

TRANSPORTATION RESEARCH BOARD

The Day of the Drones: Airports and Unmanned Aircraft Systems, Part 1

April 20, 2021

@NASEMTRB
#TRBWebinar

Learning Objectives

- Discuss managing non-airport sponsored UAS operations
- Identify potential stakeholders and assess how UAS operations may impact them



American Association of Airport Executives (AAAE)

1.0 Continuing Education Units (CEUs) are available to Accredited Airport Executives (A.A.E.)

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ACRP Research Report 212

Airports and Unmanned Aircraft Systems

Managing and Engaging Stakeholders on UAS in the Vicinity of Airports

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ACRP Report 212 Oversight Panel

Heather Hasper, DHJ Alaska, San Jose, CA (Chair)

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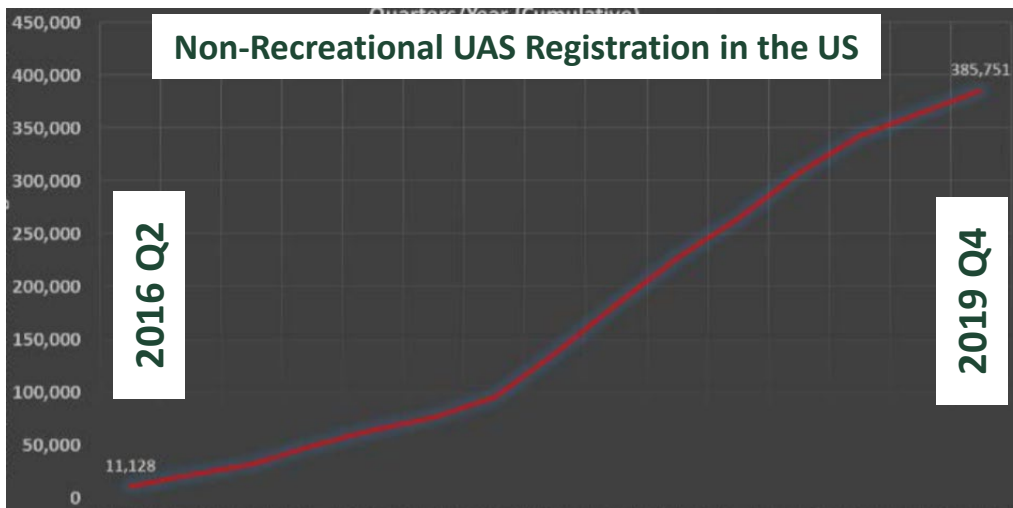
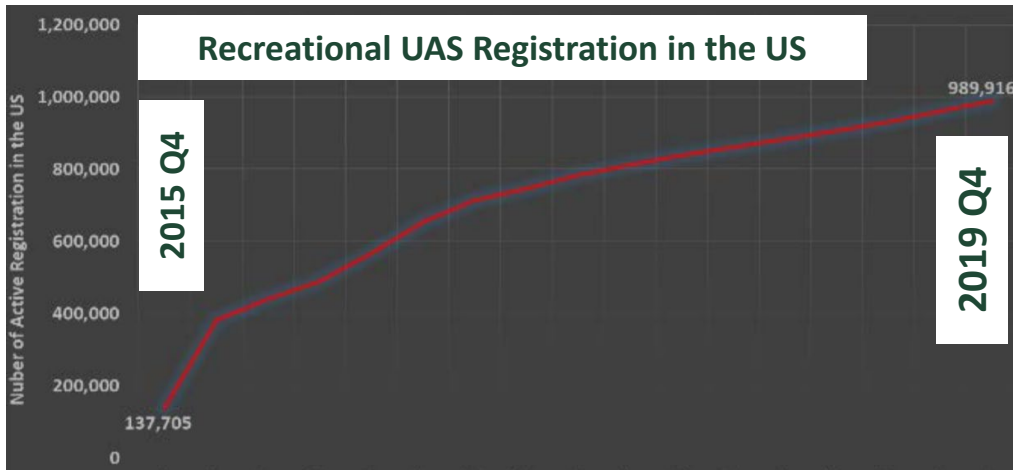
Christopher J. Oswald, Airports Council International—North America Liaison

Christine Gerencher, TRB Liaison

Outline

- Research Problem
- Research Scope
- Practical Scenarios for Airport Practitioners

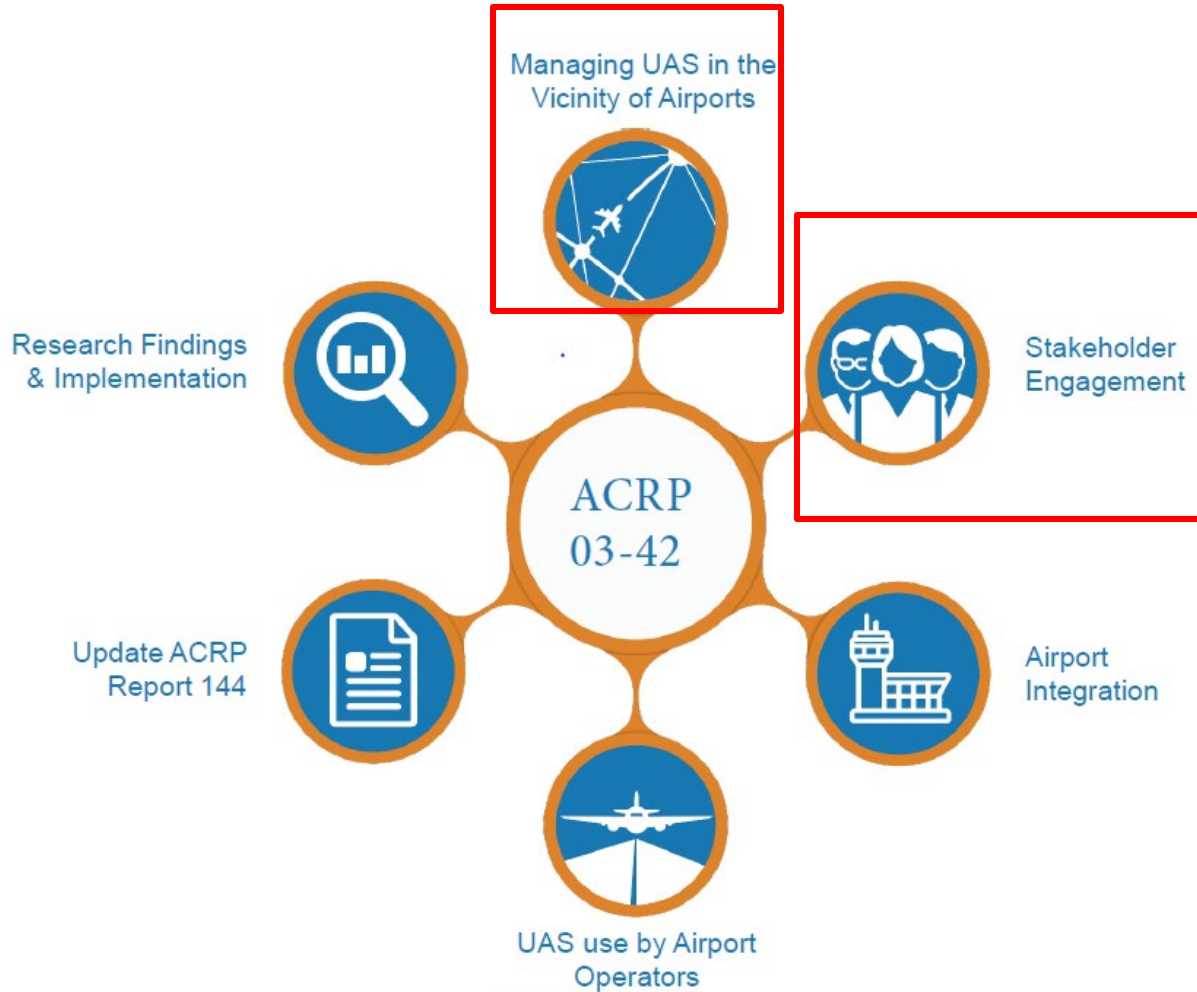
Research Problem



- ➔ New recreational UAS are being registered at a rate of 9,900 per month.
- ➔ New non-recreational UAS are being registered at a rate of 14,600 per month.
- ➔ How can airport operators manage UAS growth?

Source: FAA Aerospace Forecast 2020-2040, Unmanned Aircraft Systems.
https://www.faa.gov/data_research/aviation/aerospace_forecasts/media/Unmanned_Aircraft_Systems.pdf

Research Scope



Practical Scenarios for Airport Practitioners

Scenario 1: Obtaining Operational Approval

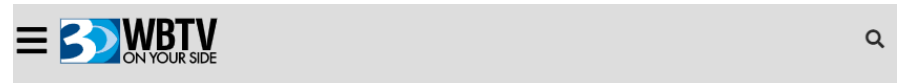
- ➔ How should airports respond to requests to fly drones in their vicinity?
- ➔ What are the current division of responsibilities for drone operations between airports, FAA, UAS operators, and law enforcement?
- ➔ What operations are allowed?



Practical Scenarios for Airport Practitioners

Scenario 2: Illegal Commercial UAS Activity in Proximity to Airports

- How should airports respond to illegal commercial UAS activity in its vicinity?
- What tools are available for responding to this threat?



NORTH CAROLINA
Illegal drone activity diverts, hold flights at N.C. airport, FBI investigating



Illegal drone activity caused airport officials to divert, suspend and hold flights in North Carolina Tuesday, the FBI says.

By [WBTV Web Staff](#) | March 10, 2021 at 6:50 PM EST - Updated March 10 at 6:50 PM

GREENSBORO, N.C. (WBTV) - Illegal drone activity caused airport officials to divert, suspend and hold flights in North Carolina Tuesday, the FBI says.

Source: <https://www.wbtv.com/2021/03/10/illegal-drone-activity-diverts-hold-flights-nc-airport-fbi-investigating/>

Practical Scenarios for Airport Practitioners

Scenario 3: Establishing Economic Benefit of UAS at an Airport

- ➔ How can airports engage the community in managing UAS operations?
- ➔ What public forums are available to ensure that airports fulfill community and stakeholder needs?

FAA To Hold Virtual Town Hall On Drones




Gregory S. McNeal

Former Contributor 

Opinion

Greg McNeal is a professor, entrepreneur and expert on tech & policy.

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 This article is more than 8 years old.

The FAA **announced** they will be holding a virtual townhall (technically "an online public engagement session") on Wednesday, April 3rd from 12 noon until 2p.m. EST to provide the public with an opportunity to comment on the privacy policy for drones (Unmanned Aircraft Systems). The townhall will focus mostly on the FAA's **test site program**. The official

Source: <https://www.forbes.com/sites/gregorymcneal/2013/03/31/faa-to-hold-virtual-town-hall-on-drones/?sh=2440e645752d>

FOR ADDITIONAL INFORMATION



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The Day of the Drones: Airports and Unmanned Aircraft Systems, Part 1

Managing UAS operations Near an Airport

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Systems Engineering



Problem Statement

Main Headers

- Item number one
 - Item number two
 - Item number three
 - Item number four



Research Approach

A1 Literature review & gap analysis for UAS management strategies

- Identify current UAS traffic management methods for UAS operations in different airspace classes by coordinating with:
 - ✓ Airports & special facilities
 - ✓ UAS operators
 - ✓ Air traffic controllers
- Evaluate gaps and propose new solutions

A2 Analyze geographic risk areas surrounding airports

- Identify current UAS traffic risk areas (develop a visual graphic)
- Evaluate gaps and propose new methods
- Create a standardized method to establish risks areas considering:
 - ✓ Traffic based assessments
 - ✓ Obstacle clearance limits

A3 Identify roles & responsibilities for coordination of UAS operations

- Identify roles and areas of responsibility
- Evaluate gaps and conflicts in responsibilities
- Maintain a dynamic table of authorities

A4 Evaluate the most effective and efficient delivery of guidance & toolkits

- Consult with airport managers about existing methods
- Evaluate the value of existing implementation methods
- Test developed guidance and toolkits
- Develop list of FAQs

A5 Synthesize results to guidance documentation and tools

- Create a list of necessary stakeholders to be targeted for implementing research results
- Develop tools centered around a comprehensive document that has actionable practices for UAS traffic management and guidance to engage with municipal governing bodies and their constituents

Task Research Team

→ Embry-Riddle Aeronautical University, Booz Allen Hamilton, VHB, TDKA

Task 1: Literature Review and Gap Analysis for UAS Management Strategies

Goal: Conduct a detailed literature review to identify where airports require guidance in handling increased number of UAS in vicinity of airports

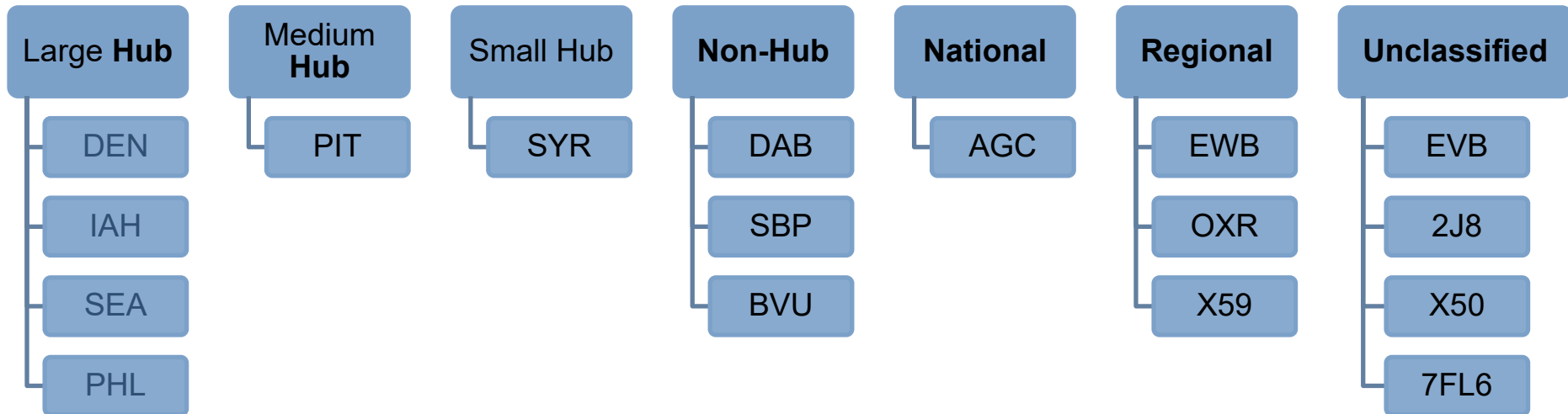
Topics addressed

- Current airport practices and policies
- Safety management systems for UAS operations and airports
- Legal considerations: federal, state, and hyperlocal
- Airport emergency planning
- Data sharing and data privacy

Task 2: Analyze Geographic Risk Areas Surrounding Airports

Airport Engagement

- Initiated outreach leveraged by our stakeholder engagement team as well
- Requested: current airport policies relevant to UAS
- Airport facility information (diagram, information, sectional)
- UAS Facility Maps (UASFM)



Task 3: Identify Roles and Responsibilities for Coordination of UAS Operations

Examined the relationship between the airport and ...

- Airport operators role in operation approval and oversight limited
- Myriad of stakeholders impacting UAS operations management
- High demand of operators to communicate pertinent information to ensure operations remain safe and uninterrupted



Task 4 and 5: Design and Synthesis of Guidebook and Toolkit

Research results were integrated into Volume 1, Chapters 2 and 3 and Accompanying Toolkit

Chapter 2 Understanding the Requirements to Manage UAS Operations

- 2.1 Development of Concept of Operations
- 2.2 Authorization, Approval, and Notification
- 2.3 Privacy and Data Considerations
- 2.4 Hyperlocal Restrictions and Federal Preemption

Chapter 3 Safety and Emergency Management Best Practices

- 3.1 Safety Management Systems
- 3.2 UAS Contingency Management
- 3.3 Guidance for Emergency Plans for UAS Operations at Airports

- Toolkit 1: Safety Management Systems
- Toolkit 2: Safety Risk Assessment Checklist
- Toolkit 3: UAS Aircraft Performance Table
- Toolkit 4: Airspace and Airport Diagram Charts
- Toolkit 5: Sample NOTAM and DROTAMs
- Toolkit 3: UAS Aircraft Performance Table
- Toolkit 4: Airspace and Airport Diagram Charts
- Toolkit 5: Sample NOTAM and DROTAM
- Toolkit 6: Sample UAS Operational Plan
- Toolkit 7 : Sample landowner permission
- Toolkit 8: Sample Airport UAS Policy Documents
- Toolkit 9: UAS Airport Operations FAQ and Other Resources
- Resource Library

Leveraging Guidebook

Chapter 2

- Serves as a primer for airport operators regarding numerous topics relevant to UAS operations within the vicinity of the airport
- Enables a better understanding of what types of authorizations are permitted within the vicinity of airports, approval processes governing such operations, data/privacy considerations, and legal considerations

Chapter 3

- Enables airport operators to develop, interpret, and assess safety management systems and the safety risk analysis process.
- Summarizes UAS contingency management practices to enable airport operators to consider such practices
- Recommends emergency planning and communication practices to address on or near-airport emergencies involving UAS

Toolkit

Concept of Operations Development (2.1)

Addresses elements of a UAS CONOP

- Goals and Objectives
- Key system components
- System operations
- Facilitate Management
- Limitations of UAS Operation
- Pilot/crew qualifications

Toolkit Resources:

- Toolkit 3: UAS Aircraft Performance Table
- Toolkit 4: Airspace and Airport Diagram Charts
- Toolkit 5: Sample NOTAM and DROTAM
- Toolkit 6: Sample UAS Operational Plan

Authorizations, Approvals, and Notifications (2.2)

Part 107 (public/civil)

Routine

Certificate of
Waiver (COW)

LAANC/UTM

Certificate of Authorization (COA) (public)

Nationwide
“blanket” COA

COA-specific area

Emergency (COA)

Section 333 Waiver (COA/COW) (civil)

Nationwide
“Blanket” COA

COA-specific area

Emergency
operation

Special Airworthiness Certificate (civil)

Special class
aircraft

Experimental
Aircraft

Restricted

Special flight permit

Toolkit Resources:

- ➔ Toolkit 7: Sample Landowner Permission for UAS Operations
- ➔ Toolkit 9: UAS Airport Operations FAQ and Other Resources

Privacy and Data Considerations (2.3)

UAS operations are linked with ongoing privacy and data concerns.

Table 1: Guidance for airport privacy considerations

Privacy Considerations	Airport's Role
Unauthorized photography of people and property	Share best privacy and practice resources with operators inquiring about operating in vicinity of airport. Direct them to review any additional community or organizational standards applicable to the UAS operator.
Disclosure of sensitive information (under airport agreement with operator)	Agreements for routine operation with UAS operators should address any privacy concerns between the airport and the UAS operator (e.g. establishment of a non-disclosure agreement)

Toolkit Resources:

➔ **Toolkit 9: UAS Airport Operations FAQ and Other Resources**

Legal Considerations (2.3)

Explores the evolving legal and regulatory environment

- Summarizes the legal authorities involved with UAS operation
- Explains the limited role that local and state authority can impact federal authority of FAA
 - FAA's safety authority preempts state or local regulation
 - State/local to retain some local authority
- Reviews relevant case law through several recently argued cases

Toolkit Resources:

- Toolkit 7: Sample Landowner Permission for UAS Operations
- Toolkit 9: UAS Airport Operations FAQ and Other Resources

SMS Development (3.1)

Guidance enables

- Airport operators to evaluate SMS of proposed operations within airport vicinity
- Airport SMS documents addressing risks of UAS operations in their vicinity

Toolkit Resources:

- Toolkit 1a: SMS Template for Managing UAS in Vicinity of Airports
- Toolkit 1b: UAS Operations Request Form
- Toolkit 1c: Initial Risk Assessment Form
- Toolkit 2: Safety Risk Assessment Checklist
- Toolkit 8: Sample Airport UAS Policy Documents
- Toolkit 9: UAS Airport Operations FAQ and Other Resources



Contingency Management (3.2)

Enables the planning of UAS contingency events during their operations

- ➔ Events include: lost link, lost communications, degraded/lost GPS position, engine failure, loss of power, flyaway, etc.
- ➔ Contingency plan must address:
 - Definition of failure
 - Method of detection
 - Action of relevant parties

Toolkit Resources:

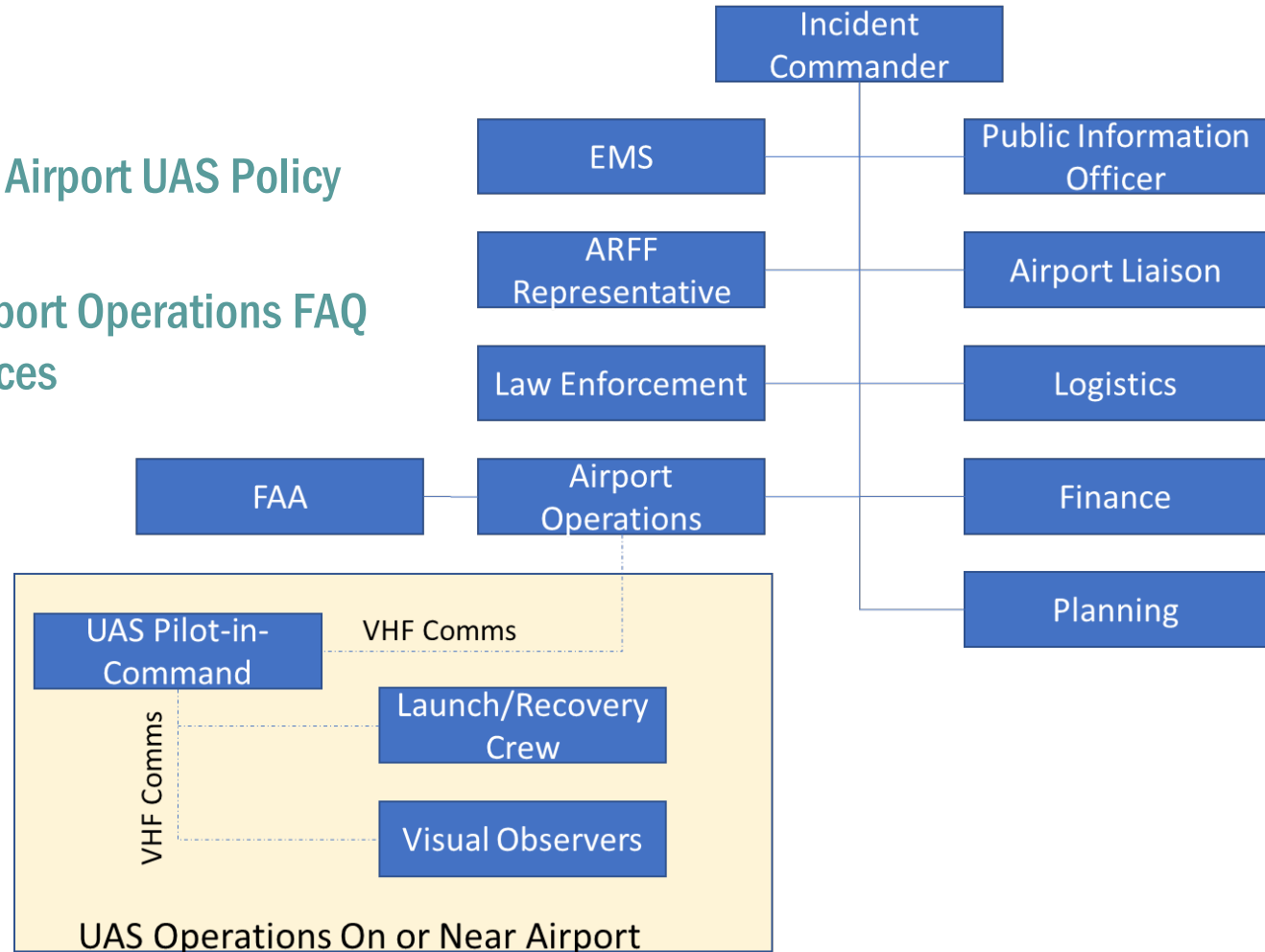
- ➔ Toolkit 8: Sample Airport UAS Policy Document
- ➔ Toolkit 9: UAS Airport Operations FAQ and Other Resources

Emergency Planning for UAS Operations at Airports

(3.3)

Toolkit Resources:

- Toolkit 8: Sample Airport UAS Policy Document
- Toolkit 9: UAS Airport Operations FAQ and Other Resources



Evolving landscape of UAS Integration

UAS integration into the National Airspace System is rapidly evolving!

→ Changes since guidebook publication

- Low-altitude authorization and notification capability (LAANC) nationwide rollout
- New public rules released: Remote ID and Operations over people

→ New capabilities exist with potential to impact airport operations

- Beyond Visual Line-of-sight
- Routine package delivery
- Large cargo
- Urban air mobility / Advanced aerial mobility (UAM/AAM)

FOR ADDITIONAL INFORMATION



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ACRP Research Report 212

Airports and Unmanned Aircraft Systems

Managing and Engaging Stakeholders on UAS in the Vicinity of Airports

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- President, AeroX
- Co-Host, No U-Turn Podcast
- Former NCDOT UAS Program Manager & NC FAA UAS Integration Pilot Program Manager
- Current NC FAA UAS BEYOND Program Manager
- Civil Engineering, NC State University



Chapter 5: Engagement and Communication Tools

Chapter 5

- 5.1 Websites
- 5.2 Social Media
- 5.3 In-Person Information Sessions
- 5.4 Free Education/Training
- 5.5 Paid Education/Training
- 5.6 Conferences and Symposiums
- 5.7 Documentation
- 5.8 Community Partnership/Affiliations



Chapter 5: Engagement and Communication Tools

List of Stakeholders

→ On airport

- Tenants
- Visitors

→ Off airport

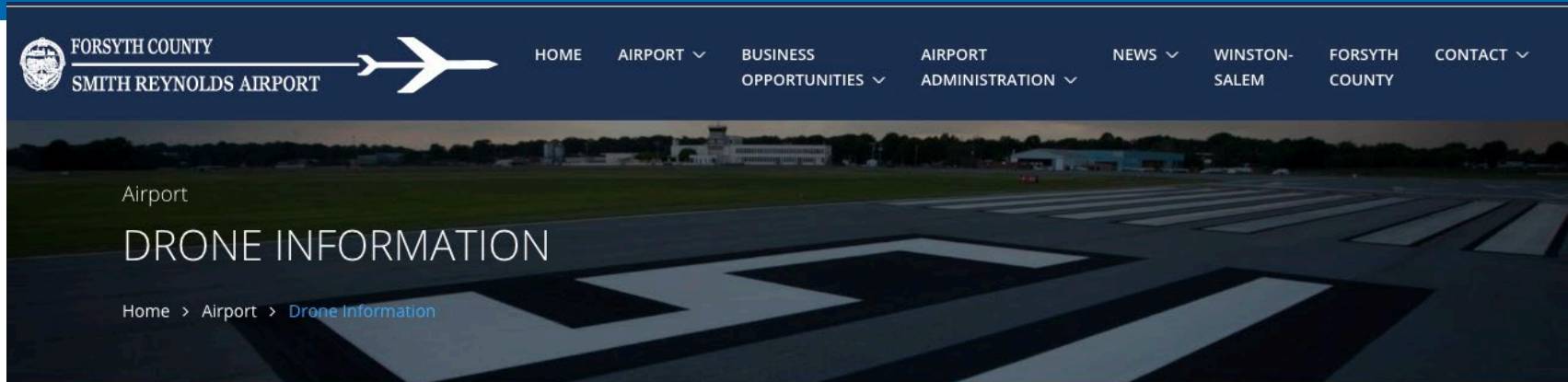
- Local UAS Operators
- Public Safety
- Local Government

→ Associations/ Professional Organizations

→ Regulators / Law Makers

AIRPORT TYPES	INDUSTRY	UAS OPERATORS
<ul style="list-style-type: none"> • Towered and non-towered airports • General aviation and commercial airports • Joint use airports 	<ul style="list-style-type: none"> • UAS manufacturers • Direct service providers (external; “UAS as a service”) • Indirect service providers (e.g., insurance claims inspection, cargo delivery, and inspection), which include operations conducted by an organization for their own benefit or for the benefit of their stakeholders • Support services (e.g., maintenance, logistics, insurance coverage) • Manned aviation (commercial and civil pilots and operators) • ATC/Operations • Construction 	<ul style="list-style-type: none"> • Civil operators (Part 107, COA with Section 333 Exemption, SAC) • Governmental (Public; including law enforcement, fire services, and other civic function) • Commercial (service providers and internal use) • Education and training UAS remote pilots/operators • Recreational education (Part 101/Section 336) • Clubs and other organized recreational users such as the Drone Racing League
ASSOCIATIONS / PROFESSIONAL ORGANIZATIONS		REGULATORS / LAW MAKERS
<ul style="list-style-type: none"> • CBOs • Advocacy • Professional (e.g., AUVSI) 		<ul style="list-style-type: none"> • Federal • State • Local (county, city, town, tribal)

5.1 Websites



Drone Information

Before operating a drone within Winston-Salem Class D airspace, please review this document:

[Drone Policy - Revised 2019](#)

For more information about drone regulations please review the [NC Department of Transportation, Division of Aviation web site](#).

Additionally, please review the [FAA web site](#) for drone resources.

Currently (as of January 2020), non-recreational drone operators are required to take and pass the [NC Department of Transportation's Unmanned Aircraft System Operator's Knowledge Test](#), in addition to attaining a remote pilot certificate from the FAA.



5.2 Social Media

Social media platforms allow for targeted, real-time stakeholder outreach. These platforms offer the targeted audience various ways to react to the information being shared as well, such as the use of the “Like” button, comment box, and sharing functions. Overall, for airports, social media platforms can be resourceful as an informal way to reach out to UAS stakeholders, but in a creative manner that perhaps would keep them more engaged.



5.3 In-Person Information Sessions

Information sessions represent a method commonly used to present specific information to an affected population. Sessions can be conducted independently, as a standalone function hosted by the presenter, or as an element of a larger event. Examples include briefings and presentations, seminars, webinars, town hall meetings, or community roundtables.



5.4 Free Education/Training

Examples include workshops or courses, such as computer-based training featuring self-paced learning modules.



SAVE THE DATE
THURSDAY, JULY 27 | 9:30 a.m. to 3:30 p.m.

UNC Charlotte's
Cone University Center
9025 University Rd.
Charlotte, N.C. 28262

DRONE WORKSHOP FOR COMMERCIAL AND GOVERNMENT OPERATORS

The N.C. Department of Transportation's Division of Aviation aims to show how beneficial and safe this technology can be through free workshops around the state, focused on commercial and government drone operations and data management.

Future Workshops: Triad, Raleigh, Wilmington, Asheville, Fayetteville and Greenville

DIVISION OF AVIATION
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

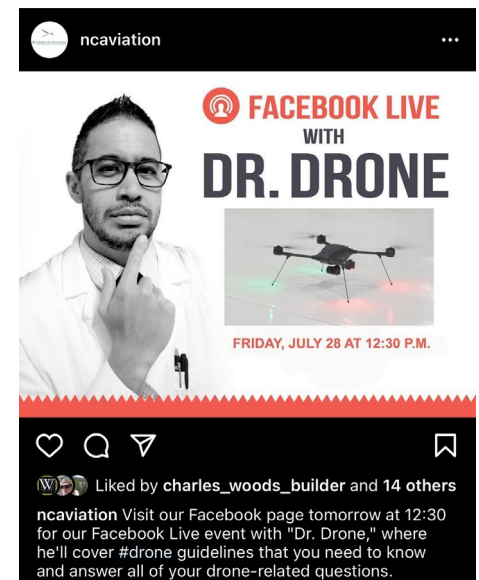
Registration is free and lunch is provided.
For more information, visit
www.ncdot.gov/aviation/uas
or contact the UAS Program Office at
UAS@ncdot.gov or (919) 814-0550.



ncdot.gov

Federal UAS Regulations

- Hobbyist or Recreational**
 - 14 CFR Part 101 (E) – Special Rule for Model Aircraft
 - Must fly within line of sight
 - Must notify an airport of operations within 5 statute miles
 - Must not interfere with manned aircraft
 - Must follow community based standards
 - Must fly solely for hobby or recreation
- Special**
 - 14 CFR Part 107 – Small Unmanned Aircraft Systems
 - Obtain Remote Pilot Certificate from FAA (2 years)
 - 16 years or older
 - Fly during day and civil twilight
 - Max altitude of 400 ft. AGL
 - Max speed of 100 mph
 - Must fly within line of sight
 - Cannot fly over people not involved with the operation
 - Class G airspace



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FACEBOOK LIVE WITH DR. DRONE

FRIDAY, JULY 28 AT 12:30 P.M.

Liked by [charles_woods_builder](#) and 14 others

ncaviation Visit our Facebook page tomorrow at 12:30 for our Facebook Live event with "Dr. Drone," where he'll cover #drone guidelines that you need to know and answer all of your drone-related questions.

5.5 Paid Education/Training

Examples include workshops and seminars (with evaluation), individual courses, and certificate, workforce/professional development, or higher-learning degree programs (e.g., associate, bachelor, master, or doctorate).



5.6 Conference and Symposiums

Conferences and symposiums are excellent opportunities to engage a large audience over days.

- UAS Focused Conferences
- Airport Focused Conferences
- Regional and Local Conferences
- Host You Own

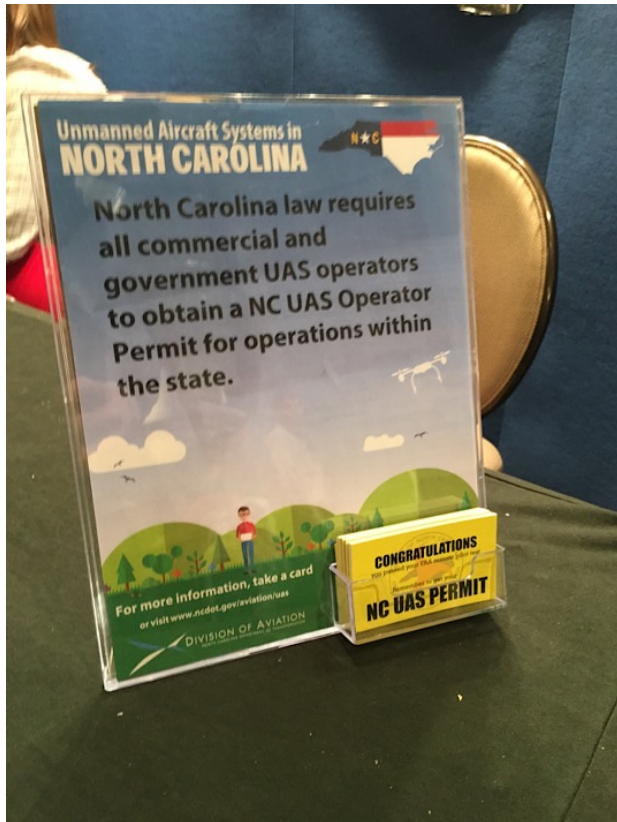


5.7 Documentation

The exchange of documentation provides the opportunity to share information to a desired audience through materials that can be distributed using websites or through direct exchange (physical or digital) with a target audience of individuals or groups.

REPORTS	POLICIES AND REGULATIONS	RESEARCH/PEER-REVIEWED ARTICLES	BRIEFINGS/PRESENTATIONS/PRESS RELEASES
MAGAZINES AND NEWSLETTERS	TECHNICAL MANUALS AND GUIDEBOOKS	TEXTBOOKS/STUDY GUIDES/WORKBOOKS	FACT/INFORMATION SHEETS

5.7 Documentation



NO DRONES OVER PRISONS
It's the law.

No Recreational drones within 500 feet around or 250 feet above a prison

No Commercial/Public Utility drones within 150 feet around or 150 feet above a prison

EXCEPTIONS

- Law enforcement
- Emergency responders
- A person who obtains written consent from the prison
- Commercial and Public Utility Operators
 - Must notify the prison at least 24 hours prior to flying a drone within the no-fly zone

PENALTIES

Attempting to deliver a weapon via a drone	Class H Felony	\$1,500 fine
Attempting to deliver contraband via a drone	Class I Felony	\$4,000 fine
Any other violation	Class 1 Misdemeanor	\$500 fine

Learn more about UAS regulations at www.ncdot.gov/aviation/uas

Session Law 2017-179, N.C. General Statute § 15A-303.1 (Effective Dec. 1, 2017)

For more information, visit www.ncdot.gov/aviation/uas, www.faa.gov/uas, or www.knowbeforeyoufly.org

DIVISION OF AVIATION
North Carolina Department of Transportation

LIMITS

- Recreational drones
- Maximum weight 55 lbs
- Maximum altitude 400 feet
- Line of sight

STATUTES

- Session Law 2014-100
- Session Law 2018-232

CERTIFICATIONS

- Remote Pilot Certificate
- NIMS
- ICSI Air Support

5.8 Community Partnership/Affiliations

Develop collaborative partnerships to further your reach.

Academic

- conducting research and education activities at universities, colleges, and other institutions

Entertainment

- supplementing attendee experience, and/or supporting major sports, music, theater, and other entertainment events (such as security monitoring and crowd control)

Consumer Products and Services

- for furthering specific commercial uses, such as consumer product delivery or tracking

Communications

- supporting journalistic endeavors of news and media organizations, including newspapers, television channels, and broadcasting companies

Insurance/Construction

- facilitating inspection, site-planning, and building efforts

Identity-Based

- (e.g., gender, minority-based, geographic)

FOR ADDITIONAL INFORMATION



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Today's Presenters

#TRBwebinar



Moderator: Heather Hasper,
DHJ Alaska



Richard Stansbury,
Embry-Riddle Aeronautical University



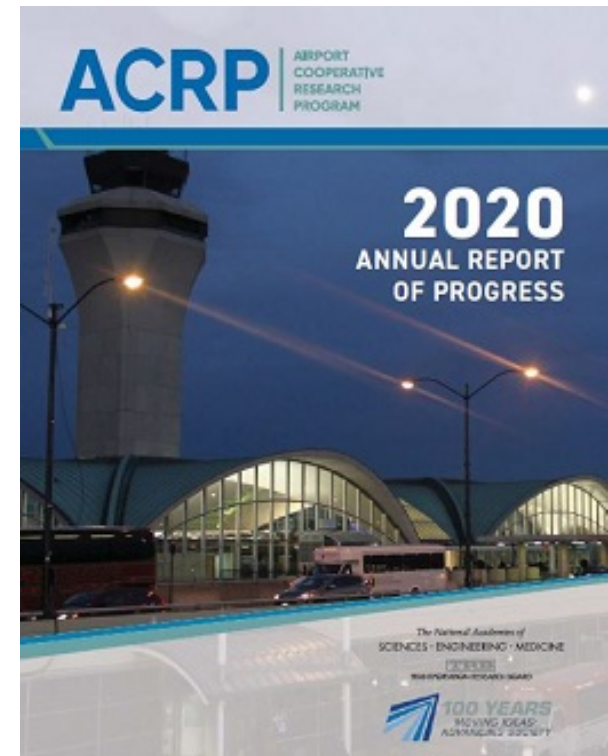
Uven Chong,
Hovecon



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Hovecon

ACRP is an Industry-Driven Program

- ➔ Managed by TRB and sponsored by the Federal Aviation Administration (FAA).
- ➔ Seeks out the latest issues facing the airport industry.
- ➔ Conducts research to find solutions.
- ➔ Publishes and disseminates research results through free publications and webinars.



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Visit ACRP's Impacts on Practice webpage to submit leads on how ACRP's research is being applied at any airport.

Visit us online:
www.trb.org/ACRP

Other ACRP Research on Today's Topic

Legal Research Digest 32: [Evolving Law on Airport Implications by Unmanned Aerial Systems](#)

Report 144: [Unmanned Aircraft Systems \(UAS\) at Airports: A Primer](#)

Report 212: [Airports and Unmanned Aircraft Systems, Volume 2: Incorporating UAS into Airport Infrastructure—Planning Guidebook](#)

Report 212: [Airports and Unmanned Aircraft Systems, Volume 3: Potential Use of UAS by Airport Operators](#)

Synthesis 74: [Combining Mixed-Use Flight Operations Safely at Airports](#)

Synthesis 104: [Current Landscape of Unmanned Aircraft Systems at Airports](#)

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Today's Presenters

#TRBwebinar



Moderator: Heather Hasper,
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Richard Stansbury,
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Uven Chong,
Hovecon



Basil Yap,
Hovecon

Part 2

- Register for [Part 2](#) of this webinar on April 27.
- For more information: trb.org

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 Transportation
Research Board

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- Networking opportunities
- May provide a path to Standing Committee membership

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