FAA Unmanned Aircraft Systems (UAS) Update

Presented to: The National Academies UAS Risk Studies Meeting

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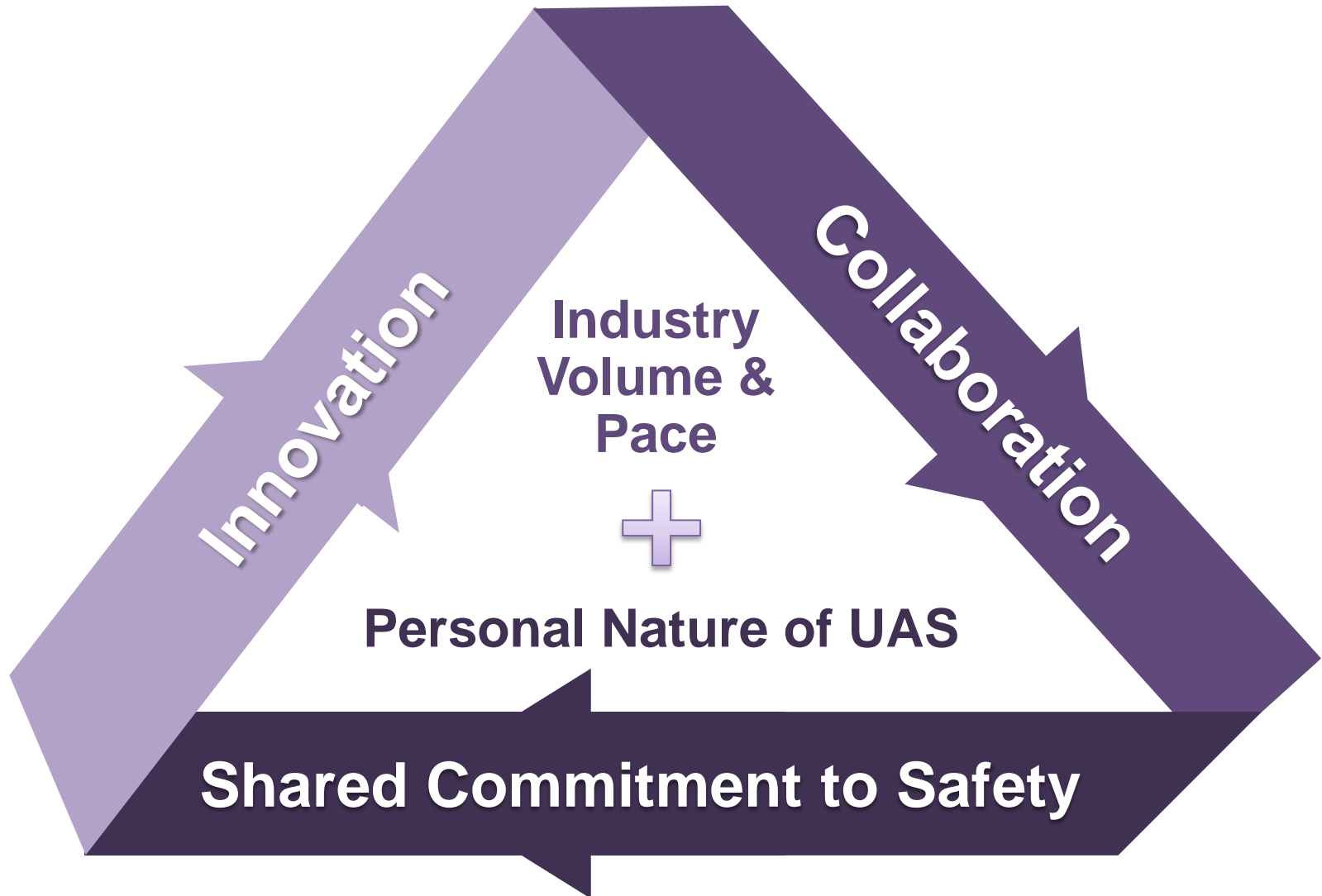
Overview

- **Why Are We Here**
- **Understanding the Environment**
  - Challenges
  - Legislative Requirements
  - Priorities and Strategies
  - FAA Approach to Risk
  - Research Alignment and Partnerships
- **Ongoing Work**
  - Standards Activities
  - LAANC & UTM
  - UAS ID and Tracking ARC
  - Other Stakeholder Activities

Why Are We Here

- **FAA Extension, Safety, and Security Act of 2016, Section 2213 – Probabilistic Metrics Research and Development Study**

  - *"…the Administrator of the Federal Aviation Administration shall enter into an arrangement with the National Academies <u>to study the potential use of probabilistic assessments of risks by the Administration</u> to streamline the integration of unmanned aircraft systems into the national airspace system, including any research and development necessary."*
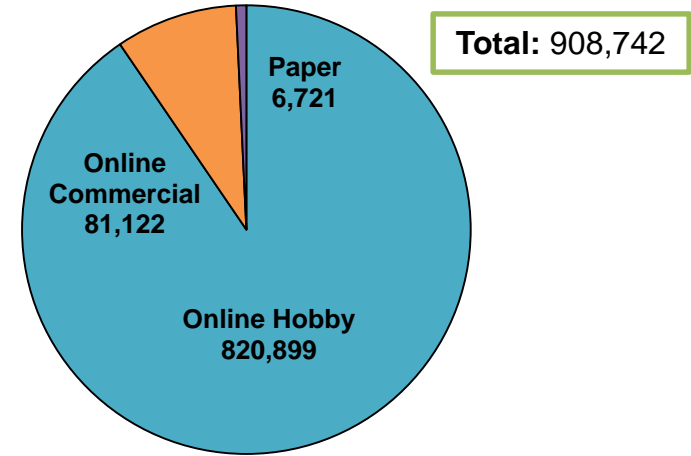
The Challenge

Innovation

Collaboration

Industry Volume & Pace

+

Personal Nature of UAS

Shared Commitment to Safety
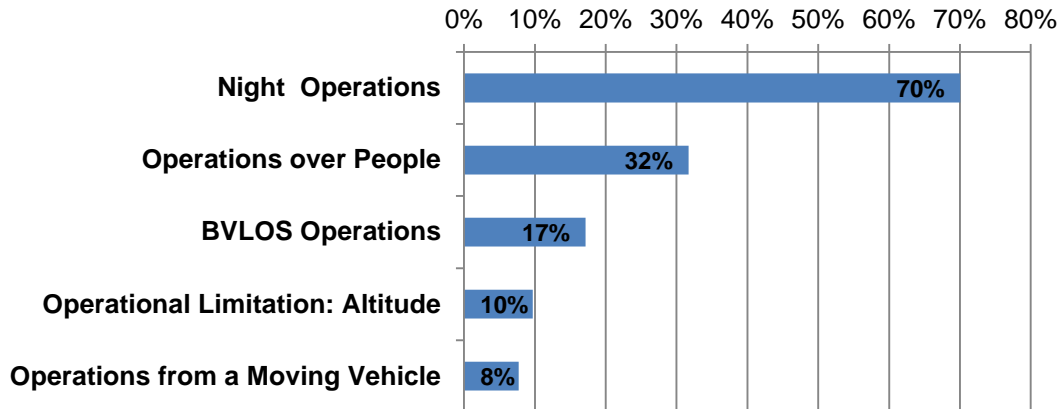
Volume Indicators

Total Remote Pilot Certificates Issued: 62,340

Total Knowledge Exams Passed: 43,835

Knowledge Exam Success Rate: 92%

UAS Registrations

Total: 908,742

- Paper 6,721
- Online Commercial 81,122
- Online Hobby 820,899

Top 5 Waiver Requests

Category	Percent
Night Operations	70%
Operations over People	32%
BVLOS Operations	17%
Operational Limitation: Altitude	10%
Operations from a Moving Vehicle	8%

0% 10% 20% 30% 40% 50% 60% 70% 80%

Airspace Waivers/ Authorizations Approved

Class B	1,087
Class C	1,667
Class D	4,471
Class E	781
TOTAL	8,006

Reported UAS Sightings
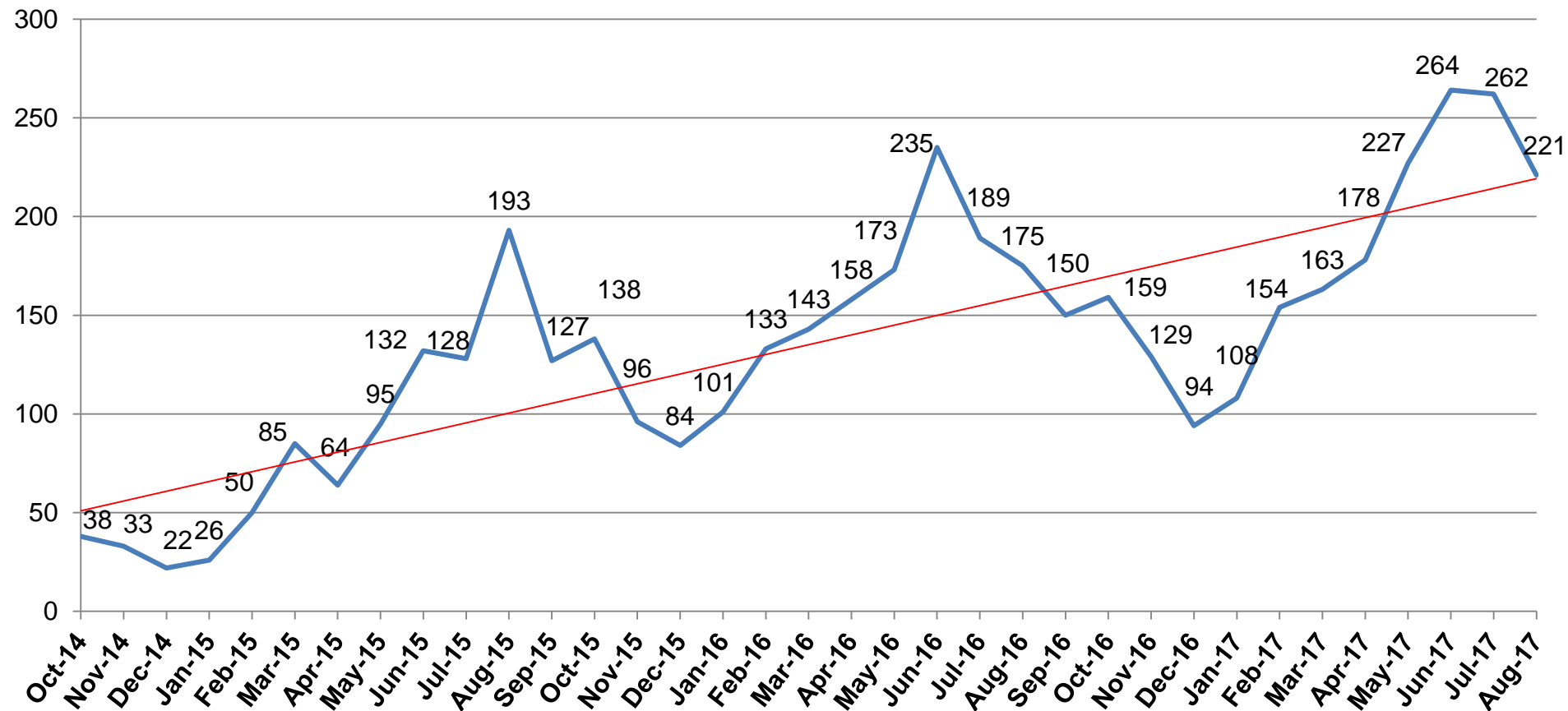
Legislative Activities

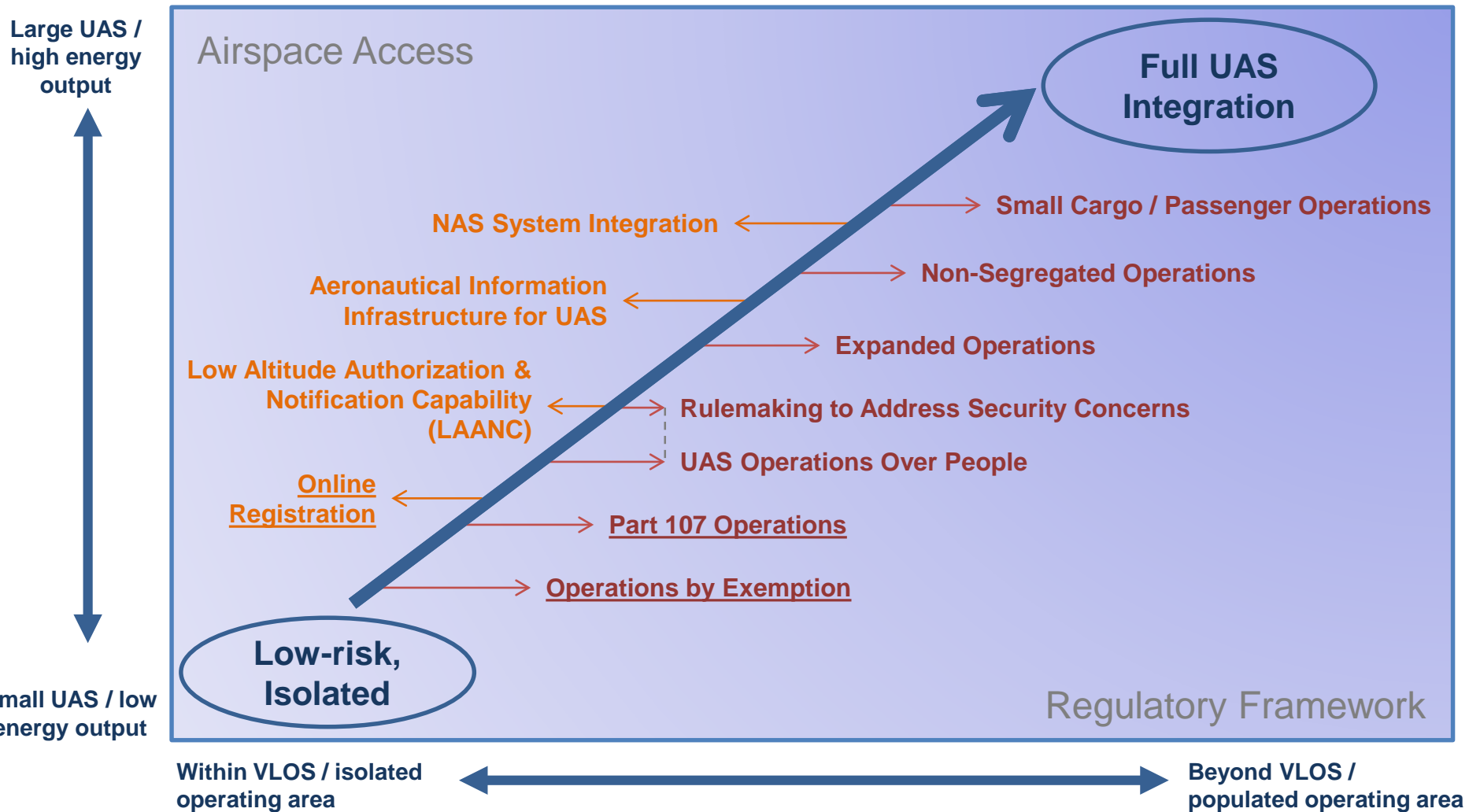- **FAA Extension, Safety and Security Act – Public Law 114-190**
  - Section 2202 – Remote ID Standards
  - Section 2206 – Airport Safety and Airspace Hazard Mitigation Pilot Program
  - Section 2208 – UTM Research Plan
  - Section 2209 – Restrictions over Fixed Site Facilities
  - Section 2211 – UAS Research Roadmap
  - Section 2212 – UAS Collision Research
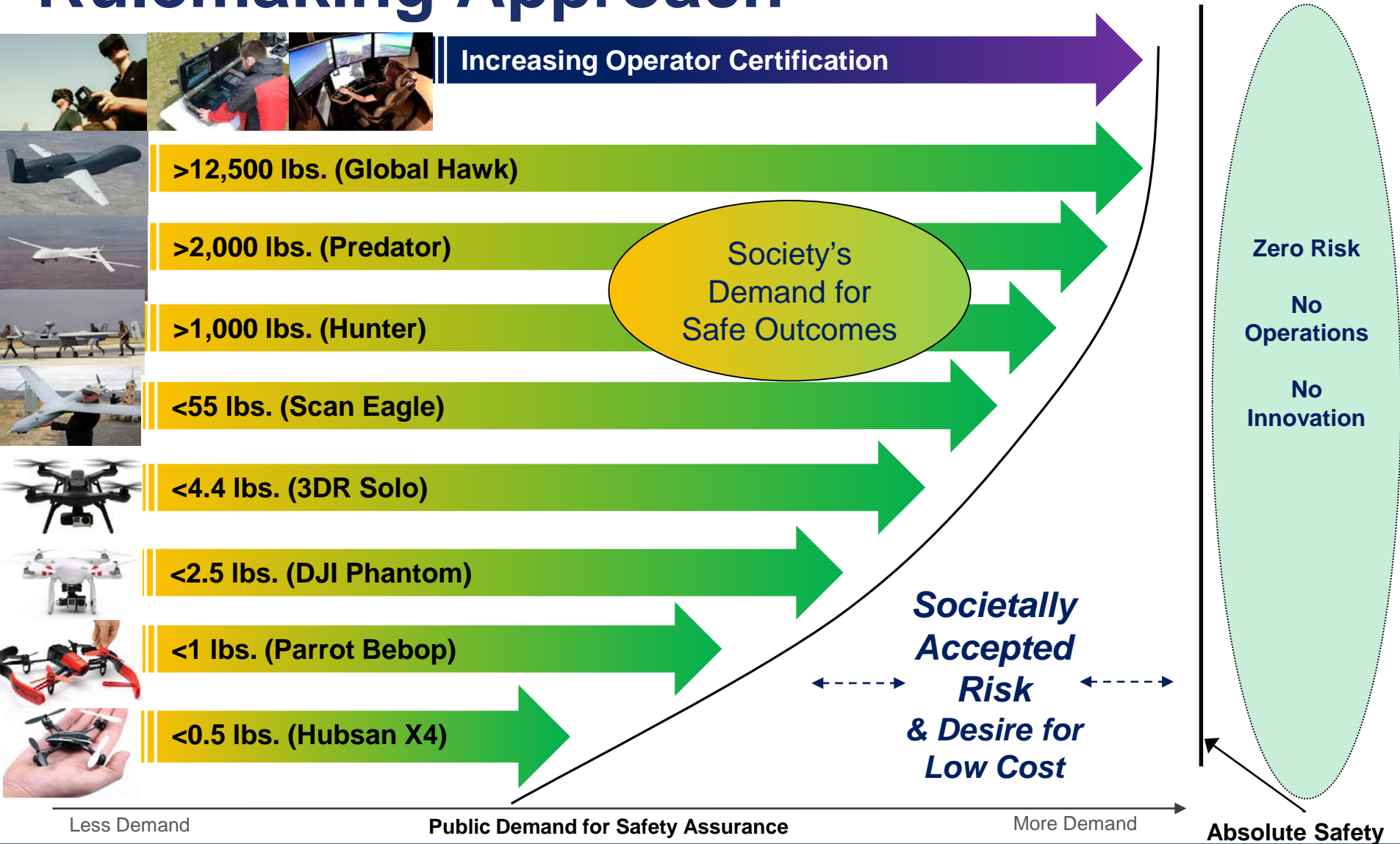 - Section 2213 – Probabilistic Risk Assessments

FAA UAS Priorities

Address Security Concerns

Automate Systems

Continue Expanding Operations

The Path to Full Integration

Large UAS / high energy output

Airspace Access

Full UAS Integration

Small Cargo / Passenger Operations

NAS System Integration

Non-Segregated Operations

Aeronautical Information Infrastructure for UAS

Expanded Operations

Low Altitude Authorization & Notification Capability (LAANC)

Rulemaking to Address Security Concerns

UAS Operations Over People

Online Registration

Part 107 Operations

Operations by Exemption

Low-risk, Isolated

Small UAS / low energy output

Regulatory Framework

Within VLOS / isolated operating area

Beyond VLOS / populated operating area

Rulemaking Approach

Increasing Operator Certification

>12,500 lbs. (Global Hawk)

>2,000 lbs. (Predator)

Society's Demand for Safe Outcomes

>1,000 lbs. (Hunter)

<55 lbs. (Scan Eagle)

<4.4 lbs. (3DR Solo)

<2.5 lbs. (DJI Phantom)

Societally Accepted Risk & Desire for Low Cost

<1 lbs. (Parrot Bebop)

<0.5 lbs. (Hubsan X4)

Zero Risk

No Operations

No Innovation

Less Demand   **Public Demand for Safety Assurance**   More Demand

Absolute Safety

System Safety – the Safety Continuum

Too little rigor…

**Safety escapes
Fatal accidents increase**

Risk of accidents due to inadequate safety program

SEEK

Establish appropriate balance in our regulatory approach

Achieve safety objectives while imposing the least burden on society.

Total Risk

Too much rigor…

**Innovative safety enhancements don't reach the fleet
Finite dollars that could be spent on safety enhancements go elsewhere
Fatal accidents increase**

Risk of accidents due to lack of safety innovation

Risk

**Extent of Safety Effort**

UAS Collaboration & Partnerships
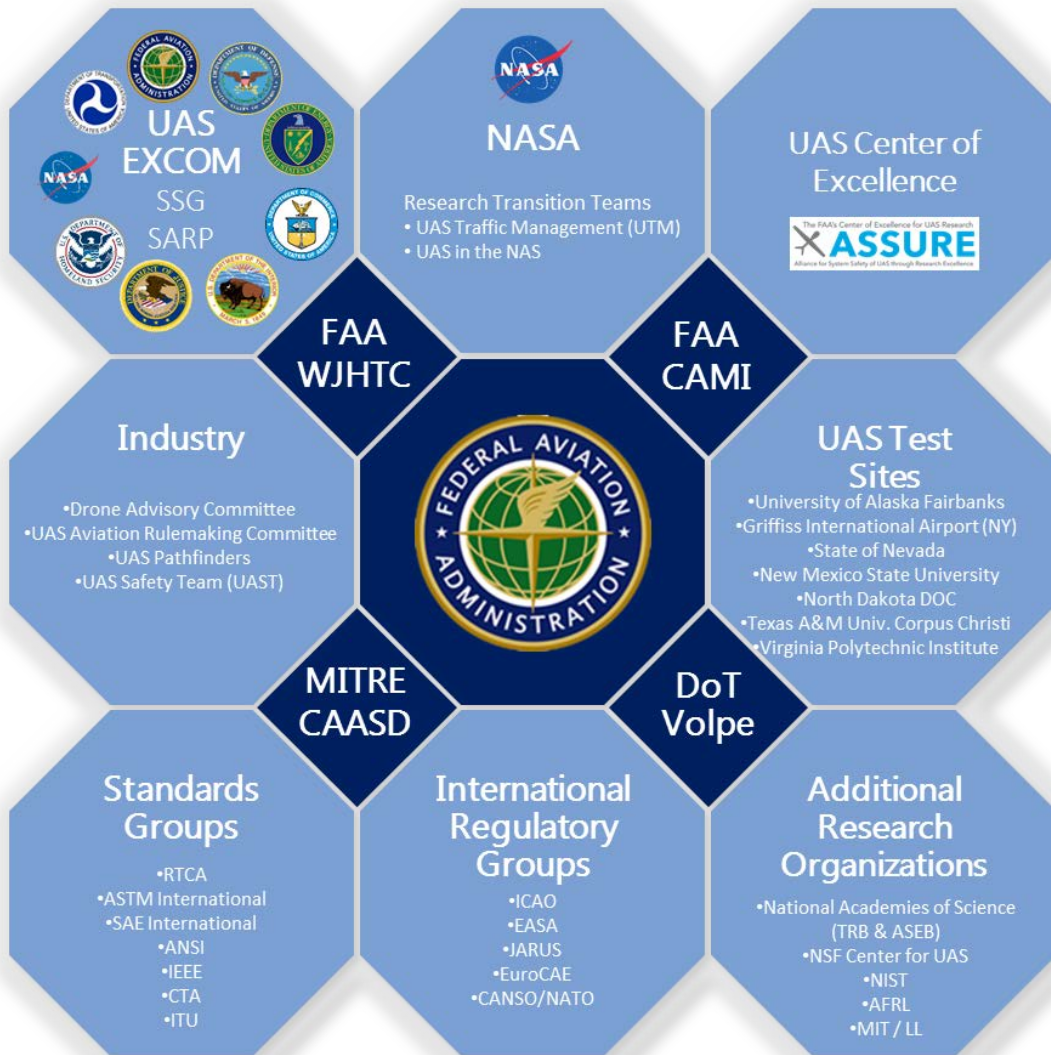
- *AFRL: Air Force Research Lab*
- *ANSI: American National Standards Institute*
- *ASEB: Aeronautics and Space Engineering Board*
- *ASSURE: Alliance for System Safety of UAS through Research Excellence (FAA's Center of Excellence for UAS)*
- *ASTM: American Society for Testing and Materials*
- *CAASD: Center for Advanced Aviation Systems Development*
- *CTA: Consumer Technology Association*
- *EASA: European Aviation Safety Agency*
- *EXCOM SSG: Executive Committee Senior Steering Group*
- *FAA CAMI: Civil Aerospace Medical Institute*
- *FAA WJHTC: William J. Hughes Technical Center*
- *ICAO: International Civil Aviation Organization*
- *IEEE: Institute of Electrical and Electronics Engineers*
- *JARUS: Joint Authorities for Rulemaking on Unmanned Systems*
- *NIST: National Institute of Standards and Technology*
- *NSF: National Science Foundation*
- *SARP: Science and Research Panel*
- *TRB: Transportation Research Board*

FAA UAS Standards Development Efforts

- **American National Standards Institute (ANSI) UAS Standards Roadmap**
  - Identify UAS standards requirements
  - Identify standards development efforts that are complete
  - Identify standards development efforts that are in progress
  - Identify gaps and identify potential Standards Development Organizations to fill the gaps

- **UAS Major Standards Development Activity**
  - RTCA SC-228
    - Working Group 1 – Detect and Avoid
    - Working Group 2 – Command & Control
  - RTCA SC-147
    - Traffic Alert & Collision Avoidance
  - ASTM
    - F38 – Design, Manufacture & Maintenance
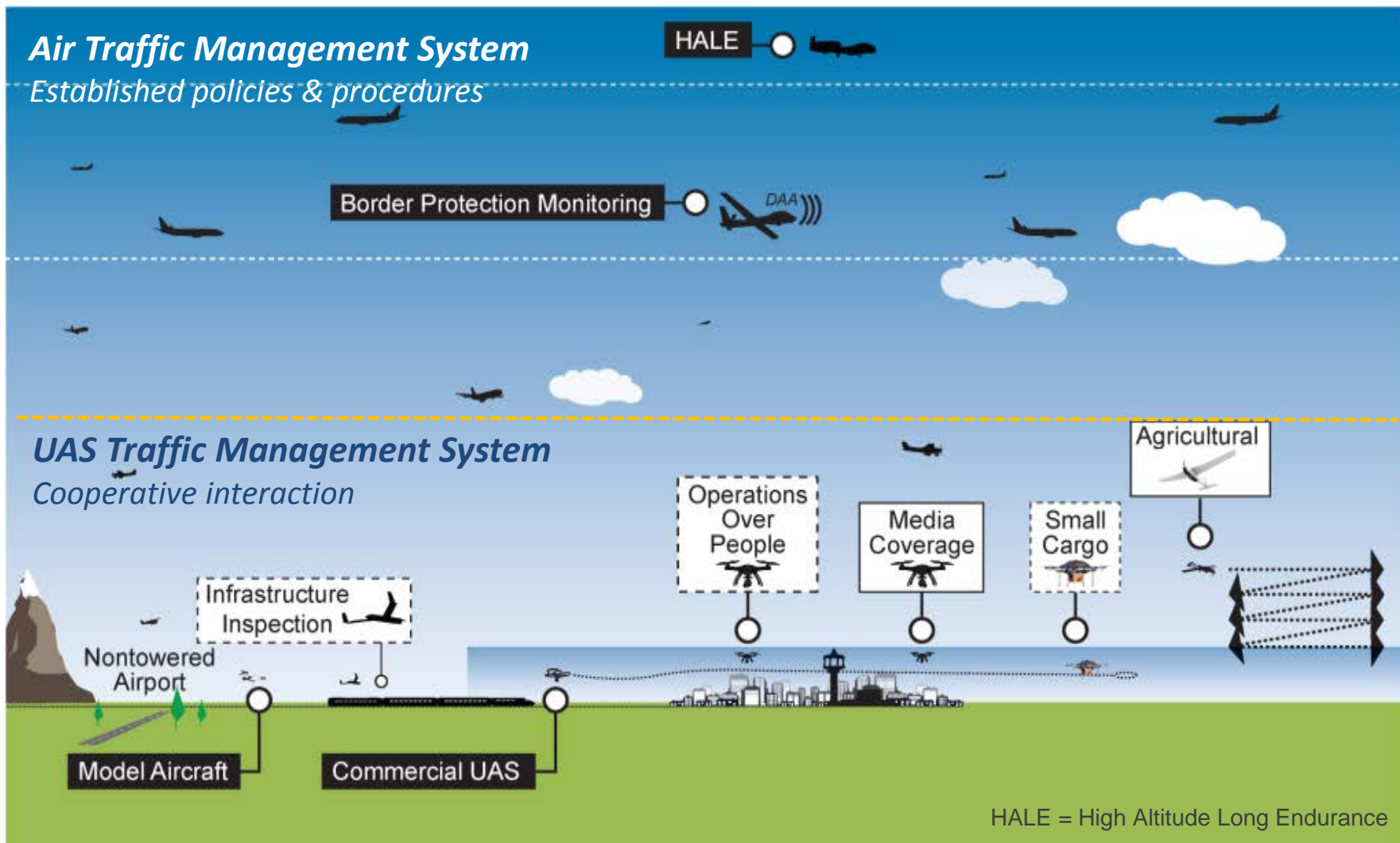 - CTA-2063
    - Small UAS serial numbers

Low Altitude Notification & Authorization Capability (LAANC)
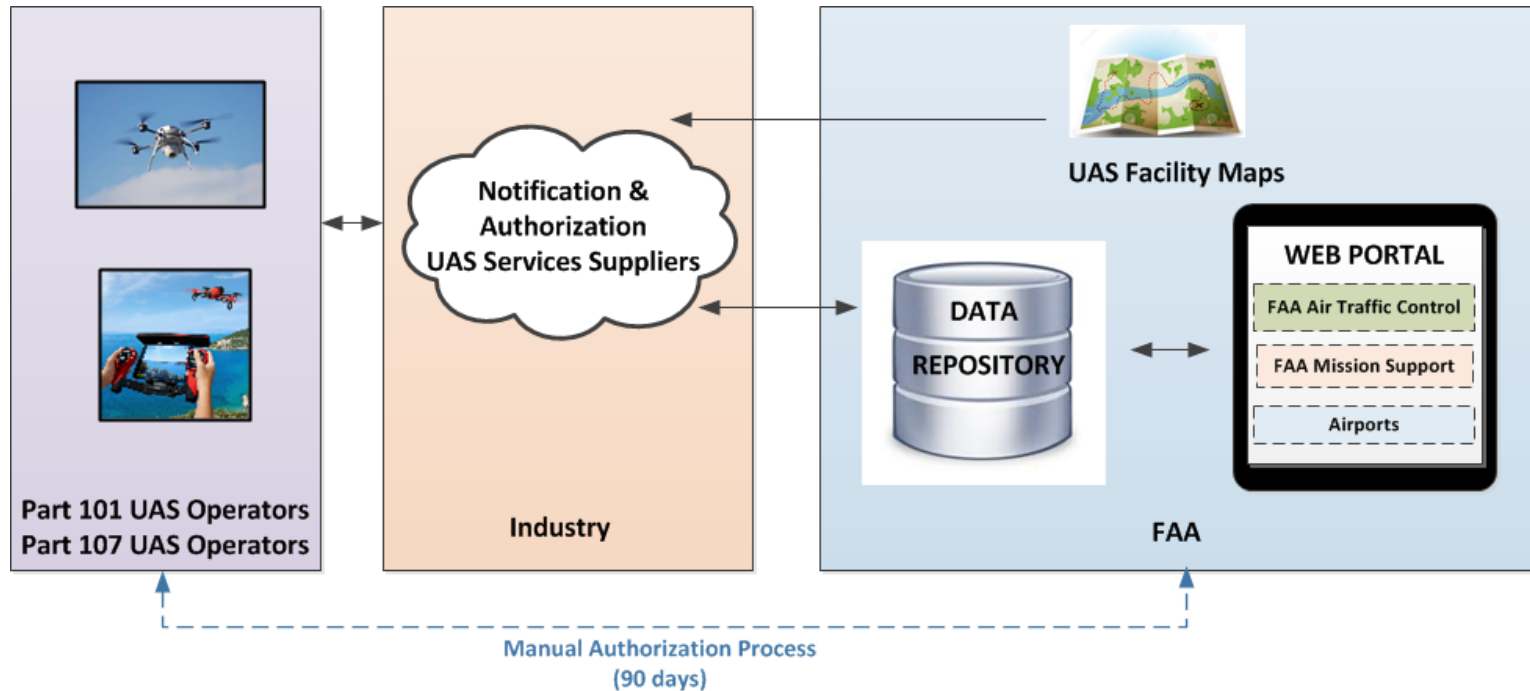
Goals
- Enable efficient Part 101/107 notification and authorization services to small UAS operators
- Provide the data exchange framework for UAS traffic management (UTM)

Managing Airspace Access – UTM

HALE

Air Traffic Management System
Established policies & procedures

Border Protection Monitoring   DAA)))

UAS Traffic Management System
Cooperative interaction

Agricultural

Operations Over People

Media Coverage

Small Cargo

Infrastructure Inspection

Nontowered Airport

Model Aircraft

Commercial UAS

HALE = High Altitude Long Endurance

UAS ID & Tracking ARC Overview

- **UAS over people raises safety and security questions**
  - Technological failure, accident, or malice
  - Increases challenge for threat discrimination for security partners

- **Working with Federal, State, and Local Defense and Law Enforcement partners**
  - Departments of Homeland Security, Defense, Justice, Interior, and Energy, and U.S. Secret Service

- **ARC will develop recommendations for remote UAS identification and tracking (2202)**
  - Membership is diverse – aviation, technology, law enforcement, and safety stakeholders

Stakeholder Collaboration

Drone Advisory Committee (DAC)	Unmanned Aircraft Safety Team (UAST)

Drone Advisory Committee (DAC)

- **Purpose:** help prioritize the FAA's UAS integration activities
- 35 members
  - UAS manufacturers and operators, traditional manned aviation, labor organizations, radio and navigation equipment manufacturers, airport operators, state and local officials
- Subcommittee + 3 Task Groups
  - Roles and Responsibilities
  - Access to Airspace
  - UAS Funding

Unmanned Aircraft Safety Team (UAST)

- **Purpose:** gather and analyze data to enhance safety and operations of drones in the nation's airspace
- 48 members
  - Primarily UAS manufacturers, operators, and data service providers, as well as traditional manned aviation groups
- 6 Working Groups
  - UAS Survey
  - UAS Data Management
  - UAS Communications
  - UAS Loss of Control
  - Injury Reduction
  - Safety Culture

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