

## Drone Advisory Committee (DAC) November 8, 2017 Meeting Minutes

### List of Attachments

- Attachment 1: Attendees
- Attachment 2: Agenda
- Attachment 3: Presentations

### Summary

The November 8, 2017 DAC meeting was hosted by Amazon at the Amazon Meeting Center in Seattle, WA. The DAC heard presentations from The MITRE Corporation and three Task Groups (TGs): TG1 - Roles and Responsibilities, TG2 - Access to Airspace, and TG3 - Unmanned Aircraft Systems (UAS) Funding. Michael Guterres of The MITRE Corporation presented the results of a local government outreach effort conducted by MITRE and Juan Alonzo, DAC member and Stanford University Professor. The outreach efforts gathered feedback from local government officials on the desired role of local governments in regulating low-altitude drone operations. MITRE conducted focus-group sessions on this topic at the annual conferences of the U.S. Conference of Mayors, and the National Association of Counties.

The Co-Chairs of TG1 presented a summary report of nine common principles developed by the TG. Of the nine principles presented, five gained group consensus. The language of the four remaining principles was disputed and as a result, two versions of the four non-consensus principles were presented. TG2 presented five final recommendations intended to guide future activities necessary to provide access to airspace for drones. With several small editorial changes suggested by the DAC, the Committee unanimously approved the recommendations for submission to the FAA. TG3 provided a summary of their work completed since their July 2017 interim report. They plan to present final recommendations to the DAC at its first meeting in 2018. The meeting discussions are summarized below.

All times noted below are Pacific Standard Time (PST).

## Official Statement of the Designated Federal Officer Dan Elwell, Deputy Administrator and Chief NextGen Officer, FAA

The Designated Federal Officer (DFO) statement was read by FAA Deputy Administrator Dan Elwell at 9:02 AM.

### DAC Chairman's Report Peter Cleveland, Vice President, Government and Policy, Intel Corporation

DAC Chairman Brian Krzanich was unable to attend the meeting. Mr. Peter Cleveland, Vice President, Government and Policy Group for Intel, led the meeting in his place. Mr. Cleveland welcomed everyone to the meeting and thanked Amazon (specifically Gur Kimchi, Sean Cassidy, Ben Gielow, and Naomi Duprey) for hosting the previous evening's event. He complimented Amazon on the meeting space and thanked them for hosting the committee. He noted that much has happened since July in the drone space. The wildfires and hurricanes over the past months demonstrated the usefulness of drones. Mr. Cleveland acknowledged the FAA for moving quickly to allow drone technology to be used, stating that the constructive approach of advising and partnering with the FAA leads to the best results. He commented that Dan (Elwell) is gaining experience in his new position and that he is appreciated. Mr. Cleveland noted that Ethan Klein of the White House Office of Science and Technology Policy (OSTP) would be making a presentation on the newly created UAS Integration Pilot Program, in addition to the MITRE and TG reports. Next, Mr. Cleveland recognized the efforts of TG1 (Co-Chairs Brendan Schulman and John Eagerton) and commended RTCA's rebalancing efforts in support of the group. He noted that TG1 has developed a list of Common Principles and will present a status update on that work. He then recognized TG2's (Co-Chairs Sean Cassidy and Rob Hughes) efforts in developing their final recommendations for DAC consideration. Next, he acknowledged TG3 (Co-Chairs Mark Aitken and Howard Kass) and highlighted that they would provide a status update as the final presentation for the day. TG3 is mid-task and is working on identifying alternative funding mechanisms as options for funding efforts to integrate drones in the airspace.

Mr. Cleveland recognized the excellent leadership of outgoing DAC Subcommittee co-chair, Bryan Quigley, and welcomed his replacement, John Allen, of jetBlue Airline. He emphasized John's experience and credibility as a leader. Following this, Mr. Cleveland emphasized that the DAC conducts a transparent process and its meetings are open to the public. He verified with DAC secretary Al Secen that no public comments had been requested to be made during the meeting.

### Approval of Minutes from Previous Meeting

The minutes of the previous meeting were unanimously approved as distributed.

## FAA Remarks

Dan Elwell, Deputy Administrator, and Chief NextGen Officer, FAA  
Ethan Klein, Policy Advisor, White House Office of Science and Technology  
Policy  
Earl Lawrence, Executive Director, FAA UAS Integration Office  
Teri Bristol, Chief Operating Officer, FAA Air Traffic Organization

Please see attachment 4 for the FAA Deputy Administrator and Chief NextGen Officer's remarks.

Mr. Ethan Klein presented a slide that introduced the new UAS Integration Pilot Program. The Administration sees this pilot program as a priority. Mr. Earl Lawrence also presented additional information on the pilot program and informed the DAC that an announcement of the program was officially released in the Federal Register, thus opening the application window for the program. Mr. Lawrence outlined the sequence of events for applying and being awarded a role in the pilot program. He reviewed the application process and indicated there had been substantial interest already shown. He further noted that additional information is available online on various websites.

Ms. Teri Bristol spoke about the success of LAANC (Low Altitude Authorization and Notification Capability) in reducing the time of approving authorizations for drone operators from days to minutes. The LAANC program is a partnership between the industry and FAA. It provides an automated process that reduces the approval time from 60-80 days, to 15 seconds.

**Question:** What role will the DAC play in the pilot program process?

**Response:** That was alluded to in opening remarks of the Deputy Administrator. There is an expectation of a re-tasking of TG1 to assist with the pilot program. That full tasking is expected soon. The websites set up by the FAA have FAQs and information about the pilot program. There is a helpdesk and social media presence. But before a new tasking for TG1 can be released it must be reviewed to ensure there will not be an organizational conflict of interest (OCI) for companies that wish to serve on the DAC and participate in the pilot program.

**Question:** How is the pilot program addressing liabilities?

**Response:** There have been no proposals received yet. The FAA wants to be surprised and hear things that are important. Liabilities have been discussed in reference to local communities with respect to drone operations. The FAA is looking for these projects to help determine answers to these questions. The White House is making sure that the FAA is working with local authorities to address these issues. Additionally, the FAA is looking to dive down into those tough questions to identify responsibilities. Other federal agencies are involved in the pilot program and will provide their expertise.

**Question:** Can the FAA elaborate on whether airport authorities can apply as a lead for a proposal?

**Response:** Yes, they can apply. Several already have.

**Question:** Will there be any public review period to allow comment on the proposals?

**Response:** No, because this is a contracting opportunity and there is a Screening Information Request (SIR) that lays out exactly how the proposals will be evaluated. There is no expectation of the public reviewing the material. Additionally, the FAA has direction from the Presidential Memo to coordinate with DoD, DHS, and NASA to get input on applicants. The decision to award lies with the Secretary of Transportation.

**Question:** Does this mean that only government will review for safety and security?

**Response:** Yes, But the FAA is soliciting community involvement as well. Applicants should coordinate with the public to determine their interest. If the public citizens of the locality applying for the program are not interested in having the program go forward, it will score lower in evaluations. There are a maximum number of applications (1,000) and it is expected that some of them will address drone operation time/use/manner questions, or zoning regulations affecting take-off and landing. Involving communities in the development of the proposal will serve as the community vetting process.

**Question:** Is there any federal funding for the pilot program?

**Response:** There will be no federal funding.

**Question:** Data will be very important in this endeavor. Is there a plan for what data will be collected, how data will be collected, and to whom and how the data will be disseminated?

**Response:** The FAA has been preparing for this program for a while. The planning office in the FAA is proceeding in a methodical way to define data required and data-gathering steps. The FAA is building on the existing Mission Logging System for test centers but will not set forth data requirements ahead of time. Those requirements will be articulated in the MOA agreements approved regarding what data will be collected (technical, information, community established criteria, etc.)

**Question:** Will there be any commitment to make the data collected available to everyone?

**Response:** Yes – all collected data will be available in the presidential report. A decision on releasing in any other form has not yet been made.

**Question:** Authorizations and pilot authorizations have been victims of our success. Automation is key. Help us understand the data collection process and how the data is going to be used--how state and

local officials can participate? How is this going to be automated, and how this will come together over time?

**Response:** FAA will be focusing on automating the system. Applicants need criteria and the local communities will teach them what they need. A sheriff can call [FAA] ATC and request a flight restriction. Many forget that. What criteria do they use to request airspace restriction? If we can automate that, it would be very helpful and will also help with the UTM concept. How we put it all together will be key in moving forward.

**Question:** (Follow up question) In manned aviation we have had great success in collaborating on safety cases. We have done so working as a team (labor, private, operators). This seems to be different. I am encouraged by the [pilot program] initiative but am concerned the process could exclude insights from some stakeholders.

**Response:** Are you referring to the Commercial Aviation Safety Team program? (Questioner: Yes, In part).

**Response:** I misunderstood the previous question as asking if all stakeholders would be involved in the selection (award) process. What you are describing is exactly what we want for the conops of the future. They would not be involved in the selection, but we would expect the proposal to address safety.

**Question:** Do you see the lead applicants being grouped by mission, or use cases, or by institutional affiliation? Will priority be given to certain use cases?

**Response:** The memo outlines the objectives. Geographic diversity (and others) will be a selection criterion. The criteria are also outlined in the memo (technological advancements, balancing of local and federal authority, what is the interaction among them). UTM, BLOS, etc. will be prioritized. We are looking for diversity among the projects selected. Proposals should assume using existing authorities and resources. Also, this is a rolling program, in which we will initially tee up at least 5 projects for the Secretary to endorse. The final number will be driven by resources (i.e., the larger the projects, the fewer there will be (and vice versa) due to resource limitations).

**Question:** Regarding liability and safety, how does the safety responsibility get delegated to local authorities?

**Response:** Everything is predicated on existing laws and regulations. Any project that requires BVLOS requires the appropriate exemption and waivers from FAA. BVLOS site projects will get priority because we are trying to advance those particular activities. However, the proposed operation still must be safe. The idea is to not bypass safety requirements.

**Question:** What altitudes are involved in pilot program?

**Response:** The presidential memorandum opens up to 200 feet and allows up to 400 feet for operations.

**Question:** How would you view any overlapping or layering of local governments applying for the pilot program?

**Response:** We would welcome multi-jurisdictional applications that are being cooperative among multiple jurisdictions.

**Question:** Who will ensure coordination among levels?

**Response:** We are learning more and more about overlapping authorities. The FAA has learned that some local authorities can't apply to the pilot program because their state pre-empts them. The FAA is learning how this works and is not quite sure how this will be covered. We will take applications at face value, judging applications on information received. We expect that coordination among local jurisdiction will be done prior to application with FAA. We are moving forward with the underlying assumption that if a city is applying for something they have the legal authority to do so.

**Comment:** This presentation has been very helpful to the DAC and TG1 also. We expect data gathered will feed back into our future tasking.

## MITRE Presentation on Local Outreach

Michael Guterres, Principal, Navigation & Unmanned Aircraft Systems, The MITRE Corporation

Mr. Guterres presented findings from their focus sessions with city and county representatives at the US Conference of Mayors Conference and the National Association of Counties Conference (refer to the slide material for the details of the presentation). The main topics discussed included input from participants on opportunities, challenges and issues facing local authorities, and communities with respect to the drones in the airspace. Mr. Guterres presented information in the following areas: background information; county and city representatives; state map outline; major findings; jurisdiction and enforcement; outreach; education and training; major concerns; benefits and positive feedback; differences between mayors' and county officials' feedback; and recommendations and next steps.

**Comment:** A member noted the tactical perspective of the counties and the strategic perspective of the mayors. The existence of a consistent data model of perspectives is encouraging.

**Question:** Is education and training a topic that the DAC will take on this afternoon or is it being tabled until TG1 is re-tasked?

**Response:** There were thoughts of asking the DAC to incorporate education and training into their recommendations going forward. The focus sessions conducted by MITRE alerted local officials to an existing monthly FAA telcon with law enforcement. We need to get that word out more.

**Question:** Did the study reveal any interest in local authorities regulating manned aircraft?

**Response:** No. The concern was brought up (i.e., a patchwork of rules). Some stated it could perhaps be managed like 911 (the emergency phone number). There was general recognition of the challenge, but not many solutions. Many are looking at drones as extended ground assets.

**Comment:** (Non-DAC member) Tom Odell, representing the NLC, stated the NLC has already been getting letters about drones. He commended MITRE for their presentations and encouraged them to include NLC in their research.

**Response:** RTCA noted that Brittney Kohler is a working with them to ensure they have the right representatives on the DAC TGs, and she, in fact, recommended that Mr. Odell attend this meeting.

## DAC Subcommittee Co-Chairs

Nancy Egan, Consultant, 3DRobotics, and John Allen, Vice President of Safety, jetBlue Airways

Mr. Cleveland introduced Nancy Egan and John Allen as the Co-Chairs of the DAC Subcommittee. Ms. Egan thanked the FAA and member organizations of the DAC who helped with the California wildfires this summer. She further thanked the FAA, Dan Elwell and Earl Lawrence for providing encouragement to the DACSC to bring the best thinking forward, including alternate views so the FAA gets the benefit of the best substantive thinking. Ms. Egan thanked the leaders and members of TG1, TG2 and TG3, who have put in many hours and produced incredible work. She also welcomed new Co-Chair, John Allen.

John thanked Ms. Egan and Bryan Quigley (outgoing DACSC Co-Chair) for their work. He stated that a regulator should be an enabler for new technology and to make new technologies work. This means we should not be risk averse and we should build trust. They then introduced TG1 Co-Chairs, Brendan Schulman and John Eagerton.

## TG1 – Roles and Responsibilities Report Out

Brendan Schulman, Vice President of Policy and Legal Affairs, DJI Technology and Dr. John Eagerton, Chief, Aeronautics Bureau, Alabama Department of Transportation/National Association of State Aviation Officials (NASAO)

The Co-Chairs presented the work completed since May. The TG has refocused on the Roles and Responsibilities, moving away from initial focus on enforcement. They provided a description of the meetings and exercises conducted by TG1, which included a field exercise looking at UAS altitude and the ability for ground observers to determine a UAS altitude accurately. The outcome of the field trip experiment served as input to the common principles.

The field exercise was conducted to provide operational data to understand the technology and its impact on ground observers. Following this, a “line in the sky” thought experiment was conducted to determine the efficacy of defining the line in the sky [below which local jurisdiction could manage drone operations]. Two teams were formed to advocate for the opposite view they held for the “line in the sky” argument. This required members to adopt and understand views they would normally not accept. The experiment produced excellent discussion and was a flexion point in the discussions to date. These experiments resulted in the formation of 9 common ground principles.

Teams self-formed to flesh out the principles into papers. By late September, it was obvious consensus on the papers was not possible in the time remaining, so the team refocused on just getting consensus on the principles themselves. A smaller team was formed to reach this consensus.

In bringing the 9 principle statements (5 in agreement and 4 in disagreement) to the DAC, the members should recognize that the principles, although presented singularly, should be considered in total.

*Please see the slide material of TG1 for the presentation details of the 9 principles.*

The 9 Principles as presented are:

- (1) Public Process to support reasonable outcomes for Local UAS Ordinances/Laws (Consensus)
- (2) UAS Operations Impact on Private Property and Interests (Non-consensus)
- (3) Common Ground Not Applicable to Manned Aviation (Consensus)
- (4) Takeoff and Landing (Non-consensus)
- (5) Initial UAS State and Local Model Policy or Guidance (Consensus)
- (6) Altitude Estimation Challenges (Non-consensus)
- (7) FAA’s Role in Aircraft Certification (Non-consensus)

- (8) Unjust or Unreasonable Discrimination (Consensus)
- (9) Generally applicable state criminal law and state tort law (Consensus)

The Co-Chairs concluded by welcoming new tasking from FAA and thanking those who attended the meetings and assisted in developing the work to date.

**Comment:** Mr. Cleveland thanked the TG1 leadership for their hard work.

**Comment:** A letter from the Mayor of San Francisco (DAC Member, not in attendance) was summarized by the Mayor's aide. The representative thanked the Co-Chairs for the presentation and clarified that where there is an alternative opinion, it is a unified response from all city/state/local representatives on TG1.

The representative then summarized the letter from Mayor Lee. The letter is attached.

**First member response:** A member responded that he respectfully could not disagree more with the letter and its characterization of the intent behind the TG, the way TG1 worked. Numerous invitations were extended to the state, local, and county representatives. A list of the names of the members from local, state, county representatives including several from the San Francisco Mayor's office that attended the kickoff meeting for the creation of the common principles was presented. In fact, San Francisco was better represented at the meeting than any other stakeholder and attended both sessions of the thought experiment despite the request from the exercise organizers to take part in only one. Invitations to join and participate in the TG had been made many times. The member then read from an email from the San Francisco representative in early July in which San Francisco was offered membership and San Francisco replied that they should NOT be listed as a member, but would be willing to act as an observer. The work of the members was in good faith, and the number of in-person meetings shows that this was not an attempt to drive through a single view or option. The member took personal and professional exception to the accusations from the Mayor's representative and others not familiar with the group's work as to what the team was trying to do and the good work done to get to this point.

**Second member response:** Several members of TG1 recognized early the need to re-balance the group, adding more local voices, and the member commended the work that RTCA conducted reaching out to and attempting to bring in additional groups, particularly from local governments. The challenge for the Co-Chairs regarding newly added participants is to bring them up to speed on the past work accomplished before they arrived; to keep the process moving without interruption, yet bring new members aboard. The leaders tried very hard to accommodate that reality via information distribution and communication mechanisms. They attempted to find dates for meetings that met most people's schedules through polling. They did their best to pick time/place/venues to have all participate. Meeting notes and data are all posted to Workspace for members to review. All members have other

jobs and are working hard - there are challenges and the TG has done as good a job as they could with the challenges they faced.

**Third member (DFO) response:** Appreciate both answers from the Co-Chairs. The FAA seeks recommendations and consensus, but the FAA found the options to be edifying and the discussion of how they were reached very interesting. He thanked the Co-Chairs for characterizing the alternative opinion as options and noted that he did not hear the output characterized as consensus and “minority rebuttal”, saying it was gracious of the Committee to do that. He acknowledged that he has been working with RTCA on the reconstituted TG makeup that he hopes will be more balanced. He recognized the many requests for additional community involvement and will keep working to maintain that balance.

**Question:** Hypothetically, if the TG balance had been closer to 50/50 in makeup [local government to industry], would the makeup of the principles have been substantively different?

**Response:** The experience of the Co-Chairs has been that the ratio of representatives is not as important as the attempt to make a thoughtful, good idea to gain support. One person can offer an excellent idea. The exercise to develop the principles was to “put yourself in the other world”, which means we had two, roughly, equal numbers of people in each group.

**Comment:** From manned aviation perspective, having a variety of opinions is normal. The public must buy-in to any change in accepting drones. We should all keep that in the forefront of the process. Every opinion is important, and we should not undermine public confidence.

**Comment:** The process is moving along. The previous comment regarding active involvement is right on. Our organization (National Association of Counties) supports the process and will be an active and thoughtful participant going forward.

**Comment:** In the case of law enforcement, that role is a unique public role and we need to have the right numbers to address these unique concerns. They have been present as subject matter experts, but should be brought on as members for the entirety.

**Question:** What are the mayor’s thoughts on what consensus is?

**Response from Mayor’s Representative:** If the goal is to have consensus, you have to come to agreement on something. That may be impossible and that is recognized. But this process was not consensus as the principles were not presented as balanced. When options were presented, Option 1 was shown as the work of the TG and Option 2 was shown as a subset of the whole group. We don’t support that view.

**Comment (DFO):** As a DAC Member, I did not interpret what I heard that way. The leadership did a very nice job of presenting the material as option 1 and option 2, and it's very clear that option 2 is also not consensus. Option 2 is the view of a narrower group than what option 1 represents. We have to be careful to say that when this is presented, the leaders are not biasing this one way or another. What's coming out is something very different than that.

**Comment:** It is important to note these are not recommendations. Option 1 was the result of the thought experiment and discussion by the group as a whole. Option 2 was a submitted alternative that was not subject to discussion by the group. So, the two options are actually different, but neither one is being reflected as consensus or a recommendation.

**Question:** Is there a new direction for TG1?

**Response (DFO):** The new tasking is being refined. It will be closely aligned with the pilot project and the DAC can help inform the pilot project. TG2 may also be better aligned to support the pilot project.

**Question:** Can the Co-Chairs comment more on the experiment on the line in the sky and can it help the DAC establish airspace going forward?

**Response:** Principle 2 deals with the Line in the Sky experiment. It was thought by most members that, if there is a line, (below which is owned and managed by local authorities rather than the FAA) it matters where you put it. Putting the line too low is a concern for privacy and can be handled by privacy laws or other constructs. Putting the line too high begins to intrude on useful airspace operations that save lives and transmit the news and other operations recognized as beneficial. It will matter where that line goes, and the higher the more flexible the regulation has to be (exceptions, presumptions, etc.). Perhaps the pilot program can help here (this was discussed during the TG1 field trip).

**Question:** Most language in the principles is about privacy and trespass, but what about safety - where does that come into play in the discussion?

**Response:** The TG had guiding principles developed a year ago and safety was paramount. After the prioritization exercise early on, the group focused on enforcement. The tasking statement asked what the interests of the government in UAS integration were.

Safety, if not explicit, is implicit in everything we discuss. Flying over people and flying low raises safety concerns.

**Comment:** Every time we look at recommendations, we should look at them with safety lens. How does each principle increase or decrease safety, and that increase or decrease can be changed based on the different perspectives?

**Comment:** The pilot program and the structure of the data to be collected needs to be looked at closely. Policy issues need to be thought of in terms of data that can be collected.

**Outcome:** TG1's presentation of Common Principles was accepted by the DAC. TG1 will be reconstituted for follow-on taskings.

## TG2 – Access to Airspace Report Out

Sean Cassidy Director, Safety & Regulatory Affairs, Amazon Prime Air, and Rob Hughes, Senior Policy Advisor, Northrop Grumman Corporation

Mr. Cleveland introduced TG 2 Co-Chairs and noted that their work has been reviewed by the DAC previously (at the May meeting). The TG was given instructions to update their material and that has been done and brought back to the DAC for approval. The recommendations delivered to the DAC today will be voted on for transmission to the FAA. This has gone through an iterative process over the past few months.

Mr. Cassidy began by extending regrets for Mr. Hughes, who could not attend the meeting. He then reviewed the process the TG used to create the deliverables. The group began with a deep dive of the tasking statement from the FAA, establishing the boundaries of the activities to make sure the deliverables would be timely. It also set the boundaries for the group in terms of scope, namely, what they were not going to do as well as what they were going to do.

The process should define deliverables that can be implemented within 24 months. The TG examined the current state of affairs and the current framework for the airspace. The group also developed assumptions and guiding principles. As an example, the group did not focus on anything that would be covered by Part 107 exemptions. Then, they examined market demand to narrow the focus to low-altitude operations, beyond line-of-sight, primarily below 400 ft. Looking at detailed desired use cases allowed the group to identify how current operating rules affect those use cases. Smaller groups were then formed within the TG and papers written that became the deliverables to the DAC. That foundation facilitated full consensus on all the issue papers. The industry players involved represented a diverse group bringing forward many opinions and concerns.

The results of TG2 were the highest priorities for what operations should be given access to the airspace next. The group proposes to continue their work, developing recommended mechanisms for implementing the recommendations.

The group felt a peak market demand would be in Class B airspace surrounding the 37 largest airports in the United States and the 30 mile “mode-C veil” airspace that surrounds the Class B areas. Agreeing that that airspace should be the subject of the recommendations, the group focused on how operations could be enabled safely. Most aircraft operating in the given airspace have requirements for communications equipment/capabilities. The group would like to address how that fact can be accounted for in the recommendations.

The final report and presentation are attached.  
The recommendations are summarized as follows:

1. **Prioritize sUAS BVLOS operations within the Mode C Veil below 400 ft AGL:** operations below the altitude where most vehicles operate, but are equipped to allow their location to be positively conveyed through standard communications interfaces (and when needed, with ATC) and understand where everyone else in the volume of airspace is. (This recommendation lead to cascading ideas that are all related.) These operations would allow close flight near airports if the flights do not cross the arrival/departure corridors for the runways.
2. **Develop technology-neutral navigation performance requirements:** This volume of airspace will require a framework that allows performance-based beyond visual line-of-sight operations that is agnostic to technology (equipment) and focuses on the performance requirements for operating in that airspace and allows industry to innovate to meet those requirements.
3. **Evaluate the minimum requirements needed to meet low altitude UAS command and control (C2) operations.** Thinking in terms of performance based requirements, we should be thinking about ways of managing command and control that are not necessarily the same as traditional aviation (aviation protected spectrum). How can we leverage cell phones and the networks that support them, if that can be done safely? How can Wi-Fi be used similarly to how dedicated short-range communications in the automotive industry are used for anti-collision devices?
4. **Establish a FAR Part 135 regulatory “pathfinder” program for commercial UAS low-altitude (<400’) BVLOS Operations: because Part 107 explicitly excludes air carrier operations (commercial operations) and specifically prohibits beyond line-of-sight operations and common carriage.** How can these operations be enabled? Meetings were held with FAA representatives on the regulatory requirements that revealed many rules that relate only to manned operations (PIC time, supplementary oxygen). We should be looking at existing rules and developing similar rules specific to UAS operations in the low-altitude regime. This can be done by identifying existing rules that must be complied with, and those that shouldn’t hinder UAS operations, but might have an alternate means of compliance.
5. **Develop Beyond 24-month Timeframe Recommendations:** Even though the initial tasking order was to develop recommendations that could be implemented within 24 months, the end goal must look at beyond 24 months as a result of the recommendations being made. The

recommendations made here will need to be examined for the mechanisms that should be put in place to implement these recommendations.

The final report incorporates changes requested by the DAC during the May 2017 meeting.

**Question:** Thank you for the recommendations. The wording of recommendation 1 may be unclear – does it refer to flight within the Mode C veil below 400 ft.?

**Response:** Yes. It refers only to flights below 400 ft.

**Comment:** Recommendations 3 and 4 are forward looking and complimentary with the integration pilot program and the pilot project can help inform answers.

**Question:** On the conventional aviation side, there are many good aspects of the recommendations. For example, Required Navigation Performance (RNP) and Required Communication Performance (RCP) should not be prescriptive. There seems to be a natural tension between technology and interoperability. How do we manage that tension?

**Response:** We need to pursue standards and guidelines that define performance. This can be done through interoperability standards and performance-based standards and by using performance-based standards that allow moving away from specific technology [i.e. are not too proscriptive].

**Question:** Is that similar to ADS-B, having two frequencies to operate? In other words, the technology (frequency) is not prescribed, but the performance of the ADS radio is?

**Response:** Yes.

**Comment:** Returning to the previous question about the Mode C Veil, the language "which includes Class B airspace" seems to be ambiguous and may lead to confusion. Recommend striking the clause from recommendation 1 for clarity before forwarding final report to the FAA.

**Response:** This goes back to the assumptions and guiding principles of the TG. Where is the market demand that needs to be met? Think of this in terms of stepping stones and make safety a priority. This needs to be scoped down to actionable recommendations.

**Question:** If we are making a recommendation from the DAC, public perceptions are important. In terms of priorities, is it more important to reach for rural access first? Would that make this initiative more successful? We should be mindful of where the lesser risk is.

**Response:** The TG considered where the point of entry for the recommendations is. These started with the FAA. If you are outside of the Mode C Veil, it does not speak to the market demand. These operations are already occurring under Part 107 waivers (for rural operations), and the TG wanted to examine beyond the current rules.

**Question:** When you say BVLOS, are you including all operations over people and nighttime operations, or focusing on a subset of those flight profiles?

**Response:** The TG was focusing on those use cases that are not part of Part 107 and this does include nighttime operations and flights over people. TG2 identified the BVLOS and nighttime operations as the framework of future use cases.

**Question:** Was there any discussion in the Subcommittee of moving the bar too quickly? Should we only allow one change at a time (e.g., BVLOS; nighttime operations; flights over people), or all three at once?

**Response:** The TG felt that would be a question for the next tasking. The Pilot Program will answer some of those questions also.

**Question:** Thinking about the future and what is appearing in draft legislation, what might be useful to the FAA going forward (in Part 135 or other places)? How can the DAC be useful going forward?

**Response:** *Recommend the next step is to have the DAC stand up a tiger team of SMEs to define within the category of aircraft what is applicable to UAS* [in Part 135]. What needs to be done to establish an alternate means of compliance and what are things that are clearly out of bounds (like oxygen requirements)? Having guidance for applicants would greatly benefit the industry.

**Question:** Does TG2 have a reasonable timeframe in mind for implementing these recommendations?

**Response:** We considered 24 months (as detailed in the tasking letter), and this is why the group stayed away from some items (e.g., rewriting Part 107; redo airspace rules). The TG looked at using technologies that were available and operations that were within the current airspace rules.

**Comment:** For the record, in looking back when the DAC first received this tasking, the idea was to enable services for the operators within a reasonable amount of time with the reasonable regulation.

**Response:** Taking things in small pieces and resolving them, codifying it and moving on is the way to go.

**Question:** When it says, "Recommend FAA prioritize BVLOS UAS Operations", do we mean prioritize the rules to allow it or prioritize it over manned operations?

**Response:** No, the recommendation is to make the development of rules or operating guidelines a priority for unmanned systems; not to prioritize one set of operations (unmanned) over another (manned).

**Question:** Are you recommending focusing on BVLOS before and at the exclusion of flight over people or at night?

**Response:** These recommendations are not that granular. The TG does not envision BVLOS that precludes flight over people and nighttime operations. So, no, it does not preclude those other operations.

**Comment:** At the time the DAC was tasked [with this work], the team consciously skipped ahead because they thought they were on the verge of having rules in place that would cover some of these situations [because there was a Flight Over People ARC in place]

**Final Comment:** With clarifying amendment, call for motion to approve the recommendations

**Outcome:** Mr. Cleveland called for motion to approve the recommendation. It was so moved and seconded. The document was approved.

## TG3 – UAS Funding Report Out

Mark Aitken, Director of Government Relations, AUVSI, and Howard Kass, Vice President of Regulatory Affairs, American Airlines

Mr. Cleveland introduced TG3 Co-Chairs, Mark Aitken and Howard Kass.

Howard Kass commented that the timing of the DAC couldn't be better. The group has made great progress through listening sessions and in-person meetings. As industry makes investment decisions, the question of the right mechanism for paying for things is in the forefront.

Before proceeding, the TG leadership thanked the DAC members for allowing their staff to participate on TG3 and recognized Nan Shellaberger (FAA) and her staff on the excellent support they have provided to TG3.

One caveat on the presentation material was stated, namely that it had to be prepared and proved 4-6 weeks prior to this meeting and so some material might be out-of-date.

The success of the industry depends on a strong private sector and government collaboration. The FAA is funded primarily from money from airline ticket taxes and fuel taxes and money appropriated by Congress (the latter being a small part of the budget). All the interest it has generated by the pilot program, proves that the FAA needs to have its required resources funded to keep up with the pace of progress of the drone industry. TG3 submitted short-term recommendations in July 2017, and long-term recommendations are due in March 2018. The listening sessions held by TG3 were open to the entire DAC (not just the TG) and focused on: 1) how should these activities be funded, and 2) a little bit on how should the FAA organize. The FAA is currently organized to support one very broad client base: manned aviation (notwithstanding commercial space). As mentioned earlier, a new chapter in the history of aviation is being written. While this is happening, the book is not being closed on previous chapters. The listening sessions have provided great input and generated great conversation on both of these activities.

The principles upon which the TG bases its finding are equity and scalability (to allow for growth). TG3 members are concerned that dollars spent are dollars being taken away from manned aviation. Funding mechanisms include taxes and fee-for-service. Taxes can be based on size/weight/operation of the user. These items do not represent final recommendations but have been discussed in the listening sessions.

The TG has been grappling with what is “equitable” in funding. The TG has expressed numerous questions it intends to answer. The current administration has indicated the safe and expeditious introduction of drones into the airspace is a priority for them and Congress has acted to put forth resources to accomplish that. TG3 believes there should not be a negative ramification for manned aviation as this effort moves forward.

There are many activities that need to be prioritized within the FAA. Who is shouldering the cost for the activities (industry/government/shared)? The group is struggling with the concept of sharing the costs (between government and industry) and what activities lend themselves to cost-sharing. What is the ratio of costs for industry and government and can this cost ratio change in relation to activity?

The TG is trying to think creatively. The TG will now break into smaller groups to fill in the details. What might fit in the next 3-5 years? The most “out of the box” thought is for classes of airspace as defined in the UTM concept (similar to the framework the FCC uses for spectrum allocation). We are unsure if the UTM concept is analogous with FCC spectrum options. The task is to explore options and that is what the group is doing.

Lately, the group has been focusing on the current landscape (LAANC and UTM). The next few meetings will be to provide finer details for the DAC to consider.

One of the challenges the TG faces is the lack of good data on what future costs are. The FAA should consider establishing a cost accounting system.

The industry is spending and building out infrastructure and the FAA must regulate that build-out. How should that be paid for? Since no one is flying today, industry is being asked to pay for something they can't use.

**Question:** Are organizational structure options within the bounds of the scope?

**Response:** Not explicitly, but the money flow of the FAA touches on that. It won't have equal weighting with funding issues, but suggestions may be driven out by the funding responses.

**Question:** In manned aviation today, support activities are certification, oversight, and then operations. Are you using existing cost buckets for what it should look like? Follow-on question: Based on that, can you use current resources to predict the future costs?

**Response:** Yes, we are looking at current cost accounting categories (operations, research and development, and facilities and equipment). For the second question, applying manned rules to drones can be complicated (e.g., number of pilots for airline aircraft versus for drones; the growth of the drone numbers is unknown.) The past three FAA budget cycle numbers were examined and have been flat. Manned aviation cost is measured in the billions and unmanned aircraft costs are measured in the 10's of millions per year. There could be a significant ramp-up in the near future. TG3 has been looking to the work of TG2 to see what those costs might be (based on their recommendations). This group has to make many assumptions and they are looking to the DAC for boundaries and input.

**Question:** Have you looked at models for access-based fees versus a usage-based model?

**Response:** We have had that discussion (but haven't looked at the numbers). There has been discussion of a tax paid at the point of purchase. It has not been seen as favorable by many in the drone industry. There is no data to look at per se, but approaches such as an annual registration fee have been discussed.

**Question:** Drones are analogous to Wi-Fi devices (device came first, then networks followed, as opposed to the network being built first and then the devices being produced).

**Response:** The TG has spent a lot of time on the network model (the cell phone analogy is raised often).

**Comment:** Drone operators should offer data to the FAA. We assume industry will carry the bulk of expense for operations.

**Outcome:** Final report is due in March 2018. Set up today has been very good. Looking forward to the final report.

## New Business

The Acting Chair called on the DAC members to identify new business for the DAC. No new business was identified.

## Action Item Review

Action	Responsible Party	Schedule	Status
Action	Responsible Party	Schedule	Status
<b>ACTIONS OPEN FROM PREVIOUS MEETING</b>			
RTCA to summarize the comments received for each TG and submit for their review and consideration.	RTCA	ASAP	CLOSED
TG1 to re-look at priority 4 (State and Local Interest In and Response to UAS) with more attention.	TG1	July	CLOSED
RTCA to help identify DAC members who wish to assist in addressing county and city conventions, and to assist in defining what output can be produced that will benefit the two conventions; and work with DAC member Mayor Lee's office and Robert Boyd to get on their agendas.	RTCA	OBE	CLOSED
RTCA to coordinate a webinar for SC-228 that can be reviewed by all DAC members.	RTCA & SC-228	ASAP	CLOSED
<b>ACTIONS OPEN FROM CURRENT MEETING</b>			
Strike "which includes Class B airspace" from TG2's recommendation 1 for clarity before forwarding final report to the FAA. Modify the Mode C Veil language.	RTCA/TG2	Nov 2017	OPEN

Action	Responsible Party	Schedule	Status
DAC to establish a TG2 Tiger Team of SME's to define what is applicable to UAS in the existing rules.	DAC/DACSC	TBD	TBD
Re-task and reconstitute TG1.	FAA/RTCA	Spring 2018	OPEN
Future DAC Agenda item for DAC procedures and meeting tenets.	DAC/RTCA	Spring 2018	OPEN
Coordinate DAC 2018 Meeting Schedule.	RTCA	Dec 2017	OPEN

## Closing Chairman Remarks

Mr. Cleveland thanked the DAC members for attending and participating in the DAC meeting. He also thanked Administrator Huerta for his leadership and accessibility to the aviation industry. He commented that Administrator Huerta has been an incredibly effective link between government and industry.

## FAA DFO Closing Remarks

The Deputy Administrator thanked Amazon for being great hosts. He said he was encouraged by the attendance at the meeting. He reiterated the Unmanned Aircraft Systems (UAS) Integration Pilot Program numbers mentioned earlier in the day and referenced the White House presidential memo on the Pilot Program. He stated that the FAA welcomes any ideas going forward within the confines of the OTA structure and are open to more discussion and training on how this is going to progress. The Pilot Program will inform this nascent industry, so they want to get it right.

He continued that he couldn't emphasize enough his thanks to TG1 for the group's efforts, and it is not a failure or a flaw that there are alternate options; it was edifying and educational, and with more time they could have reached consensus. He thanked TG2 for their recommendations. He found them to be superb and he believes many of those recommendations will complement the Pilot Program. In referring to the TG3 work, he expressed his concern that the recommendations of funding and budget is outside of the control of the FAA. The FAA is not as interested in those recommendations as they have little say in how to implement recommendations.

He observed that this is possibly the first advisory committee he has sat through where the FAA reauthorization was not discussed, and he reminded the group that the FAA is on an extension until the

end of March. Since this is a high-profile part of FAA, there are things that may happen in the legislative process until March. There is a controversial proponent of the house bill to move ATO out of the FAA. If that were to become a reality, that would change the complexion of these discussions quite a bit. There is much going on outside this room that will affect the work being done by this group and subgroups.

He said that the next time the DAC is together, he hopes for progress on those fronts. He closed by thanking everyone for taking time to attend and provide input.

## Adjournment

The meeting was adjourned at 4:30 PM.

## Attachments

DRAFT

## November 8, 2017 DAC Attendance

Name	Organization
Adams, Tim	Federal Aviation Administration (FAA)
Agvent, Greg	CNN
Aitken, Mark	Association for Unmanned Vehicle Systems International (AUVSI)
Allen, John	JetBlue Airways
Allison, Darren	RTCA, Inc.
Alonso, Juan	Stanford University
Ambrose, Jennifer	Federal Aviation Administration
Anderson, Blair	Amazon
Baker, Mark	Aircraft Owners and Pilots Association
Banga, Jaz	Airspace Systems Inc.
Barkowski, Justin	Aircraft Owners and Pilots Association
Bechdolt, Anne	FedEx Express
Belhumeur, Marc	NATCA
Berlinberg, Eric	Amazon
Bosch, Dan	SICdrone
Bova, Ubaldo	Amazon
Boyd, Robert	Riley County, Kansas
Bristol, Teri	Federal Aviation Administration
Broadbent, Alana	Amazon
Brock, Bob	State of Kansas
Brown, Chris	Federal Aviation Administration
Burgess, James	Google
Canoll, Tim	Air Line Pilots Association (ALPA)
Carleton, Jordan	Amazon
Cassidy, Sean	Amazon
Chrisman, Geoffrey	Flirty
Cirillo, Michael	Airlines for America
Cleveland, Peter	Intel
Cochran, Walt	Leidos
Cooper, Diana	Precision Hawk USA Inc.
Crawford, Korin	Avenue 360 Infrastructure & Real Estate
Dalton, Daniel	Airspace Systems, Inc.
Deux, Antoine	Amazon

Name	Organization
DeWinter, Marque	International Alliance of Theatrical Stage Employees - International Cinematogra
Dixon, Scott	Amazon
Donovan, Colleen	Federal Aviation Administration (FAA)
Dreiling, Lindsey	State of Kansas
Duprey, Naomi	Amazon
Durand, Jean-Guillaume	Amazon
Eagerton, John	ALDOT/NASAO
Egan, Nancy	3D Robotics
Elwell, Dan	Federal Aviation Administration (FAA)
Endicott, Catherine	
Falkin, Melissa	Amazon Prime Air
Fanelli, Matt	Skyward IO, A Verizon company
Felser, Larry	Amazon
Flint, Deborah	Los Angeles World Airports
Fontaine, Paul	Federal Aviation Administration (FAA)
Garver, Lori	Air Line Pilots Association (ALPA)
Gielow, Ben	Amazon
Gilbert, Trish	National Air Traffic Controllers Association (NATCA)
Gomez, Martin	Facebook
Graetz, Todd	BNSF Railway
Gramaglia, Tom	American Tower Corporation
Greene, David	Wisconsin Department of Transportation, Bureau of Aeronautics
Grimsley, James	University of Oklahoma
Guckian, Paul	QUALCOMM TECHNOLOGIES INC.
Guterres, Michael	The MITRE Corporation
Hall, Brandon	Textron Unmanned Systems
Hanson, Rich	Academy of Model Aeronautics
Harm, Chris	Federal Aviation Administration (FAA)
Hartman, Ryan	Insitu Inc.
Hernandez, Matt	Amazon
Horsager, Taylor	American Family Insurance
Irvine, Peter	US Department of Transportation
Jenny, Margaret	RTCA, Inc.
Kass, Howard	American Airlines, Inc.
Kenitzer, Allen	Federal Aviation Administration
Khattar, Puneet	Zipline International Inc
Kim, Gene	Southwest Airlines
Kimchi, Gur	Amazon Prime Air
Kirov, George	Harris Corporation

Name	Organization
Klein, Ethan	White House
Larson, Shelly	Federal Aviation Administration
Lawrence, Earl	Federal Aviation Administration (FAA)
Lenfert, Winsome	Federal Aviation Administration (FAA)
Leveson, Nancy	MIT Lincoln Laboratory
Lindgren, Adrienne	City of Los Angeles
MacArthur, John	Washington State Dept of Transportation
Mahoney, John	USGS/FGDC
Malloy, Lisa	Intel
Martin, Greg	Federal Aviation Administration
Martino, Christopher	Helicopter Assoc International
Mattai, Nan	Rockwell Collins, Inc.
McCardle, Matt	Amazon
McDuffee, Paul	Insitu
McKelligan, Mark	NATCA
Mefford, Cory	SICdrone
Mills, Houston	United Parcel Service (UPS)
Monaco, John	Property Drone Consortium
Mora, Marily	Reno-Tahoe Airport Authority
Murdock, Joel	FedEx Express
Murphey, Sean	T-Mobile
Niles, Frederick	The MITRE Corporation
Odell, Thomas	National League of Cities
Paczan, Nathan	Apple
Papadopoulos, Didier	Garmin
Pasztor, Andrew	Wall Street Journal
Penrose, Christopher	AT&T
Peter, Lorelei	Federal Aviation Administration (FAA)
Phelps, Adam	Spokane International Airport
Pollner, Leslie	City of San Francisco
Power, Andres	San Francisco, California
Reed, Mark	Air Line Pilots Association (ALPA)
Remo, Laura	Department of Transportation
Resmini, Paolo	Matternet
Richards, Jeffrey	NATCA
Richter, Jennifer	Akin Gump / CTIA
Robinson, Phil	Protonex Technology Corp.
Roth, Robert	Amazon
Samanta Roy, Robie	Lockheed Martin Corporation

Name	Organization
Sapir, Genevieve	Department of Transportation
Schulman, Brendan	DJI Technology
Schultz, Dean	Reno-Tahoe Airport Authority
Secen, Al	RTCA, Inc.
Shellabarger, Nan	Federal Aviation Administration (FAA)
Spengler, George	Amazon
Stone, Kevan	National Association of Counties
Straub, Phil	Garmin Ltd.
Suarez, Brandon	General Atomics Aeronautical Systems, Inc.
Suomi, David	Federal Aviation Administration
Swafford-Brooks, Lisa	Department of Transportation
Swanson, Mo	Echodyne Corp
Teel, Brandi	RTCA, Inc.
Terkeurst, Brandi	Delta Air Lines
Terry, Ryan	Lockheed Martin
VanOverschelde, Riley	Amazon
Velky, Jacob	Duke Energy
Voronka, Nestor	M42 Technologies
Wang, Daniel	Amazon
Weidner, Steve	NATCA
Williams, Dan	Federal Aviation Administration
Williams, Heidi	NBAA
Williams, Pete	Amazon
Willis, Randy	Federal Aviation Administration
Wright, Marchall	Security101
Wynne, Brian	Association for Unmanned Vehicle Systems International (AUVSI)
Yap, Basil	North Carolina Department of Transportation
Young, Alden	Amazon
Zuccaro, Matthew	Helicopter Association International (HAI)

## Fifth Meeting of the Drone Advisory Committee (DAC) Agenda

**DATE:** November 8, 2017

**TIME:** 9:00 AM – 4:30 PM PST

**PLACE:** Amazon Meeting Center  
2031 7th Avenue  
Seattle, WA 98121

### Wednesday, November 8, 2017

Start	Stop	
9:00 AM	9:02 AM	Official Statement of the Designated Federal Officer (DFO)
9:02 AM	9:12 AM	Welcome and Introductions, Review of Previous DAC Meeting
9:12 AM	9:15 AM	Approval of Minutes from Previous DAC
9:15 AM	9:25 AM	DAC Chairman's Report
9:25 AM	9:50 AM	FAA Remarks
9:50 AM	10:05 AM	Presidential Memo on UAS Integration Pilot Program
10:05 AM	10:25 AM	MITRE Report
10:25 AM	10:35 AM	Break
10:35 AM	10:40 AM	DAC Sub-Committee (DACSC) Co-Chair Report
10:40 AM	11:10 AM	Report of DACSC Task Group (TG) 1 (Roles and Responsibilities)
11:10 AM	12:00 PM	Discussion of Task Group 1 Material
12:00 PM	1:15 PM	Lunch
1:15 PM	1:55 PM	Report of DACSC TG2 (Access to Airspace)
1:55 PM	2:40 PM	Discussion of TG2 Material
2:40 PM	2:55 PM	Break
2:55 PM	3:35 PM	Report of DACSC TG3 (Funding UAS)
3:35 PM	4:10 PM	Discussion of TG3 Material
4:10 PM	4:20 PM	New Assignments/Agenda Topics/Next Meeting Details/Meeting Summary
4:20 PM	4:25 PM	FAA DFO Closing Remarks
4:25 PM	4:25 PM	Adjourn



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## Interim Report out of DACSC TG1 (Roles and Responsibilities)

**Co-Chairs:**

Dr. John Eagerton

Brendan Schulman



# Task Group 1

## Tasking Statement (Reminder)

The (big, audacious, transformative) TASK:

- Develop a set of consensus based recommendations :
  - the roles and responsibilities of federal, state, and local governments in regulating and enforcing drone laws
- Consider and include recommendations regarding:
  - Defining low-altitude UAS navigable airspace susceptible to State/local governmental interests;
  - Relative roles and responsibilities of the Federal, State and local governments;
  - Enforcement;
  - Education;
  - Technological tools and solutions;
  - Local government operational issues



# Common Principles

## **(1) Public Process to support reasonable outcomes for Local UAS Ordinances/Laws**

- In order to implement state, local, or tribal time/place/manner ordinances/laws, there must be a public process to support reasonable outcomes. This could include common practices such as advanced hearings and public notices that enable stakeholder input. This process could also benefit from voluntary reporting of these notices to a centralized repository.



# Common Principles

## (2) UAS Operations Impact on Private Property and Interests

- **Option 1:** If there is a “line,” the property/trespass/exclusionary rights aspect should be at a relatively low (or close-in) limit which could be a lower altitude (or closer distance) than a line used for community time/place/manner restrictions. If this “line” is relatively high, the property/trespass/exclusionary framework should be less absolute and more liberal, and include features like exceptions for transient operations, a requirement to show substantial interference (such as in the existing aerial trespass doctrine), rebuttable presumptions, and other protections for beneficial applications that do not generally cause actual harm or nuisance.
- **Option 2:** The 5<sup>th</sup> Amendment to the Constitution furthered the right to private property by guaranteeing that “No person shall...be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation.” The Supreme Court interpreted the 5<sup>th</sup> amendment in the aviation context to convey to a property owner the right to enjoy his or her property within the “immediate reaches above the land” (United States v. Causby, 328 U.S. 256 (1946)). Further, the FAA has concluded in the context of UAS that “Laws traditionally related to state and local police power – including land use, zoning, privacy, trespass, and law enforcement operations – generally are not subject to federal regulation. Skysign International, Inc. v. City and County of Honolulu, 276 F.3d 1109, 1115 (9th Cir. 2002).” (FAA Fact Sheet, December 2015). Developing a “line in the sky” to define the “immediate reaches above the land” where private property owners hold a property right may assist to provide clarity to property owners and allow UAS operators to efficiently operate in national airspace.



# Common Principles

## **(3) Common Ground Not Applicable to Manned Aviation**

- None of this applies to manned aircraft operations.



# Common Principles

## (4) Take off and Landing

- **Option 1:** Takeoff and landing should be subject to the same framework of reasonable time/place/manner restrictions and the process-based protections above. This requires state and local government to make adjustments to existing zoning authority. Reasonableness would take into account UAS that take off and land at fixed sites such as airports or heliports. There should be greater latitude to operations that take off or land from the UAS operator's private property.
- **Option 2:** State and local governments are the exclusive regulators of land use and zoning. These state and local police powers allow state and local governments to reasonably regulate UAS takeoff and landing within their jurisdiction without limitation.



# Common Principles

## **(5) Initial UAS State and Local Model Policy or Guidance**

- Model drone policy or guidance for reasonable time/place/manner (RTPM) restrictions should be created by informed, diverse stakeholders to inform policymaking in a process that is collaborative, appropriate, reasonable, and based on knowledge of the benefits and challenges presented by this technology. However, as every jurisdiction faces different constraints and opportunities, no one model policy will likely serve every community. Development of model drone policy or guidance should come in advance of a new RTPM framework, but it should not unreasonably delay implementation of a new RTPM framework, and therefore must be subject to a reasonable near-term schedule.



# Common Principles

## (6) Altitude Estimation Challenges

- **Option 1:** The difficulty in judging altitude from the ground raises concerns about enforcement, if there is a “line.” There is a compelling interest in development of precise altitude measurement technologies. Also important if there is no “line.”
- **Option 2:** In order to facilitate federal, state, tribal, and local regulation and law enforcement of UAS, the FAA should encourage the development of technologies that allow for precise altitude measurement.



# Common Principles

## (7) FAA's Role in Aircraft Certification

- **Option 1:** In an aviation operational context, FAA is the exclusive regulator of [matters such as]: aircraft design, testing, airman certification, aircraft cert, operator cert, equipage, technology standards, economic regulation, security regulation (other than operational restrictions that are contemplated in a new framework).
- **Option 2:** The FAA is the exclusive regulator of aircraft certification, aircraft licensing, and maintenance of unmanned aircraft systems. State and local governments, through their police powers, are the exclusive regulators of land use, zoning, privacy and trespass. Federal, state, tribal and local governments all have a role in oversight of UAS safety and operations.



# Common Principles

## **(8) Unjust or Unreasonable Discrimination**

- The grant/acknowledgement of authority that enables state and local regulation should not unjustly or unreasonably discriminate as to the UAS type, model, owner operator, manufacturer, or purpose of the operation. Likewise, the state and local restrictions should not unjustly or unreasonably discriminate as to the UAS type, model, owner, operator, manufacturer, or purpose of the operation. Justifiable differentiation may be necessary to achieve public interest goals.



# Common Principles

## **(9) Generally applicable state criminal law and state tort law**

- In most respects, generally applicable state criminal law and state tort law should not be disturbed. However, to the extent that such generally applicable laws create a carve-out for otherwise unlawful behavior when such behavior is conducted using UAS, such laws will need to be updated.



## Comments/Discussion

- TG1 continues to work towards developing consensus recommendations



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## Final Report out of DACSC TG2 (Access to Airspace)

**Co-Chairs:**

Sean Cassidy, *Amazon Prime Air*

Robert Hughes, *Northrop Grumman*



# Agenda

- Background
- Follow-up from 15 Jun DAC SC
- Approved Recommendation 1
- Approved Recommendation 2
- Approved Recommendation 3
- Approved Recommendation 4
- Approved Recommendation 5
- Summary of Report Changes
- Questions



# Background

- FAA Tasking

- Provide recommendations for roles and responsibilities for the UAS, the remote pilot, the operator, and air navigation service provider.
- Provide recommendations for safe, expedited UAS airworthiness and operational approvals where required, for the various near-term (within 24 month) UAS missions.
- Provide recommendations on minimum essential aircraft equipage, public/private infrastructure needs, and operational requirements beyond those currently permitted (such as under 14 Code of Federal Regulations Parts 101 and 107) to include information flow and interoperability considerations.
- Provide recommendations on methods of communications for command and non-payload communications – specifically, how these requirements may vary among the likely near-term UAS missions.

- 70 members (23 voting)

- Process





## Follow-up Items for DAC & DACSC

- 3 May DAC indicated general approval for DACSC TG2 five draft recommendations with the following exceptions:
  - Urged to change recommendations stylistically to make them more advisory and less directive in nature (FAA Input)
  - Modify C2 technology-specific recommendation (recommendation 3) to be more technology neutral (Industry member input)
- TG2 follow-up edits and balloting re interim recommendations based on 3 May DAC input
  - Webex 5 June to review recommended edits
  - Balloting June 6-8 on revised recommendations
  - 100 percent consented (17 of 23 voting members participating)
- Presentation to DACSC June 15 -- Approved
- Final recommendations prepared for 21 July DAC – Deferred to 8 Nov DAC



# Recommendations

*(Approved 15 Jun)*

## *Interim Recommendation 1:*

- *Addition of clarifying language along with footnote regarding Class B airspace and Mode C veil*
- *Removal of verbiage regarding manned aircraft operation densities*

### **1. Prioritize sUAS BVLOS operations within the Mode C Veil below 400 ft AGL.**

Recommend FAA prioritize BVLOS UAS operations in airspace within the Mode C Veil which includes Class B airspace, below 400 feet AGL, and below the obstacle clearance surfaces (OCS) for either the airport itself or any instrument approach to the airport. Within this volume of airspace, equipage requirements exist for nearly all aircraft, thus enabling cooperative aircraft separation and Part 107 BVLOS and commercial UAS BVLOS operations.

“Mode C Veil” refers to Section 1, Appendix D of 14 CFR 91, Airports/Locations: Special Operating Restrictions. These operating restrictions apply below 10,000 feet MSL within a 30-nautical-mile radius of each location of airports listed in Section 1: <https://www.gpo.gov/fdsys/pkg/CFR-2001-title14-vol2/xml/CFR-2001-title14-vol2-part91-appD.xml>



# Recommendations

*(Approved 15 Jun)*

## *Interim Recommendation 2:*

- *Stylistic change (from “FAA should” to “Recommend FAA”)*

### **2. Develop technology-neutral navigation performance requirements.**

Recommend the FAA establish, evaluate and implement performance-based navigation requirements for low altitude BVLOS operations within the Mode C Veil, the result of which will promote integrated BVLOS airspace operations with shared intent, position data, and other information to help UAS operators/pilots maintain awareness of other aircraft as well as remaining in their approved operating volume.



# Recommendations

*(Approved 15 Jun)*

## *Interim Recommendation 3:*

- *Retitle recommendation heading to remove cellular specific language*
- *Replace recommendation language to incorporate performance based guidance vs more prescriptive cellular/3GPP verbiage*

### **3. Evaluate the minimum requirements needed to meet low altitude UAS C2 operations.**

- Recommend the FAA sponsor a program to evaluate the viability of existing commercial technologies and networks in the context of performance-based C2 (command and control) standards and concepts of operation. The FAA should consider leveraging the work of industry groups.
- As part of this program recommend FAA sponsor an operational prototype that includes different connectivity options including cellular. Within this prototype, the FAA should pursue the opportunity to pull data directly from other industry trials.



# Recommendations

*(Approved 15 Jun)*

## *Interim Recommendation 4:*

- *Stylistic change (from “FAA should” to “Recommend FAA”)*

### **4. Establish a FAR Part 135 regulatory “pathfinder” program for commercial UAS low-altitude (<400’) BVLOS operations**

- Recommend the FAA create a well-defined pathway, derivative of Part 135 and other related requirements for air carrier operations and operations for compensation and hire, that are specific to UAS and that enable low-altitude BVLOS commercial operations.
- Upon the conclusion of this regulatory pathfinder program, recommend FAA promulgate further guidance in the form of an Advisory Circular and include a Part 135-derivative process path for operational approval.



# Recommendations

*(Approved 15 Jun)*

## *Interim Recommendation 5:*

- *Stylistic change (from “FAA should” to “Recommend FAA”)*

## **5. Beyond 24 Month Timeframe Recommendations**

- Recommend FAA conduct an analysis of, at a minimum, FAR Part 91 and Part 77 as a basis for the creation of a new set of operational rules which provide the operational flexibility of Visual Flight Rules, while operating with reference to displays and instruments without natural visual reference to a horizon. This analysis must consider visibility, distance-from-clouds criteria, equipage, and communication requirements related to dynamic operations in Class G and Class E (including “Upper E”) airspace, specifically above 400 ft AGL.
- This analysis should also consider the impact of a UTM capable of providing separation between (i) UAS with other UAS and (ii) UAS with other manned aircraft independent of Air Traffic Control.



# Summary of DACSC Final Report Changes

- Title Page retitled: “Drone Access to Airspace,”
- Subtitle from “interim” to “final”
- Added paragraph to executive summary statement reflecting the culmination of this process that lead to our recommendations.

*“The summary and recommendations reflect an iterative process involving first task group consensus, then DAC SC approval, and finally affirmation by the DAC to ensure the final product is aligned with the input of all those groups. The first set of interim recommendations were presented to the DAC on 3 May 2017 where there was general consensus on most of the items presented with two minor recommendations: First it was recommended we change the tone of the recommendations to FAA and make them more advisory rather than directive in nature. Next it was recommended we modify our command/control (C2) technology-specific recommendation (recommendation 3) to be more technology neutral. Modifications to the draft recommendations were made, consensus was attained within TG2 on the modified recommendations, and final recommendations reported to the DAC SC, which gave its approval on 15 June 2017 and recommended these comprise our final recommendations to the DAC.”*

- Appended with FAA tasking letter to TG2
- Cleaned up the formatting in the appendix
- Corrected minor grammatical errors



Questions?



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# DACSC TG3 Update

## November 8, 2017



# Refresher and Background

- Future success of the drone industry depends on government and private sector funding to support and facilitate the integration and operations of drones in the NAS.
- The FAA requires new resources to be devoted to this task.
- Task Group 3 (TG3) submitted short term recommendations to the DAC in July 2017.
- Longer term recommendations are due in March 2018.
- We held a listening session for the entire DACSC in July.



# Listening Session Notes

- Key issues to address are how to fund and how to organize.
- Should it be a separate agency? FAA people that work on drones consolidated into one agency? Within FAA? Outside?
- Examples of funding constructs
  - National Park Service funded by user fees and annual passes
  - FCC- spectrum are auctioned off to users
  - FDA gets funding from drug companies that want to do trials
- Principles: Make a plan that is equitable; generate revenues to fund FAA to pay for these things; and scalability.
- The purpose of the DAC to foster this industry.
- Right now it's a zero-sum game, every dollar spent on drones is a dollar not spent on manned.
- Use tax for using airspace or on services rendered, could be passed on to end user, proportional and fair.
- Tax could be a based on cost, size, height, weight.



# Listening Session Continued...

- Shouldn't be segmented by class of airspace, that's why we have the National Airspace *System*; it is not segmented.
- Registering under 107 is primarily commercial, we could link the two.
- Counterpoints:
  - Taxing a process that already costs a lot will discourage advancement. Part 107 doesn't use the word commercial. Part 107 operators are integrating into NAS. There will be significant resistance, because it's unfair.
  - We're taxing the good guys if we track by the rule. We aren't addressing the bad actors or passive users.
  - We are putting a tax on small business to pay for a dream system for the larger companies that won't start operating until the thing is built, paid for by the little guy.
- User fees also an option.
- Current registration fee pays for the cost of the actual registration system only.
- People receiving services should be paying for those services. It is hard to argue that a real estate photographer under part 107, flying below the trees, receives benefit of the FAA.



# Process and Next Steps

- Look at all intended beneficiaries of the system--delivery companies, logistics, utilities, google, telecom, we need to look at all of those when we come up with an equitable plan for funding.
- Look at all funding options:
  - Taxes
  - Fees
  - Auction for classes of airspace within UTM (think FCC spectrum auction)
  - PPPs.
- Consider the organizational structure options:
  - A new mode within DOT
  - A new operational division within DOT with all resources centralize
  - Status quo in FAA current organizational structure, with increased staffing throughout.
- Additional FAA/Industry Briefings:
  - Update on UAS Office Integration Office and FAA-wide UAS activity
  - LAANC/UTM—what it is, timelines, FAA and industry responsibilities, allocation of resources, technology needs, and how it is envisioned to be a piece of a broader UTM framework
  - How the spectrum system is allocated and sold and monetized
- Then we will divide into groups and work through recommendations.



# Discussion

# U.S. Mayors and County Officials: Drone Discussion Groups

Michael Guterres

November 8, 2017

MITRE

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## Background

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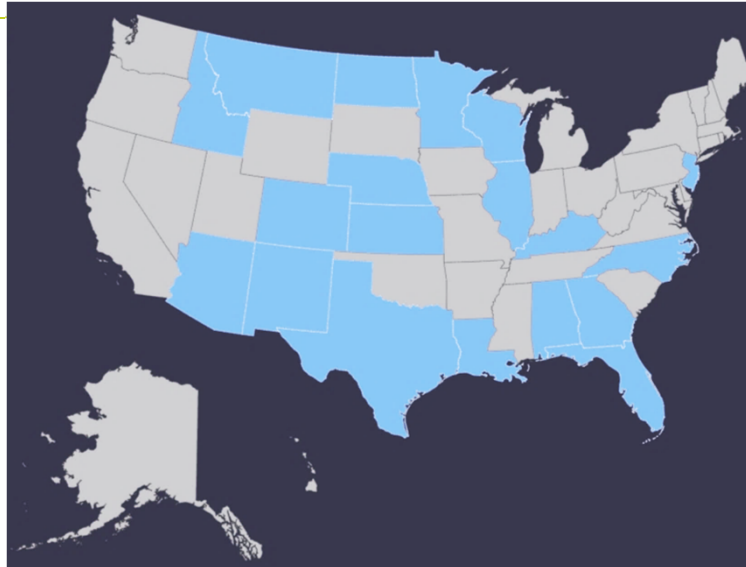
- **FAA, at the request of members of Drone Advisory Committee**, asked Stanford and MITRE to solicit broader feedback from local government officials about their views on what role, if any, local governments should have in regulating low-altitude drone operations
- Two near-term opportunities were identified:
  - U.S. Conference of Mayors in Miami, Florida, June 23-26, 2017
  - National Association of Counties Conference in Columbus, Ohio, July 21-24, 2017
- **MITRE carried out focus-group sessions at both events**, using a variety of scenarios and questions to elicit opinions and views
- **Earl Lawrence and Jonathan Cross (AGC) participated** in both events as technical advisors

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## County and City Representatives: State Map



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## Outline

- Major Findings
- Jurisdiction and Enforcement
- Outreach, Education & Training
- Major Concerns
- Benefits

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## Major Findings

- **Jurisdiction:** Local governments want jurisdiction over low-altitude drones in their geographic areas
- **Enforcement:** Local officials expect to be responsible for enforcement of drone laws
- **Outreach:** Local officials want to be included in national decision making about drone laws, or at least have input
- **Education & Training:** Local officials and law enforcement feel they need drone-related education, training, and outreach
- **Concerns:** Most significant concerns about drones in their communities are safety, security, privacy, difficulty of enforcement, liability, operations by children, preemption, and lack of laws for recreational drones
- **Benefits and Positive Feedback:** Most local officials are enthusiastic about potential benefits of drones in their communities for both public use and private use

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## Jurisdiction and Enforcement

- **Jurisdiction:** Mayors and County Officials want jurisdiction over drone operations at low altitudes in their geographic areas
  - No specific altitude proposed; 50 feet, 100 feet, 200 feet all mentioned
  - Local officials would like to be able to set local restrictions as needed
    - Some expressed a wish for a baseline set of Federal and/or state regulations, along with the ability to customize specific aspects of the rules to each community's needs
- **Enforcement:** Local officials and local law enforcement expect to be responsible to enforce drone rules and handle drone-related problems in their cities and counties
  - They do not believe that FAA is able to provide enforcement resources

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## Outreach, Education and Training

- **Outreach:** Local officials and communities want to be included in the Federal and state discussions and decision making about drone laws
  - Mayors and County Officials want to participate in the process as rules for drones are developed and evolve, not just at the end
- **Education & Training:** Mayors and County Officials believe they and local law enforcement need FAA education and training about drone laws, operations, and issues
  - To help local officials create more effective local drone laws, some would like FAA to provide guidance or help with development of local rules (Note – FAA has been doing so since 2015)
  - To help local law enforcement enforce drone laws more effectively, need to know:
    - What is lawful under Federal laws
    - What is in their jurisdiction
    - When to call FAA
  - To help local governmental agencies use drones more effectively, need to know how to obtain approvals for public operations

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## Major Concerns

- **Safety, security, and privacy**
  - Significant safety concerns about drones interfering with first responders such as firefighting
  - Privacy identified as both a “real” issue and a “perception” issue; i.e., public perception that all drones are spying on them
- **Enforcement**
  - Concerns about difficulty of catching errant drone operators
  - Concerns about how to tell good guy from bad guy operator
- **Liability**
  - Liability concerns if local drone laws are passed and bad things happen
  - Liability concerns if local government operates drones for public use and bad things happen
- **Children**
  - Concerns about how to manage drones being operated and registered by children
- **Preemption**
  - Concerns that state and Federal governments will disregard local needs and issues and override local rules
- **Recreational Drones**
  - Concerns about lack of legal jurisdiction over recreational operators, and recent court decision about registration

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## Benefits and Positive Feedback

- **Enthusiastic about expected benefits** of commercial drones:
  - Financial growth potential for local jobs, businesses, taxes
  - Enhanced convenience and safety for public works, inspections, firefighting, search and rescue, etc.
  - Interested in educating the public about drones in a positive way, to improve public expectations and assumptions
- **Eager for drone identification** capability:
  - Want inexpensive solutions for local law enforcement to identify and track drones (e.g., smartphone app)
  - Want easy way to tell the difference between types of drone operations (e.g., recreational vs. real estate vs. news gathering vs. firefighting)
- **No significant concerns raised about resources and costs** needed for drone enforcement:
  - Generally seen as “normal cost of doing business”
  - Some minor concerns raised about cost of training local law enforcement

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## Differences Between Mayors' and County Officials' Feedback

- **County Officials more focused on:**
  - Positive aspects of drone current and future potential uses and benefits
  - Concerns about overregulation (national, state, and local)
  - Logistics of clarifying and managing jurisdictional boundaries and differences between laws; examples discussed:
    - Texas state law prohibiting drones from photographing a property without explicit approval by property owner
    - Logistical orchestration of 911 handoffs between jurisdictions
- **Mayors more focused on:**
  - Concerns about safety, security, and privacy; examples discussed:
    - Firefighting operations suspended because of unknown drones
    - High school football championship game suspended because of an unknown drone
    - Local parades and gatherings affected by unknown drones
  - Concerns about state governments overriding local jurisdictions

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## Recommendations and Next Steps

- **Continued engagement by the FAA and UAS community with local government entities is essential**
  - Local officials are eager to be part of making commercial UAS a reality
  - Continuous educational outreach and a sincere attempt to address their on-going issues will improve partnership
- **Detailed report is being provided to the FAA**

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## Backup Information

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## National Association of Counties: Drone Policy Resolution 2016-17

- *Resolution Stressing the Important Role of Counties in Establishing and Implementing Laws and Regulations for Unmanned Aircraft Systems (UAS)*
- *Issue: Counties must have a seat at the table as Congress and the Administration develop and implement laws and regulations relating to unmanned aircraft systems (UAS), i.e. drones.*
- *Adopted Policy: The National Association of Counties (NACo) calls on Congress and the president to consult and work closely with County Officials and other local stakeholders as they consider new legislation and regulations addressing the emerging UAS/drone industry and to permit appropriate local regulations in any new legislation or regulation. We further urge the FAA to allocate additional seats on the Drone Advisory Council to counties.*
- *Approved | July 25, 2016*

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## U.S. Conference of Mayors Conference: Resolution in Support of Drone Federalism (1 of 2)

WHEREAS, cities recognize that domestic unmanned aircraft systems (UAS), or drones, have many potential benefits and may help improve city services from infrastructure inspection to search and rescue and firefighting, and security at large gatherings to accident investigations; and

WHEREAS, cities would like to harness the innovation of drones and safely integrate this technology into their airspace now and in the future; and

WHEREAS, UAS are significantly different from manned aviation and require different rules since drones take-off, land, and primarily operate in low-altitude airspace extremely close to people, structures and events; and

WHEREAS, UAS operate over very short distances and require information of a local character that cities are best equipped to share with operators and with future autonomous systems; and

WHEREAS, NASA and the FAA are working to develop an unmanned traffic management (UTM) system to manage drones flying in low-altitude airspace, which will require active participation from states and cities to be effective; and

WHEREAS, cities use traditional police, land use, and zoning powers to protect the safety of their citizens, guarantee the enjoyment of their communities, maintain order, and provide for the general welfare; and

WHEREAS, cities have the authority to regulate conduct in public places to ensure safety, such as skateboarding on city sidewalks, using heavy equipment on city streets or permitting large gatherings in public spaces; and

WHEREAS, cities can use their authority to make reasonable time, manner, and place restrictions around First Amendment rights; and

WHEREAS, the local needs of cities vary within and across states and Federal regulators will never have sufficient information or enforcement resources to know when conditions on the ground may make the low altitude operation of a drone unsafe due to local public gatherings, local sporting events or emergency response; and

WHEREAS, drones have interfered with first responders operations, including firefighting aircraft, air ambulance helicopters, and law enforcement helicopters; and

WHEREAS, drones have crashed into power substations leaving entire neighborhoods without power, been used to drop contraband into prison yards, and have flown over large public gatherings, falling from the sky, injuring children and damaging property; and

WHEREAS, it is local first responders, not the FAA, that residents call when drone incidents occur; and

WHEREAS, an integrated regulatory framework is needed so that local regulations complement Federal and state regulations to ensure that the benefits and opportunities presented by drones can be realized,

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## U.S. Conference of Mayors Conference: Resolution in Support of Drone Federalism (2 of 2)

*NOW, THEREFORE BE IT RESOLVED, that the United States Conference of Mayors supports Federal legislation and regulation to allow local governments to participate in the regulation of drones by issuing reasonable restrictions on the time, manner, and place of operation of a civil unmanned aircraft system that is operating below 200 feet above ground level; and*

*BE IT FURTHER RESOLVED, that the United States Conference of Mayors urges Federal action that provides that the operation of civil unmanned aircraft in the immediate reaches of the airspace above property is not authorized without the permission of the property owner; and*

*BE IT FURTHER RESOLVED, that the United States Conference of Mayors urges the FAA to establish pilot programs with state, local and tribal governments to participate in the development of unmanned traffic management (UTM) so that all drone operators know what the conditions are when a drone can be operated in low altitudes; and*

*BE IT FURTHER RESOLVED, that the United States Conference of Mayors opposes any efforts to pre-empt local participation in the regulation of low-altitude drone operations.*

*Approved | June 24, 2016*

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