



# 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



# Drone Advisory Committee

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

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?



# Drone Advisory Committee

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

- **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





# Drone Advisory Committee

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

(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.



# Drone Advisory Committee

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

**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?



# Drone Advisory Committee

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

- **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](http://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.



# Drone Advisory Committee

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

**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.



# Drone Advisory Committee

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

**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





# Drone Advisory Committee

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

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.



# Drone Advisory Committee

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

**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.



# Drone Advisory Committee

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

**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 with 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?



# Drone Advisory Committee

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

## 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.



# Drone Advisory Committee

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

**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?





# Drone Advisory Committee

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

- **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

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

**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

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

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## Appendix A: Meeting eBook

DRAFT



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# Drone Advisory Committee eBook

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**DAC Member (Public) Information for the  
July 17, 2018 DAC Meeting • Santa Clara, CA**



# Drone Advisory Committee

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

## Table of Contents

<b>DAC Member Information (Public)</b>	<b>Page</b>
1) Travel/Meeting Logistics	1
2) Confirmed FAA/DOT Attendees	3
3) Meeting Agenda	4
4) DAC Membership Roster	5
5) UAST Briefing Paper	6
6) UAS Implementation Plan and UAS Integration Research Plan Briefing Paper	8
7) Remote ID Briefing Paper	25
8) DAC Charter	27
9) Fact Sheet: Advisory Committee Member Roles and Responsibilities	30
10) Fact Sheet: UAS Metrics Update	31





# Drone Advisory Committee

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

## Travel/Meeting Logistics

### Schedule

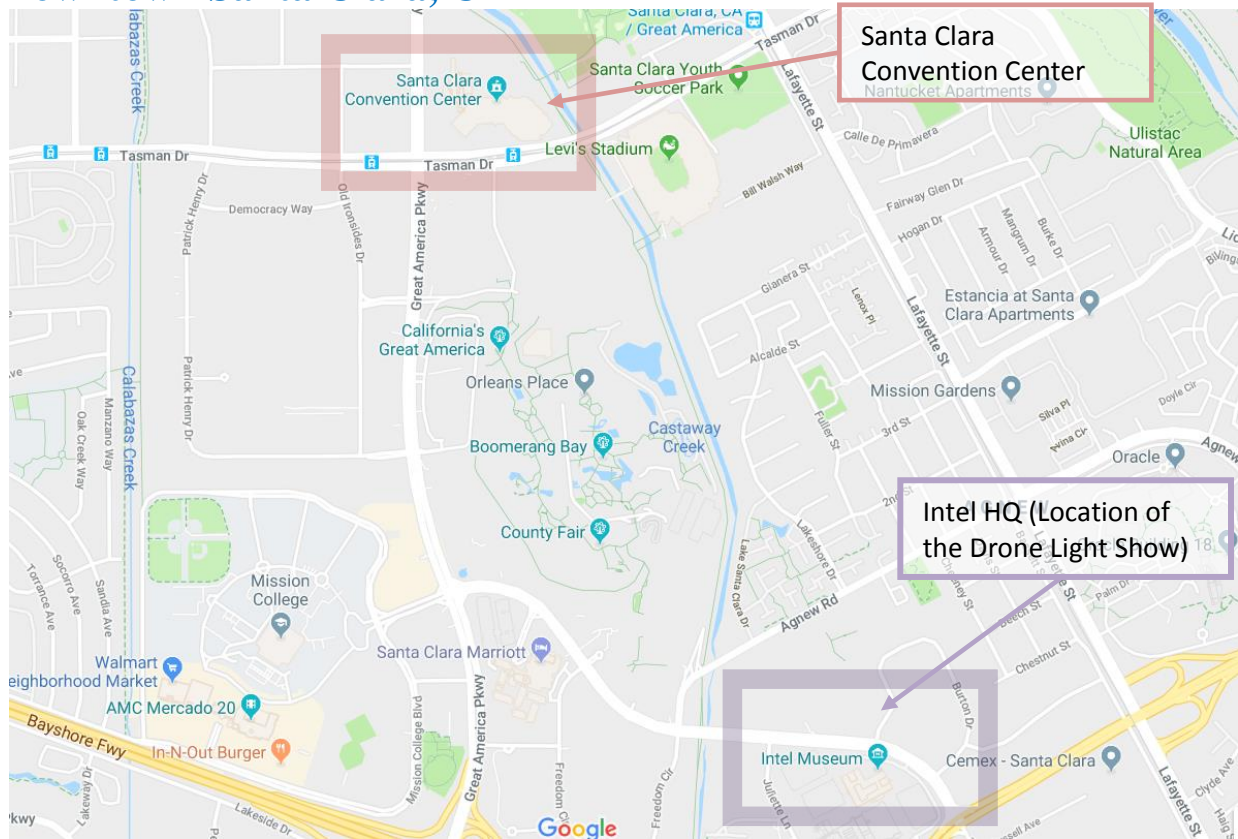
Monday, July 16, 2018	
6:30 p.m. – 8:30 p.m.	DAC Member (including select FAA) Reception and Dinner (invitation only)
8:30 p.m. – 9:30 p.m.	Intel Drone Light Show and Reception (open to all meeting attendees who register by COB 7/12)
	<b>Location (for both events):</b> Intel Corporation, 2200 Mission College Blvd., Santa Clara, CA 95054 <b>Parking:</b> Free at Intel <b>Shuttles:</b> None

Tuesday, July 17, 2018	
All events at the Santa Clara Convention Center, Grand Ballroom, Sections G and H 5001 Great American Parkway, Santa Clara, CA 95054	
8:00 a.m. – 9:00 a.m.	Breakfast
	<b>DAC Member (including select FAA):</b> Catered <b>Everyone else:</b> Continental
9:00 a.m. – 11:45 a.m.	DAC Meeting
	<b>Parking:</b> Free at the convention center <b>Shuttles:</b> None
11:45 a.m. – 1:15 p.m.	Lunch
	<b>DAC Member (including select FAA):</b> Catered <b>Everyone else:</b> Sandwich lunch provided
1:15 p.m. – 4:00 p.m.	DAC Meeting Continued
4:00 p.m.	Meeting Adjourned

### Map Showing Santa Clara, CA and the Surrounding Area



## Downtown Santa Clara, CA



**Questions/Comments:** Chris Harm ([chris.harm@faa.gov](mailto:chris.harm@faa.gov) or 202-267-5401),  
UAS Stakeholder and Committee Liaison



# Drone Advisory Committee

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

## Confirmed FAA/DOT Attendees

Name	Title	Org.
1. Carl Burleson	Acting Deputy Administrator and Acting DAC Designated Federal Officer	FAA
2. Colleen Donovan	Senior Advisor to the Deputy Administrator	FAA
3. Ali Bahrami	Associate Administrator for Aviation Safety (AVS)	FAA
4. Tony Fathabadi	AVS Assistant	FAA
5. Earl Lawrence	Executive Director, UAS Integration Office (AUS)	FAA
6. Chris Harm	UAS Stakeholder and Committee Liaison, AUS	FAA
7. Teresa Denchfield	Logistics Coordinator, AUS	FAA
8. Tim Arel	Deputy Chief Operating Officer, Air Traffic Organization (ATO)	FAA
9. Jay Merkle	Deputy Vice President, Program Management Office, ATO	FAA
10. Claudio Manno	Associate Administrator for Security and Hazardous Materials Safety	FAA
11. Lorelei Peter	Assistant Chief Counsel for Regulations	FAA
12. Genevieve Sapir	Senior Attorney	DOT
13. Laura Remo	Chief, Air Carrier Fitness Division	DOT
14. Stefanie McCans	Project Manager, Aviation Safety Auditor	DOT
15. Robin Koch	Supervisory Auditor	DOT
16. Damon Walker	Transportation Industry Analyst	DOT
17. Rachel Mencias	Student Trainee (Auditor)	DOT



# Drone Advisory Committee

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

## Public Meeting Agenda

**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

	Start	Stop	
1.	9:00 a.m.	9:01 a.m.	<b>Official Statement of the Designated Federal Officer</b>
2.	9:01 a.m.	9:02 a.m.	<b>Approval of the Agenda</b>
3.	9:02 a.m.	9:15 a.m.	<b>Opening Remarks</b>
4.	9:15 a.m.	10:15 a.m.	<b>FAA Update</b>
5.	10:15 a.m.	10:30 a.m.	<b>Break</b>
6.	10:30 a.m.	11:00 a.m.	<b>Unmanned Aircraft Safety Team Briefing on Safety Data</b>
7.	11:00 a.m.	11:45 a.m.	<i>Discussion of Safety Data</i>
8.	11:45 a.m.	1:15 p.m.	<b>Lunch and Networking</b>
9.	1:15 p.m.	1:45 p.m.	<b>FAA's Unmanned Aircraft Systems (UAS) Implementation Plan (IP) and FAA's UAS Integration Research Plan (IRP)</b>
10.	1:45 p.m.	2:15 p.m.	<i>Discussion of FAA's UAS IP and IRP</i>
11.	2:15 p.m.	2:30 p.m.	<b>Break</b>
12.	2:30 p.m.	2:45 p.m.	<b>Remote Identification</b>
13.	2:45 p.m.	3:30 p.m.	<i>Discussion of Remote Identification</i>
14.	3:30 p.m.	3:45 p.m.	<b>New Business/Agenda Topics</b>
15.	3:45 p.m.	4:00 p.m.	<b>Closing Remarks</b>
16.	4:00 p.m.	4:00 p.m.	<b>Adjourn</b>

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

**Questions/Comments:** Contact Chris Harm, UAS Stakeholder and Committee Liaison ([chris.harm@faa.gov](mailto:chris.harm@faa.gov) or 202-267-5401).



# Drone Advisory Committee

## DAC Membership – As of 6/28/2018

Stakeholder Group	Members
Designated Federal Officer	<b>Dan Elwell</b> , Acting Deputy Administrator, Federal Aviation Administration
Chair	<b>Vacant</b>
UAS Manufacturers	<b>James Burgess</b> , Product and Systems Lead for Project Wing, Google X <b>Michael Chasen</b> , CEO, PrecisionHawk USA Inc. <b>Martin Gomez</b> , Director of Aeronautical Platforms, Facebook <b>Gur Kimchi</b> , Co-Founder and VP, Amazon Prime Air <b>Brendan Schulman</b> , VP of Policy and Legal Affairs, DJI Technology
UAS Operators	<b>Greg Agvent</b> , Senior Director of National News Technology, CNN <b>Todd Graetz</b> , Director, Technology Services, UAS Program, BNSF Railway
UAS Hardware Component Manufacturers	<b>Nan Mattai</b> , Senior VP, Engineering and Information Technology, Rockwell Collins, Inc. <b>Phil Straub</b> , Executive VP and Managing Director, Aviation Division, Garmin, Ltd.
UAS Software Application Manufacturers	<b>Jaz Banga</b> , Co-Founder and CEO, Airspace Systems, Inc.
Traditional Manned Aviation Operators	<b>Mark Baker</b> , President and CEO, Aircraft Owners and Pilots Association <b>Houston Mills</b> , Global Aviation Strategy and Public Policy Director, United Parcel Service <b>Steven Rush</b> , President, Professional Helicopter Pilots Association <b>Matthew Zuccaro</b> , President and CEO, Helicopter Association International
Airports and Airport Communities	<b>Deborah Flint</b> , Chief Executive Director, Los Angeles World Airports <b>Marily Mora</b> , President and CEO, Reno-Tahoe Airport Authority
Labor (controllers, pilots)	<b>Tim Canoll</b> , President, Air Line Pilots Association <b>Trish Gilbert</b> , Executive VP, National Air Traffic Controllers Association
Research, Development, and Academia	<b>Robie Samanta Roy</b> , VP of Technology Strategy and Innovation, Lockheed Martin Corporation
Local Government	<b>David Greene</b> , Bureau of Aeronautics Director, Wisconsin Department of Transportation <b>Wade Troxell</b> , Mayor of Fort Collins, Colorado, and the National League of Cities
Navigation, Communication, Surveillance, and Air Traffic Management Capability Providers	<b>George Kirov</b> , VP and General Manager, Commercial UAS Solutions, Harris Corporation <b>Christopher Penrose</b> , Senior VP of Emerging Devices, President of Internet of Things, AT&T
Other	<b>Rich Hanson</b> , President, Academy of Model Aeronautics <b>Brian Wynne</b> , President and CEO, Association for Unmanned Vehicle Systems International



## **Unmanned Aircraft Safety Team**

### **Briefing Paper by Ben Marcus (Co-Chair)**

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The Unmanned Aircraft Safety Team (UAST) is an industry-government partnership committed to ensuring the safety of Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS). The UAST supports the safe integration of UAS with data-driven safety enhancements and collaboration among members of the UAS industry. The UAST provides industry and government the mechanism to work together to increase safety in a non-regulatory fashion. Over 60 organizations are members of the UAST, including UAS manufacturers, operators, modelers, safety experts, and members of the manned community as well. Some examples of industry members include Academy of Model Aeronautics (AMA), Airline Pilots Association (ALPA), Aircraft Owners and Pilots Association (AOPA), Association for Unmanned Vehicle Systems International (AUVSI), Helicopter Association International (HAI), Amazon, Boeing, DJI, Kittyhawk, Measure, MOTA, Yuneec, and Zipline. The team is co-chaired by one FAA representative and one industry representative, currently Earl Lawrence from the FAA's UAS Integration Office and Ben Marcus from AirMap. A steering committee provides governance and direction.

### **Background**

The UAST leadership has identified three keys to success for moving forward:

1. Adequate funding for data collection and analysis
2. Active participation from vested industry members
3. UAS community commitment to embrace and implement safety enhancements

As a data-driven group, collecting and analyzing flight data is a key component of the UAST's work. The UAST and MITRE, an independent third party data collection and analysis entity, have examined a small amount of flight data provided by UAST members. It has established core elements that should be included with each dataset and standard failure modes for UAS safety analysis. Using these lists, the UAST has begun outlining safety cases that include specific safety questions, related telemetry fields, potential data driven analysis outputs, and both in-flight and procedural mitigation strategies.

The UAST's goal is to develop an Aviation Safety Information Analysis and Sharing program similar to the one the Commercial Aviation Safety Team (CAST) uses. This system would use de-identified industry-sourced data and look for systemic safety issues. The UAST has recently developed a data governance document and cooperative agreement, setting the groundwork for the development of this system. However, significant resources are required to fully develop this system.

While implementing the operational flight data effort, the UAST is using accident/incident reports from a variety of sources including FAA, NTSB, and newsworthy reports to develop safety enhancements in a manner similar to CAST and the General Aviation Joint Steering Committee.

## **Discussion**

Using analysis of these accidents and incidents, including the collision between a U.S. Army Blackhawk helicopter and a small quadcopter near New York City in September 2017, the UAST has adopted by consensus the first three safety enhancements.

Safety Enhancement 1 – Geofencing and Airspace Awareness. This SE aims to reduce the risk of collision through better airspace awareness for operators, geofencing capabilities, and preventing inadvertent beyond visual line of sight flight for untrained or ill-equipped operators. To reduce the risk of collision with other aircraft or structures, the industry should improve airspace awareness and geofencing capabilities. Two areas are being addressed:

- i. Education, outreach (and possibly credentialing) on airspace awareness and authorization
- ii. Enabling technology safety features to help prevent flight into unauthorized airspace

Safety Enhancement 2 – Flight Control Return-to-Launch (RTL) Function. This safety enhancement aims to reduce the risk of collision by proposing specific design objectives when incorporating RTL capability into UAS. It also proposes education and outreach to help ensure pilots understand the correct setup of RTL mode during mission planning/pre-flight.

Safety Enhancement 3 – Improve UAS Sightings Reports. This safety enhancement aims to clarify the risk associated with UAS by improving the quality of sighting reports from manned aircraft by both developing reporting requirements and educational material to better assess these incidents.

## **UAST Challenges**

While the UAST made great progress in less than two years since its founding, challenges remain that the Drone Advisory Committee can help address.

1. Limited funding to support data collection and analysis: Significant financial resources are required to collect, de-identify, and analyze UAS data in a way that promotes safety in the NAS and provides additional benefit to those contributing the data.
2. Resources available to support UAST work: To be a truly effective safety team the UAST requires time and commitment from both industry and government members.
3. Reluctance to share flight data: Concerns over privacy and added value/benefit need to be addressed to fully reap the benefits of an industry-wide shared safety data analysis system.

## **FAA's UAS Implementation Plan and UAS Integration Research Plan**

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The mission of the Federal Aviation Administration (FAA) is to provide the safest, most efficient airspace system in the world. The National Airspace System (NAS) is a complex national asset providing essential capabilities for the United States along with a critical medium for aviation, the traveling public, commerce, and national security.

The emergence of Unmanned Aircraft Systems (UAS) technology triggered a broad range of applications in government, industry, academia, and recreational endeavors. The rapid growth of the UAS industry has created the need to ensure this new technology is safely integrated into the NAS. As with any rapidly advancing technology, successful integration of UAS into the NAS provides opportunities for innovation and growth, but also presents many challenges. To address these challenges, the FAA created the UAS Implementation Plan and UAS Integration Research Plan to guide the FAA on its path to full integration.

### **The UAS Implementation Plan**

The integration of UAS into the NAS requires every office in the FAA to work toward this common goal. In order to coordinate such a venture, the FAA's UAS Integration Office led a collaborative effort across all FAA lines of business to develop a five-year plan. Subject matter experts from across the agency, under the guidance of the FAA's UAS Executive Working Group and UAS Management Board, created and then annually updated the UAS Implementation Plan.

This UAS Implementation Plan is an agency-wide document detailing how the FAA intends to accomplish its integration objectives over the next five years. It provides a common framework for discussing the vast landscape of UAS-related activities across the FAA. The plan provides a description of the actions, expected outcomes, and requisite timelines to achieve integration. Activities range from standards development to workforce training to outreach activities.

### **The UAS Integration Research Plan**

UAS research is the foundation of UAS integration activities. Research enables the development of informed policies, procedures, and regulations. The UAS Integration Research Plan presents a framework for managing the variety of UAS-related research activities across the FAA, industry, academia, and other agencies.

The UAS Integration Research Plan, intended to be a rolling five-year plan and updated annually, is aligned to FAA Strategic Priorities, FAA Priority Initiatives, UAS Strategic Priorities, the Five-Year UAS Integration Approach, and the National Aviation Research Plan. It informs and reflects the priorities and initiatives of the FAA and research partners.

The FAA's Research, Engineering, and Development Advisory Committee (REDAC), another FAA Federal Advisory Committee, also reviews the UAS Integration Research Plan and provides input to the FAA that is incorporated into revisions of the annual plan.

**Items for Discussion with the Drone Advisory Committee (DAC)**

1. The FAA's research plan is focused on applied research, or in other words, focused on supporting rulemaking and policy setting. What other groups and or individuals should the FAA be reaching out to assure we are identifying all the core research needed to support rulemaking?
2. What entities would the DAC recommend the FAA engage to ensure that a variety of stakeholders are able to evaluate and comment on these plans?
3. With academia, industry and basic research entities like the National Aeronautics and Space Administration continually advancing technology what strategies do you recommend so that we fully incorporate UAS advancements into our research plan?

**Attachments**

1. UAS Implementation Plan – Executive Summary
2. UAS Integration Research Plan – Executive Summary

## UAS FY2019 IMPLEMENTATION PLAN: EXECUTIVE SUMMARY

The sky is changing. What was once the province of airplanes and helicopters is now the frontier for unmanned aircraft systems, or drones. UAS are dramatically changing the way we view aircraft and the role of the pilot. In short, technological advances and the automation of many processes and core piloting skills have revolutionized aviation, attracting a new community of remote operators taking to the sky.

Even more radically, UAS are changing the way we see the future of flight. And the future is promising. Industry estimates that full integration of drones could reach a national economic benefit of \$82 billion and more than 100,000 jobs within the decade<sup>1</sup>. The applications UAS can perform have the potential to transform society – our neighborhoods, our communities, our everyday lives -- in ways that not only significantly bolster economic development, but also support human well-being and maintain public safety, including by:

- Delivering life-saving medical devices and other equipment.
- Facilitating response to hurricanes, wildfires, and other natural disasters.
- Forecasting dangerous weather patterns.
- Enabling inspection of critical infrastructure, such as pipelines and railways.
- Aiding precision agriculture.
- Serving consumers through new and innovative ways to deliver household and business products.
- Improving the safety and efficiency of the most dangerous, dirty, and dull jobs
- Helping control the world's deadliest creature – the mosquito.

While the rapid growth of the UAS industry has created tremendous opportunities for innovation and growth, the Federal Aviation Administration's core mission continues to be safety. In upholding this mission, the need to ensure this new technology is integrated *safely* presents us with a number of exciting and unusual regulatory and technical challenges. Safety of the National Airspace System (or NAS) -- a complex national asset that provides an essential medium for aviation, the traveling public, commerce, and national security -- is paramount.

The *Implementation Plan for Integration of Unmanned Aircraft Systems into the National Airspace System: FY2019 Implementation Plan* is an agency-wide document detailing activities the FAA will carry out over the next five years. The purpose of the Plan is to organize and track agency-wide integration efforts and facilitate coordination of interdependent activities across the FAA by providing a common framework for discussion. The UAS Integration Office collaborated with a cross-agency team of subject matter experts to develop the Plan under the guidance of senior FAA leadership.

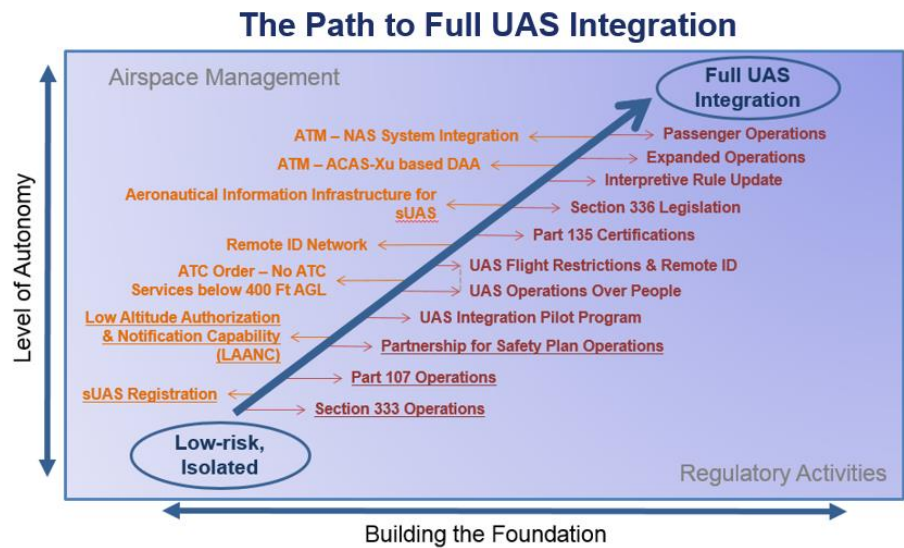
### Vision

The FAA's vision for fully integrating UAS into the NAS entails unmanned aircraft operating harmoniously with manned aircraft, side-by-side in the same airspace. Additional air navigation services will be needed to facilitate unmanned traffic management at low altitudes. This vision goes beyond accommodation practices, which largely rely on segmenting operations to maintain systemic safety. As we work to realize this vision, UAS must be introduced to the NAS incrementally -- progressing to increasingly complex operations -- to ensure the safety of people and property both in the air and on the ground.

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<sup>1</sup> The Economic Impact of Unmanned Aircraft Systems in the United States, AUVSI, March 2013

This vision is anchored by FAA's mission to provide the safest, most efficient aerospace system in the world. To successfully achieve it requires a multi-dimensional balancing act between the potential of the technology, the speed of innovation, the volume of operations, and the shifting landscape of regulations and standards. As the fulcrum, a single safety risk management process will need to evolve, accounting for three interdependent factors: the aircraft, the airspace, and applicable safety mitigations.



## UAS Forecast

Total Model (Hobbyist) Fleet (Million sUAS Units)			
Year	Low	Base	High
2017	1.10	1.10	1.10
2018	1.50	1.60	1.73
2019	1.76	2.00	2.35
2020	1.87	2.20	2.73
2021	1.92	2.30	2.94
2022	1.96	2.40	3.17

To support the agency's phased integration approach as outlined in the UAS Implementation Plan, the FAA has launched various market research activities to understand the possible magnitude of the UAS sector, implications on the spectrum of aircraft that may be used for model (hobbyist) flying, and the safety implications for the gradual integration of the UAS fleet into the NAS. Market estimates suggest that the small UAS, or sUAS, model fleet will likely more than double in size over the next 5 years, from the present 1.1 million units to over 2.4 million units<sup>2</sup>.

The non-model sector, which is primarily commercial in nature, is exceptionally dynamic and is anticipated to accelerate in growth over the next few years.

Total Commercial Fleet (Number of Units)		
Year	Base	High
2017	110,604	110,604
2018	158,900	168,339
2019	229,400	268,937
2020	312,100	410,862
2021	407,400	604,550
2022	451,800	717,895

<sup>2</sup> FAA Aerospace Forecast: Fiscal Years 2018-2038, FAA, March 2018



## What's Now

The FAA is making steady progress toward achieving full-scale integration. We introduced an online registration system for UAS weighing more than 0.55 pounds and less than 55 pounds. Since its introduction in December 2015 there have been over 1.1 million UAS registered for both commercial and recreational purposes. For perspective, there are currently just under 300,000 manned aircraft registered.

The Small UAS Rule, or part 107, established rules for routine, low-risk sUAS operations within line of sight. Continuing efforts to enable more complex operations are underway, including waivers for operations under part 107 and UAS type certification projects. Examples of more complex operations include those that go beyond visual line of sight, over people, and at night. For operations that cannot be performed under part 107, companies are looking at ways to meet the provisions of existing regulations to facilitate more complex operations, such as agricultural applications under part 137 to conduct aerial spraying and surveying for agricultural applications.

## What's New

The FAA initially intended to integrate UAS by creating a series of performance-based rules that would enable higher risk operations. The agency was set to release a draft rule for operations over people in late 2015, when other federal agencies expressed concern about the rule's security implications. To address these concerns while continuing to advance UAS operations, we shifted our focus from a regulations-first framework to an operations-first framework. A number of projects based on existing safety requirements are underway to support this approach. The data generated and the lessons learned from project implementation are informing the next series of UAS regulations.

One of the most exciting new developments in our operations-first integration efforts is the recently announced UAS Integration Pilot Program. The IPP is a partnership with state, tribal, and local governments to jointly test and mature the concepts, processes, and data required to further integrate UAS into the NAS. The FAA will draw upon the results of the 10 IPP partnerships to inform rules, processes, and procedures to enable expanded UAS operations.

In order to ensure the safe operation of these new operations (and to ensure they are safely interacting with the existing ones), the FAA is working to update and automate its systems to address the increased volume. On any given day, there are 60,000 commercial aircraft flying through the NAS into the 30 biggest airports in the United States. If current trends persist, the same number of drone flights could originate from just one delivery fulfillment center in a major city. These orders of magnitude require a significant automation capabilities.

NASA and industry partners have been developing a suite of Unmanned Traffic Management capabilities, which they will transfer to the FAA to incorporate into a low altitude unmanned traffic management framework. This will facilitate countless more operations than can be managed manually. The FAA is already building its capabilities and components and deploying technologies that have evolved from previous UTM research. These include the UAS registration system and the Low Altitude Authorization and Notification Capability, a partnership between the FAA and industry. LAANC is designed to enable part 107 operators to obtain near real-time approval of airspace authorization requests and is launching at FAA air traffic facilities throughout 2018.

## What's Next

The FAA has always relied on standards development bodies to develop safety standards for certification and operations, and the agency's approach to UAS is no different. Currently, there are a number of organizations developing standards on all things UAS, from control and communications links to UAS propellers. These performance standards provide a crucial basis for safety as UAS operations become more complex – helping to ensure the reliability, compatibility, and interaction of UAS regardless of manufacturer or model.

In addition to these standards, certifications will also be crucial for UAS package delivery and other operations. For example, design certification is one necessary component for large scale UAS package delivery, as is an Air Carrier and Operator Certification, also known as a part 135 certificate. A number of companies are already working through these processes. Although they will take time, the requirements will ensure public safety as package delivery via UAS becomes a routine option for the American public.

And, as noted above, the full deployment of UTM services and capabilities will create an environment in which the entire spectrum of UAS operations can be safely realized, including transportation of people and property. The FAA is in the process of fielding these services, starting with registration and LAANC. Next up is developing and implementing requirements for remote identification of UAS and dynamic

airspace management. By establishing a single set of airspace rules, the former is necessary from a safety perspective. It will also address security concerns posed by UAS. While there are many pieces to put together, UTM will allow for full integration of unmanned and manned aircraft at low altitudes.

While significant UAS integration progress continues to be made, the FAA recognizes that much remains to be done to maintain existing operational capacity, security, and safety, while protecting airspace users, people, and property on the ground from excessive risk. Our safety mission continues to be the driver for UAS integration. Working in collaboration with other federal agencies, industry partners, and research institutions, we are actively extending our culture of safety to the world of unmanned aircraft – first by normalizing low risk operations and, through systems enhancements and regulations, building the framework to support more advanced capabilities.

The FY2019 Implementation Plan identifies the UAS integration path forward in the form of critical near term, longer term, and cross-cutting activities and the timelines for realizing those efforts. We are committed to striking the appropriate regulatory and oversight balance to ensure that innovation is able to thrive without compromising the safest, most efficient aerospace system in the world.

***The sky is changing, and it's open for business. The FAA will help you reach it safely.***





**Federal Aviation  
Administration**



<https://my.faa.gov/org/linebusiness/avs/offices/aus.html>

For Official Use Only

# **UAS Integration Research Plan** 2017–2022

*Executive Summary*



## Introduction



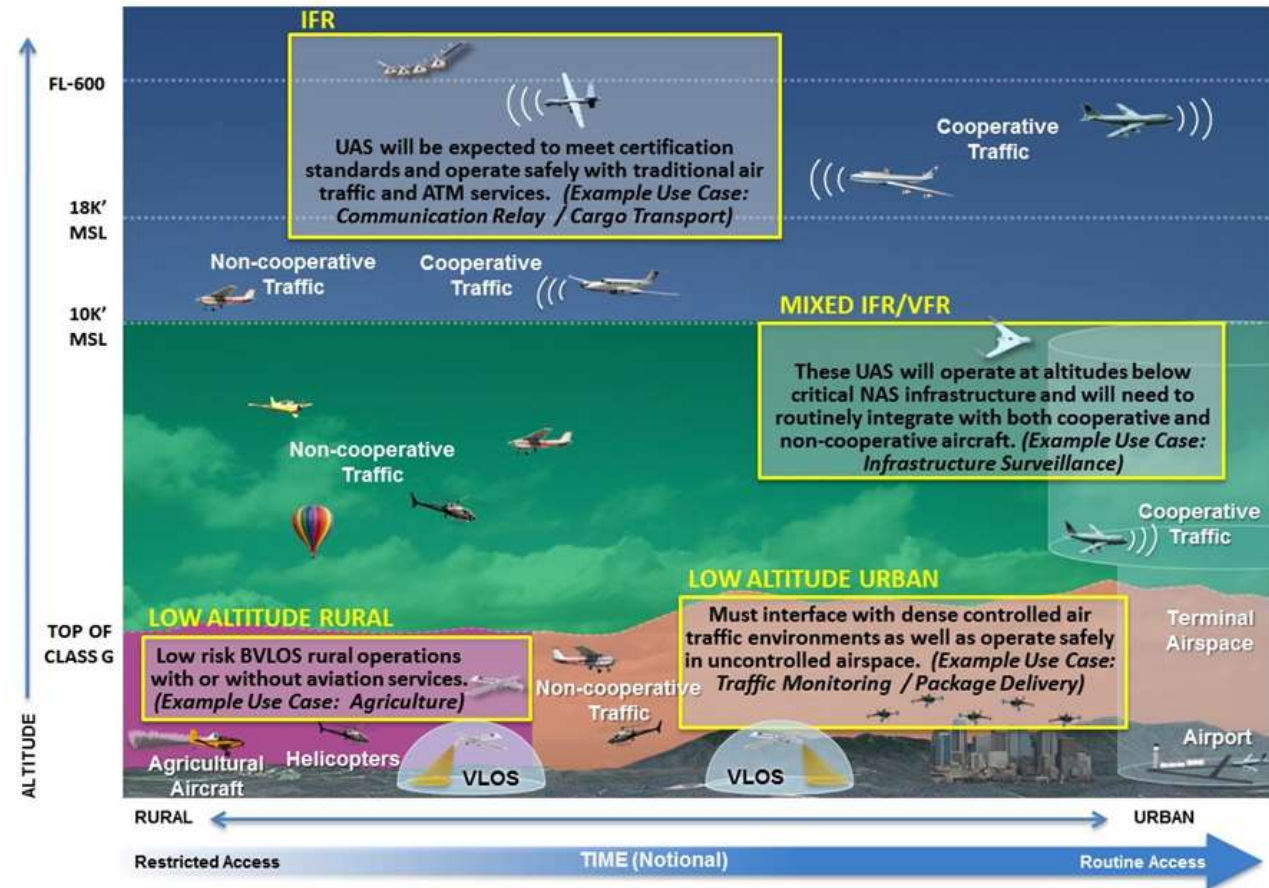
UNMANNED AIRCRAFT SYSTEMS (UAS) RESEARCH is the foundation of UAS integration activities. Research enables informed policies, procedures, and regulations. Section 2211 (Unmanned Aircraft Systems Research and UAS Research Activity Overview) of the FAA Extension, Safety, and Security Act of 2016 directs the FAA to work collaboratively with stakeholders to develop a roadmap of the estimates, schedules, and benchmarks for integrating UAS into the NAS. This shall include how to use research, assessments of abilities to integrate UAS, and updates on the advancement of various technologies. To meet this requirement, the FAA developed this *UAS Integration Research Plan*, which presents a framework for managing the variety of UAS-related research activities across the FAA, industry, academia, and other agencies.

The *UAS Integration Research Plan* is aligned to FAA Strategic Priorities, FAA Priority Initiatives, UAS Strategic Priorities, the five-year UAS Integration Approach, and the National Aviation Research Plan. While the *UAS Integration Research Plan* is a result of these strategic priorities and initiatives, it is also a vital component in an iterative process; this plan informs and reflects the priorities and initiatives of the FAA and research partners.

The FAA has established and maintains partnerships with entities including the National Aeronautics and Space Administration (NASA), numerous federal agencies, a dedicated UAS Center of Excellence (COE), UAS Test Sites, Federally Funded Research and Development Centers (FFRDCs), industry, academia, independent research organizations, and domestic and international standards groups.

## Integrating UAS into the National Airspace System

**A**IRSPACE ACCESS for UAS in the National Airspace System (NAS) will expand incrementally as the FAA implements a phased approach over the next few years. Current, planned, and future UAS-related research activities and results will enable the FAA to revise regulations and keep pace with the growing demands of NAS users. UAS operations are in development that span the airspace environment, from High Altitude Long Endurance (HALE) aircraft flying for days or weeks, to aircraft flying only a few hundred feet or less above the ground.



Source: Adapted from NASA, Aeronautics Research Mission Directorate

## Current UAS Research Landscape

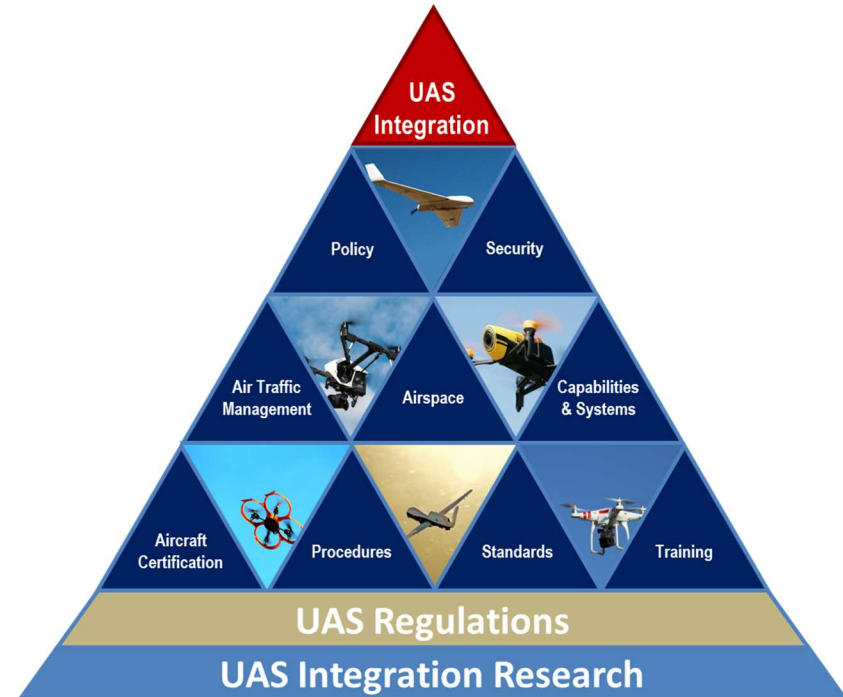
**T**HE FAA PLANS to incrementally expand the operational envelope, allowing UAS operations with increasing levels of complexity, while fully maintaining critical safeguards for existing users of the NAS. This will ultimately allow UAS to safely conduct routine operations. The FAA is leveraging many UAS-related research activities across different research organizations, such as academia, NASA, UAS Test Sites, and standards bodies. It is leveraging technological advances from industry, lessons learned from approved operations, and expertise from around the world.

The FAA and partners have multiple efforts in progress to build upon recent changes to UAS-related regulations. For instance, the FAA is working with industry to approve UAS operations in Pathfinder programs, while NASA is exploring Low Altitude Traffic Management concepts. Multiple private and public research organizations are developing Detect and Avoid (DAA) technologies.

As UAS operations become more fully integrated in the NAS, the FAA will mature its UAS operational requirements, develop repeatable approval processes, assess and invest in

required infrastructure and systems, and continually analyze the costs and benefits for the FAA and UAS stakeholders. At the same time, the FAA will invest in additional research areas based on priorities identified within the FAA and by UAS stakeholder groups.

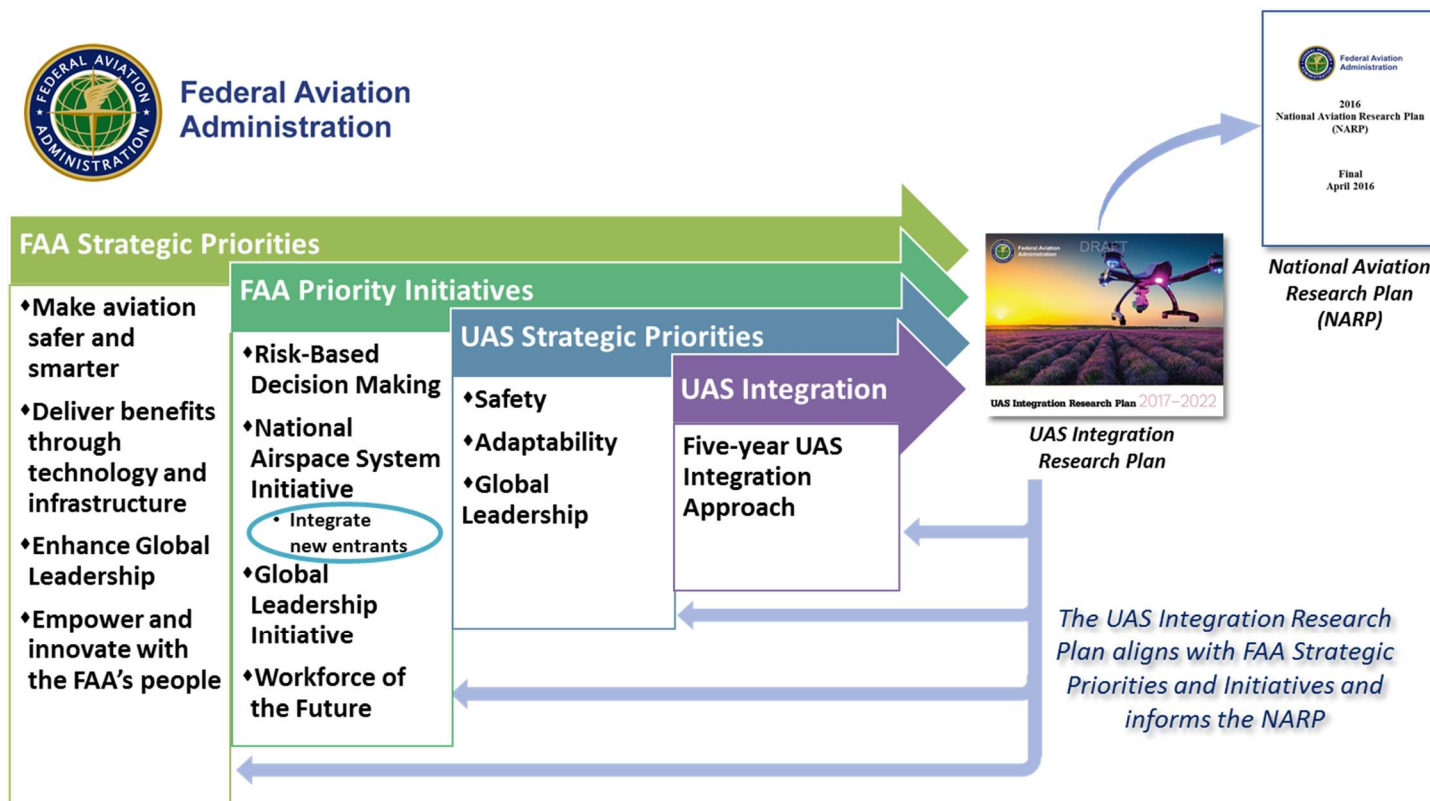
## UAS Integration Research Functional Framework





## Alignment of Research to FAA's Strategic Priorities and Initiatives

THE *UAS Integration Research Plan* is aligned to FAA Strategic Priorities, FAA Priority Initiatives, UAS Strategic Priorities, and the five-year UAS Integration Approach, and informs the *National Aviation Research Plan*. This *UAS Integration Research Plan* is a result of these strategic priorities and initiatives and is a vital component in an iterative process. This plan informs and reflects the priorities and initiatives of the FAA's research partners, functional areas, and research activities that have been undertaken or identified by the participating UAS community.

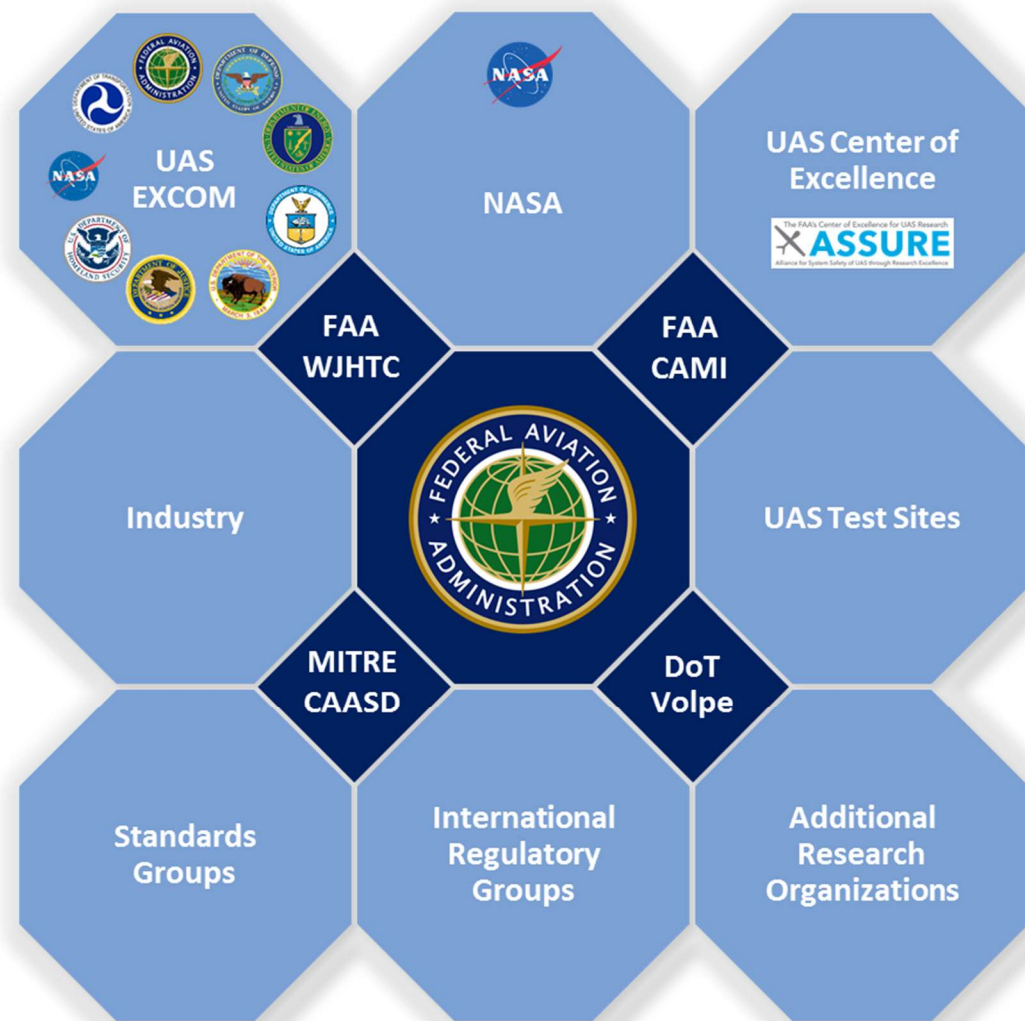


## UAS Research Collaboration and Partnerships

**I**NTEGRATION OF UAS operations is a multifaceted global challenge, requiring coordinated efforts within the FAA and across multiple agencies. To enable industry objectives while maintaining the security, safety, and civil rights of the public requires meeting multiple objectives in different domains.

The FAA is taking advantage of independent, non-sponsored UAS research efforts. It is leveraging a wide spectrum of UAS research and analyses being conducted by government agencies, industry, academia, international organizations, standards bodies, etc. to inform rulemaking and operational changes that will enable full UAS integration into the NAS.

### UAS Research Partners



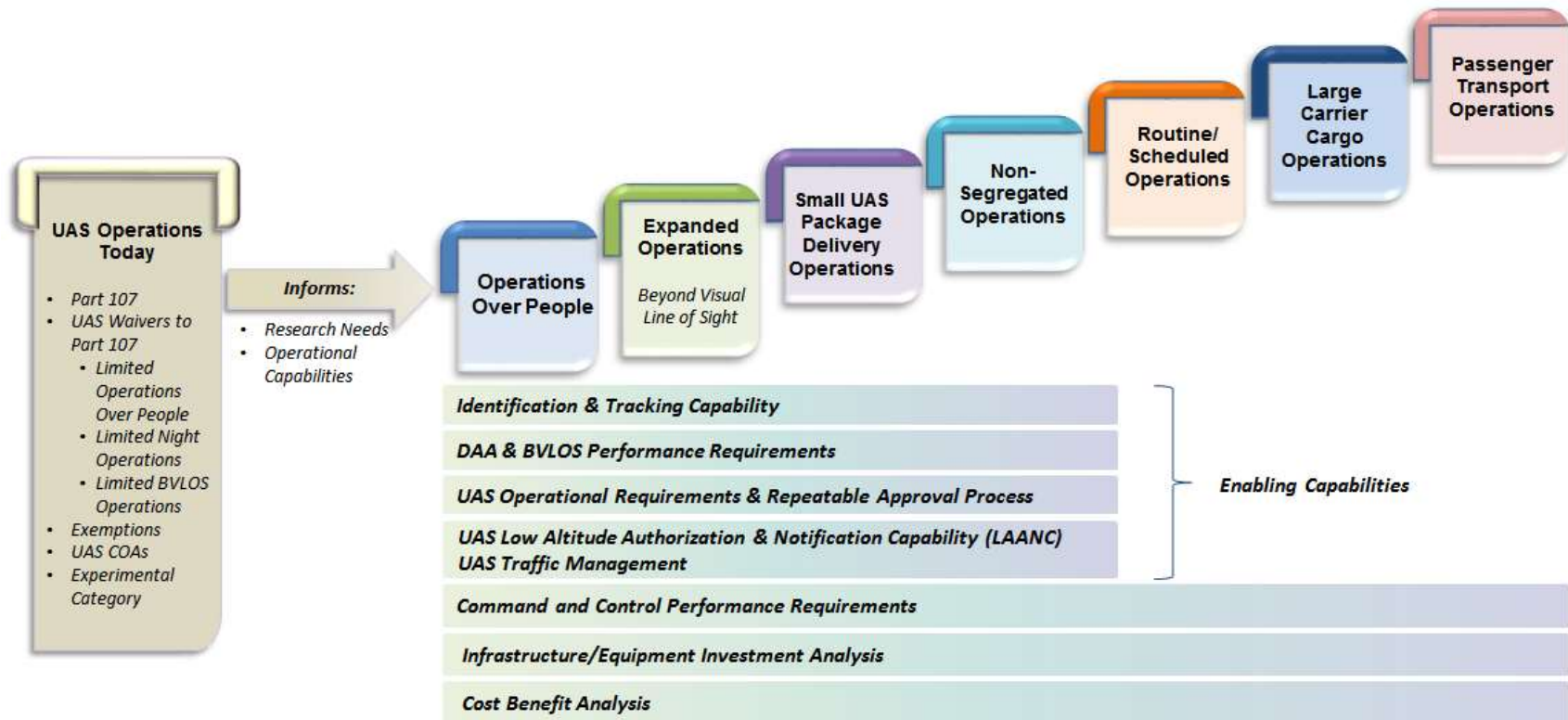


## UAS Research Partners

- **AFRL**: Air Force Research Lab
- **ANSI**: American National Standards Institute
- **APAC**: ICAO Asia and Pacific Office
- **ASEB**: NAS Aeronautics and Space Engineering Board
- **ASSURE**: Alliance for System Safety of UAS through Research Excellence
- **CANSO**: Civil Air Navigation Services Organization
- **CTA**: Consumer Technology Association
- **EASA**: European Aviation Safety Agency
- **EuroCAE**: European Organisation for Civil Aviation Equipment
- **EXCOM SSG SARP**: Executive Committee – Senior Steering Group – Science And Research Panel
- **FAA CAMI**: Civil Aerospace Medical Institute
- **FAA WJHTC**: William J. Hughes Technical Center
- **ICAO**: International Civil Aviation Organization
- **IEEE**: Institute of Electrical and Electronics Engineers
- **ITU**: International Telecommunications Union
- **JARUS**: Joint Authorities for Rulemaking on Unmanned Systems
- **MIT/LL**: Massachusetts Institute of Technology Lincoln Laboratory
- **MITRE CAASD**: Center for Advanced Aviation System Development
- **NAS**: National Academy of Sciences
- **NATO**: North Atlantic Treaty Organization
- **NSF**: National Science Foundation
- **NIST**: National Institute of Standards and Technology
- **SAE**: Society of Automotive Engineers
- **TRB**: NAS Transportation Research Board

## Operational Capabilities Towards Full UAS Integration

**T**HE FAA'S APPROACH TO UAS RESEARCH is phased by operational capabilities providing a pathway to UAS integration, which will enable incremental expansion of airspace access for UAS over the next few years. As depicted in the graphic, these operational capabilities use a "building block approach" where successive capabilities are informed by previous research. It is important to note that the research path differs from the path used by rulemaking, as research informs rulemaking and policy.





**Operations Over People:** Includes expansion of the Code of Federal Regulations (CFR) 14 part 107 rule to enable small UAS (sUAS) to operate over persons not directly participating in the operation. Research activities include evaluation of ground collision severity and counter UAS technologies. Additional research is needed to determine risk-based thresholds and to develop centralized data collection.

**Expanded Operations:** Builds upon part 107 sUAS operations over people while expanding to beyond visual line-of-sight (BVLOS) operations, swarms, and on-airport operations. Research activities include the development of low altitude UAS traffic management, detect and avoid (DAA) requirements, and requirements for multi-UAS operations. Additional research is needed to evaluate UAS safety containment capabilities and develop cybersecurity requirements.

**Small UAS Package Delivery Operations:** Enables sUAS fleet operators to conduct operations that involve multiple launches and landings for delivering or retrieving packages or material. Research activities include development of automation strategies and human factors standards. Additional research is needed to develop standards for certification and pilot proficiency.

**Non-Segregated Operations:** Enables UAS operations to co-exist, with restrictions, in controlled airspace with manned aircraft. Includes operations with large, properly equipped UAS at varying altitudes and under instrument flight rules (IFR). Includes interstate delivery and small cargo operations. Research activities include procedures for lost link and

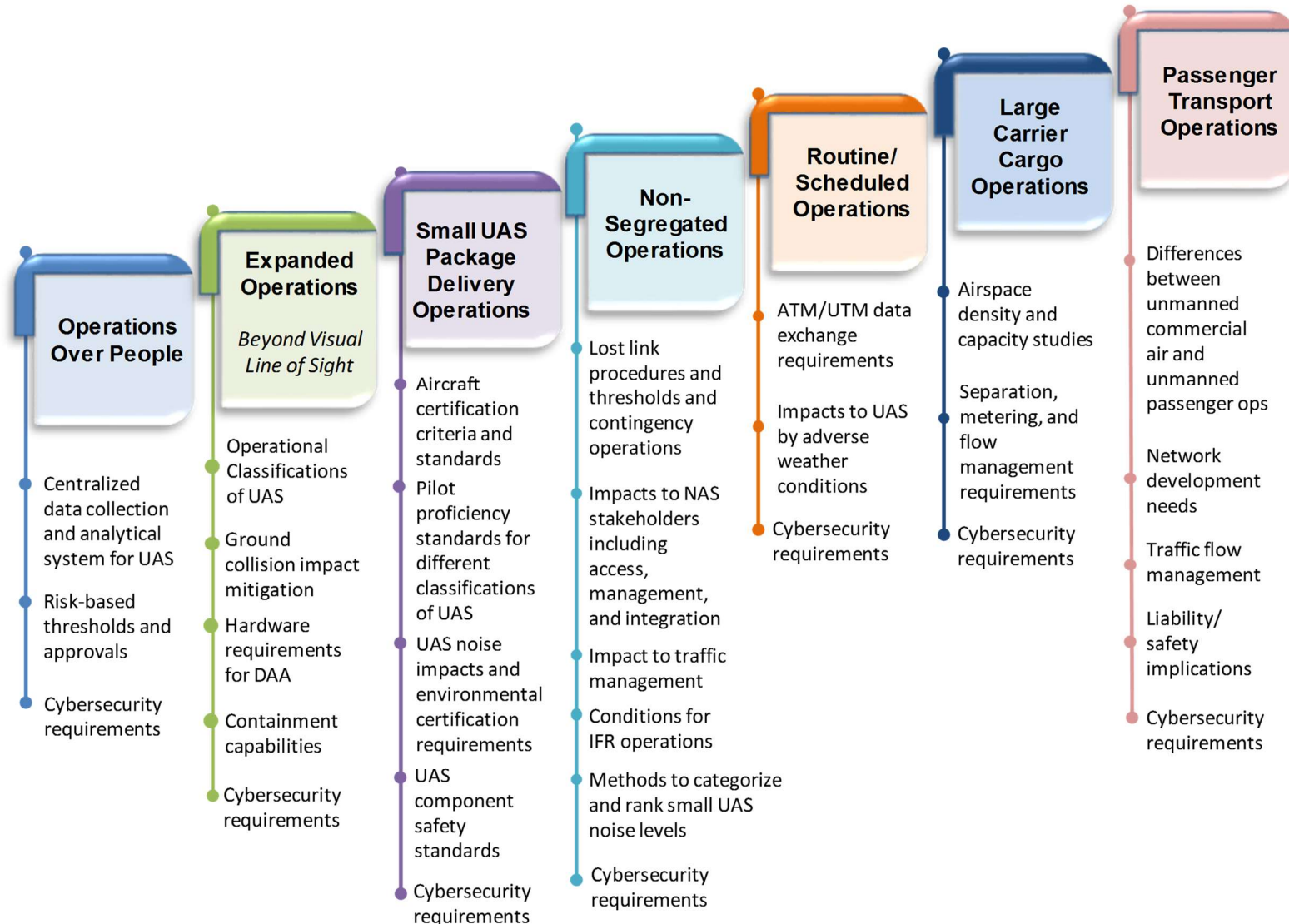
thresholds for contingency operations. Additional research is needed to assess the severity of airborne collisions, determine communications thresholds, and to develop UAS performance standards

**Routine/Scheduled Operations:** Enables regularly scheduled UAS arrivals and departures at Class B, C, and D airports and permits optionally piloted aircraft for large cargo operations. Research activities include evaluating collaborative decision making capabilities and leveraging flight data to develop enhanced safety analyses. Additional research is needed to determine cybersecurity requirements, develop data exchange interfaces, and to explore impacts of adverse weather on UAS.

**Large Carrier Cargo Operations:** Enables the transport of cargo to be conducted by remote pilots in U.S. domestic airspace. Research activities include determining command and control (C2) standards and evaluating failure risks. Additional research is needed to identify separation, metering, and flow management requirements, and to perform studies related to airspace density and capacity.

**Passenger Transport Operations:** Enables air taxi services to be conducted by remote pilots, based on vehicle performance and type certification of the aircraft, its equipment, and the automation technology that replaces pilot functions on board. Research activities include investigating standards and emerging technologies for human transport by UAS. Additional research is needed to study differences between unmanned commercial air operations and unmanned passenger operations, and to identify network development needs.

## Summary of Identified Needs for Operational Capabilities





## Advancing FAA's UAS Research Program

**A**S UAS TECHNOLOGIES and business cases evolve, so will the demand for increased UAS operations. The FAA must keep up with the UAS community as operations expand, in order to ensure the safety of the NAS and to people on the ground. Therefore, research needs that were previously unanticipated may arise due to the rapid pace of UAS progression, increased operations, and the associated safeguards and mitigations.

The FAA will continuously re-evaluate its UAS research program to determine the required level of effort and to account for unanticipated changes. Because UAS integration challenges span multiple FAA Lines of Business, any of which may sponsor UAS research, estimated levels of effort will account for cross-agency research resources and leverage collaboration with partners to the extent possible.

The FAA will continue to work with research partners to determine a path forward for addressing gaps, and will continue to revise research plans to reflect the dynamic nature of the UAS landscape.



## Remote Identification

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The Federal Aviation Administration's (FAA) small Unmanned Aircraft Systems (UAS) rule (part 107) is just the beginning of an incremental approach to a regulatory framework for expanded UAS operations. As Transportation Secretary Elaine Chao recently announced, the FAA will soon be issuing a notice of proposed rulemaking for operations over people and an advanced notice of proposed rulemaking for security concerns.

In order to move forward, the FAA is prioritizing remote identification (ID), which enables threat discrimination and is a crucial component of a UAS Traffic Management (UTM) system, along with the FAA's Low Altitude Authorization and Notification Capability (LAANC) and dynamic airspace management. The FAA is committed to establishing these requirements as quickly as possible.

There are numerous components to effectively implement remote ID, including ensuring that the technology is scalable and appropriate to meet safety and security requirements.

### Background

To address safety and security concerns, the FAA established an Aviation Rulemaking Committee (ARC) to provide recommendations on how to implement an ID and tracking system for UAS, and our security partners were involved in the process. In October 2017, the agency received the report from this ARC, which is available here:

[https://www.faa.gov/regulations\\_policies/rulemaking/committees/documents/media/UAS%20ID%20ARC%20Final%20Report%20with%20Appendices.pdf](https://www.faa.gov/regulations_policies/rulemaking/committees/documents/media/UAS%20ID%20ARC%20Final%20Report%20with%20Appendices.pdf)

Since October 2017, industry and the government have been working concurrently to accelerate the development of a remote ID rule and related standards. In early 2018, FAA began sharing a conceptual remote ID framework with industry and security partners and the public. In the spring of 2018, the FAA assembled a cross-functional rulemaking team and published a Rulemaking Identification Number (RIN) to the Unified Spring Agenda of Regulatory and Deregulatory Actions, which can be found here:

[https://www.reginfo.gov/public/do/eAgendaMain?operation=OPERATION\\_GET\\_AGENCY\\_RULE\\_LIST&currentPubId=201804&showStage=longterm&agencyCd=2100](https://www.reginfo.gov/public/do/eAgendaMain?operation=OPERATION_GET_AGENCY_RULE_LIST&currentPubId=201804&showStage=longterm&agencyCd=2100)

At the same time, at least three standards bodies have formed groups or committees to address standards for remote ID:

- ASTM International:
  - Group F38 (WK27055) - New Practice for UAS Remote ID and Tracking
  - Initiated: 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

- Consumer Technology Association:
  - ANSI/CTA-2067 Small Unmanned Aerial Systems – Remote Identification
  - Initiated: February 2017, 25% complete

### **Possible Items for Discussion with the DAC**

1. The remote ID framework is being developed, in part, to facilitate UTM and Beyond Visual Line of Sight (BVLOS) operations throughout the National Airspace System (NAS). The FAA believes the participation of all UAS operating in the NAS, including model aircraft operators, is required. Absent congressional action with respect to the Special Rule for Model Aircraft (Pub. L. 112-95, Section 336), the FAA would not be able to apply remote ID requirements to model aircraft.

Can the remote ID rule be effective without applicability to model aircraft operators? Are there ways for the remote ID requirements to be effective without applicability to model aircraft operators?

2. As the FAA has initiated rulemaking for remote ID requirements, our ability to participate in the committee work by the above referenced standards groups for remote ID is limited. However, industry consensus for remote ID, which can inform a final rule, is critical for a successful remote ID system without unnecessary delay. Specifically, as the remote ID system is being developed with the UTM conceptual operations in mind, the effectiveness of the remote ID rule may be contingent upon the availability of new systems to support network capabilities. The FAA has existing relationships and agreements with UAS service suppliers who facilitate airspace authorizations under part 107 through LAANC. Similar or new network-based systems need to be developed by the FAA and/or private industry in order to enable remote ID implementation.

How can industry work towards consensus by all parties on remote ID standards?

3. The FAA is considering a network-based remote ID system that builds on the LAANC data exchange model.

What is the most effective way to develop and implement a network-based system? How do you conceive the network-based system would be structured? What are the pros and cons of setting up a UAS Service Supplier network (like that used for LAANC) as compared with another network-based concept? How long would it take manufacturers to update software to accomplish remote ID? How long does it take to update software to use remote ID data? Is there anything required from the FAA to assist software development?



U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

**ORDER  
1110.157**

Effective Date:  
06/15/18

**SUBJ:** Charter of the Drone Advisory Committee

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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](http://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



## **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.

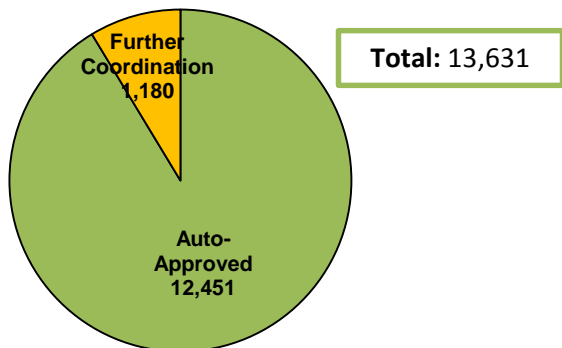
Participation in a FACA such as the Drone Advisory Committee (DAC) provides the Federal Government with essential advice from subject matter experts and a variety of stakeholders. The FACA requires that committee memberships be "fairly balanced in terms of the points of view represented and the functions 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 the DAC public meetings.
- 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. Alternate representatives may be appointed when necessary by the Secretary of Transportation.

# UAS Metrics Update

## LAANC Airspace Requests

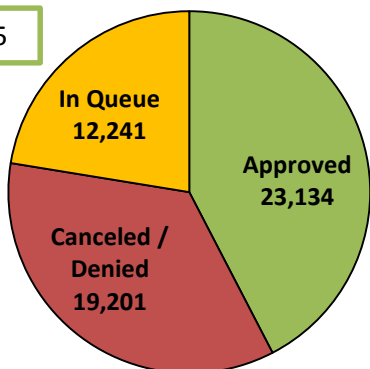
### Incoming Requests\* (total)



**Remote Pilot Certificates Issued: 98,118**  
**Knowledge Exam Success Rate: 92%**

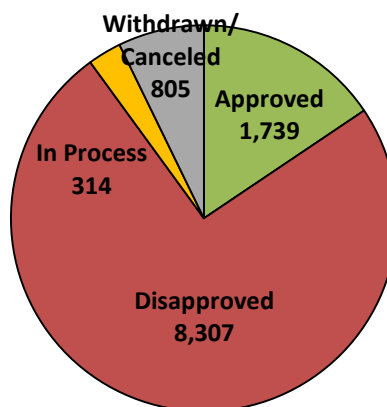
## Manually Processed Airspace Waiver/Authorizations

**Total: 11,165**



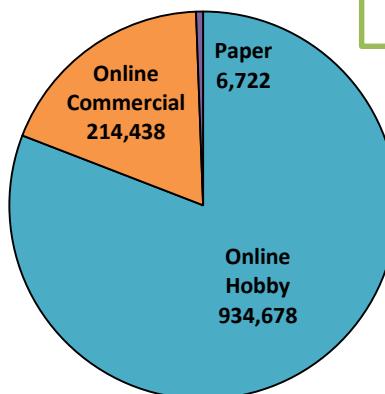
## Non-Airspace Waivers

**Total: 55,608**



## UAS Registrations

**Total: 1,155,838**



Part 107 Provision (Top 5 Requested)	# Waivers Issued
Night Operations	1,635
Operations over People	13
BVLOS Operations	18
Operational Limitation: Altitude	21
Operations from a Moving Vehicle	6

**10 UAS Integration Pilot Program (IPP)**  
 Lead Participants

**12 UAS Type**  
 Certification  
 Projects Ongoing

**4 Active Partnership**  
 for Safety Plans  
 (PSP) Underway



# Drone Advisory Committee

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

## Appendix B: Meeting PowerPoint Presentation

DRAFT



# Drone Advisory Committee

July 17, 2018 Meeting  
Santa Clara, CA



# Official Statement of the DFO

## **PUBLIC MEETING ANNOUNCEMENT**

**Read by: Designated Federal Officer Carl Burleson  
Drone Advisory Committee  
July 17, 2018**

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:

**July 3, 2018**

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.



# Approval of the Agenda





# Opening Remarks

## DFO Burleson (FAA)



# FAA Update

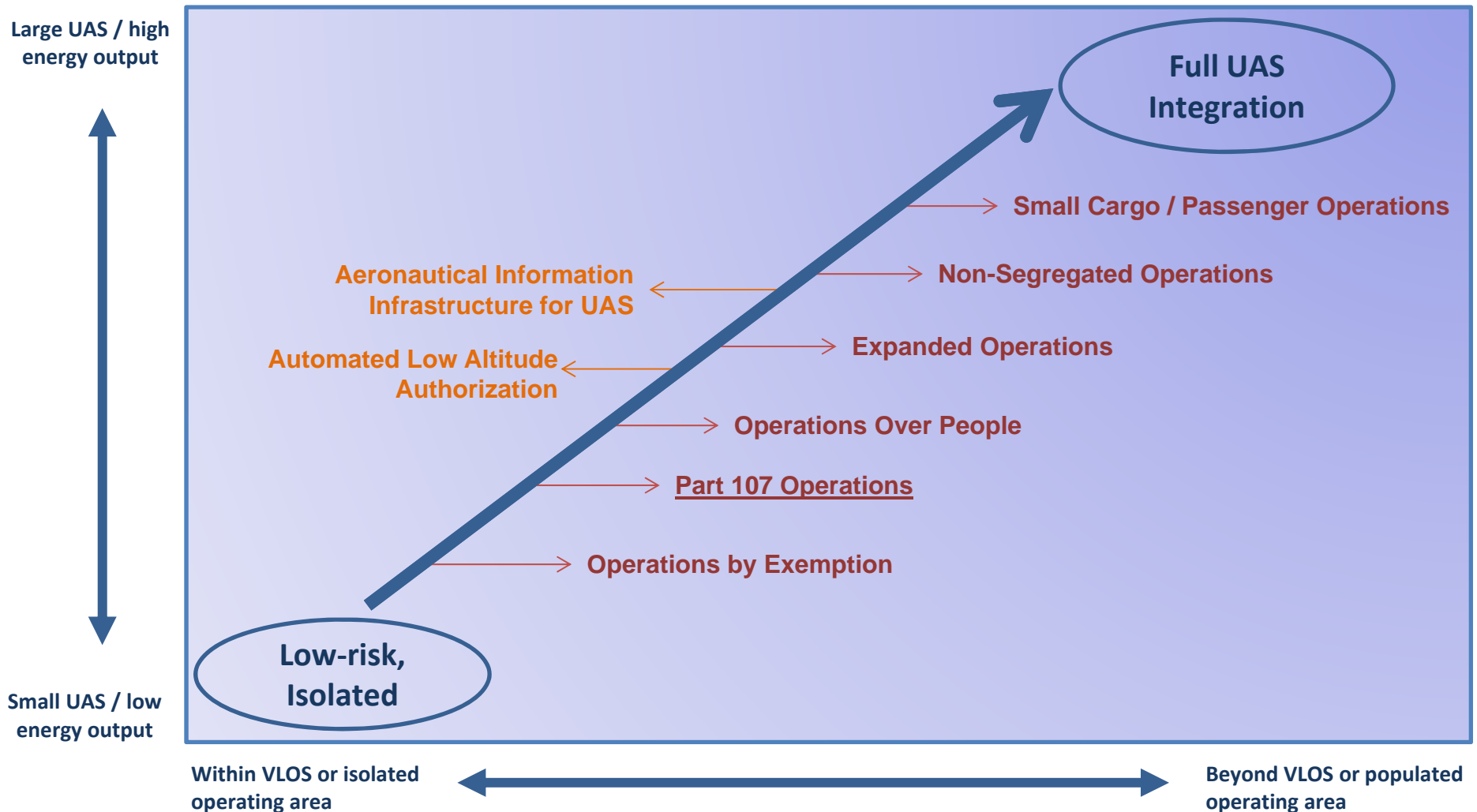
Earl Lawrence (FAA) and Jay Merkle (FAA)



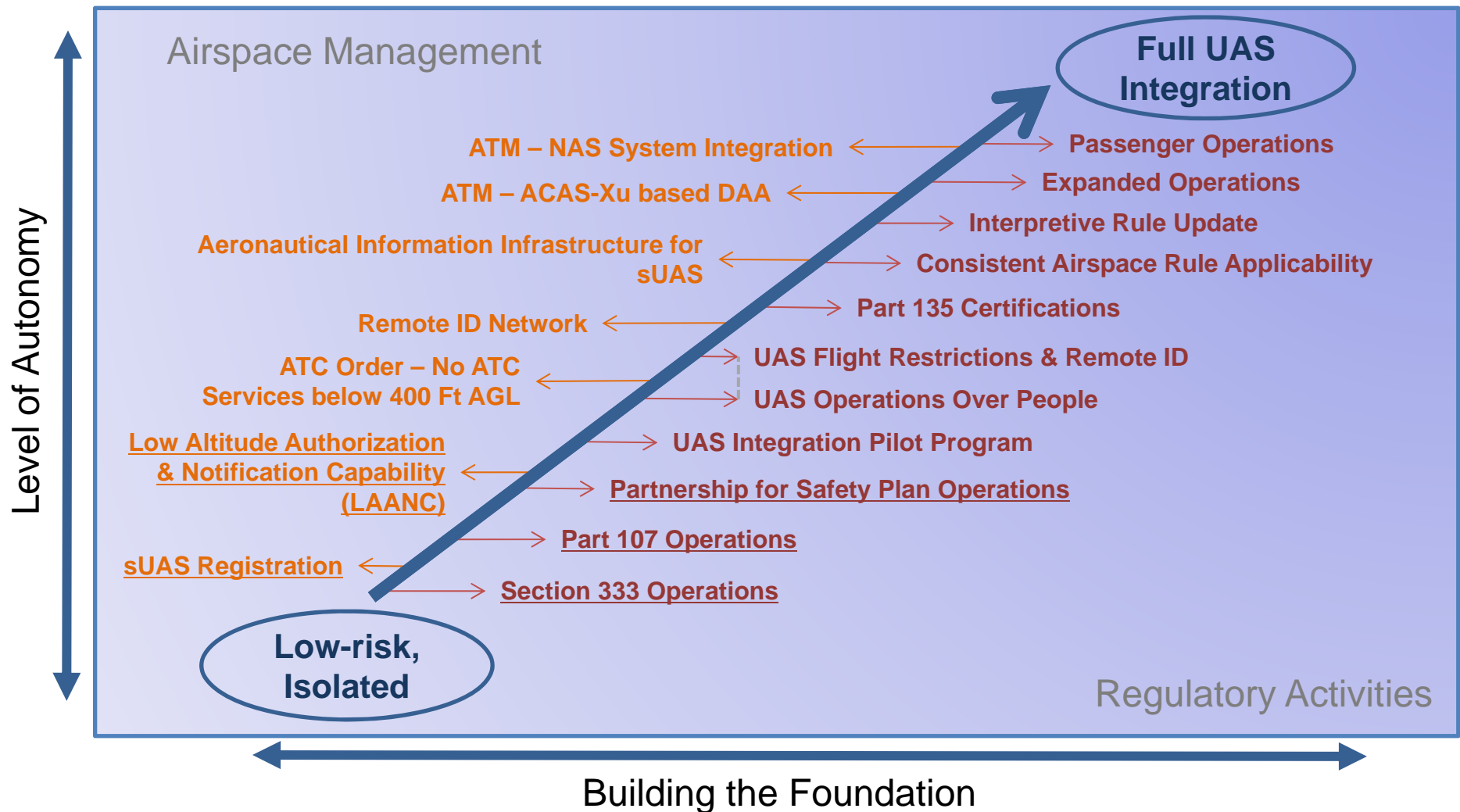
# The Three A's of Flying an Aircraft



# UAS Integration Strategy – 2016



# UAS Integration Strategy – 2018

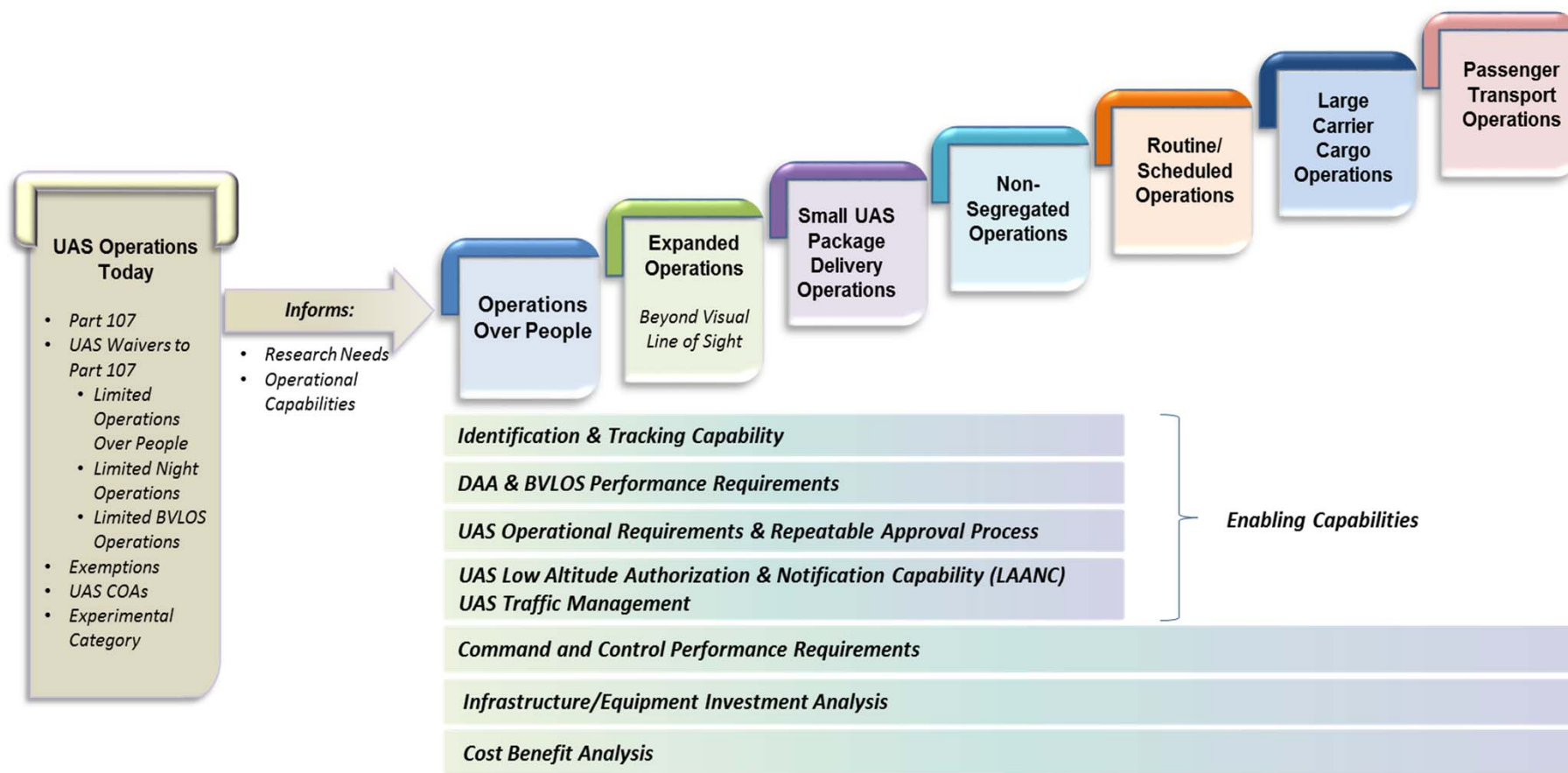




# Formula for Integration



# Aligning Research Priorities



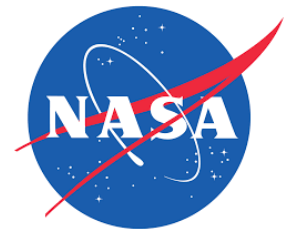
# Operations First Approach



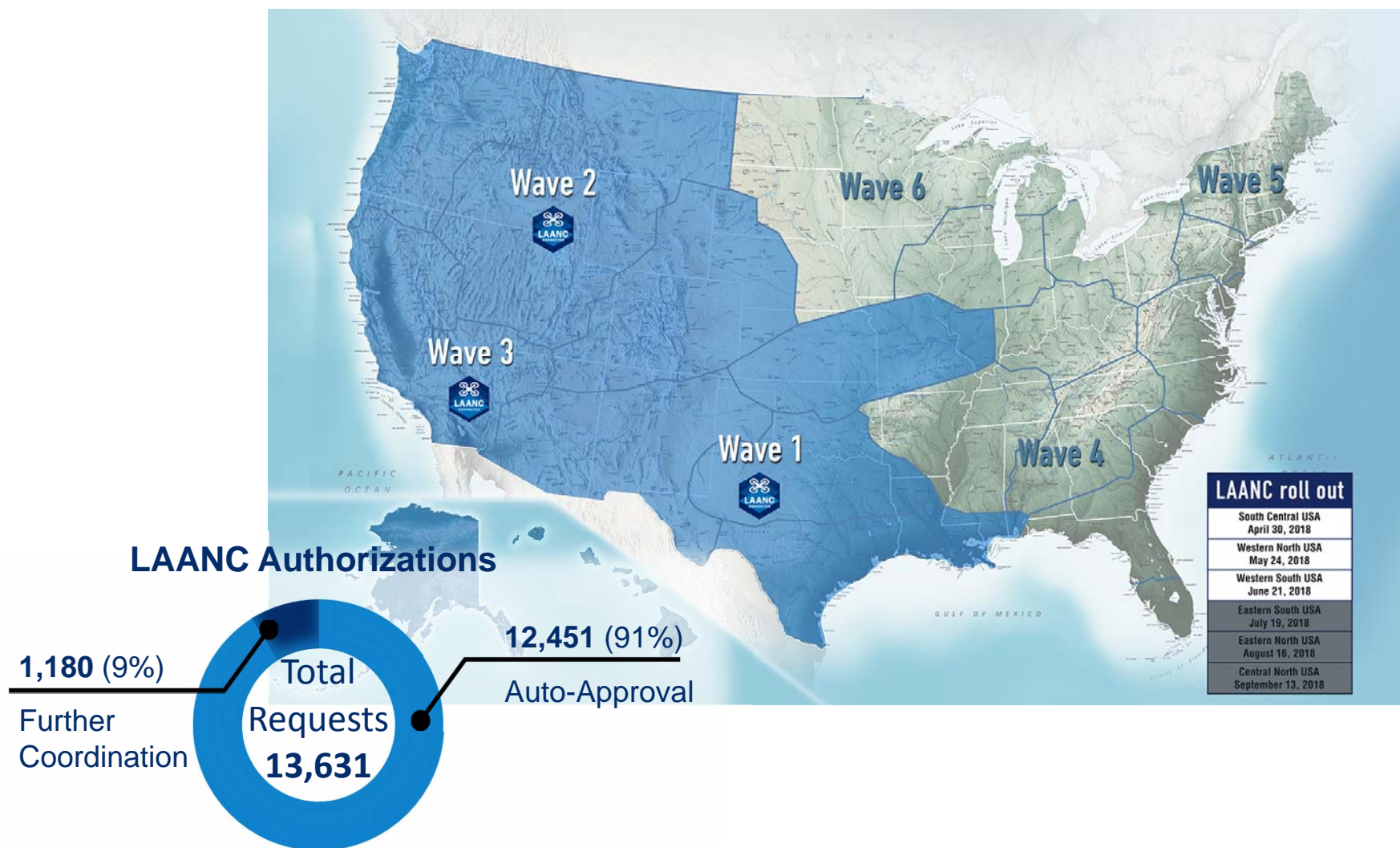
## Partnerships for Safety



## UTM Pilot Program



# LAANC Update



# Same Airspace, New Services

## AIRSPACE

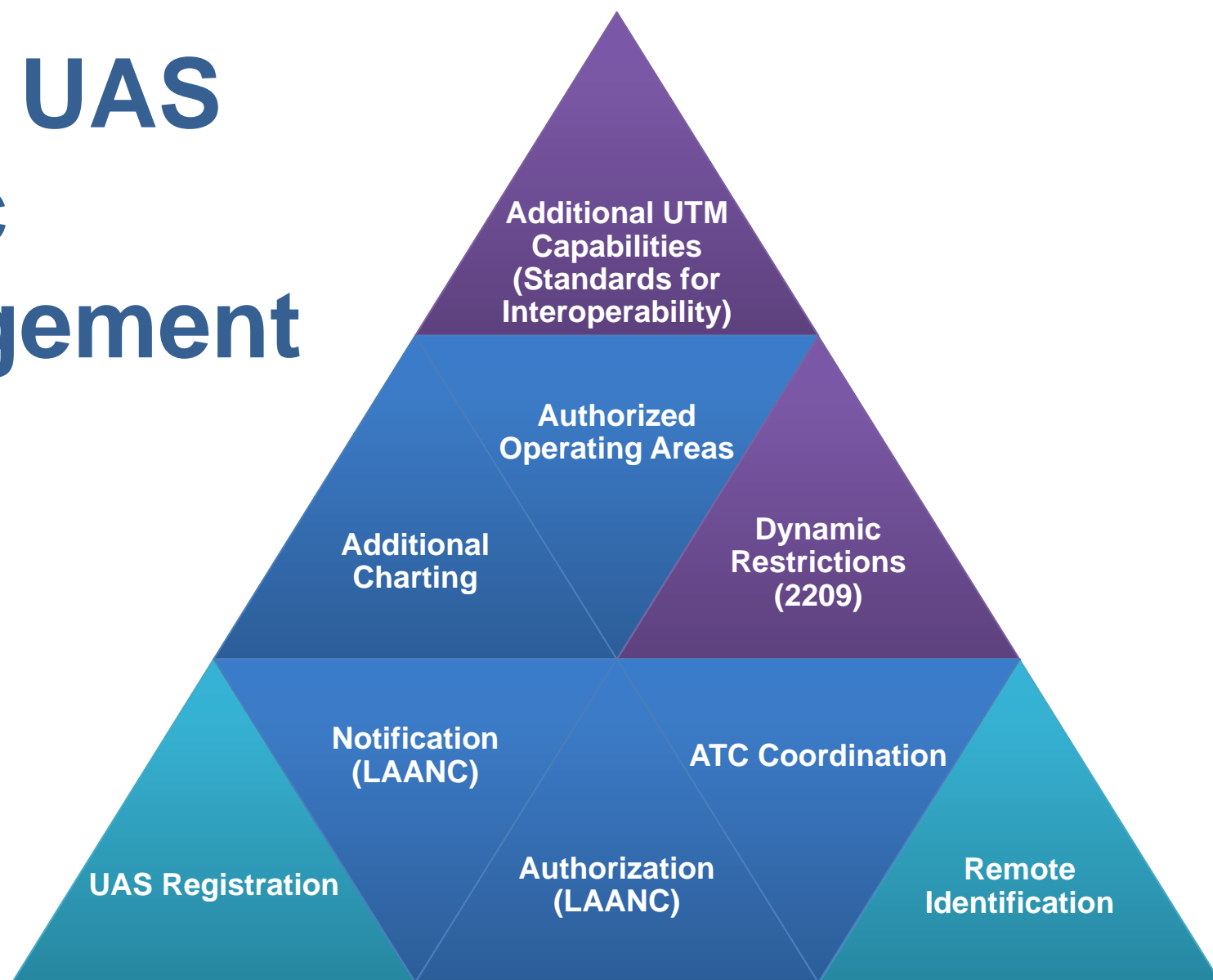
- Class A, B, C, D, E
- Prohibited
- Restricted
- Special Use

## SERVICES

- ATM
  - Instrument Flight Rules (IFR)
  - Visual Flight Rules (VFR)
- UTM



# FAA's UAS Traffic Management (UTM)



# Status of Rulemaking Efforts

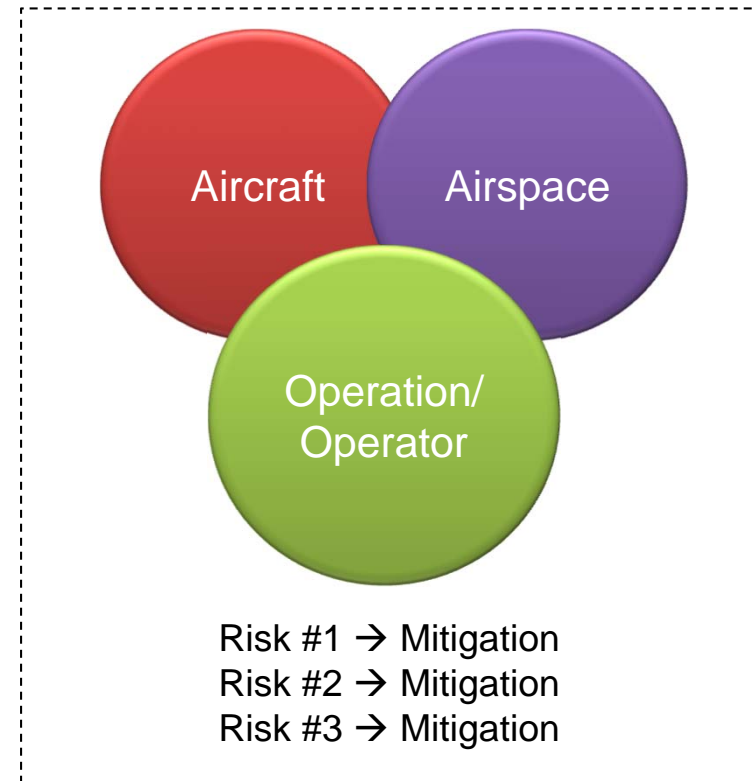
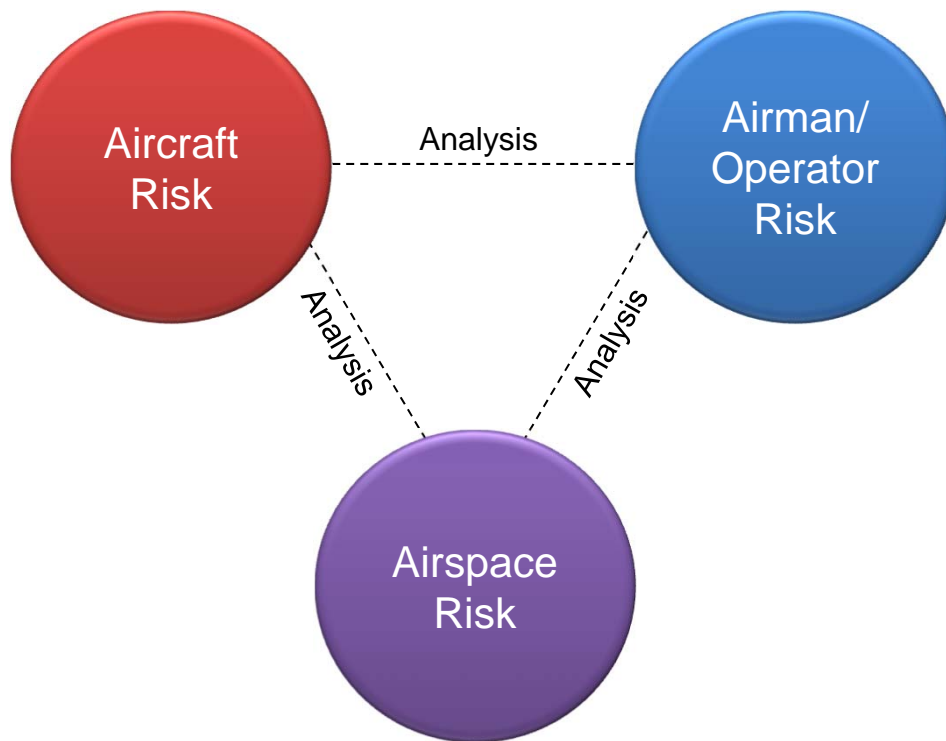
Rule	Stage
Safe and Secure Operations of sUAS	ANPRM
Operations of sUAS Over People	NPRM
External Marking Requirement for sUAS	Interim Final Rule
Registration and Marking Requirements for sUAS	Final Rule

[www.reginfo.gov/public/do/eAgendaMain](http://www.reginfo.gov/public/do/eAgendaMain)



# Risk-Based Integration

*Moving from independent risk assessments...*



*...to a single, streamlined operational risk assessment process*

# Break



# **Unmanned Aircraft Safety Team Briefing on Safety Data**

Ben Marcus (Co-Chair)







# Unmanned Aircraft Safety Team (UAST)

Ben Marcus – UAST Industry Co-chair

7/17/2018



# UAST



## ■ Mission Statement

- The Unmanned Aircraft Safety Team (UAST) is an industry-government partnership committed to ensuring the safe operations of Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS). The UAST supports the safe integration of UAS with data-driven safety enhancements and collaboration amongst members of the UAS industry.

## ■ Purpose

- The UAST uses a data-driven, consensus-based approach to achieve the following:
- Proactively identify and analyze safety issues that unmanned aircraft may pose to the NAS and people and property on the ground.
- Develop voluntary and implementation-focused solutions to address safety issues and prevent accidents involving unmanned aircraft.
- Promote cooperation, communication, and coordination amongst members of the UAS community in addressing matters important to UAS safety.

UAST proprietary. Do not distribute.

# Keys to Success



- Adequate funding for data collection and analysis
- Active participation from vested industry members
- UAS Community commitment to embrace and implement Safety Enhancements

UAST Proprietary. Do not distribute.

# Membership & Website



- 60 Organizations are members
- Diverse group of unmanned and manned stakeholders
- Learn more at <https://www.unmannedaircraftsafetyteam.org/>
- Follow the UAST on Twitter - <https://twitter.com/uasafetyteam>



UAST proprietary. Do not distribute.

# UAST Working Groups

- Steering Committee
- Data
- Communications
- Safety Culture
- Uncontrolled Flight Mitigation
- Injury Prevention
- Anonymous Reporting



UAST proprietary. Do not distribute.



# All Hands Meeting Structure

- Accident Incident Briefing
  - 107, NTSB, Newsworthy Reports
- Safety Enhancements
  - Proposals, Update, and Results
- Data Updates
- Safety Related Presentations
- Open Discussions
- Meets every 3-6 months



UAST proprietary. Do not distribute.

# Safety Enhancements Approved



## ■ SE-1 Airspace Awareness and Geofencing

- Aimed to reduce the risk of collision through better airspace awareness for operators, geofencing capabilities, and preventing inadvertent BVLOS flight.

## ■ SE-2 Flight Control / Return to Launch Point

- Aimed at reducing the risk of collision by proposing specific design objectives when incorporating RTL capability in UAS and education/outreach to help ensure pilots understand RTL capabilities and setup.

## ■ SE-3 Improving UAS Sightings Reports

- Aimed at clarifying the risk associated with UAS by improving the quality of sightings reports by developing better reporting methodologies for pilots and providing educational material to better assess perceived UAS sightings.

## ■ SE's in the que

- Injury Prevention
- Risk Management
- Preflight/SOP development

UAST proprietary. Do not distribute.

# Data - Overview



- Long term initiative similar to CAST and GAJSC
  - Aggregate operational data from operators (may come via manufacturers)
  - Voluntary
- Build a sufficient data set to enable investigation of issues for UAS and try to identify systemic challenges and opportunities for improvements and safety enhancements

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# Core Data Elements

Category	Core Data Elements
<b>Flight Trajectory</b>	Latitude Longitude
<b>Altitude</b>	GPS Altitude Barometric Altitude
<b>Attitude</b>	Pitch Roll Yaw
<b>Speed</b>	Ground Speed Airspeed
<b>Weather</b>	Air Temperature Wind Speed Wind Direction Air Pressure
<b>Battery</b>	Voltage Current Temperature Percentage Remaining
<b>System Status</b>	Failure/Warning Message Components Health (GPS, Communication, etc.)
<b>Flight Control</b>	Navigation Mode (manual, auto) Flight State (takeoff, air, land)
<b>Configuration</b>	Commanded Altitude Commanded Speed Commanded Bearing Commanded Pitch Commanded Roll Home Settings



Category	Core Data Elements
<b>Performance</b>	Altitude Error Track Error Speed Error Pitch Error Roll Error
<b>Aircraft</b>	Model
<b>Time</b>	Time Stamp

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## Data – Current Status



- Governance document in place
- Co-operative agreement available between Trusted 3rd Party (MITRE) and data source
- Initial research looking into systemic safety issues is being conducted
- UAST intends to create a board to oversee UAS data collection and funding (similar to the ASIAS Executive Board) in September
- Looking for active UAS fleet operators to participate

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# Opportunities



- Demonstrate the UAS community's commitment to the safety of the NAS
- Proactively prevent UAS-related accidents
- Learn from each other within the UAS community
- Create a unified safety message

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# Challenges / Opportunities



- Limited funding to support data collection and analysis
- Educating new set of aviation stakeholders on the value of safety teams
- Very limited details in accident/incident reports
- Reluctance to share flight data
- Availability of resources to work on UAST efforts
- Selection of next Industry CoChair and Steering Committee

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# ***Discussion of Safety Data***

## All



# Lunch and Networking



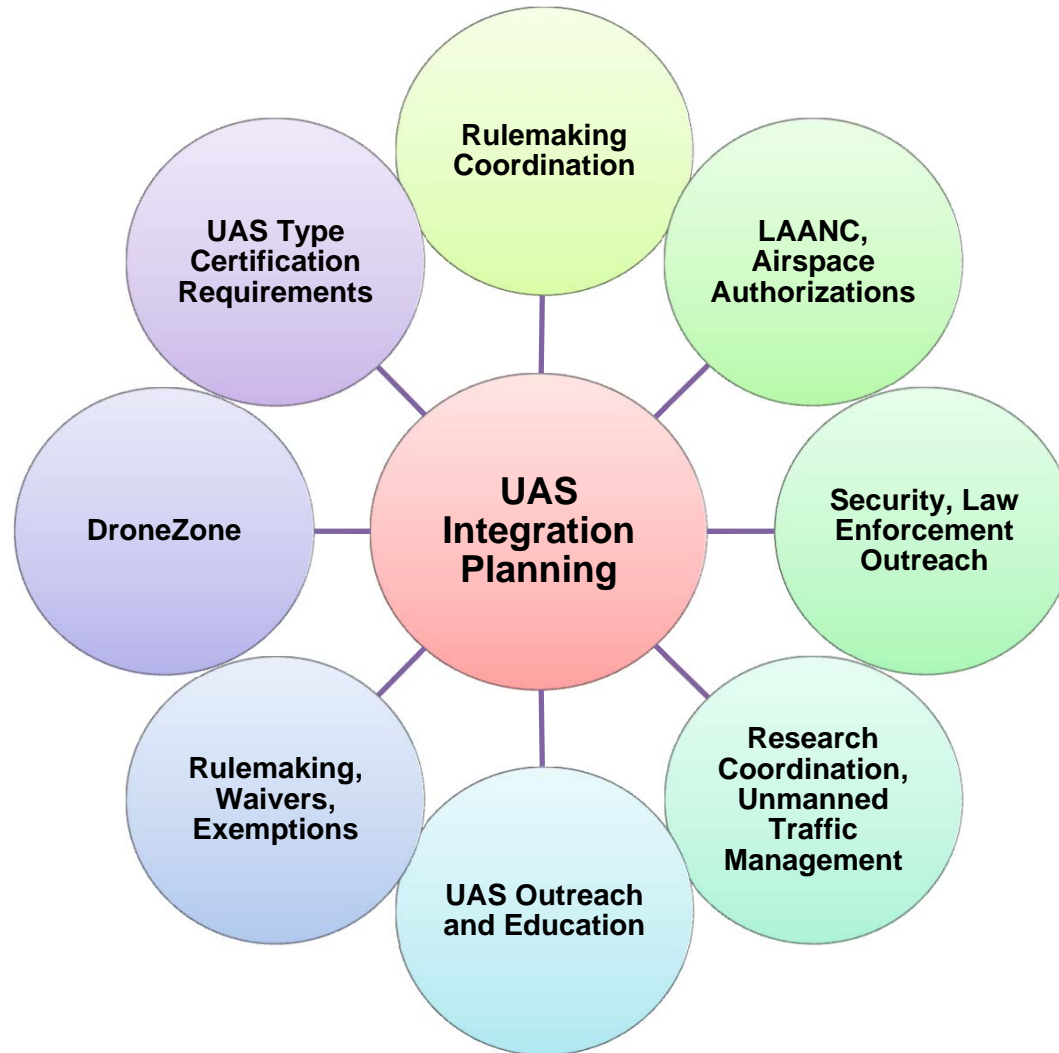
# **FAA's UAS Implementation Plan and Integration Research Plan**

Earl Lawrence (FAA)



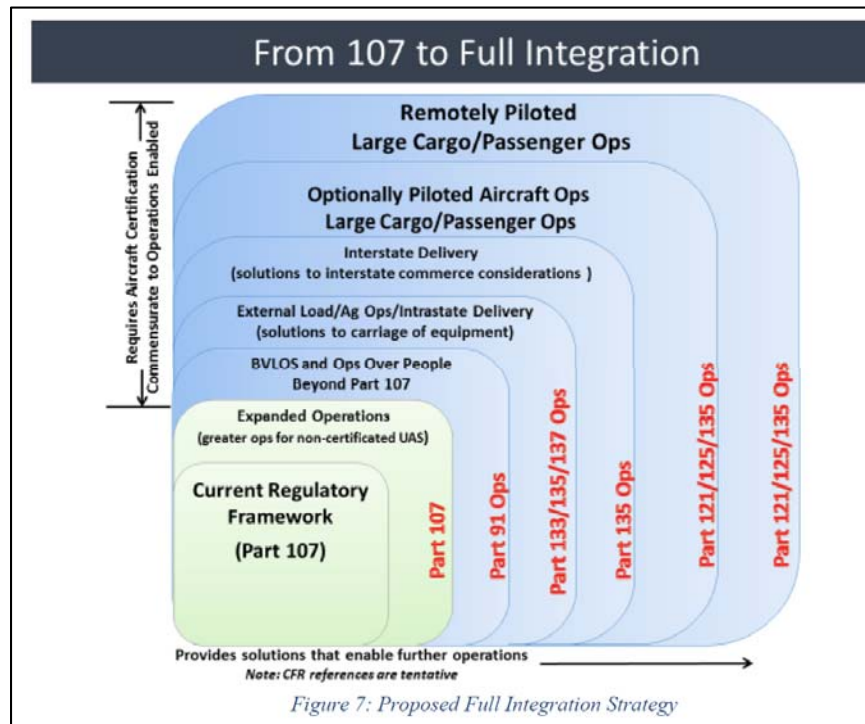


# Diversity of Activities



# Evolution of UAS Implementation Plan

*From Rulemaking Cadence...*



U.S. Department of Transportation  
Federal Aviation Administration



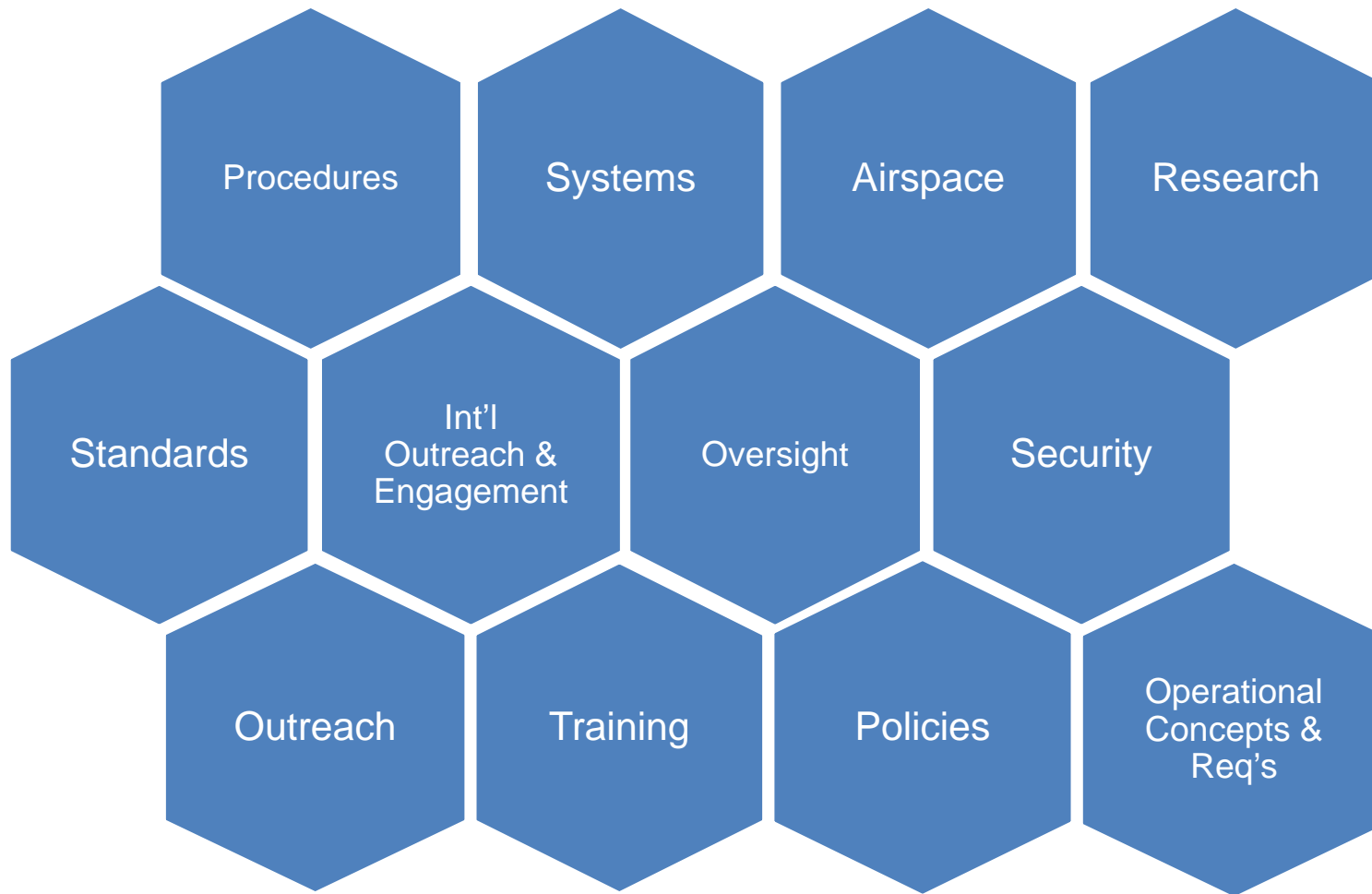
Partnerships for Safety

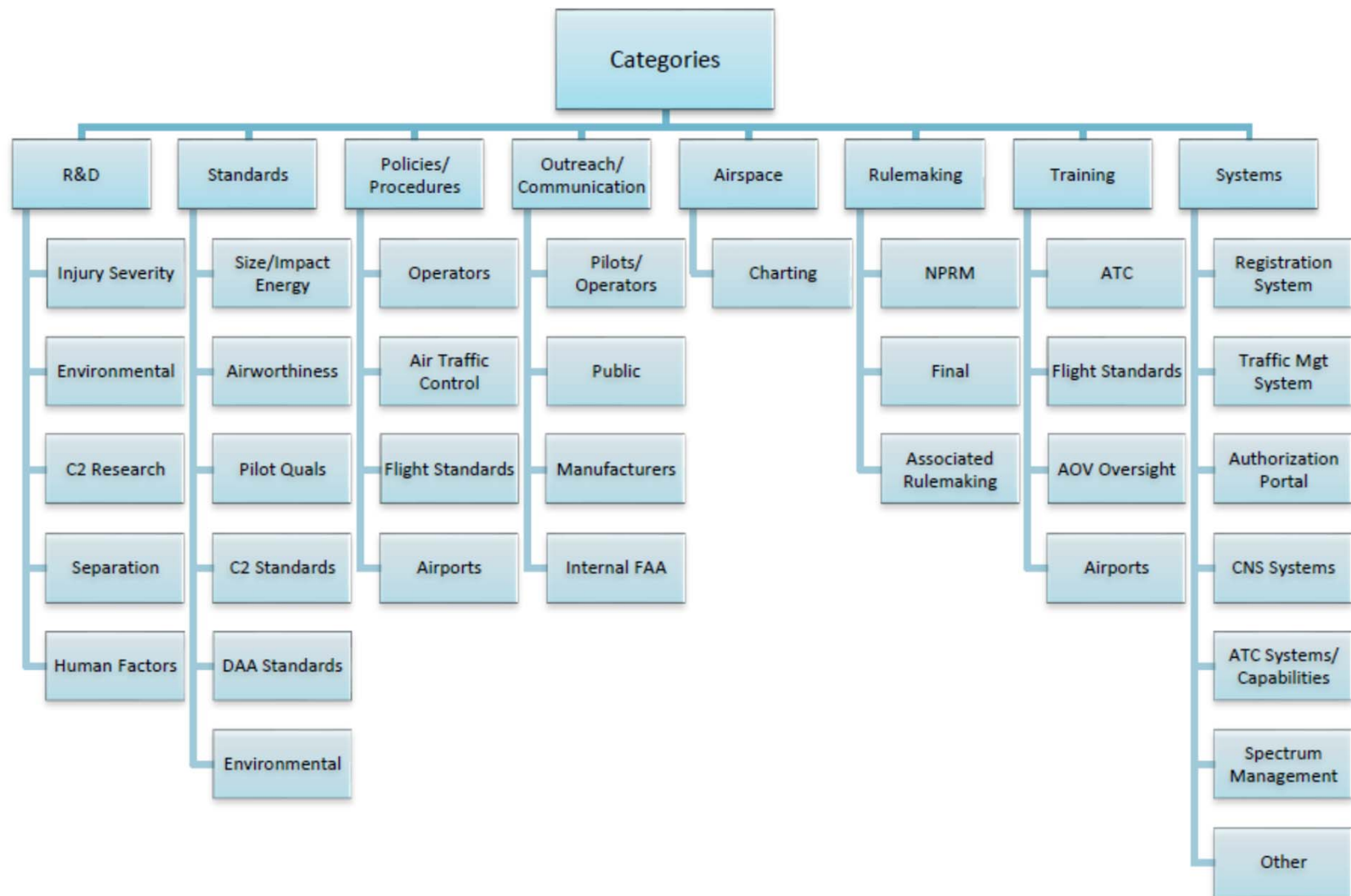


*...To Enabling Operations Now*

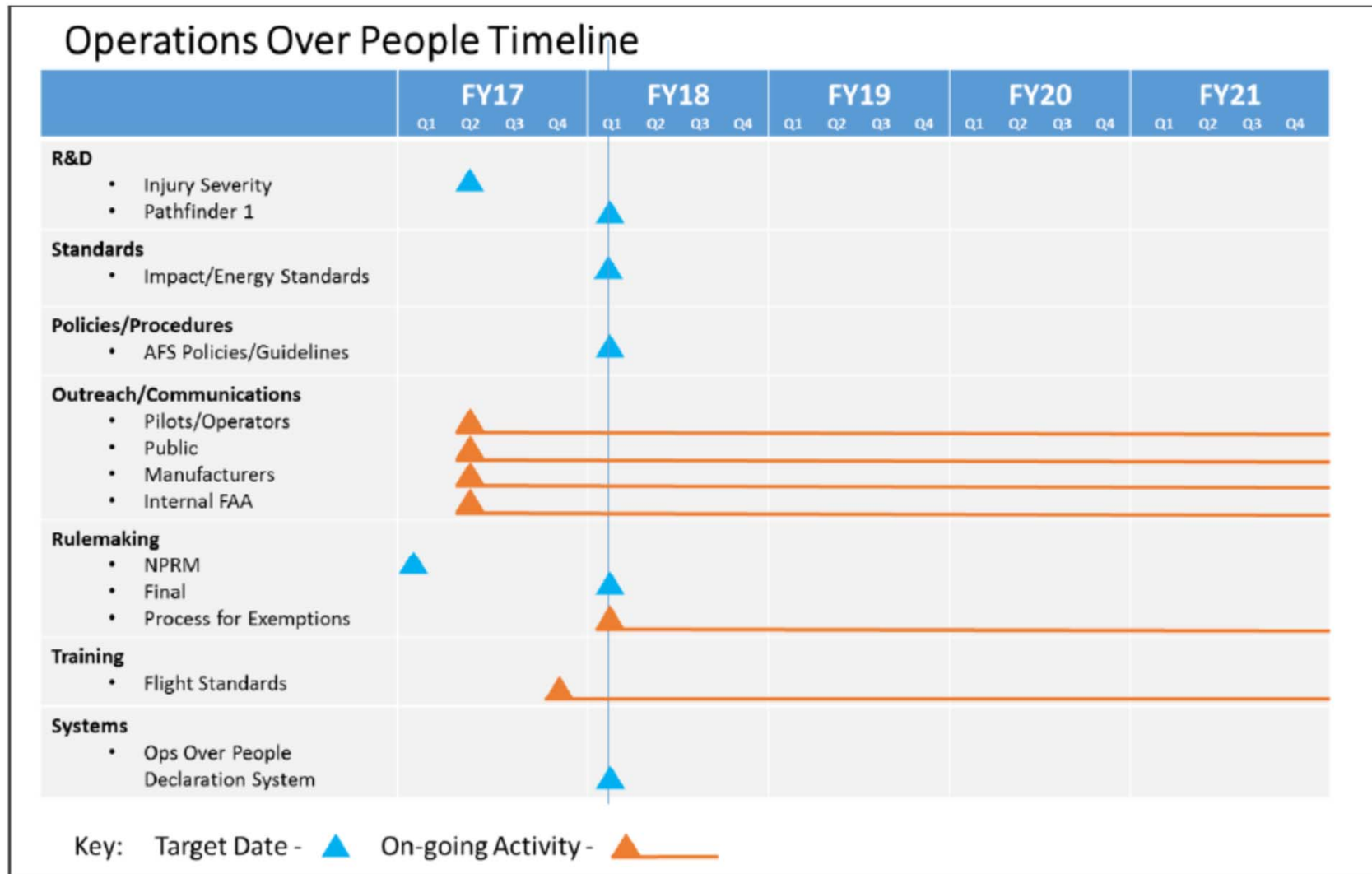


# Implementation Plan Categories

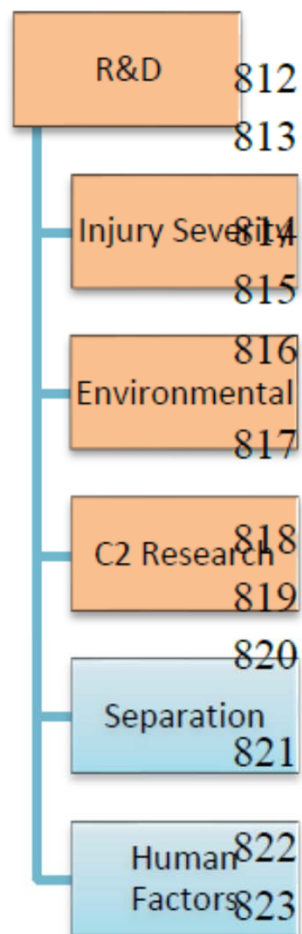




## Overview Timeline







R&D activities cutting across Injury Severity, Environmental, and C2 Research categories:

AUS oversees the Focus Area 1 Pathfinder partnership program with CNN, which provides a research platform to test out technologies and procedures to safely enable UAS operations over people

R&D activities pertaining to Injury Severity:

ANG will conduct research to inform industry consensus standards and FAA approval criteria on severity levels for weight/impact energy of UAS operating over people.

R&D activities pertaining to Environmental:

The FAA will conduct research to inform approval criteria for any potential noise constraints on UAS operating over people



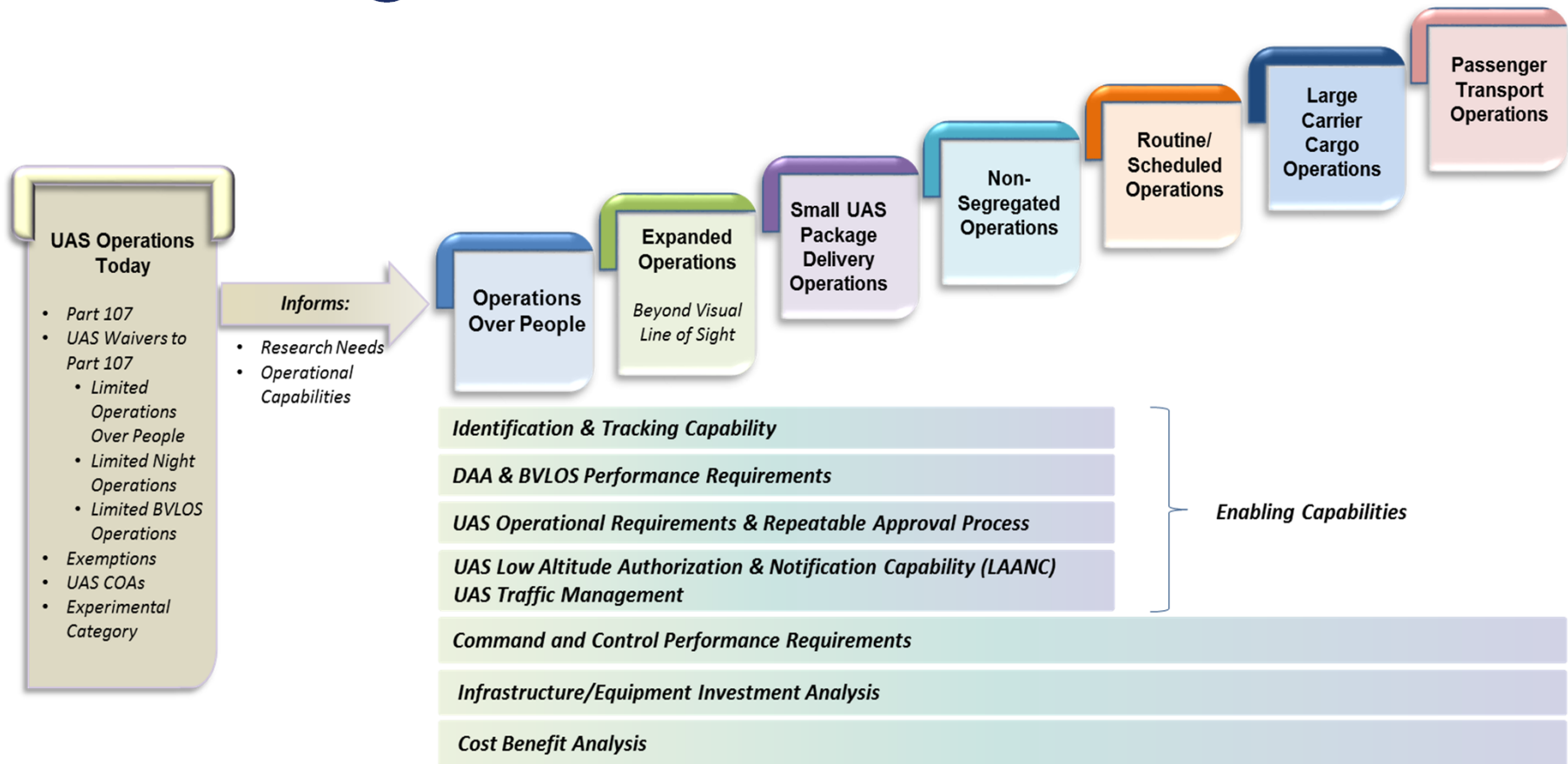
Federal Aviation  
Administration



For Official Use Only

# UAS Integration Research Plan 2017–2022

# Operational Capabilities Towards Full UAS Integration





# UAS Research Collaboration & Partnerships



# ***Discussion of the FAA's UAS Implementation Plan and Integration Research Plan***

## **All**



# Break





# Remote Identification

## Earl Lawrence (FAA)



# Defining the Need

- **Facilitate efficient management of low-level operations in all types of airspace**
  - Provides optional situational awareness to air traffic management
  - Doesn't necessarily interact with current ATC systems used for IFR or separation services
- **Assure safety and security needs**
- **Help FAA with education and enforcement of FAA regulations**
- **Facilitate public safety officials' ability to locate and communicate with a UAS operator**

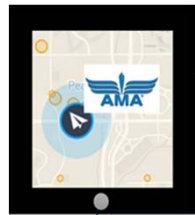


# Conceptual Applicability

- **Most contentious topic in the Remote ID ARC Recommendation Report**
- **Simple starting point – align with UAS registration requirements:**
  - UAS registered under Part 48 or Part 47 (everything 250g and over)
- **Simple end point – UAS operated within the ATM system as opposed to the UTM system would have to meet a higher bar:**
  - In class A, B, C, D, or E airspace without an authorization issued under 107.41 or 91.127(c), 91.129(d), or 91.130(a); or
  - In class G airspace above 400' feet AGL

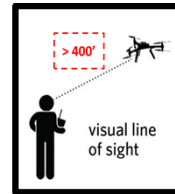


# Considering Categories for Compliance



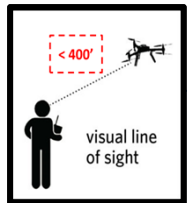
ID Flying Locations

1



UA and Control  
Station Location

3



Control Station Location

2



UA with Local  
Transmitter and Control  
Station Location

4



Not Included

# Possible Requirements for Manufacturers

- **Possible performance requirements:**
  - Standard serial number (ANSI/CTA-2063)
  - Minimum location accuracy standard
  - UTC time stamp standard
  - Identifier to transmit the type of operation (hobby, government, 107, etc.)
    - Option to provide name of operator
  - Local transmitter meets TSO C-XXX, ASTM FXXX or other acceptable standard
- **UA certified by a Declaration of Compliance**
- **Industry Consensus Standards**



# Current Challenges

- Multiple standards bodies working on standards when requirements are still be identified by the FAA within the rulemaking process
- ID requirements for ALL UAS is critical to facilitate the currently envisioned UTM / BVLOS operations
- FAA needs to build the systems to support the networked ID system
- For rulemaking efforts to move quickly, consensus needs to be developed between all parties (manufacturers, UAS operators, manned operators, communities, first responders, national security, FAA) to prevent major delays





# ***Discussion of Remote Identification***

## **All**



# New Business / Agenda Topics

## All



# Next DAC Meeting

- October 17, 2018
- Washington, DC



# Closing Remarks

## DFO Carl Burleson (FAA)



**Adjourn**  
Thank you for coming!



# Questions/Comments Beyond Today's Discussion

## Contact the FAA's UAS Integration Office

**Earl Lawrence**, Executive Director

[Earl.Lawrence@faa.gov](mailto:Earl.Lawrence@faa.gov)

and/or

**Chris Harm**, UAS Stakeholder and Committee Liaison

[Chris.Harm@faa.gov](mailto:Chris.Harm@faa.gov)







# Drone Advisory Committee

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

## Appendix C: Meeting Attendees

First Name	Last Name	Company/Organization	Attendee Type
1. Peter	Cleveland	Intel	Host
2. Roxanne	Koester	Intel	Host
3. Lisa	Malloy	Intel	Host

First Name	Last Name	Company/Organization	Attendee Type
4. Greg	Agvent	CNN	DAC Member
5. Jaz	Banga	Airspace Systems	DAC Member
6. James	Burgess	Wing	DAC Member
7. Tim	Canoll	ALPA	DAC Member
8. Michael	Chasen	PrecisionHawk	DAC Member
9. Deborah	Flint	LA World Airports	DAC Member
10. Trish	Gilbert	NATCA	DAC Member
11. Todd	Graetz	BNSF	DAC Member
12. Rich	Hanson	AMA	DAC Member
13. Gur	Kimchi	Amazon Prime Air	DAC Member
14. George	Kirov	Harris Corporation	DAC Member
15. Nan	Mattai	Rockwell Collins	DAC Member
16. Houston	Mills	UPS	DAC Member
17. Marily	Mora	Reno Tahoe Airport Authority	DAC Member
18. Chris	Penrose	AT&T	DAC Member
19. Brendan	Schulman	DJI	DAC Member
20. Wade	Troxell	Ft. Collins, CO	DAC Member
21. Brian	Wynne	AUVSI	DAC Member
22. Matt	Zuccaro	Helicopter Assoc. International	DAC Member

First Name	Last Name	Company/Organization	Attendee Type
23. Jugdeep	Aggarwal	US Hang Gliding and Paragliding Association	Guest
24. Mark	Aitken	Akin Gump Law Firm	Guest
25. Michael	Baum	Aviation Code Initiative	Guest
26. Anne	Bechdolt	FedEx Express	Guest
27. Greg	Belaus	AT&T	Guest
28. Lee	Brown	Landrum & Brown (L&B)	Guest
29. Melanie	Burns	California Department of Corrections	Guest
30. Lorne	Cass	American Airlines	Guest
31. Mike	Cirillo	Airlines for America	Guest
32. Diana	Cooper	Precision Hawk	Guest



# Drone Advisory Committee

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

33. Dan	Dalton	Airspace Systems, Inc.	Guest
34. Melvin	Davis	Cavan Solutions	Guest
35. Tom	Devine	Airports Council International	Guest
36. Andrew	Elefant	Kittyhawk	Guest
37. Michael	Hannigan	Landrum and Brown	Guest
38. Raj	Helweg	Air Methods	Guest
39. Robert	Hughes	Northrup Grumman	Guest
40. Sezen	Jones	AirMap	Guest
41. Adrienne	Lindgren	WSP   Parsons Brinckerhoff is now WSP	Guest
42. Peter	Lyons	A3 by Airbus	Guest
43. Ben	Marcus	AirMap	Guest
44. Charles	Marshall	AERWAZE	Guest
45. Margaret	Nagle	Google X	Guest
46. Matthew	Navarrete	Union Pacific Corporation	Guest
47. Jonathan 'Joey'	Neptune	General Atomics	Guest
48. Elizabeth	Pasztor	Boeing	Guest
49. Jason	Quisling	Air Methods	Guest
50. Sasha	Rao	Maynard Cooper & Gale LLP	Guest
51. Mark	Reed	ALPA	Guest
52. Melissa	Rudinger	AOPA	Guest
53. Dean	Schultz	Reno Airport	Guest
54. Stella	Weidner	Boeing	Guest
55. Steve	Weidner	NATCA	Guest
56. Gretchen	West	Commercial Drone Alliance	Guest
57. Joshua	Ziering	Kittyhawk	Guest

First Name	Last Name	Agency	Attendee Type
58. Tim	Arel	FAA	Government
59. Ali	Bahrami	FAA	Government
60. Carl	Burleson	FAA	Government
61. Teresa	Denchfield	FAA	Government
62. Colleen	Donovan	FAA	Government
63. Tony	Fathabadi	FAA	Government
64. Chris	Harm	FAA	Government
65. Robin	Koch	DOT	Government
66. Earl	Lawrence	FAA	Government
67. Claudio	Manno	FAA	Government
68. Stefanie	McCans	DOT	Government
69. Rachel	Mencias	DOT	Government



# Drone Advisory Committee

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

70. Jay	Merkle	FAA	Government
71. Barney	Owens	DoD	Government
72. Lorelei	Peter	FAA	Government
73. Genevieve	Sapir	DOT	Government
74. Angela	Stubblefield	FAA	Government
75. Damon	Walker	DOT	Government

DRAFT



# Drone Advisory Committee

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

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## Appendix D: Public Statements

DRAFT

## **Dedrone Statement for DAC Meeting 7/17**

Dedrone is a technology company based in San Francisco, that has developed a drone detection technology platform to secure protected airspace against unwanted drones. Our company supports the FAA and the mission to safely integrate drones into our national airspace.

Our role in the drone industry is in airspace security for critical infrastructure, including military bases, correctional facilities, stadiums, public events and VIPs. We work closely with the Department of Defense to provide data on airspace activity near military installations, and have a global network of customers and partners who share our concern to ensure that all drones in their airspace are authorized to be there. We have taken an active role in supporting legislators and regulators to develop sensible laws for using drones, whether for commercial or recreational purposes.

Dedrone is a member of Drone Safe Communities, a nationwide initiative which helps educate policy-makers on the risks of unauthorized drone operations and actions needed to ensure our country can continue to enjoy the innovations of drones while responsibly addressing these new safety and security risks.

Dedrone's software is a machine learning network using information from a proprietary database, DroneDNA. Our system, called DroneTracker, gathers intelligence from various sensors, including radio frequency, microphones, and cameras. DroneTracker can detect drones over a protected site and determines the communications protocol of the drone, its flight path and the location of the pilot. Once a drone is detected, the software alerts security personnel and can be integrated to deploy a passive security measure or defeat technology.

We are happy to support the members of the DAC by providing data on drone detection technology, and sharing insights from our customers on how to prevent drone incursions and secure their lower airspace. We look forward to being a resource and helping the committee and the FAA in any way we can. For more information on Dedrone, visit [www.dedrone.com](http://www.dedrone.com)

Daniel K. Elwell,  
Acting Administrator  
Federal Aviation Administration  
U.S. Department of Transportation  
800 Independence Ave., SW  
Washington, DC 20591

July 16, 2018

Dear Acting Administrator Elwell,

We write to formally request that you make available to the public a live or archived audio recording of the upcoming meeting of the Drone Advisory Committee. The FAA's Drone Advisory Committee plays a key role in setting public policy on drone deployment for the United States, yet the public is largely excluded from this process. This secrecy is of particular concern given ongoing public concerns about the deployment of drones in the United States.

EPIC believes that strong privacy and safety rules are vital for the safe integration of drones in the National Air Space. Secretary Chao has also recently acknowledged the need to establish a "safe path forward" for drones in the United States.<sup>1</sup> This is an issue of significant public interest, yet the public has not been given the access necessary to participate in the policymaking process.<sup>2</sup>

According to the Federal Register notice, the Drone Advisory Committee will hold a meeting tomorrow open to those able to travel to Santa Clara, California. *See* July 17, 2018 Drone Advisory Committee (DAC) Meeting, 83 Fed. Reg. 31,254 (July 3, 2018).<sup>3</sup> The notice does not indicate that the meeting will be open to members of the public who are not able to attend in person.

Livestreaming enables full and timely public participation in an advisory committee's proceedings. It also allows the press, policy makers, and others to more fully understand the agency's work. Federal advisory committees commonly livestream their meetings to satisfy their obligations under § 10(a) of the Federal Advisory Committee Act. *See, e.g.,* [Advisory Committee on Automation in Transportation \(ACAT\), Transportation.gov](#) (Apr. 13, 2017), ("Watch the livestream of the first ACAT meeting[.]"); [Presidential Advisory Commission on Election Integrity](#), The White House (July 13, 2017) ("This meeting will be livestreamed for remote viewing[.]").

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<sup>1</sup> Elaine L. Chao, *Creating a Safe Path Forward for Drones*, Richmond Times-Dispatch (May 31, 2018), [https://www.richmond.com/opinion/their-opinion/guest-columnists/elaine-l-chao-column-creating-a-safe-path-forward-for/article\\_7ddf199a-1575-5444-91eb-fb36f85c8242.html](https://www.richmond.com/opinion/their-opinion/guest-columnists/elaine-l-chao-column-creating-a-safe-path-forward-for/article_7ddf199a-1575-5444-91eb-fb36f85c8242.html).

<sup>2</sup> *See* EPIC, *EPIC v. Drone Advisory Committee* (2018), <https://www.epic.org/privacy/litigation/faca/epic-v-drone-advisory-committee/default.html>.

<sup>3</sup> <https://www.federalregister.gov/documents/2018/07/03/2018-14394/july-17-2018-drone-advisory-committee-dac-meeting>.



Moreover, the FAA regularly livestreams important agency events. *See, e.g.,* [Media Advisory](#), Federal Aviation Administration (Aug. 26, 2016) ("The briefing will be available via livestream on YouTube[.]"); [@FAANews](#), Twitter (May 9, 2018) ("Join . . . #FAA Acting Administrator Dan Elwell, elected officials, and #drone industry stakeholders at 2:30 PM ET today for the announcement of the #DronePilot selectees. Watch via @USDOT's livestream[.]").

We request that you provide livestreaming for the meeting this week in Santa Clara and for all public Drone Advisory Committee meetings going forward.

Respectfully Submitted,

/s/ Marc Rotenberg  
Marc Rotenberg  
EPIC President

/s/ Jeramie D. Scott  
Jeramie D. Scott  
EPIC National Security Counsel

/s/ Alan Butler  
Alan Butler  
EPIC Counsel

/s/ John Davisson  
John Davisson  
EPIC Counsel