

# Strategic Air Taxi Market Analysis

An Executive Outlook

2021

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# URBAN AIR TAXIS

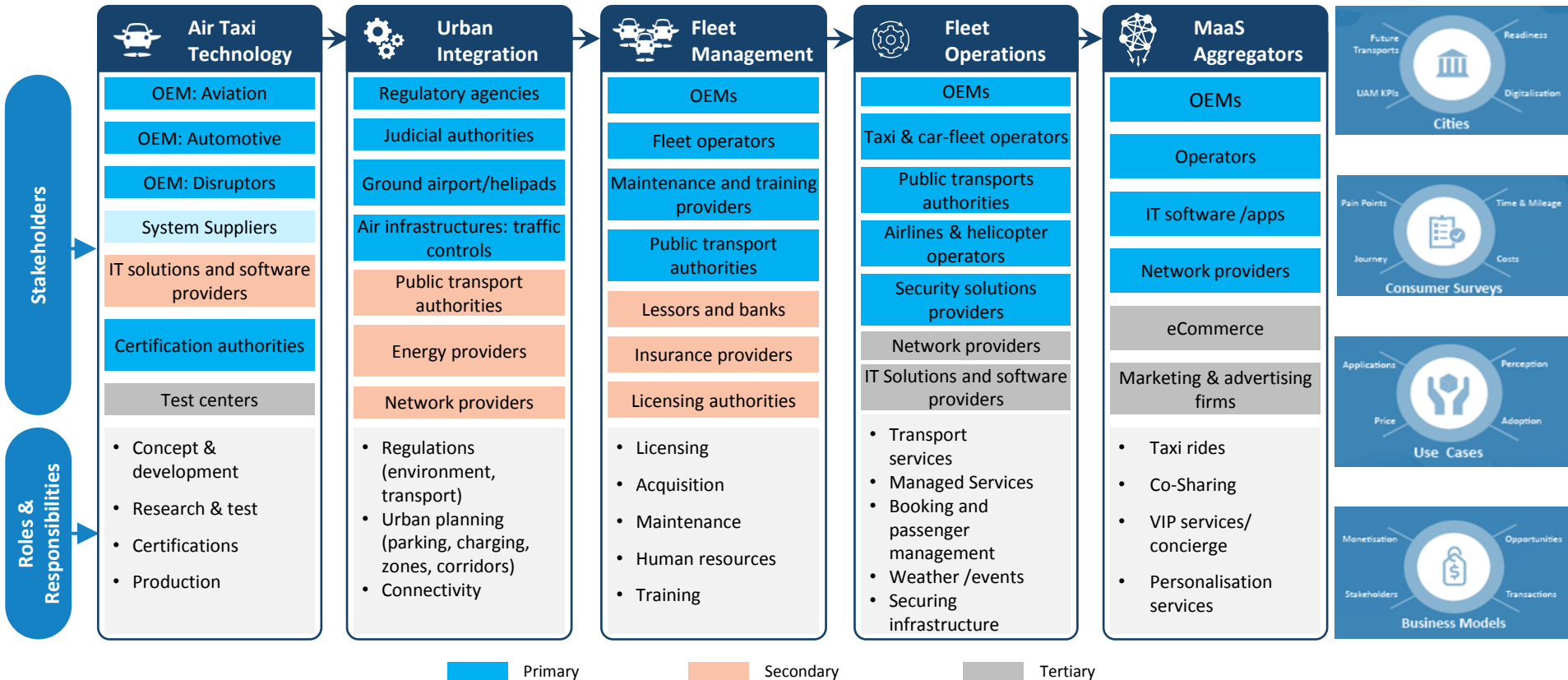
EXPLORING THE PIONEERING OPPORTUNITIES OF TOMORROW



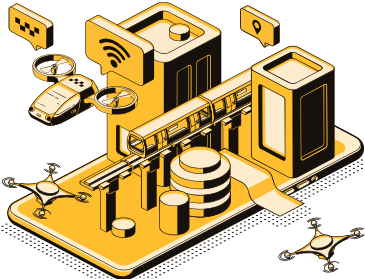
Source: Frost & Sullivan

# AIR TAXI ECOSYSTEM :

## VALUE CHAIN, KEY STAKEHOLDERS, MAIN ROLES AND RESPONSIBILITIES



# DEMAND <> SUPPLY: PERCEPTIONS, PROBABILITY & POTENTIAL



**100+** smart cities analyzed across 60 attractiveness parameters assessing transport habits and aviation capabilities



Top 10 cities - most attractive destinations to host urban aero mobility (UAM) capability



Regionally balanced list of 12 cities extracted from top 5 cities in 5 regions

- ✓ PERCEPTION
- ✓ WILLINGNESS
- ✓ ADDRESSABLE JOURNEYS
- ✓ PRICE POINT
- ✓ OPERATIONS PERSPECTIVES

**4,669**  
customer/  
citizen surveys

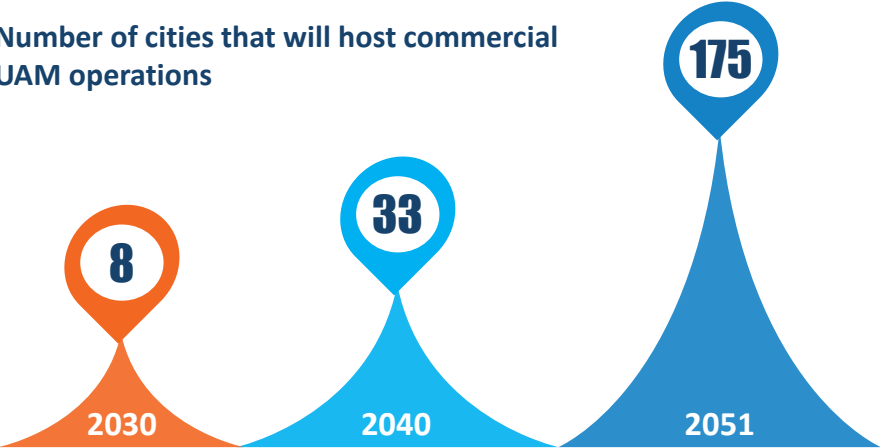
- ✓ PERCEPTION
- ✓ TECHNICAL CRITERIA
- ✓ COST PER FLIGHT HOUR
- ✓ OPERATIONAL VIABILITY

**60+**  
value chain  
stakeholders

Image source: Freepik, gettyimages

# PERCEPTIONS: ROBUST & RESILIENT

Number of cities that will host commercial UAM operations



Based on demand perceptions, passenger volumes and per journey operating margins, the Air Taxi business is considered to be operationally and financially viable.



Indicated service price per journey across all the surveyed cities is higher than the cost per flight hour (CPFH) perceived by value chain stakeholders.

Across the 12 cities surveyed, potential customers would be willing to pay between



**\$17 and \$50**  
for shared Air Taxi trips  
(like a carpool)



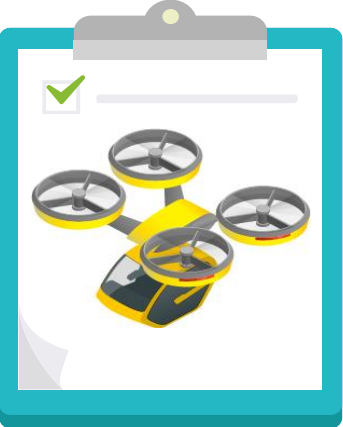
**\$50 and \$110**  
for personal Air Taxi trips  
(like an Uber)

Image source: Freepik, gettyimages

# PROBABILITY: HIGH & ATTRACTIVE

Nearly half of all consumer/customer survey respondents declared that they would definitely or probably use

**AIR TAXIS** as a transportation option in the future.



In addition, the age group over 50 is the least likely to use Air Taxis meaning that the overall percentage of potential customers willing to fly in them will steadily increase over time.



Travel time is the main determining factor for consumers when selecting a transport mode for daily work commutes.



Stakeholders identify battery energy density limitations as the most impactful technology affecting progress in the development and implementation of Air Taxi platforms.



Respondents indicated that trip cost/price was a more of a concern than safety.

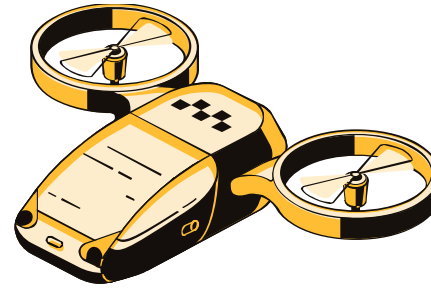
Image source: Freepik, gettyimages

# POTENTIAL: READY TO TAKE-OFF!!



**\$2.7  
trillion**

The Serviceable Addressable Market (SAM) across intercity and intracity journey types is estimated to generate **\$2.7 trillion** in OEM and operations services revenues by 2040.



**2.5  
million**

By 2040, cumulative consumer demand will translate into the need for more than **2.5 million** Air Taxi platform units across the various vehicle capacity types.



**LONDON**

**London** tops the ranking of cities assessed to be the most attractive to host Advanced Air Mobility / Urban Air Mobility (AAM/UAM) operations.

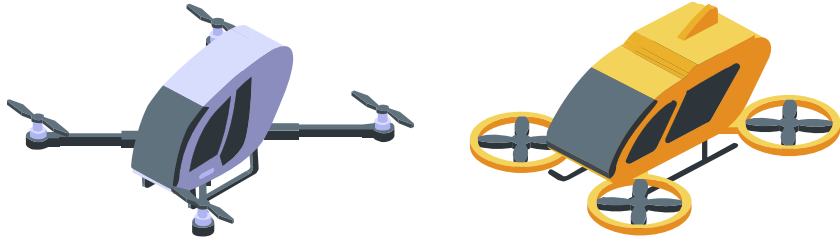


**DUBAI**

However, **Dubai** is set to become the first city, globally, to host commercial AAM/UAM operations in **2025**.

*Image source: Freepik, gettyimages*

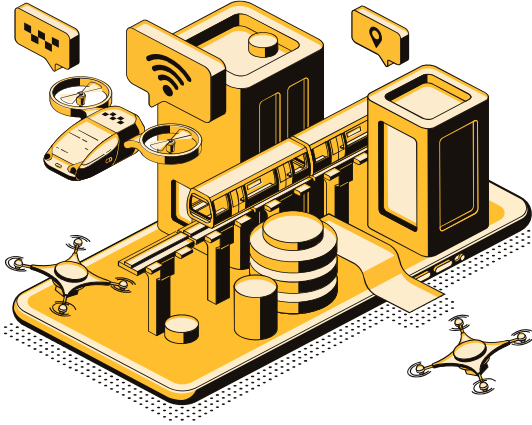
# SOLUTIONS: HYBRID SUPPLY ADDRESSING TAILORED DEMAND



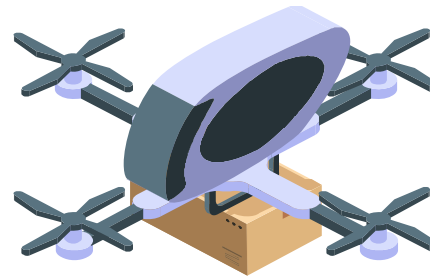
Air Taxi services providers should plan for a mixed fleet, offering both **2 and 4 passenger options** as this will fulfill most demand requirements.



Infrastructure planning should account for a **network of small vertiports** dispersed across a city.



Meeting the **demands of intercity**, AAM travel should be considered a knowledge-building step toward developing/ implementing intracity solutions.



While there will be significant future demand for Air Taxi services, large AAM aircraft will likely be used initially for **cargo transport**. This is due to the lower regulatory barriers and comparatively easier waiver process for unmanned aircraft flying along defined air routes.

*Image source: Freepik, gettyimages*



# ACTIONS: SHIFTING THE NORM



Stakeholders should determine the demand and potential for cargo transport as well as related platform design strategies. Air Taxi developers should design **modular platforms** that support applications across cargo, passenger, and mixed fleets.

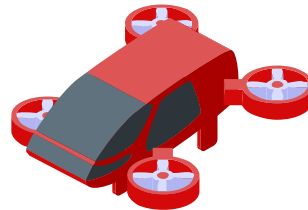


## Collaboration & Coordination

Stakeholders should engage with local governments and urban planners of cities that exhibit the most readiness for Air Taxi integration. Significant coordination will be required to ensure consensus on the development and implementation of operating/technology standards.



Stakeholders need to recognize the critical importance of communication across the value chain. Air Taxis and other airborne vehicles will need to be compatible with a **unified digital infrastructure**, manage communications, and ensure seamless data transfer across all autonomous platforms, and between platforms and data centers.



## Supply Chain Restructuring

The aviation industry will need to dramatically rethink and overhaul its supply chain to ensure that it effectively serves large-scale demand. Synergizing learnings in certification and product development areas through sustained partnership between automotive and aviation industries will be instrumental in meeting spiraling demand.

*Image source: Freepik, gettyimages*

# WRAP UP

## REPORT AVAILABLE FOR LICENSING

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## QUESTIONS?





**TruWeather**<sup>™</sup>  
S O L U T I O N S

MICRO-WEATHER DATA ANALYTICS FOR THE AUTOMATION AGE

NTCOG– 26 JANUARY 2021

[TruWeather Solutions Inc.](#)

# Weather Impacts All Our Decisions...

...Aviation Autonomy Is An Unprecedented Micro-Weather Challenge ...

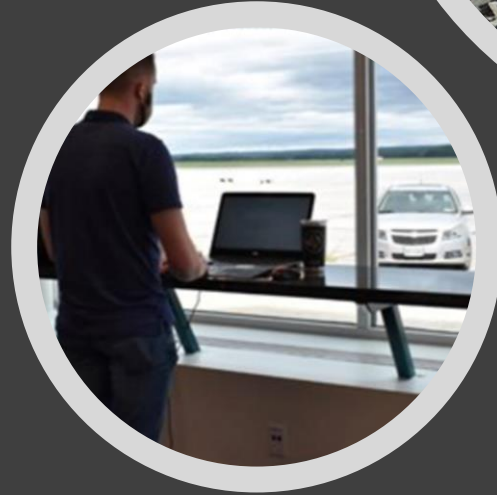
...UAS Industry Must Care About This...

...It will Take an ecosystem of Weather Sensors

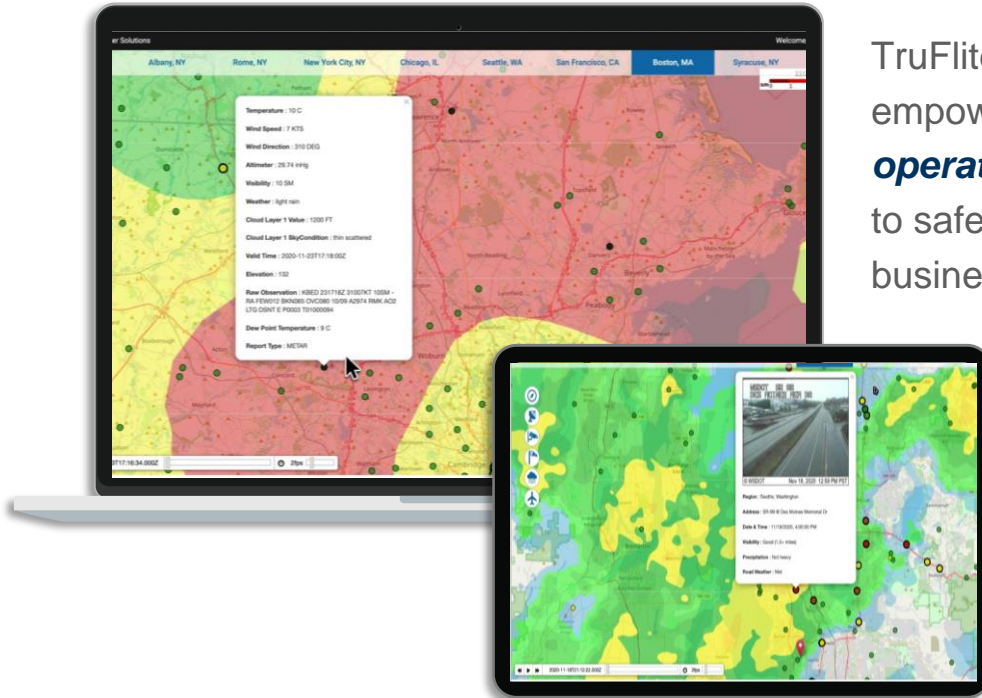


# How Do We Know This?

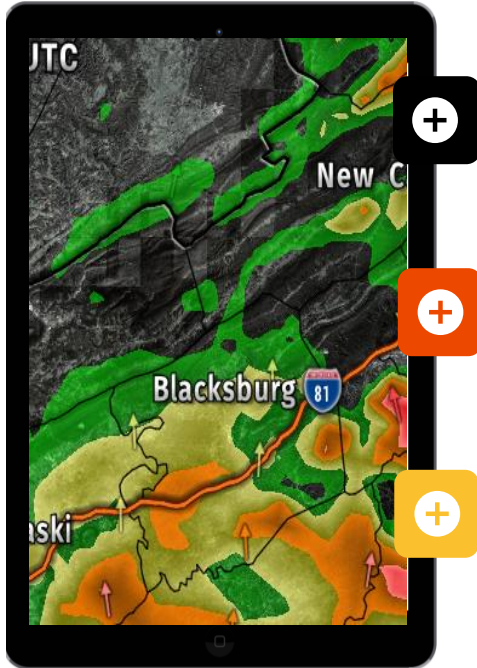
TruWeather is a micro weather data and analytics company that provides weather insights to Autonomous Systems



# TWS TRUFLITE V360°



TruFlite V360° is an **All-In-One SaaS platform** empowering **Unmanned Aerial System operators, dispatchers** and **airspace managers** to safely optimize flight time and increase business margins 40% when weather is a factor



## *Targeted Mission Planning and Execution*

TruFlite V360<sup>o</sup> provides the user with the right data, for the right time, the right location and the right application.

## *One Stop Shop Capabilities*

Our SaaS analytics platform integrates a hugely fragmented market of the best data suppliers and sensors to acquire the most relevant weather intelligence for ubiquitous flight.

## *Weather Cost Recovery*

TruFlite's tailored and actionable insight increases vehicle utilization rates, optimizes resources and customer scheduling by targeting the best flight windows—more flying means more revenue.

# WHY TRUWEATHER?



**WE ACCELERATE THE COMMERCIALIZATION OF PROVEN NEXT GENERATION SCIENCE AND TECHNOLOGY INTO OUR ROBUST PLUG AND PLAY MICRO-WEATHER ANALYTICS PLATFORM**

- 35 Years In Aviation/Logistics Operations and Weather Systems
- Can Integrate Proprietary Customer Weather Sensors
- Proven US Air Force Framework to Increase Operations Effectiveness
- Recognized Globally For Emerging Smart City Weather Solutions



# SENSOR PARTNERS



SATELLITE WEATHER DATA AND PREDICTION



WEATHER INSTRUMENTED DRONES



ENVIROMENTAL SENSORS AND DISPLAYS



RUGGED SONIC WIND SENSORS



SENSOR MONITOR SYSTEMS,  
DETECT FAULTS, MITIGATE  
FAILURES



WIND LIDAR PROFILER SENSORS



UMASS  
AMHERST

CITYWARN AND WEATHER RADAR

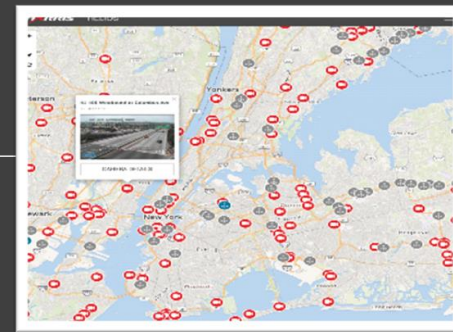


WEATHER ANALYTICS R&D

# Our Weather Infrastructure has a “Weather Data Dead Zone” in the lowest 5,000 Feet of the Atmosphere



An Ecosystem of New  
Generation Weather Sensors  
Required to Close the  
“Weather Data Dead Zone”  
Gap and Improve Weather  
Knowledge and Predictions



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# The Reality

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- Governments Cannot Solve This Alone
  - Lack Resources (\$3T US Deficit)
  - Inter-Agency Bureaucracy
- Public – Private Partnerships
  - “CASA-model”
  - Incentive Sensor constituencies
  - Can address UAS weather gaps
- Requires Agility and Rapid S&T Transition

# New Aviation Weather Paradigm

- Follow NASA/FAA UTM federated approach
- Weather Supplemental Data Service Providers (SDSP)
- Certify “weather data” rather than “instruments”
- Data performance and risk-based standards
- Business model to incentivize infrastructure investment
  - States and local municipalities; private investors





Urban Canyon Adds  
Complexity to Weather  
Measurement Gap...

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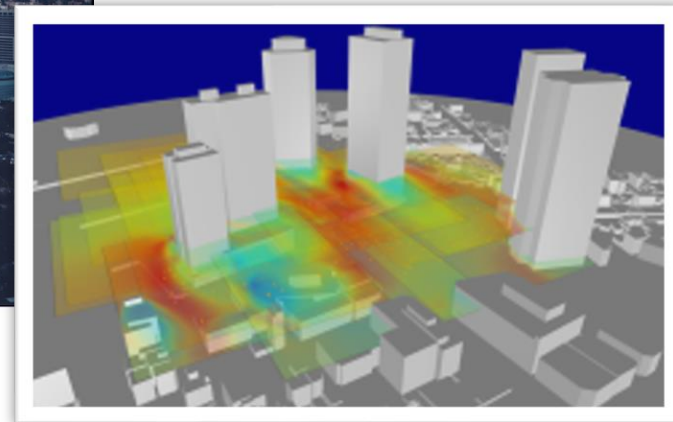
Credit: NASA AMES Research Center, Dr. John Melton

# HAZARD DETECT AND AVOID



Credit: Lillian Gipson/NASA

TRUWEATHER'S R&D TO BUILD AND COMMERCIALIZE THE FIRST URBAN WIND PREDICTIONS CONFIGURABLE TO ANY CITY FOR DRONES AND AIR TAXIS WORLDWIDE



# Future Smart City Weather Data Collection Ecosystem

## Integral to Smart City Infrastructure Planning

Array of Sensors

Performance-Based

Public-Privately Funded

Government Oversight

Weather SDSP Ecosystem Managed





## Contact Info

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### Thank you

- Don Berchoff
- TruWeather Solutions
- Reston, VA/Syracuse NY/Albany NY/Grand Forks ND
- [Don.berchoff@truweathersolutions.com](mailto:Don.berchoff@truweathersolutions.com)
- <http://www.truweathersolutions.com>



# Remote ID, Ops Over People & At Night



Dawn M.K. Zoldi, CEO & Founder - January 26, 2021

# Overview

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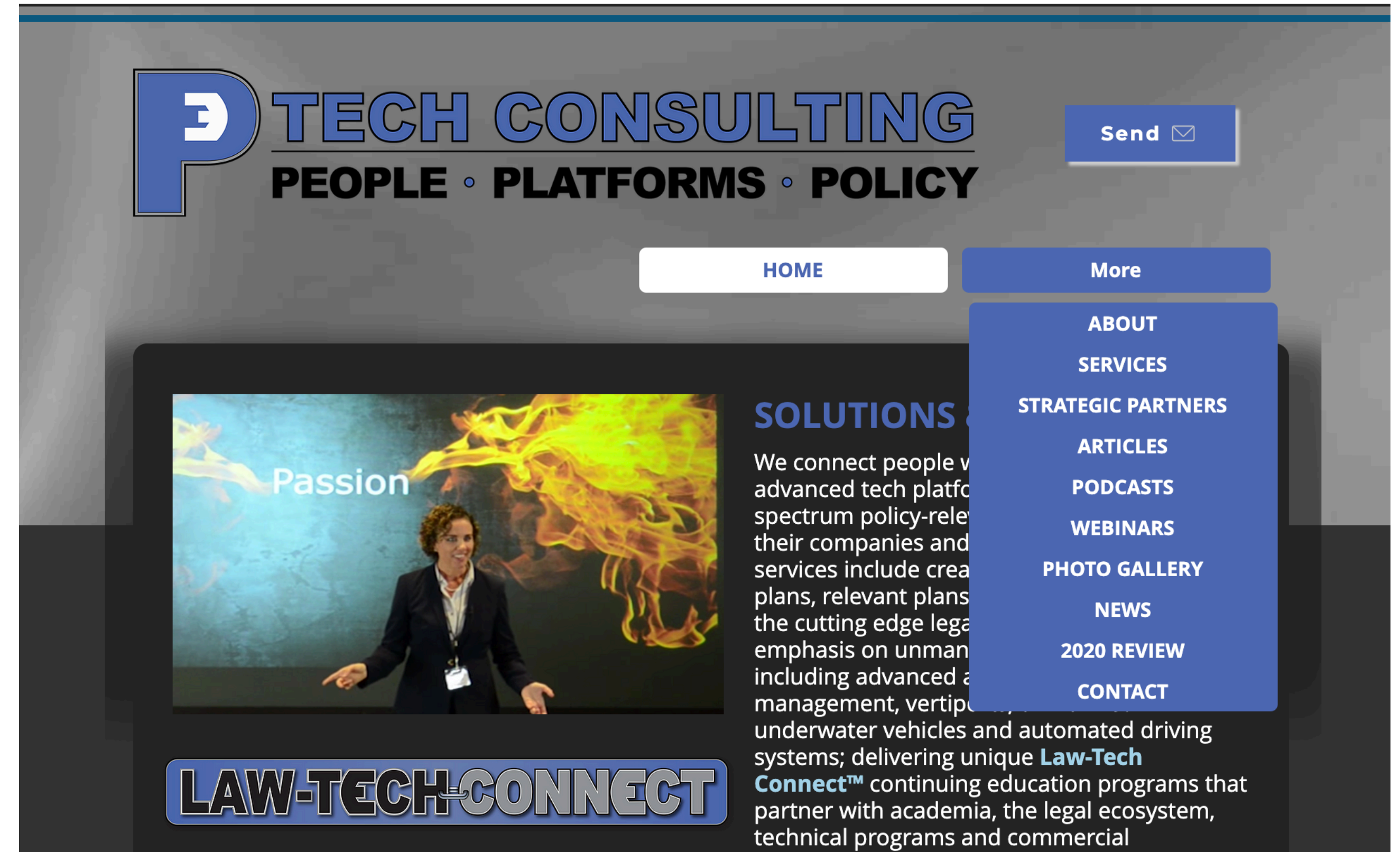
- Intro
- Remote ID
- OOP
- Night Ops
- Resources & Questions



# Intro



- \*Disclaimer
- [www.p3techconsulting.com](http://www.p3techconsulting.com)
- [www.linkedin.com/in/dawn-zoldi-5bb8b181](https://www.linkedin.com/in/dawn-zoldi-5bb8b181)
- [www.facebook.com/p3techconsulting](https://www.facebook.com/p3techconsulting)



# Remote ID



- History & Purpose
- Applicability - and Not
- How it Works
  - Standard RID
  - Broadcast Module
  - FRIA
- Message Elements



# Remote ID (Con't)



## Breaking Down the US Rollout of Remote ID **DA**

A Look at New FAA Remote Identification Regulations

**New RID Rules Published**  
The FAA is expected to publish the new rules on the Federal Register in January, beginning a 60 day countdown until the rules become effective.

**Rules Go Into Effect, But No Impact on Drone Pilots for 30 Months**  
While the rules may go into effect as early as March 2021, the FAA has allowed for a 30 month period before any operational rules go into effect, although industry stakeholders will need to take action sooner.  
After this 30 month period, the rules **require all unmanned aircraft that need to register with the FAA to remotely identify**. Notably, this discloses drones weighing 0.55 lbs or less, unless operated under Part 107 or another criteria that would require registration.

**Three Ways to Remotely Identify:**

- 1 Standard Remote ID Unmanned Aircraft**  
A pilot purchases a drone that broadcasts telemetry and other information to its surroundings (likely via Bluetooth or Wi-Fi).
- 2 Install a Remote ID Broadcast Module**  
A pilot purchases a separate broadcast module, installs it and registers the module's serial # for the aircraft.
- 3 Fly in a FAA-Recognized Identification Area (FRIA)**  
Working with other organizations, the FAA will establish geographic areas where drones not equipped with Remote ID can fly.

**Actions Required of Manufacturers and Applications Open for FRIA**

- 1 New Aircraft Must Meet Standard Remote ID Requirements**  
Manufacturers must install RID capabilities on all new drones to meet Standard Remote ID requirements (#1 above).
- 2 FRIA Application Window Opens**  
Recognized community-based organizations, educational institutions and more can apply to establish a FRIA. FRIA authorizations are valid for 48 months.

**January 2021** | **March 2021** Remote ID rules become law | **August 2022** Manufacturer compliance required | **August 2023** All registered UAVs must use RID

V1.0 / Find more insights at [droneanalyst.com](https://droneanalyst.com)

# OOP



- History
- Applicability & Not
- What it Allows
  - Moving Vehicles
  - At Night
  - \*Open Air Assemblies



# OOP (Con't)



Category	Additional Requirements	Ops Permitted
<p><b>1:</b> &lt; 0.55 pounds at take-off + no exposed rotating parts to lacerate human skin</p>	<p>None</p>	<ul style="list-style-type: none"> <li>• OOP</li> <li>• briefly transit over moving vehicles</li> <li>• dwell over moving vehicles only if UA remains w/in/over closed or restricted-access site + humans inside vehicle w/in site on notice</li> <li>• op in sustained flight over open-air assemblies only if meets Standard RID/RID broadcast module requirements</li> </ul>
<p><b>2:</b> &gt; 0.55 pounds/no airworthiness cert; not create &gt;11 ft lbs damage, no exposed rotating parts, no safety defects</p>	<ul style="list-style-type: none"> <li>• <b>Pilot:</b> display label on UA that can conduct Cat 2 ops; have OIs incl. lms + OOPs cats for DOC</li> <li>• <b>Manufacturer:</b> MOC + (DOC) + product support and notification process</li> </ul>	<ul style="list-style-type: none"> <li>• OOP</li> <li>• briefly transit over moving vehicles</li> <li>• dwell over moving vehicles only if UA remains w/in/over closed or restricted-access site + humans inside vehicle w/in site on notice</li> <li>• op in sustained flight over open-air assemblies only if meets Standard RID/RID broadcast module requirements</li> </ul>



# OOP (Con't)



Category	Additional Requirements	Ops Permitted
<b>3:</b> > 0.55 pounds/no airworthiness cert; not create >25 ft lbs damage, no exposed rotating parts, no safety defects	<ul style="list-style-type: none"> <li>• Same as Cat 2</li> </ul>	<ul style="list-style-type: none"> <li>• OOP &amp; vehicles only when op w/in/over closed or restricted-access site + all humans on notice or SUA is flying over humans directly participating in op or located under a covered structure or inside a stationary vehicle providing reasonable protection from it if it falls.</li> <li>• NO ops over open-air assemblies</li> </ul>
<b>4:</b> Part 21 airworthiness cert + op'd IAW oplims in approved Flight Manual or as otherwise specified by the Administrator	<ul style="list-style-type: none"> <li>• must have mx, preventive mx, alterations or inspections performed by qualified persons IAW rule requirements</li> </ul>	<ul style="list-style-type: none"> <li>• IAW approved Flight Manual</li> <li>• sustained flight over open-air assemblies when the op standard RID or RID broadcast modules requirements met</li> </ul>

- **Plus:** inspection, testing & compliance demonstration provisions; expands the list of who can make the “ask” for various documents beyond FAA.

# Night Ops



- New Training
  - Available March 1, 2021
  - Applicable March 16, 2021
  - Initial will also now include night ops.
- SUA must have operational anti-collision lights w/ sufficient flash rate + vis for 3 statute miles.



# Timelines



- **Clock starts:** January 15, 2021

	<b>RID</b>	<b>OOP</b>	<b>Night Ops</b>
<b>Effective</b>	Start+ 60 days	Start + 60 days	Start + 60 days
<b>Operators</b>	+ 30 months	<ul style="list-style-type: none"><li>• Cat 1: Effective date</li><li>• Cat 2 - 4: MOC/DOC*</li></ul> *some ops RID on board	Effective date w/ right training
<b>Manufacturers</b>	+ 18 months	<ul style="list-style-type: none"><li>• MOC/DOC (9 - 12 mo?)</li></ul>	N/A

# Resources & Questions

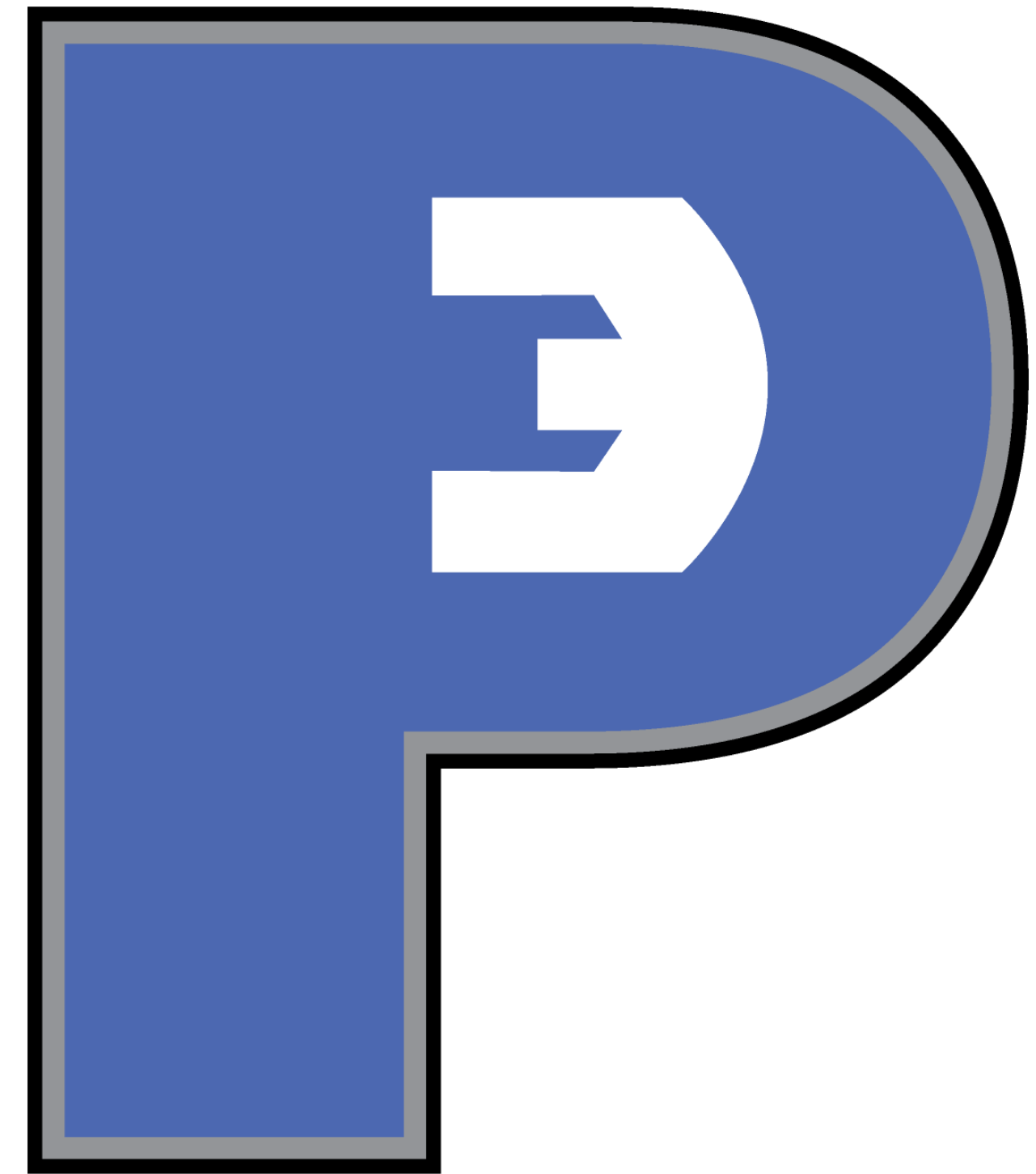
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- **Final RID Rule:** <https://www.federalregister.gov/documents/2021/01/15/2020-28948/remote-identification-of-unmanned-aircraft>
- **IUS RID Article:** <https://insideunmannedsystems.com/3-2-1-done-remote-id-rule-is-final>. + *Stay Tuned for Feb/Mar IUS!*
- **Final OOP Rule:** <https://www.federalregister.gov/documents/2021/01/15/2020-28947/operation-of-small-unmanned-aircraft-systems-over-people>
- **IUS OOP Article:** <https://insideunmannedsystems.com/oops-there-it-is/>
- **Contact Me:** [dawn@p3techconsulting.com](mailto:dawn@p3techconsulting.com)

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**Thank You!**



# North Texas UAS Safety and Integration Task Force

*Working Group Rosters*



# Education and Public Awareness

<b>Name &amp; Organization</b>	
<b>Maggie Schuster</b>	Your Aerial View (Leader)
<b>Evan Merelli</b>	ELM Aerial Services (Second)
<b>Arjuna Fields</b>	FAA
<b>Candy Slocum</b>	Interlink
<b>Charles Gbadebo</b>	Skystream Aerial, LLC
<b>Chris Jenseth</b>	AUVSI
<b>Christa Slejko</b>	Dallas County Community Colleges - North Lake
<b>David Setzer</b>	NCTCOG Workforce Development
<b>Ernanda White</b>	Black Girls Drone
<b>Kennard Wells</b>	AUVSI
<b>Kenneth Bergstrom</b>	NCTCOG
<b>Linda Brady</b>	Dallas County Community Colleges - Brookhaven
<b>Louise Jupp</b>	Terreco Aviation
<b>Mario Herrera</b>	The Culmination Group
<b>Ron Poynter</b>	OnPoynt Aerial Solutions
<b>Scott Dodson</b>	Cobb Fendley



# Legislation and Policy

<b>Name &amp; Organization</b>	
<b>Michael Hill</b>	Cumulus Technologies (Leader)
<b>Bob Farris</b>	Amflight Services (Second)
<b>Catherine Self</b>	BNSF
<b>Christopher Jenseth</b>	AUVSI Lonestar Chapter
<b>Ernanda White</b>	Black Girls Drone
<b>Jared Jancek</b>	TXDroneCo
<b>Lorinda Mikesell</b>	Meiyssel Insurance Service
<b>Mark Colborn</b>	Dallas Police Department
<b>Nick Allen</b>	NCTCOG
<b>Scott Shtofman</b>	Quad Axis/FirstIZ
<b>Arjuna Fields</b>	FAA





# Training and Workforce

<b>Name &amp; Organization</b>	
<b>Wes Jurey</b>	UAS Werx (Leader)
<b>Bill Swope</b>	Halff Inc
<b>Bryan Archer</b>	Galaxy UAV/AUVSI
<b>Candy Slocum</b>	Interlink
<b>Charles Gbadebo</b>	Skystream Aerial, LLC
<b>Christopher Jenseth</b>	AUVSI Lonestar Chapter
<b>Ernanda White</b>	Black Girls Drone
<b>Jim Semerand</b>	ASCM Assn of Supply Chain Management
<b>Kelly Konley</b>	Dallas County Community Colleges
<b>Nick Graff</b>	Dallas County Community Colleges
<b>Tim Samuels</b>	Dallas County Community Colleges - Ascend Institute
<b>Arjuna Fields</b>	FAA
<b>Kennard Wells</b>	AUVSI



# Integration

<b>Name &amp; Organization</b>	
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<b>Apoorva Bajaj</b>	University of Massachusetts - CASA
<b>Arjuna Fields</b>	FAA
<b>Catherine Self</b>	BNSF
<b>Charles Gbadebo</b>	Skystream Aerial, LLC
<b>Christopher Jenseth</b>	AUVSI Lonestar Chapter
<b>Ernanda White</b>	Black Girls Drone
<b>Mark Colborn</b>	Dallas Police Department
<b>Natalie Bettger</b>	NCTCOG
<b>Robbie Terrell</b>	DFW Airport
<b>Adrian Doko</b>	AUVSI Lonestar Chapter
<b>Scott Shtofman</b>	Quad Axis/FirstIZ



# Schedule

## Next week 2.2.20

Education and Public Awareness – 9:00 am to 10:00 am

Legislation – 10:30 am to 11:30 am

Training – 1:00 pm to 2:00 pm

Integration – 2:30 pm to 3:30 pm



# Contacts

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