



Drone Advisory Committee eBook

**DAC Member (Public) Information for the
June 6, 2019 DAC Meeting • Arlington, VA**



Drone Advisory Committee

6/6/2019 DAC Meeting • Arlington, VA

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Logistics

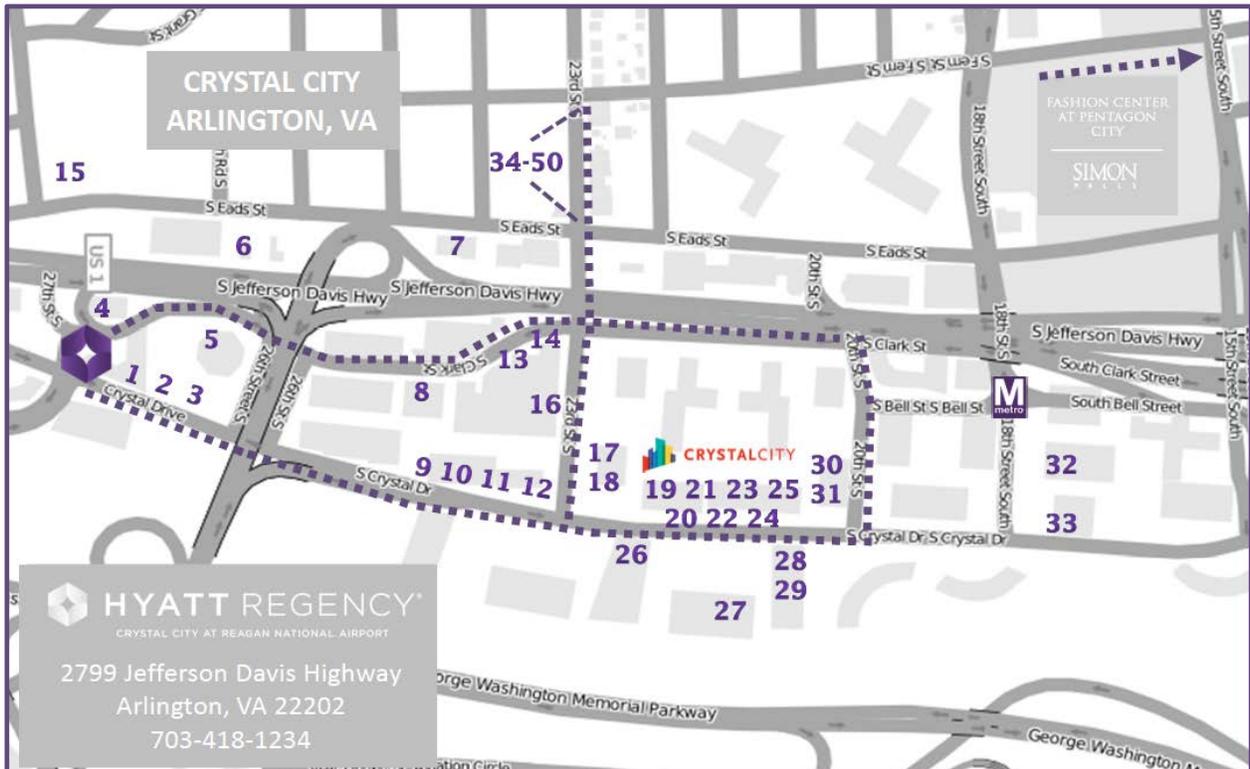
Schedule

Thursday, June 6, 2019 Hyatt Regency Crystal City (Regency E, Ballroom Level) 2799 Jefferson Davis Highway, Arlington, Virginia 22202	
9:00 a.m. – 10:20 a.m.	DAC Meeting Begins and First Morning Session <i>(Coffee will not be provided BEFORE the meeting)</i>
10:20 a.m. – 10:35 a.m.	Break <i>(Coffee will be available)</i>
10:35 a.m. – 11:40 a.m.	DAC Meeting Second Morning Session
11:40 a.m. – 1:10 p.m.	Open Lunch and Networking <i>(Lunch will not be provided, restaurant options below)</i>
1:10 p.m. – 2:05 p.m.	DAC Meeting First Afternoon Session
2:05 p.m. – 2:20 p.m.	Break <i>(Beverages will be available)</i>
2:20 p.m. – 4:00 p.m.	DAC Meeting Second Afternoon Session
4:00 p.m.	Meeting Adjourned

Parking and Shuttles

Parking
<ul style="list-style-type: none"> • Valet parking at the Hyatt Regency • Paid self-parking next to the Hyatt Regency
Complimentary Hyatt Regency Shuttles
<ul style="list-style-type: none"> • Crystal City Metro Station on the Blue & Yellow Lines: Complimentary shuttle leaves every 30 minutes. NOTE: Metro’s Blue & Yellow Lines will be shut down for WMATA’s Platform Improvement Project from National Airport to Huntington & Franconia-Springfield, affecting Braddock Rd, King St, Eisenhower Ave, Van Dorn St, and Franconia-Springfield & Huntington stations. • Ronald Reagan National Airport: Complimentary shuttle leaves every 20 minutes (airport pickup is at doors 2 and 4 on the upper level).
Walk from Crystal City Metro Station
<ul style="list-style-type: none"> • .7 miles / approximately 15 minutes

Area Map



RESTAURANTS WITHIN WALKING DISTANCE

- | | |
|--|--|
| 1 Cinnabar, Lobbibar, Perks – 703-418-1234 | 26 Chipotle – 703-920-8779 |
| 2 Bozelli's Italian Deli – Pizza - 571-970-4570 | 27 Ruth's Chris Steak House – 703-979-7275 |
| 3 Starbucks M-F 5:30AM-7PM S/S 6AM-4PM | 28 Noodles & Company – 703-979-1525 |
| 4 Clark Street Grill – Deli – 703-418-1577 | 29 Cosi – 703-521-1904 |
| 5 Fresh Chop Chop – American – 703-416-0700 | 30 Highline RxR – Rest/Bar – 703-413-2337 |
| 6 McDonald's Restaurant -24 hrs | 31 McCormick & Schmick's – 703-413-6400 |
| 7 Kabob Palace – Afghan 24 hrs– 703-486-3535 | 32 King Street Blues – BBQ – 703-415-2583 |
| 8 Subway – American – 703-566-8701 | 33 Morton's The Steakhouse – 703-418-1444 |
| 9 Mezeh- Mediterranean – 703-685-9907 | 34 Grill Kabob– 703-566-6806 |
| 10 Jimmy John's – American – 571-257- 7261 | 35 Taj of India – Indian – 703-920-1100 |
| 11 Buffalo Wild Wings – 703-413-0160 | 36 Bistro 7107 – Philippines – 571-312-4155 |
| 12 Legal Seafood – Seafood – 703-415-1200 | 37 Cantina Mexicana – Mexican – 703-979-7033 |
| 13 Kohinoor Dhaba –Indian – 703-778-5005 | 38 Café Italia Ristorante – Italian – 703-521-2565 |
| 14 Bar Louie – American – 571-302-7420 | 39 Top Thai Restaurant – Thai – 703-521-1305 |
| 15 Jaleo – Spanish Tapas – 703-413-8181 | 40 Andalusia Tea and Hookah – 703-970-0750 |
| 16 Kora – Italian – 571-431-7090 | 41 Crystal City Sports Pub – 703-521-8215 |
| 17 Ted's Montana Grill – Grill House – 703-416-8337 | 42 Bob and Edith's Diner - Breakfast 24 hrs– 703-920-2700 |
| 18 Cold Stone Creamery – 703-418-2223 | 43 Enjera Restaurant - Ethiopian – 703-271-0815 |
| 19 Chick-Fil-A – 703-415-7815 | 44 Bonsai Sushi – Japanese – 703-553-7723 |
| 20 Neramitra Thai – 703-413-8886 | 45 Freddie's Beach Bar/Restaurant -703-685-0555 |
| 21 Good Stuff Eatery – 703-415-4663 | 46 Urban Thai – 703-979-0777 |
| 22 We, The Pizza – 703-415-7992 | 47 Tortoise & Hare Bar and Grill – 703-979-1872 |
| | 48 Athena Pallas – Greek – 703-521-3870 |
| | 49 Harer Mesob -Ethiopian – 703-553-5500 |
| | 50 Portofino Restaurant – Italian – 703-979-8200 |



Drone Advisory Committee

June 6, 2019 DAC Meeting • Arlington, VA

Confirmed FAA/DOT Attendees

Name	Title	Org.
1. Carl Burluson	Acting Deputy Administrator and Acting DAC Designated Federal Officer	FAA
2. Danny Blum	Senior Advisor to the Deputy Administrator	FAA
3. Lirio Liu	Acting Deputy Associate Administrator for Aviation Safety	FAA
4. Jay Merkle	Executive Director, UAS Integration Office (AUS)	FAA
5. Bill Crozier	Deputy Executive Director, UAS Integration Office (AUS)	FAA
6. Joe Morra	Director, Safety & Integration Division, UAS Integration Office (AUS)	FAA
7. Erik Amend	Manager, Executive Office, UAS Integration Office (AUS)	FAA
8. Jessica Orquina	Senior Communications Specialist, UAS Integration Office (AUS)	FAA
9. Mike O'Shea	Program Manager, UAS Integration Office (AUS)	FAA
10. Teresa Denchfield	Logistics Coordinator, UAS Integration Office (AUS)	FAA
11. Teri Bristol	Chief Operating Officer, Air Traffic Organization	FAA
12. Maureen Keegan	Air Traffic Organization	FAA
13. Randy Willis	Air Traffic Organization	FAA
14. Claudio Manno	Associate Administrator for Security and Hazardous Materials Safety	FAA
15. Angela Stubblefield	Deputy Associate Administrator for Security and Hazardous Materials Safety	FAA
16. Guy Turner	Deputy Director, National Security Programs and Incident Response, Office of Security and Hazardous Materials Safety	FAA
17. Phil Newman	Assistant Administrator for Government and Industry Affairs	FAA
18. Kate Howard	Deputy Assistant Administrator for Government and Industry Affairs	FAA
19. Arjun Garg	Chief Counsel	FAA
20. Lorelei Peter	Assistant Chief Counsel for Regulations	FAA
21. Kirk Shaffer	Associate Administrator for Airports	FAA
22. Trish Hiatt	Deputy Director, Office of Airports Safety and Standards	FAA
23. John Dermody	Director, Office of Airport Safety and Standards	FAA
24. Christopher Hillers	Aviation Transportation Analyst, Department of Transportation Office Aviation and International Affairs	DOT
25. Peter Irvine	Associate Director of Office of Aviation Analysis, Department of Transportation	DOT
26. Laura Remo	Department of Transportation	DOT
27. Damon Walker	Department of Transportation	DOT
28. Genevieve Sapir	Senior Attorney, Department of Transportation	DOT



Drone Advisory Committee

June 6, 2019 DAC Meeting • Arlington, VA

Public Meeting Agenda

Time: 9:00 a.m. to 4:00 p.m. Eastern Time

Location: Hyatt Regency Crystal City (Regency E, Ballroom Level)
2799 Jefferson Davis Highway, Arlington, VA 22202

	Start	Stop	
1.	9:00 a.m.	9:01 a.m.	Greeting from FAA
2.	9:01 a.m.	9:05 a.m.	Official Statement of the Designated Federal Officer
3.	9:05 a.m.	9:15 a.m.	Review of Agenda and Approval of Previous Meeting Minutes
4.	9:15 a.m.	9:25 a.m.	Opening Remarks from DAC Chairman
5.	9:25 a.m.	9:55 a.m.	The FAA's Plan to Address the FAA Reauthorization Act of 2018
6.	9:55 a.m.	10:25 a.m.	FAA Update: Remote ID Outlook
7.	10:25 a.m.	10:40 a.m.	Break
8.	10:40 a.m.	10:55 a.m.	Drone Safety Week
9.	10:55 a.m.	11:40 a.m.	Update on Counter-UAS Technology Trends <i>Technology & Tools for Countering UAS Security Risks</i>
10.	11:40 a.m.	1:10 p.m.	Lunch and Networking
11.	1:10 p.m.	2:05 p.m.	The FAA Knowledge Test for Recreational Flyers
12.	2:05 p.m.	2:20 p.m.	Break
13.	2:20 p.m.	3:20 p.m.	Industry-Led Technical Topics
14.	3:20 p.m.	3:50 p.m.	New Business/Agenda Topics/Review Taskings
15.	3:50 p.m.	4:00 p.m.	Closing Remarks
16.	4:00 p.m.	4:00 p.m.	Adjourn

RSVP Required: Email DACmeetingRSVP@faa.gov providing your full name and organization (if representing an organization).

Questions/Comments: Contact Jessica Ann Orquina, Senior Communications Specialist (jessica.a.orquina@faa.gov or 202-267-7493).



Drone Advisory Committee

DAC Membership – As of 5/29/2019

Stakeholder Group	Members
Designated Federal Officer	Dan Elwell , Acting Administrator, Federal Aviation Administration
Chair	Michael Chasen , Chief Executive Officer, PrecisionHawk USA, Inc.
Airports and Airport Communities	Deborah Flint , Chief Executive Director, Los Angeles World Airports Marilyn Mora , President and Chief Executive Officer, Reno-Tahoe Airport Authority
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 Christopher Penrose , Senior Vice President of Emerging Devices, President of Internet of Things, AT&T Mariah Scott , President, Skyward (a Verizon company)
Research, Development, and Academia	Robie Samanta Roy , Vice President of Technology Strategy and Innovation, 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) Matthew Zuccaro , President and Chief Executive Officer, Helicopter Association International Lorne Cass , Vice President, Operations / Industry Affairs, American Airlines (AA) Vacant
UAS Hardware Component Manufacturers	Phil Straub , Executive Vice President and Managing Director, Aviation Division, Garmin, Ltd. Vacant
UAS Manufacturers	James Burgess , Chief Executive Officer, Wing (an Alphabet company) Michael Chasen , Chief Executive Officer, PrecisionHawk USA Inc. Gur Kimchi , Co-Founder and Vice President, Amazon Prime Air 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 Peter Cleveland , Vice President of Law and Policy Group, Intel Corporation
Other	Rich Hanson , President, Academy of Model Aeronautics Brian Wynne , President and Chief Executive Officer, Association for Unmanned Vehicle Systems International



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Stakeholder Group	Members
	Thomas Karol , General Counsel, National Association of Mutual Insurance Companies David Silver , Vice President for Civil Aviation, Aerospace Industries Association



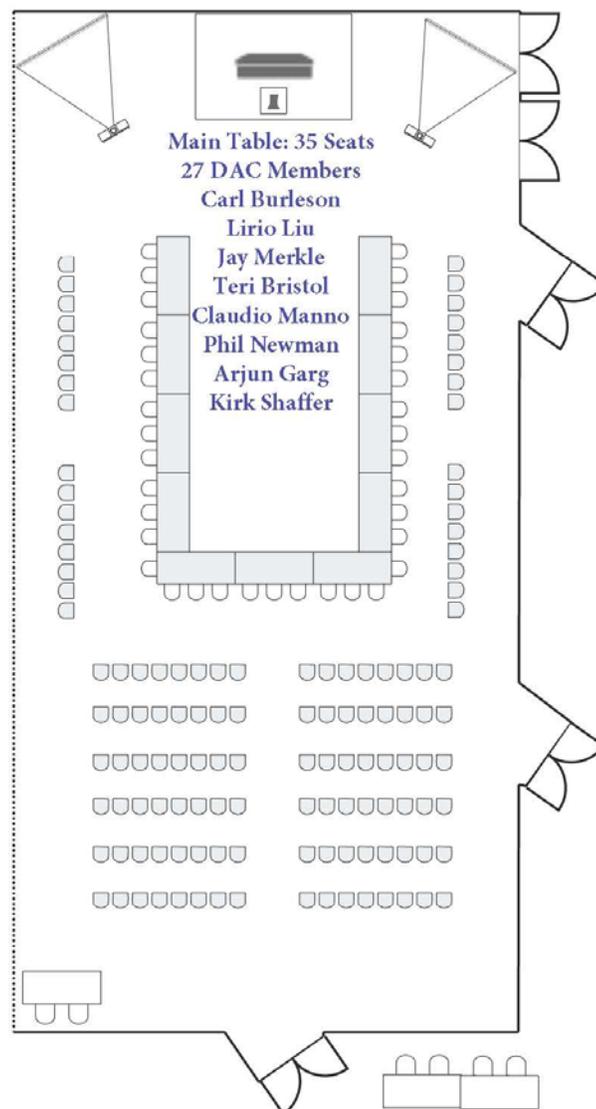
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HYATT REGENCY®

CRYSTAL CITY AT REAGAN NATIONAL AIRPORT



5 Feet



FAA DRONE ADVISORY COMMITTEE

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Official Statement of the DFO

PUBLIC MEETING ANNOUNCEMENT
Read by: Designated Federal Officer Carl Burleson
Drone Advisory Committee
June 6, 2019

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:

May 15, 2019

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.

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REVIEW OF AGENDA AND APPROVAL OF PREVIOUS MEETING MINUTES

Carl Burleson

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



Agenda

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3:50 p.m.	4:00 p.m.	Closing Remarks
4:00 p.m.	4:00 p.m.	Adjourn



Action Item Update

- Summary of action items from July 2018 meeting.
 1. DAC: Think about how the you can assist the UAST.
 2. FAA: Discuss the core UAST data elements with the IPP lead participants.
 3. FAA: Determine if the DAC is the correct home for a technical subgroup.



OPENING REMARKS FROM DAC CHAIRMAN

Michael Chasen

Chair, FAA Drone Advisory Committee

Chief Executive Officer, PrecisionHawk USA Inc.



Welcome to the DAC

- Our goal is to deliver **strategic guidance** to the FAA over the coming years.
- We are no longer talking about what is going to happen with drones in the future – **it is happening now**. And this group needs to work closely with the FAA to ensure that we have proper framework to handle the exponential growth in deploying drone technology that we expect to see over the next few years and months!
- We have a lot of work ahead of us to safely integrate drones into the national airspace system, and we are going to **hit the ground running** to tackle some of the most pressing issues at our next meeting.

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DAC 2.0

Michael Chasen	Chairman, Drone Advisory Committee (DAC) Chief Executive Officer, PrecisionHawk USA, Inc.	Matthew Zuccaro	President and Chief Executive Officer, Helicopter Association International
Dan Elwell	Acting Administrator, Federal Aviation Administration	Lorne Cass	Vice President, Operations / Industry Affairs, American Airlines (AA)
Deborah Flint	Chief Executive Director, Los Angeles World Airports	Phil Straub	Executive VP and Managing Director, Aviation Division, Garmin, Ltd.
Marilyn Mora	President and CEO, Reno-Tahoe Airport Authority	James Burgess	Chief Executive Officer, Wing
Trish Gilbert	Executive VP, National Air Traffic Controllers Association	Gur Kimchi	Co-Founder and VP, Amazon Prime Air
Joe DePete	President, Air Line Pilots Association	Brendan Schulman	VP of Policy and Legal Affairs, DJI Technology
David Greene	Bureau of Aeronautics Director, Wisconsin Department of Transportation	Michael Sinnott	Vice President Product Development and Strategy, Boeing Commercial Airplanes
Wade Troxell	Mayor of Fort Collins, Colorado, and the National League of Cities	Greg Agvent	Senior Director of National News Technology, CNN
Bob Brock	Director of Aviation and UAS, Kansas Department of Transportation	Todd Graetz	Director, Technology Services, UAS Program, BNSF Railway
Mark Colborn	Senior Corporal, Dallas Police Department	Jaz Banga	Co-Founder and CEO, Airspace Systems, Inc.
Michael Leo	Captain, New York City Fire Department	Chris Anderson	Chief Executive Officer, 3DR
Steve Ucci	Senior Deputy Majority Leader, Rhode Island State Assembly	Peter Cleveland	Vice President of Law and Policy Group, Intel Corporation
George Kirov	VP and General Manager, Commercial UAS Solutions, Harris Corporation	Rich Hanson	President, Academy of Model Aeronautics
Christopher Penrose	Senior VP of Emerging Devices, President of Internet of Things, AT&T	Brian Wynne	President and CEO, Association for Unmanned Vehicle Systems International
Mariah Scott	President, Skyward (a Verizon company)	Thomas Karol	General Counsel, National Association of Mutual Insurance Companies
Robie Samanta Roy	VP of Technology Strategy and Innovation, Lockheed Martin Corporation	David Silver	Vice President for Civil Aviation, Aerospace Industries Association
Mark Baker	President and CEO, Aircraft Owners and Pilots Association		
Houston Mills	Vice President, Flight Operations and Safety, United Parcel Service (UPS)		

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Entering the Next Phase of Growth



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Taking the Next Step



TECHNOLOGY that can keep drones in the air for longer, carrying heavier payloads, and can operate safely with our existing national airspace system.



POLICIES that can support all of the use cases we are thinking of for drones today but also **don't limit the ideas we will think of tomorrow.**

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Top 5 Priorities for the DAC

- 1** Remote ID
- 2** Beyond Visual Line of Site (BVLOS)
- 3** Counter UAS
- 4** The Waiver Process
- 5** Public-Private Partnerships



THE FAA'S PLAN TO ADDRESS THE FAA REAUTHORIZATION ACT OF 2018

Jay Merkle
Executive Director
UAS Integration Office
Federal Aviation Administration



2018 Reauthorization

- Congress prioritized UAS integration in reauthorization
- Establishes full FAA authority over all UAS operating in the NAS
- Reaffirms the UAS Integration Pilot Program
- Provides authority to DHS and DOJ to engage in counter UAS activities to address security risks posed by UAS
- Directs the development of risk-based consensus safety standards
- 50 UAS related provisions within the 2018 reauthorization



Status of Rulemaking Efforts

Rule	Stage
Safe and Secure Operations of sUAS	ANPRM
Operations of sUAS Over People	NPRM
External Marking Requirement for sUAS	Interim Final Rule
Registration and Marking Requirements for sUAS	Draft Final Rule
Remote Identification	Developing Draft NPRM

www.reginfo.gov/public/do/eAgendaMain



Other Major Provisions

- **UAS Integration Pilot Program achieved major milestone with first Lead Participant operating under Part 135.**
- **Unmanned Traffic Management Pilot Program is on track for completion by September 2019.**
- **Cross-FAA team formed to revise existing regulation to accomplish multiple provisions (such as sUAS safety standards & carriage of property by sUAS for compensation/hire).**



FAA UPDATE: REMOTE ID OUTLOOK

Jay Merkle
Executive Director
UAS Integration Office
Federal Aviation Administration



Remote ID

- Remote ID will support in identification and discrimination of any threats by providing the information about all drone operators in the National Airspace System.
 - It is fundamental to enable more complex operations.
 - It is central to safe and secure full integration.
 - Remote Identification will be a great benefit in identification and discrimination of any threats by providing the information about all drone operators in the airspace.
 - Registration and remote ID will enable more effective detection around airports.



Remote ID Set the Stage for UTM

- Remote ID is a first step toward UTM.
 - Remote ID will help build the basic infrastructure for UTM in which advanced operations can flourish.
 - Today, UAS must avoid manned aircraft operating at these altitudes.
 - Remote ID, as a part of UTM, will enhance and facilitate de-confliction with traditional, manned aircraft, and with future UAM.



Remote ID Rulemaking Status

- FAA is drafting a proposed rule on Remote ID.
 - We have focused our resources into completing the notice of proposed rulemaking.
 - We are working to ensure that the Remote ID rule is well constructed and implementable involves keeping policy/rule development, implementation and standards in synch.
 - Our plan is to publish the rule later this year.



What is Next?

- Meeting rulemaking procedure requirements including comment periods and cost-benefit analyses that can create a challenge.
- Industry-led voluntary compliance could allow for increased complex operations in a shorter time period.



Remote Identification

- Operations over People and Beyond Line of Sight rules depend on Remote Identification being implemented
- FAA is working to release a Notice of Proposed Rulemaking for Remote Identification
- However, we know that rulemaking is a lengthy process
- We have an opportunity through the DAC to drive adoption of Remote Identification ahead of rulemaking



Remote Identification

- Proposal: Set up DAC Task Group focused on driving industry-led voluntary compliance with Remote Identification ahead of rulemaking
- Deliverable: Provide recommendations to the DAC outlining a process and framework for driving voluntary industry compliance
- Timeline: Recommendations due in 90 days



Remote Identification

- DAC member discussion on Remote Identification
- FAA comments and tasking
- Announcement of Task Group Lead
- Solicitation of interest for participation in Task Group
 - For members not present, we will reach out to them to gauge interest



Tasking Discussion

- **Proposed DAC Tasking #1: Remote ID**
- The Final Rule for remote identification of UAS is likely up to 24 months away. In the absence of remote identification of UAS and in consideration of security partners' concerns regarding operations over people and other waived operations under part 107 in the intervening period, the FAA tasks the DAC to develop recommendations on:
 1. What voluntary equipage of remote identification technologies by UAS manufacturers or operators could occur in the short-term prior to a Final Rule for remote identification with the understanding that the requirements finalized in that rule may differ from short-term solutions based on the rulemaking proposal and any comments received during rulemaking.
 2. What types of incentives, if any, could be provided by the FAA for operators who voluntarily use UAS equipped in accordance with the recommendations in #1?
 3. Are there other drivers that could lead to widespread use of remote identification prior to the enactment of a Final Rule for remote identification and finalization of remote identification requirements?



Tasking Discussion

- **Proposed DAC Tasking #1: Remote ID (continued)**
- The standards referenced by the DAC are:
 - ASTM International:
 - Group F38 (WK27055) - New Practice for UAS Remote ID and Tracking
 - First workgroup meeting in June 2018, currently finalizing the title and scope for the standard
 - SAE International:
 - AIR6388 – Remote Identification and Interrogation of Unmanned Aerial Systems
 - Initiated: March 2017, possibly on hold, pending publication of an NPRM
 - ANSI Consumer Technology Association (CTA):
 - ANSI/CTA-2063 Small Unmanned Aerial Systems Serial Numbers
 - Published April 2017
 - ANSI/CTA-2067 Small Unmanned Aerial Systems – Remote Identification
 - Cancelled October 4, 2018



DRONE SAFETY WEEK

Jay Merkle
Executive Director
UAS Integration Office
Federal Aviation Administration



Why?

- Drone use for both business and recreational use is growing across the country.
- Safety awareness and practice has to keep pace with drone innovation and application.
- ***As societal benefits from drones are realized; the drone safety culture must become part of the fabric of our society.***
- Sustained messaging becomes woven into our collective toolbox of high impact safety messages (e.g. “click it or ticket” and “don’t drink and drive”).



Concept: National Drone Safety Awareness Week

- ***Drone safety is everyone’s responsibility..***
- Puts the spotlight on drone safety for communities and stakeholders across the country.
- A public-private partnership that would draw upon the collective resources of the drone community.
- An annual weeklong series of activities in mid-November.



Goals

- ***Focus on drone safety and education.***
- Welcome all users into our community and start (and sustain) the safety conversation.
- Keep the public informed of latest safety requirements and best practices.



Who?

- **FAA and DOT will lead this national event.**
- **Important stakeholders include:**
 - UAST
 - KBYF Partners
 - Consumer Technology Association
 - UAS industry partners
 - Federal, state, and local government
 - Government associations
 - Aviation and industry associations
 - Standards bodies
 - Academia
 - Business and recreational drone users
 - Airborne Public Safety Association (APSA) and other law enforcement entities



Daily Themes

- Monday: *Public Safety*
- Tuesday: *Business Focus – photography, real estate, insurance*
- Wednesday: *Business Focus – infrastructure and agriculture*
- Thursday: *Business Focus – package delivery*
- Friday: *Education and STEM*
- Saturday and Sunday: *Recreational Flyers*



Discussion





UPDATE ON COUNTER-UAS TECHNOLOGY TRENDS

Angela Stubblefield

Deputy Associate Administrator

Office of Security and Hazardous Materials Safety

Federal Aviation Administration

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UAS Security Risks

- **Malicious use of UAS is increasing**
- **Partnership between Federal and industry partners is critical to countering threats**
- **Multi-faceted strategy required to balance safety, security and integration**
 - Regulatory & Policy
 - Technology
 - Aircraft Requirements
 - C-UAS



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Current State of Play

- **Rulemaking & policies will improve threat discrimination**
 - Remote Identification
 - Section 349
- **FAA is closely coordinating with DOD, DOE, DHS & DOJ on C-UAS implementation**
 - Fixed site, deployable & mobile
 - Threat definition, roadmap & objective standards
 - Operational risks to NAS must be identified, analyzed & mitigated
- **Challenges with C-UAS persist = expansion difficult to manage**



UAS Detection & C-UAS Considerations

Considerations for UAS Detection Systems

- Legal constraints
- Technical readiness
- Cost vs. Capability vs. Coverage
- FAA coordination required to manage operational risk

UAS Mitigation & Countermeasure Technologies

- Only authorized for specific missions of DOD, DOE, DHS, DOJ
- May affect performance of ANS equipment on the ground and/or aircraft onboard systems
- Congress prescribes high degree of FAA coordination
- Uncoordinated use of countermeasure technology & potential UAS response could introduce greater hazards than the UAS hazard mitigated



Discussion Items

- **C-UAS Performance & Impact Data**
- **Airspace Access**
- **Cybersecurity**
- **UAS C2**
- **Future Technology Impacts**



Tasking Discussion

- **Proposed DAC Tasking #2: UAS Security Issues**
- The FAA tasks the DAC to identify what currently existing or near term technical solutions at the aircraft or operational limitation/capability level could make it less likely that clueless and careless operators could operate UAS in ways that can be perceived as posing a safety or security threat?
- In 90 days, identify what is the universe of actions that IF relevant industry stakeholders agreed to do them, would substantially reduce the likelihood of unintentional threatening behavior.





THE FAA KNOWLEDGE TEST FOR RECREATIONAL FLYERS

Jay Merkle
Executive Director
UAS Integration Office
Federal Aviation Administration

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Legislation

- The FAA Reauthorization Act of 2018, Section 349 (g)(1) Aeronautical Knowledge and Safety Test
 - Requires the FAA to develop an aeronautical knowledge and safety test in consultation with manufacturers of unmanned aircraft systems, other industry stakeholders, and community-based organizations.

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Request for Information (RFI)

- The FAA will be publishing an RFI with the goal to develop a partnership or partnerships between the FAA and private entities (commercial, non-profit, academic, or other) that will be able to administer the knowledge training and test module on various platforms that are positioned to maximize access to the recreational flyer community.
- The FAA plans to publish this RFI within the next month.



Concept for the Test

- Narrative-style training to educate recreational flyers on how to fly safely in a way they can relate to.
- Safety and operational information presented in practical, easy to understand way (for any age or experience level).
- Material and questions presented as relevant for fun and safe operations so test taker feels time was well spent.
- Experience is engaging and encourages recreational flyers to promote the test to others
- Focus is on building a safety culture that promotes information sharing and responsible flying.



Seeking Input from Stakeholders

- What is the most effective model for administering the knowledge test to recreational flyers to get the highest level of participation?
- Should there be any fees associated with the test and, if so, who should absorb those costs?
- How can designees handle test takers that are minor children under age 13?
- What data should be collected and stored by designees and how will that data be made available to law enforcement and the FAA?



Advisory Circular

- The FAA is developing a new Advisory Circular that will provide guidance on the full implementation of the statute, including:
 - Community based organization recognition process
 - Standards and limitations for UAS over 55 pounds
- The draft Advisory Circular will be posted for public comment, providing another opportunity for the FAA to receive input on the entirety of the implementation





INDUSTRY-LED TECHNICAL TOPICS

Michael Chasen

Chair, FAA Drone Advisory Committee

Chief Executive Officer, PrecisionHawk USA Inc.

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Part 107 Waiver Improvements

- Part 107 waiver system is primary mechanism for conducting expanded operations until rulemaking is complete
- With increasing demand for waivers and due to the critical nature of this mechanism for industry in coming years, recommendations for process improvements would be extremely beneficial

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Part 107 Waiver Improvements

- Benefits of making improvements:
 - Increasing FAA efficiency/effectiveness in processing requests
 - Increasing awareness among operators about the waiver process
 - Improving the metrics of successful waiver applications by increasing FAA effectiveness and operator awareness of the process and criteria



Part 107 Waiver Improvements

- Proposal: Set up DAC Task Group focused on recommending improvements to the Part 107 waiver process
- Deliverable: Prepare recommendations for the DAC outlining existing Part 107 waiver process and recommending improvements
- Timeline: Recommendations due in 90 days



Part 107 Waiver Improvements

- DAC member discussion on Part 107 Waiver Improvements
- FAA comments and tasking
- Announcement of Task Group Lead
- Solicitation of interest for participation in Task Group
 - For members not present, we will reach out to them to gauge interest



Beyond Visual Line of Sight

- BVLOS operations will drive significant economic, commercial and societal benefits
- Some research has been conducted already
 - Pathfinder Program and UAS Integration Pilot Program
- What more needs to be done to advance BVLOS operations in current environment and to plan for future rulemaking?



Beyond Visual Line of Sight

- DAC member and FAA discussion on setting up a Task Group **at next DAC meeting** to provide recommendations for advancing BVLOS
 - Scope of the work
 - Prioritize focus areas
 - Timing for setting up proposed Task Group and for delivering recommendations



NEW BUSINESS AGENDA TOPICS / REVIEW TASKINGS

Carl Burleson

Designated Federal Officer, FAA Drone Advisory Committee
Acting Deputy Administrator, Federal Aviation Administration

Michael Chasen

Chair, FAA Drone Advisory Committee
Chief Executive Officer, PrecisionHawk USA Inc.



Tasking Discussion

- **Proposed DAC Tasking #1: Remote ID**
- The Final Rule for remote identification of UAS is likely up to 24 months away. In the absence of remote identification of UAS and in consideration of security partners' concerns regarding operations over people and other waived operations under part 107 in the intervening period, the FAA tasks the DAC to develop recommendations on:
 1. What voluntary equipage of remote identification technologies by UAS manufacturers or operators could occur in the short-term prior to a Final Rule for remote identification with the understanding that the requirements finalized in that rule may differ from short-term solutions based on the rulemaking proposal and any comments received during rulemaking.
 2. What types of incentives, if any, could be provided by the FAA for operators who voluntarily use UAS equipped in accordance with the recommendations in #1?
 3. Are there other drivers that could lead to widespread use of remote identification prior to the enactment of a Final Rule for remote identification and finalization of remote identification requirements?



Tasking Discussion

- **Proposed DAC Tasking #1: Remote ID (continued)**
- The standards referenced by the DAC are:
 - ASTM International:
 - Group F38 (WK27055) - New Practice for UAS Remote ID and Tracking
 - First workgroup meeting in June 2018, currently finalizing the title and scope for the standard
 - SAE International:
 - AIR6388 – Remote Identification and Interrogation of Unmanned Aerial Systems
 - Initiated: March 2017, possibly on hold, pending publication of an NPRM
 - ANSI Consumer Technology Association (CTA):
 - ANSI/CTA-2063 Small Unmanned Aerial Systems Serial Numbers
 - Published April 2017
 - ANSI/CTA-2067 Small Unmanned Aerial Systems – Remote Identification
 - Cancelled October 4, 2018



Tasking Discussion

- **Proposed DAC Tasking #2: UAS Security Issues**
- The FAA tasks the DAC to identify what currently existing or near term technical solutions at the aircraft or operational limitation/capability level could make it less likely that clueless and careless operators could operate UAS in ways that can be perceived as posing a safety or security threat?
- In 90 days, identify what is the universe of actions that IF relevant industry stakeholders agreed to do them, would substantially reduce the likelihood of unintentional threatening behavior.



Tasking Discussion

- **Proposed DAC Tasking #3: 107 Waivers**
- The FAA tasks the DAC to review the framework of the existing 107 waiver process provided by the FAA and develop recommendations on improving this process.



Future DAC Tasking

- **Proposed (future) DAC Tasking #4: FAA UAS Comprehensive Plan**
 - The FAA Reauthorization Act of 2018, Section 342, requires the FAA to update the comprehensive plan in consultation with representatives of the aviation industry, Federal agencies that employ unmanned aircraft systems technology in the national airspace system, and the unmanned aircraft systems industry.
 - The FAA will send the draft UAS Comprehensive Plan to the DAC members and task the DAC to provide feedback.
 - The FAA anticipates initiating this tasking within the next two months.



CLOSING REMARKS

Carl Burleson

Designated Federal Officer, FAA Drone Advisory Committee
Acting Deputy Administrator, Federal Aviation Administration

Michael Chasen

Chair, FAA Drone Advisory Committee
Chief Executive Officer, PrecisionHawk USA Inc.





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DAC Briefing Paper:

UAS Security Risks and Counter-Unmanned Aircraft Systems Policy & Technology

Background

Sparked by the January 2015 incident in which an unmanned aircraft system (UAS) landed on the White House lawn, the Department of Transportation (DOT) and our Federal security partners have been actively working to improve the U.S. Government's ability to identify, assess and respond to security risks posed by the malicious use of small UAS. Since that time, the Federal Aviation Administration (FAA) has led DOT's efforts, working closely with interagency security partners such as Department of Defense (DOD), Department of Homeland Security (DHS), and Department of Justice (DOJ), as well as the National Security Council, to safely and efficiently integrate UAS into the National Airspace System (NAS), while also enhancing and advancing security capabilities to identify and protect against the malicious use of UAS. UAS technology is, in many cases, evolving more quickly than regulations can be promulgated, and is outpacing security design features and technologies, including counter-UAS (C-UAS) systems, as they come into the marketplace. As the concerns for errant and nefarious use of UAS grow with incidents occurring outside of conflict zones and UAS incursions disrupting operations at or near airports, the desire and pressure to acquire and deploy UAS detection and threat mitigation systems is increasing steadily, despite legal constraints, aviation safety and air navigation services impacts, and operational risk concerns about their use in the NAS.

UAS Security Initiatives

While the FAA conducted a statutorily directed pilot program in 2016 to explore airspace hazard mitigation at airports using UAS detection technology, more research, testing, evaluation and data is needed to determine their efficacy and impacts on aviation safety, air navigation services infrastructure, and other civil communications when used in civil, particularly urban, environments. UAS detection systems most commonly use Radar, Electro-Optical/Infrared (EO/IR), Radio Frequency (RF), or acoustic technologies to identify UAS. EO/IR is the easiest to deploy, but most limited in threat detection and discrimination with little use as a primary sensor but definite benefit as a secondary detection validation tool. Small UAS are not easily identifiable by radar, although commercial radar identification capabilities are improving; most radars require multiple federal spectrum licenses. RF and acoustic systems rely on known libraries to identify UAS and, depending on the system, potentially violate criminal provisions of Title 18 and 49 that protect electronic communications. FAA's evaluations identified a number of challenges in the airport environment, including the impacts of interference, a relatively low level of technical readiness for adequate performance in the airport environment, and prohibitive costs to provide complete area coverage for all types of small UAS. Testing and evaluation in a variety of different civil environments is critical to assessing performance and impacts. Such testing should increase with additional authorities granted to DHS and DOJ in the 2018 FAA Reauthorization Act. Regardless, accurate detection, as well as the ability to distinguish compliant, legitimate drone operations from those warranting additional scrutiny and possible response, is vital to carrying out effective mitigation.



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The FAA is currently conducting rulemaking to require remote identification of UAS, which will provide critical information about unmanned aircraft (UA) and the location of their control stations—enabling not only detection but also real-time law enforcement response and enforcement, as well as FAA education, civil enforcement, and Air Traffic Management (ATM) support to security efforts. As such, remote identification will help us locate “cooperative” UAS that make their location/identification known and actively participate in the NAS. Remote identification will also allow the FAA to educate the “careless and clueless” to spur compliance with regulatory requirements for safe and secure operations, and the information available will enable law enforcement and security response efforts to focus on threats posed by the criminal use of UAS. However, remote identification does not address the need to counter UAS threats posed by malicious operators who will likely attempt to conceal their identification, location, etc. (i.e., “non-cooperative” UAS), to include terrorists and nation-state actors.

The operation of C-UAS mitigation systems also poses significant hurdles—they generally conflict with multiple federal laws, such as the Pen/Trap Statute, the Wiretap Act, the Federal Communications Act, the Aircraft Sabotage Act, and Aircraft Piracy, and are reliant upon accurate detection of small, low-flying objects. UAS are aircraft and, therefore, are afforded the same legal protections as manned aircraft, and the communications link between the UA and the control station are considered privileged communications under U.S. laws.

Many mitigation systems primarily rely on jamming the RF signal between the controller and the UA itself or injecting alternate command signals to redirect the UAS. Most practitioners recognize the next evolution is autonomous operations, as UAS are evolving to beyond visual line of site (BVLOS) operations, using GPS-controlled flights, and even inertial navigation systems, where command-link jamming may not be effective. New technologies must look at methods to counter threats from malicious autonomous UAS operations, without impacting compliant UAS, manned aircraft operations, and air navigation services reliant upon the same navigation systems, such as GPS.

In 2016/2017, Congress granted the DOD and Department of Energy (DOE) limited C-UAS authority to detect, track, identify, and mitigate UAS security risks to select facilities, missions, and assets. The FAA has worked with DOD and DOE to define what actions constitute a threat, and to develop and implement a concept of operations for safely integrating C-UAS systems at fixed sites and for mobile assets in the NAS. This integration work is built around collaboration with DOD and DOE to characterize, mitigate, and enable the acceptance of the operational risks of these systems through a variety of shared processes including the analysis of spectrum issues and tactical notifications to Air Traffic Control (ATC). In 2018, Congress granted DHS and DOJ similar authorities for specific missions, operations, and activities, and the FAA is now working with those Departments to apply the best integration practices developed with DOD and DOE

The FAA’s role in supporting our federal security partners’ research and use of C-UAS technologies is to ensure the safety and overall efficiency of the NAS is not compromised, as well as ensure fair warning to operators. Congress has directed federal agencies that receive C-UAS authority to coordinate with the FAA to assess and mitigate safety and efficiency NAS



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impacts for the deployment of C-UAS technology at each fixed location, and for *ad hoc* deployable or mobile operations. As we continue to define and refine policies, processes, and procedures associated with C-UAS deployment in the NAS, the Federal Government is taking a deliberate and phased approach to granting such authorities and only for specified national security and public protection missions. This process must be risk-based and consistent and involve information sharing among Federal Government partners.

Discussion

The FAA continues to work with Congress and other federal agencies on the granting and implementation of targeted statutory C-UAS authority for security partners. To support these efforts and potential expansion of such authorities, we want to encourage industry research and development of security design features and C-UAS systems that meet the requirements of security partners and enable safe use in the NAS. The FAA and our security partners need to be able to address both current and future threats, and we are looking to industry to also provide insight into the future evolution of UAS technology and how security risk mitigation can become part of that technological advancement.

C-UAS System Capabilities Data: What can industry provide in regard to specific, data-intensive analyses of C-UAS system performance, capabilities, and safety impacts (both detection and mitigation—operational and those in development) in civil environments to ensure their use balances aviation safety, airspace access, and effective airspace security?

Airspace Access: What is the current state of geo-fencing and other technologies used to determine where and under what conditions UAS can fly? Are there situations in which geo-fencing is the primary protection against nefarious operators? How do we secure the systems from tampering? How can geo-fencing and these other technologies be employed in mixed environments where some UAS may be permitted under specific circumstances to operate while the vast majority cannot, e.g., at an airport or around critical infrastructure?

Cybersecurity: While it is illegal to hijack any aircraft, including UAS, by physical or electronic means, UAS are particularly susceptible and laws will not stop hostile actors. What are industry partners doing to protect UAS data-links and data from cyber threats and address vulnerabilities in a timely fashion? Cyber vulnerabilities make a UAS more susceptible to being commandeered and used for nefarious purposes, and the data could be aggregated and used by those with hostile intent. How can we balance both cyber security for compliant UAS and detection/mitigation of hostile UAS, which currently rely upon exploitation of those same cyber vulnerabilities?

Future UAS C²: What do members envision as the state of technology for command and control (C²) of UAS in the next five years? What systems in development could be immune from RF interdiction and what potential options exist for securing UAS from nefarious use or developing onboard security risk mitigations?



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Future Technologies, C-UAS Technology & Policy: What questions should we be asking? What aspects of this challenge of countering malicious use do you feel have not been considered appropriately in the public dialogue on this issue?

Conclusion

The FAA seeks input from the DAC and aviation stakeholders to continue progressing the safe and secure integration of UAS into the NAS. We look forward to your input on how industry can address security risks at the aircraft-level, and how security risks can be effectively countered with little to no impact on the safety and efficiency of the NAS or the operation of lawful UAS.



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

**ORDER
1110.157**

Effective Date:
06/15/18

SUBJ: Charter of the Drone Advisory Committee

1. Enter overview of the Order here. This will help provide a uniform look for all FAA directives. **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. 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 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 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 the FAA and or provide input to 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 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. For the period of this charter, the FAA plans to utilize contractual support to provide for logistics and administrative support.

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 \$704,000, which includes 1.0 full-time equivalent salary and benefits at \$204,000, plus \$500,000 in contractor costs.

8. Designated Federal Officer. The FAA Administrator, on behalf of the Secretary of Transportation will appoint a full-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 Designated Federal Officer 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. Committees will meet as follows:

- a. It is estimated that the DAC will meet three times a year to carry out its responsibilities.
- b. Meetings of the DAC will be announced in the *Federal Register* at least 15 days before each meeting, unless exceptional circumstances require shorter notice. Such circumstances will be explained in the notice. DAC meetings will be open to the public, except as provided by section 10(d) of the FACA and applicable regulations. The DAC will publish an annual report summarizing activities held in closed or partially closed meetings, consistent with the policies of the Freedom of Information Act.
- c. Anyone interested may attend committee meetings and appear before the DAC within reasonable limits of space and time. Additionally, anyone interested may file written statements with the committee.

10. Duration. 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. The FAA will submit recommendations for membership to the Secretary of Transportation, who will appoint members to the DAC. All DAC members serve at the pleasure of the Secretary of Transportation.

a. The DAC will have no more than 35 members.

b. Members will serve without charge, and without government compensation. The employing organization bears all costs related to its participation. Members must represent a particular interest of employment, education, experience, or affiliation with a specific aviation-related organization.

13. Subcommittees. The DAC DFO 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.

a. The records of the committee and subcommittee will be handled in accordance with the General Records Schedule 6.2, or other approved agency records disposition schedules.

b. Meeting minutes must be kept in accordance with GSA standards as published in 41 CFR Part 102-3 Subpart D - § 102-3.165.

c. These records will be available for public inspection and copying, 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 provided for or by the DAC are available for public inspection at www.faa.gov/regulations_policies.

15. Filing Date. This charter is effective June 15, 2018, the date on which it was filed with Congress. This Committee will remain in existence for 2 years after this date unless sooner terminated or renewed.



Daniel K. Elwell
Acting Administrator



Drone Advisory Committee

June 6, 2019 DAC Meeting • Arlington, VA

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.



Federal Aviation Administration

Carl E. Burleson **Acting Deputy Administrator**

Carl E. Burleson began serving as Acting FAA Deputy Administrator as of January 7, 2018. In this new role, he is the second highest-ranking official at the agency and is responsible for ensuring the safe and efficient operation of the largest aerospace system in the world, a system that operates more than 50,000 flights per day. He is also responsible for regulating the safety of equipment and operators of the U.S. aviation industry.



Prior to this assignment, Burleson had been the FAA's Deputy Assistant Administrator for Policy, International Affairs, and Environment since 2011. In this role, he led the agency's efforts to increase the safety and capacity of the global aerospace system in an environmentally sound manner. This includes leading the FAA's strategic policy and planning efforts; coordinating the agency's reauthorization before Congress; overseeing the national and international aviation policies, strategies, and research efforts in the environment and energy arenas; managing the FAA's aviation activity forecasts, economic analyses, and regulatory evaluations; and, dealing with the aviation war risk insurance program.

Mr. Burleson has held the following FAA positions: Director of Environment and Energy (2001-2011); Chief of Staff for FAA Administrator (1999-2001); FAA Senior Representative for Northern Europe/United Kingdom of International Aviation in London, England (1994-1999); Manager of International Operations Branch, International Aviation (1992-1994); International Aviation Specialist of International Aviation (1990-1991); and Regulatory Economist/Loan Guarantee Specialist, Office of Policy and Plans (1989-1990).

Mr. Burleson holds a Master of Arts in Economics from University of Boston, Master of Arts in International Development from American University, and Bachelor of Arts in Government and Communications from University of Virginia. He was a finalist in the Public Service to America Awards in 2010 for his efforts in dealing with aviation environmental challenges. He is recipient of the Office of Secretary's International Aviation and Safety Award.



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, cross-cutting analysis and integration, and special initiatives.

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

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

Michael Chasen
Chief Executive Officer, PrecisionHawk



Michael Chasen is the CEO of PrecisionHawk – a leading software and service provider in the commercial drone space. PrecisionHawk uses advanced drone technology combined with A.I. and Machine Learning to provide actionable business intelligence and works across the Energy, Agriculture, Telecom, Construction, and Infrastructure space. PrecisionHawk is also one of the thought leaders in flying Beyond Visual Line of Sight (BVLOS).

In his tenure as CEO, PrecisionHawk has grown to over 250 employees. In 2017, Chasen oversaw a series D funding round that culminated in \$75 million, bringing PrecisionHawk’s total funding to over \$100 million to date and establishing the company as the world’s most well-capitalized commercial drone company.

In 2018, Chasen also lead PrecisionHawk to acquire five companies including 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

7/17/2018 DAC Meeting • Santa Clara, CA

Meeting Minutes

Time: 9:00 a.m. to 4:00 p.m. Pacific Time

Location: Santa Clara Convention Center, Grand Ballroom, Sections G and H – 5001 Great America Pkwy, Santa Clara, CA 95054

For additional information, please view the following appendices:

- A) Meeting eBook
- B) Meeting PowerPoint Presentation
- C) Meeting Attendees
- D) Public Statements

Summary

Acting Drone Advisory Committee (DAC) **Designated Federal Officer (DFO) Carl Burleson** opened the meeting at 9:00 a.m. on July 17. In his opening remarks, **Burleson**, also the Acting Federal Aviation Administration (FAA) Deputy Administrator, welcomed **Fort Collins, CO Mayor Wade Troxell** as a new DAC member. **Burleson** thanked former **DAC Chairman Brian Krzanich (Intel)**, and described changes to the DAC charter. These changes elevated the DAC to a Federal Advisory Committee and reset the DAC substructure (no DAC subcommittee or tasks groups) and previous discussion topics.

The FAA's **Earl Lawrence** and **Jay Merkle** provided an agency update, which included a description of a more robust integration strategy, the FAA's operations first approach under existing regulations with exemptions, and accelerating operations with a single risk assessment process. **Troxell** suggested the FAA make public engagement a pillar of the FAA's integration.

Unmanned Aircraft Safety Team (UAST) Co-Chair **Ben Marcus** provided an overview of the UAST's work and safety enhancements, and asked for greater participation and resources from DAC member companies/organizations. The conversation transitioned into a discussion on the scope of FAA enforcement and the need for remote identification (ID).

Lawrence provided an overview of the Unmanned Aircraft Systems (UAS) Implementation Plan and UAS Integration Research Plan. DAC members commented that more collaboration is needed with other agencies, such as the National Transportation Safety Board (NTSB) and Federal Communications Commission (FCC). There might also be a need for a possible DAC substructure, such as a subcommittee, dealing with technical data and developing standards, and the need to repeal section 336.

Lawrence also provided an overview of remote ID and the FAA's potential categories for compliance, stressing that three groups are developing standards before the FAA has released requirements. The DAC's main concern was the lack of acceleration of remote ID requirements and unanimously approved the following motion: *With safety first, hasten remote ID as quickly as possible.*



Drone Advisory Committee

7/17/2018 DAC Meeting • Santa Clara, CA

The meeting resulted in the following action items:

- 1) DAC: Think about how you can assist the UAST.
- 2) FAA: Discuss the core UAST data elements with the UAS Integration Pilot Program (IPP) lead participants.
- 3) FAA: Determine if the DAC is the correct home for a technical subgroup.

Host Introduction

Peter Cleveland (Intel) welcomed attendees and thanked members of Intel and the FAA who helped plan the meeting.

Official Statement of the Designated Federal Officer

Burleson read the official statement at 9:00 a.m.

Approval of the Agenda

The DAC unanimously approved the agenda.

Opening Remarks

Burleson provided opening remarks (as there was no DAC chair at the time of this meeting). He stated that **FAA Acting Administrator Dan Elwell** could not attend, welcomed **Troxell** as a new DAC member, and thanked **Krzanich** for his recent service as the DAC chair. He described how the DAC charter has changed. Now directly under the FAA, the new charter resets the DAC to just the DAC membership (no DAC subcommittee or tasks groups). He further explained the new focus on DAC members providing advice directly to the FAA at DAC meetings. Finally, he stated that **Secretary of Transportation Elaine Chao** will announce the new DAC chair and determine DAC membership in the coming months.

The FAA's Air Traffic Organization (ATO) **Deputy Chief Operating Officer Tim Arel** thanked the local San Jose tower and other ATO personnel for enabling an Intel drone light show the night before.

FAA Assistant Chief Counsel Lorelei Peter explained the roles, responsibilities, and limitations of DAC members and the requirements of the Federal Advisory Committee Act.

FAA Update

Earl Lawrence, Executive Director, FAA's UAS Integration Office and Jay Merkle, Deputy Vice President, Program Management Office, ATO

Briefing

Lawrence described the current environment of integrating UAS in the National Airspace System (NAS) with industry assisting in facilitating integration. Discussion centered on a collaborative approach and how that affects risk mitigation in multiple areas. The UAS



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integration strategy has evolved from 2016 to 2018, based on risk. Changes to the strategy were made based on security and privacy concerns and learning about operations and data before defining rules.

From a safety standpoint, the regulatory structure is already in place and outlines current safety mitigations. Using mitigations and exemptions as necessary, the FAA can focus on enabling automation that is supported by industry's advancement and ability to meet goals. For example, the FAA's ATO instituted the Low Altitude Authorization and Notification Capability (LAANC) to provide a tool for air traffic controllers to manage the airspace, enable future operations, and help inform future rules. The FAA also conducts or leverages applied research that is necessary to support the regulatory framework and expanded operations. This allows the FAA to exercise the risk assessment process and determine how these operations will interact in various scenarios. Having more operational data will better inform future rules.

The FAA has developed a *Partnerships for Safety Program* to help build consensus among stakeholders on how to enable operations with a focus on safety. When operations have strong safety cases but encounter other barriers (e.g., noise and privacy concerns), efforts like the IPP, and others, will help in addressing those issues. Of note, the congressionally-mandated UAS Executive Committee meets quarterly to share experiences to align activities with the FAA's government partners.

Merkle continued with the presentation and explained that the LAANC nationwide beta roll-out has expanded to 50 locations and 10 sites. The fourth "wave" of expansion was to deploy on July 19, 2018. By September 2018, LAANC will be available at nearly 300 air traffic facilities covering approximately 500 airports. Starting in April 2019, the FAA will begin onboarding new service suppliers in six-month waves. Airspace classes will remain but the FAA will offer new UAS Traffic Management (UTM) services. UAS Service Suppliers (USS) will provide the UTM services directly. A successful UTM system relies on two regulatory pieces: UAS registration and remote ID. Before all data exchanges are operational, research needs to be completed on dynamic restrictions (section 2209) in app format and interoperability standards.

Lawrence added that a National Academy of Sciences (NAoS) Report came to the same conclusion as the Joint Authorities for Rulemaking on Unmanned Systems: Specific Operations Risk Assessments mitigate risk on the operations side in a structured way. The NAOs report notes that a single risk assessment process is necessary to combine all concerns from various areas. There are draft procedures on moving forward in the IPP and other venues.

Discussion

Greg Agvent (CNN): I need to take a quick time out as an operator. LAANC has been a huge advantage to CNN, thank you FAA. Earl, you said it's important you capture data, how do you capture data?



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- **Lawrence:** The FAA captures data through many sources, including the UAST, Aviation Safety Information and Analysis and Sharing (ASIAS) database, test sites input data, IPP, and UAS Implementation Plan, to name a few. How does that interaction happen in these communities? Accident reporting systems - ATO has another system where they gather information. We send out surveys periodically and we have one out right now. We also survey from commercial registration of UAS.
- **Merkle:** ATO safety and mission support organizations are consistently reviewing operations; five to six people engage daily for LAANC. LAANC does not require the user to provide data.

Troxell: Thank you for the presentation. My question deals with communities. Is there any intention on engaging feedback from citizens more generally?

- **Lawrence:** One of the IPP requirements is to setup a system for obtaining feedback from local citizenry. City, state, county, tribal are all setting up their mechanisms. Resources are a concern, that's why there are only 10 IPP lead participants at this time. There is a severe lack of understanding about what people are allowed to do today.
- **Troxell:** I recommend that you make public engagement a pillar of your policy.

Houston Mills (UPS): Do you see the traditional risk process being used in a single streamlined process.

- **Lawrence:** In my job, it's what level of automation do you have, and what is the risk assessment associated with that. Other hazardous companies that are dealing with hazards are taking that info on how to best apply it to operations.

Marily Mora (Reno-Tahoe Airport Authority): Technology is great, but there also needs to be a mindset change with air traffic control making controllers enablers of operators. Thank you ATO.

Matt Zuccaro (Helicopter Association International): In the transition from the original DAC to the chartered DAC, will issues carry over?

- **Burleson:** The information from the last DAC is available to the FAA. If there are issues that this body wants to continue to address, we can take it on board for this DAC. The FAA was legally required to closeout the last DAC. It's a new start.
- **Zuccaro:** If I understood what you said, you are going to develop regulations based on the structure of current regulations?
- **Lawrence:** We take the base safety goals and use that to guide us in the future. At this point in time, where is the focus on oversight of regulatory control for private recreational use? One of our areas of focus is to have consistent airspace regulations, to make sure the rules are consistent across the board.

Tim Canoll (Air Line Pilots Association): Great briefing. Excited about the whole approach. The challenge, however, is from a manned perspective. Much of our data points to building this incredibly safe system has been the result of tragedy. The Commercial Aviation Safety Team



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(CAST) has a lot of information and techniques we have used since its inception. I urge the UAST to model after CAST.

- **Lawrence** Automation will continue, it's not that we are transitioning to un-crewed necessarily, but moving to a crew of 2 for 10 aircraft, for example.

Unmanned Aircraft Safety Team Briefing on Safety Data

Ben Marcus, UAST Co-Chair

Briefing

UAST Co-Chair **Ben Marcus** stated that the mission of the UAST is to bring industry and government together to understand and resolve systemic issues before regulators have to take action. The UAST meets every three to six months and reviews all accidents that occurred between meetings. The UAST is led by one industry and one FAA co-chair, with a Steering Committee that all serve two-year terms.

The UAST brings together data from various sources, allows for the analysis of root causes on common problems, and guides development of interventions to resolve problems. The UAST's data working group determines important information and utilizes third-party groups to process and analyze data. There is also a communications working group that develops safety messages to send to organizations' constituents.

Anonymous reporting provides incentives for operators to report occurrences. Industry must be able to trust the information and be assured that it will only be used for learning and providing necessary mitigations. Safety enhancements are developed by reviewing proposals, receiving updates, and review results. A safety enhancement is scored based on risk and intervention strategies. The UAST received safety related presentations from the NTSB. The development of a future UAST database will require sufficient time to function like the ASIAs database.

The challenges the UAST faces are figuring out how to finance this effort and create an ASIAs like reporting system and how to collect data and incentivize participation to create a large dataset for a systemic look at common risks.

Discussion

Chris Penrose (AT&T): What is the MITRE budget?

- **Marcus:** \$2.5 million per year.

Nan Mattai (Rockwell Collins): What are the unique challenges of data?

- **Marcus:** Certain reasons manufacturers don't want to participate in UAST, such as a lack of tangible benefits. There has been a greater increase in CAST participation because airlines have seen the benefits.



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Deborah Flint (Los Angeles World Airports): Airports are extremely interested in sightings of UAS, and therefore would be willing to participate in the UAST.

- **Lawrence:** You can help us with the local law enforcement community. The Department of Homeland Security paid for the California Highway Patrol to come to DC for an aviation rulemaking committee meeting. The FAA sees a lot of desire to participate, but it's hard to get the travel approvals to attend these meetings.
- **Troxell:** I would like to build on this line of thought. Thinking about local more, even UAS has the name "systems" in it. We are in a bubble of systems, we need systems of systems thinking. Moving from a trust us point of view (where we are now), to a more engaged, informed, intentional approach. We need to embrace more systems of systems.

Mora: There is an organization on the National League of Cities that can help get out the public safety message.

Gur Kimchi (Amazon Prime Air): I appreciate the work the UAST is doing. Sharing accident data and a historical context of safety data is needed. We need to create a system of systems. I counted the number of times you said funding for the UAST. To compare the two, how is CAST funded?

- **FAA's Associate Administration for Aviation Safety Ali Bahrami:** CAST membership consists of about 70 operators. Because of the benefits of Safety Management Systems (SMS) and data, CAST has served as a tool for these operators to deal with mitigations. It would be a great opportunity for the UAST to analyze CAST as an example. More leverage and knowledge exists in the industry because CAST is around.

Action Item 1 – DAC: Think about how the you can assist the UAST.

Kimchi: As systems become more autonomous, there is a different set of analyses that need to take place. CAST also has to think about increased autonomy.

- **Marcus:** Airlines have the same types of data, UAS data is extremely varied. MITRE would need one-to-one agreements with companies to determine how data analysis is different for UAS.

Mills: Is there an opportunity to connect the IPP with the UAST?

- **Mattai:** To build on this question, is there an opportunity to define a core data set of elements that can be used for the IPP, as it is just getting started?
- **Lawrence:** Good idea, the FAA will share UAST data elements with IPP participants.

Action Item 2 - FAA: Discuss the core UAST data elements with the IPP lead participants.

Bahrami: CAST discussed whether we should link CAST members to each safety case.

- **Canoll:** Will an FAA employee serve as a linking member between CAST and the UAST?



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- **Bahrami:** It could be a CAST member who serves as this link.
- **Lawrence:** We do have a formal linking member between the CAST and UAST.

Agvent: How can the DAC highlight the UAST?

- **Marcus:** I encourage you to go back to your organizations to heighten the awareness within your companies. The UAST is a critical enabler. We are trying to take action as an industry to improve UAS operations. You can support with: 1) resources and 2) implementing safety enhancements.

Jaz Banga (Airspace Systems): My question is about non-cooperative UAS. There are real life issues we are having right now, such as UAS at a stadium. Federal agents are not reporting to local officers that something is going on. Local officers say the FAA is not at all prosecuting anyone. Is the FAA dealing with the stick side of this?

- **FAA's Deputy Associate Administrator for Security and Hazardous Materials Safety Angela Stubblefield:** That seems like bad information to be honest with you. Enforcement is to identify the operator, which we do. The FAA is working with law enforcement. Is this a situation of education, enforcement? We are taking those actions in every way we can.
- **Banga:** In this case, the Federal authorities have the location and operator. Is there a group in communication with the FAA that is working on this?
- **Stubblefield:** National Security Council has a rules of engagement or use of force group. The FAA also has a law enforcement assistance program where our sole job is to educate local law enforcement. Just because it flies, doesn't mean local laws are applicable. We have webinars every month to educate public safety and law enforcement personnel.

Banga: Can you notify people of penalties for not following these regulations?

- **Marcus:** UAST does not serve as a public outreach for penalties. I'll add, however, that the UAS community has a lot of individual operators. Very difficult for UAST to reach all of those individual operators. In the case of the UAST, how do we engage with each of those operators? How do we encourage them to participate in the system?
- **Banga:** How do you notify a local aircraft if a drone does interfere?

Rich Hanson (Academy of Model Aeronautics): It's not just public safety providers, but also in the prosecutorial area. Push back is at the prosecutorial level. We need to also talk to prosecutors.

Brendan Schulman (DJI): There used to be card that the FAA would send to the deputies to further educate people on the scene.

- **Lawrence:** We still have law enforcement cards, and you can visit faa.gov/uas. Finding things on a Government webpage tends to get varying responses. The FAA is used to dealing with a community of 100's of thousands, now it's a couple hundred million. City attorneys usually place this lower on the priority list. Yes, the FAA can provide the information, but local communities don't know where the lines are.



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Flint: Airport law enforcement organizations would be interested in this information.

- **Stubblefield:** We do attend conferences of the Airport Law Enforcement Agencies Network and Chiefs of Police organizations. Just about every law enforcement conference has an FAA presentation with it. The FAA is also working on an updated law enforcement assistance guide.

Troxell: I would build a robust engagement strategy. The Conference of Mayors is a very small subset. There is no magic bullet. Building a strategy that deals with how to communicate literally down to the citizen. It's a strategy, very intentional. Communities within communities. The strategy should be very intentional about how we are reaching out.

Mora: A systematic approach is a good idea. Associations are a good place to go.

Banga: How would we change the way we communicate, how do we make this clear?

- **Burleson:** If a plane went down, there would be a large effort to find out why. If you touch on this, how do we get more data and understand what the risks are? The same level of incentives for CAST is coming for the UAST. The FAA is big on SMS. Incentives for traditional users will flow. Having data and discussions can get things done without having to have a regulation.

Bahrami: Two key words: trust and maturity. UAST data providers have to appreciate that it will not be used for enforcement. This will take time, and it won't be easy. We still have to encourage and educate them in the role they play for the safety of the NAS.

Kimchi: Is it acceptable moving forward, there are still unregistered UAS? More concerned about people not knowing they need to participate. Does the FAA feel that it has all the tools to maintain the safety of the NAS?

- **Burleson:** No. Getting to remote ID is very important. Not that we need one set of rules for everyone. We have a framework that varies across different users to manage risk. We are trying to have a framework to manage risk across users in the NAS. Not in a position today to fully address these concerns. The FAA needs data to build the framework. We want drones to be really boring. Similar to how you get on an airplane, you are more concerned about where your bag goes. No one sells life insurance anymore at airports.
- **Lawrence:** Part of the discussion involves those folks not in the framework we are discussing. Remote ID is critical because it identifies everyone who is operating and can show who is broadcasting their position. A lot of people in low-level airspace, now adding millions more. We need the ability to drill with all the operators in that airspace. That dirt road in front of your house is now a super-highway. No bicycles on the super highway. Do you build a pedestrian bridge? We need to address the fact that it's a super highway, no longer a dirt road.

Marcus: Please let me know how your company/organization can contribute.



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Brian Wynne (AUVSI): Marcus is finishing his term as UAST Co-Chair, please join me in recognizing Marcus (the DAC gave Marcus a round of applause).

The FAA's UAS Implementation Plan and UAS Integration Research Plan Earl Lawrence, Executive Director, FAA's UAS Integration Office

Briefing

Lawrence explained that the previous DAC highlighted the UAS Implementation Plan as an area of interest. Under the new DAC structure, the FAA is also introducing the UAS Integration Research Plan. With the complexities of subject areas in a large organization, an integration plan is necessary to ensure everyone is aligned under a singular vision. Specific regulations are not necessarily tied to a five-year timeline (may take longer); however, the FAA identified the areas necessary for full integration. The UAS Implementation Plan is broken down into specific sections with greater detail. The FAA coordinates with many different partners, including the Federal government and international organizations. The Research, Engineering, and Development Advisory Committee (another Federal Advisory Committee similar to the DAC, though it is largely academic) is reviewing the UAS Integration Research Plan.

Discussion

Mattai: Were there any significant changes to this year's update compared to prior years?

- **Lawrence:** The quick answer is yes. Moved more to operations first. Research, operations, then rulemaking.

Mills: Do you see any value in sharing your priorities?

- **Lawrence:** We have taken the feedback from the previous DAC task groups and incorporated this into FAA plans. The FAA is very focused on applied activities.
- **Mills:** Are we aligned with all the plans you have?
- **Lawrence:** Remote ID is the priority; everything hinges of that.

Troxell: On the research side, do any of the aspects relate to the behavioral social sciences?

- **Lawrence:** Behavioral science is technical. We have human factors. The societal impacts are intended to be filled by the IPP.
- **Troxell:** When you talk about the public, it sounds like you're saying a "bucket of public." The FAA needs to break the bucket up into smaller groups.
- **Lawrence:** Our outreach and communication plans break that down. For example, firefighting in drone operations is a priority, so we are targeting these areas.

Kimchi: It seems like the research part of these plans is well funded. Is the operational part well funded?

- **Lawrence:** That discussion occurs on an annual basis. For the last couple of appropriations, we have been well funded in both the research and operational areas. The



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FAA's UAS Integration Office has doubled in size since it was created. We look at LAANC right now, and are looking at it to do more remote ID work. The FAA didn't think of this last year. How do we advance it, do we advance it?

- **Kimchi:** You collaborate with a lot of groups, but the NTSB is not mentioned.
- **Lawrence:** The NTSB is not on the list, but we reach-out to the correct agencies when questions come up, including the NTSB.
- **Kimchi:** You mention standards. There are a few technical standards being developed. Not sure this is in the domain of research.
- **Lawrence:** We have recognized that we need more data and input in the area of IT governance – the rules about how to operate a system. We also have a chief data officer, whom we engage, and a chief research director.
- **Merkle:** It's the FAA's expectation that this community will develop the standards.
- **Lawrence:** We should also state that there is a need to develop standards.

Kimchi: Traffic collision avoidance system technology is a great example. If we come up with different standards, the systems cannot talk to each other. The FAA should point to one set of standards.

- **Merkle:** There is not a great body identified for pulling this community together. Our endorsement of specific standards needs to take different forms. It could be regulatory, or how you might need to organize yourself for a USS, or business rules for operation.
- **Kimchi:** We can assign a subcommittee with engineers to develop these standards.
- **Lawrence:** I am struggling around how the FAA would arrange the engineers to provide advice.
- **Kimchi:** The FAA should create a subgroup focused on engineering tasks.

Action Item 3 – FAA: Determine if the DAC is the correct home for a technical subgroup.

Burleson: Budget questions are always complicated. Whatever money we get, it's good to have the DAC's advice on priorities. I am open to having the DAC think about a technical subgroup to work this.

Lawrence: The FAA sponsored an ANSI roadmap, and we are thinking about more of a steering committee and what the function of the steering committee would be. We need to address the overlaps we see, and only industry can decide what the right standards body is.

- **Merkle:** To illustrate this point, take the USS interface. The FAA cannot be in the middle of the USS interface.

Kimchi: Making sure the FAA requirements are cultured is critically important. You need standards for interoperability.

Canoll: Looking at all the substantive research, I hope we are not putting any research dollars on transport category UAS.



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Mills: You talk about remote ID and tracking and registration, do we need discuss that further as a group, or is it going on legislatively?

- **Lawrence:** It's always on the list. I would rephrase it as a challenge, it changes our plan. The FAA plan right now is based on everyone participating in the system. Beyond visual line-of-sight (BVLOS) would be rather difficult if it's legal for anyone to pop up along the flight path. We get direction from Congress and the administration. We can say if it reads this way, then here are the impacts. If this way, these are the impacts. Many discussions in the security area right now. We have to address other US Government concerns, and we need to make sure the FAA is supporting their needs.

Banga: Shouldn't the security side be involved with this as well? Security was a prerequisite to UAS. Any chance to involve these folks?

- **Stubblefield:** Security partners are intimately involved in the section 336 conversation. They would like to see a repeal of section 336, which is critical for the FAA in determining how to move forward. From the security perspective, knowing platform and operator are foundational to an adequate framework for security support.

Kimchi: I agree remote ID is the top priority; it is foundational. There is also a question on security and basic security mechanisms. Who doesn't have to implement remote ID?

Burleson: Who are we missing on research?

- **Mattai:** I didn't see the FCC on the list.

Kimchi: With vehicle-to-vehicle standards, there are DOT standards that we can learn from.

Burleson: The FAA was late to the party figuring out how to manage drones. We didn't fully see the implications of this new technology, this new user. The pace of technology change is quite dynamic. Do you have any advice on how to try and not miss the next technology change, given the pace of change? It's a challenge for the FAA to keep up with the pace of change.

Banga: There are a lot of UAS companies. The FAA should setup some areas where you can try anything and everything you want. We need places to practice.

Canoll: The winners and losers are going to make the decisions at the right times. While we have to be reactive in providing a safe and efficient decision, that is where it ends.

Burgess: The FAA has been slow, but to give credit to the registration rules, the FAA has the right intent to ensure safety. At Wing, we don't know the next technologies. We should focus on performance intent.

Mattai: The FAA should have frequent enough cadences of the research plan, and be agile and adapt as it see things coming.



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Mills: The FAA should enable a way to utilize the existing infrastructure so it doesn't inhibit faster and greater flexibility.

- **Lawrence:** So two things. Operations first is the idea, using the existing regulatory structure with exemptions. We can accelerate this with the risk assessment process, which can provide a clear way to analyze the risk an operator introduces into the NAS.

Todd Graetz (BNSF): During the BNSF Pathfinder, there was an existing construct and established rules that required BNSF to make some adjustments to move forward.

Schulman: Part of the trend of safety and mitigations is to find the low hanging fruit pathways to operations. We need a night operations rule. Nighttime operations will save lives. Why is an alley in Manhattan class B airspace? Can we find ways of rethinking? Why do you need an automated process if you are in an alley or under trees with a drone? Is there a way for us to say if you are using something small and safe, we want you to do that operation. The FAA should provide a rules environment that lets you use the built-in technologies more often.

Remote Identification

Earl Lawrence, Executive Director, FAA's UAS Integration Office

Briefing

Lawrence provided an overview of the FAA's actions concerning remote ID: There are three standards bodies trying to set standards; we need to ensure these standards bodies are not duplicating efforts and that they are effective. We are looking at remote ID to assist in facilitating safe movement of drones in the airspace and aligning it with UAS registration. The FAA's intent is to not link registration with weight. If you operate in a LAANC area, you will operate with remote ID. Operating above that, you must comply with air traffic management requirements. Operations under listed regulations require certain approvals that may not be required operating under LAANC.

Lawrence further explained the four proposed categories of remote ID:

1. Location of specified area is identified;
2. Location of control station;
3. Location of control station and unmanned aircraft; and
4. Location of control station and a transmitting unmanned aircraft.

Manufacturers' standards are used as primary requirements. Manufacturers affirm that they are compliant will all required regulations. There are current challenges with multiple standards bodies developing standards while regulations are still being developed. Remote ID is key to enable UTM and BVLOS operations. How do we organize while dealing with legal issues to enable these types of operations?



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Discussion

Mills: Which standards bodies are there?

- **Lawrence:** ASTM F38, SAE, and others. I think there are competing interest groups that want specific solutions.

Troxell: I have had some experience with the Department of Energy (DOE) as it relates to interoperability. DOE formed an interoperability group. There might be something of more value in interoperability.

- **Lawrence:** I just heard you suggest that everyone waits until the FAA puts a Notice of Proposed Rulemaking (NPRM) out and send out the requirements. The engaged group started with the Aviation Rulemaking Committee, we also have regulatory barriers to how we have the dialogue.
- **Peter:** As the rulemaking process opens, we don't want the FAA separately driving standards.

Penrose: What is the desired timeframe to get to a remote ID solution we can start with?

- **Lawrence:** We have past the ideal timeframe for a solution. We are accelerating our rulemaking efforts as quickly as we can. Mid-next year is the timeframe we are looking at now. We have the standards bodies, and we have people doing BVLOS and retrieving data from their operations.
- **Penrose:** How are we tying off the work being done with the UTM perspective?
- **Lawrence:** We can have our discussions internally. There is a lot of thirst for data and information. There are tools we can use. My number one concern was that there are three bodies trying to do something. I am not sure the three bodies' efforts are effective.

Kimchi: When you create standards, you start with requirements, then standards to satisfy the requirements. You presented a skeleton of requirements. We did this three years ago with "V to V," it can provide systems talking to each other. The FAA should focus on the requirements. Are existing standards sufficient? Where do we go from here?

- **Lawrence:** That is why I wanted to have this discussion. I'm saying do you want to send people to these meetings. We are not prohibiting operations now, it's just not as open yet. We are doing individual approvals. Is that ok? Is that the strategy for now? It would be operations first for another year or so. The FAA is looking for consensus on the best path forward.

Hanson: Back when the small UAS rule was being developed, the FAA asked standards bodies to work on standards.

- **Lawrence:** The work that is being done is not at the behest of the FAA. Just because an FAA employee was at a meeting, that was not the FAA declaring that we want the standards. I just want to make sure you understand what an official endorsement or ask is.



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Canoll: Two quick things. Are you asking the DAC for help in a decision that the ARC was unable to make?

- **Lawrence:** No. I'll repeat: I'm asking for a discussion among those that send people to these meetings, do you want to send your people to these three bodies.

Agvent: I am also confused. First off, does the NPRM inform the groups or do the groups inform the NPRM. Who is the decider?

- **Lawrence:** In the end, it's the US government who decides. That decision is based on all the input we get. If you are working on something that informs us, it effects what we do. We understand that it is a symbiotic relationship.

Banga: When is time up?

- **Lawrence:** There will be an NPRM, which is defining more. The final is the final rule. The longer you take to provide information to the FAA, the less likely it is to get incorporated.
- **Banga:** What is the minimum viable thing for remote ID?
- **Lawrence:** I cannot answer the question directly because it is one for the public process. Every agency has an interest in UAS.
- **Banga:** We need a 1) unique identifier for the drone, 2) a unique identifier for the pilot, and 3) credentials.

Burgess: Most of the remote ID solutions will likely be used by non-aviation folks. Given that, one of the most helpful features of a remote ID system will be to tell if a UAS is within the rules or not. Is it possible to have a remote ID framework that doesn't have the FAA side of the system?

- **Merkle:** The design option is whether the information resides in the network or is within the FAA. Nothing inherent about airspace authorization. However, there may be other partners who support security missions that would have to define a performance system to retain it. There are options there. There are also archival questions. Security partners say the government has to hold the info. We may need access to vector information. We might have different needs near term for that. Might also have a need for air traffic operations, to be able to query that. There are sets of requirements merging that we need to discuss. In any of these cases, the availability of the information beyond the air navigation service provider, we need to talk about identifying user in an electronic manner, such as law enforcement. How do we authenticate them real time?
- **Burgess:** We might be able to feed requirements back to the FAA. If you require X, then we can produce Y.
- **Merkle:** It's going to be if you make these decisions, these are the risks/trades; a different choice.

Burleson: The FAA is framing this conversation because we are aware of multiple standards efforts. We also wanted to inform the DAC that we have a rulemaking process, which will be published early next spring. What is the best way forward to advise these multiple efforts?



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- **Lawrence:** This is a difficult issue.

Agvent: As one of the few operators in the room right now, we are flying everyday. First person that shows up is law enforcement, who asks: who are you, are you authorized to be here? All drone operations are local. It's the beat cop who needs to know whether to worry about something or not?

Zuccaro: Might be helpful to get briefings by law enforcement.

- **Lawrence:** Does the DAC want to do that?
- **Burleson:** The DAC is setup to provide advice to the FAA. There is a rulemaking in place and we cannot talk much about the rulemaking in this forum.

Kimchi: We need authentication, accounting to be a prerequisite. I think interagency coordination. You shouldn't have to depend on network connectivity. Questions remain about who will use this system.

Schulman: There is a wider world out there and remote ID standards are coming from France and the European Union. You will get passed by others.

- **Lawrence:** The FAA is not saying slow down, you have three groups working the same issue, and we haven't finished defining it.

Hanson: How much harmonization will be on the international scale?

- **Schulman:** DJI only wants to do it once. This is an international race! We need one global requirement or standard.
- **Burleson:** It doesn't benefit anyone for having to use different equipment or different standards. We will take back the advice of the DAC that you would like to see the NPRM sooner than later. We have a few rulemaking priorities we are trying to manage.

Lawrence: Hearing that from the DAC is important. The DAC could go to the administration to make it move quicker.

- **Burleson:** It helps when industry makes that point.

Troxell: It sounds like it might be a zoom out in this interoperability architecture. Are there generally values that allow for interplay between a lot of different kinds of technologies? Interplay between the three aspects, too many moving parts? Or will a proprietary architecture become dominant?

- **Burleson:** Your point is taken on interoperability.

Wynne: Discussion today about barriers to forward progress. Remote ID is a lynchpin for safety and the perception that different Federal agencies have a hand in slowing down the regulatory process. We take whatever opportunity we can at this meeting. Happy to motion to make clear to everyone that the DAC wants to get remote ID done. Other agencies are not in the room that could slow this process down. We don't want to end up having a hard stop later.



Drone Advisory Committee

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Burgess: The DAC is hearing that remote ID is a key issue, but the nuance is we learn so much from operational testing. If we rush to solidify a solution via speculation before we get out and operate, its incomplete. Let's rush to get that operational data, with the IPP being one of those methods. This is not to say we have an answer before it has been validated.

Schulman: We already incorporated remote ID on DJI products. You can see 70 percent of the total people out there with DJI remote ID. We don't have enough officers to respond to the drones. What do you do when you cannot respond?

Burleson: The FAA has clearly heard the DAC's concerns with remote ID.

Wynne made a motion to approve the following statement, which was seconded: "With safety first, hasten remote ID as quickly as possible (approved unanimously)."

New Business/Agenda Topics

Mills: Are we still working on DAC tenets?

- **Kimchi:** They are meant for the members to help determine recommendations.

Burleson: I heard today that an exchange between the DAC and the IPP selectees would be beneficial.

Closing Remarks

Burleson thanked the DAC members for their participation, meeting participants for attending, and Intel for the hosting the meeting. The next meeting will occur on Oct. 17, 2018 in Washington, D.C.

Adjourn

The meeting ended at 4:15 p.m. Pacific Time.



Drone Advisory Committee

6/6/2019 DAC Meeting • Arlington, VA

Submitted Written Comments

From: [Peter Burke](#)
To: [Peter Burke](#); [Harm, Chris \(FAA\)](#)
CC: [Michael.Chasen@precisionhawk.com](#); [Dan.Elwell@faa.gov](#); [Orquina, Jessica A \(FAA\)](#)
Subject: DAC (drone advisory committee) makeup
Date: Friday, May 17, 2019 6:17:16 PM

To: FAA Acting Administrator Dan Elwell
CC: Chris Harm chris.harm@faa.gov
CC: Jessica Ann Orquina Senior Communications Specialist Jessica.A.Orquina@faa.gov
CC: Michel Chasen, Chair, DAC, michel.chasen@precisionhawk.com

Dear Acting Administrator Dan Elwell-

I am a professor of EE at University of California Irvine.
(I was a nominee to the DAC, which was announced this week.)

I noticed you are a USAFA grad from your profile. My father was a USAFA grad ('70) as was my brother ('96). I have been told the cadets this year are having a great time building and testing drone swarms there; I'd like to go visit. I have always wanted to do something like that at the University of California with my own students, but FAA and university regulations have been so strict that it will probably never happen.

The reason I am emailing to express my strong disappointment with the selected makeup of the "Drone Advisory Committee".

There is not a single university person on the committee. There are 100,000 part 107 pilots but none of them are represented on the committee. Of the 800,000 registered hobbyists, there is only 1 representative on the committee (AMA).

The committee makeup is really skewed against individual operators, and this of course includes students and universities as well as tinkerers in their garage. I am guessing the USAFA cadets have special representation from the USAF allowing them to build and fly drone swarms, but where does that leave civilian students as well as hobbyists on the DAC? Under the bus. This week, for example, in the federal register, the FAA guidelines essentially grounded all student and educational activities at universities in controlled airspace, which must include thousands of students. At UC Irvine in engineering, for example, we have hundreds of engineering students every year build and fly drones. That activity is now grounded with the interim rule. Who is going to stick up for the students, hobbyists, tinkerers, educators, and high level university activities to the FAA on the drone advisory committee?

I'm not sure what the selection process was, but the end results is skewed towards large institutions.

For the sake of the future of aviation in the US, I strongly urge the committee makeup to be revised to better reflect the university constituents, as well as the 800,000 registered hobbyists, rather than focus on big business interests.

Respectfully,
-Peter Burke

PS-

To Chris Harm & Jessica Ann Orquina, since you coordinated the DAC nominations, can you make sure this email gets to Michael Chasen (DAC Chair) and FAA Acting Administrator Elwell (DAC designate federal officer member)?

--

Peter John Burke
Professor
Department of Electrical Engineering and Computer Science
Department of Biomedical Engineering
Department of Chemical Engineering and Materials Science
EG 2232 University of California, Irvine
Irvine, CA 92697-2625
<http://www.burkelab.com>
Office phone: [949-824-9326](tel:949-824-9326)
Fax: [949-824-3732](tel:949-824-3732)



RTCA, Inc.
1150 18th Street, NW, Suite 910
Washington, DC 20036
Phone: (202) 833-9339
Fax: (202) 833-9434
www.rtca.org

DATE: May 31, 2019

TO: Drone Advisory Committee
Mr. Michael Chasen, Chairman

SUBJECT: RTCA Activities Associated with Counter-UAS Technology

As the newly appointed President and CEO of RTCA, Inc., I offer my congratulations to the new members of the FAA's Drone Advisory Committee (DAC) as well as to its new chairman, Mr. Michael Chasen. Although RTCA no longer has a direct role in the activities of the DAC, we continue to applaud the importance and significance of this Federal Advisory Committee to the safety, security, and overall health of the aviation ecosystem.

Based on conversations earlier this year with the FAA Acting Administrator and the Department of Defense, RTCA is in the process of soliciting from industry the need for technical performance standards to support counter-UAS technology. In a joint meeting in our offices last month with FAA, Department of Defense, Department of Justice, Department of Homeland Security, Airports Council-North America, Aerospace Industries Association, and the Air Line Pilots Association, International, it was made clear there is a need for further action on this topic. In the coming months, RTCA will continue to pursue those discussions, including exploring a more formal memorandum of cooperation between the appropriate organizations.

Again, congratulations to the committee. RTCA stands by to support your efforts in addressing both the opportunities and the challenges of UAS development and integration into the airspace system.

Sincerely,

Terry McVenes
President and CEO

TO: Drone Advisory Committee
Date: June 1, 2019
From: Dean Schober
Hartford, WI

I have several items I would like to bring to the attention of the committee;

Item A)

- 1) As of last month there were 1,391,192 drones registered in the FAA drone database
- 2) 367,773 were commercial/public
- 3) 1,018,208 were to Recreational pilots

Recreational pilots make up 73% of registrations and that's based off 1 aircraft per recreational pilot who only receive one registration number vs. a separate number per aircraft for commercial/public/institutional pilots.

Despite this significant majority of recreational pilots the DAC, which is made up of 33 people, has only one (1) representative from recreational pilots. Manned aircraft pilots have a higher representation (5) and they have nothing to do with drones. Local government representatives have six seats, and I'm not quite sure why the helicopter pilots association needs to representatives on the committee.

I'm asking that the majority of pilots be represented by 50% of the DAC seats. Or that some arrangement is made so the interest and opinions/concerns of actual drone pilots be considered by the DAC before making rules that affect them.

I would like to add that the drone community, recreational and commercial, are interested in safely integrating into the NAS and have no desire to endanger manned flight or interrupt manned air traffic or ATC activity.

We would however, like to see our right to enjoy our hobby without undue regulation. We would request that laws effecting our hobby not be made without a fair and equal representation of pilots and CBO's involved in the hobby.

Item B)

I would also ask that the DAC re-consider the requirement for a spotter when a pilot is flying FPV. I believe a reasonable set of rules allowing for low level flight in areas that are free of significant manned aviation be allowed under the rules.

I base this off several things, first, when a pilot puts on a set of FPV goggles they do not lose their other senses, they can hear people and machines around them and can hear aircraft long before they can be seen. As I type this letter two army black hawk helicopters flew near my house. I immediately went outside and started to look for them. I could hear them several minutes before seeing them pass to the West, moving Southwest at about 1000 feet and about a quarter mile to the West. Had I been flying, goggles on or not, I would have had plenty of time to descend below the treetops and or land before they came into view.

The FPV camera often provides a better image of what is going on around the UAS, where it is located and its proximity to fixed objects as well as what is underneath them. Line of sight to the aircraft is focused on just that, it is more hampered by visibility issues, distance and objects on the ground that prevent seeing what is under the UAS.

As a comparison manned aircraft have limited view from the cockpit of an airplane, the environment is loud and the pilots need to wear headphones to hear radio traffic. Their sight is limited just as an FPV camera is yet there is no requirement for a spotter in general aviation airplanes.

Statement from Deborah Flint, CEO, Los Angeles World Airports
Drone Advisory Committee
June 6, 2019

- I am very sorry that I am unable to attend today's meeting personally, but I have sent key leadership from my team and look forward to engaging with all of you – our new Chair Michael Chasen and both new and continuing members – on the critically important work of this committee.
- The world today looks very different from when the DAC last met 11 months ago.
- We have seen majorly disruptive drone incidents at and around major global airports – most notably at Gatwick, but also at Newark and other U.S. airports.
- We know that a Gatwick-type incident at LAX would be devastating for the local, regional, and national economy.
- It also could grind the public appetite for integration of drones into the National Airspace System to a halt.
- Yet, even after Gatwick and other incidents, the fundamentals for preventing and responding to such incidents are not yet in place.
- This committee has the right people and mandate to tackle these issues and develop specific timeframes, outcomes and clearly defined roles and responsibilities to guarantee the safety and security of our airports.
- Thank you for treating this issue with the urgency it demands.