RTCA

THE GOLD STANDARD FOR AVIATION SINCE 1935

Drone Advisory Committee
Public Meeting

September 16, 2016

PUBLIC MEETING ANNOUNCEMENT
Read by: Designated Federal Official Victoria Wassmer
Drone Advisory Committee
September 16, 2016

In accordance with the Federal Advisory Committee Act, this Advisory Committee meeting is OPEN TO THE PUBLIC.

Notice of the meeting was published in the Federal Register on: September 1st, 2016.

Attendance is open to the interested public.

With the approval of the Chairman, members of public may present oral or written statements at the meeting.

Persons wishing to present or obtain information should coordinate with RTCA Program Director – Al Secen and the Chairman – Brian Krzanich

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Overview of RTCA & Federal Advisory Committees DAC Meeting

September 16, 2016

FACA Guidelines & Principles

- Promote Openness, Accountability, Balanced Viewpoints
- Membership Balanced Representation from Community
- Competing Interests Welcome
- Potential Conflicts of Interest Must Be Disclosed
- Limit FAA Membership, Serve as Ex-officio Members
- Committee Meetings Open to the Public
- Agenda in Federal Register 15 Days Prior to Meeting
- Agendas, Meeting Minutes & Materials Posted on Web
- All WG Recommendations Vetted through Parent Comm
- Parent Committee Not a “Rubber Stamp” of Subcomm
- Non-member Allowed to Speak with Prior Approval

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Consensus Process

- Consensus is the Essence of the Value that RTCA Brings to the Aviation Community
- Role Of Chairman is to Ensure Consensus
- Opportunity for All Voices to Be Heard
- Analytical Basis for Decisions
- Transparent Process
  - Documentation captures discussion & resolution
- Consensus is not Always 100% Agreement
- Members “Can Live With” & Support the Results

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Dissenting Opinion

- If an issue cannot be resolved in timely manner, dissenter encouraged to document non-concur
- Dissenting opinion presented to FAA along with committee’s consensus
- Committee leadership document why the committee believes its position is the superior one

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Key Committee Positions

- A Minimum of Three Key Roles Must be Filled:
  - Chair(s)
  - Designated Federal Official
  - Secretary

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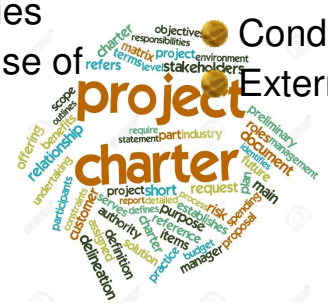
Terms of Reference: Charter for the Committee

- Committee Leadership
- Background
- Purpose and Scope
- Structure of Committee
- Responsibilities
- Envisioned Use of Deliverables
- Membership Makeup
- Tasking
- Operating Norms
- Oversight
- Conduct of Meetings
- External Coordination



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Operating Norms

- Guide, Track & Report Progress of WGs & Task Groups
- DAC - Coordinate Products for Submittal to the FAA
- Term limits
- Consensus and Non-concurs
- 3 Plenary Meetings per Year
- ~6 DACSC Meetings
- Potential for Work Groups and Task Groups

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Guidelines for Recommendations

- Advance UAS Integration into the NAS
- Increase Safety, Security, Capacity and Efficiency Of NAS
- Be Consensus-based and Articulate Required Resources
- Define Requirements for Public/Private Partnership Activities
- Be Actionable With Specific Outcome
- Articulate Assumed Capabilities, Policies, Ops Concepts and FAA's Role
- Address Whether Conops are Flexible Enough
- Address Whether Conops Impact Safety, Security or Efficiency?
- Address Whether Recommendations Require and Inform New Performance Standards?
- Address Interoperability Issues?
- Include Duration of Proposed Recommendation
- Address Whether Recommendation Require Rulemaking?

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FAA Response to DAC Recommendations

- Could lead to:
  - Additional Tasks
  - New WGs or TGs formed
  - Tasks to other groups such as ARCs
  - Tasks to Standards Committees
  - Tasks to Research Organization

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Expectations of Committee Members

- Prepare for meetings
- Show up to meeting
- Listen and Learn
- Contribute to products
- Commit to recommendations

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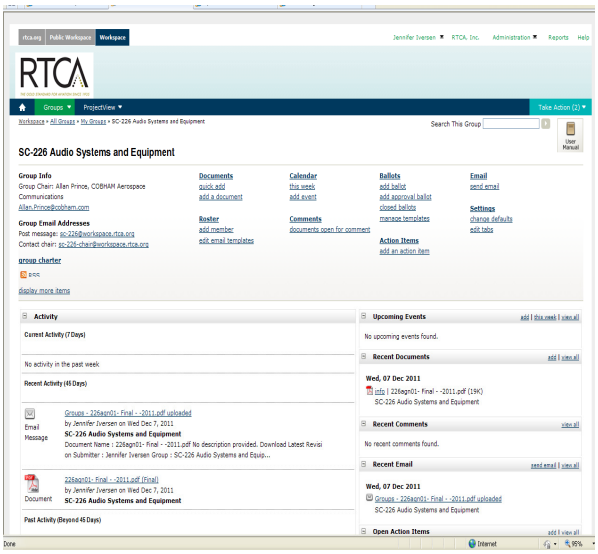
Collaboration Workspace



RTCA maintains a "Go To" place for members only

- Meeting/Attendance information
- Calendar
- Agenda
- Meeting Summary
- Committee Papers
- Documents
- Doc commenting tool

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Drone Advisory Committee

Overview of DAC Objectives

Presented by: Hoot Gibson, FAA Senior Advisor to the Deputy Administrator on UAS Integration

Presented to: Drone Advisory Committee

Date: September 16, 2016

Objectives for the First Meeting

- **Develop a functioning team**
- **Understand Federal Advisory Committee Act (FACA) rules**
- **Review current UAS landscape**
- **Discuss UAS activities in FAA Reauthorization**
- **Review survey results and through discussion, drive toward focus areas for subcommittee work**

Objectives for the First Year

- **Maintain working knowledge of FAA's UAS integration strategy and its constraints**
- **Advise the Administrator on gaps in the FAA UAS integration strategy & provide recommendations**
- **Provide a consensus position on the FAA's five-year UAS CONOPS and its priorities**
- **Given FAA UAS integration plan advise on legislative strategy and priorities**

Drone Advisory Committee Meeting

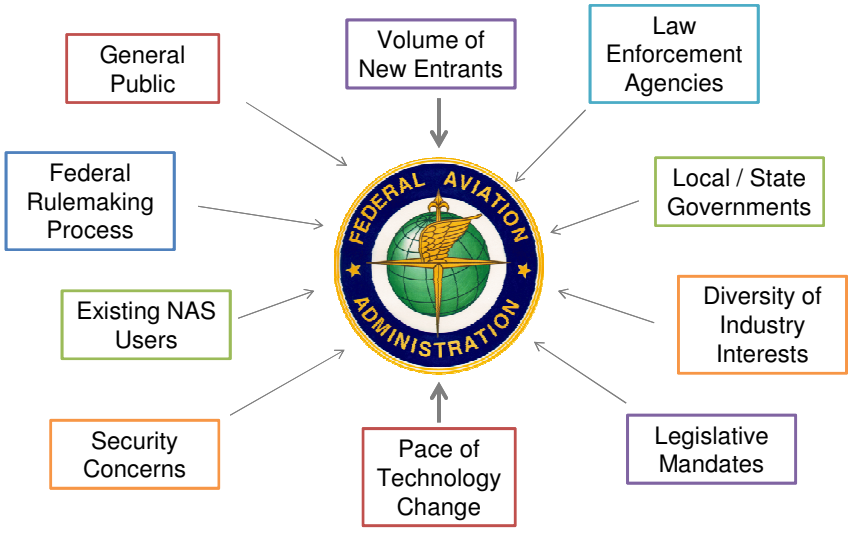
Overview of the UAS Landscape

Presented by: Earl Lawrence, Director, UAS Integration Office

Presented to: Drone Advisory Committee

Date: September 16, 2016

Current Regulatory Environment



Growing Stakeholder Community


Remote Pilots


Service Providers


Existing NAS Users


Manufacturers


Local Governments

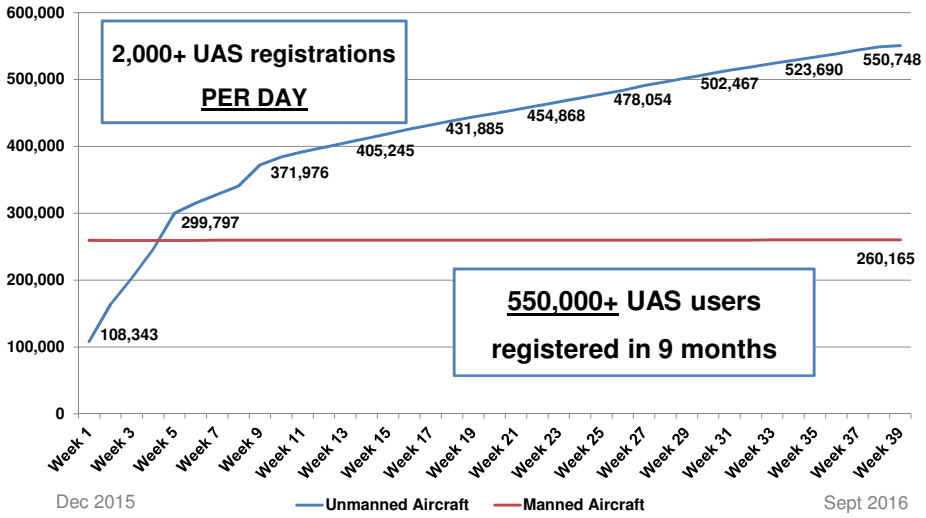

Congress


Law Enforcement


Tribal Governments

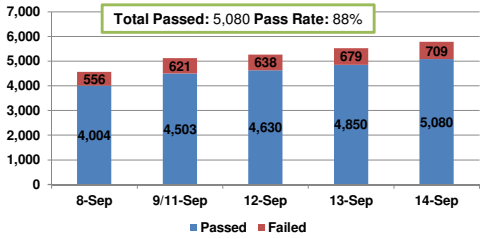

General Public

Unmanned vs. Manned Aircraft Registration

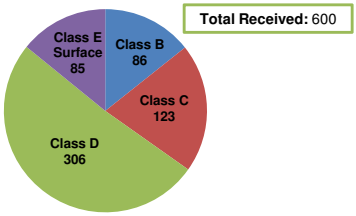


Part 107 Progress

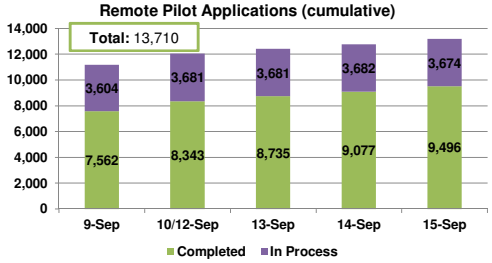
Remote Pilot Knowledge Tests Taken (cumulative)



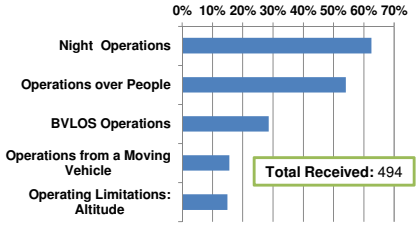
Airspace Authorization Requests (cumulative)



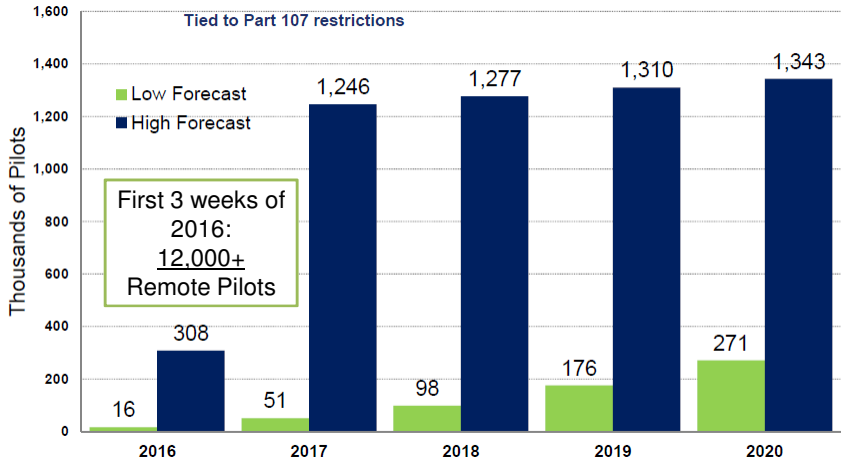
Remote Pilot Applications (cumulative)



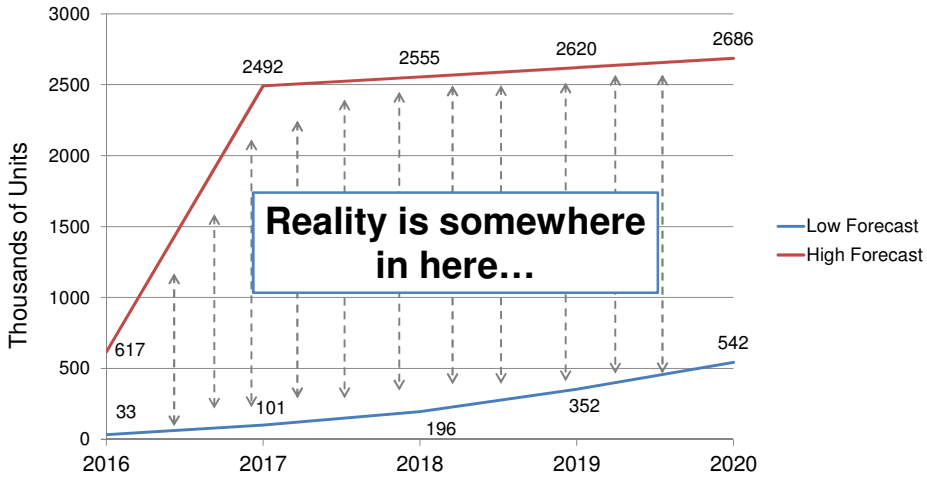
Top 5 Waiver Requests



Remote Pilot Forecast



Small UAS (non-model) Fleet



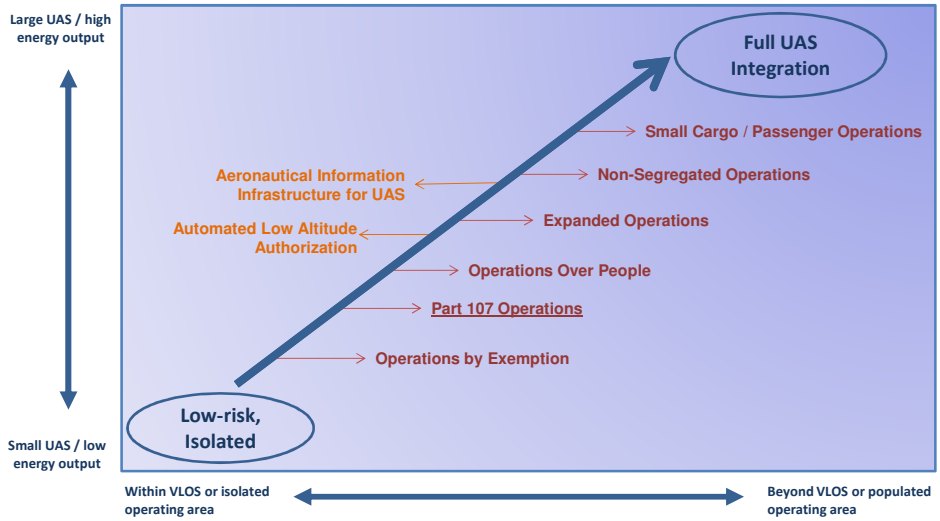
UAS Strategic Priorities

Safety: *Enable safe UAS operations within the NAS*

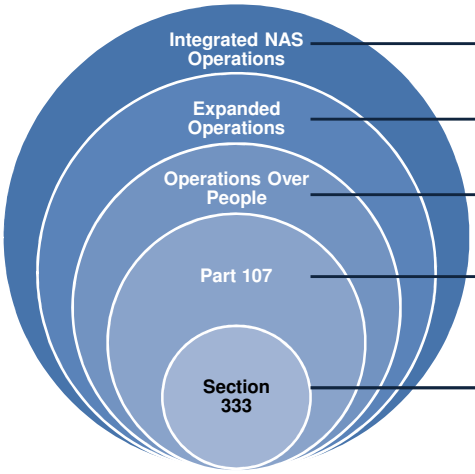
Adaptability: *Create an environment where emergent technology can be safely and rapidly introduced into the NAS*

Global Leadership: *Shape the global standards and practices for UAS through international collaboration*

FAA UAS Integration Strategy



Building the Regulatory Framework



- Interaction with ATC
- Safety achieved via compliance to conventional aircraft operating principles

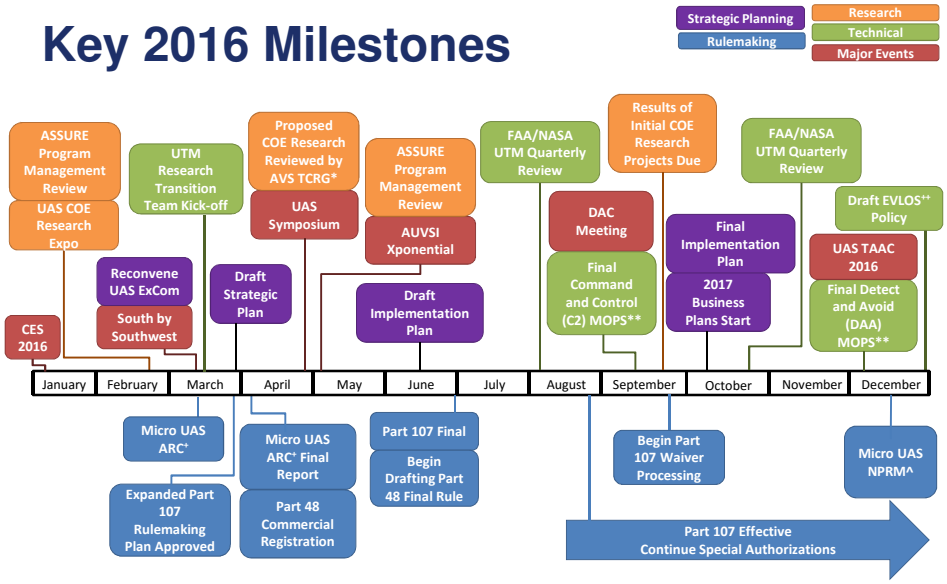
- Expand part 107 to facilitate low altitude operations through Airworthiness certification
- Routine Focus Area Pathfinder 2 and 3 operations

- Expand part 107 to incorporate standards for flight over non-participating people
- Routine Focus Area Pathfinder 1 operations

- Regulatory framework for routine sUAS operations
- Safety achieved through VLOS and operating limitations

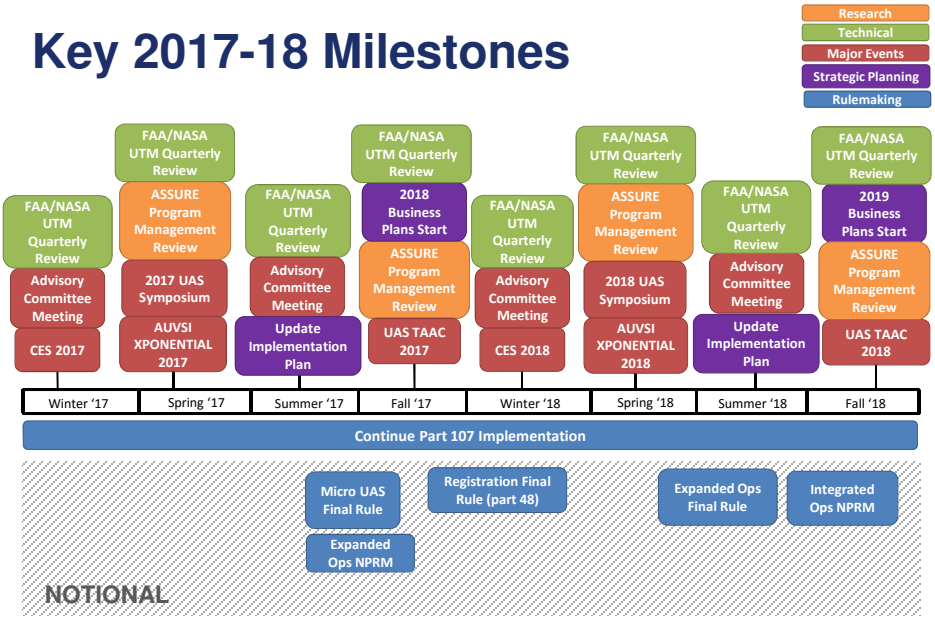
- Case-by-case exemptions granted to existing regulations
- Enables non-recreational UAS operations before final part 107 rulemaking
- Safety achieved with operating conditions and limitations

Key 2016 Milestones

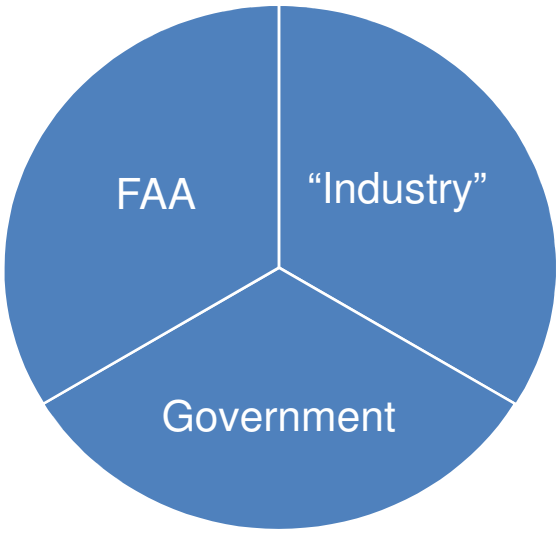


*Technical Community Representative Group | +Aviation Rulemaking Committee | ^Notice of Proposed Rulemaking | **Minimum Operational Performance Standards
++Extended Visual Line-of-Sight

Key 2017-18 Milestones



Consensus-Building is Key to Speed



Final thoughts…

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Drone Advisory Committee
Survey Results

Al Secen

DAC Secretary

Overview

- A survey was created to gain insight into members' priorities, sensitivities, and organizational goals
  - Expectations
  - Concerns
- Prioritization of the DAC recommendations starts with identification of issues
- Rating these priorities is the next step
- The following charts review the survey responses

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Overview (continued)

The survey asked members to provide information on:

- Top Priority Issues
  - First Year
  - Longer-term
- Top Technical Issues
- Top Policy Issues
- Top Perception Issues
- Expectations
  - Timing of Integrated Ops
  - Pace of UAS Integration
- Member Demographics
  - Applications
  - Domain
- Understand my Place in FAA Strategy?
- Open-ended questions
  - Info from FAA
  - What Industry Can Do
  - What FAA Can Do
  - 5-year Goals

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Problem Space Boundaries

DOMAIN
Low Altitude BVLOS
Low Altitude VLOS
Model/Hobby
Public Use Operations
Full UAS Integration into the NAS
Certification
CNS MOPS
Performance Testing
Spectrum
SW/HW Development, Testing, Cert.
Security
Privacy

TECHNOLOGY
Big Data Management
Collision Avoidance
Cybersecurity
Electronic Signatures and Identification
Spectrum

PERCEPTION
Privacy
Armed drones
Interdiction (unfriendly drones)
Law enforcement use
Noise
Safety and reliability
Understand FAA UAS plans/strategy
Use case/operational concept

REGULATORY/POLICY
Interdiction (cybersecurity?)
Performance Standards
Policy/Inter-agency collaboration
Pre-emption
Privacy
Regulatory enforcement
Regulatory Flexibility
Safety

As expected, the boundaries for this committee's use are very broad and far-reaching

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SURVEY RESULTS

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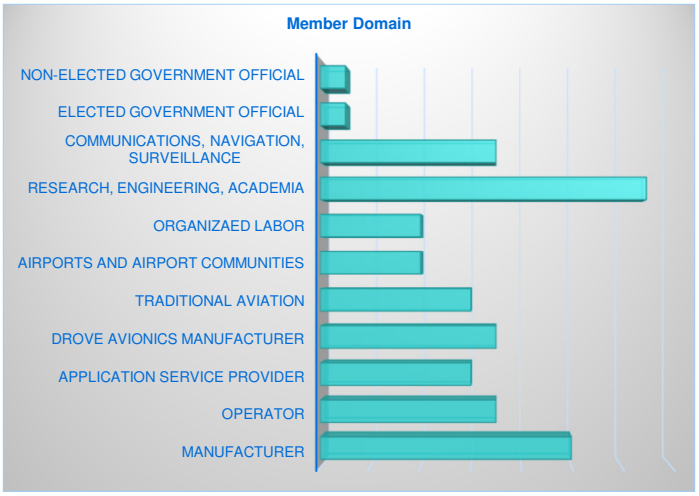
Member Domain

Question:

In what domain is your business involved (select all that apply)?

Result:

There is a broad range of organizations representing the many facets that UAS operations will impact. This implies reaching a consensus may be challenging.



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Expectations

Question:

If you are involved in manufacturing or operating drones, how quickly do you foresee being able to operate in the airspace on a routine basis without waivers?

Result:

There is a fairly even split between members who build or fly UAVs and those who don't. Most of those whose organizations do, are expecting quick access for their products and services

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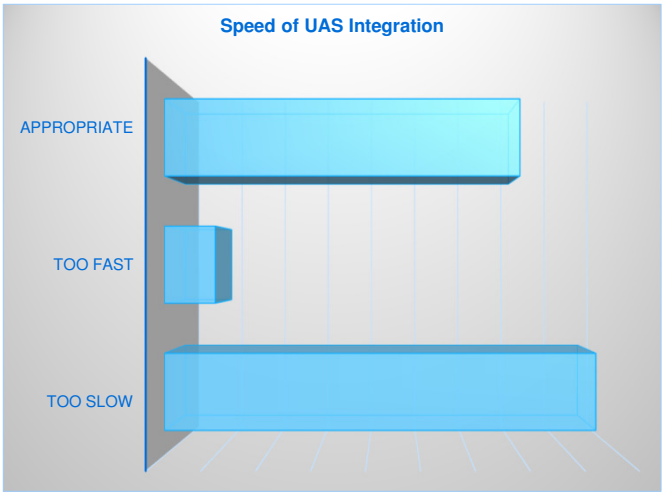
Speed of Integration

Question:

Choose the statement that most accurately reflects your position [on speed of UAS integration]:

Result:

There is a almost an even split of those who feel the integration effort is too slow and those that feel it is appropriately paced. This indicates an area where bridging to reach consensus will be required.



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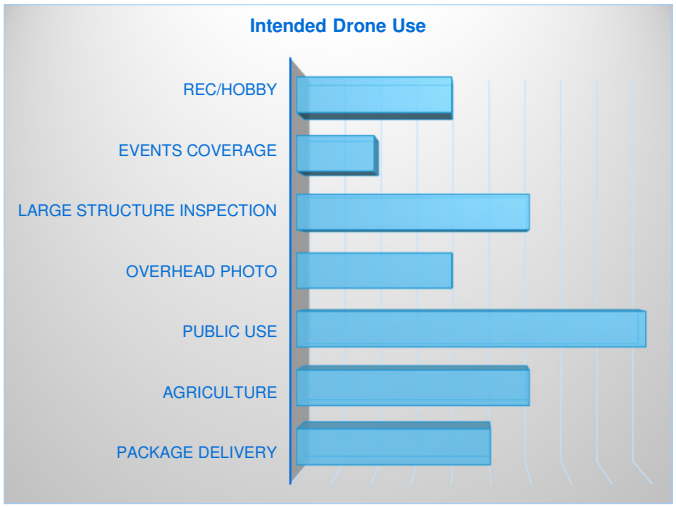
Intended Use

Question:

If you are involved in manufacturing or operating drones, what is (are) your intended applications?

Result:

Wide range of possible uses implies a good cross-section of industry operators. Determining priorities, though, could be a challenge.



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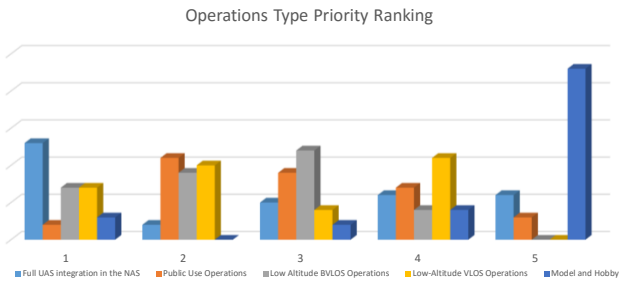
Operational Priority

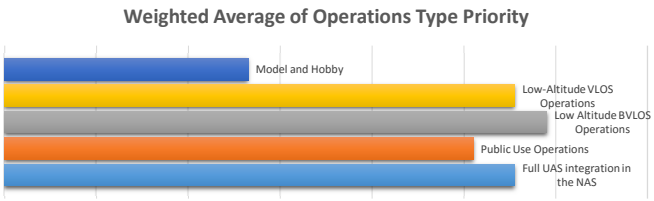
Question:

Order the following UAS domain topics in order you think the DAC should address them

Result:

The range of priority interests is broad, but there is a slightly greater interest in BVLOS, low-alltitude VLOS and Full Access to the Airspace operations.





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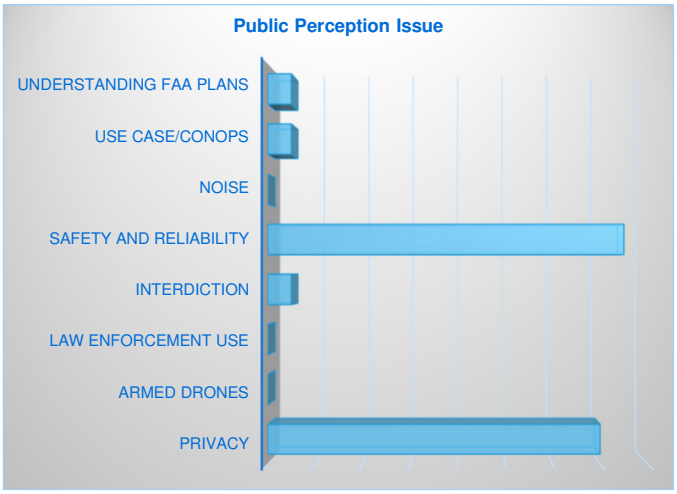
Public Perception

Question:

What is the biggest public perception issue facing UAS integration?

Result:

Members believe the public is primarily concerned about safety and privacy. The committee is close to consensus in this area.



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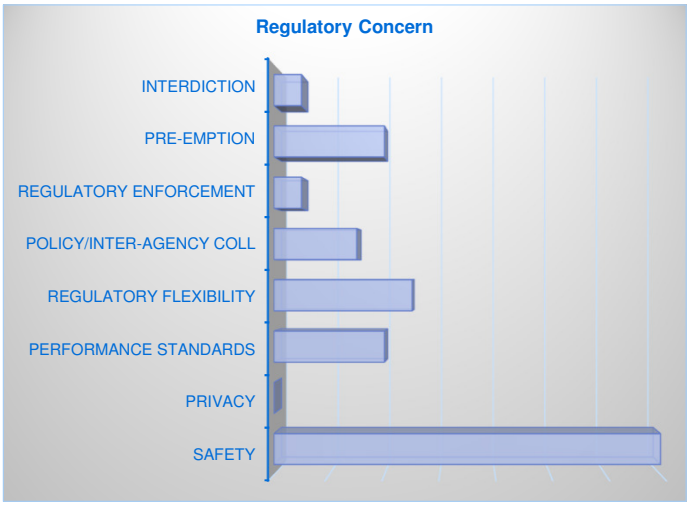
Regulatory Concern

Question:

What is your biggest regulatory / policy concern?

Result:

While there is a broad array of concerns on the regulatory front, safety ranks high by the members. Agreement on regulatory concerns will influence mitigating priorities.



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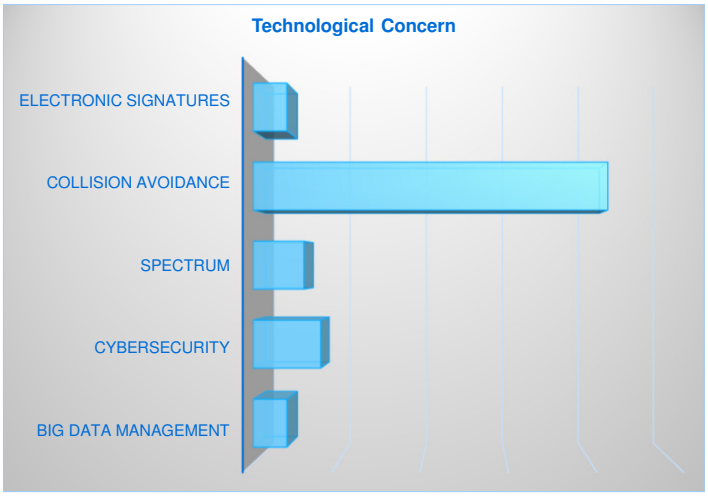
Technological Concern

Question:

What is your biggest technological concern?

Result:

Collision avoidance is deemed a highly pressing technological concern. Another area where consensus is close, but other opinions must be addressed. Consensus here will also influence priorities



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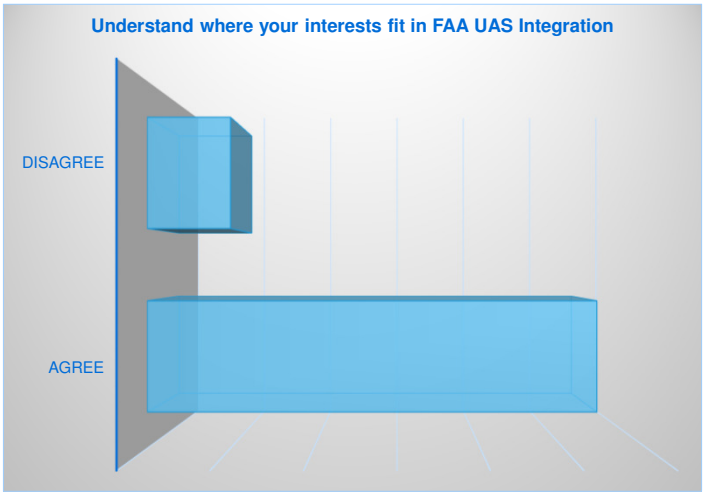
FAA UAS Integration

Question:

I understand where my interests fit in the FAA's UAS integration strategy.

Result:

Most members believe they understand how their goals can be supported by UAS integration. This aids in focusing consensus building by highlighting the benefits to the organizations of the recommendations they will deliver



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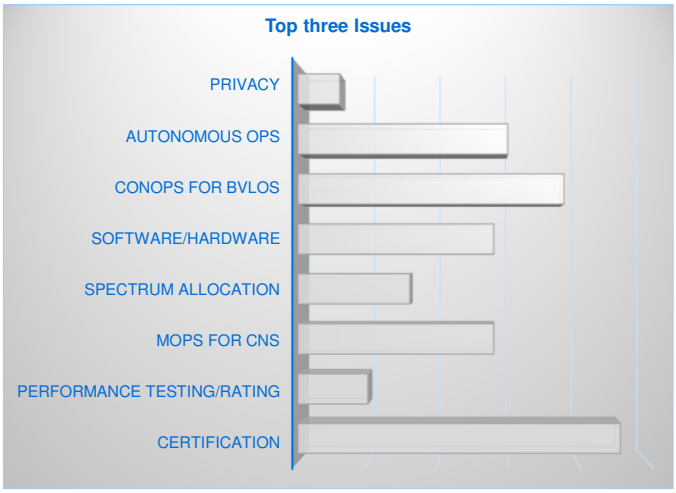
Top Three Issues

Question:

Select the top three topics you think the DAC should address during its first year.

Result:

A wide array of responses indicates work for the DAC in setting priorities. Broad responses indicate consensus could be a challenge. More data (from sub group work) can assist in refining these results to identify the "must haves".



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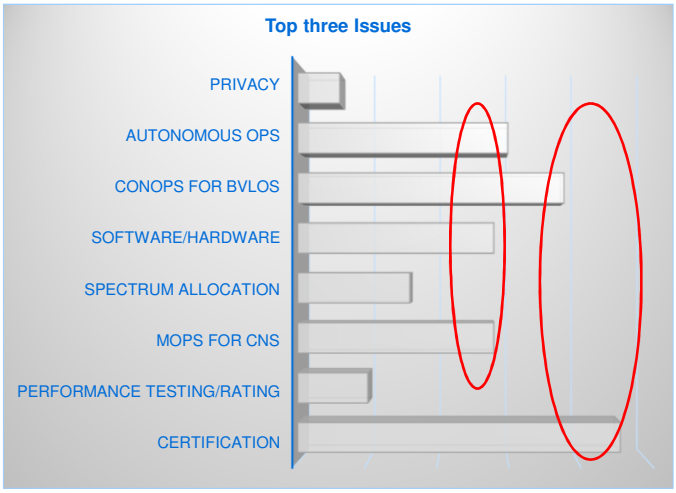
Top Three Issues

Results:

The analysis indicates a close ranking of the top 5 issues. The ranking does not reveal a mandate on industry's view of what needs to be addressed. Criteria must be developed and agreed upon that can gauge the value gained/cost incurred for each alternative.

Once the criteria are developed, then evaluation by the DAC of the issues against those criteria should drive out the top candidates



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Summarizing Results

There is near consensus on

- Perceived public concerns
- FAA strategic plan alignment
- Technological concerns for industry

Consensus yet to be reached on

- Pace of integration efforts
- Focus of priorities going forward
- Top three issues facing UAVs in the airspace

The team believes they understand public concerns, what the hardest technical challenge is and how their organizations will benefit from UAS integration: build on this mutual creed to forge consensus on priorities

The wide variety of domains and intended uses for UAVs expressed by the members will naturally lead to a wide variety of priorities. Research, data, and discussion will drive the committee to consensus for priorities on which the FAA should focus.

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Drone Advisory Committee

September 16, 2016

LUNCH 12:00 PM – 1:00 PM

Analyzing Results

Consensus exists		Leading Issues
Safety	Can we determine from this early result, a recommendation that the FAA can use to focus resources and effort?	BVLOS
FAA Alignment	And in so doing, how soon (realistically) do these recommendations have to be enacted to consider them successful	Certification
Collision Avoidance		Autonomous Ops
		Software/ Hardware
		MOPS for CNS

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What Did You Say?

- **Access** to Airspace is a Priority
- **Safety** if Essential and Must be Addressed
- Drone Applications are Many and Diverse
- Operational Priorities: Low Altitude BVLOS, VLOS
- Public Perception Issues: Safety, Privacy
- Broad Array of Regulatory Concerns, with Safety Assurance High
- Technology: Collision Avoidance Ranked #1
- Access in 6 months to one Year
- Pace is between Appropriate and too Slow

- Given All That, What Should the DAC Take On?
  - Certification
  - BVLOS Conops
  - Performance Standards
  - Software/Hardware
  - Autonomous Operations

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Can We Unpack That?

- What is Included in:
  - Certification
  - BVLOS
  - Performance Standards
  - SW/HW Development, Testing and Certification
  - Autonomous Operations?
- What is Missing?

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Next Steps

- Establish DAC Subcommittee
  - Representative for each DAC member
  - Additional members organizations from pool of DAC applicants
  - Others as appropriate to address high priority issues
- Schedule first meeting of DAC-SC by end of October

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Example: The NextGen Advisory Committee (34)

Designated Federal Official	Victoria Wassmer, Dep Asst Admin, FAA
Chair	Richard Anderson, Delta Air Lines, Inc.
Operators	Mark Baker, President & CEO, AOPA Ed Bolen, President & CEO, NBAA Jim Bowman, SVP, FedEx Express Jeff Martin, EVP, JetBlue Airways Russell Childs, President, SkyWest, Inc. (Regional Airline Association Chairman)
International	Florian Guillermet, Executive Director, SESAR Joint Undertaking Frank Brenner, Director General, Eurocontrol
Airports	Mario Diaz, Director of Aviation, City of Houston Department of Aviation Ginger Evans, City of Chicago
DOD	Martin Whelan, Director of Future Operations, United States Air Force
FFRDC	Lillian Ryals, Senior Vice President, MITRE Corporation/General Manager, MITRE CAASD
RTCA	Margaret Jenny, President, RTCA

Aircraft Manufacturer	Per Noren, VP, Digital Aviation, Boeing T. Allan McArtor, Chairman, Airbus Americas Pete Bunce, President & CEO, General Aviation Manufacturers Association
ATC Automation	David Melcher, President,Aerospace Industries Assn Pete Dumont, President, Air Traffic Control Assn Vicki Schmanske, Vice President Operations, Lockheed Martin IS&GS Civil, Defense & Intel John Harris, Vice President, Raytheon
ATC Infrastructure	Carl D'Alessandro, Harris Corporation
Avionics	Carl Esposito, Honeywell Aerospace
Environment	Brad Pierce, NOISE – Aurora City Council
FAA	Eduardo Angeles, Assoc Admin for Airports Teri Bristol, Chief Operating Officer Air Traffic Org Jim Eck, Assistant Administrator, NextGen John Hickey, Dep Assoc Admin for Aviation Safety Rich Swayze, Assistant Administrator, International Aviation and Policy
Unmanned Aircraft Systems	Ryan Hartman, President and CEO of Insitu
NASA	Dr. Jaiwon Shin, Assoc Admin, NASA

Example: NACSC - ~75 members

- Industry Co-Chairs, Operators – Carriers and GA
- Operators 13
- International 4
- Airports 4
- DOD
- Labor 5
- Aircraft Manufacturers 4
- ATC Automation 11
- Provides 9
- Environment
- UAS

- All NAC Members have Representation on SubComm
- Others in each category included to:
  - Give voice to more who want to participate
  - Expand expertise
- Alternates allowed (provided they are up to speed)

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DAC Subcommittee: Task # 1

- Start with Priorities Identified Today
- Flesh Out What is Included in Each Issue
- Develop 5-6 criteria to select among issues alternatives, e.g.:
  - DAC preferences
  - How essential is it to successful drone integration
  - Cost indices and risk values
  - Number of users/operators benefitting from the alternative
  - Others?
- Rank and weight the criteria
- Apply criteria to list of alternative issues
- Output rank-ordered list of issues/alternative
- Apply reason & subject matter expertise to list
- Perform sensitivity analysis with different criteria rankings
- Develop recommendation for DAC

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BACKUP

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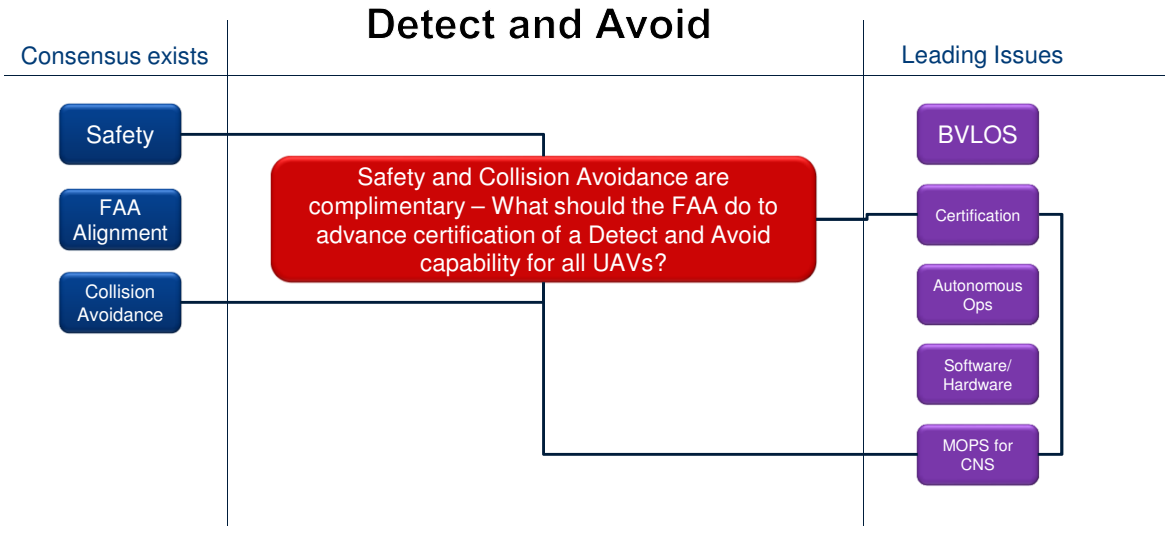
Analyzing Results



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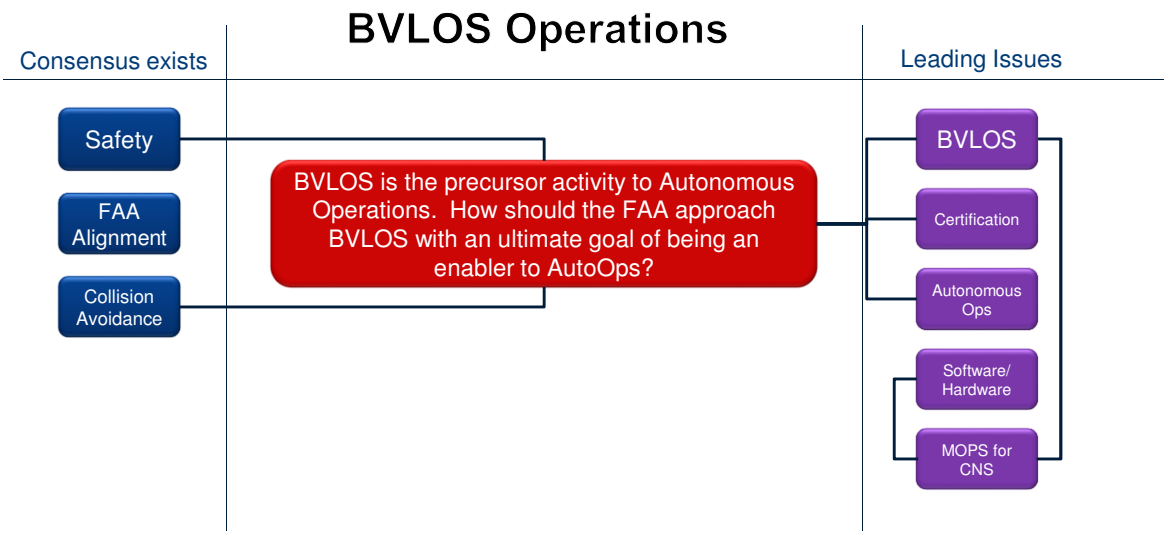
Analyzing Results



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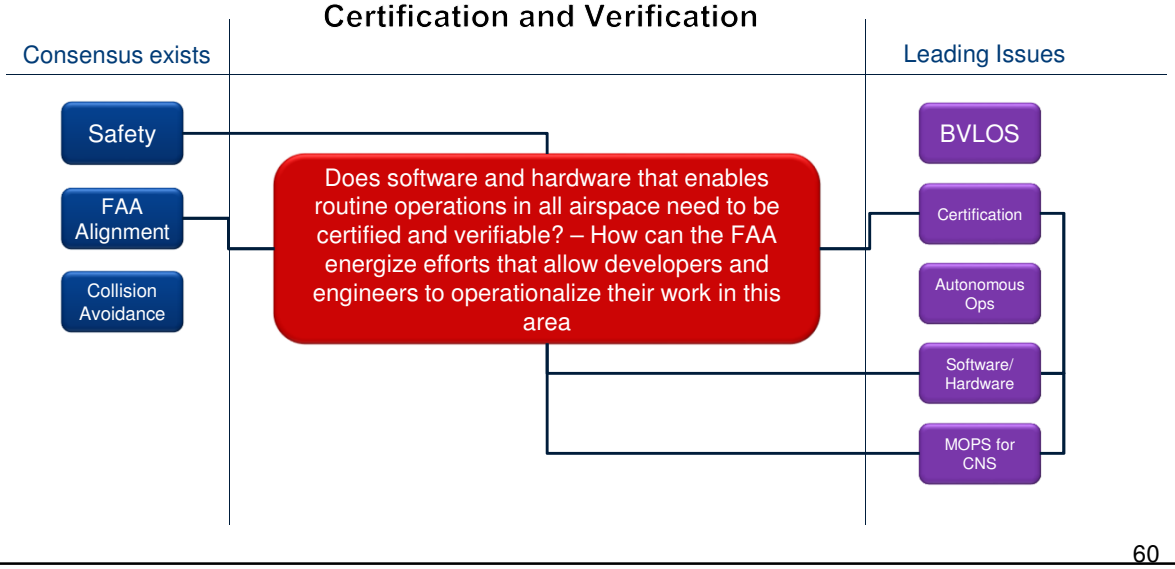
Analyzing Results



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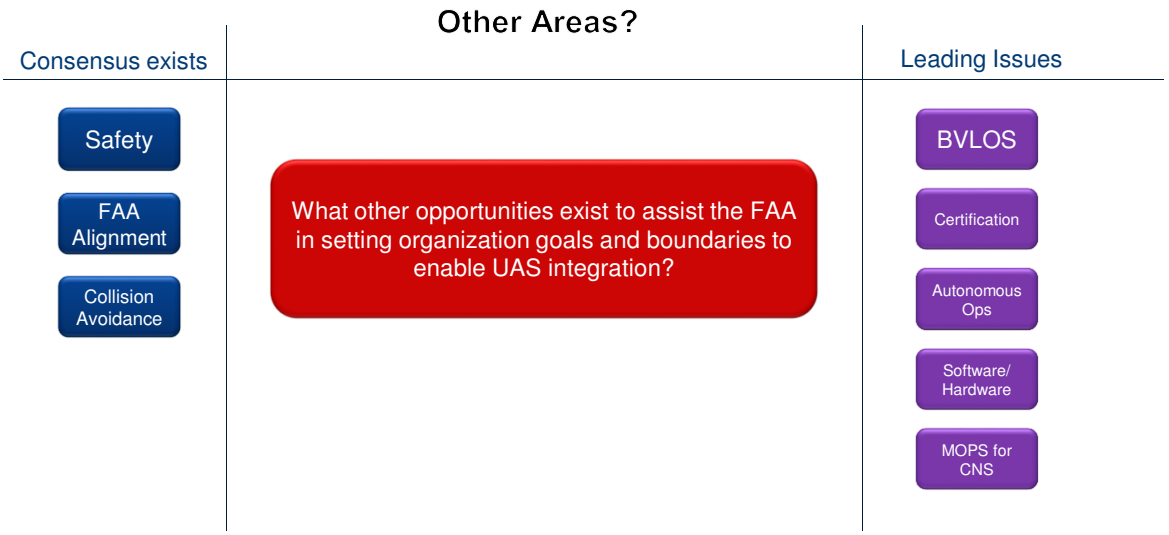
Analyzing Results



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RTCA

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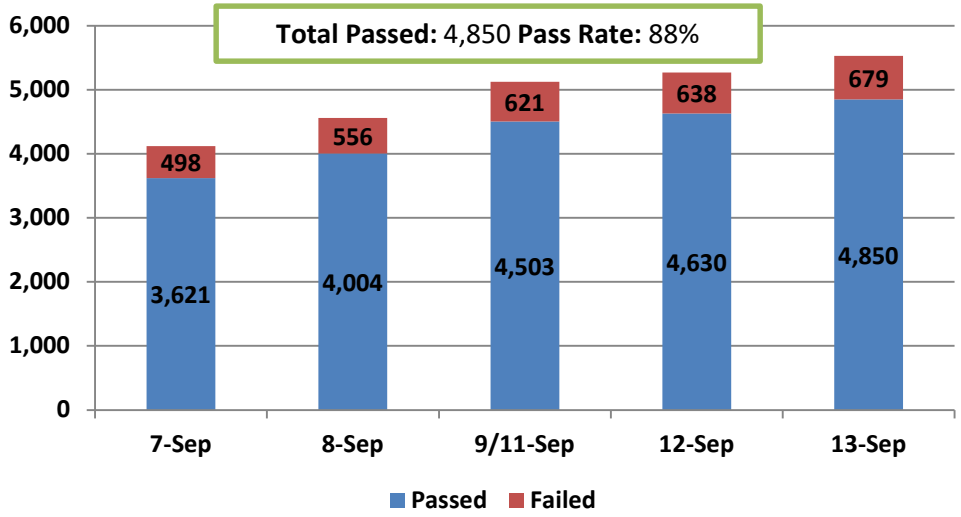
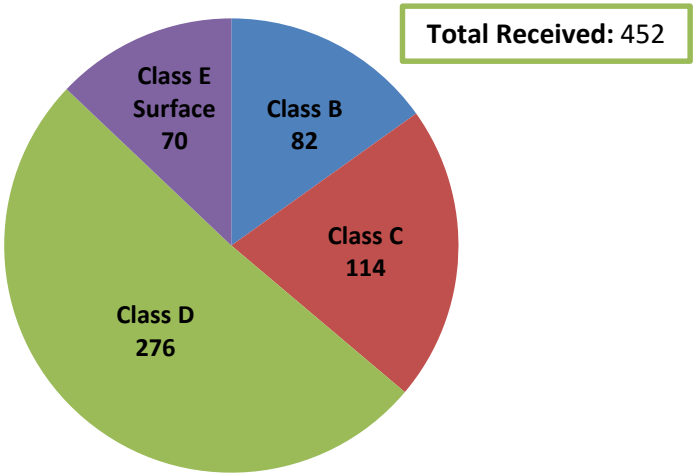
UNMANNED AIRCRAFT SYSTEMS
Small UAS Rule (14 CFR Part 107) Metrics

Federal Aviation Administration

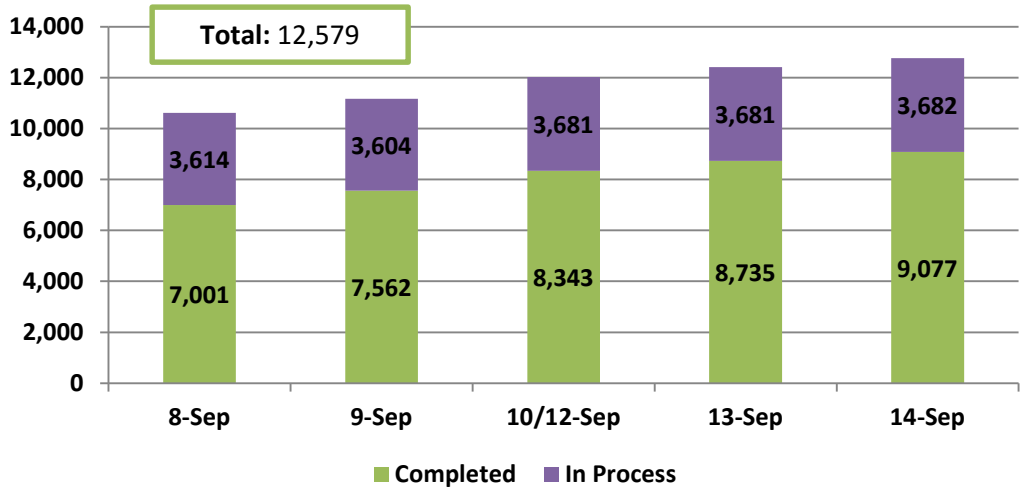
Remote Pilot Knowledge Tests Taken (cumulative)



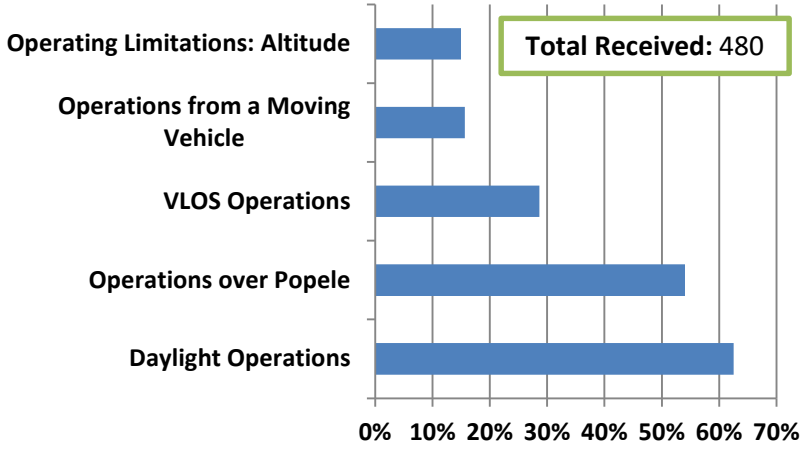
Total Airspace Authorization Requests



Remote Pilot Applications Processed (cumulative)



Top 5 Waiver Requests



UNMANNED AIRCRAFT SYSTEMS
Small UAS Rule (14 CFR Part 107) Overview

Federal Aviation Administration

PART 107

The Small UAS rule adds a new part 107 to Title 14 Code of Federal Regulations (14 CFR) to allow for routine civil operation of small Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) and provide safety rules for those operations. The rule became effective on August 29, 2016.

PART 107 WAIVERS

Because UAS operations evolve rapidly, a key provision of this rule is a waiver mechanism to allow individual operations to deviate from many of the operational restrictions of the rule if the Administrator finds that the proposed operation can safely be conducted under the terms of a certificate of waiver.

REMOTE PILOTS

- Must be 16 years old
- Must be able to read, write, and understand English
- Must pass an aeronautical knowledge exam
- Must undergo TSA Security Check

MAJOR PROVISIONS

- Unmanned aircraft must weigh less than 55 lbs. (25 kg)
- Aircraft must remain within visual line-of-sight (VLOS) of the pilot*
- No operation over persons not directly participating in the operation*
- Daylight-only or civil twilight (with appropriate anti-collision lighting) operations only*
- Maximum groundspeed of 100 mph (87 knots)*
- Maximum altitude of 400 feet or within 400 feet of a structure*
- Minimum weather visibility of 3 miles from control station*
- Remain 500 feet from clouds (no ceiling requirement)*
- Operations in Class B, C, D, and Class E surface areas require ATC approval
- Operations in Class G airspace are allowed without ATC permission
- Pilot must perform pre-flight check
- No operation from a moving vehicle unless the operation is over a sparsely populated area*
- No carriage of hazardous materials

*Subject to waiver

RECREATIONAL OPERATIONS

Recreational operators, including radio-controlled (RC) aircraft, may choose to operate under Part 107, or must satisfy all the criteria specified in Section 336 of Public Law 112-95 (which will now be codified in 14 CFR part 101), including the stipulation they be operated only for hobby or recreational use and in accordance with community-based safety guidelines.

FESSA Section	Requirement
2202	**Identification Standards**
	The Administrator, in consultation with DOT, RTCA, and NIST, will convene industry stakeholders to facilitate development of consensus standards for UAS, including remote identification and a publicly accessible database of UAS operators.
2203	**Safety Statements**
	The Administrator must develop language and guidance for safety standards that all manufacturers must include with the UAS.
2204	**Interagency Cooperation for UAS in support of firefighting operations and utility restoration**
	The FAA will enter into agreements with Secretaries of Agriculture, Interior, and Energy (and any other relevant agency) to facilitate the expeditious authorization of UAS for firefighting and utility restoration.
2205	**Interference with wildfire suppression, law enforcement, or emergency response effort by operation of UAS**
	New language added to US Code that penalizes UAS use near wildfires.
2206	**Pilot project for airport safety and airspace hazard mitigation**
	The Administrator shall establish a pilot program for airspace hazard mitigation at airports and other critical infrastructure.
2207	**Emergency exemption process**
	The Administrator shall publish guidance for emergency exemptions and/or COAs for civil and public operators to respond to disaster or emergency situations.
2208	**UAS UTM**
	The Administrator shall coordinate with NASA administrator to continue development of research plan for UAS UTM.
2209	**Application for designation**
	The Secretary of Transportation must develop a process to allow applicants to petition the FAA to prohibit or restrict aircraft, including UAS, operations near a fixed site facility.
2210	**Operations associated with critical infrastructure**
	The Administrator must create an application process for UAS operators to apply to use a UAS for critical infrastructure projects, in particularly allowing for BVLOS and nighttime ops
2211	**Unmanned aircraft systems research and development roadmap**
	FAA, NASA, and stakeholders in industry and academia shall develop a roadmap of the estimates, schedules, and benchmarks for integrating UAS into the NAS; amends Section 332, which still requires annual roadmap updates.
2212	**Unmanned aircraft systems-manned aircraft collision research**
	The Administrator and NASA shall develop a program to conduct testing or modeling of collisions between manned and unmanned aircraft.
2213	**Probabilistic metrics research and development study**
	The Administrator will enter into an arrangement with the National Academies to study the potential use of probabilistic assessments of risk by the FAA to streamline the integration of UAS into the NAS.

UNMANNED AIRCRAFT SYSTEMS
Small UAS Registration

Federal Aviation Administration

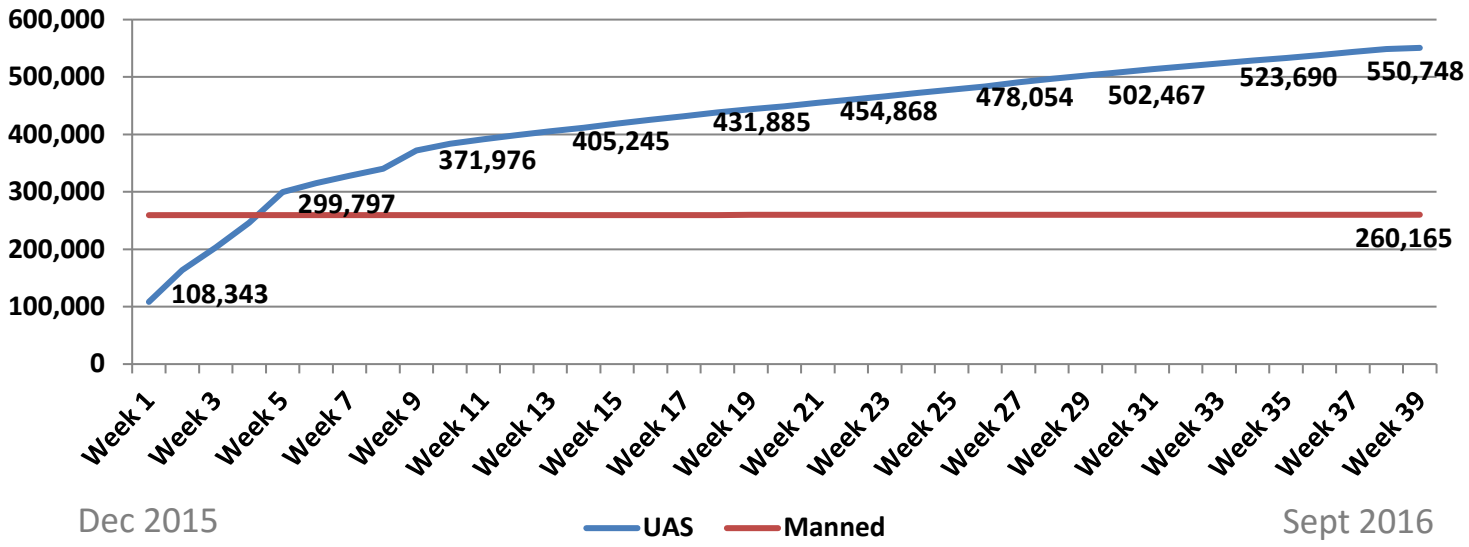
REGISTRATION TASK FORCE

In October 2015, the FAA announced the UAS Registration Task Force Aviation Rulemaking Committee (ARC) to develop recommendations for a small UAS registration process. The Task Force was comprised of 25 members representing a range of stakeholder viewpoints, interests and knowledge of the objectives and scope. The Task Force met for three days in November 2015 and delivered its final recommendation report on November 20, 2015.

RULE OVERVIEW

- UAS between 0.55 and 55 lbs. and flown outdoors must be registered
- Registrants must be at least 13 years old and provide a full name, physical and email addresses
- UAS must be marked with the registration number
- Registration costs $5 and is valid for 3 years

Unmanned vs. Manned Aircraft Registration



Registermyuas.faa.gov