authority on regulatory and policy matters.



Recreational Sub-Group Recommendation #2

The FAA should further integrate recreational UAS manufacturers, community-based organizations, and recreational stakeholder leaders into its advisory and policy processes, so that this long-standing and evolving segment of recreational aviation has an equivalent seat at the table to segments of manned aviation. More robust bidirectional collaboration is crucial to build trust and help the drone community “fully adopt the safety culture that is so ingrained in manned aviation.”

- Actively learn and implement stakeholder guidance from those who have successfully created a safety culture and record. The FAA should identify and collaborate with community-based organizations as other civil aviation authorities in England, Canada, and Australia have done.
- Recognize safety modeled by leadership and celebrate recreational achievements.
- One size does not fit all.



Recreational Sub-Group Recommendation #3

Recommendations 1 and 2 will capture a large portion of the recreational community; moreover, the subgroup believes the FAA must also reach individuals outside those communication channels. In addition, the FAA should educate the general public to help promote a culture of safety through a greater understanding and acceptance of UAS.

- Safety should always be the underlying message in all communication. Recreational UAS messaging should not be heavily focused on the negative actions or risks caused by outlier operations.
- Avoid negative training; the tone should be positive as it is in the manned community.
- Partner with existing platforms and other educational entities.



Recommendations: Small Commercial Sub-Group

- | | |
|---|-------------------------------------|
| 1) Leader commitment and prioritization of safety | 5) Safety knowledge |
| 2) Policies and resource of safety | 6) Employee/member sense of control |
| 3) Group cohesion | 7) Individual commitment to safety |
| 4) Psychological safety | |

- Ingraining a safety culture has seven influential factors.
- Assertions of the sub-group
 - UAS commercial operators have a predisposition that the FAA prefers a nonconfrontational approach when first addressing minor or inconsequential safety violations.
 - UAS commercial operators have evolved their perception of UAS. As they gain experience, they view a drone as a serious aircraft.
 - UAS commercial operators actively seek emergency procedures.



Small Commercial Sub-Group Recommendation #1

UAS Education Using Existing FAASTeam

| Description | Anticipated Benefits |
|--|--|
| <ul style="list-style-type: none">• Create a UAS Safety <i>education program</i> using the existing structure and organization of the FAA Safety Team (FAASTeam).• Define more opportunities within the National Performance Plan for the FAASTeam program managers at each Flight Standards District Office. Give them the flexibility they need to promote UAS education in their regions.• Leverage the Wings program to enhance UAS operator proficiency. Give incentives to take FAA Safety courses. Idea: Reduce the cost of Part 107 renewal based on completed Wings credited courses. | <ul style="list-style-type: none">• Reach: Of the 191,570 Part 107 operators, only 67,590 are FAAsafety.gov users. Offering incentives and standardizing training, increases the probability of more Part 107 operators registering for accounts.• Exposure: Part 107 operators would gain a better understanding of the aviation industry overall. The FAA maintains a certain level of control over education, while promoting safety in a uniform way.• Cost: Utilizing an existing internet portal and FAA organizational framework expedites opportunities to reach more people while minimizing deployment expenses. |



Small Commercial Sub-Group Recommendation #2

Safety Culture Self-Assessment

| Description | Anticipated Benefits |
|---|--|
| <ul style="list-style-type: none">• Create a safety culture self-assessment.• Self-assessment tools are used in other industries including municipal fire departments to provide an approximate measurement and direction for improvement. | <ul style="list-style-type: none">• Metrics: A self-assessment tool will establish an approximate measurement of a small company's safety program.• Continuous Improvement: A self-assessment tool will reinforce the foundational tenet of always learning and always striving to improve. |



Small Commercial Sub-Group Recommendation #3

Flight Risk Assessment Tool

| Description | Anticipated Benefits |
|---|---|
| <ul style="list-style-type: none">• Add a view-only flight risk assessment tool (FRAT) to LAANC and B4UFLY. The FAA has supported FRATs in general aviation. The tool would introduce the operator to:<ul style="list-style-type: none">• P: Pilot• A: Aircraft• V: enVironment• E: External pressures | <ul style="list-style-type: none">• Criteria to refuse a mission: The PAVE process allows general aviation pilots to assess the safety risks of a flight and, if the risks are too great, to decline the mission.• Reinforce the relationship to general aviation: Using the same language for both general aviation and UAS to characterize the risk of a flight allows UAS operators to continue to learn from general aviation. |



Recommendations: National Sub-Group

Background:

- Larger companies utilize UAS in support of their regular business.
- Use cases include reducing the safety risk by providing an alternate means of completing tasks.
- Have highly focused safety teams, processes, and procedures:
 - Expected safety manuals.
 - Employee safety rules.
 - General organizational oversight that match well with aviation risk reduction policies and procedures
 - Assumed that the policies and procedures are complementary with any UAS-specific FAA SMS, FAA Part 107, and related rules.



National Sub-Group Recommendation #1

Operations

- Complex beyond visual line of sight (BVLOS) operations should utilize the existing manned FAA Safety Management System policies and procedures.
 - Includes some policies that have been adapted for UAS BVLOS operations in the NAS.
 - Assumed scaled operators utilize active commercial/general aviation pilots with instrument ratings/experience.
- Less complex BVLOS and/or LOS, a more graduated approach as outlined by other task groups and by the TG8 safety tenets should be followed.



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October 22, 2020

National Sub-Group Recommendation #2

Safety Policies/Governance

- Risk-based/performance-based safety policies should be leveraged to ensure safe operating requirements are a natural fit with the overall operation and the established safety culture of the organization.
- Ensure that national UAS operators provide training, governance, and continuing education opportunities for its UAS pilots.



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National Sub-Group Recommendation #3

Knowledge Sharing

- Elements of the larger operator's programs should be shared with regional/local operators to establish mutual best practice collaboration.



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Thank you to our tasking group contributors from:

Academy of Model Aeronautics (AMA)

Aerospace Industries Association (AIA)

Aircraft Owners and Pilots Association (AOPA)

Air Line Pilots Association (ALPA)

American Airlines

Association for Unmanned Vehicle Systems

International (AUVSI)

Boeing

BNSF Railway Company

Dallas PD Helicopter Unit

Da-Jiang Innovations (DJI)

DRONERESPONDERS

FPV Freedom Coalition

Google

Hyundai America Technical Center (HATCI)

Influential Drones

National Air Traffic Controllers Association
(NATCA)

National League of Cities

United Parcel Service (UPS)



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DAC Task Group #5 – UAS Facility Maps

Bill Stanton

UAS Integration Lead
Air Traffic Organization

UAS Facility Maps – Recommendation #1



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October 22, 2020

- Refine the standardized grid spacing to 30 seconds of latitude by 30 seconds of longitude
- FAA Response
 - The FAA agrees that refining the standardized grid spacing to 30 seconds of latitude by 30 seconds of longitude will increase the access of airspace to UAS operators.
 - The FAA formed an internal working group that is meeting regularly to discuss and plan for the related policy, process, and system updates that will be required to implement this recommendation.
 - The FAA has begun initial discussions with UAS Service Suppliers (USS) and is planning to implement the recommended grid spacing refinement as part of the FY21 LAANC upgrade cycle. The FY21 LAANC upgrade cycle is currently planned for completion in late fall 2021.



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October 22, 2020

UAS Facility Maps – Recommendation #2

- Incorporate a standardized approach when reviewing and assigning grid squares altitude ceilings around airports
- FAA Response
 - The FAA acknowledges the recommendation for a standardized approach and recently formed an internal concept development workgroup to establish a scalable, quantitative, risk-based approach for determining grid square altitudes.
 - The workgroup developed a risk-based algorithm that generates the optimal altitude for each grid based off of multiple data sources, including surveillance data, mitigations for certain encounters, and existing airspace restrictions.

UAS Facility Maps – Recommendation #2 (continued)



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October 22, 2020

- Incorporate a standardized approach when reviewing and assigning grid squares altitude ceilings around airports
- FAA Response
 - The algorithm's criteria is under refinement and will be thoroughly reviewed and tested by appropriate FAA and National Air Traffic Controllers Association (NATCA) representatives. When complete, the algorithm will be tested in an operational demonstration prior to application to all UAS Facility Maps.
 - Implementation is targeted for mid-2021.



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October 22, 2020

UAS Facility Maps – Recommendation #3

- Pilot Program
- FAA Response
 - The FAA is currently planning to conduct an internal beta test as part of the implementation plans for the grid spacing refinement and altitude algorithm.
 - The FAA expects the beta test to include approximately 10 air traffic facilities with a broad cross-section of airspace complexity.
 - Details on the scope of the beta test are under discussion but the FAA will collect valuable data and analyze the potential benefits that result from the UAS Facility Map refinements.



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October 22, 2020

UAS Facility Maps – Recommendation #4

- Stakeholder and UAS Facility Maps Grid Refinement Team
- FAA Response
 - The FAA formed working groups with appropriate internal stakeholders to discuss and plan for UAS Facility Map refinements.
 - The FAA views grid square altitude assignments as a core air navigation service provider (ANSP) responsibility. Grid square altitude assignments are the equivalent of issuing an airspace clearance and therefore it is not appropriate to introduce external stakeholders into this process.

UAS Facility Maps – Recommendation #4 (continued)



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October 22, 2020

- Stakeholder and UAS Facility Maps Grid Refinement Team
- FAA Response
 - The altitude algorithm that's currently under development and described above includes the appropriate criteria to address the concerns mentioned in this section of the DAC's recommendation.
 - The FAA is planning to review the algorithm periodically, with the purpose of making refinements as necessary. Once operational, continual refinements are intended to lead to more dynamic and responsive updates to the UAS Facility Map grid altitudes to maximize airspace efficiency and usage.



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15-minute Break



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October 22, 2020

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.



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October 22, 2020

DAC Task Group 7 – UTM Performance Capability Priorities

Jay Merkle

Executive Director

UAS Integration Office



UTM Performance Capability Priorities

DAC Tasking

- Review the UAS Traffic Management (UTM) Concept of Operations (CONOPS) and determine industry performance capability priorities for UTM.

DAC Task Group Provided the FAA:

- Definition document on performance capabilities.
- Matrix breaking down performance capabilities by: responsible party, resource required, status of capability, and industry priority level for the capability in the next 12 – 14 months.
- CONOPS review
 - 12 areas where more discussion is needed.
 - Matrix of comments.



UTM Performance Capability Priorities

Recommendations

1. The FAA and relevant UAS Stakeholders work to put a timeline together in advance of the next Drone Advisory Committee meeting that includes dates of when the FAA and industry believe that the task will be accomplished.
2. The FAA to allocate resources based on the priority levels contained in this report.

Key Item Taken into Consideration by the FAA

- *“The FAA and industry must work together prior to version 3.0 being published to ensure that clarity occurs”*



UTM Performance Capability Priorities

Overarching Response

Thank you!

- FAA sees the incredible amount of effort the task group put into developing this positive and constructive feedback, and we thank you for it.

FAA concurs with the recommendations.

- FAA agrees with industry's assessment of prioritization and commitment of resources.
- However, as noted by the task group, we must work together, so we have to adjust the target for this request accordingly.

FAA will collaborate with industry on the ConOps

- The FAA is taking the steps to set up a series of interactive discussions to address specific areas highlighted by DAC TG7.
- FAA adjudicating comments from Appendix 2 and addressing stylistic comments.



UTM Performance Capability Priorities

Interactive Discussions

FAA is working with NASA Aeronautics Research Institute (NARI) to set up venue.

- Utilizing experience of FAA's work with NASA on initial Concept and Research Transition Team.
- Desiring broader industry engagement – will work with industry associations.
- Expected to begin in Q4 of CY2021.

Establishing structured sessions.

- Targeted discussion areas on a bi-weekly cadence.
- Will address all 12 areas identified by TG7.
 - **Some areas may be combined or broken apart to facilitate constructive dialogue.**
 - **Anonymized comments from report will be used to further seed discussion.**



UTM Performance Capability Priorities

Path to UTM CONOPS 3.0

Update to CONOPS will include:

- Synthesis of discussions with industry around DAC identified topic areas.
- Adjustment from stylistic and individual comments provided by DAC.

General adjustment/updates for:

- Recreational operations.
- Airspace constraints (e.g. UAS Volume Reservations (UVRs)).
- Message/information security.
- Public safety/security operations.
- Security stakeholder information requirements.
- UTM services updates.

FAA targeting a Q2 2021 release of UTM CONOPS 3.0

- FAA is also concurrently developing a complimentary UTM Implementation Plan.



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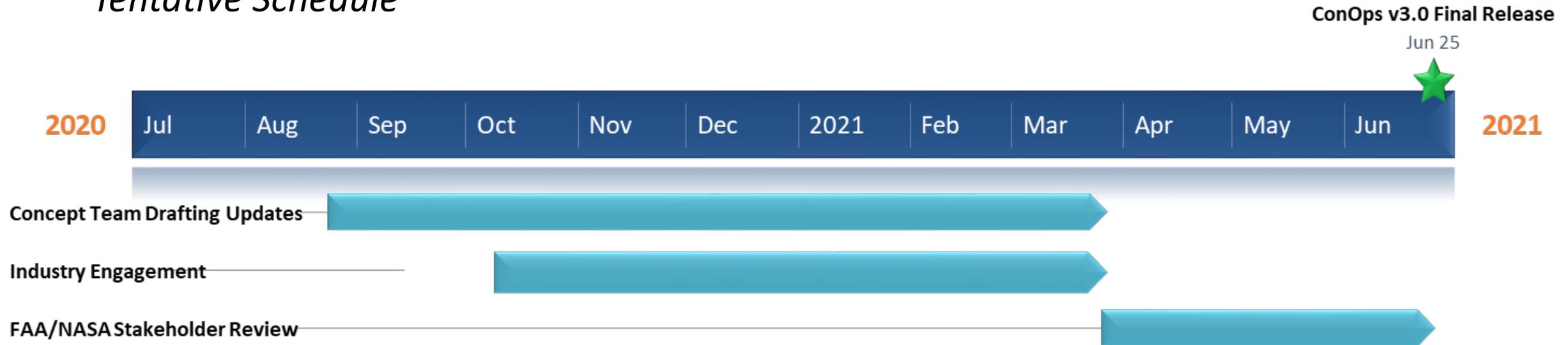
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October 22, 2020

UTM Performance Capability Priorities

Path to UTM CONOPS 3.0

Tentative Schedule





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October 22, 2020

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Present New DAC Tasking

Jay Merkle

Executive Director
UAS Integration Office



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October 22, 2020

Background

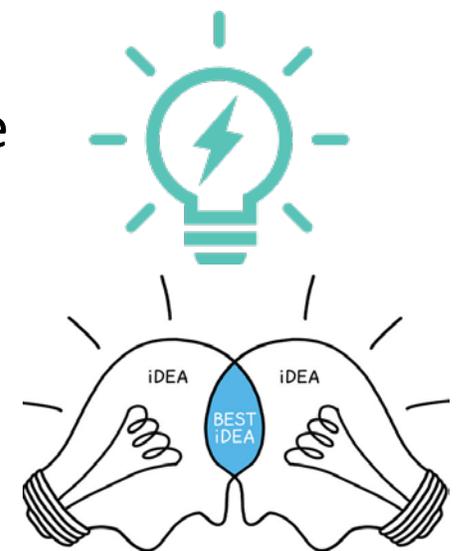


FAA Issued an RFI: [FAA Low Altitude Manned Aviator Participation In UAS Remote Identification](#) on March 17 in the System for Award Management (SAM) portal.

Objectives:

Learn how manned aircraft can receive and use UAS Remote Identification information.

Engage with low altitude manned aviators and other parties who are interested in exploring how UAS Remote ID can improve safety and reduce collision risk between UAS and manned aircraft at low altitudes.





Manned-community concerns with RID

Of 30 total responses **11 were from Pilots Associations and Public Safety Orgs.**

Pilot-based organizations see dubious benefits:

- UASs have primary responsibility to avoid manned-aircraft.
- RID is security-centric; it may be inadequate to affect safety.
- Adding RID receive capability would be an additional expense burden to low-level aircraft pilots.
- Low-level pilots are especially concerned with task saturation (e.g., avoiding obstructions & being distracted from the mission).
- Any solutions should integrate with current avionics (EFB, ADS-B).





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DAC Tasking

Opportunity: Can Remote ID be used to increase situational awareness between manned aviation that routinely operates at low altitudes away from airports and UAS operating in the same airspace?

Tasking: DAC to engage operators in low altitude airspace to obtain feedback on how remote identification might be used to increase situational awareness and use this feedback to develop recommendations on how the FAA can address responses to the RFI.



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October 22, 2020

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Standing Subcommittee Proposal

Gary Kolb

Stakeholder Liaison
UAS Integration Office



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October 22, 2020

Standing Subcommittee Proposal

Establish a Standing **Operations and Technology Subcommittee**

Intent: Leverage DAC member and stakeholder expertise in identifying emerging industry trends in operations and technology that assist in the facilitation of UAS integration into the NAS.

Output: Provide recommendations to the DAC and if approved, forwarded to Office of the Secretary of Transportation and the FAA for integration into ongoing initiatives and programs.

Membership: Core subcommittee membership comprised of a minimum of 50% DAC members from any stakeholder group. Remaining 50% can be any non-DAC member once they have been approved by the Secretary of Transportation.

Structure: Core subcommittee receives taskings from FAA thru the DAC as outlined in the DAC charter.



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October 22, 2020

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October 22, 2020

New Business/Agenda Topics

Michael Chasen

Chair, FAA Drone Advisory Committee

Chairman, Advisory Board, PrecisionHawk USA Inc.



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October 22, 2020

Closing Remarks

Dan Elwell

Designated Federal Officer, FAA Drone Advisory Committee

Deputy Administrator, FAA

Michael Chasen

Chair, FAA Drone Advisory Committee

Chairman, Advisory Board, PrecisionHawk USA Inc.



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October 22, 2020

Adjourn

Charter of the Drone Advisory Committee

- 1. Committee's Official Designation.** The Committee's official designation is the Drone Advisory Committee (DAC).
- 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 objective of the DAC is 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 Unmanned Aircraft Systems (UAS) into the National Airspace System. In response to FAA requests, the DAC may provide the FAA and DOT with information that may be used for tactical and strategic planning purposes.
- 4. Description of Duties.** The DAC will act solely in an advisory capacity and will not exercise program management responsibilities. Decisions directly affecting implementation of transportation policy will remain with the FAA Administrator and the Secretary of Transportation. The DAC 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 DAC structure (including the structure of subcommittees and or task groups).
- 5. Agency or Official to Whom the Committee Reports.** The DAC reports to the Secretary of the U.S. Department of Transportation (DOT) through the FAA Administrator.
- 6. Support.** The FAA will provide support as consistent with the act, including funding for the Committee. The UAS Integration Office is the primary entity within the FAA responsible for supporting the DAC.

- 7. Estimated Annual Operating Costs and Staff Years.** The FAA’s annual operating costs to support the DAC 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 DAC Designated Federal Officer (DFO). The DAC 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 DAC 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.**

 - a. DAC estimates meeting three times a year to carry out its responsibilities. DAC 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 1120.3B.
- 10. Duration.** Continuing, subject to renewal every 2 years.
- 11. Termination.** The charter will terminate 2 years after its effective date, unless renewed in accordance with FACA and other applicable regulations. If the DAC is terminated, the FAA will give as much advance notice as possible of such action to all participants.

12. Membership and Designation. DAC shall comprise members appointed by the U.S. Secretary of Transportation upon recommendation by the FAA Administrator. All DAC members serve at the pleasure of the Secretary of Transportation.

- a. The DAC will have no more than 35 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; traditional manned aviation operators; UAS hardware component manufacturers; UAS manufacturers; UAS operators; UAS software application manufacturers; and other interests.
- 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.
- c. Member representatives and SGEs are appointed for a 2-year term, but can continue to serve until their replacement is chosen or they are reappointed

13. Subcommittees. The FAA Administrator has the authority to create and dissolve subcommittees as needed. Subcommittees must not work independently of the DAC. They must provide recommendations and advice to the DAC, not the FAA, for deliberation, discussion, and approval.

14. Recordkeeping. The records of the DAC 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 DAC will be available for public inspection at https://www.faa.gov/uas/programs_partnerships/drone_advisory_committee/.

15. Filing Date. This charter is effective June 12, 2020, which is the filing date of this Charter with Congress.



Drone Advisory Committee

October 22, 2020 DAC Meeting • Virtual

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 Drone Advisory Committee (DAC) 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. DAC members assume the following responsibilities:

- Attend $\frac{3}{4}$ of all DAC public meetings during membership term.
- Provide oversight, deliberation, comments and approval of the DAC activities.
- Contribute respective knowledge and expertise.
- Participate as a member on a working group, if desired.
- Coordinate with the constituents in his or her Unmanned Aircraft System and aviation sector.
- Review work plans, if requested.
- Review the DAC and any subcommittee or working group recommendation reports.
- Inform the DAC Chair and the DFO when he or she can no longer represent his or her organization/association on the DAC.
 - Members may continue to serve until a replacement has been appointed or removed.

Daniel K. Elwell

Deputy Administrator

Daniel K. Elwell is the Deputy Administrator of the Federal Aviation Administration (FAA). Mr. Elwell was sworn in to office on June 26, 2017 following his appointment by President Trump. He also served as Acting FAA Administrator from January 2018 until August 2019.

Elwell previously served at the FAA as the Assistant Administrator for Policy, Planning, and Environment from 2006–2008. Most recently, he was Senior Advisor on Aviation to U.S. Secretary of Transportation Elaine L. Chao. Earlier in his career, he served as a legislative fellow for the late Senator Ted Stevens (R-Alaska).

From 2013–2015, as Senior Vice President for Safety, Security, and Operations at Airlines for America (A4A), Elwell was responsible for leading the advancement of commercial aviation safety and security excellence for major U.S. air carriers.



Prior to A4A, Elwell was Vice President of the Aerospace Industries Association (AIA) from 2008–2013. In this role, Elwell represented civil aerospace manufacturers and led policy development and advocacy for the civil aerospace manufacturing interests of more than 300 AIA member companies.

Elwell was a commercial pilot for 16 years with American Airlines, flying DC-10, MD-80, and B-757/767 aircraft. While maintaining his proficiency as an MD-80 Captain, he served as Managing Director for International and Government Affairs at American Airlines.

Dan earned his pilot wings at Williams Air Force Base in Arizona after graduating from the U.S. Air Force Academy with a Bachelor of Science degree in International Affairs. Lieutenant Colonel Elwell retired from military service as a Command Pilot with more than 6,000 hours combined civilian and military flight time in the U.S. Air Force and U.S. Air Force Reserve, including combat service during Operation Desert Storm.



Federal Aviation Administration

Jay Merkle

Executive Director, Unmanned Aircraft Systems Integration Office

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



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

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

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

Michael Chasen

Chairman of the Advisory Board, PrecisionHawk



Michael Chasen is the Chairman of the Advisory Board of PrecisionHawk, a leading software and service provider in the commercial drone space. PrecisionHawk uses advanced drone technology combined with artificial intelligence (A.I.) and machine learning to provide actionable business intelligence across Energy, Agriculture, Telecom and Infrastructure industries. PrecisionHawk is also one of the thought leaders in flying Beyond Visual Line of Sight (BVLOS).

Michael served as CEO of PrecisionHawk where he oversaw a series D funding round that culminated in \$75 million and represented one of the largest financings to date in the commercial drone space.

In 2018, Chasen also lead PrecisionHawk to acquire five companies: Droners.io, AirVid, HAZON Solutions, InspectTools and Uplift Data Partners. These acquisitions helped solidify PrecisionHawk as the market leader for commercial drone services with a database of over 15,000 commercially-licensed drone pilots.

Prior to PrecisionHawk, Chasen was the co-founder and CEO of Blackboard (NASDAQ: BBBB), a leader in the global eLearning space. He grew Blackboard to serve over 30,000 institutions worldwide, had 3,000 employees and 20 offices around the world. Michael took Blackboard public in 2004 and ran it as a public company for 7 years before selling to Providence Equity Partners for \$1.7B. Michael then started SocialRadar, a company specializing in improving location accuracy on SmartPhones, which he sold to Verizon in 2016.

Michael has an undergraduate degree in Computer Science and an MBA from Georgetown.



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

Detailed Minutes

Introduction

The Drone Advisory Committee (DAC) meeting was held on June 19, 2020, from 12:00 PM to 3:00 PM EST. Due to the COVID-19 pandemic, this meeting was held virtually and livestreamed for the public to observe.

Designated Federal Officer (DFO) Opening Remarks

Mr. Elwell started his opening remarks by reading the Official DFO Statement. Before moving to the agenda, Mr. Elwell shared that the Secretary of Transportation, The Honorable Elaine Chao, had created a special video to share with the DAC members. The Secretary expressed her thanks for the hard work done by the DAC members and highlighted the important working being done by the FAA during COVID-19. After the conclusion of the video, Mr. Elwell moved on to the agenda and informed the audience that the agenda for the meeting today was sent ahead of time for everyone's review. Mr. Elwell shared that today's agenda and DAC meeting is planned to be shorter than normal. FAA responses to the task group recommendations for Facility Maps and Beyond Visual Line of Sight (BVLOS) Challenges, which would normally be done at this meeting, will be presented at the October 2020 meeting instead. Mr. Elwell shared that today's meeting will discuss additional DAC recommendations on Unmanned Aircraft Systems (UAS) Traffic Management (UTM) and interim recommendations on Aviation Safety Culture. Mr. Elwell thanked the DAC members for their hard work during the COVID-19 pandemic and in particular thanked David Silver and Captain Joe DePete for leading the task groups. Today's meeting will close out with an opportunity for the DAC members to highlight any new business or recommend future agenda topics.

Mr. Elwell noted there is one last housekeeping item, the approval of the meeting minutes from our February 27, 2020 DAC meeting. These minutes have been posted on the DAC website and were also included in the read ahead material for today's meeting. Mr. Elwell asked for a motion to approve the February 27, 2020 meeting minutes. DAC member Wade Troxell made the motion and other DAC members seconded the motion. Mr. Elwell asked if there are any objections. There were no objections and the motion passed. Next, the DFO shared that safety continues to be the FAA's core mission as evidenced by ongoing work to process requests for operations to support the response to the COVID-19 emergency. The FAA took a proactive approach and was able to anticipate the types of drone operations that might be required to support the response to the current pandemic. Waivers were granted and actual operations were conducted that enabled the delivery of virtual goods and services including; water, food, medical supplies, and testing kits. The DFO highlighted the FAA is continuing to work with several private companies and public safety organizations to assist them in developing safe and efficient concepts of operation to help out their local communities across the nation.

Mr. Elwell announced that the Federal Register notice was published yesterday announcing a 60-day solicitation period for new DAC members. At the end of June the DAC will have five



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

vacancies and the FAA is looking to compile a list of qualified applicants for the Secretary's review. Mr. Elwell emphasized that it is very important that the DAC continues to have representation from all sectors of the drone community, in order for it to continue to accomplish its work. The DFO asked the DAC members assistance in spreading the word of this opportunity to qualified applicants across the drone community in order to recruit a diverse group of members to serve on the DAC committee.

The DFO emphasized that a priority within the agency is the work being done to finalize the Remote Identification (Remote ID) rule. The Notice of Proposed Rulemaking was published in the Federal Register in December and the FAA received over 53,000 comments. Currently, the FAA is reviewing these comments and plans to publish a final rule in December 2020. Mr. Elwell informed the audience the annual FAA UAS Symposium is going virtual this year. The FAA will continue to partner with the Association for Unmanned Vehicle Systems International (AUVSI). Registration is now open for to digital events on July 8-9 and August 18-19. Mr. Elwell concluded his opening marks by pointing out that it has been an unusual last three months. But, that does not mean that the FAA staff has not been busy. He thanked Jay Merkle, his team, and the DAC members for all the hard work during these challenging times. He then turned over the floor to DAC Chair Michael Chasen (PrecisionHawk).

DAC Chair Opening Remarks

Mr. Chasen welcomed all the DAC members from around the country to the first ever virtual DAC meeting. He then welcomed all of those viewing on livestream. The DAC Chairman shared that a lot has happened since the last time the DAC gathered at the last meeting. The world has started to face challenges that are truly unprecedented, maybe even unimaginable, from just four months ago. There is an ongoing global pandemic nationwide and protests, either of which on their own would be defining for the times. Yet together raises the challenges we must face as a nation, and as a world, to a level never seen before in his lifetime. Many of the people and companies around the table have been affected by both challenges and have realized as a group, and as a civilization, that to endure everyone must work together. Companies and governments each doing their part to work for the greater good and help us all get through these trying times.

Mr. Chasen shared that in many ways, this is what the DAC also represents. People, companies, and the government working together to move an industry forward. Drones have proven to be helpful in the coronavirus response, from package delivery to assisting with social distancing notifications. These positive use cases highlight just how important this work is. Mr. Chasen shared that we should not forget that there is other work to be done. We must all continue to focus on the tasks at hand, while at the same time lend our resources and commitment to help those people affected by the coronavirus and to stand alongside those fighting for equal human rights, the Black Lives Matter movement. Mr. Chasen finished his opening remarks by thanking the DAC members for their hard work and moved to the first agenda item. Mr. Chasen then invited Mr. David Silver to present the Task Group 7 final recommendations on UTM.



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

Recommendation & Discussion for DAC Tasking #7: UTM Performance Capability Priorities

Presenters:

David Silver, Vice President, Civil Aviation Aerospace Industries Association

Max Fenkell, Director, Unmanned and Emerging Aviation Technologies, Aerospace Industries Association

Mr. Silver thanked the DFO and DAC Chair for bringing everyone together for today's meeting and for the opportunity to continue the work of Task Group 7. The Task Group's work has stretched into these last few months to finalize the product and the group's recommendation to the FAA. Mr. Silver went on to thank the members of Task Group 7 who were extremely flexible and helped deliver the product to the FAA. The continued tasking from the FAA required the group to finish what they had previously started. The FAA provided the Task Group with the FAA CONOPS 2.0 document. The group very much appreciates the FAA sharing this work with the group. Task Group 7 included an extremely diverse group who participated in the conversation and the work that was conducted through different means including; surveys, plenary meetings, and series of breakout calls focusing on areas that required more in-depth review.

The group has bucketed the items in into two main areas, the first area where the Task Group agreed that the FAA CONOPS 2.0 document enjoyed unanimous support. The group felt like the FAA was absolutely on the right track. Other areas were where the Task Group felt that discussion was needed between industry and the FAA. The group also added in stylistic comments because as a group of engineers and pilots, we felt like we had to comment on syntax. Areas the group felt had unanimous support:

- Description of the federated UTM system
- Recognition of the benefits of LAANC and the clear need for the UTM system
- Understanding that some of the technologies referenced in the document are not fully developed yet, but will be necessary to maintain the safety of the National Airspace System (NAS)
- Specification of performance rules governing UAS Service Suppliers (USSs) and certain UTM services
- Recognition of standards development organizations and their contributions to UTM and overall NAS safety
- Notion of Government-qualified services and/or service providers

Overall Task Group 7 felt the document is an accurate reflection of the state of UTM development and the group supports a majority of the document as written. The group felt like the system reflects this in terms of the federated approach which will allow maximum flexibility and the maximum number of operators. The Task Group is extremely supportive of this



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

approach. LAANC continues to be the foundation of UTM the group thinks it is critical to recognize its benefits as we continue to build the UTM system. The Task Group does understand that a lot of the technology is not yet fully developed. However, it is good that we understand what will be required in order to ensure the continued safety of the NAS. Areas like detect and avoid, are needed so that we can eventually hit the full-scale integration that we anticipate and we appreciate the FAA's recognition of this within the CONOPs.

The group felt that the performance based rules and authoritative data requirements that the USSs must achieve in order to provide UTM service safely, was good. The group agrees that this includes making airspace available to all operators and the need to have the UAS information shared with other qualified USSs. The other topics the group supports is the work of ASTM, Remote ID, and the UTM standards and services that are required to be used by the operator or have a direct connection to the FAA systems. The Task Group is also fully supportive, and agrees with the FAA, that operators must be qualified against a specific set of performance based rules. Mr. Silver shared that the group understands that this is not the final version of the document and they anticipate further conversations with the FAA. The group did feel that were 12 specific areas where more discussion was required. He then invited Mr. Max Fenkell to speak on those 12 areas.

Mr. Fenkell reiterated the hard work the group put into the document. He shared the group agreed that the following areas requiring more discussion:

- Role of Flight Information Management System (FIMS)
- Participation of UAS within UTM
- Role of UAS Volume Reservations (UVR)
- Manned Aircraft Operations Participation
- Benefits of UTM
- Role of Performance Authorizations
- Networked Remote ID
- The accuracy of the scenarios contained within the document
- Data protection
- Volume-based vs. Trajectory-based Strategic De-confliction
- Roles and Responsibilities of the Operator and USS

Mr. Fenkell shared that the common theme in the areas of discussion: more clarity is needed. He acknowledged that this is also a recognition that this is only version 2.0 and there will be subsequent versions 3.0 and 4.0, which the group anticipates will clarify a lot of these areas.

Role of FIMS

The first area needing clarity is the role of the FIMS. Task Group 7 supports the FAA concept of FIMS as defined in Section 2.3.24 of the document. As shown in figure 3, of the notional UTM architecture details for the three areas, between FIMS and the UAS service suppliers need to be provided. Overall the CONOPS document should provide more clarity around the specific



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

functions FIMS would serve, the separation of roles of FIMS and the USS, as well as how FIMS can provide information to the legacy air traffic control system (ATC).

Participation of UAS within UTM

Participation of UAS within UTM as stated in Section 2.4.1 is that all operators not receiving ATC separation services are required to participate in UTM at some level using applicable services to meet the performance requirements for their operations. The Task Group noted this is a departure from UTM CONOPS 1.0, which said that visual line of sight operations did not need to have UTM. The Task Group is seeking more clarity around the terms “all UAS” and “at some level.” Any corresponding requirements may change based on the operation, for example visual line of sight or BVLOS, the size of the aircraft, location, mission type, and many more factors.

Role of UVR

As UTM is rolled out, the group recognizes that there are many different incidents that could require airspace to be limited for a period of time. Task Group 7 supported the UVR concept but believes that more clarity is needed on how the UVR will be utilized. One question that came up constantly throughout the task groups work is, would UVRs be available only to public safety or would a similar functionality will be available to commercial entities?

Manned Aircraft Operators Participants

Manned aircraft operator participation or manned participation, was a topic of great conversation in the Task Group. Section 2.4.1.3 of the CONOPS, states manned aircraft operators are not required to participate in UTM, but may and are encouraged to voluntarily do so to gain the safety benefits from shared awareness among airspace users. Task Group 7 agrees with the text as is written in the section, that manned aircraft operators participation in UTM should be voluntary. However, more discussions are needed on responsibilities, safety risks, and other topics, as this issue takes shape. Task Group 7 fully supports that a more robust discussion is needed on responsibilities of manned operators within UTM.

Benefits of UTM

The group agrees wholeheartedly, with all of the benefits in section 2.2 of the CONOPS. However, the group added to some items for consideration and recognizes that there is probably far more items still out there. UTM would really do a lot in order to benefit the aviation community but the group wanted to add to additional considerations to the UTM for the FAA to review, to make sure that it is a more encompassing approach.

Role of Performance Authorizations

This is another area where the group recognizes will continue to become clear as we move through CONOPS 2.0 to 3.0 to 4.0. The groups agrees with the majority of the text in section 2.4.2, but feels that there is still some items that need greater clarity. Task Group 7 believes that subsequent versions of the CONOPS will likely include some of these areas but more information is needed about the specific type of performance linked to authorizations. There are some open questions about what qualifies, how exactly that will work, and what exactly this is



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

going to look like in practice. Task Group 7 assumes that this will come out as we move forward to future versions of the CONOPS.

Networked Remote ID

We really limited our comments here to what was in the CONOPS specifically because of the Remote ID rulemaking. We unanimously support the notion of Remote ID due to safety benefits for all users of the NAS but we believe that the FAA should provide some more clarity on specifics tied to the UTM architecture. One question that came up was how a broadcast Remote ID would work within UTM. Could the sensors that relay info to the USS versus the aircraft receive messages? This is a question that we anticipate will come up as the rule comes out and other things become more clear.

The Accuracy of the Scenarios Contained within the Document

Next the group looked at the accuracy of the scenarios contained within the document. The group fully supports the accuracy of all five of the scenarios but recognizes that more complex scenarios will be needed, to address the future realities of the NAS. The task group was concerned that recreational fliers were not a part of any of the examples, even though they obviously make up a large segment of the population flying UAS today. The Task Group also believes that some of the scenarios appeared to over simplify the complexity of some of the issues. Lastly, the group felt that some more specifics could be used to help clarify some of the scenarios. These are all things that the Task Group anticipates will be made clearer as the CONOPS progresses.

Data Protection

The Task Group looked at the data protection within the CONOPS, which lays out principles for three types of UTM services that operators might use, in order to support their missions, including those services that are required by the FAA. The Task Group felt that for these services the USS should use internationally accepted data protection standard in order to ensure that the customer, government, and peer services are secured for the continued and safe operation of the UTM network.

Volume-based vs. Trajectory-based Strategic De-confliction

For Volume-based vs. Trajectory-based strategic deconfliction, the group felt that the CONOPS assumes that the USS automation will use a series of intended four dimensional volumes or airspace volumes to identify operations that may be in conflict. The Task Group agrees with its approach, which will likely work for low bandwidth traffic but may not scale to high operational tempo or work when the majority of traffic is operating point to point. The task group is seeking clarity from the FAA on whether its trajectory-based approach, which is more aligned to the evolving air traffic management system used for legacy air traffic control, would be effective as UAS operations evolve into the future.



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

Roles and Responsibilities of the Operator and USS

Lastly, the Task Group looked at the roles and responsibilities of the operator of the UAS. As the above themes have illustrated, the CONOPS laid out many new principles and concepts for managing UAS traffic. As the airspace continues to develop, the FAA must clearly define who is responsible for an individual piece of the UTM ecosystem. Task Group 7 recommends that in subsequent versions of the CONOPS, the FAA clearly define the roles and responsibilities for the operator and the USS platform.

After reviewing the points by the Task Group, Mr. Fenkell went on to share the group's thoughts on the stylistic comments. He shared that the group found a few typos and broken links that they wanted to present to the FAA. While not having to do with the substance of the document, it was important to highlight these typos and broken links. Lastly the document did not contain specific recommendations at the end. But the group felt that their recommendations were contained throughout the areas that they were seeking clarity from the FAA. The group felt that the areas they are seeking clarity take the place of specific recommendations at the end. The group also updated two parts of the previous report, which they included in the final report based on comments received at the last DAC meeting. The first being the definition of surveillance which was a question that was asked by Jay Merkle. The definition was updated to match the definition in the UTM CONOPS 2.0 document. The second being the FAA's responsibility on spectrum, which was based on a question that Mr. Christian Ramsey asked.

Mr. Fenkell ended his presentation by thanking the Task Group members for their hard work over the 180 days. He felt the group had put together a very good product. He also thanked the testers for all their hard work.

Motion to Accept

After Task Group 7's presentation, Mr. Chasen thanked the group for their hard work and time. Mr. Chasen then entertained a motion to forward Task Group 7's UTM recommendation to the FAA.

- Captain Houston Mills (UPS): Moved to forward the recommendations to the FAA.
- Todd Graetz (BNSF): Seconded the motion.

Mr. Chasen then asked if there were any objections. No objections were lobbied, so the motion was passed.

Discussion:

- Robie Samanta Roy (Lockheed Martin): I wanted to raise to the whole issue of spectrum. As you know, all of this interconnectivity is not going to be able to be effective, unless there is obviously spectrum allocation usage, etc. Looking through the notes and draft minutes from our last DAC meeting, there was some discussion about what the group had done. I wanted to ask how the FAA is going to be moving forward on the spectrum side internally. I also wanted to raise for their awareness that the Department of Commerce has the Commerce Spectrum Management Advisory Council (CSMAC),



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

which is working on the spectrum issues. Wanted to know how the FAA, from interagency perspective, is working with the CSMAC?

- David Silver (AIA): I agree. I think that the work the CSMAC is doing is really important. I think that we would assess from Task Group 7 perspective, we would encourage the FAA to continue to work interagency coordination in this in this area, in addressing the operational requirements for spectrum resources. Obviously this wasn't in our CONOPS report and this wasn't something that we specifically reviewed. But we are aware of the effort and we think it's really important.
- Max Fenkell (AIA): One of the other things that I would note is I think the first meeting you referenced in the minutes in which Christian asked the FAA a question about the resource requirement for spectrum. I think at the time I called it the lifeblood of our industry. I think that has become ever clearer as we continue to develop new technologies and products that are going to require increased spectrum requirements. We would fully support the recommendation for the FAA and CSMAC to work together. I know that there great people looking at this issue. Obviously, as we continue to move forward and innovate new platforms, the spectrum requirements are going increase as well. We need to look at all possible options including; defined aviation safety spectrum, other options, mobile, wireless, requirements, etc. The CSMAC report add do a lot to that approach. I really appreciate the question and I fully support your views.
- Robie Samanta Roy (Lockheed Martin): Thank you both David and Max. And just as an FYI Lockheed Martin is a part of the CSMAC. So we have a little bit of connectivity on both ends.
- Captain Houston Mills (UPS): Echoing Robie's thanks stated to David and Max. You talked a little bit about the manned aviation interface with UTM on a voluntary basis. I was just kind of curious, in terms of how did you see that interface taking place and what does the team recommend to the FAA, to gain from that particular recommendation.
 - Jay Merkle (FAA): I can take that question for you Captain Mills and I can also address Robie's question. First remember this version of UTM CONOPS 2.0 is actually 400 feet and below only, so it is not taking on the larger question of say Class B airspace at 1,000 feet or 10,000 feet or something like that. This is 400 feet and below, so primarily that would be general aviation and helicopters, interacting with UAS in that airspace and obviously some sport aviation as well. What we really want to encourage here, and as you can see we also sent out the request for information (RFI) from the FAA out to everyone, about how could manned aviation take advantage of something like Remote ID information. We see a tremendous potential opportunity for manned aviation to receive information from UTM, including things like Remote ID and other information, to better create a joint situational awareness in low altitude airspace. It is really around that joint situational awareness in the low altitude airspace. Back to the spectrum, yes we are aware of all the spectrum issues and on almost a one-off basis, we deal with it right now with particular request for command



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

and control links. The notice of proposed rulemaking for Remote ID stated, that we would not use protected aviation spectrum. But we are exploring other parts of spectrum and how they could be useful. Where I think you will see this evolve, we just aren't there quite yet, in UTM CONOPS 2.0 talks about performance authorization. Think about this a little bit like required navigation performance or required column performance, or whatever. I think as we get into those more complex operations and start codifying those performance authorizations that is where you will see the need and the opportunity for spectrum particularly, around command and control points to really mature.

- David Silver (AIA): Task Group 7 was clear the manned aviation participation at all levels, continues to be an area of great concern and that there remains the need for continued engagement. Because different stakeholders, quite honestly do have different views. I have my own personal views but I want to make sure that we fully engage everybody as we develop the next CONOPS so that we can arrive to the next CONOPS with an agreed upon solution and as opposed to having to re-litigate issues later.
- Jay Merkle (FAA): That is good feedback and I can't wait to really dig in and go through them with my colleagues and industry. We have also firmly heard that feedback as well. We are working on a way that CONOPS 3.0 will be able to engage industry and you should hear about that very soon. We want to do the same thing, we want to work together on future versions of UTM.
- Bob Brock (Kansas Department of Transportation): Thanks to David and Max, you guys took on one of the tougher task groups. UTM is a tough topic and it is going to drive a great deal of access and the ability for rural America. As I sit here in Kansas on a rainy day, we think about what it is going to be like to reach out touch and benefit those commercial farmers, the major organizations for emergency management, and those kind of things. So, that is an awful big deal and I appreciate the effort. My short question is our safety case through the FAA to be able to do our most important thing, we always talk about BVLOS. UTM is such a critical piece of risk mitigation, is there a recommendation or does the Task Group have any kind of language in your recommendation, to discuss at what level will the FAA consider UTM as an important part of a risk management process and to make certain that the entire holistic safety case, really does represent the entirety of the safety. UTM is one piece but I think it is a significant piece and the industry talks about a great deal as something that would be additional situational awareness in the NAS.
 - David Silver (AIA): Thank you, Bob. I think that we underlined in the report actually quite early that we see the UTM as really the basis of future safety risk system for UAS as a whole. It is an underlying concept that we understand the importance of we know the FAA does to. We offered I believe unequivocal calls for it.
 - Max Fenkell (AIA): What we said is, "critical to the safety of the NAS that UTM becomes fully operational." We agree with the majority of the text in Section 2.4.2 but feel that some items require greater clarity of discussion. Task Group 7



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

believes that subsequent versions of the CONOPS will likely include some of these areas but more information is need about specific types of performance linked to an authorization. For example, will the aircraft or Communications Navigation Surveillance (CNS) capabilities determine the authorization? Likewise could an authorization be linked to the geographic location instead of the airspace? Those are just two of the questions of the many that came up in the discussion. We believe that these are just some of the questions that the FAA continues to clarify. I think the group had a heated discussion over the topics that you're talking about and I think we realized that CONOPS 2.0 is the launching point for those topics.

- Bob Brock (KS DOT): Thank you for the follow-up on that. The coordination amongst the AUS office to make it possible for us to actually go fly BVLOS and demonstrate the need of these things. This really provides connectivity across all the lines of business and FAA. The industry both respects it and appreciates the opportunity to demonstrate. Thanks guys, appreciate it.
- Mark Colburn (Dallas, TX Police Department): As a helicopter pilot, I have essentially operated mostly in low altitude airspace for the past 40 years. This area of manned aircraft operator participation in UTM is of great interest and concern to me. In the UAS CONOPS 2.0, the FAA clarified how manned operators could voluntary participate in UTM, either by passive or active means. Passive participation is to utilize UTM information but not make flight intent available, for active participation manned operators are encouraged and can make their flight intent available. Additionally in CONOPS 2.0, the following sentence was added to the active participation definition, "They can also voluntarily equip with capabilities, for instance ADS-B to provide additional data about their operations." I understand that ADS-B Out, that is pretty much a given. Because the way I understand the document is that information will be received by the ATC system, transmitted through the FIMS to the USS or to the UTM system. So, therefore that information should be made available to the drone operators. My question is does the FAA's concept of voluntary equipage with Remote ID only include a network solution? In other words, broadcasting their flight intentions via the internet through the LAANC to a USS provider before takeoff.
 - Jay Merkle (FAA): Mark, we are working on the final Remote ID rule and when that comes out the answer to your question will be revealed.
- Mark Colborn (Dallas, TX Police Department): Has the FAA given any additional consideration to exploring the less expensive alternative to ADS-B? For instance, an aftermarket standalone battery-powered broadcast Remote ID beacon. The owner with an unalterable serial number could register that. Ideally for use not only on UAS but perhaps manned aircraft?
 - Jay Merkle (FAA): We did receive comments about that in the Remote ID Notice of Proposed Rulemaking (NPRM) during the public comment period. We are looking at how to adjudicate those comments in the final policy. So the answer comes out with the rule. But I do want to circle back to the performance authorizations question and the regulatory question that Bob brought up.



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

Absolutely agree that we need to flesh out more about this performance authorization. But, the role of the safety case, and particularly the role of the regulatory side, was a big leap from UTM CONOPS 1.0 to 2.0. We realized that we were not doing a good job of articulating the role of the regulatory side in the kind of things Aviation Safety brings to an ecosystem like UTM, in terms of operating rules, aircraft manufacturing, and production maintenance. That is the significant change you see in CONOPS 2.0 is clarifying an entire aviation safety ecosystem that includes the things that you would expect Flight Standards to do, Aircraft Certification, and the Air Traffic Organization. That is really why we wanted to clarify that message and we look forward to going through your comments and working on CONOPS 3.0 and making it even better. The question Max had about all UAS participating at some level, good feedback on clarifying that. But again, this is one of those that from CONOPS 1.0 didn't recognize things like registration or airspace authorization or Remote ID, as a part of the larger UTM ecosystem. So CONOPS 2.0 does recognize them as a part of that larger ecosystem. Therefore, we didn't do a great job of explaining it and thanks for the feedback. We will get back to that and what we meant by at least at some level.

- Jaz Banga (Airspace Systems): Two questions, I have for you. In the UTM system are we actually incorporating any non-cooperative information, as far as low altitude goes. There is you know radar coming online, RF, LIDAR. Who is responsible for receiving that information and are making sure that it is distributed to whoever is in the UTM system. That is my first question.
 - Jay Merkle (FAA): Right now we are investigating what type of non-cooperative would be necessary in order to support detect and avoid. I don't think we know the answer yet. But under the UTM concept it would mostly be a service supplier, putting that infrastructure out to the operator. It would not be the FAA.
 - Jaz Banga (Airspace Systems): Understood, various data that is coming online from all the different companies that are starting to protect their facilities. They are also deploying radars and RF's and systems like that. That information you know especially on the radar side could be available on the non-cooperative side. That is why I make that comment and would love to discuss that more.
- Jaz Banga (Airspace Systems): Second question, on the identity part in this system. We have talked a lot about aircraft identity and we have talked a lot about whether it is broadcasted or network or all that kind of stuff. I think that we are missing from an identity standpoint, how about the identity of the operator or in the world of autonomy, the system that is controlling it. When I think about from an international security angle, I know that it is not necessarily the FAA's purview. But, how do we know who is controlling a drone? I do not know if there is any room here to insert information about verifying that?



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

- Jay Merkle (FAA): We received many public comments on that very topic and we are currently adjudicating them. I am going to give you the same answer, I gave Mark. You will know more about the role of Remote ID and identity, come December. We are also actively engaged with our security partners and we are working through, how across government, in all of government, how Remote ID will be used by them and what role it will play in their missions.
- Jaz Banga (Airspace Systems): I will reach out directly to you about some of that. I think I have some information there as well.
- Jay Merkle (FAA): Okay, and thank you. I just want to go back and clarify my first answer to you. It would most likely be in our interest in non-cooperative being developed as performance standard against something like detect and avoid. We would be technology agnostic, we would just say here is the performance that you would need in detect and avoid to get the safety risk credit. So that is where you would see us codify that.
- Jaz Banga (Airspace Systems): Got it and you know it is going to be in two places right, in the aircraft and on the ground. Going to have to figure out how people can get that information to those folks, is really what I'm asking about.
- Jay Merkle (FAA): Understood.
- Christian Ramsey (uAvionix Corporation): Jay, you mentioned the RFI regarding manned aviation use of Remote ID. What is the next steps with that? I think that has been closed and I am assuming you are reviewing responses, what next?
 - Jay Merkle (FAA): It has closed we are reviewing the responses and we could discuss with Dan or others, possibly presenting that here at the DAC or at some other forum. We have not really gotten to that stage yet Christian. We are really just digesting the information.

Interim Recommendation & Discussion for DAC Tasking #8: Safety Culture

Presenters:

Captain Joe DePete, President, Airline Pilots Association (ALPA)

Captain Steve Jangelis, Chairman for Safety, ALPA

After the completion of Task Group 7's discussion, Mr. Chasen invited Task Group 8 to present on Safety Culture recommendations.

Captain Joe DePete began his presentation by thanking the DAC and the FAA for their foresight and wisdom on this issue. Captain DePete shared that, "we know how to do this and it worked very well." Over the last several decades, aviation crews have been able to develop a very mature safety culture. We know today this was possible through building relationships and most importantly establishing trust and the lessons learned, by both our failures and our successes. I have to tip my hat to the former Associate Administrator for Safety Peggy Gilligan. Captain



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

DePete shared when he spoke to former Associate Administrator about when the Commercial Aviation Safety Team (CAST) started its efforts to dramatically try to reduce the amount of fatality risk in aviation, which at the time was unacceptable based on what the growth of the industry. Ms. Gilligan informed Captain DePete, that she had all the decision-makers in a room, locked the door, and said nobody leaves until we figure this out.

What resulted was an incredible ability to work together collaboratively because everything great in aviation comes out of collaboration. But, also the creation of our program, Aviation Safety Information Analysis and Sharing (ASIAS). What that is, for the sake of the public that are viewing here right now, is a very robust data collection effort. We were able to make aviation, when you consider you know what aviation does, we are putting people in metal and composite tubes in the lowest stratosphere, we made that the safest form of transportation ever known to man. The risk was greater to get in your car and go to a supermarket than it was to come and get on an airplane. Captain DePete stated that this is a remarkable achievement, not only recently but in all of mankind. It was not long ago that an aircraft accident was literally kind of the starting point for our analysis, the findings, and the development of safety challenges or changes that we wanted to make. In other words, it was reactive. We had to wait for something to happen and now we have a predictive capability. It was forensic, in other words.

Now though, through these voluntary safety action programs, specifically ASAP which is the Aviation Safety Action Program and FOQA which is Flight Ops Quality Assurance, we see how effective these measures are. We utilize collaborative tools now that enhance aviation safety through the analysis of voluntary reported safety events and discrepancies. That leads to the prevention of accidents and incidents before they happen. In other words, we strive now to be proactive and it's an incredible. If you've never been over to MITRE and see what they're able to do with that data. It is absolutely incredible and quite an achievement. Captain DePete highlighted that being proactive requires all the elements of the operational community to work together. We always say, "We don't compete on safety." It is the tide that lifts all boats. Captain DePete expressed how impressed he is with the DAC for recognizing that and for the FAA knowing it as well. Captain DePete thanked Secretary Chao for all the work that she has done in this area. He thanked Administrator Dickson and the Deputy Administrator Dan Elwell, with whom Captain DePete has talked to this topic and shared the achievements that have been made. Safety is a good business practice right, if you want you want a successful business you have to be successful here. Everyone has seen the importance of being proactive and collaborative in terms of safety. Just recently with the COVID-19, it became clear that in order to ensure the safety of our passengers, crew, and to get this industry, that is so pivotal to maintaining our economy, that we have to work together, it is the only way we can succeed.

It has not been an easy road over the past several months. It has been hard for everyone and for all the stakeholders. However, we have to make sure that we are all vigilant because we can still stumble. That is why I say a culture, because a culture suggests something completely different. It is not directives, it is not rigid, rather it is an acceptance, and embodiment of a set of principles, and that is what we have built in this amazing industry. We keep telling this good



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

story about what we have been able to do. We read this bad news but honestly I believe that given the restrictive nature of aviation in general, it being a very controlled environment, that with us all working together once again we will we will overcome another hurdle with the COVID crisis. We will be able to say to everyone “welcome back” and “welcome aboard”. That it is safer to come to your airport now and get on an airplane then it would be for you to go to the supermarket in your car. Captain DePete shared that this can be done because we have done it before.

In the drone community we have an incredible opportunity. The drone community does not have to repeat the long and often time painful learning curve that we had to go through in manned aviation. We can adopt a safety culture that has made manned aviation the safest form of transportation ever known to man. To that end the FAA tasked Task Group 8 to answer the question, “What other ways we can help the drone community fully adopt the safety culture that is so ingrained in manned aviation?” As President of the Air Line Pilots Association (ALPA), which includes 34 airlines, 63,000 pilots in both the U.S. and Canada and is the largest non-governmental safety organization in the world that has been involved in solving and working together on the COVID crisis. ALPA has an incredible toolbox as the largest non-government organization. Captain DePete shared that ALPA also has a Chairman for Safety, who is also the Chair of the Airport Committee, and many other different groups, Captain Steve Jangelis. Captain DePete tasked Captain Jangelis to take the lead in going over what the tasking and the work that was done by Task Group 8. Captain DePete invited Captain Jangelis to review Task Group 8’s recommendations.

Captain Jangelis shared that starting he would talk a little bit about the background of the tasking. After the February 2020 DAC meeting, Captain DePete sent out an email invitation to the DAC members for volunteers to support for the new Safety Culture Task Group. The solicitation received over 20 positive responses. In mid-March the task group received the official FAA tasking, including tasking question, tasking summary, and justification. Unfortunately that was just when the COVID pandemic was taking its grip on the world and the transportation industry. ALPA then turned its full attention to the crisis at hand for members, as well as the flying public. Thus delaying our start of the Task Group.

By mid-April we have developed a structure for the Task Group, including four operationally focused subgroups, and identified a leadership team from the Task Group membership. Realizing our time was short to develop full recommendations for the tasking, we decided, with DAC leadership support, to break our work into two goals.

- Goal number 1: Established an understanding across all stakeholders about the importance of foundational truths for tenets of a safety culture, and to help build a common view of how to move forward.
- Goal number 2: Develop an in-depth set of recommendations for the third quarter DAC meeting based on each operational task.



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

To generate recommendations and ideas to assist the drone community in adopting an aviation safety culture, four subgroups were created along the lines of operational communities. Each of the four subgroup leads organized their subgroups and held weekly telecom meetings to develop and refine the safety culture tenets. The tenants were agreed to by the team leadership comprised of subgroup leads, the six consensus tenets are:

- Safety Ownership
- Safety Modeled by Leadership
- Organizational Values
- Learning Culture
- System-wide Approach
- Trust

Safety Ownership

Empowering each individual across all group with a share of the collective responsibility to learn, understand, advocate, and participate in the best safety practices and behaviors for the intended activity.

Safety Modeled by Leadership

Safety culture is driven throughout the aeronautical community from the operator to the executive level management. Leaders should model safe practices (walk the talk) and reinforce the critical importance of safety as the top priority in the community.

Organizational Values

A safety culture reflects the values, principles, and normal behavior of an individual engaged in an activity that presents risk to the life, safety or property of others and must be scalable to the organization.

Organizations can promote and enhance a culture of safety by modeling behavior, educating individuals, and emphasizing the importance of safety during activities that present heightened risks to the people or property.

Learning Culture

A positive safety culture will always continue to learn and grow; individuals can adapt and change. Few operations in the NAS are error-free but operators learn from failures going forward, utilize risk management tools (knowledge) to improve the safety and quality of operations or productions with the power of data sharing both internally and within the communities to which they belong.

System-wide Approach

Those who set and promote safety rules and parameters must share the responsibilities of system wide safety by the creation of risk-based rules that are reasonable and proportionate in light of the relative risk of the operation.



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

It is also important to promote a voluntary non-punitive environment where the sharing/reporting of unintentional unsafe experiences (events) is fostered and supported by an educational approach to continuously improving safety in the NAS.

Trust

Captain Jangelis shared that this was the hot ticket issue. The one issue that came up over and over. When the group discussed it was going to take to get the drone community into adopting an aviation safety culture, they found trust was key.

A strong safety culture is enhanced by trust, a firm belief in the honesty, reliability and the ability of others

- Trust is a two-way street and assumes all stakeholders (individual and organizations) are committed to doing the right thing to ensure safe and successful operations.
 - Operators/stakeholders must trust that regulators and authorities will transparently act on and implement constructive input from operators/stakeholders and support best practices and constructive measures to address safety concerns.
 - Regulators must trust that operators/stakeholders will adhere to prescribed safety standards and operational norms.
- Trust promotes confidence amongst Operators, Stakeholders, and Regulators and leads to a cooperative environment for the sharing of safety related information, data and ideas.

Captain Jangelis shared the next steps to follow are: the four subgroups are already developing the recommendations to answer the FAA tasking and will be back in the fall to deliver the combined recommendations to address this most important issue.

Discussion

After completing his presentation, Captain Jangelis turned over the hosting duty to Captain DePete. Captain DePete then asked the DAC members if they had any questions or comments.

- Captain Houston Mills (UPS): Captain Mills thanked the presenters for their great work. We really appreciate the great work ALPA has done in really understanding what it takes each and every day, to keep the skyways safe around the world. One thing I would just add, these recommendations to the FAA build around tenants that are really universal. They are tenants that apply regardless of manned or unmanned. Anyone that operates in this space, these are tenants that everybody can build on whether it's the individual operator or a major entity. In terms of being able to take these concepts and bring them home to fruition. I think it's really important as we are talking about this roadmap and as we work to integrate eventually to full integration. Right now we are focused on 1.0 DAC, 2.0 DAC, but eventually we are going to be where we have full integration. So, as we talk through these tenants, we have talked



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

about things that will stand the test of time. As we are looking at these concepts and throw them out there, these are foundational principles that should hold up no matter what the level of integration. I really just want to compliment your team for taking that concept and making sure we work through and are not just focused on a current environment. But we are looking forward to what we are going in the future. These tenants will not just apply today but they also apply tomorrow. I just want to comment on that, and thank you.

- Captain Joe DePete (ALPA): Thank you Captain Mills, I appreciate that. I know you and I have worked together a long time and the contributions that you have made, I just can't say enough about them. Thank you so much for all your work on that committee.
- Brendan Schulman (DJI): Thank you, very much. This is a really important topic and at DJI we are always looking for ways to make existing operations safe. Whether that is implementing a new technology or educating our customers. I am really glad that we are working on this we have got the initial set of tenants. We are continuing work and in particular in engaging the community by things like surveys, that I think will help inform the things that we contribute to the FAA. I do think it's important to put this topic in context and that's the unquestionably stellar safety record that small UAS have to date. We undertook an analysis based on data voluntarily shared with us and this is in our NPRM comment. What we determined is that in 2019 across the U.S., there were 87.8 million flights of small UAS, totaling at least 10.3 million hours of flight time. If you put that in the context of aviation as a whole and compared to things like general aviation for example, which does have a fatal accident rate. If you were to take out that amount of operational flight time, we would expect something like a 103 fatal accidents per year for small UAS. Instead we have zero and I'm proud there are zero. So it is important to try improving safety or develop a safety cultures. But putting principles like that into context. We want to make sure that we communicate with the operators on a level they understand. That we look for ways to actually develop a culture, and I was glad to see in this report reference, the importance of the rules being reasonable. If the rules make sense, if they are not just addressed to risk and they seem to balance the costs, the benefits, and the burdens. Then I do think that the operational community will step-up and take safety more seriously and inculcated as a culture rather than just a set of rules that an agency in Washington is asking everyone to comply with. That is really the key as we as we move forward, this is the safest form of aviation the world has ever seen. As Captain DePete pointed out, aviation itself is remarkably safe and we should be proud of that. We should look for ways to improve that, whether it is a Remote ID rule or other rules and restrictions on opening up future operations. Thank you to the group and looking forward to our continued discussions on it.
 - Joe DePete (ALPA): Thank you, Brendan. I couldn't agree with you more. That is why I said, and I mean this, this is really the beginning. We have such an incredible opportunity as the growth in the industry goes on. I think we are off to a good start and again I thank all the members of the task group and



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

everybody that contributed. I agree with you that it cannot be a rigid set of rules but that is why I think the concept of stressing the culture right is more important at this point.

- Brian Wynne (AUVSI): Thank you, for your leadership on this and for Steve as well. I have been really pleased to participate. You mentioned Peggy Gilligan and I second that. I just wanted to point out for the group, many of us are already participating know, but it was in fact a meeting that that Peggy. Where she sat in on, she gave us a very good briefing on CAST, the history, and how CAST works. Many of us have been over to MITRE to look at the Aviation Safety Information Analysis and Sharing System (ASIAS). What came out of that of course was the unmanned UAS safety team, modeled after CAST. It is our effort in the spirit of this undertaking to try and get out ahead of any kind of heartache to try and leverage what has really worked very well on CAST. Which is the voluntary nature that is based on the trust that Steve underlined. I think I would urge us to really get behind, it is very expensive, the ASIAS system. It started out small based on that trust. More and more operators participated, as I understand it. We need to do the same thing with you UAST, so that as a community we are being data-driven as well and following on with the great work that has been done ahead of us in aviation. The General Aviation Joint Steering Committee (GAJSC) also falls in this category as well. I have benefited as a GA pilot.
 - Joe DePete (ALPA): Brian, The Airline Pilots Association (ALPA) was founded on the principle of safety. Our motto, “schedule and safety”. I remember back in 2015, I believe it was that you actually approached us as President of the Association Unmanned Vehicle System International (AUVSI) and you embody doing it right. You knew that that the importance in terms of the growth of the industry to get ahead of the curve in terms of it. We both had the concerns at the time with what was a slight bit of a hole, in terms of the hobbyists. Now that has kind of been addressed. I just cannot say enough about the work that you are doing and your participation in this. I appreciate it, thank you.
- Wade Troxell (Mayor of Fort Collins, CO): I one of the things that came up in the safe culture and related to stakeholders, which I brought to the table, a self-certification that firefighters use in our communities. Where it extends beyond, in this case the pilot and the aircraft itself, but it also has to be culture that's inculcated within the airspace in which they're flying. So 400 feet below in urban centers you need to create a safe environment within that. There can be self-certifications within communities for air safe UAS flight. I think there are some lessons to be learned and we talked about this. I appreciate the conversations that we had with regards to self-certification and in communities as it relates to UAS flight. As you know it is a more complex airspace than you would find at higher altitudes.
 - Joe DePete (ALPA): I know I totally agree and I hope everybody that is watching today is picking up how professional and dedicated everybody here is. In the DAC we pilots call it a shared mental model. That is kind of what we are working on and we are very excited about the socio-economic benefits of



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

this industry. As Houston said, we are trying to work together on safe integration and when the pieces are all put in place. It will be just like manned aviation. Right now, it will be just a seamless experience. We are off to a good start, no question about that.

- Joe DePete (ALPA): I had one question maybe for the FAA, is it still towards the fall or towards the end of the year for the Remote ID component. Is that still on the books for NPRM?
 - Jay Merkle (FAA): Yes, we are still targeting for December 2020.
- Joe DePete (ALPA): Foundational component, right?
 - Jay Merkle (FAA): Yeah, for the final rule.

Motion to Accept

At the conclusion of the Discussion for Task Group 8, Captain DePete thanked all those who helped and then handed over to the DAC Chairman. The DAC Chairman then entertained a motion to forward Task Group 8's Interim Safety Culture Recommendations to the FAA.

- Todd Graetz (BNSF): Moved to forward Task Group 8 recommendations to the FAA.
- Captain Michael Leo (New York City Fire Department): Seconded the motion.

Mr. Chasen then asked if there were any objections. No objections were lobbied, the motion was passed.

Industry-Led Technical Topics/Open Discussion

The DFO thanked the task group members for their hard work. Before opening up the floor to the DAC members for any new business or agenda topics. The DFO shared he wished to highlight the status of the DAC solicitation. As mentioned previously, the Federal Register notice was published on June 18, 2020, which formally opens the 60-day window for the FAA to receive nominations for new DAC members. It is very important that the DAC continues to have representation from all sectors of the drone community. The DFO asked the DAC members assistance in spreading the word of the opportunity to qualified applicants across the drone community. Thus helping to assure the FAA has a diverse group of members on this committee to advise as we continue the work to safely integrate UAS into the NAS.

The next DAC meeting will be in the October 2020 time frame. A decision on whether it will be in person or virtual, has not yet been made. The FAA will share those details as we get closer to the meeting agenda items for the October meeting. The meeting will include FAA Responses to the Facility Maps, BVLOS, and UTM recommendations. The FAA will also look forward to the final recommendation report from Task Group 8 on Safety Culture. There are no new taskings from the FAA to the DAC at today's meeting. The DFO turned over the floor to the DAC Chair, to see if he or any other DAC members had new business.



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

- Brendan Schulman (DJI): I just wanted to ask about the progress on what we refer to as the section 2209 rulemaking, concerning designated facilities that are eligible for flight restrictions. This is something that has been pending for a while I believe. It is on schedule for rulemaking in September, I know my organization is interested in helping contribute to good outcomes there by using geofencing features for example, to avoid locations that raise heightened security concerns. I think it has been a little while since we have heard an update on that process and I would appreciate if there is any insight.
 - Jay Merkle (FAA): Thank you, Brendan. The rulemaking team is hard at work and working towards the publish schedule and hope to get an NPRM out soon.
- Chris Anderson (3DR): I actually have two suggestions. The first one is perhaps maybe beyond the scope of this committee. I think is a broader one for the FAA to consider, it is about de-gender some of the terminology we use. As many of you may know at NASA and their style guide has ceased using unmanned and uses un-crewed as the as the preferred term. I am just wondering as I go through these wordings, every time I see unmanned. It kind of grates me. I'm wondering whether there could be some consideration of using some phrase like unpiloted or un-crewed in our in our conventions going forward. Second item, at the last act meeting I did present a suggestion that we consider a spinning up a working group on weather simulation data can be used in lieu of real-world data especially in the DNR (durability and reliability) type certification process. I would like to know whether that's appropriate for a DAC working group going forward.
 - Jay Merkle (FAA): I can address your first question we have recognized the same thing and we have been discussing some alternatives that we are considering. We are going back and looking at that as well, rather than burden everybody on the DAC was all that. If you want to talk to me I would be happy to talk to you about it. It is very clunky language and we have also recognized things like traditional aviation don't really tell the right story. The second one, I guess we can talk with Dan the DFO, and see if it is something we want to consider.
 - Captain Joe DePete (ALPA): If I may Chris, I support that as a president who just started a Presidential Committee on diversity inclusion. I have heard that from my members often and so I also lend my support and exploring new terminology that is a little more inclusive.
- Captain Houston Mills (UPS): One general question, just wondering is there anything that we have learned during this COVID-19? I know that there has been a lot of requests to take advantage of unmanned systems or UAS in these various environments. I know your team has been working really hard to grant exemptions under Part 107. Is there anything you guys have learned it you know perhaps we need to be thinking about? I mean obviously this is a very unique period of time and some would say that this is all for naught, we have trained for things to accelerate. Sometimes acceleration is good, sometimes you can accelerate too fast, so just



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

curious if maybe if there's anything you can share just relative Covid-19 that was run during this time period.

- Jay Merkle (FAA): I will consult with Mr. Elwell to see if we want to give a longer presentation at the next DAC meeting. The most important thing we have learned is the people who are most effective in providing the response, are those that already knew how to operate safely and had their operation up and running. They can simply pivot in support of COVID-19 support. Those that were struggling to figure out how to get their operation running. At the same time they were trying to respond to the crisis, it is far more difficult for them. So one of the things that we are coming out of this with is how do we work with the community to get more operators into a position of either under Part 107 or 91 or 135 or someplace, that would have more of a capacity to respond. We also saw that due to where we are in this industry, there is a certain limit to the response that we can do. There are only so many aircraft that our pilot off board. I think as the industry grows it is something that both the industry and FAA need to stay in touch with. How do we make sure we are positioned well to respond to these things?
- Trish Gilbert (NATCA): I am going to go backwards to the safety culture great work that Task Group 8 did. There was a comment that was made about general aviation and I didn't want to let it sit. Just a little historical background, the airline industry has been doing voluntary safety reporting for a very long time. The FAA is only had in air traffic control for about eleven or twelve years. It is relatively new and we are still learning from a lot of stuff there, even though it's very robust. The general aviation community, when you compare it to drone activity, to general aviation. I just think we should be cautionary in that vein and that they do not really participate in a voluntary safety reporting program. They have NASA, Aviation Safety Reporting System (ASRS), they are testing in ASIAs, and they have a couple groups doing some work with confidential info share. I just want to say I think it's really important the work that Task Group 8 has done. But we must realize that there's a lot more work in other parts of the aviation industry that have not quite and got to that point. That is why you see bigger numbers over there and I think the Deputy Administrator just did a safety Town Hall with general aviation talking about this kind of thing. I just didn't want that to sit as something that we should compare ourselves to because again they really are in their early stages. Thank you.

Closing Remarks and Adjourn

The DAC Chairman shared he appreciates the FAA's dedication to keeping these channels of communication open between the drone community and the FAA. He agreed that this has been a productive meeting and wished want to thank not only all of the DAC and Task Group members for the presentations, but also all those behind the scenes who made it possible to hold this great virtual meeting. Kudos to the FAA production team for the many hours of prep work that went up to leading today. The DAC Chairman believed this was an incredibly productive meeting and



Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

worked well over zoom and is looking forward to the next DAC meeting, whether that be in person or virtual.

The DAC Chairman then asked for a motion adjourn the DAC.

- Todd Graetz (BNSF): Moved to adjourn the DAC meeting.
- Captain Michael Leo (New York City Fire Department): Seconded the motion.

Mr. Chasen then asked if there were any objections. No objections were lobbied, the motion was passed and the DAC meeting was adjourned.

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Drone Advisory Committee

06/19/2020 DAC Meeting • Virtual

Appendix A: Meeting Attendees

| Name | Title | Org. |
|------------------------------------|--|------|
| 1. Dan Elwell | Deputy Administrator and DAC Designated Federal Officer | FAA |
| 2. Angela Stubblefield | Chief of Staff | FAA |
| 3. Ali Bahrami | Associate Administrator for Aviation Safety | FAA |
| 4. Jay Merkle | Executive Director, UAS Integration Office | FAA |
| 5. Bill Crozier | Deputy Executive Director, UAS Integration Office | FAA |
| 6. Arjun Garg | Chief Counsel, Office of General Counsel | FAA |
| 7. Kirk Shaffer | Associate Administrator, Airports | FAA |
| 8. Claudio Manno | Associate Administrator, Security and Hazardous Materials Safety | FAA |
| 9. Timothy Arel | Deputy Chief Operating Officer, Air Traffic Organization | FAA |
| 10. Brianna Manzelli | Assistant Administrator, Office of Communications | FAA |
| 11. Teri Bristol | Chief Operating Officer, Air Traffic Organization | FAA |
| 12. Alex Zektser | Attorney Advisor | DOT |
| 13. Erik Amend | Manager, Executive Office, UAS Integration Office | FAA |
| 14. Gary Kolb | UAS Stakeholder & Committee Liaison, UAS Integration Office | FAA |
| Confirmed FAA/DOT Observers | | |
| Name | Title | Org. |
| 1. Adrienne Vanek | Director, International Division, UAS Integration Office | FAA |
| 2. Michael McCrabb | Foreign Affairs Specialist, UAS Integration Office | FAA |
| 3. Christopher Swider | International Specialist, UAS Integration Office | FAA |
| 4. William Stanton | UAS Integration Lead for Air Traffic Organization | FAA |
| 5. Tonya Coultas | Deputy Associate Administrator, Security and Hazardous Materials Safety | FAA |
| 6. Rico Carty | Deputy Executive Director, Flight Standards | FAA |
| 7. Genevieve Sapir | Senior Advisor, Security and Hazardous Materials Safety | FAA |
| 8. Julie Marks | Deputy Director, Safety and Integration Division, UAS Integration Office | FAA |
| 9. Robert Sweet | Senior Advisor, Air Traffic Organization | FAA |
| 10. Elizabeth Forro | Special Assistant, UAS Integration Office | FAA |
| 11. Alison LePage | Digital Communications Manager, Office of Communications | FAA |
| 12. Alison Duquette | Digital Communications Team Lead, Office of Communications | FAA |
| 13. Jessica Orquina | Lead Communications Specialist, UAS Integration Office | FAA |
| 14. Khurram Abbas | Communications Specialist, UAS Integration Office | FAA |
| 15. Gretchen Tressler | Technical Writer, UAS Integration Office | FAA |
| 16. Jennifer Riding | Program Analyst, UAS Integration Office | FAA |