

# **Company Introduction**

July 26, 2022

# **DroneUp**

The path forward is up.





**DroneUp Business Overview** 

- Market Opportunity and Landscape
- → The DroneUp Advantage
- Product Overview



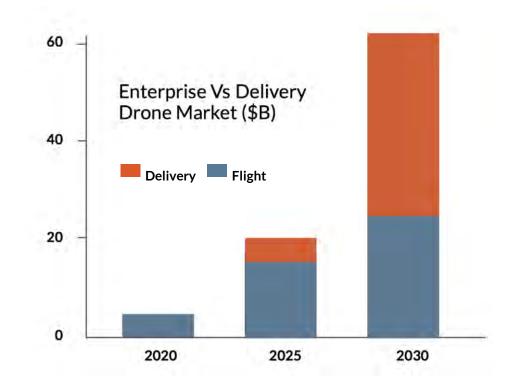


**Market Opportunity and Landscape** 



or Drone Flight is growing as a solution across categories.
Delivery is projected to expand exponentially.

DVLOS is the gateway to projected category growth of 30-50% to nearly \$60B by 2030.



# The DroneUp Advantage



# Walmart is the catalyst for DroneUp's significant advantage

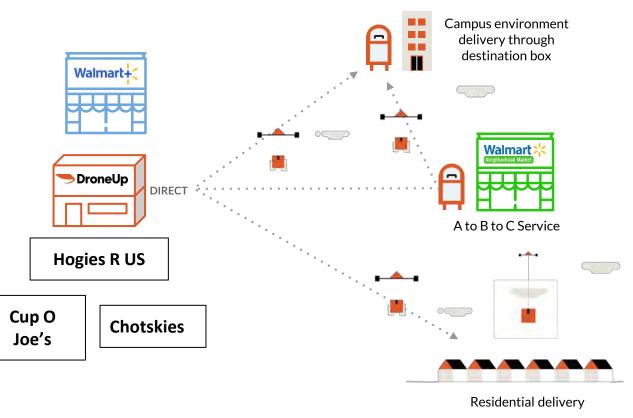
90% of the U.S. population lives within 10 miles of a Walmart.

Walmart Hub Launch November 2022



## **Delivery Service**

DroneUp's solution consists of a mix of drones optimized for speed and distance, Hubs and Destination Boxes to provide required infrastructure support, and autonomous delivery software that enables scaled simultaneous deliveries during daytime and nighttime operation hours.



# **Software & Flight Services**

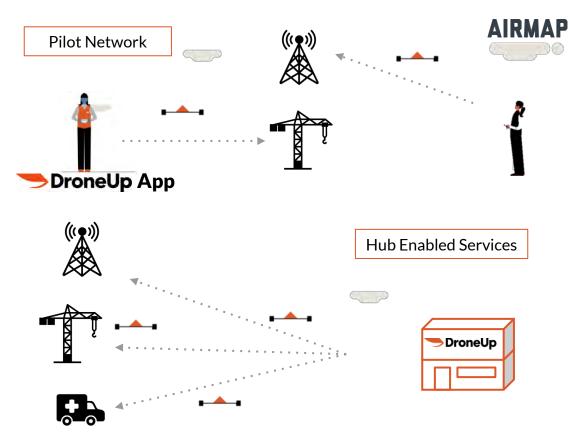
The DroneUp App & pilot network enable nationwide coverage for drone services.

- 101,000+ Hours Flown
- 80 Waivers
- 10 Patents
- Nationwide coverage
- Visualization and Analytics partnerships

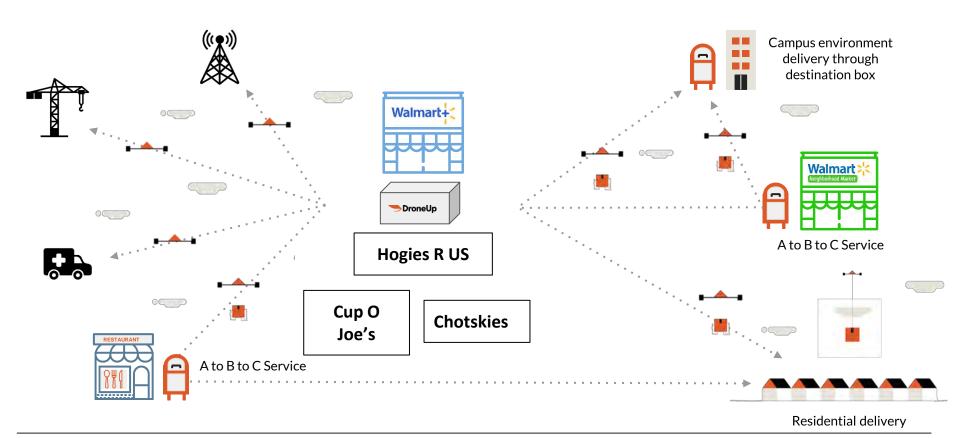
Leverage Hub infrastructure and off-peak retail labor for other flight services

Flight Services revenue will offset delivery cost

Unlock national flight service accounts through pilot network

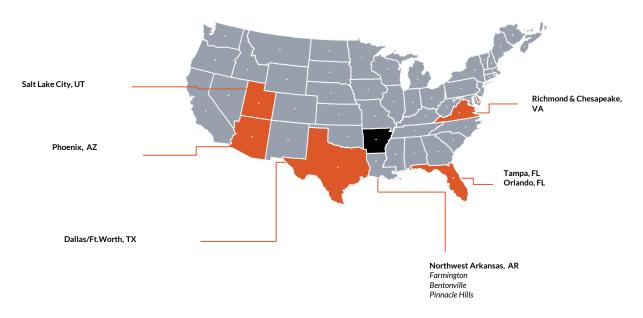


# **DroneUp Ecosystem**



# **Proposed 2022 Hub Growth**

- + By end of year we will have a total of 34 operational Hub facilities in the U.S.
- + DroneUp has begun vetting site locations for 2023.



#### Legend:

- + Operating States
- + Coming Soon & Expansion States
- \* Site Locations priorities being vetted by DroneUp Team.



# **Current: Line of Sight**

#### **Visual Observers**

Enhances safety by aiding the RPIC in duties of knowing aircraft position and protecting the NAS

#### **FlightOps**

Part 107 certificate holding Visual Observers equipped with ability to control the aircraft remotely, if needed







# **Product Overview**



# **Product Overview**

## **Delivery**

**Distribution Network** 

**Proprietary Hardware** 

**Software & Flight Services** 

**Delivery Software System** 

**DroneUp App for Pilot Network** 

Airmap







# The Hub

Hubs provide the required infrastructure support to enable scaled drone deliveries and services during daytime and nighttime hours of operation.



Hubs are the physical structures that house our operations.

Our hub infrastructure is rapidly growing, with 34 hubs expected by the end of 2022.



# DroneUp App

#### **Live Chat**

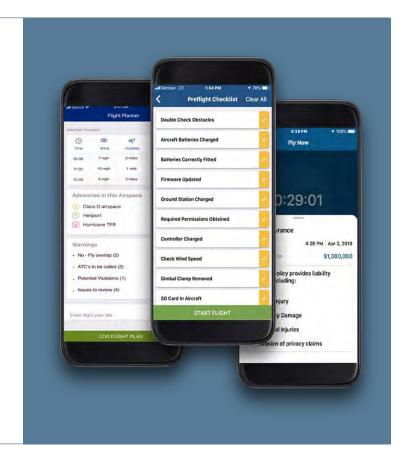
Mission managers and pilots communicate in real-time chat. Pilots can capture and upload data in the app.

# **Insurance and Safety**

Pilots use the DroneUp app for preflight checklists to authorize insurance. Pilots also submit their Part 107 Certificate through the Credentials Manager of the DroneUp app. DroneUp Verifies current.

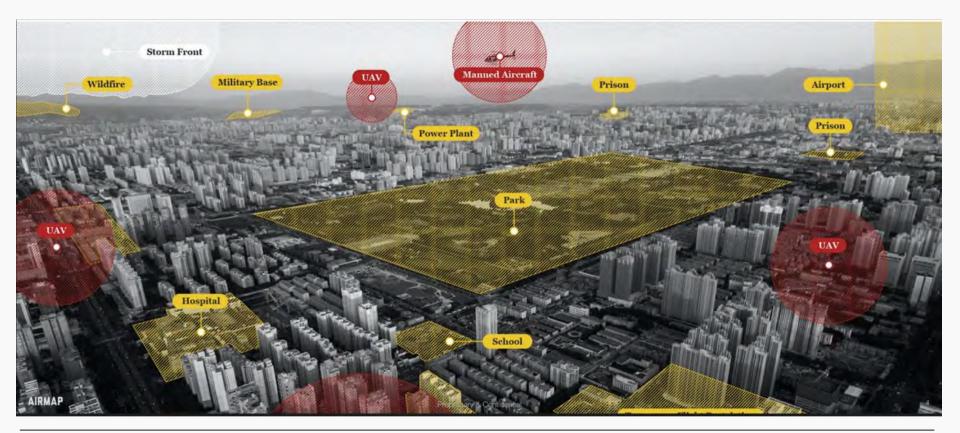
#### **Patented Platform**

Load tested to over one million simultaneous missions, the DroneUp platform is the only system able to match, mobilize and support drone teams on a global scale.





# **DroneUp Acquires Airmap - Global UTM Leader**



#### THE PROBLEM

Traditional air traffic operations and **coordination across stakeholders is manpower intensive, complex, and not optimized for massive proliferation** of drone & advanced air mobility traffic.

#### THE SOLUTION

AirMap UTM provides technology and services to simplify, inform, and unify all stakeholders toward the common goal of compliance, safely monitoring and managing airspace from digitalized exchange of information to and from operator apps and common operational picture dashboards.

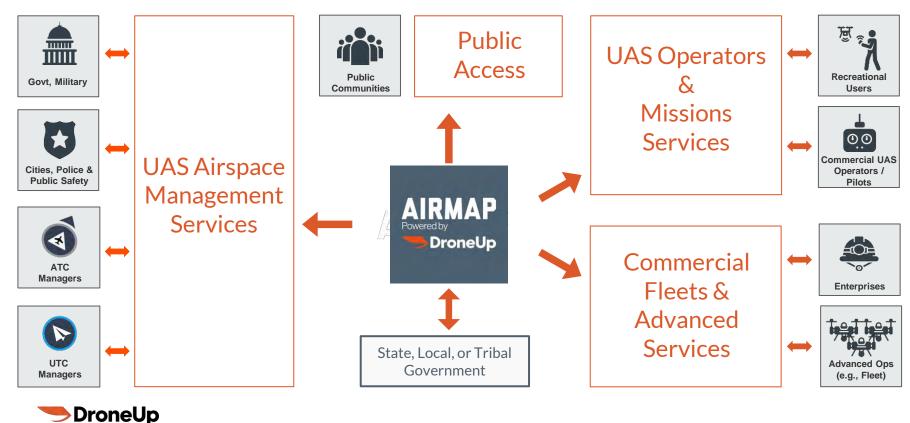


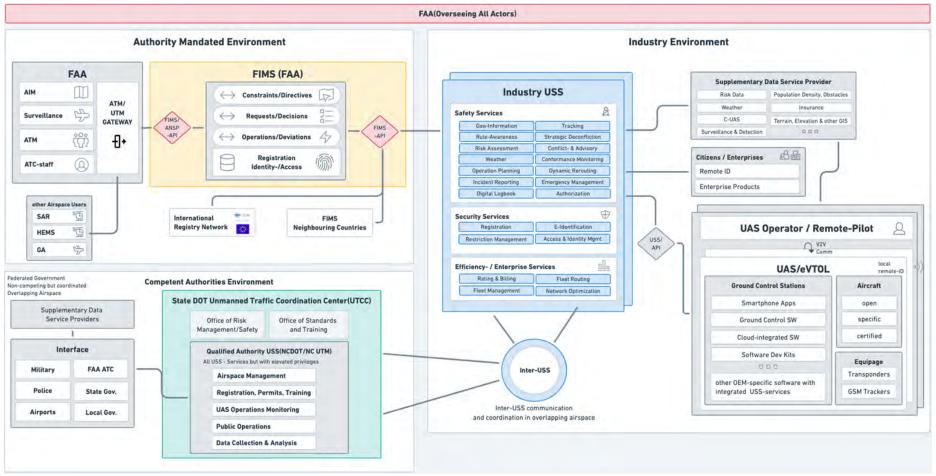






UTM Service Providers like the AirMap platform enable the provision of high-value digital airspace services to authorities, drone operators, and enterprises.







# **UTM Platform**

DroneUp's UTM Platform enables Operators and puts Authorities in the pulse of airspace – giving air and ground authorities tools to oversee community safety and wellbeing.

- + Influence and shape airspace
- + Ground control configuration
- + Improved reach of operators
- + Monitor traffic
- + Incident Reporting / Investigation

# DroneUp technology is the intersection between pilot and authorities.





# **AirMap Pilot Apps**

#### Registration

- Pilots create a profile with contact information and credentials
- Pilots manage aircraft by name, type, and model
- Pilots view completed and planned drone flights

#### **Discover Your Airspace**

- Pilots get static and dynamic airspace rules pertaining to their flight areas
- Pilots plan flight paths, including details like altitude and duration
- Pilots send notice and / or request authorization in regulated airspaces



FREE Highly-rated mobile apps
Available for Android and iOS
Powered by the AirMap SDK

#### **Get Compliance Briefing**

- Pilots view flight conditions like weather and wind prior to takeoff
- Pilots receive in-app flight briefing to review and confirm compliance with airspace rules and advisories
- Pilots submits flight

#### **Get Traffic Alerts**

- Pilot flies drone directly from AirMap app with seamless connection to UTM platform\*
- Pilot receives in-flight traffic alerts of nearby aircraft
- Pilot gets real-time notifications about changes of airspace



# **AirMap Pilot Apps**







#### AirMap UTM Dashboard

#### Airspace management for any environment



#### **Manage Your Airspace**

- Import your airspace data or use AirMap Global Contextual Airspace
- Create temporary & dynamic flight restrictions
- Edit existing data with easy-touse graphical UI
- Instantly publish rules to 85% of the drone market

#### **Authorize Flights**

- Receive flight notifications from operators
- Manage authorization requests with automatic or manual approval capability
- Contact operators directly
- View drone and manned air traffic in real time

#### **Engage Local Authorities**

- Delegate flight management and airspace management to local authorities like Police, Cities, and States
- Implement multi-jurisdictional authorizations
- Provide streamlined interface for local authorities to identify flights

#### **Inform General Public**

- Make airspace information and rules viewable by general public
- Broadcast anonymized flights to public web site
- Publish contact information and escalation protocol in case of emergency



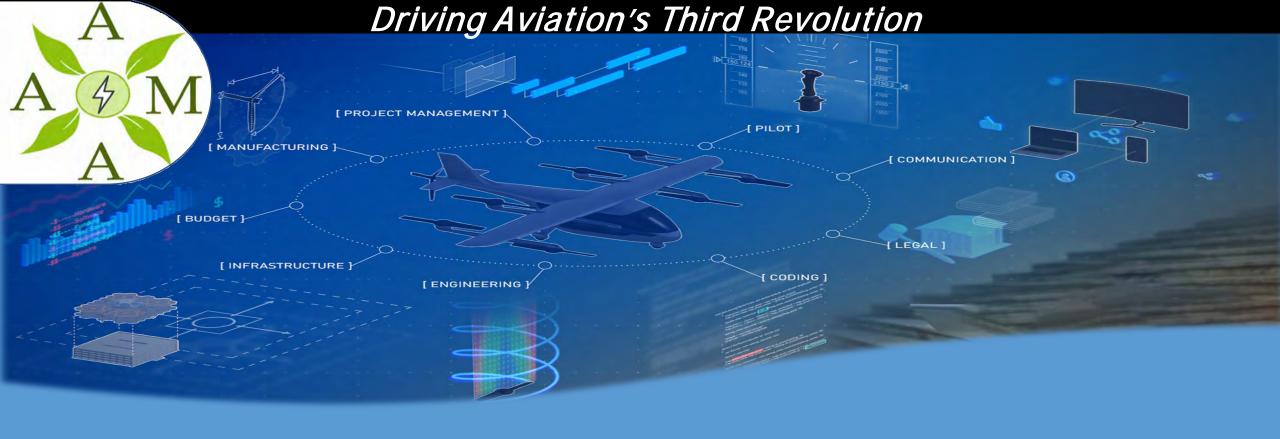
Demo: AirMap for Drones and UTM Dashboard





# **Thank You**

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# **Advanced Air Mobility Association**

# **AAMA Mission**

To lead the frontier of Advanced Air Mobility (AAM) training and operational integration and to leverage the transformative potential of AAM to bring the world to together



# AAMA Vision

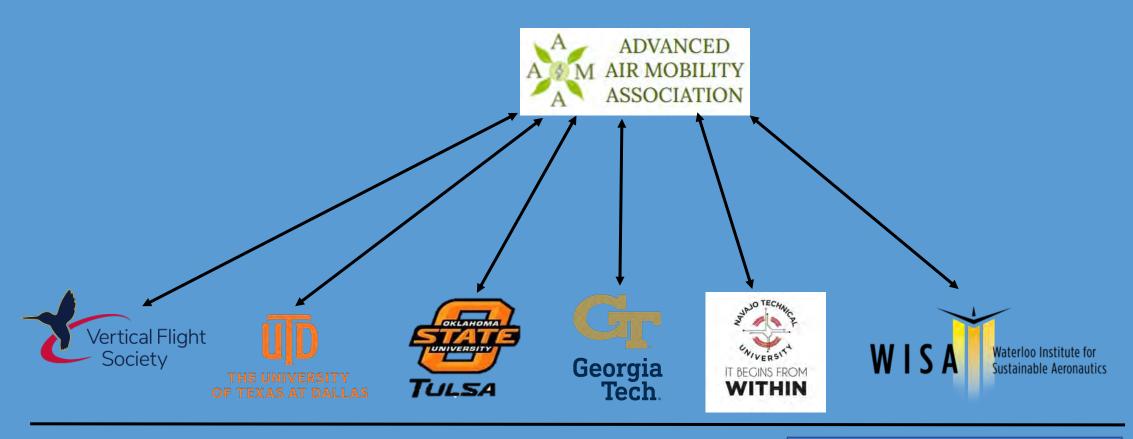
By leveraging the "Soft Power of Aviation, be the worldwide partner of choice in the education, training and integration of a safe, efficient and standardized Advanced Air Mobility
Infrastructure and the adoption of a 0 impact Aviation Model that serves all of mankind.

# We are Advancing and Promoting AAM as a Global Societal Imperative



This presentation consists of general capabilities information that does not contain controlled technical data as defined within the International Traffic in Arms (ITAR) Part 120.10 or Export Administration Regulations

# **The AAMA Consortium**



## Train and Educate the first generation of AAM Professionals

- Specialized Interdisciplinary AAM Training
- AAM Transition and Skills Bridge Training
- Primary AAM/STEM Education
- Promote inclusion in AAM Sector
- Advocacy, Consulting and Engagement with Federal Law Makers





# AAMA is active in the following Standards Development Organizations



"EPIC"
Electric Propulsion
Innovation Committee



Revolutionary Vertical Lift
- E-VTOL Working Group
- Crosscutting Working Group



E-VTOL Flight Test Council



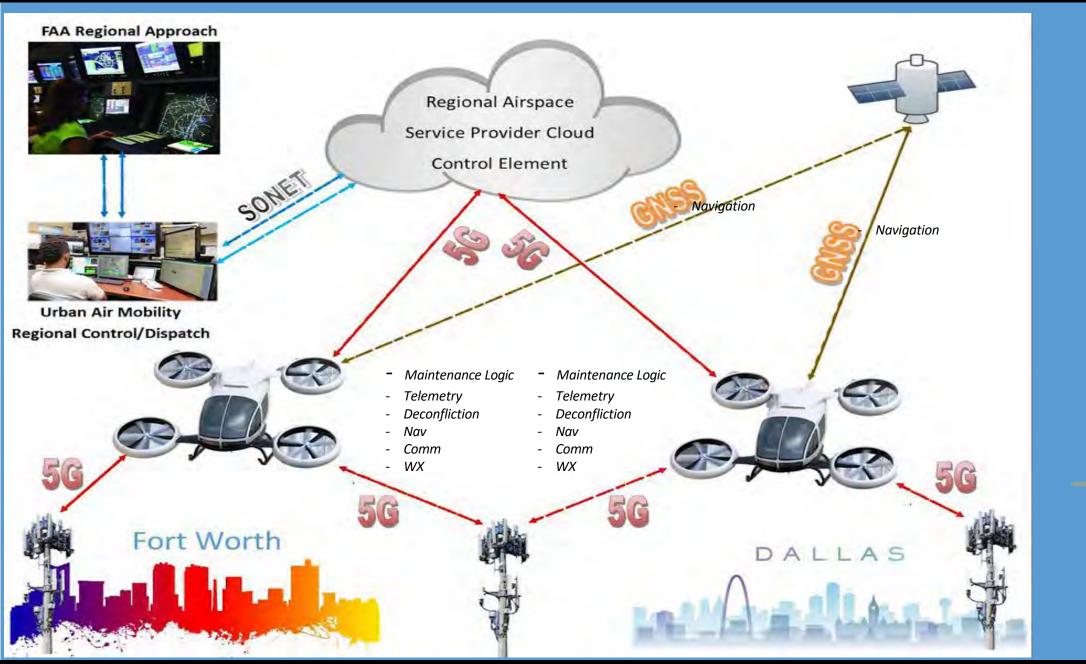
UNMANNED AIRCRAFT
SYSTEMS STANDARDIZATION
COLLABORATIVE



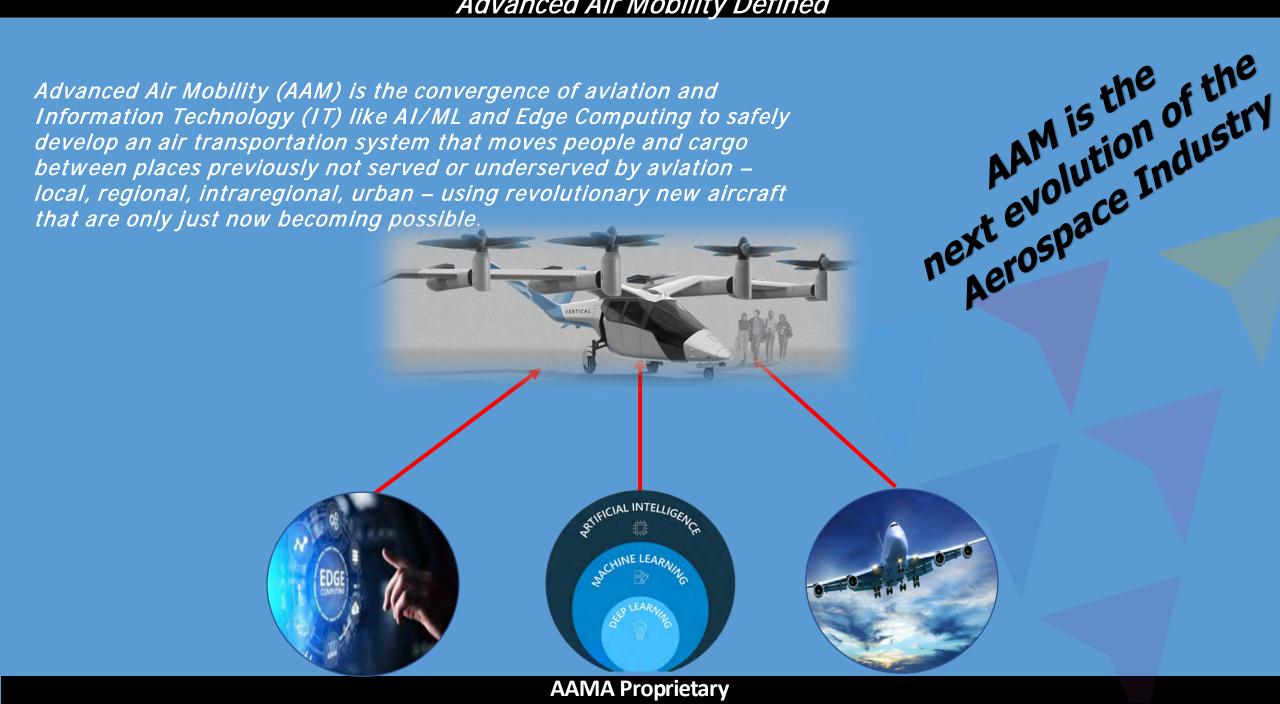
WK76044
Contextual Framework for
Increasingly Autonomous Aviation
Systems

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# We make all the pieces fit...



# Advanced Air Mobility Defined



# Operating Verticals of Advanced Air Mobility (AAM)

Urban Air Mobility (UAM) <30km

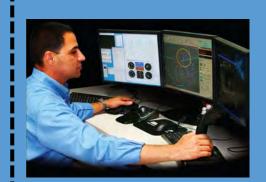


Regional Air Mobility (RAM) 30KM- 500km





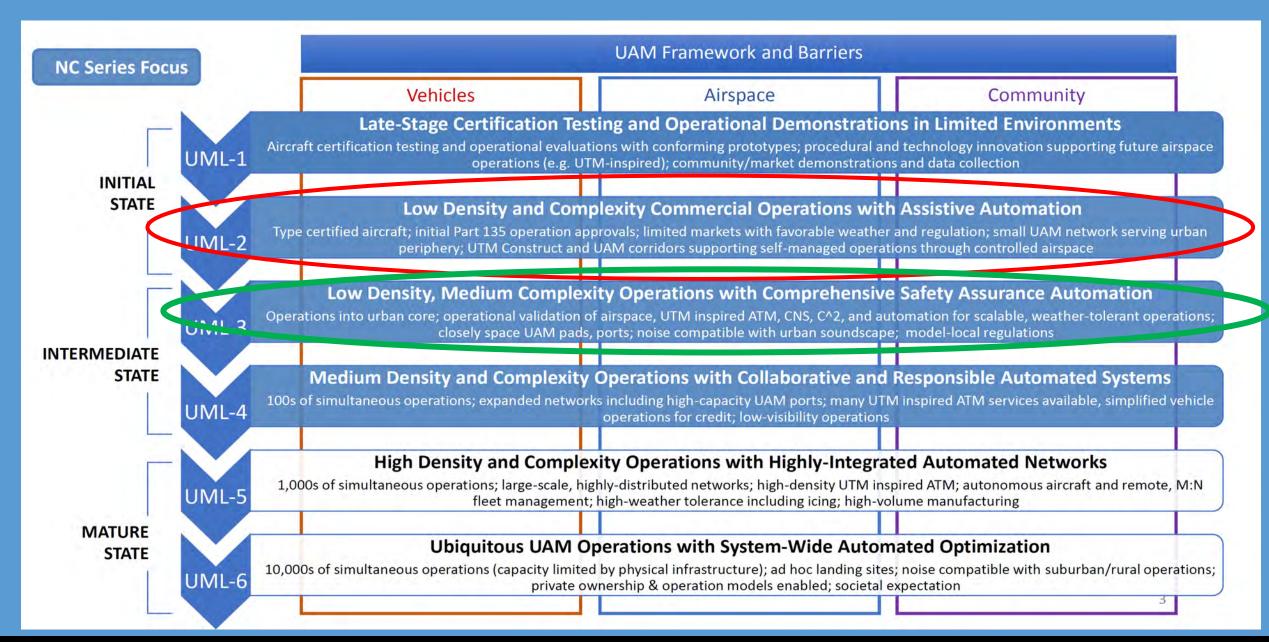
sUAS







### **AAM/UAM Maturity Levels**



## AAM/UAM is at the Project Mercury Phase





## The Challenge!





This presentation consists of general capabilities information that does not contain controlled technical data as defined within the International Traffic in Arms (ITAR) Part 120.10 or Export Administration Regulations

## Bridging the gap between Legacy Aerospace and Aerospace 3.0







- **Operations**
- Maintenance











- Pilot Optionable
- > Fully Autonomous





# Implement a Standardized Training and Education model for the Nations first Corp of Advanced Air Mobility Professionals

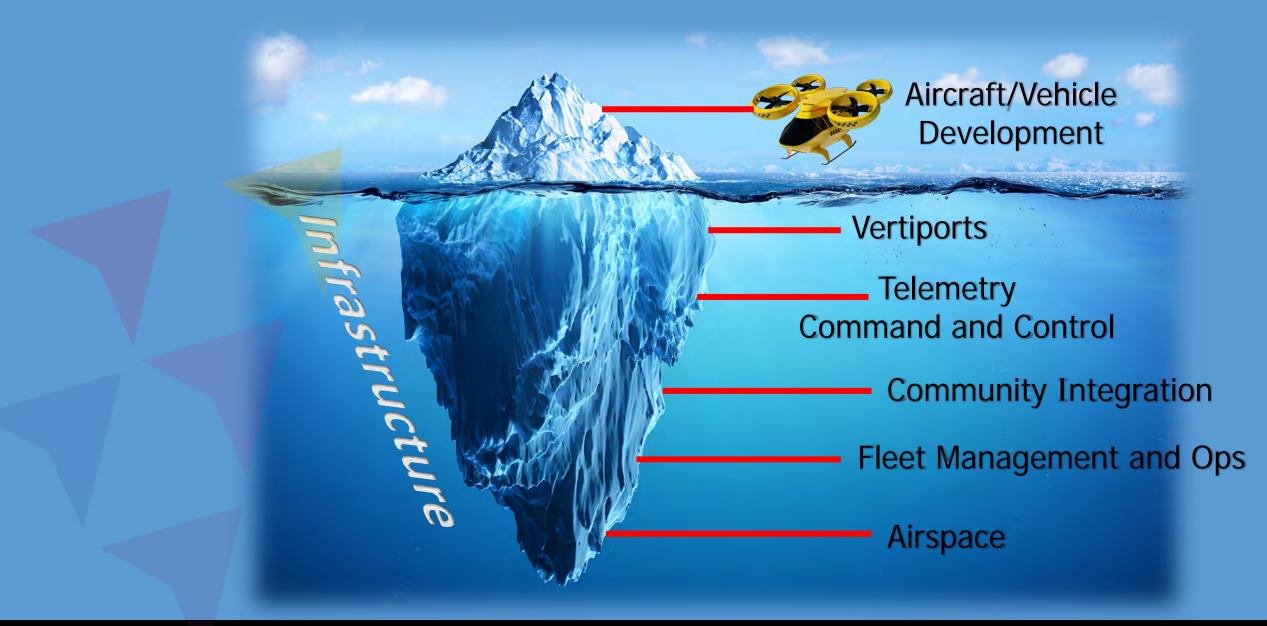




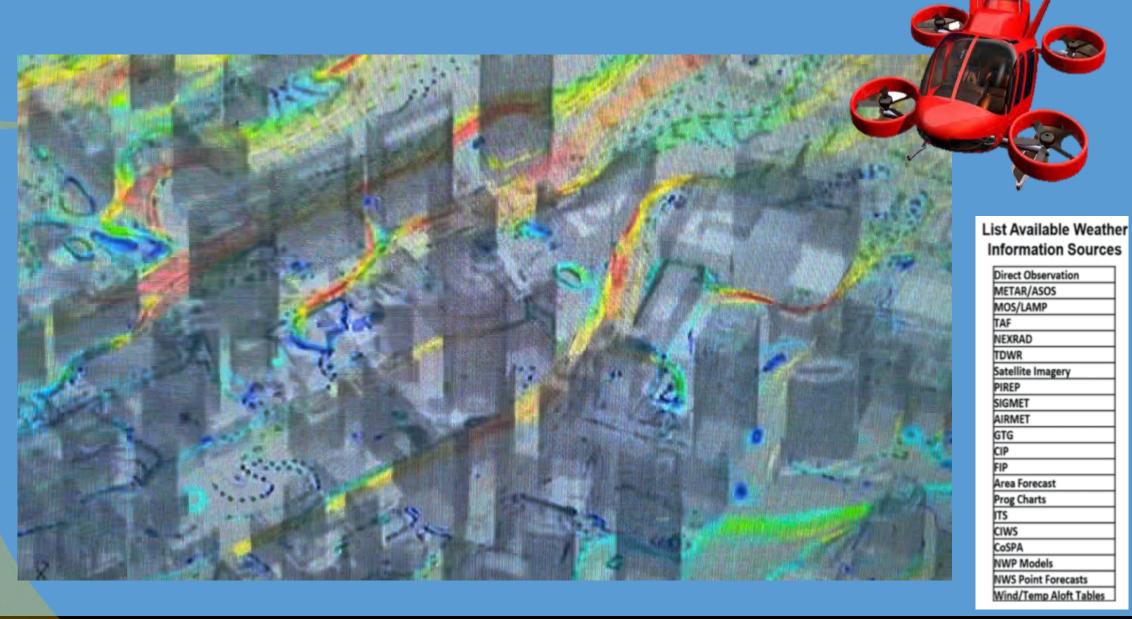




## The aircraft is just the visible element of the larger AAM/UAM Ecosystem



# Micro Weather and Now Casting



## A totally new paradigm of vehicle dispatching will be required





# **Vertical Flight Workforce**

www.vtol.org/workforce

- eVTOL needs thousands more engineers!
  - US Army-Navy-NASA-funded Vertical Lift Research Centers of Excellence (VLRCOE) only producing dozens of grad students. Need more government & industry funding for university research/grads!
  - VLRCOEs are inadequately funded for existing demand need +\$20–50M/yr more funding!
  - Each company needs 500-1,000 engineers to develop each eVTOL to certification (plus next gen)!
- Competition: Helicopter industry needs thousands of more engineers!
  - Huge new military and civil rotorcraft development programs need thousands of more rotorcraft engineers in the coming decade-plus!
- Talent pipeline is underfunded zero sum game!
  - Competition fierce for VTOL grads & experienced engineers!
- Need a "National eVTOL Strategy" for workforce, aircraft, motors, batteries, infrastructure, etc.!

10,000 additional engineers needed in the next decade!

### The pilot development pipeline is already severely constrained

## Demand for Pilots will increase with AAM/UAM

- · AAM will accelerate the demand for new pilots
- Total number of pilots in 2018 were 360,000 with 55,000 in business aviation and 305,000 with airlines
- Expected attrition over the next 10 years is 150,000 with 210,000 continuing
- Estimated number of pilots needed in 2028 will be close to 600,000 with about 60,000 AAM pilots
- Growth of airlines will generate need for another 160,000 pilots
- Anticipated training requirements will likely change aircraft are certified and come online
- Pilot certification and training will remain the same in the near-term with airlines and operators reaching out to a younger pool of trainees

Source: McKinsey Study released in 2018







**Graphics: Courtesy BETA** 



## Current Federal Legislation

H.R. 6270 = Advanced Aviation Infrastructure Modernization Act

H.R. 3482 = Establish the National Center for the Advancement of Aviation

H.R. 6841 = Minorities in Aviation Education Act of 2022

S. 516= ADVANCED AIR MOBILITY WORKING GROUP



# The Aerospace Industry must again ignite the passions and imaginations of Young Americans across all socio-economic communities







### REPORT AND RECOMMENDATIONS OF THE

## Urban Air Mobility Advisory Committee





#### **Background and Purpose**

In spring 2021, the Texas Legislature passed Senate Bill 763 in the 87th Regular Session requiring the Texas Transportation Commission to establish the Urban Air Mobility Advisory Committee "to assess current state law and any potential changes to state law that are needed to facilitate the development of urban air mobility operations and infrastructure in this state."

## Urban Air Mobility Advisory Committee Recommendations

Extend the work of the Urban Air Mobility Advisory Committee beyond the sunset date of January 1, 2023, to continue working in key areas of this emerging and quickly evolving industry in order to remain responsive to the needs of Texas and ensure Texas' role as a leader in this industry.



# Airspace and Infrastructure

- Provide consistency across Texas law by creating statutory uniformity and standard definitions pertaining to unmanned aircraft operations and urban air mobility/advanced air mobility.
- Develop an urban air mobility/advanced air mobility-centric research facility to test and evaluate technology, provide data collection opportunities, and coordinate with federal entities to share information and help guide data-driven public policy. The Texas Legislature is encouraged to consider the benefits of state funding for the successful development and operation of this facility.
- Develop a statewide plan, or integration within the Texas Airport System Plan, that addresses the potential locations for and classifications of vertiports and other associated infrastructure to help define the future operational environment of urban air mobility/advanced air mobility.
- Direct the State to work with municipalities to provide technical assistance to local governments in adapting and integrating urban air mobility/advanced air mobility in their communities.

#### **Definition UAM**

**Urban air mobility (UAM)** envisions a safe and efficient aviation transportation system that will use highly automated aircraft that will operate and transport passengers or cargo at lower altitudes within urban and suburban areas.

#### **Definition AAM**

Advanced air mobility (AAM) builds upon the UAM concept by incorporating use cases not specific to operations in urban environments, such as:

- Commercial intercity (longer range/thin haul).
- · Cargo delivery.
- · Public services.
- Private/recreational vehicles.



- Encourage the development of an urban air mobility/advanced air mobility sandbox by:
  - a) Directing the preparation of a feasibility study to understand the market, differentiating factors from similar existing facilities, potential market/players, funding sources, revenue opportunities, locations, necessary digital and physical infrastructure, and potential use cases; and
  - b) **Pursuing the development of a facility** that will provide opportunity for testing and commercialization that will attract business and move the industry and state forward.
  - c) Having the State take the initiative to work with industry to determine additional standards in terms of communications, technology, and environmental awareness systems to encourage consistency and harmony at all levels of government and stakeholders.
- Consider the initial funding for a UAM/AAM Sandbox Feasibility Study and ultimately its development along with an incentive program to attract industry with the ultimate objective of using user fees to fund the ongoing operations and maintenance of the sandbox
- Encourage state agencies to adopt a technology-neutral/open architecture approach to the urban air mobility/advanced air mobility industry to allow easier adoption of new technologies and deployment into new regions.
- Identify areas where technology will drive standardizations.

### Urban Air Mobility (UAM) Advisory Committee Guiding Vision

## Maximizing "Opportunity" and "Safety"

- Texas will be the destination for early adaptation and development of UAM Technologies.
- 2 UAM will provide extensive business and economic opportunities for our residents.
- The adaptation of a UAM paradigm will create upward social mobility for our residents.
- Texas will be the national role model for the safe deployment of UAM.

## Urban Air Mobility Advisory Committee Working Groups



### **Urban Air Mobility Advisory Committee Meetings**

The Urban Air Mobility Advisory Committee held four public meetings which included opportunities for input from stakeholders and the general public. The working groups each held four meetings for a total of 16. All 20 of these meetings were posted in advance on TxDOT's website and were open to the public. Public comment was welcomed and received at all meetings.



### **Safety and Security**

- In collaboration with the appropriate federal entities, the state will work to encourage the development of minimum standards/safety management systems for vertiport operations including passenger and goods movements and ground infrastructure.
- Recommend Texas law does not conflict with federal law.
- Encourage the Legislature remain an active participant in urban air mobility/advanced air mobility as the industry and technology will outpace current regulations and enable the appropriate state agency to lead and manage the regulatory concerns.
- Direct the Texas Department of Transportation to review existing state aviation standards and guidelines, airport facility planning, and compatibility guidance to ensure they apply to urban air mobility/advanced air mobility.
- Support the development of standardizations at the federal level and within industry as technology develops/ changes so safety is prioritized as the technology matures.
- Encourage state-level cooperation with local governments to ensure appropriate preparation, training, and safety practices associated with vertiport operations including law enforcement, fire service, and emergency medical services associated with traditional aviation and advanced air mobility aircraft operations.



- Direct all law enforcement and first responder agencies to adopt education and training recommendations as identified in Unmanned Aircraft: Responding to and Recovering from Disasters (State of Texas, November 2020), a report born out of House Bill 2340 (86R, 2019), establishing a small unmanned aircraft study group for a statewide response team.
- Create a statewide primary point of contact to direct urban air mobility/advanced air mobility workforce development efforts, lead public awareness and education efforts, and collaborate with local, regional, state, and federal entities to encourage more input and participation.
- Direct the State to provide resources and assistance on the use of urban air mobility/advanced air mobility technology infrastructure for cities, local and regional governments, transportation planning organizations, other entities, and industry to better identify what the different levels of government can do to integrate industry innovation and community vision and help promote urban air mobility/advanced air mobility technology.
- Direct the appropriate state agencies to jointly collaborate with local school districts, higher education institutions, and any interested private and/or public stakeholders on educational opportunities related to urban air mobility/advanced air mobility technologies.



#### In Closing

The recommendations developed by this committee represent the culmination of many meetings and hours of discussion on how best to position our state to facilitate the emerging and quickly evolving advanced air mobility industry.

The committee recognizes that many of the recommendations may add additional workload to some agencies such as the TxDOT Aviation Division. The Aviation Division, which currently has responsibilities surrounding the planning, programming, and funding of airport projects across the state

as well as some aviation education responsibilities, is likely to find itself as the focal point for several of these recommendations. The committee understands that many of the additional roles and responsibilities imbedded within its recommendations will be best addressed and carried out with appropriate accompanying resources.

The committee would like to thank the Texas Legislature and TxDOT for the opportunity to participate in this important work and their commitment to advanced air mobility.

# REPORT AND RECOMMENDATIONS OF THE Urban Air Mobility Advisory Committee

PREPARED FOR THE
Texas Transportation Advisory Commission Advisory Committee



#### FOR MORE INFORMATION

This person Address phone number email address

https://www.txdot.gov/inside-txdot/division/planning/urban-air-mobility-advisory-committee.html





# **ACRP Synthesis 03-17**

Airport-Centric AAM Market Analysis

July 25th, 2022







POPULAR TO YEARS

Q =

Technology → Vehicles → Electric Vehicles

# An electric aircraft just completed a journey of 1,403 miles

The plane from Beta Technologies began its travels in New York and flew all the way to Arkansas, making seven stops along the way and spanning six

BY ROB VERGER | PUBLISHED JUN 2, 2022 3:46 PM

TECHNOLOGY



**AIRCRAFT MAKER INKS DEAL** U.P.S. TO BUY ELECTRIC PLANES MADE IN VERMONT

MIDDLEBURY THURSDAY Advantage WEATHER



## **ACRP Synthesis 03-17**

Airport-Centric Advanced Air Mobility\* (AAM) Market Study

### **Project Objectives**

- Evaluate if/how US airports are integrating potential AAM service into infrastructure and operations planning
- · Analyze and identify opportunities, challenges, research gaps, and other planning considerations for airports
- Summarize, compare, and contrast AAM demand forecasting studies

### **Project Tasks**

- 1. Literature review of AAM Market Demand Studies
- 2. Surveys of airport managers/staff
- 3. Follow-up interviews with a small number of airport managers/staff
- 4. Interviews with industry representatives (AAM OEMs, service providers, and infrastructure companies)
- 5. Synthesis report

<sup>\*</sup> For this project, AAM refers to eVTOL and other advanced electric aircraft serving the passenger and cargo markets, but not SUAS



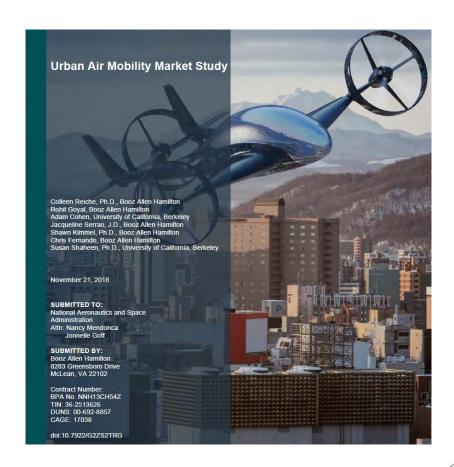
### **Literature Review**

# The Literature Review will Synthesize Public Market Demand Studies From:

- NASA
- FAA
- Consultants
- Academic researchers

### **Compare and Contrast:**

- Forecasting methodology
- Time horizon
- Geographic scope
- Use cases included
- Forecast results





## **Airport Survey**

# Brief (~10 minute) web-based survey of airport managers/staff

- Familiarity and engagement with AAM
- Airport planning considerations for AAM
- Opportunities and challenges related to AAM

### Seeking a diverse range of participant airports

- All airport types and sizes
- Large Hub, Medium Hub, Small Hub, Nonhub, Nonhub Nonprimary, Reliever, and General Aviation
- Airport managers, planners, or other staff familiar with airport planning

### ACRP S21-03-17 Survey

#### Introduction

Thank you for participating in this ACRP survey about Advanced Air Mobility (AAM)

The purpose of this survey is to gather input from a broad and diverse sample of US airports about their familiarity and engagement AAM, and to identify key considerations for airports when developing and implementing plans to support future AAM service. The results of this survey will be used to develop an ACRP Synthesis Report that summarizes, compares, and contrasts existing AAM market studies.

Your answers will be kept confidential and will only be used for this study.

If you have questions about the study or participation, please reach out to me directly at <a href="Mark.Fowler@rsginc.com">Mark.Fowler@rsginc.com</a> Thanks again for your time and participation.

Mark Fowler

RSG

#### Survey Instructions

Please use the "Next" and "Back" buttons at the bottom-center of the screen to navigate the survey. It is important that you do not use your web browser's "forward" and "back" buttons because your answers may not be recorded

Answering all of the questions should take about 10 minutes

Next

0%



## **Airport and Industry Interviews**

### **Airport Interviews**

- We plan to follow-up with ~5 airports to collect more information about AAM planning practices
- More open-ended, qualitative discussion that will be summarized as case examples in the synthesis report

### **Industry Interviews**

- We plan to speak with industry representatives from:
  - OEMs (e.g., Archer, Beta, Joby, Lilium, Volocopter, Wisk, etc.)
  - Service operators (e.g., Blade, Eve, Heli-jet, Netjets, etc.)
  - Infrastructure developers (e.g., Ferrovial, Skyports, Tavistock, etc.)



## Closing

### How can I help?

• Participate in the survey (or have an appropriate staff member participate in the survey on your airport's behalf)

https://survey.alchemer.com/s3/6929342/tx

Thank you for your time!







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## Jonelle Hanson

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