

# ANSI Unmanned Aircraft Systems Standardization Collaborative (UASSC)

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July 15, 2020 Webinar



# Today's Agenda

UASSC background, mission, objectives	UASSC Co-Chairs
Gap Analysis Process	Jim McCabe, Sr. Dir, Standards Facilitation, ANSI
Topics / High Priority Gaps covered by Working Groups (WGs)	WG Co-Chairs
Q&A - We'll hold Q&A until the end - Raise hand to be unmuted or ask via Q&A panel	All



These slides & the recording link will be made available on the ANSI website

# UASSC Co-Chairs

## ◆ Government

— Art Hinaman

Manager, Technical Support Branch

Office of UAS Integration

Federal Aviation Administration

(on behalf of UASSC Co-Chair Jay Merkle)

## ◆ Industry

— Chris Martino

Vice President, Operations

Helicopter Association International

# ANSI Unmanned Aircraft Systems Standardization Collaborative (UASSC)

- ◆ Launched in 2017 following a meeting where standards and policy activities were discussed
- ◆ Many standards developing organizations (SDOs) involved in UAS, prompting need for coordination
- ◆ **Mission: To coordinate and accelerate the development of the standards and conformity assessment programs needed to facilitate the safe integration of unmanned aircraft systems (UAS) into the national airspace system (NAS) of the United States, with international coordination and adaptability**



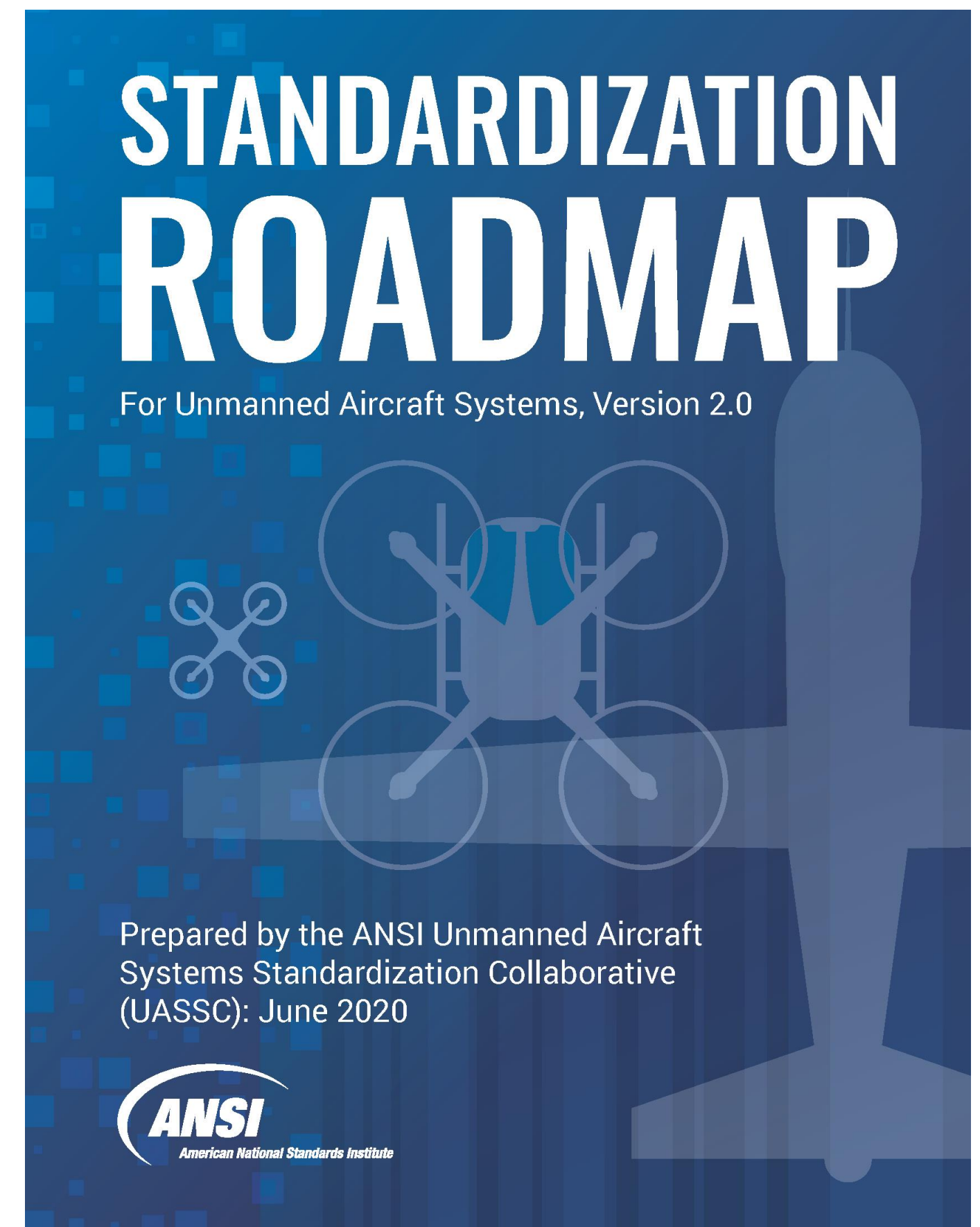
# Objectives

- ◆ To foster coordination and collaboration among industry, standards developing organizations, regulatory authorities, and others on UAS standardization issues, including pre-standardization research and development
- ◆ To clarify the current and future UAS standardization landscape and enable stakeholders to better focus standards participation resources
- ◆ To provide a basis for coherent and coordinated U.S. policy and technical input to regional and international audiences on UAS standardization
- ◆ To support the growth of the UAS market with emphasis on civil, commercial, and public safety applications
- ◆ UASSC is NOT developing standards



# Deliverable

- ◆ A comprehensive roadmap describing the current and desired future standardization landscape for UAS
  - V1 published December 20, 2018
  - V2 published June 30, 2020
  - 71 open gaps (no published standard) identified w/accompanying recommendations
  - Available as a free download at [www.ansi.org/uassc](http://www.ansi.org/uassc)



# Goals for Version 2

- ◆ Expand topics covered (e.g., spectrum applicable to C2 link and communications, recreational operations, passenger transport, etc.)
- ◆ Engage subject matter experts not previously involved
- ◆ Identify potentially overlooked issues and gaps
  - 16 new gaps identified
- ◆ Track progress to address the roadmap recommendations, including new or completed work
  - 2 version 1 gaps closed
- ◆ Review priorities
- ◆ Incorporate feedback

# Structure and Participation

- ◆ Steering Committee – Governing Body
- ◆ **WG1 – Airworthiness Standards**
- ◆ **WG2 – Flight Operations Standards: General Concerns and Personnel Training, Qualifications, and Certification Standards**
- ◆ **WG3 – Flight Operations Standards: Infrastructure Inspections, Environmental Applications, Commercial Services, and Workplace Safety**
- ◆ **WG4 – Flight Operations Standards: Public Safety**
- ◆ Participation open to UAS stakeholders that have U.S. operations
  - **ANSI membership not a prerequisite**
  - Participants come from industry, government agencies, standards developing organizations (SDOs), and other interested stakeholders
  - **Some 400 individuals from 250 organizations (public and private)** supported the roadmap's development



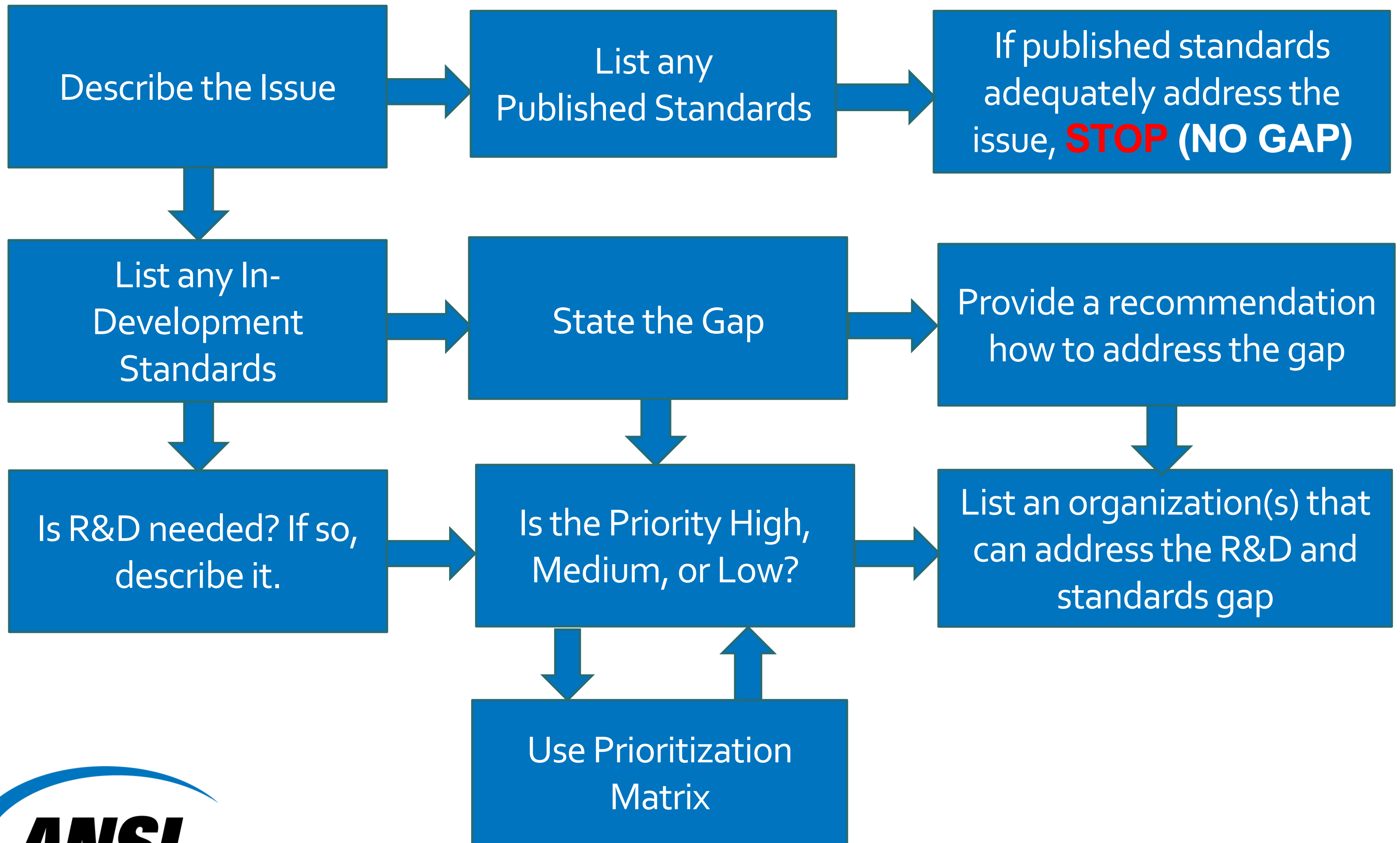


# Roadmap V2 Process and Contents

- ◆ September 12, 2019 kick-off meeting to launch version 2 update
- ◆ Overviews of activity by government agencies, industry initiatives, SDOs
- ◆ **Gap analysis with recommendations where standards are needed** constitutes the main body of the document
  - A “gap” means no published standard exists for the issue in question
  - Identifies priorities for action, organization(s) that can do the work, and related R&D needed
- ◆ Working groups generally met twice monthly via virtual web meetings
  - Subject matter experts drafted the gap analysis sections
- ◆ Public review and subsequent disposition of comments
- ◆ Publication of V2 on June 30, 2020



# Process Flow for Describing Issues & Gaps



# Sample Gap Statement

- **Gap I2: Crane Inspections**. Standards are needed to establish requirements for the use of UAS in the inspection, testing, maintenance, and operation of cranes and other material handling equipment covered within the scope of ASME's B30 volumes
- **R&D Needed**: No
- **Recommendation**: Complete work on draft [B30.32-20XX, Unmanned Aircraft Systems \(UAS\) used in Inspection, Testing, Maintenance, and Lifting Operations](#) to address crane inspections using UAS.
- **Priority**:\* Medium
- **Organization**: ASME
- **Status of Progress**\*\* Green
- **Update**\*\* Work continues on development of the draft B30.32 standard.

\* Refer to prioritization matrix on next two slides

\*\* Status of Progress & Update for carryover gaps from version 1.0



# Prioritization Matrix: Making the CASE for the Gap Priority Level

## Criteria

- **Criticality (Safety/Quality Implications)** How important is the project? How urgently is a standard or guidance needed? What would be the consequences if the project were not completed or undertaken? A high score means the project is more critical.
- **Achievability (Time to Complete)** - Does it make sense to do this project now, especially when considered in relation to other projects? Is the project already underway or is it a new project? A high score means there's a good probability of completing the project soon.

## Scoring Values

- 3 - critical
  - 2 - somewhat critical
  - 1 - not critical
- 
- 3 - project near completion
  - 2 - project underway
  - 1 - new project



# Prioritization Matrix (contd.)

## Criteria

- **Scope (Investment of Resources)** - Will the project require a significant investment of time/work/money? Can it be completed with the information/tools/resources currently available? Is pre-standardization research required? A high score means the project can be completed without a significant additional investment of resources.
- **Effect (Return on Investment)** - What impact will the completed project have on the industry? A high score means there are significant gains for the industry by completing the project.

## Scoring Values

- 3 - low resource requirement
  - 2 - medium resource requirement
  - 1 - resource intensive
- 
- 3 - high return
  - 2 - medium return
  - 1 - low return

## Score Rankings

- High Priority (a score of 10-12)
- Medium Priority (a score of 7-9)
- Low Priority (a score of 4-6)



# Roadmap V2 Open Gaps Breakdown

WG/Chapter \ Priority	High (0-2 years)	Medium (2-5 years)	Low (5+ years)	Total
WG1 Airworthiness (6)	17	2	0	19
WG2 Flight Operations (7)	10	3	0	13
WG3 Infrastructure Inspections/ Commercial Svcs (8)	9	9	2	20
WG4 Public Safety Operations (9)	5	6	1	12
WG2 Personnel Qualifications (10)	6	1	0	7
Total	47	21	3	71

53 open gaps need Research & Development



# V2 High Priority Open Gaps Breakdown

WG/Chapter \ Priority	High (0-2 years)	Tier 1 (Most Critical)	Tier 2 (Critical)	Tier 3 (Least Critical)
WG1 Airworthiness (6)	17	9	4	4
WG2 Flight Operations (7)	10	5	5	0
WG3 Infrastructure Inspections/ Commercial Svcs (8)	9	3	1	5
WG4 Public Safety Operations (9)	5	2	1	2
WG2 Personnel Qualifications (10)	6	0	4	2
Total	47	19	15	13



# Working Group 1 – Airworthiness Standards (Roadmap Chapter 6)

## Co-Chairs

- ◆ Phil Kenul  
Senior Vice President, Aviation and Operations  
TriVector Services, Inc.  
(Chair, ASTM F38)
  
- ◆ Mark DeAngelo, PhD  
Aerospace Engineer  
Standards Innovation & Technology – SAE International  
Pilot – Part 61 Private Certificate



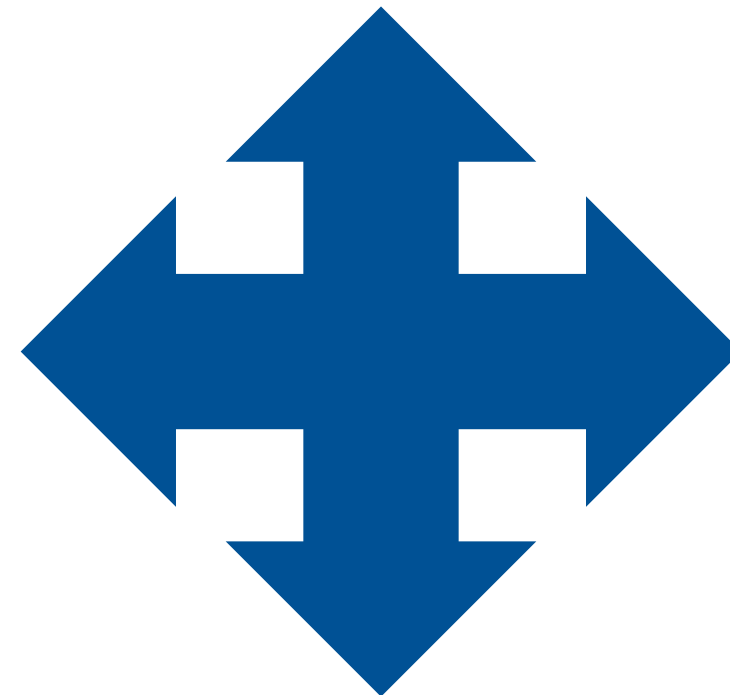


# Working Group 1 – Airworthiness Standards (Roadmap Chapter 6)

## ANSI UASSC Roadmap

[Developed by ANSI/Industry (contains Recommendations, Gaps, Ref., etc.)]

Standards Development Organizations (SDOs) are encouraged to address ANSI Roadmap Gaps by revising existing Stds. or writing new Stds.



FAA Rules, Guidance, Policies

**FAA Certification/Approval ==>**  
**Show Compliance & Find Compliance**  
(using Accepted Industry Stds., FAA Regs, ACs, etc.)



# Working Group 1 – Airworthiness Standards (Roadmap Chapter 6)

- ◆ Design and Construction
- ◆ UAS System Safety
- ◆ Quality Assurance/Quality Control

## Avionics and Subsystems:

- ◆ Command and Control (C2) Link and Communications
- ◆ Navigation Systems
- ◆ Systems Performing Detect and Avoid (DAA) Functions
- ◆ Software Considerations and Approval
- ◆ Flight Data and Voice Recorders for UAS
- ◆ Cybersecurity

- ◆ Electrical Systems
- ◆ Power Sources and Propulsion Systems
- ◆ Noise, Emissions, and Fuel Venting
- ◆ Mitigation Systems for Various Hazards to UAS
- ◆ Parachutes for Small Unmanned Aircraft
- ◆ Maintenance and Inspection
- ◆ Enterprise Operations: Level of Automation/Autonomy and Artificial Intelligence (AI)
- ◆ ***Blockchain for UAS\****

*\*Bold Italics = New to version 2*



# WG1 – High Priority Gaps

## Tier 1 (Most Critical)

- ◆ Gap A1: UAS Design and Construction (D&C) Standards
- ◆ Gap A2: UAS System Safety
- ◆ Gap A6: Alignment in Standards Between Aviation and Cellular Communities
- ◆ ***New Gap A20: Unlicensed Spectrum Interference Predictability***
- ◆ Gap A7: UAS Navigational Systems
- ◆ Gap A8: Protection from Global Navigation Satellite Signals (GNSS) Interference Including Spoofing and Jamming
- ◆ Gap A9: Detect and Avoid (DAA) Capabilities
- ◆ Gap A10: Software Considerations and Approval
- ◆ Gap A12: UAS Cybersecurity

## Tier 2 (Critical)

- ◆ Gap A4: Avionics and Subsystems
- ◆ Gap A16: Mitigation Systems for Various Hazards to UAS
- ◆ Gap A18: Maintenance and Inspection (M&I) of UAS
- ◆ Gap A19: Enterprise Operations: Levels of Automation/ Autonomy and Artificial Intelligence (AI)

## Tier 3 (Least Critical)

- ◆ Gap A13: Electrical Systems
- ◆ Gap A14: Power Sources and Propulsion Systems
- ◆ Gap A15: Noise, Emissions, and Fuel Venting
- ◆ Gap A17: Parachute or Drag Chute as a Hazard Mitigation System in UAS Operations over People (OOP)

# Working Group 2 – Flight Operations Standards: General Concerns and Personnel Training, Qualifications, and Certification Standards (Roadmap Chapters 7 & 10)

## Co-Chairs

- ◆ Joe Valasquez  
Founder and Chief Flight Engineer  
DroneScape, PLLC
- ◆ Jon Gustafson, PS, CFedS, PMP, GISP  
Senior Principal, US East Geospatial Services Leader  
Stantec

# Working Group 2 – Flight Operations Standards: General Concerns and Personnel Training, Qualifications, and Certification Standards (Roadmap Chapters 7 & 10)

## Operations: General Concerns:

- ◆ Privacy
- ◆ Continued Operational Safety
- ◆ Beyond Visual Line of Sight
- ◆ Operations Over People
- ◆ Weather
- ◆ Data Handling & Processing
- ◆ UAS Traffic Management
- ◆ UAS Remote Identification
- ◆ Geo-fencing
- ◆ *Recreational Operations*
- ◆ *Design and Operation of Aerodrome Facilities for UAS*
- ◆ *UAS Service Suppliers Process and Quality*

## Personnel Qualifications:

- ◆ Terminology
- ◆ Manuals
- ◆ UAS Flight Crew
- ◆ Additional Crew Members
- ◆ Maintenance Technicians
- ◆ Compliance/Audit Programs
- ◆ Human Factors in UAS Operations

# WG2 – High Priority Gaps

## Tier 1 (Most Critical)

- ◆ Gap O2: Continued Operational Safety
- ◆ Gap O3: Beyond Visual Line of Sight (BVLOS)
- ◆ Gap O4: UAS Operations Over People (OOP)
- ◆ Gap O8: Remote ID: Direct Broadcast
- ◆ Gap O9: Remote ID: Network Publishing

## Tier 2 (Critical)

- ◆ Gap O5: UAS Operations and Weather
- ◆ Gap O7: UTM Services Performance Standards
- ◆ Gap O10: Geo-fence Exchange

## Tier 2 (contd.)

- ◆ ***New Gap O12: Design and Operation of Aerodrome Facilities for UAS***
- ◆ ***New Gap O13: UAS Service Suppliers (USS) Process and Quality***
- ◆ Gap P2: Manuals
- ◆ Gap P3: Instructors and Functional Area Qualification
- ◆ Gap P5: UAS Maintenance Technicians
- ◆ Gap P9: Human Factors in UAS Operations

## Tier 3 (Least Critical)

- ◆ Gap P1: Terminology
- ◆ Gap P7: Displays and Controls



# Working Group 3 – Flight Operations Standards: Infrastructure Inspections, Environmental Applications, Commercial Services, and Workplace Safety (Roadmap Chapter 8)

## Co-Chairs

- ◆ Brian Daly  
Assistant Vice President, Standards & Industry Alliances  
AT&T
  
- ◆ Philip Hall  
Founding Director & CEO  
RelmaTech Inc.



# Working Group 3 – Flight Operations Standards: Infrastructure Inspections, Environmental Applications, Commercial Services, and Workplace Safety (Roadmap Chapter 8)

## Vertical Infrastructure Inspections:

- ◆ Power Plants and Industrial Process Plants
- ◆ Cranes
- ◆ Building Facades
- ◆ Low-Rise Residential and Commercial Buildings
- ◆ Communications Towers

## Linear Infrastructure Inspections:

- ◆ Bridges
- ◆ Railroads
- ◆ Power Transmission Lines, Structures, and Environs
- ◆ *Hydrocarbon Pipeline Inspections*
- ◆ *Airport Operations*

## Environment Applications:

- ◆ Environmental Monitoring
- ◆ Pesticide Application
- ◆ Livestock Monitoring and Pasture Management

## Commercial Services:

- ◆ Package Delivery
- ◆ *Cargo Transport*
- ◆ *Passenger Air Taxi Transport (short-haul)*
- ◆ *Passenger Transport (long-haul)*
- ◆ *Sensing Services*
- ◆ *News Gathering*

## Workplace Safety





# WG3 – High Priority Gaps

## Tier 1 (Most Critical)

- ◆ ***New Gap I17: Commercial Passenger Air Taxi Transport via UAS (short-haul flights carrying few passengers and/or cargo)***
- ◆ ***New Gap I19: Commercial Sensing Services***
- ◆ ***New Gap I20: Use of sUAS for Newsgathering***

## Tier 2 (Critical)

- ◆ Gap I12: Occupational Safety Requirements for UAS Operated in Workplaces

## Tier 3 (Least Critical)

- ◆ Gap I1: UAS Inspections of Power Plant and Industrial Process Plant Assets
- ◆ Gap I7: Railroad Inspections: BVLOS Operations
- ◆ Gap I9: Inspection of Power Transmission Lines, Structures, and Environs Using UAS
- ◆ Gap I10: Pesticide Application Using UAS
- ◆ Gap I11: Commercial Package Delivery via UAS



# Working Group 4 – Flight Operations Standards: Public Safety (Roadmap Chapter 9)

## Co-Chairs

- ◆ Kristy Kiernan, PhD  
Assistant Professor, Program Chair MS in Unmanned Systems  
College of Aeronautics, Worldwide  
Embry-Riddle Aeronautical University
- ◆ Eric Schwartz  
Quality Project Manager, Power Delivery  
Florida Power and Light Company



# Working Group 4 – Flight Operations Standards: Public Safety (Roadmap Chapter 9)

- ◆ sUAS for Public Safety Operations
- ◆ Hazardous Materials Incident Response
- ◆ Transport and Post-Crash Procedures Involving Biohazards
- ◆ Forensic Investigations Photogrammetry
- ◆ Payload Interface and Control for Public Safety Operations
- ◆ Search and Rescue
  - sUAS IR Cameral Sensor Capabilities
  - sUAS Automated Missions during Emergency Response
- ◆ Response Robots
- ◆ Public Safety Tactical Operations
- ◆ UAS *Detection* & Mitigation
- ◆ *Emergency Management and Disasters*
- ◆ *Data Formatting for sUAS Public Safety Operations*

# WG4 – High Priority Gaps

## Tier 1 (Most Critical)

- ◆ ***New Gap S11: UAS Detection***
- ◆ Gap S9: UAS Mitigation

## Tier 2 (Critical)

- ◆ ***New Gap S13: Data Format for Public Safety sUAS Operations***

## Tier 3 (Least Critical)

- ◆ Gap S3: Transport and Post-Crash Procedures Involving Biohazards
- ◆ Gap S5: Payload Interface and Control for Public Safety Operations

# Questions?

- ◆ Raise hand to be unmuted or ask via Q&A or chat panel



- ◆ Send questions / comments / get on mailing list: [uassc@ansi.org](mailto:uassc@ansi.org)

# For More Information

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