Unmanned Aerial Systems

Operating and Support Considerations for Long Term Success

September 27 2022

Chris Yakabe & Mike Whitted, InnoVets LLC

Today's Presentation:

20 minutes

- Basic considerations for site operations
- Case Studies
- Discussion

Choosing a Location (site selection & suitability)

- Define Mission (defining the mission will drive location selection or else "work backwards")
- Large or small UAS?
- Vertical or fixed-wing? (Both?)
- Focus on a specific area(s) of concentration (Research, commerce, package delivery, wildlife or LE surveillance, disaster response, oil field/rig inspection, pipeline/powerline/rail inspection, etc.)
- "Ecosystem" (Grand Sky: General Atomics and Northrop-Grumman)

Logistic Support

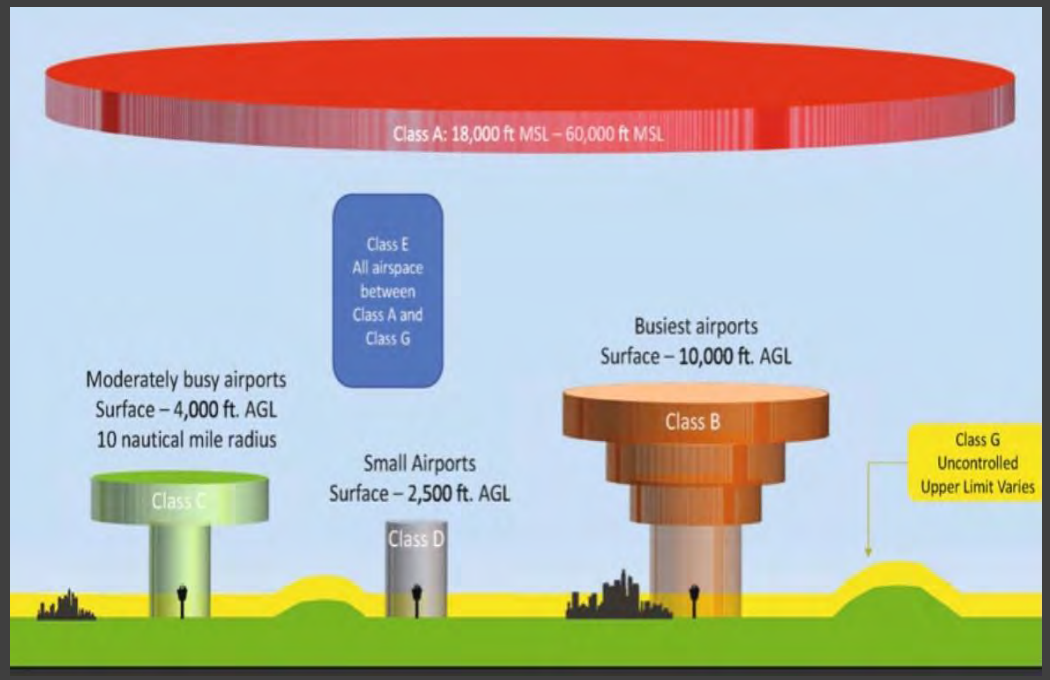
- Existing or customizable work-space (offices, hangars, maintenance)
- Security (physical, virtual/intellectual)
- Fuel availability (petroleum based, electrical/battery charging)
- Utilities, IT infrastructure/accessibility
- Data transfer and storage (cyber)
- Transportation (accessibility/towing)

Environmental Considerations

- General Weather trends (temperature, cloud cover, density altitude)
- Historical winds (particularly crosswinds; runway not always aligned toward prevailing wind. Some UAS particularly sensitive)
- Wildlife habitat (indigenous & migratory)
- Hazardous material handling & disposal (e-waste, composites)
- Environmental assessment/impact statement mandate

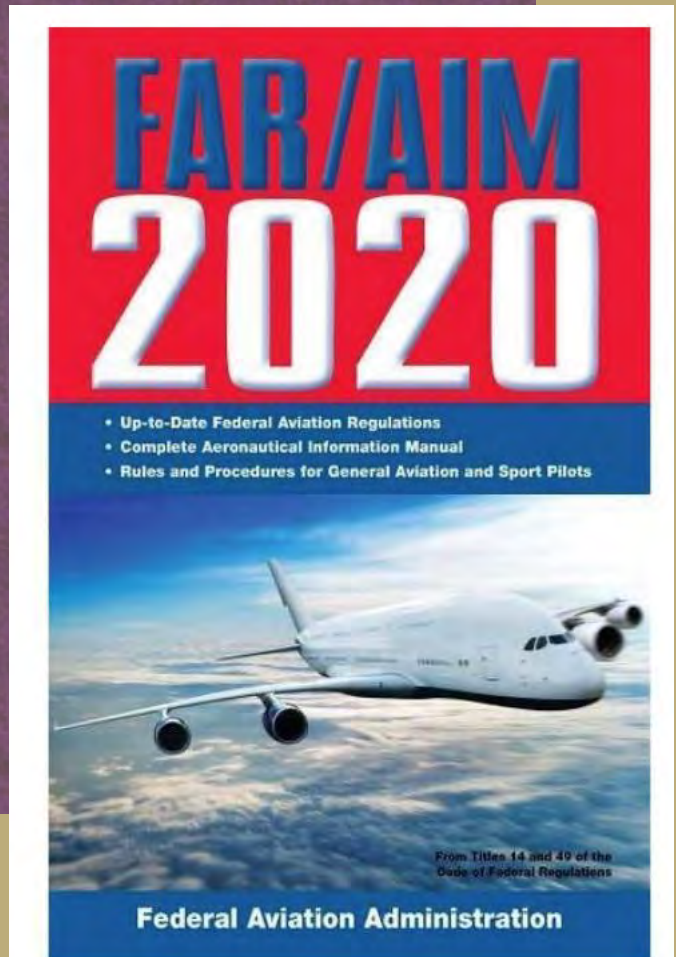
Airspace Considerations

- Customer needs vs. Accessibility
- Integrating manned & unmanned aircraft
- Flight restrictions
- Wildlife or environmentally sensitive areas



Regulations & how they apply to your unique situation

- Part 107
- Section 333 Exemption
- COA
- COTS waiver



External Support (“Ecosystem”)

- Existing tenants
- Local residents
- Local/state government (tax incentives?)
- The *“Competition”*
- Other supporting industries
- Intermodal transportation/transfer hub (shipping, rail, communications, data)
- Federal government
- Political and citizen support at all levels

Grand Sky Commercial Air Park
Grand Forks AFB, ND

Ennis Municipal (F41)

- Ennis Municipal Field (F41)

FBO

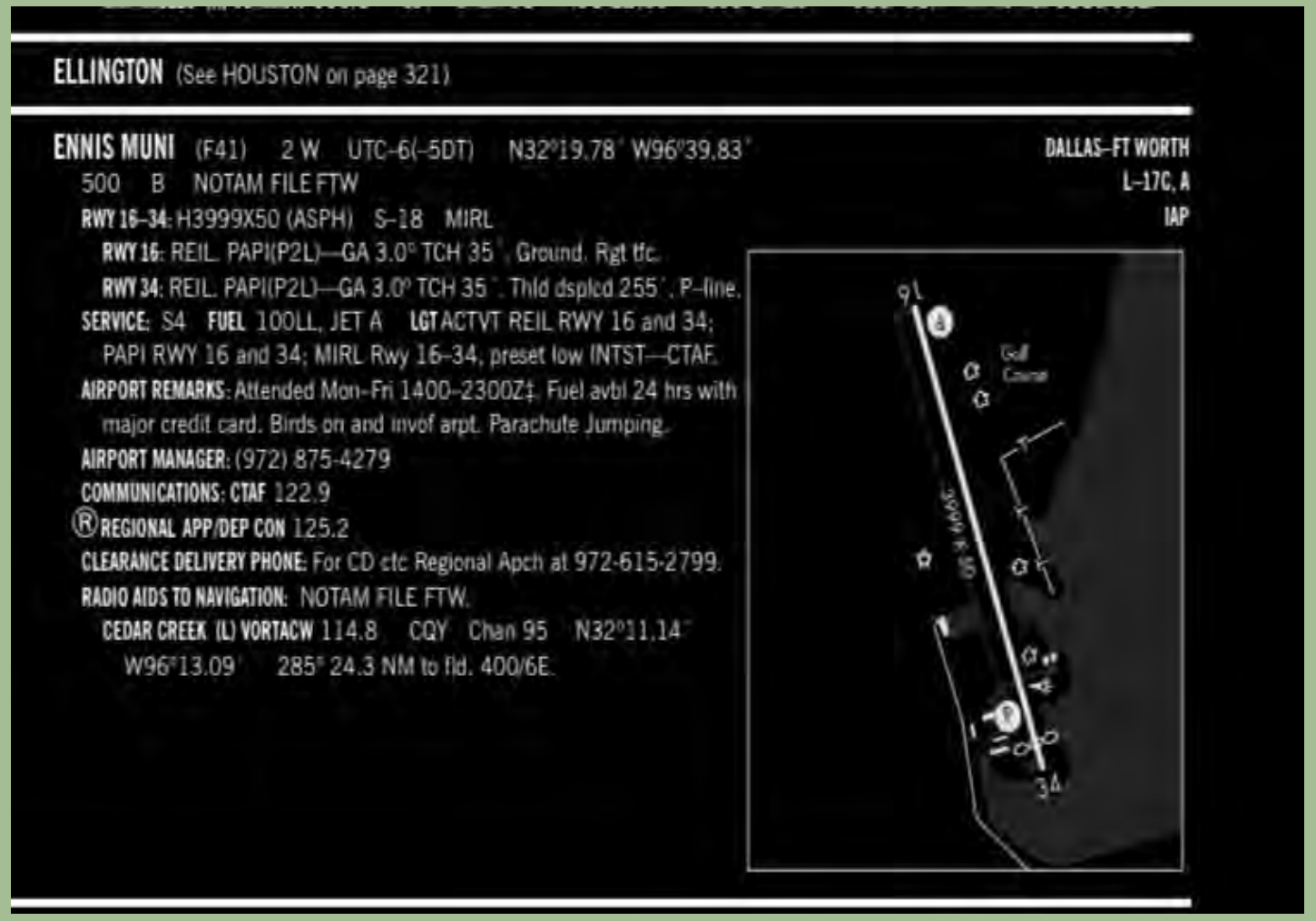
City of Ennis
(972) 875-4279
122.9 UNICOM
100LL $3.12
Jet A+ $2.89

AIRCRAFT MAINTENANCE / SERVICES

Hammock Aviation Services
(972) 875-4279
122.9 UNICOM

OTHER

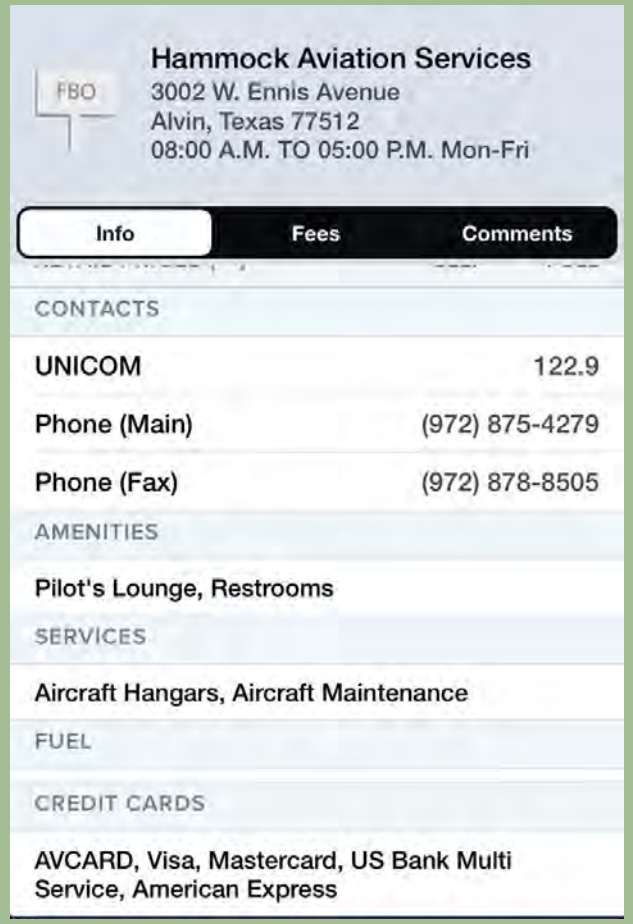
Poplawski Aircraft Painting
(972) 875-2111

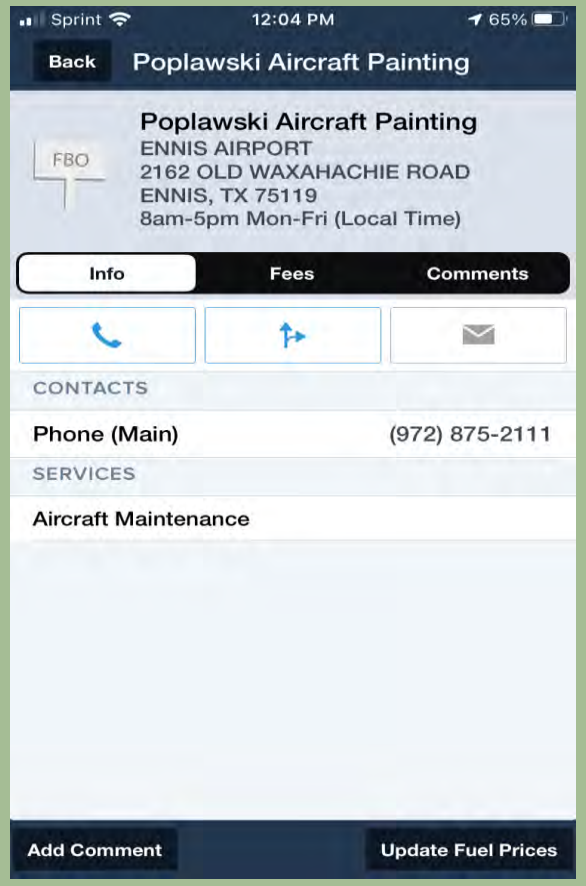


ELLINGTON (See HOUSTON on page 321)

ENNIS MUNI (F41) 2 W UTC-6(-5DT) N32°19.78' W96°39.83' DALLAS–FT WORTH
500 B NOTAM FILE FTW L–17C, A
RWY 16–34: H3999X50 (ASPH) S–18 MIRL IAP
RWY 16: REIL. PAPI(P2L)—GA 3.0° TCH 35'. Ground. Rgt tfc.
RWY 34: REIL. PAPI(P2L)—GA 3.0° TCH 35'. Thld dsplcd 255'. P–line.
SERVICE: S4 **FUEL** 100LL, JET A **LGT** ACTVT REIL RWY 16 and 34; PAPI RWY 16 and 34; MIRL Rwy 16–34, preset low INTST—CTAF.
AIRPORT REMARKS: Attended Mon–Fri 1400–2300Z‡. Fuel avbl 24 hrs with major credit card. Birds on and invof arpt. Parachute Jumping.
AIRPORT MANAGER: (972) 875-4279
COMMUNICATIONS: CTAF 122.9
Ⓡ **REGIONAL APP/DEP CON** 125.2
CLEARANCE DELIVERY PHONE: For CD ctc Regional Apch at 972-615-2799.
RADIO AIDS TO NAVIGATION: NOTAM FILE FTW.
CEDAR CREEK (L) VORTACW 114.8 CQY Chan 95 N32°11.14' W96°13.09' 285° 24.3 NM to fld. 400/6E.

Ennis Municipal (F41)





toeknee25 — 3 months ago

Departing, contact approach ASAP. They will either get you a squawk and then almost immediately transfer you over to another freq. OR tell you to contact another controller

cecstl — 4 months ago

Very well maintained runway. If strong gusting winds, watch for wind shear near the ground on south approach. Watch for Ag crop aircraft and parachuting operations here.

andy65 — 1 year 4 months ago

A nice local airport. Friendly people. Bought fuel. No tie down charge even though I stayed more than one night.

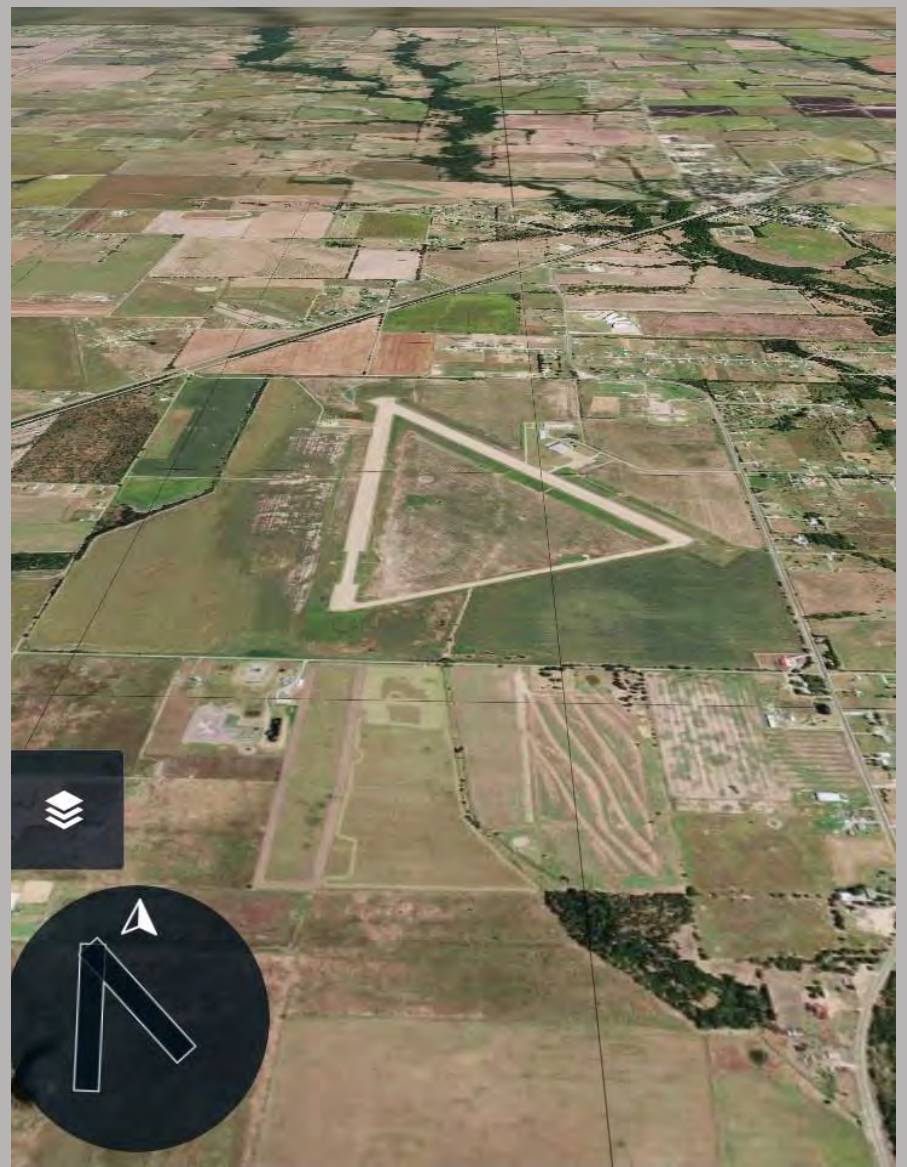
flexvince — 1 year 7 months ago

Parachute activities on the airport.

wizzrd02 — 4 years ago

For south or east approach/departure use 126.72

Caddo Mills Municipal Airport (7F3)



Caddo Mills Municipal Airport (7F3)

Caddo Mills Municipal Airport
FBO
4096 FM 1565
Caddo Mills, TX 75135
Mon-Sat 8:00 am-6:00 pm
Sun Noon-5:00 pm

Info | Fees | Comments

RETAIL PRICES (---)	SELF	FULL
100LL	None	None
Jet-A	None	None
Jet-A+	None	None

CONTACTS

Phone (Main)	(972) 974-4779

aaron — 2 years 4 months ago

No GA fuel, terminal or FBO. There is a large building that appears to be an FBO terminal adjacent to the GA Ramp, but it is privately owned. Airport is primarily used for touch and go's and the parachute operation on the West side.

yourpilotincommand — 2 years 7 months ago

Flew over this evening and noticed pilot controlled runway lighting inop.

hkbarret — 6 years 4 months ago

No sailplane activity. Parallel grass runway no longer active.

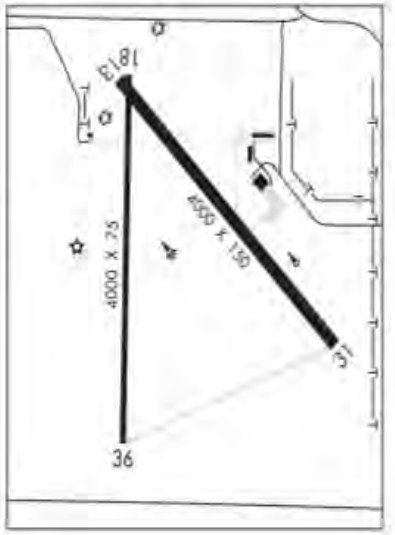
dginther — 9 years 5 months ago

Cc auth is down for fuel, so assisted fuel only. Good fuel prices, but I question to accuracy of the pump as we took 17 gallons to the tab of a pa28, even though there was fuel in the tank. No more glider operations. Both runways active and in reasonable shape.

A/FD

TEXAS 257

CADDO MILLS MUNI (7F3) 2 SW UTC-6(-5DT) N33°02.17' W96°14.59' DALLAS-FT WORTH
542 B NOTAM FILE FTW L-17D, A
RWY 13-31: H4000X150 (CONC) S-26 IAP
RWY 13: Tree.
RWY 31: Tree.
RWY 18-36: H4000X75 (CONC) S-26 MIRL
RWY 18: Tree.
RWY 36: Tree.
SERVICE: LGT ACTIVATE MIRL Rwy 18-36—CTAF.
AIRPORT REMARKS: Attended Mon-Sat 1500-0000Z‡. For arpt attendant other times, call 214-585-9953. Parachute Jumping. Skydiving activity on arpt. Rocket launch area adj to txy east of Rwy 13-31, midway. Rwy 13-31, 18-36 markings faded. Ramp on east-side of Rwy 13-31 in poor condition.
AIRPORT MANAGER: 214-585-9953
COMMUNICATIONS: CTAF/UNICOM 122.8
®**FORT WORTH CENTER APP/DEP CON** 132.025
CLEARANCE DELIVERY PHONE: For CD ctc Fort Worth ARTCC at 817-858-7584.
RADIO AIDS TO NAVIGATION: NOTAM FILE FTW.
BONHAM (H) VORTACW 114.6 BYP Chan 93 N33°32.25' W96°14.05' 175° 30.0 NM to fld. 700/6E.
COMM/NAV/WEATHER REMARKS: UNICOM not monitored.



CAIN (See SLIDELL on page 402)

Discussion…

Questions?

Chris Yakabe

chris@innovets.net

Mike Whitted

Mike@innovets.net

Thank You for your Time!

Offshore Platform Cargo Resupply Utilizing UAVs

INTEGRATING DRONE TECHNOLOGIES INTO TRADITIONAL AVIATION SERVICES

OFFSHORE CARGO RESUPPLY

OFFSHORE CARGO BUSINESS CASE

CLIENT

- Oil rig delivery company supporting the oil industry for over 75 years.

CURRENT SITUATION

- Delivering via helicopter or maritime vessel.
  - Helicopter costs ~$1800/hr during the day and 3X at night typically for emergencies only.
  - Maritime vessel costs ~$5,000-$8,000+/day + fuel and crew.
- Delivering small items is inefficient via a helicopter or vessel but a reliable supply chain is crucial.

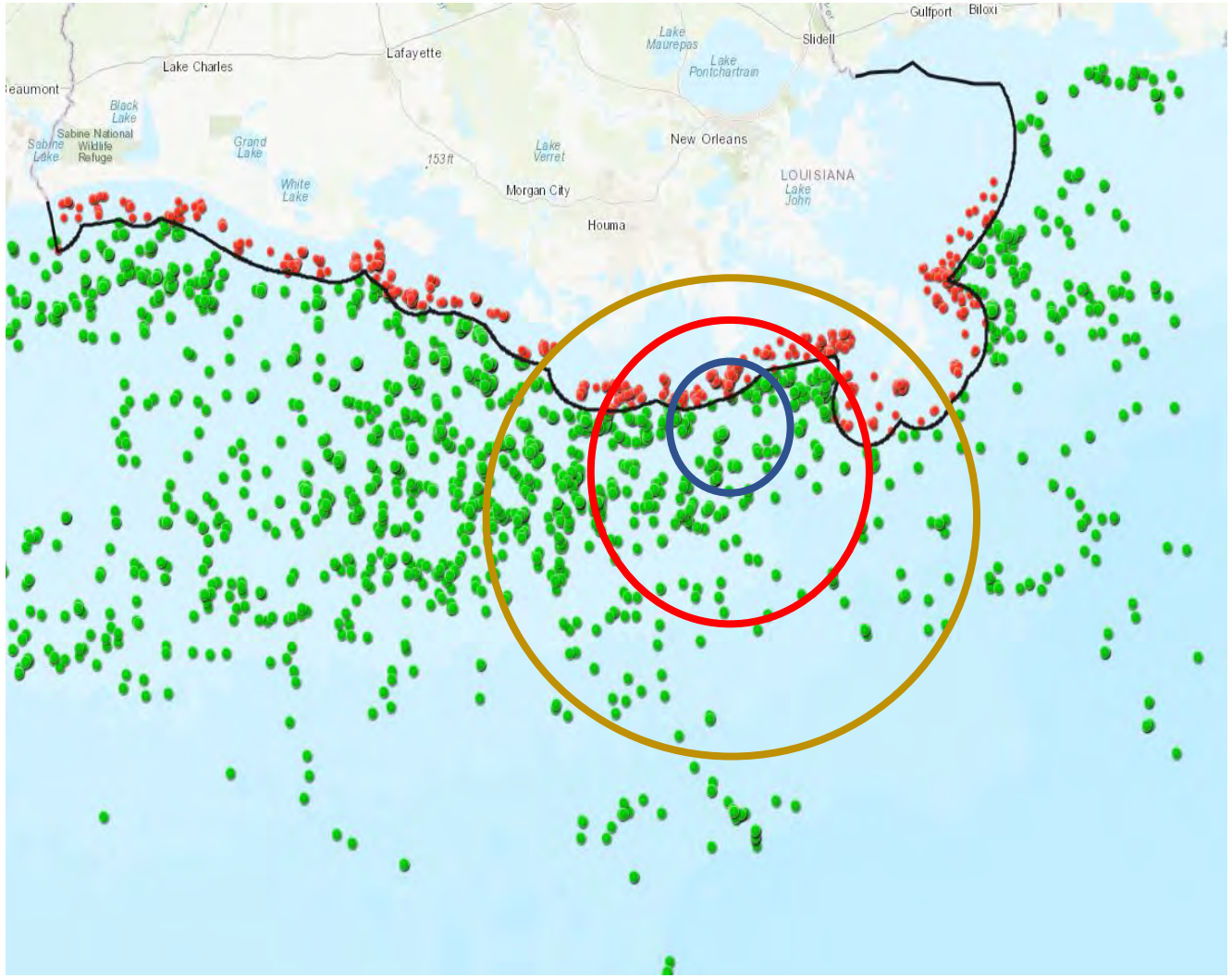
OBJECTIVES

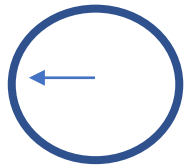
- Significantly reduce operating cost to safely deliver goods day or night.
- Expand ability to deliver small payloads more frequently.

KEY CHALLENGES

- A complete safety analysis must be conducted which requires intensive preparation.
- The legal and regulatory framework is a key element.
- Must be able to safely land a drone in a high-risk metal environment.
- Potential disturbances by radar and high-power transmission equipment are included in our risk analysis.

PORT FOURCHON, LA. OPERATIONS

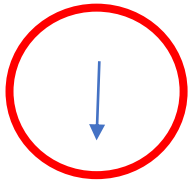




Phase 1

Avidrone 210TL with 20lb Payload
Avidrone 490TL with 35lb Payload

25 Mile Radius



Phase 2

Avidrone 210TL with 35lb Payload
Avidrone 490TL with 50lb Payload

50 Mile Radius

Phase 3

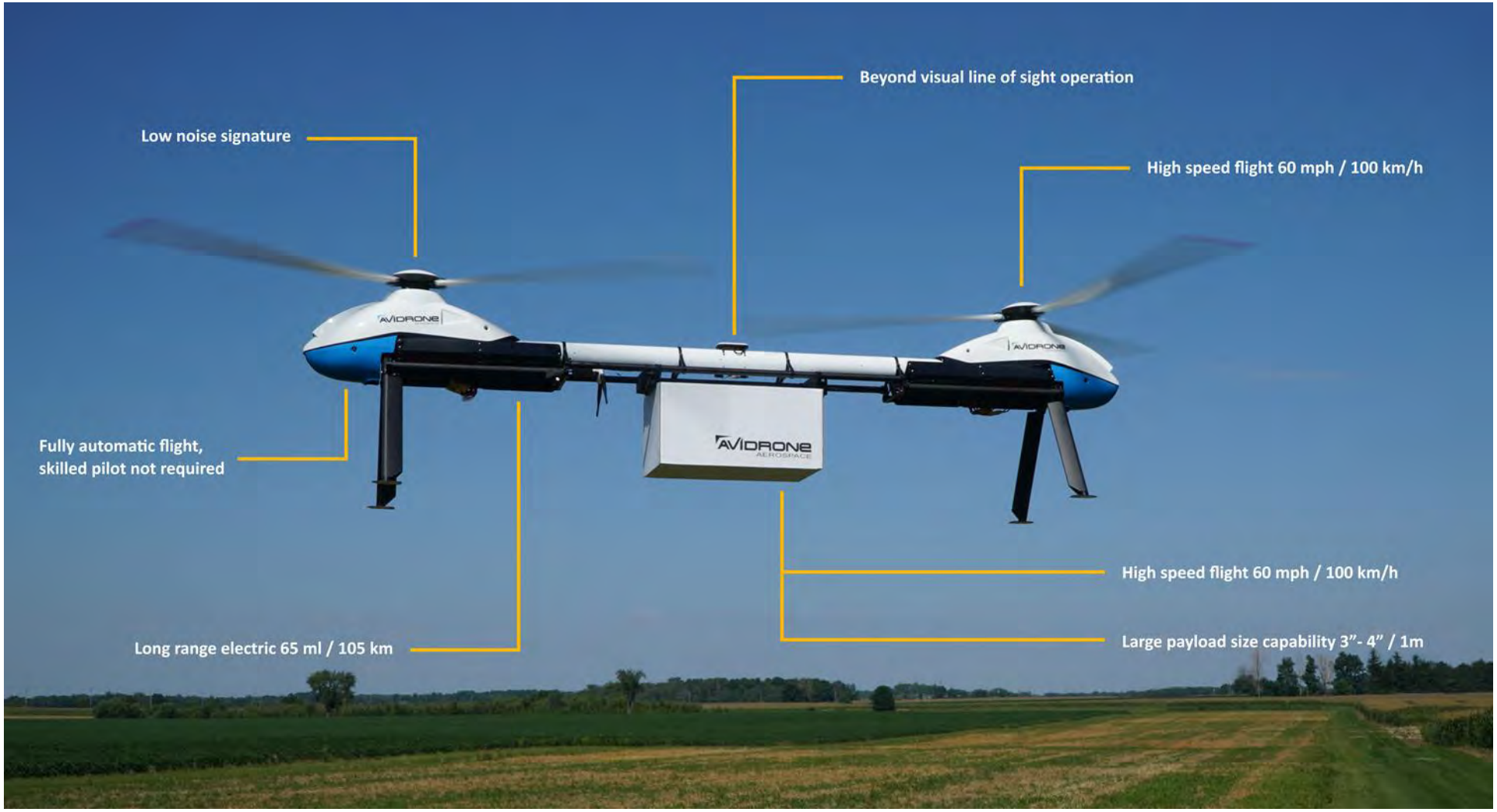
Avidrone 210TL with 35lb Payload
Avidrone 490TL with 50lb Payload

100+ Miles Radius

AVIDRONE

AVIDRONE 210TL

Drone Cargo Resupply



- Low Noise Signature
- Fully Automatic Flight
- Long Range Electric
- High Speed Flight
- BVLOS Operations
- Large Payload Size Capability 3’-4’/1m
- Automated package delivery
- Long range- ISR, Target tracking technology

LIFTING POWER & SPEED

210TL Heavy Lift

Payload- 35lb/16kg
Range- 65mi/105km
Speed- 60mph/97kmh
Endurance- 75mins
Gross Weight- 85lb/38kg

490TL Super Heavy Lift

Payload- 50lb/23kg
Range- 100mi/160km
Speed- 60mph/997kmh
Endurance- 90mins
Gross Weight- 120lb/56kg

Automated, all-electric UAS setting new standards of payload, range, & speed.

OFFSHORE CARGO RESUPPLY SOLUTIONS

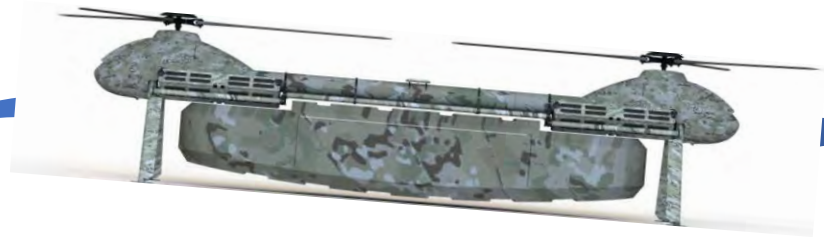
Avidrone' s Fully automated Proprietary, and Secure UAV control system allows for touch-and-go cargo delivery.

Avidrone flight control system does all the flying by itself, maintaining safe & secure coordinated flight, including BVLOS operations.

Avidrone's Focus on performance & special operations allows for new ways to do airborne tasks such as automating cargo transport, as well as delivering critical supplies, to difficult places with medicine, tools and parts.

Avidrone 210TL & 490TL feature dual rotors to maximize efficiency and stability. Advanced payload capacity, range & hauling capacity that outperforms other designs while allowing vertical take-offs & landings and high-speed cruising to cover a variety of distances.

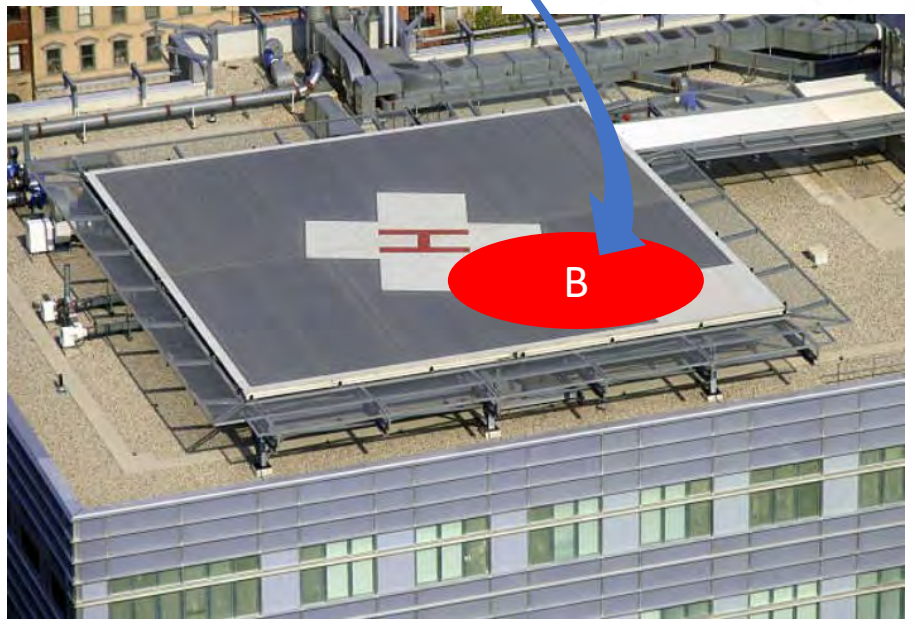
Automated Beyond Visual Line of Sight



- Automated A to B flight from Any location to another and back
- No Pilot, No remote control needed
- Common control system, Avidrone developed secure software
- Dual Ground Station capable
- Emergency landing zones
- Flight without data link is permitted, fully automatic flight

- Ground station 1

- Optional / Ground station 2



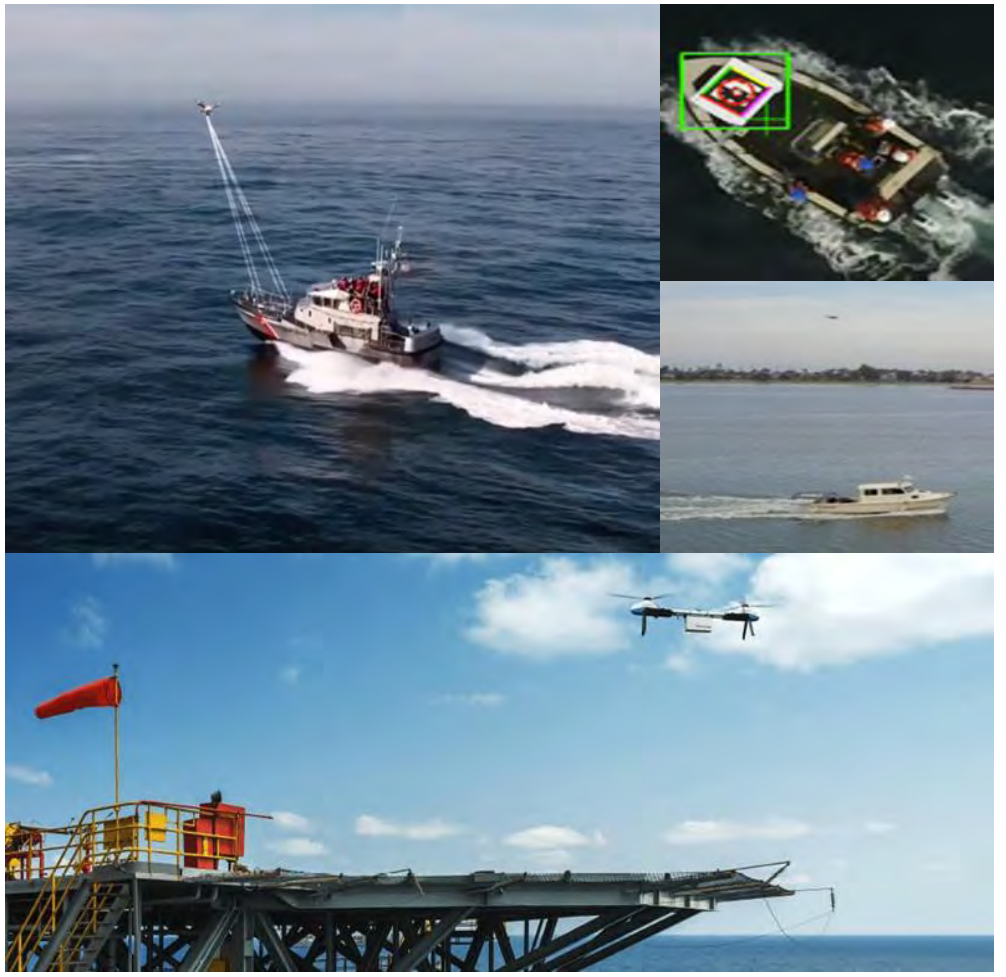
UNMATCHED PRECISION TOUCHDOWN

Precision Landing Systems

- Integrated Vision-based [moving] target landing systems into Avidrone Autopilot and UAV system
- Uses computer vision, simple, printed visual target on landing site
- Outer-loop control system works with autopilot to ensure safe, reliable operation of aircraft in highly dynamic environment
- Avidrone’ s laser altimeters on each end of the tandem craft allow for absolute landing accuracy on any surface, no matter how uneven.

Built for Cargo Resupply
Fully Autonomous Flight Operations

- The core application for Avidrone systems is cargo delivery
- Quick release servo actuated drop mechanism
  - Utilizes a proprietary handle design to hold and drop the boxes
- Boxes can be any material, size is customizable
  - Could be insulated, heated, cooled, cardboard, plastic, metal, etc.
  - Standard is cardboard boxes with the integrated handle

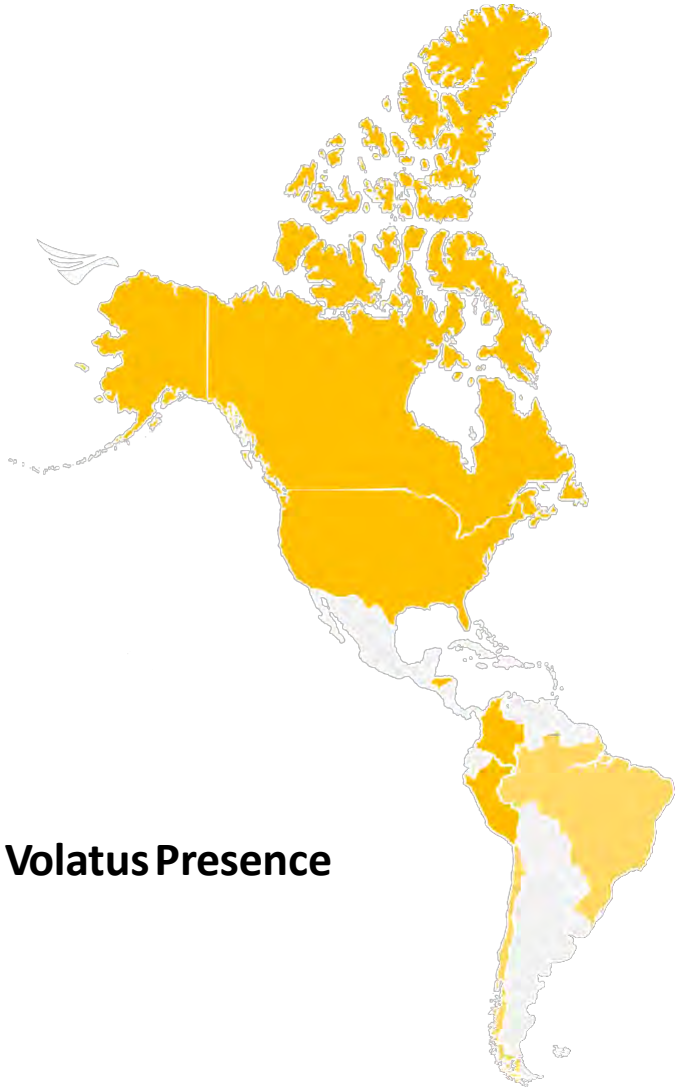


THE FUTURE OF AIR CARGO IS REMOTELY PILOTED

Commercial Air Carrier

- Operating Certificates & Licenses enabling unmanned cargo
- Positioned as first commercial Air Carrier in Canada to operate both conventional aircraft and UAVs

Volatus is a global leader in the commercialization of drone technologies.



Volatus Presence

EXPANDING GLOBAL FOOTPRINT

- Presence across Americas and United Kingdom
- Expanding presence in the European Region
- 1200+ pilots in our network spread across the Americas
- Equipment and Service capabilities in 7+ countries
- Capital Market Presence in Canada and the USA

STRATEGIC PARTNERS

Companies seek us out: to commercialize, distribute and market their UAV technologies

Thank You

Michael Hill | Regional Director

(e-mail)- michael.hill@volatusaerospace.com

VOLATUS
AEROSPACE

UNT
UNIVERSITY OF NORTH TEXAS

X4+
Mind The Gap!

UNMANNED EXPERTS

North Central Texas Advanced Air Mobility

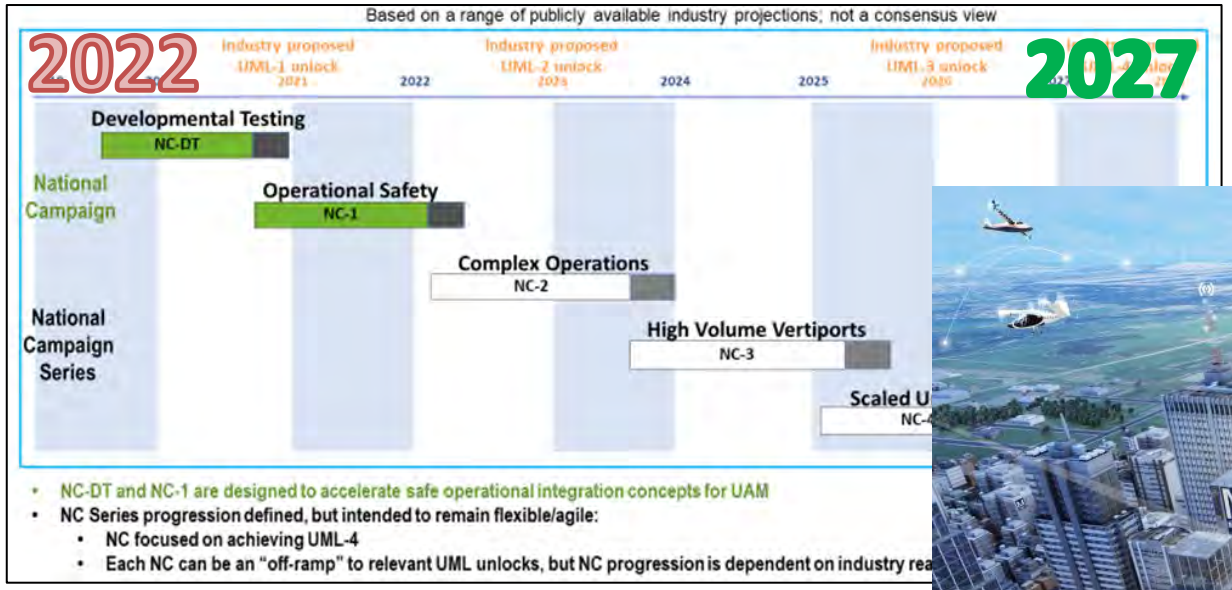
An Update from May 22

CAVEAT: IMHO / Chatham House Rules

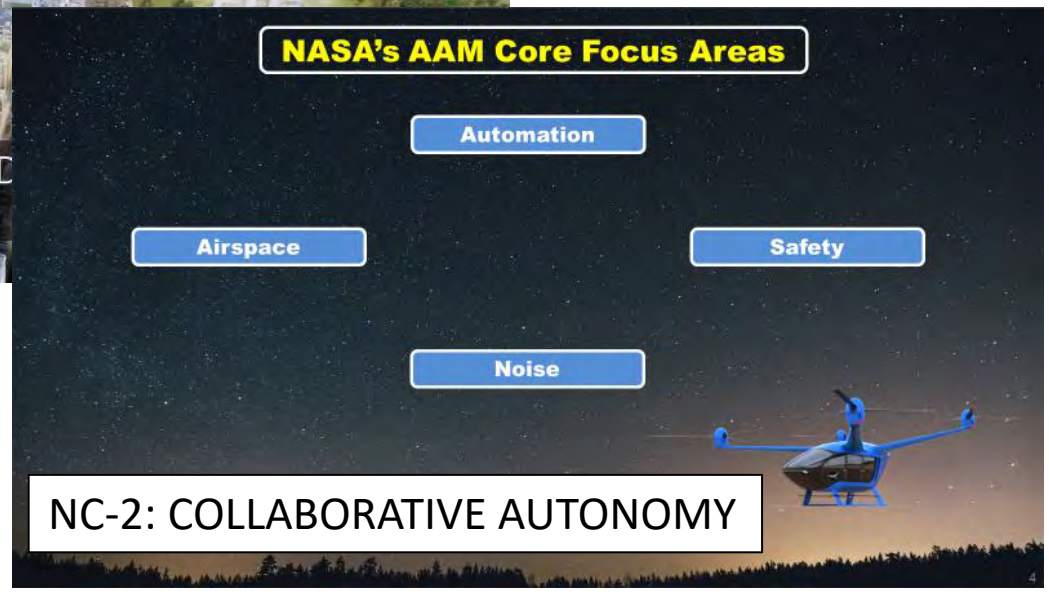
Scope

- NASA POV
- State Programs
- Industry Reality
- North Texas Cohort Update
- Next Steps

NASA NC-?


Based on a range of publicly available industry projections; not a consensus view
2022
Industry proposed UML-1 unlock
Industry proposed UML-2 unlock
Industry proposed UML-3 unlock
2027
2021
2022
2024
2025
Developmental Testing
NC-DT
National Campaign
Operational Safety
NC-1
Complex Operations
NC-2
National Campaign Series
High Volume Vertiports
NC-3
Scaled U
NC-
• NC-DT and NC-1 are designed to accelerate safe operational integration concepts for UAM
• NC Series progression defined, but intended to remain flexible/agile:
• NC focused on achieving UML-4
• Each NC can be an "off-ramp" to relevant UML unlocks, but NC progression is dependent on industry rea


PAM MELROY
AAM Roundtable with NASA D
August 9, 2022


NASA's AAM Core Focus Areas
Automation
Airspace
Safety
Noise
NC-2: COLLABORATIVE AUTONOMY

State Programs

EVA connects drone infrastructure to airports in Michigan

September 23, 2022 | UAM infrastructure, Vertiports

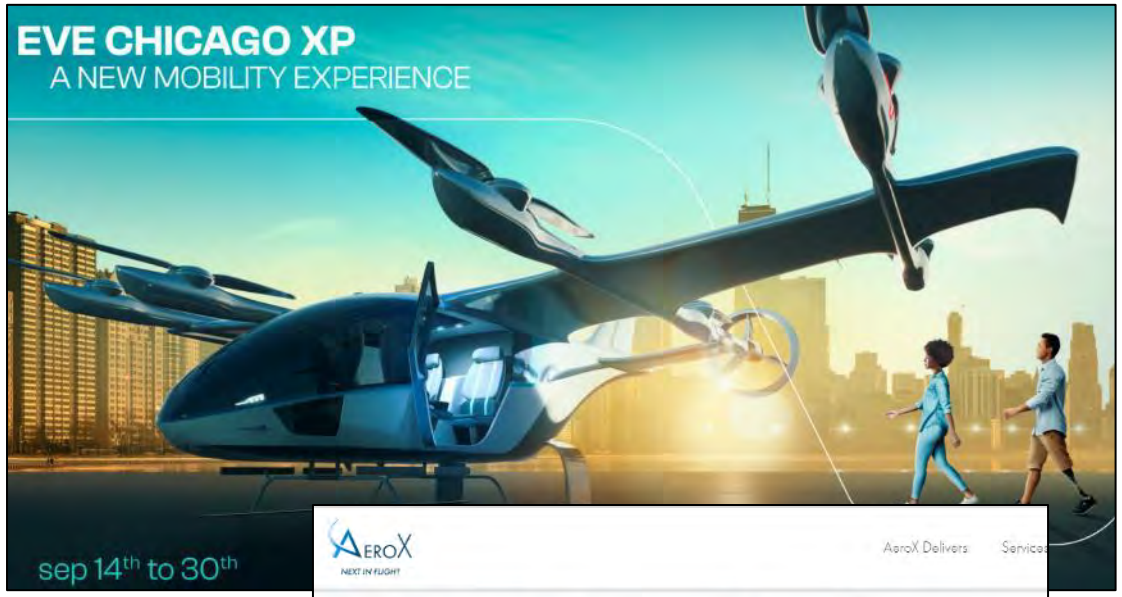
EVA announced today it is working with The Michigan Economic Deve
Gerald R. Ford International Airport Authority, Southwest Airlines® ar
Launchpad for Innovative Technologies and Entrepreneurship (FLITE)

DriveOhio
Advancing Smart Mobility

Ohio AAM Framework

August 2022

Advanced
Air Mobility



Advanced Air Mobility Task Force Proposed in Florida

By Jessica Reed | January 5, 2022
Send Feedback | @JessicaReed_AVN

Advanced Air Mobility (AAM), eVTOLs, Ferrovial, lilium, Senate, Tavistock development company

AeroX
NEXT IN FLIGHT

AeroX Delivers | Services

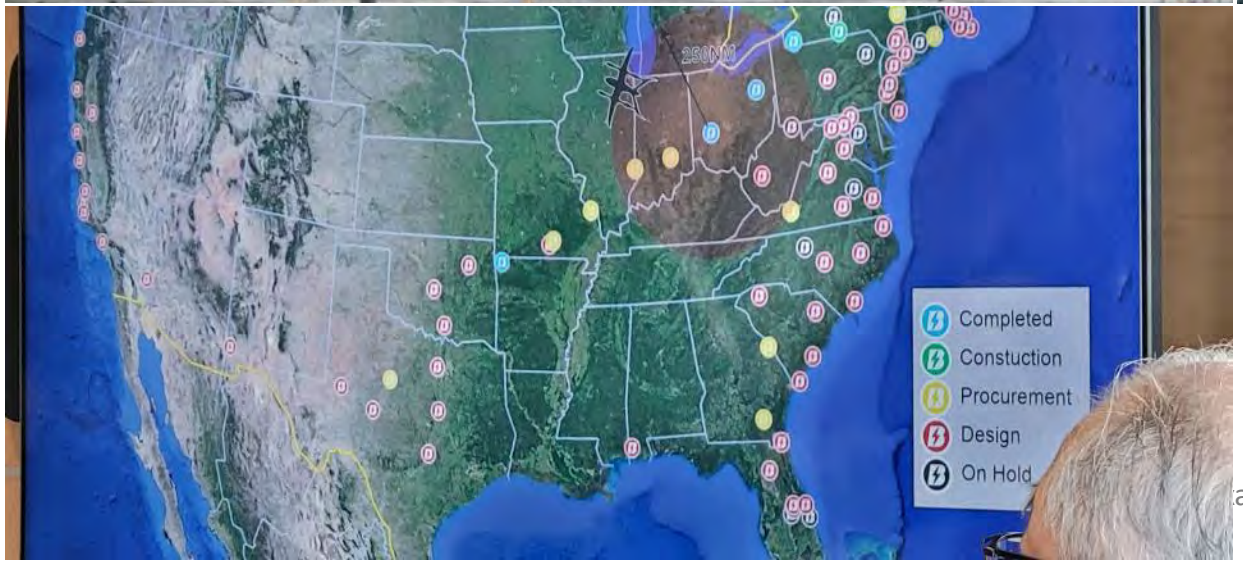
North Carolina General Assembly Grants AeroX $5 Million for Advanced Air Mobility System

November 29, 2021

Winston-Salem, N.C. – The North Carolina General Assembly has awarded AeroX a $5 million grant to design and develop an urban advanced air mobility system in Winston-Salem and Forsyth County, North Carolina.

Grant funds will flow to AeroX through the North Carolina Department of Transportation Division of Aviation, which administers state and federal aviation grant funding for North Carolina and has been a national leader in demonstrating and enabling government and commercial use of unmanned aircraft systems (UAS, or drones).

Example: BETA Alia



Winners & Losers?

United Airlines steps up to buy $1B worth of Archer's future flying taxis

The startup plans for a reveal of its eVTOL machine sometime this year, but United is onboard.

Sean Szymkowski

American Airlines And Virgin Atlantic Buy Up To 400 Flying Taxis

BY DANIEL MARTÍNEZ GARBUNO
PUBLISHED JUN 10, 2021

Bristow Reaches Deal to Buy Up To 50 eVTOLs From Vertical Aerospace

Fully electric aircraft will carry up to four passengers with a top speed of 200 mph.

By FLYING Staff September 22, 2021

RUMINT / Wise Words…

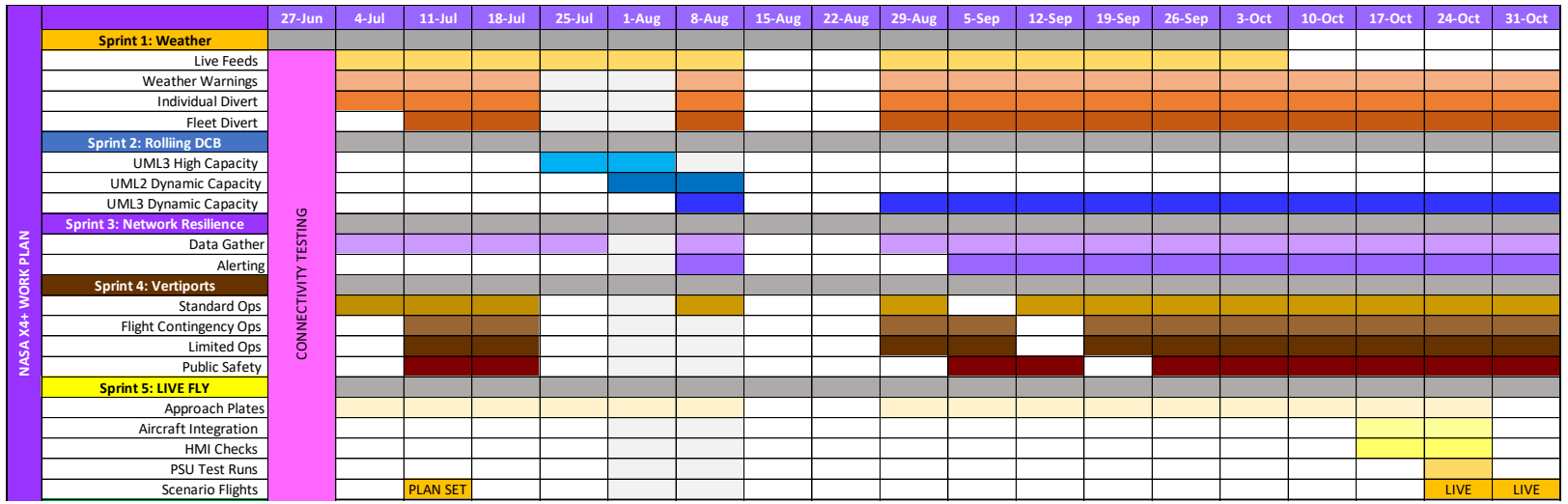
- Vertical Flight Society are v. engaged
- Ohio building $5M AAM Ops Center and 35 VP network!
- Boeing/Wisk AAM CONOPs just dropped!
- Charging: 800kWH: 1hr@300+kw, 4.5hrs@180kw, 16hr@50kw
- CONOPs is land, 7 min charge top off – take off!
- CaaS: Charging as a Service
- Jet fuel = 45MJ/kg Lithium Ion = 0.7MJ/kg!
- Pax carriage is not an attractive / saleable use case = Farm to Market!
- Military Use Case is for dispersed operation resupply!

X4+ Program

- X4: Minimum Viable Product PSU
  - 7 companies / cohorts
  - Q2CY21 – Q3CY21
  - *(Q1CY22 – Q2CY22)*
- NC-1: Deployment to Flight Trial
  - Q4CY22 – Q2CY22
  - *(? - ?)*
- X4+: Bridging Program
  - North Texas Cohort
  - Expand MVP
    - Weather
    - Dynamic DCB
    - Live Flight
- NC-2: Unified program

X4 Sprint Schedule

Scenario	Sprint	Features Tested	Testing Duration
1	Connectivity	FIDXP (FIMS-AZ), ASDS	9/27 - 11/5
	Operational Intent	FIMS-AZ and ASDS with Aval Claim *(starting 10/26)* DSS Connectivity, DSS Operation Proposition, PSU Network Connectivity and Distribution	11/8 - 11/19 (11/22 Thanksgiving)
	Nominal Flight	Vehicle Simulation, Telemetry Updates, Conformance Monitoring, Operation Close-out	11/29 - 12/10 (12/13-1/10 Holidays)
	Authorization	FIDXP Airspace Authorization	1/17- 2/4
	Strategic Conflict Management	Testing and evaluation of CBRs, Strategic Conflict Management, Multi-Operator Load Tests, DSS Operation Rejection Cases	2/7 - 3/11
	Scenario 1 Collab Sim	-	3/14 - 3/18
2	Constraints	Constraints Ingestion	4/4 - 4/8
	Operation Modification	PSU/Operator Modify Op, PSU-DSS Operational Mod and PSU Network Publish	4/11 - 4/22
	Scenario 2 Collab Sim	-	4/25 - 4/29
3	Go-Around Op Mod	PSU Modify Op w/Go-around, PSU-DSS Op Mod w/Go-around and PSU Network Publish	5/2 - 5/20
	Scenario 3 Collab Sim	-	5/23 - 5/27



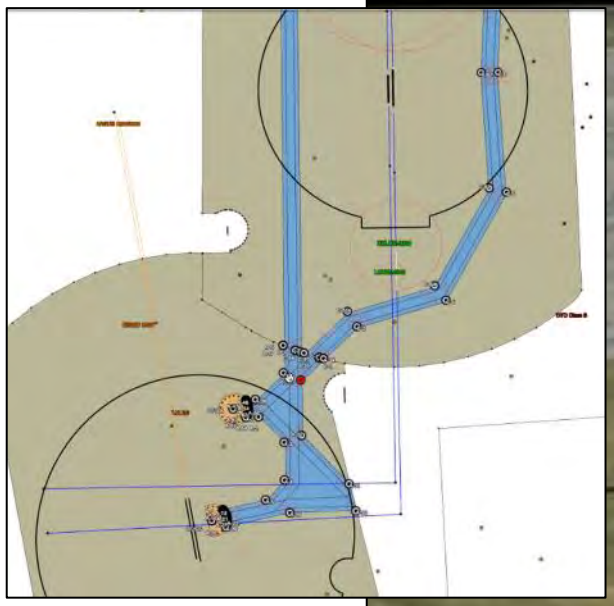
UNMANNED EXPERTS

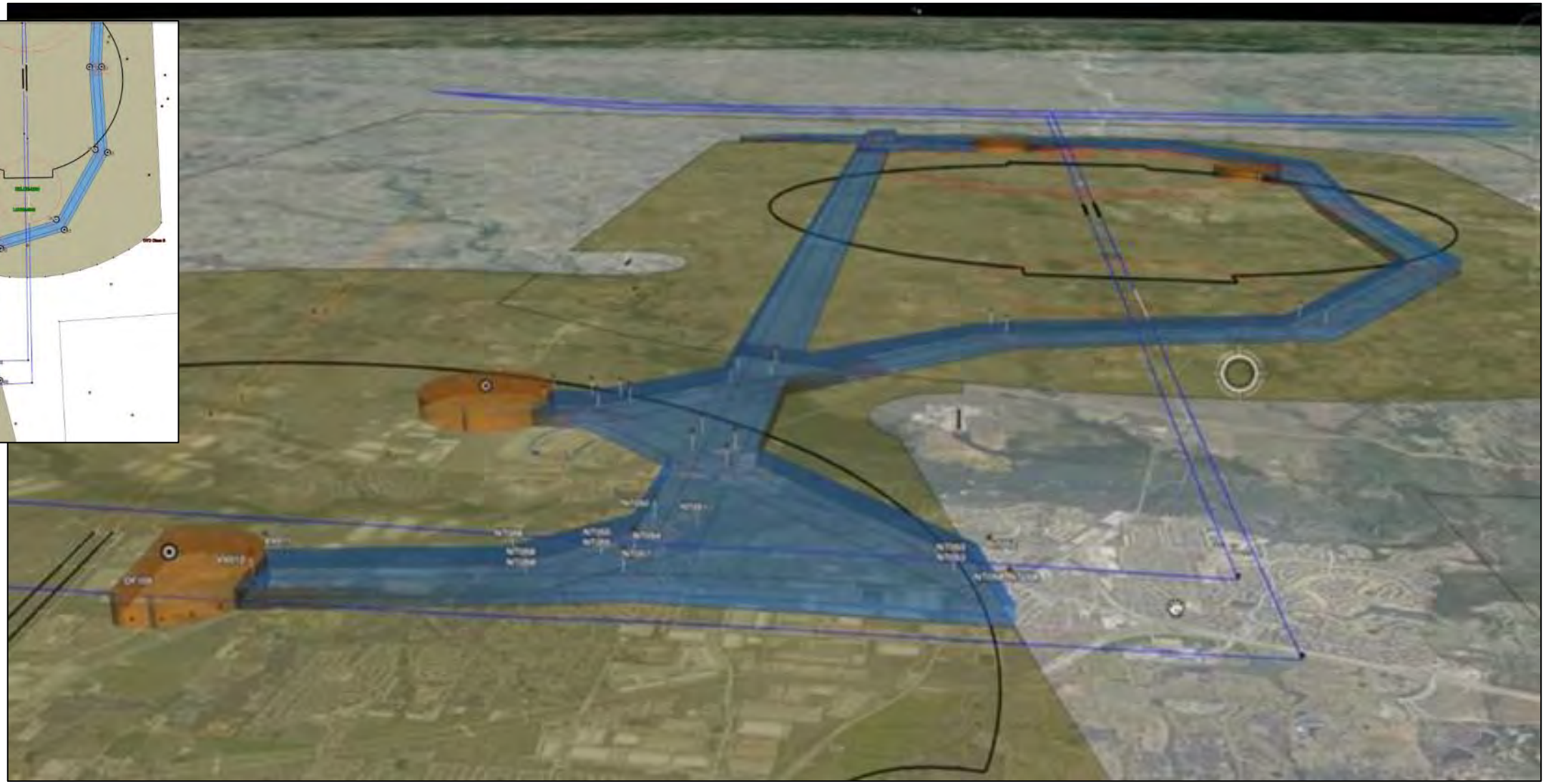
UNT UNIVERSITY OF NORTH TEXAS

X4+ Airspace

NASA

AGILITY PRIME





Current NTX Cohort Partners

UNT UNIVERSITY OF NORTH TEXAS

UNMANNED EXPERTS

BELL

GUS

Alliance Texas
A DEVELOPMENT OF HILLWOOD
A PEROT COMPANY™

TEXAS A&M UNIVERSITY CORPUS CHRISTI | LONE STAR UAS CENTER OF EXCELLENCE & INNOVATION

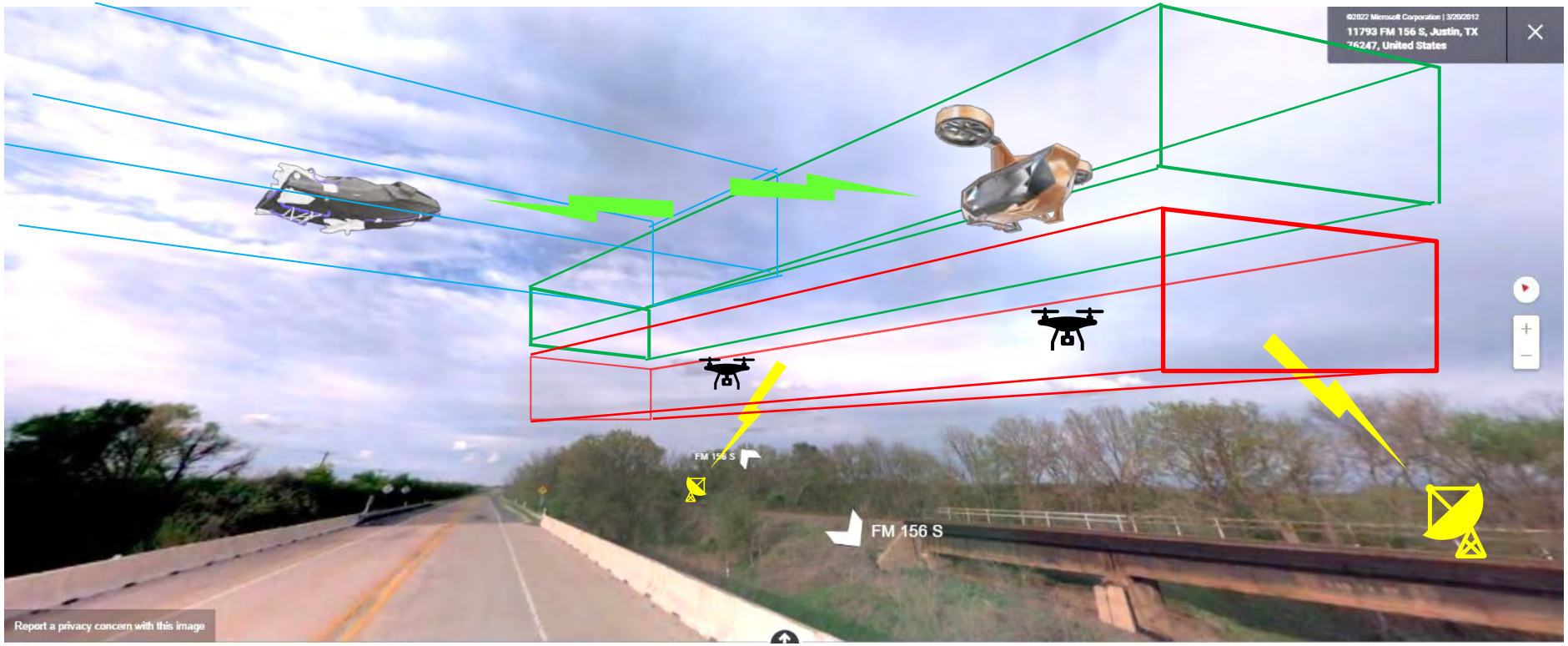
Avianco

AAMTEX
ADVANCED AIR MOBILITY OF TEXAS

NASA

AGILITY PRIME

NTx Cohort AAM Airspace Plan



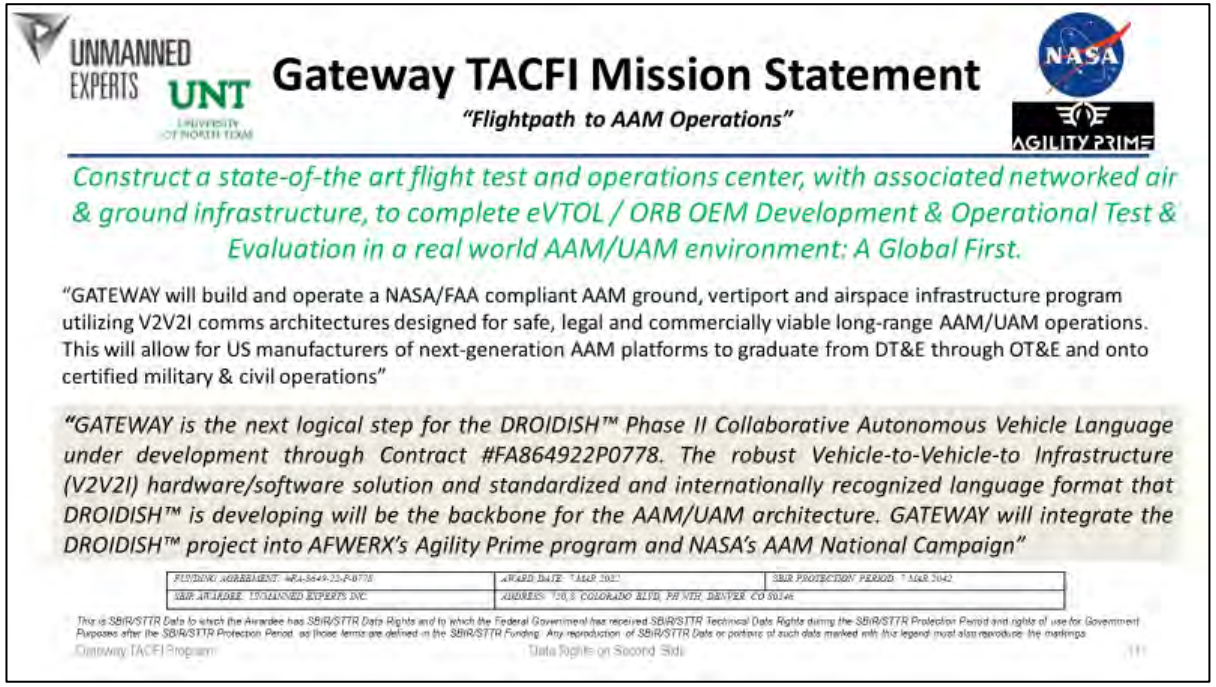
Demonstrate V2V2I Strategic and Tactical Contingency Management

Vertiport Positions

DISC PK:	33.2557N	97.1513W
ROSE LN:	33.2977N	97.213W
MIZ:	33.0465N	97.2951W
AFW:	*32.9947N*	*97.3083W*

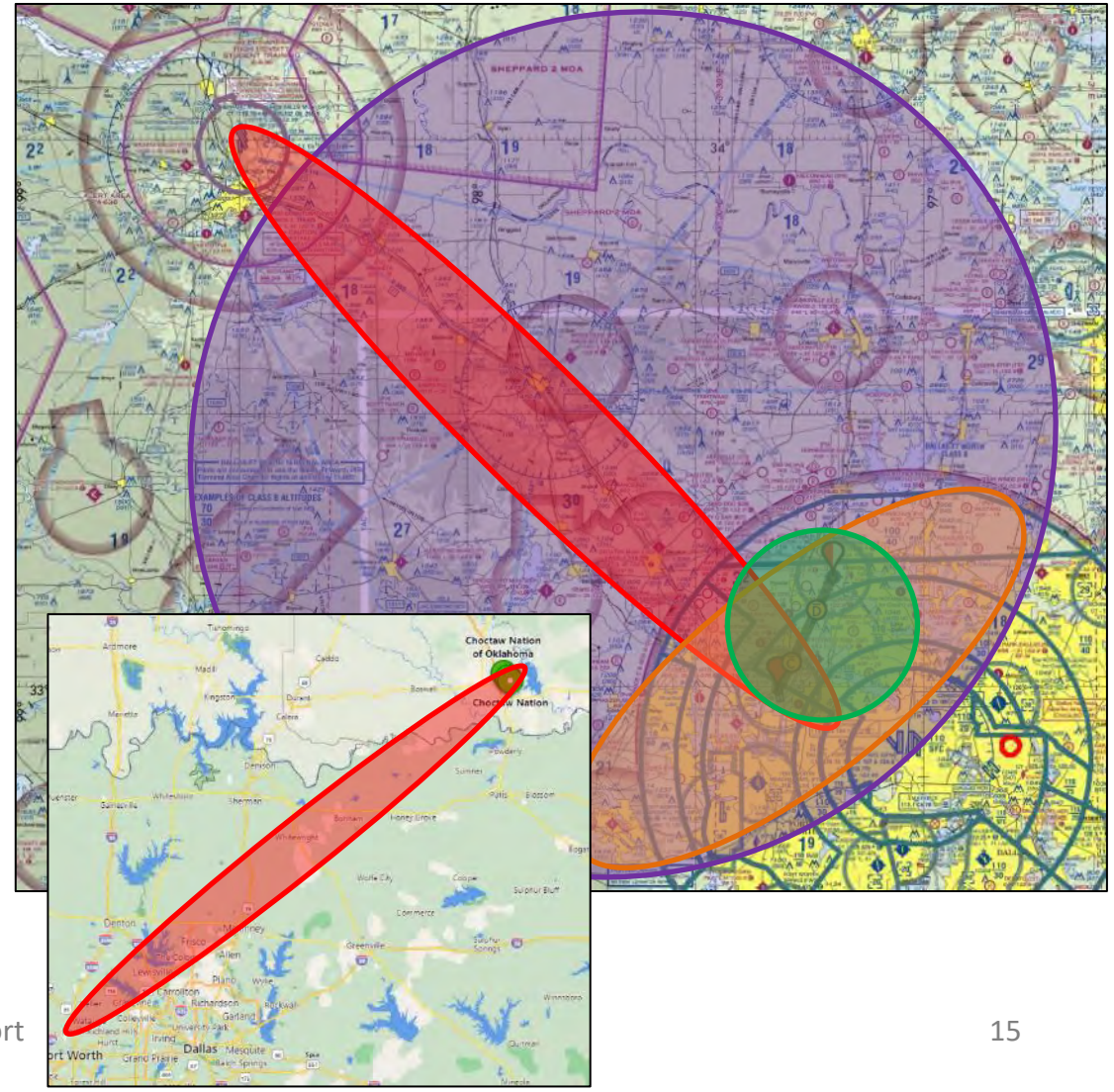
GATEWAY

Securing North Central Texas in AAM?



Gateway Capability Builds?

- Phase I - Alpha:
  - "Main Line One" / ATX-MIZ to Denton
  - Localized Technology Test & Evaluation Range
- Phase II Bravo:
  - "Air Track Map Zero" / Parker Co. to Frisco
  - eVTOL Operational Test Center
- Phase III Charlie:
  - "Air Rail Test Track" / MIZ to Wichita Falls
  - Possible route to Choctaw Nation
  - Regional Air Rail Technology Test Center
- Phase IV Delta:
  - North Texas Regional AAM Command Center
  - DFW to Amarillo



Unmanned Experts Inc.

Confidence at the Cutting Edge

Consultancy

Build Knowledge

RDT&E

Field New Capabilities

CONOPs

Operationalize

North Texas UAS Safety and Integration Task Force

Advanced Air Mobility and Wildlife Hazards Management

Lisa Harmon
Mead & Hunt, Inc.

September 27, 2022

Introduction

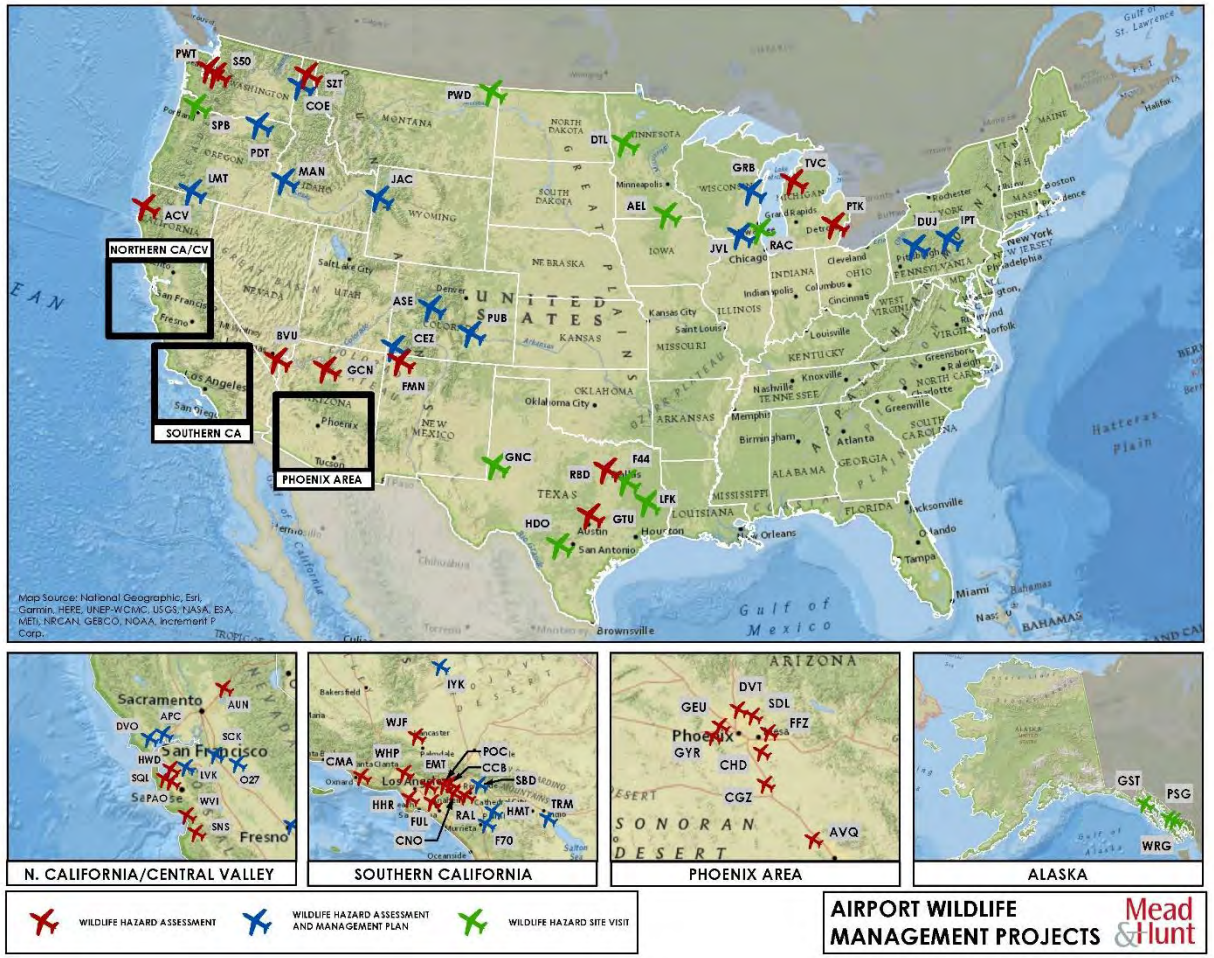
Mead&Hunt

Full-service Aviation Firm

Planning | Engineering | Compliance

Wildlife Hazard Management Services

- Wildlife Hazard Assessments (WHAs), Management Plans (WHMPs), Site Visits
- Community Outreach and Education
- Facility design review to avoid and minimize wildlife hazards to aviation



Presentation Agenda

- Historic relationship between aircraft and wildlife management
- New relationship between AAM and (Airport) Wildlife Hazard Management.
- Potential challenges (e.g., airspace, and land use)
- Current and adaptative approaches to manage wildlife in support of AAM

Goal: Encourage dialogue across multiple disciplines and stakeholders

What is a Wildlife Strike?

A wildlife strike/direct conflict occurs when…

- Aircraft collide with wildlife;
- Aircraft damage is identified from a wildlife strike;
- Wildlife remains are found within 200 feet of runway centerline; and
- An animal's presence creates a significant negative effect on a flight (i.e., aborted takeoff/landing, emergency stop, aircraft left pavement area to avoid collision with animal.

Source: FAA AC 150/5200-32A, Reporting Wildlife Aircraft Strikes

What is a Wildlife Strike?

Indirect conflicts from wildlife include:

- Nesting/damage to aircraft
- Chewing or digging of wires
- Prey base for other wildlife

Source: Premierflightct.com

Source: FAA AC 150/5200-32A, Reporting Wildlife Aircraft Strikes

Wildlife Strike Background

Frequency of Strikes

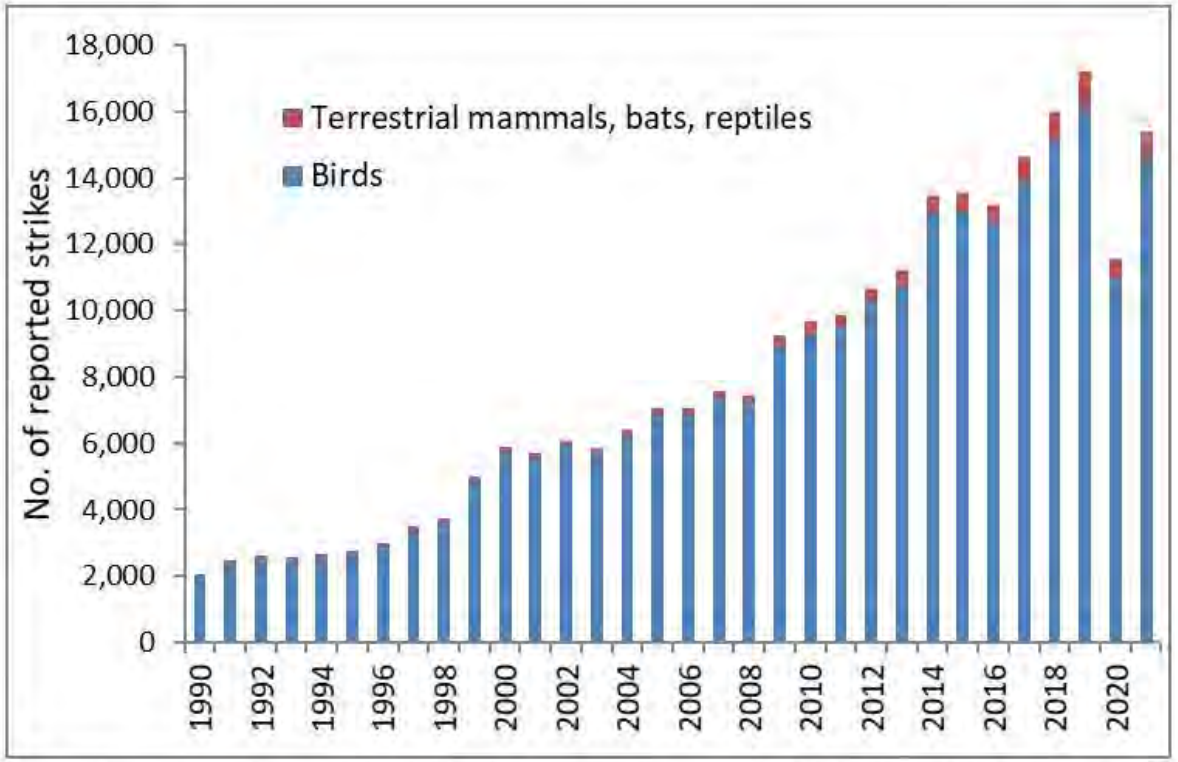


Figure 1. Number of reported wildlife strikes with civil aircraft, USA, 1990–2021. The 254,980 strikes involved birds (245,010), terrestrial mammals (5,359), bats (4,010), and reptiles (601). An additional 4,597 strikes were reported for U.S.-registered aircraft in foreign countries for a total of 259,577 strikes (see Tables 1, 2, and 18).

Strikes and strike rates are increasing

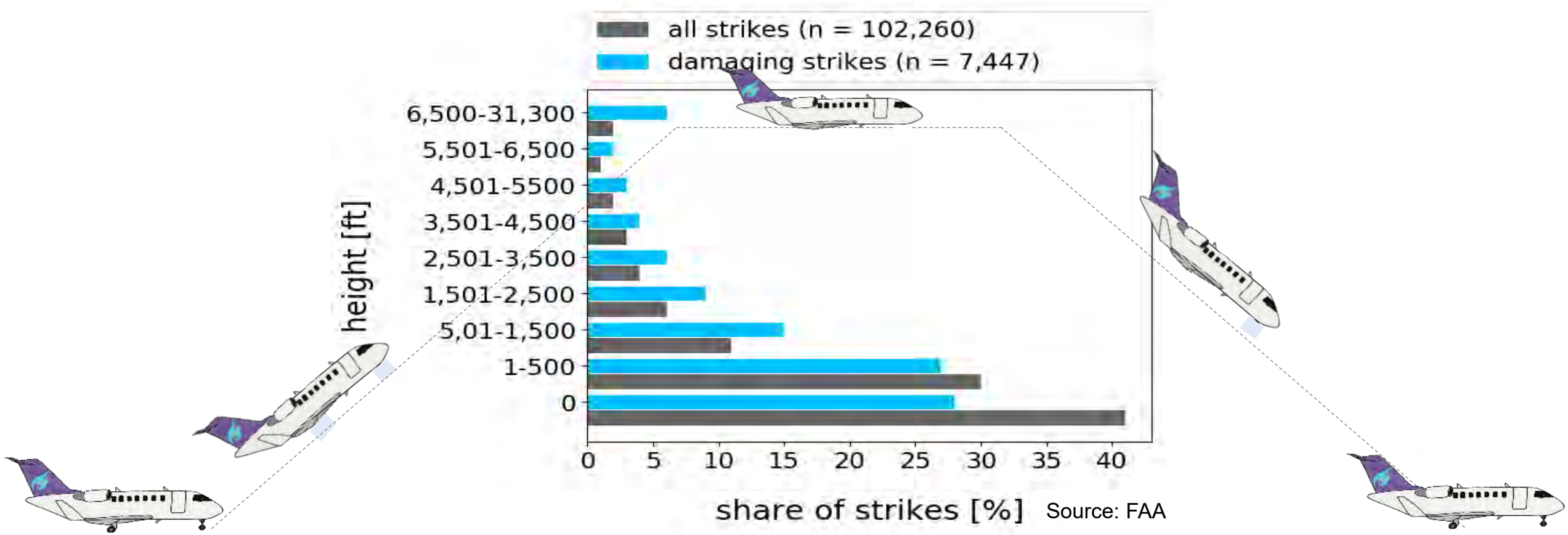
- Increased wildlife populations–especially large birds
- Encroachment/adaptation to urban settings
- Increased air traffic
- Faster, quieter two-engine aircraft
- Better reporting!

Mixed news….

- Although strike rates are increasing, we have more data than ever to learn from and to develop new solutions.

Where Wildlife Strikes Occur

Altitude of Recorded Strikes



Source: FAA

Advanced Air Mobility (AAM) Characteristics

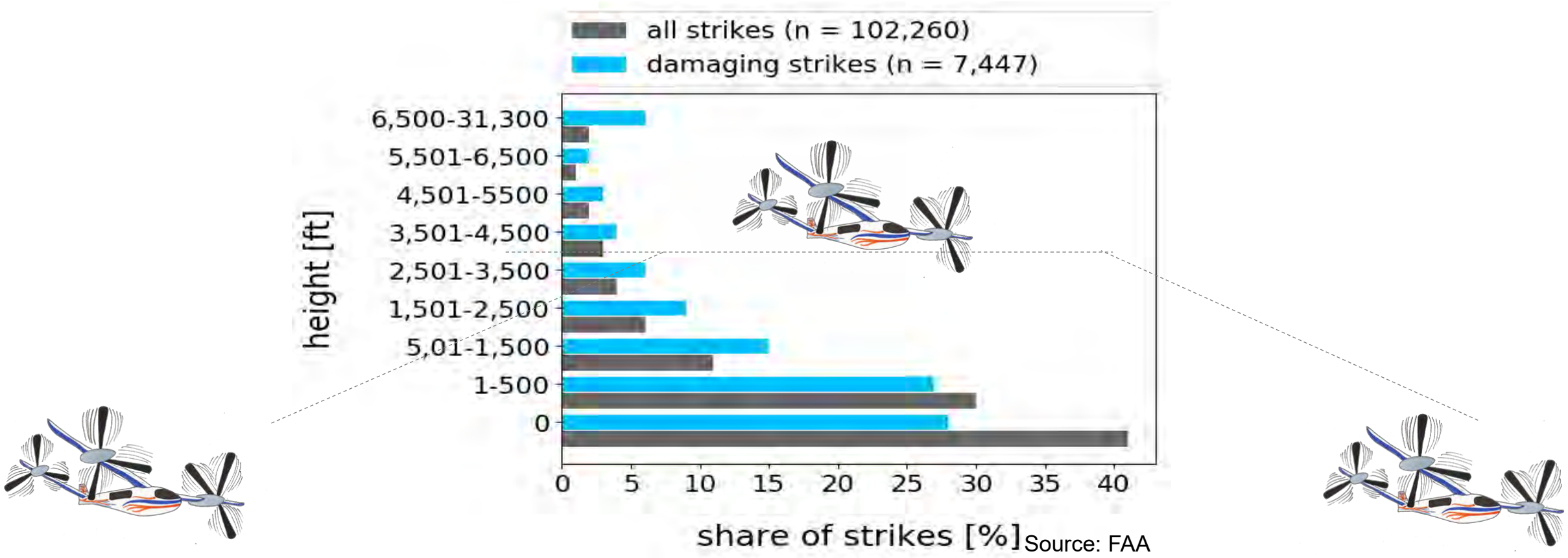
General AAM Characteristics (relevant to wildlife)

- Small aircraft (numerous, diverse designs)
- Carry cargo or passengers (up to 8)
- Quieter aircraft engines (batteries/hydrogen)
- Travel at low altitudes from (400 to 4,000 feet AGL)
- Travel in defined corridors


Source: NASA

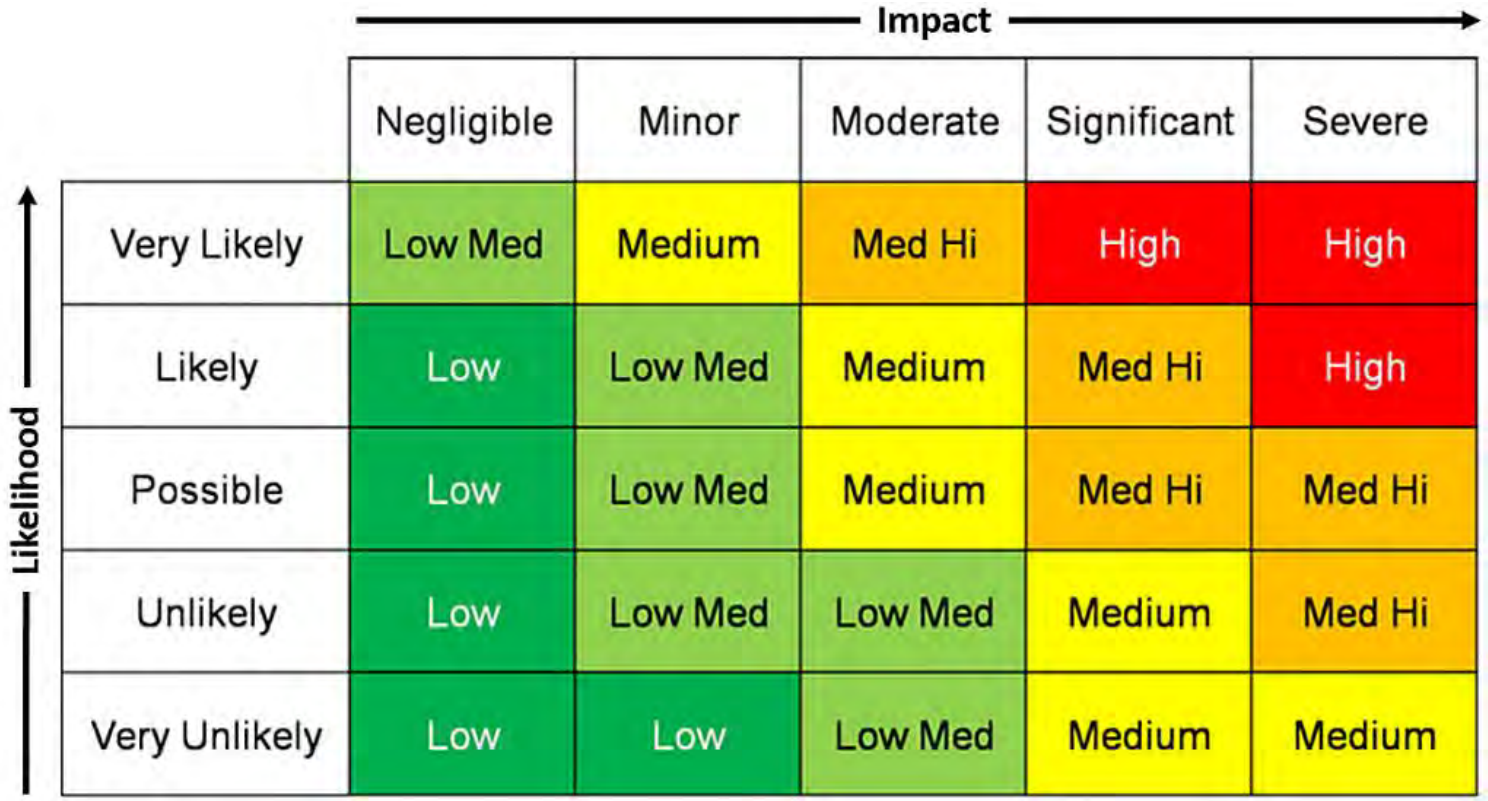
Wildlife Hazards and Risk Assessment

Likelihood of Wildlife Strikes for AAM/UAM



Source: FAA

Wildlife Hazards and Risk Assessment



Risk = Likelihood * Impact

New Technology and Potential Solutions

Consider Lessons Learned/Apply Available Knowledge

Facility Planning/ Management	Airframe/Certification Requirements	Operational Solutions
• Siting and Design Guidance • On-Site Controls • Corridor Management • Land Use/Zoning • Community Outreach and Education	• Revised Certification Requirements • Aircraft Adaptations for Increased Perceptibility	• Pre-flight Procedures • In-flight Technology and Procedures

(We've got this!)

AAM and Wildlife: Characteristics, Challenges, and Considerations

New Technology and Diverse Design

- *Characteristics and Challenges*
  - Technology push and expedited schedule
  - Numerous, diverse designs (hundreds!)
  - Traditionally considered as part of aircraft certification
- *Considerations*
  - Comparatively smaller aircraft
  - No single “one size fits all” solution
  - Provide industry outreach to OEMS (BSC-USA, WBA, VFS)

AAM and Wildlife: Characteristics, Challenges, and Considerations

Operational Considerations

- *AAM Characteristics*
  - Comparatively quieter engines (perceptibility to wildlife)
  - Comparatively fast operating speeds (up to 200 mph)
  - Low-altitude operations throughout operation (In the “Strike Zone!”)
- *Tactical Challenges*
  - Reduced time for conflict recognition (operator/wildlife)
  - Reduced time for evasive action and recovery (operator/wildlife)
- *Considerations*
  - Increased use of avian radar
  - Increased operator training
  - Systematic controls for autonomous aircraft (eventually)


Source: NASA


Source: FAA

AAM and Wildlife: Characteristics, Challenges, and Considerations

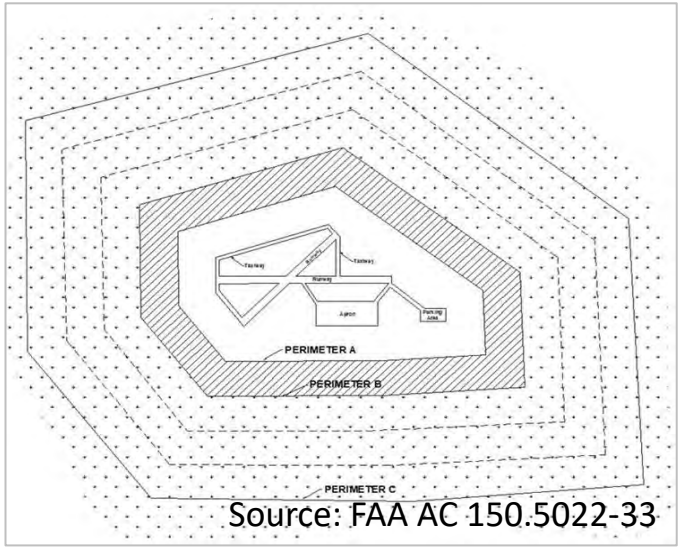
Urban Operations

- *Characteristics and Challenges*
  - Limited space for emergency/controlled landings
  - Urban environments include hazardous wildlife!
  - Urban environments provide:
    - Food
    - Water
    - Shelter
- *Considerations*
  - Identify on-site/nearby open space during site selection and throughout the entire corridor!
  - Identify/address urban wildlife habitats/hazards (WHAs, WHMPs, etc.)
  - Every site is unique!

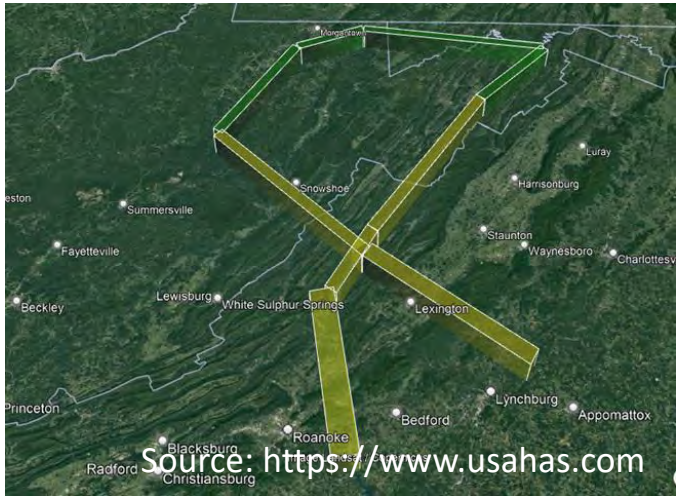
AAM and Wildlife: Characteristics, Challenges, and Considerations

Land Use

- *Characteristics and Challenges*
  - Current land use regulations and guidance are airport-focused
  - Current controls focus on nearby areas and approach/departure areas (where conventional aircraft operate at <3,500 feet)
  - AAM must include “corridor-based considerations” (not just takeoffs/landings!)
- *Considerations*
  - Adapt guidance to consider a “corridor-based approach” (weather prediction tools, migration maps, etc.)
  - Adapt/incorporate radar (NexRAD) and other tools
  - Weather and wildlife forecasting (migration tracking)
  - Consider easements/rights-of-way during corridor planning



Source: FAA AC 150.5022-33



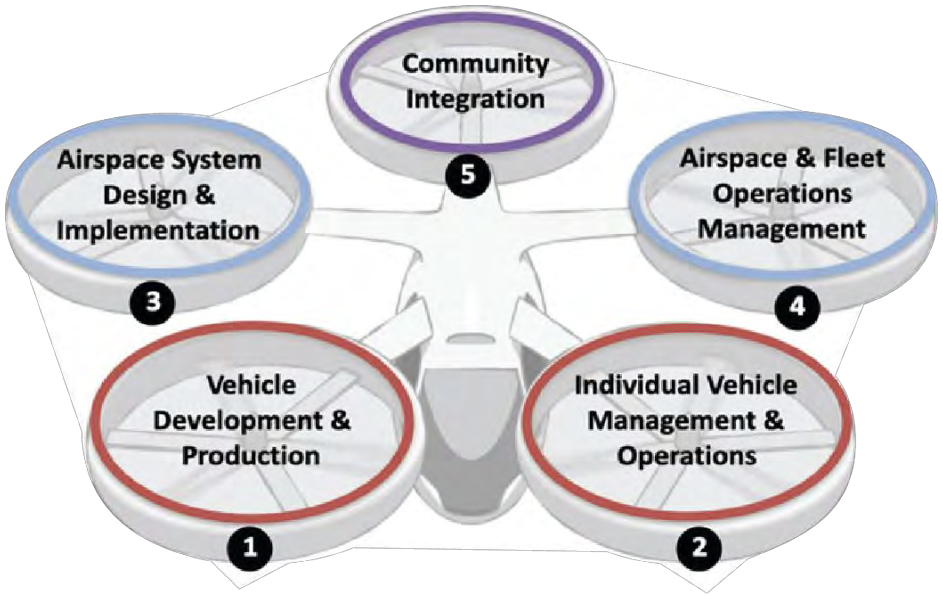
Source: https://www.usahas.com

AAM and Wildlife: Characteristics, Challenges, and Considerations

Vertiport Development and Operation

- *Characteristics and Challenges*
  - Non-airport locations
  - New and diverse operators (FBOs, cities, regional transportation agencies, others)
  - FAA E.B. 105 does not include site-selection criteria
  - Local policies/ordinances may not consider/be consistent with wildlife management
- *Considerations*
  - Provide outreach/guidance to vertiport operators (Jurisdictions, MPOs)
  - Incorporate WHM programs similar to airports

Consider wildlife at every stage of AAM development!



1. **Consider Airframe and Certification. Consider guidance and requirements for new vehicles (OEMs and regulators).**
2. **Incorporate strategic avoidance equipment/systems into individual vehicle design and operation. Formulate guidance, procedures for pilots.**
3. **Consider WHM in forthcoming vertiport siting guidance.**
   - **Develop guidance and BMPS for vertiport operators and host communities.**
4. **Consider WHM during corridor/route planning.**
   - **FAA Regulations**
   - **Consider Land use policies and zoning ordinances to support vertiports *and* the flight corridor).**
5. **Conduct community outreach and education about forthcoming AAM operations and wildlife.**

Thank you.

Thoughts or comments?

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