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

Urban Air Mobility Proving Ground

North Central Texas Council of Governments (NCTCOG)

February 2019

November 2018 Urban Air Mobility Grand Challenge

Industry Day Participants

- **47** Aircraft Developers
- **23** Comm/Nav/Surveillance Providers
- **22** Integrated Automation & Operations Developers
- **18** ATM Developers (both traditional and UAM)
- **12** Universities
- **10** Fleet Operations Providers
- **10** Test Site Representatives
- **8** Manufacturers
- **6** Propulsion System Developers
- **5** Media
- **5** Federal Agencies
- **5** Local Governments
- **5** Airspace Designers
- **3** Vertiport Designers
- **2** Trade Associations


HALE UAS
UPPER CLASS E AIRSPACE
MARKET: LARGE UAS & HALE
LARGE UAS
LARGE UAS
CLASS A AIRSPACE
MARKET: THIN / SHORT HAUL
AIRPORT
URBAN VERTIPORT
SMALL AIRPORT
DRONEPORT
MARKET: URBAN AIR MOBILITY
DISTRIBUTION CENTER
MARKET: SMALL / MEDIUM UAS

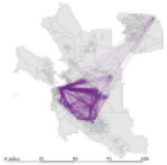
Grand Challenge (GC) Series Overview

Vehicles

functional UAM vehicles with threshold level of demonstrated airworthiness

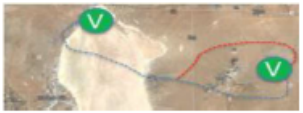
Airspace Management

airspace and air traffic management technologies and services built and simulated to a threshold level of UAM ATM requirements



Safety and Integration Scenarios

airworthiness processes and realistic UML-4 scenarios designed in concert with the FAA, with range(s) and Testbeds as a UAM proving ground



Stakeholder Integration

societal integration and acceptance of UAM Operations including public acceptance, supporting infrastructure, operational integration, standards organizations, the local regulatory environment, etc.

Industry Provided

NASA Provided

Ecosystem Wide Support

Lone Star Urban Air Mobility Proving Ground Overview

- **Goal: Building on our recent *NASA TCL4/TO7 Award…**

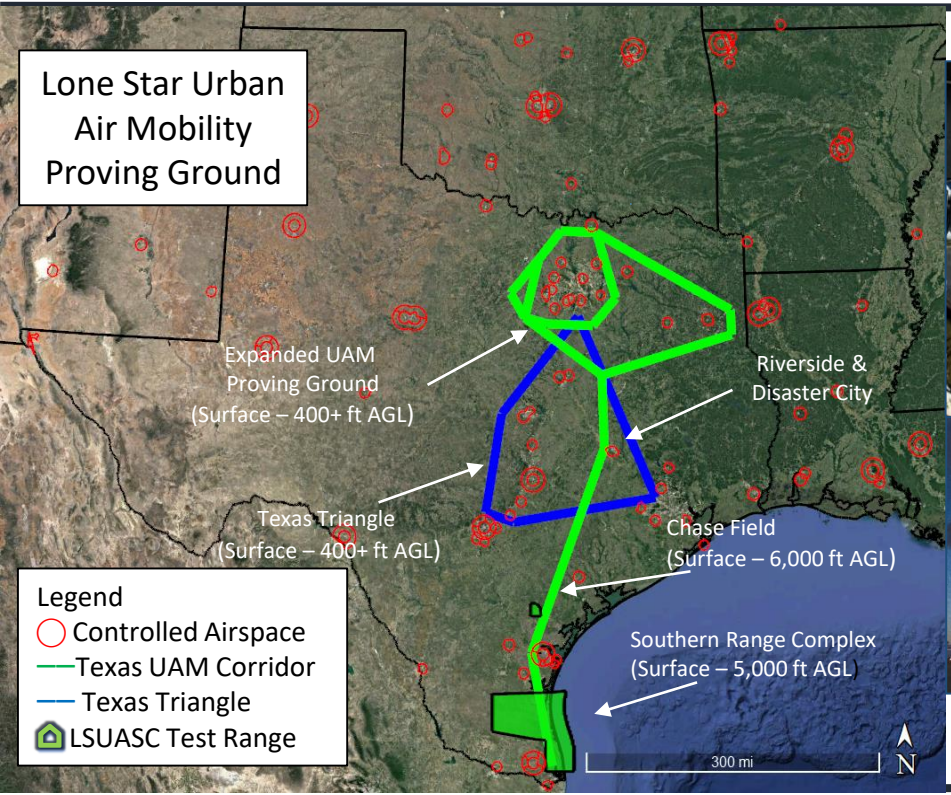
  Provide the UAM Community of Practice, OEMs, ECOSYSTEM Vendors and Providers (GBSAA, C2, Weather Radar & Monitoring, Airspace De-Confliction, UTM-Like Tools, Urban Communities, User-Stake Holders) with an opportunity to begin testing & exploring the art of the possible.

- **UAM GC 1 2020 Edwards Air Force Base:**
  - LS UAMPG Offers OEMs and Ecosystem Providers opportunity to conduct systems and flight testing “prior” to NASA GC1
  - LS UAMPG offers NCTCOG Team opportunity to attract NASA to Texas for GC 2 and beyond

***August 2019, in downtown Corpus Christi, TX**

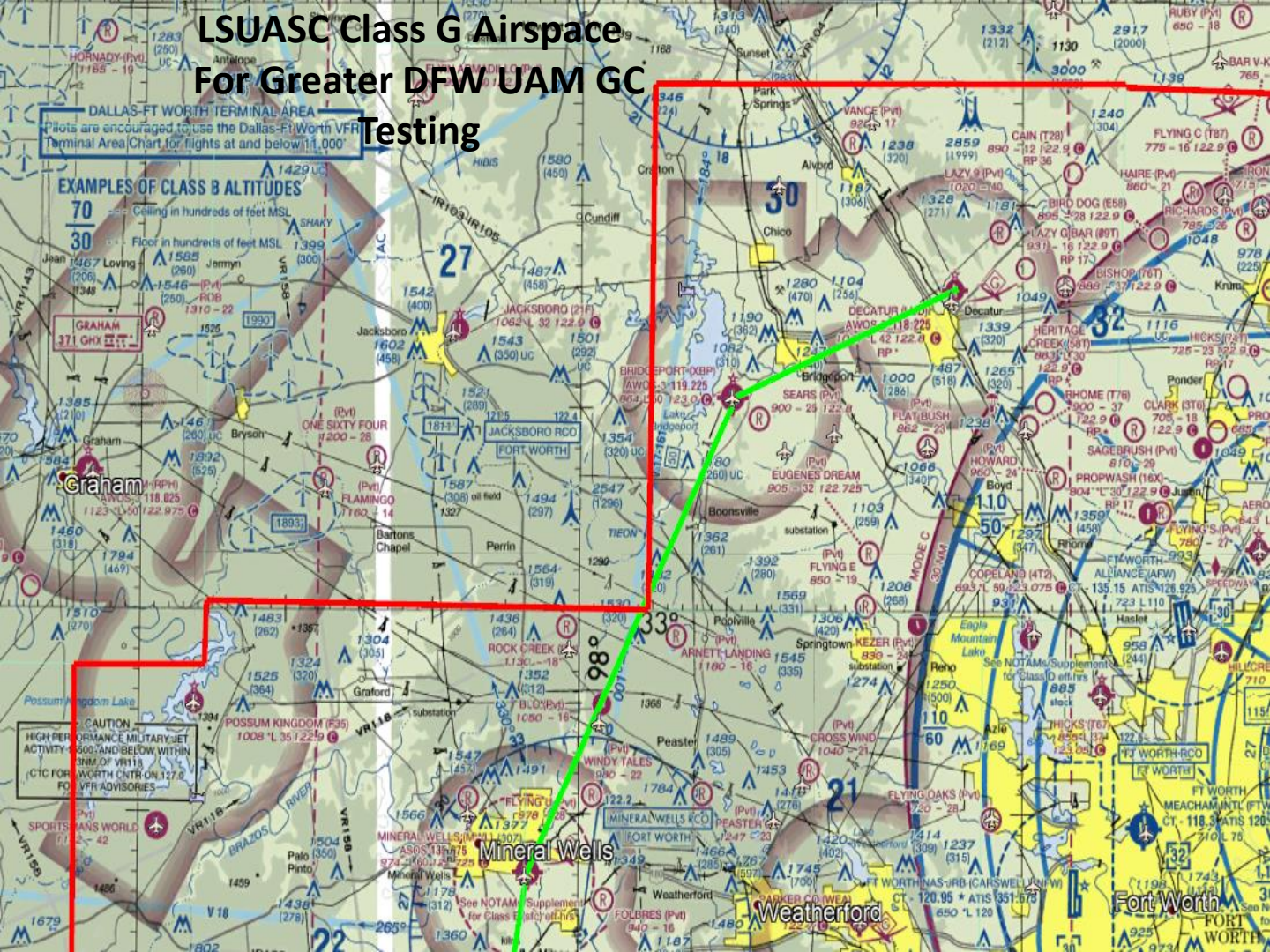
Urban Air Mobility Proving Ground Corridor Options

(Advantaging our National Class G Airspace Authorization)

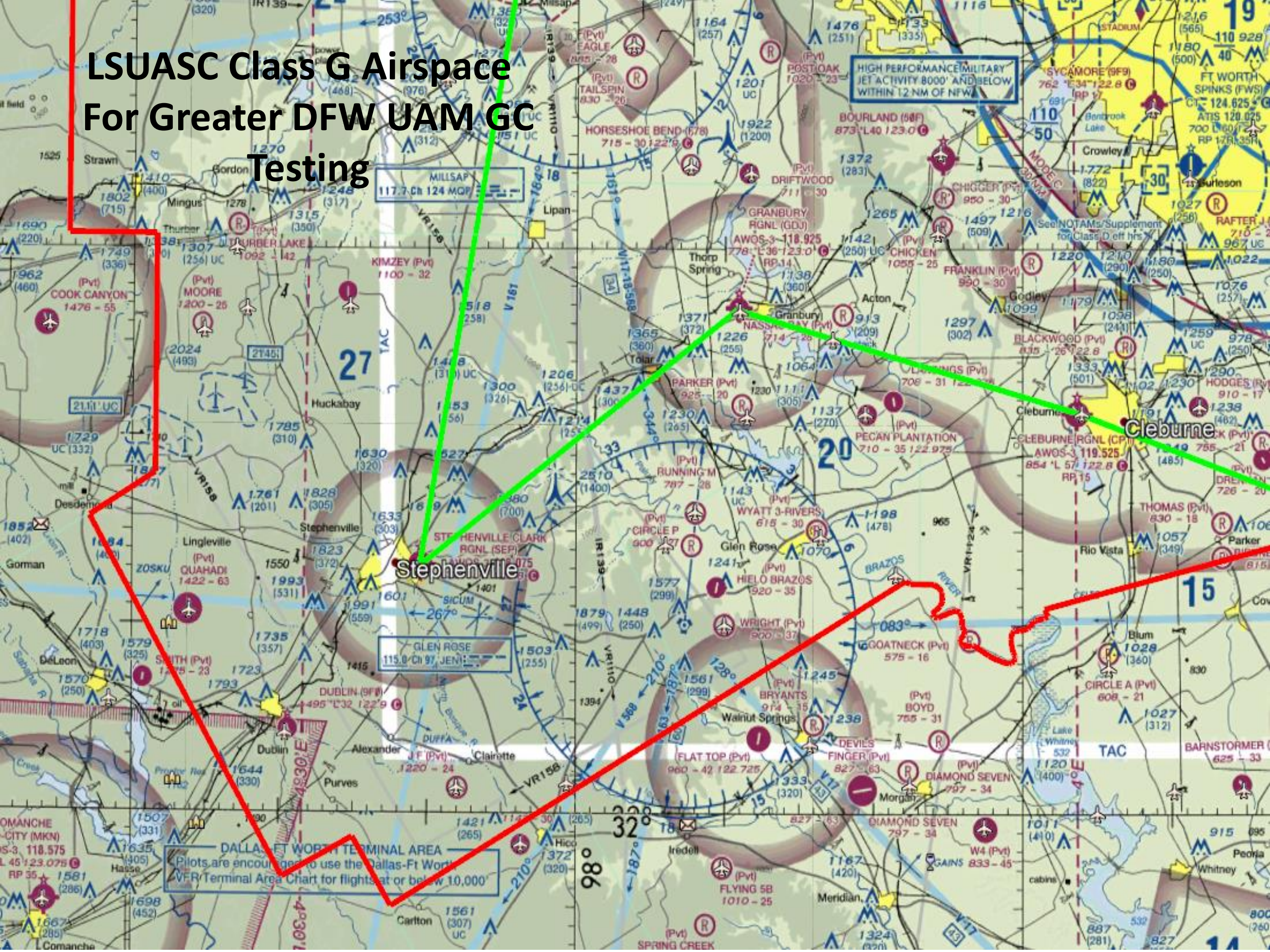


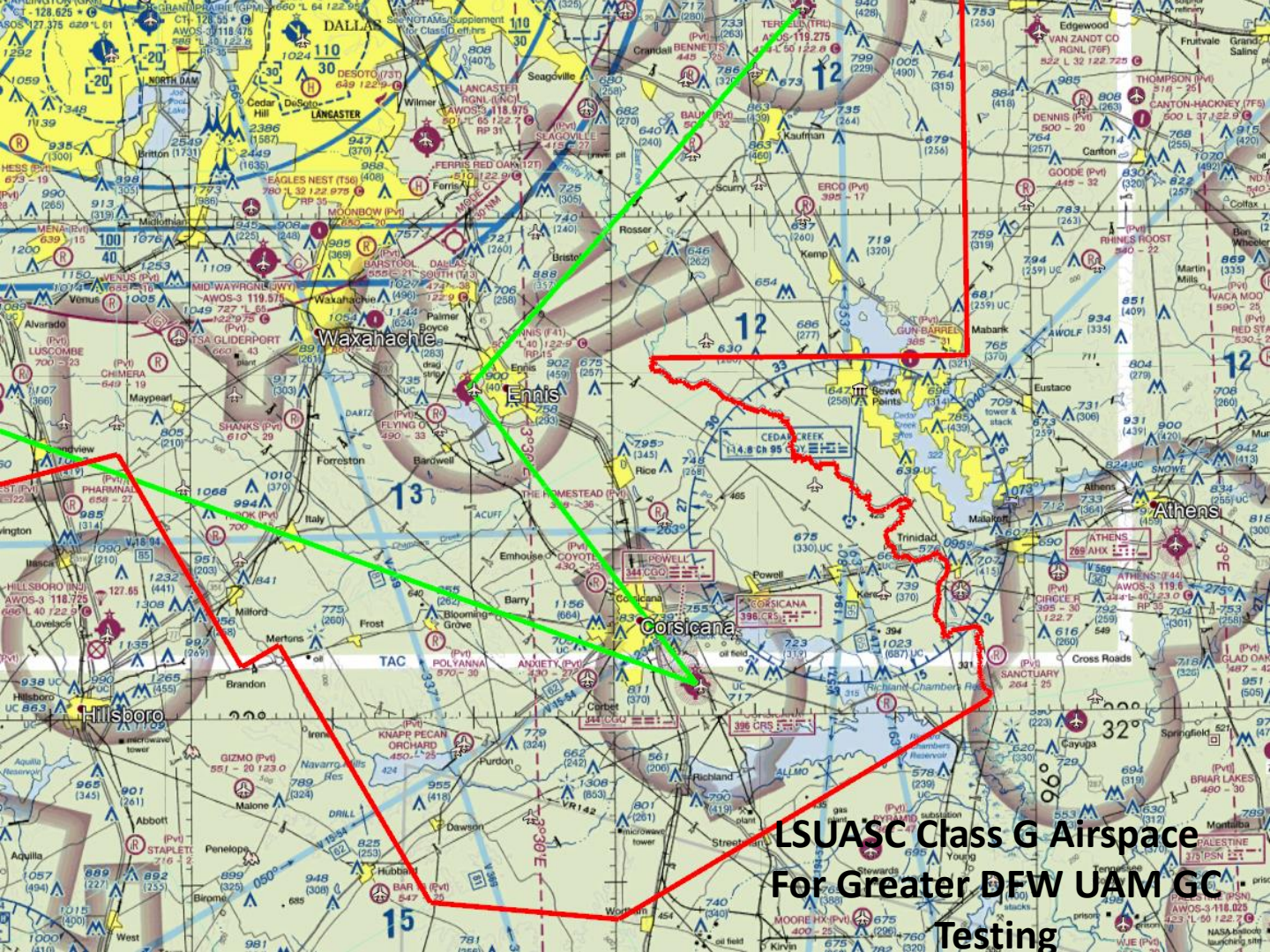
Our Mission Control Center

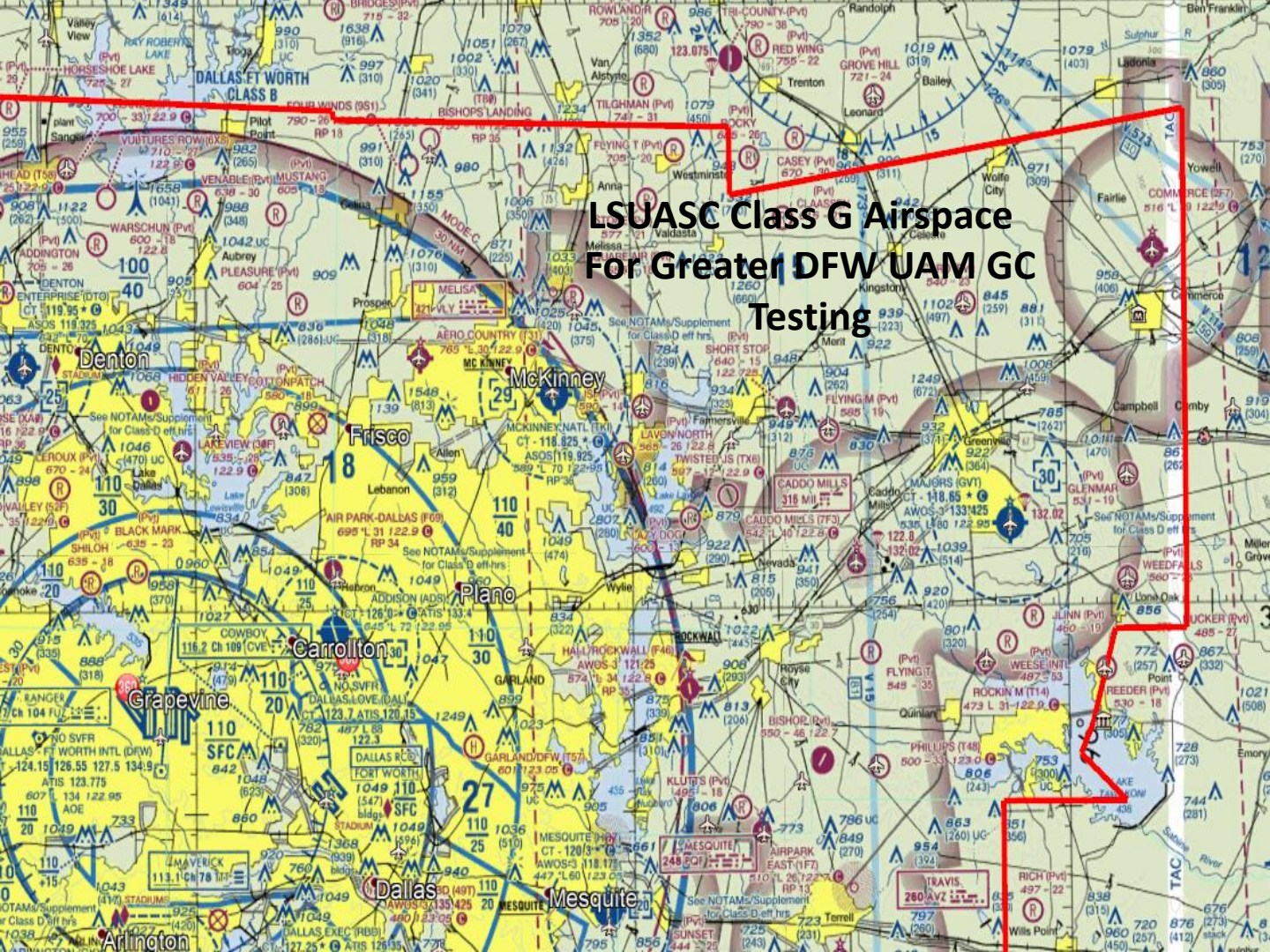
Remote C2 for UAS Night Operations


LSUASC Class G Airspace
For Greater DFW UAM GC
Testing
Graham
Mineral Wells
Weatherford
Fort Worth

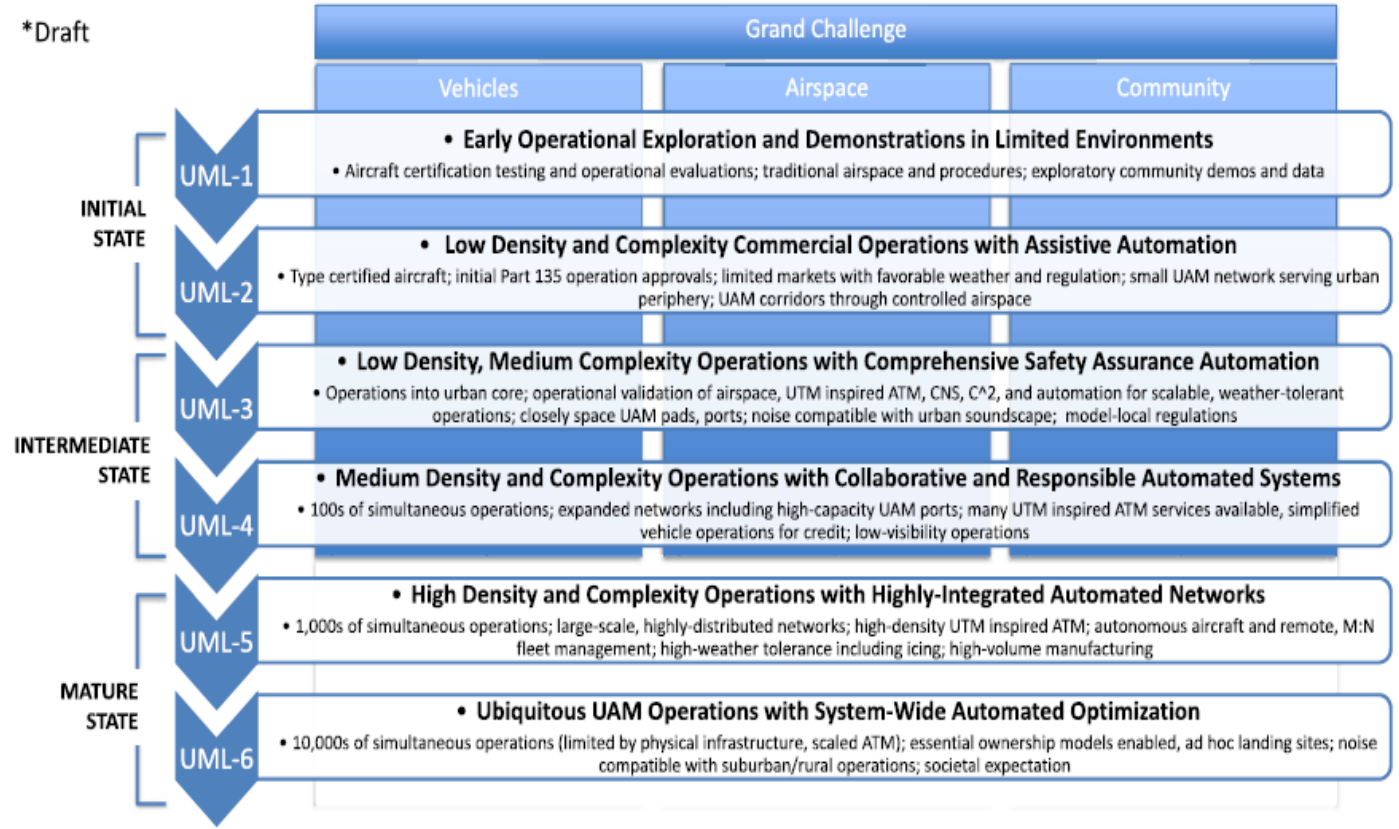
LSUASC Class G Airspace For Greater DFW UAM GC Testing




LSUASC Class G Airspace
For Greater DFW UAM GC -
Testing


LSUASC Class G Airspace
For Greater DFW UAM GC
Testing
DALLAS FT WORTH
CLASS B
Denton
McKinney
Frisco
Plano
Carrollton
Grapevine
Dallas
Mesquite
Arlington

UAM Maturity Levels (UML)



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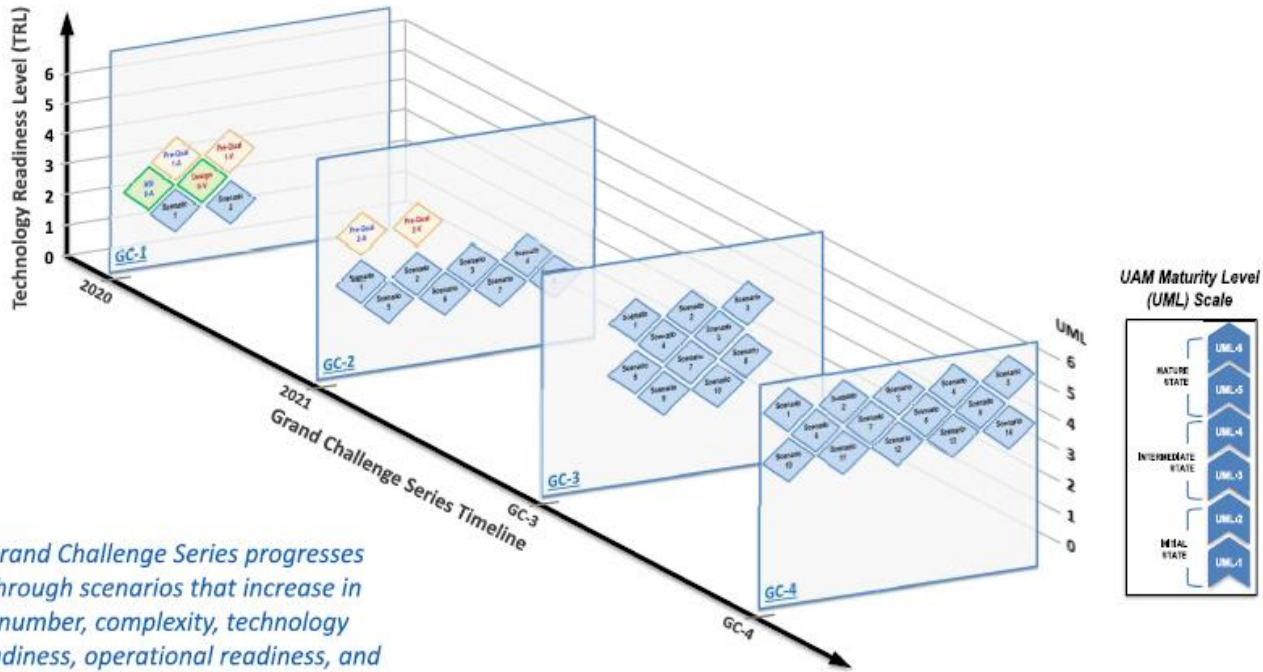
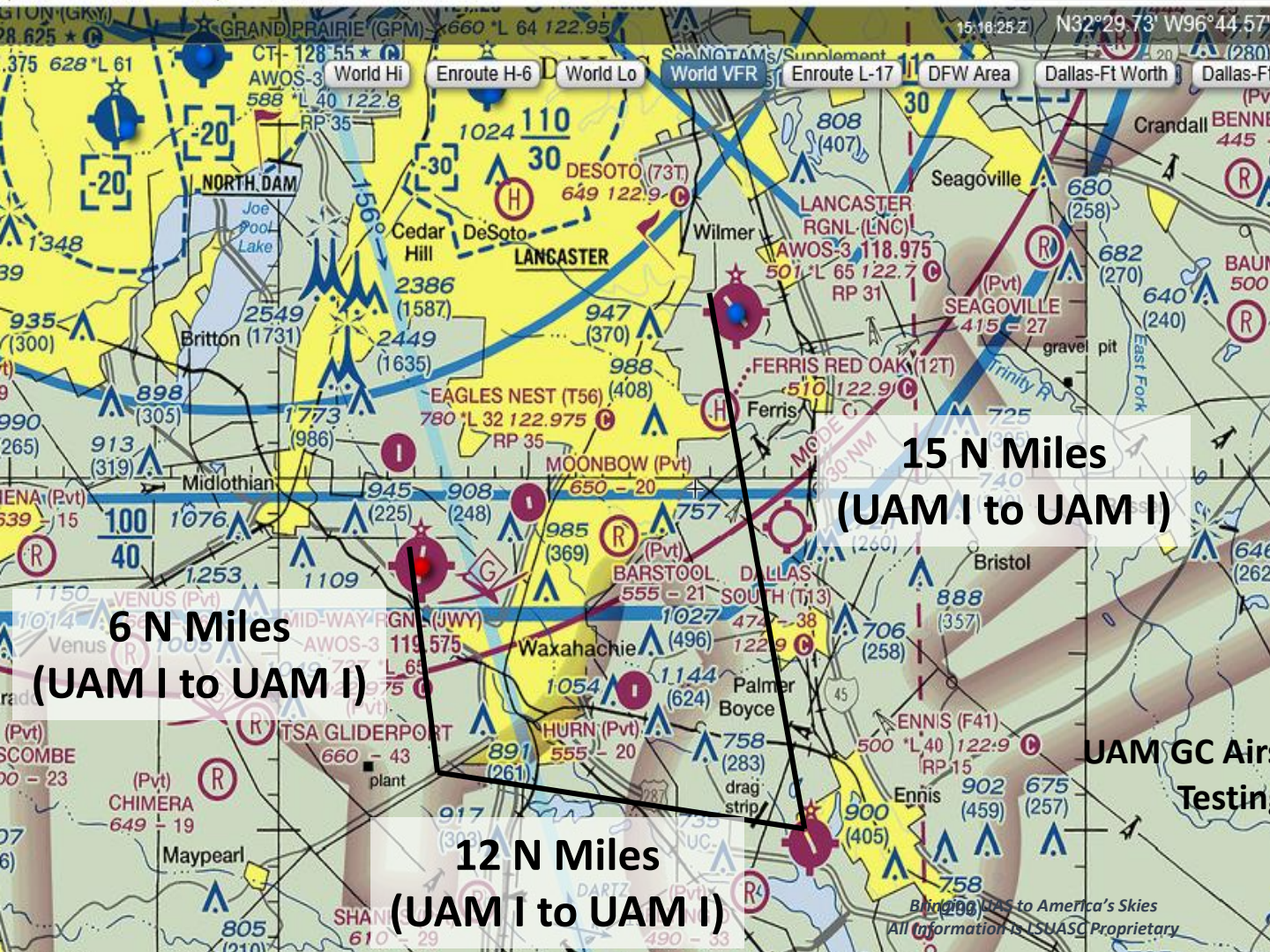
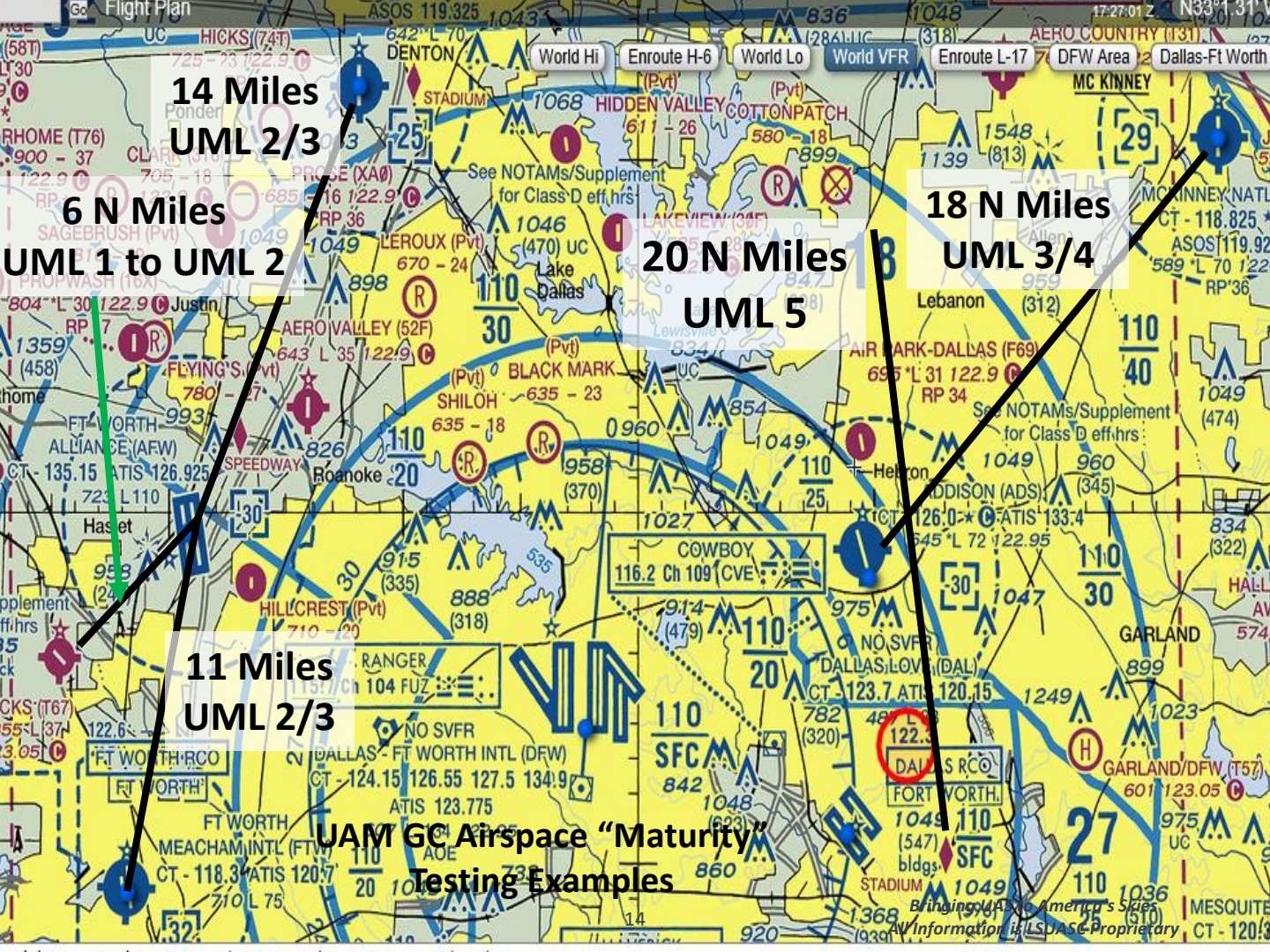
Grand Challenge Series Progression



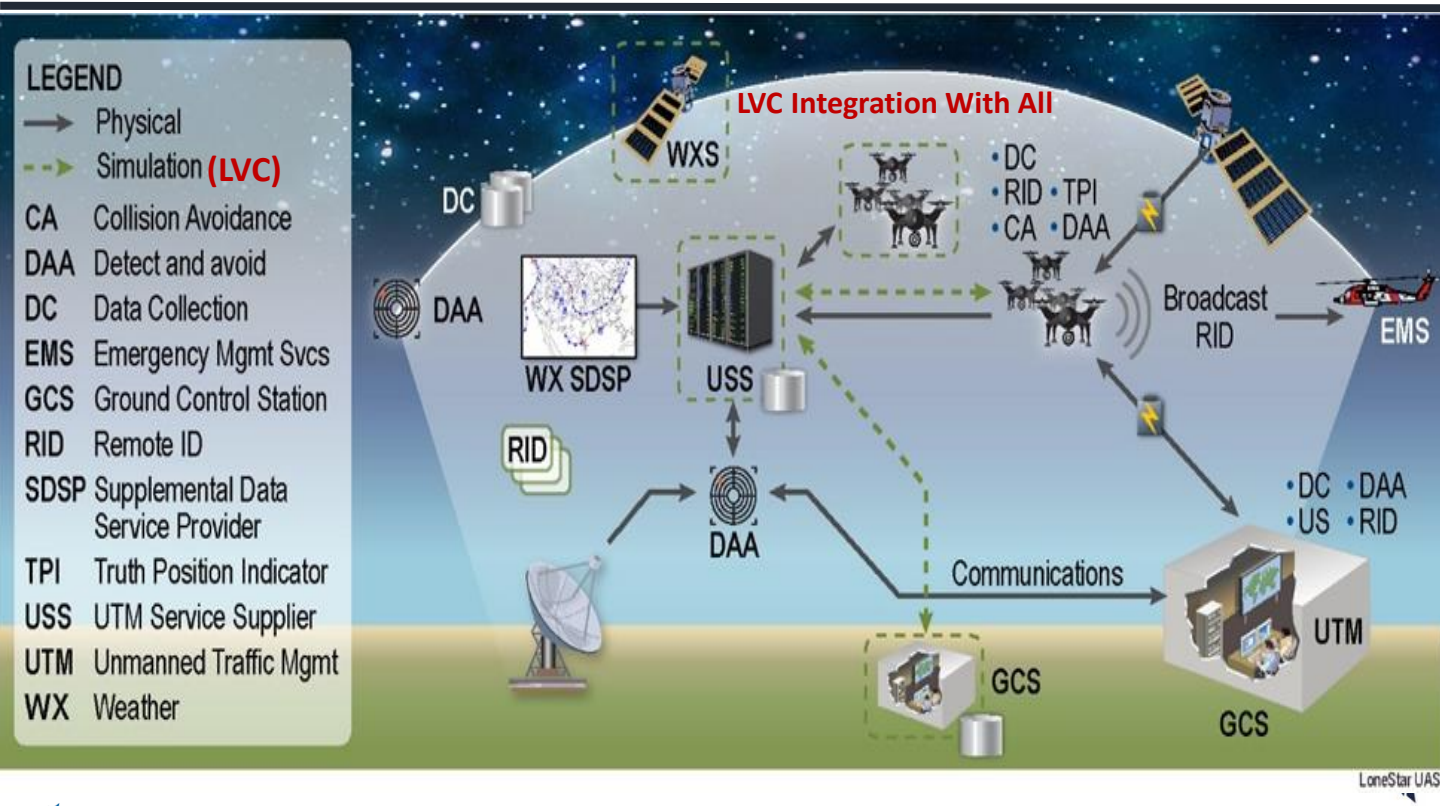
Grand Challenge Series progresses through scenarios that increase in number, complexity, technology readiness, operational readiness, and standards and regulatory emphasis


15 N Miles
(UAM I to UAM I)
6 N Miles
(UAM I to UAM I)
12 N Miles
(UAM I to UAM I)
UAM GC Airs
Testin
Bringing UAS to America's Skies
All information is ISUASC Proprietary


14 Miles
UML 2/3
6 N Miles
UML 1 to UML 2
20 N Miles
UML 5
18 N Miles
UML 3/4
11 Miles
UML 2/3
UAM GC Airspace "Maturity"
Testing Examples
Bringing UAS to America's Skies
AV Information is LSAASC Proprietary

Current Architecture

(Opportunities to Partner)



Way Ahead

- LSUASC will remain engaged with NASA and the FAA during upcoming UAM GC Meetings.
- We will also continue outreach to UAM GC “Proving Ground” enabler Team Mates.
- Sustain coordination with NCTCOG and DFW partners to identify areas of intersection.
- Bring UAM GC Systems Testing to Texas!

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The Urban Air Mobility Vision

UAS and the Navy

CDR Pete "Lang" Morgan
FAA Central Service Area NAVREP

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peter.morgan@faa.gov

Intent

- Familiarize leaders on the role of Naval Representatives (NAVREPs) to the FAA
- Introduce US Navy (UAS) concepts
- Introduce COAs
- Introduce Part 91 and Part 107
- Introduce UAS Facility Maps and SSI TFRs

Where & Who

FAA Headquarters (Washington, DC)

FAA Western Service Area (Renton, WA)

FAA Central Service Area (Fort Worth, TX)

FAA Eastern Service Area (Atlanta, GA)

Who We Work With

- FAA stakeholders
- Sister services
- Other agencies and departments
- State and local governments
- Military facilities and individual units
- Academia & Industry
- Citizens

What We Do

- Ensure good stewardship and safe use of the national airspace system (NAS)
- Policy & Process formation / information transfer
- Airspace actions & environmental impacts
- Airfield & Air Traffic Control inspections
- Facility encroachment
- NAVAID review
- Mediator between FAA & DOD
- Public education & outreach
- Congressional inquiries & noise complaints
- Pilot deviations
- Regional emergency coordination and response
- Unmanned Air Systems (UAS) integration

Requirements for UAS Program

- **COMNAVAIRFOR M-3710.7 (NATOPS) Chapter 14**
  - Comply with 14 CFR Part 91
  - Certificate of Authorization (COA) requirements
    - Interim or Permanent Flight Clearance
  - Possible Crewmembers
    - UAS Commander
    - Air Vehicle Operator
    - Mission Payload Operator
    - UAS Crewmember
    - Ground Maintenance Vehicle Operator
  - Proficiency Requirements (1/90, 6/180, 1 launch/recovery/90)

Requirements for UAS Program

- **COMNAVAIRFORINST 3710.9**
  - Group 1 & 2 UAS (0-20, 21-55 lbs)
  - Aircraft Controlling Custodian – “Wing” (O-7 level)
    - Administrative control of assignment, employment & logistics
    - Maintains inventory
  - Aircraft Reporting Custodian – “Squadron” (O-5 level)
    - Approves crew qualifications
    - Maintains training and qualifications
  - Minimum training
    - Basic UAS training
    - Airspace operations
    - Safety
    - Local area requirements

ATC Guidance Document

	DOD Class B,C,D,E Airspace	Class A and Non-DOD Class B,C,D,E Airspace	Restricted, Warning, Prohibited, TFR, SSI Airspace	
Public Part 91 DOD Program of Record, DOD Experimental, Non DOD (Public), DOD Contract (Public)	**(A)** Airspace access granted by local DOD ATC facility via the NAVREP	**(D)** Airspace access request reviewed by DOD and granted by FAA	**(E)** Airspace access coordinated directly with the using agency or appropriate TFR/SSI point of contact	DON UAS Operator's Lane
Commercial Part 107 / Sec 333 Commercial and DOD Contract (Non-Public)	**(B)** Airspace access granted by local DOD ATC facility via the NAVREP; initial airspace access request and approval pass through FAA HQ, via the NAVREP	Soon to be updated		
Model Part 101E Model Aircraft	**(C)** Local DOD ATC notified by proponent if within 5 miles of airfield; ATC may deny access based on air traffic safety			
	Local DOD ATC Airspace Manager's Lane	Note: Airspace access requests for Part 101 or 107 operations in Class G airspace are not required by the FAA		

Figure 1. U.S. National Airspace Access Overview

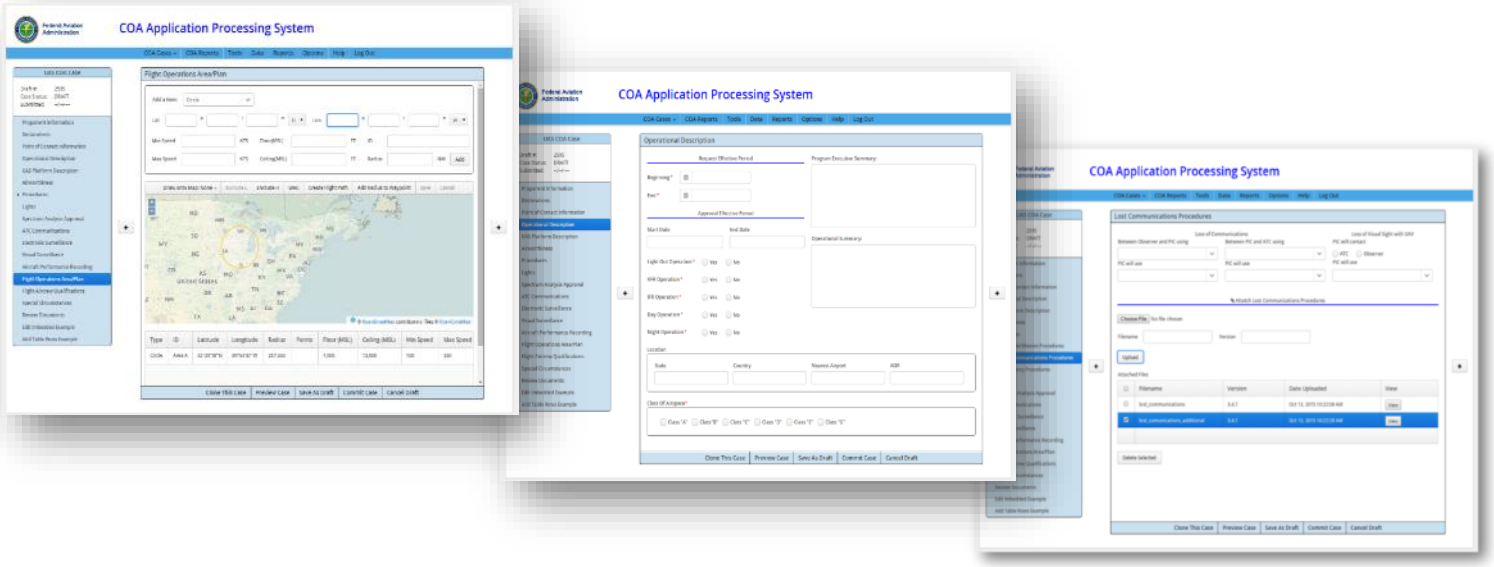
Part 107 vs Part 91

- Part 107 (Commercial COA)
  - Faster Process
  - Requires Remote Pilot Certificate
  - Waiver for
    - Night
    - BVLOS
    - Over People
    - >400’
    - Outside of Class G
- Part 91 (Public COA)
  - Longer Process
  - Night/BVLOS/People/400’/Controlled airspace can be pre-approved
  - Emergency COAs available once initial COA approved

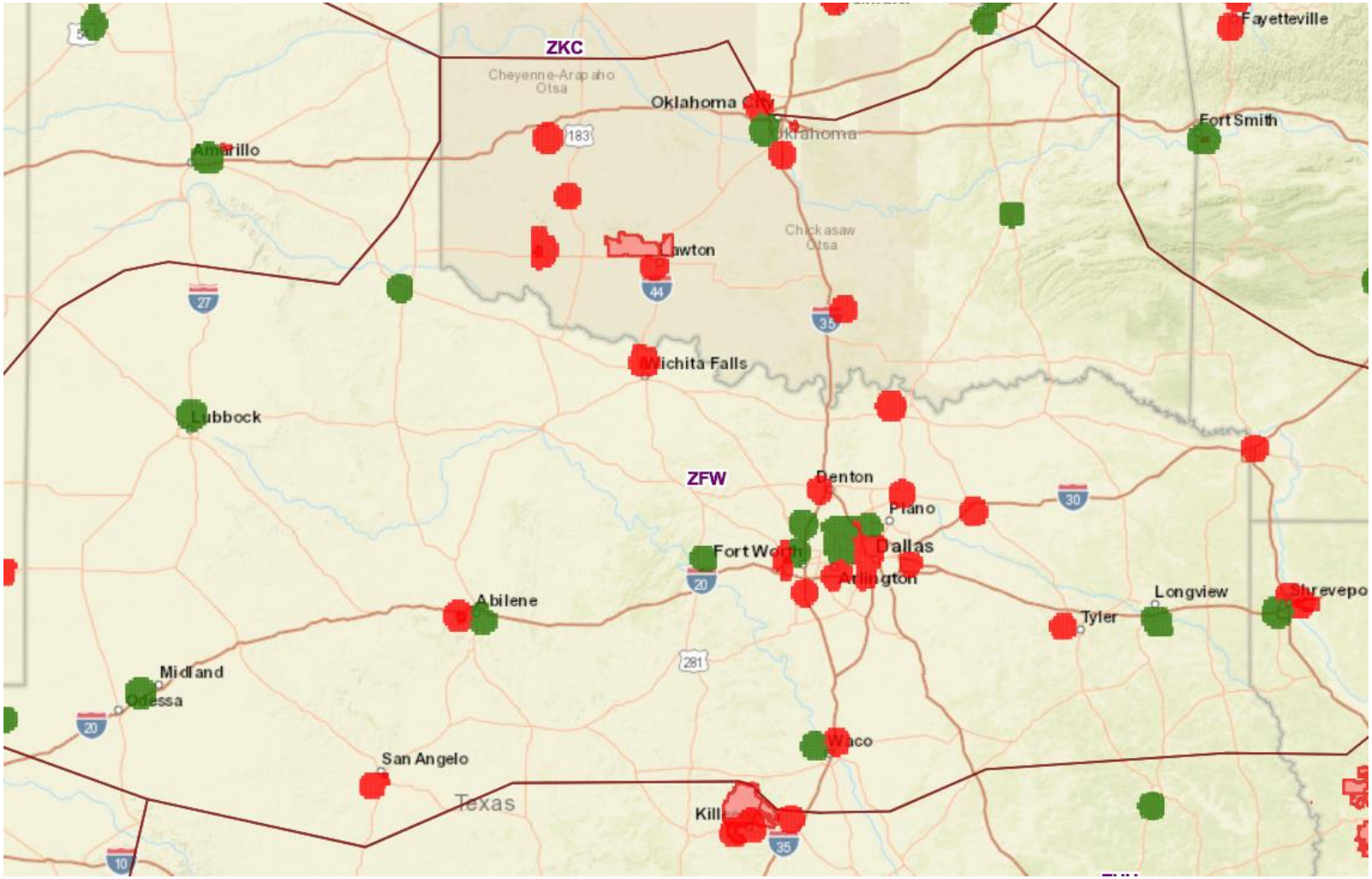
LAANC

DOD-CAPS: Overview

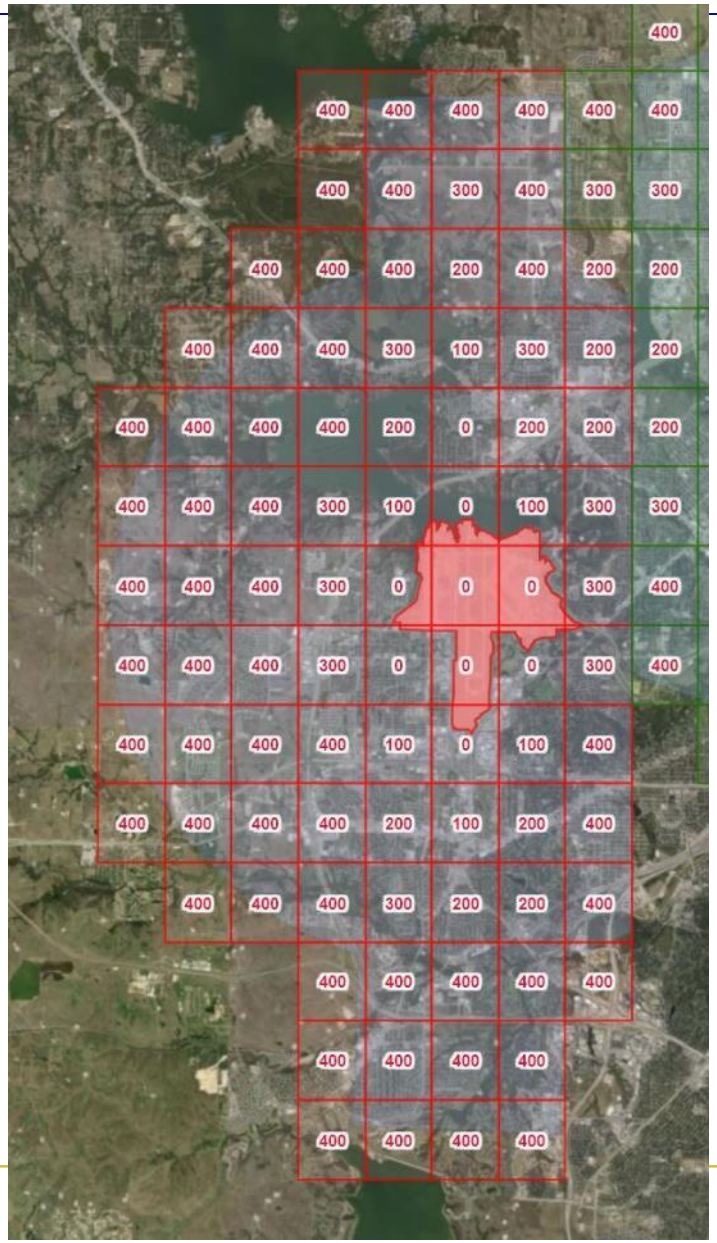
- COA Application Processing System (CAPS)
- DOD approval authority within DOD delegated airspace
- Single system for both DOD and FAA approved requests
- One system for users, reviewers, and approvers to learn
- COA data for all DOD operations available in one location
- CAPS/DroneZone integration late 2019/2020



UAS Facility Maps



NFW UAS Facility Map



Access & Authorization

Access

- Facility typically gives 2 times:
  - Initial: 48/24hr prior call to facility
  - Final: 30min prior to launch call to facility

Authorization

- **Commercial (Part 107): FAA via website**
  - Certificate of Authorization (COA)
- **DOD (Part 91): DON via NAVREPs**
  - Flight Authorizations

Security & Reporting

- **Special Security Instructions (SSI)**
  - Are not force fields and do not apply above 400 feet
  - Provides more formal, legal, and visible protection of National Security Sensitive / Department of Defense (DOD) facilities left vulnerable by increased unmanned air system (UAS) access to the National Airspace System (NAS)
  - SSI **do not prohibit organic operations** or authorized emergency & vetted operations approved by the facility
  - Sites are public and active on http://uas-faa.opendata.arcgis.com/
  - Modifications to existing sites and additional facility inputs ongoing within DoD
  - Corresponding published notice-to-airmen (**NOTAM**) provides specific details
- **Reporting unauthorized UAS to local authorities and FAA**
  - Mutually supports internal DoD / Service reporting and individual facility policies
  - Close relationships with local law enforcement, the Regional FAA Law Enforcement Assistance Program (LEAP), and Regional Operations Center (ROC)
    - Critical for rapid external response to determine point of origin, intent, threat trends, and to assist in the determination of criminality

NOTAM Content

- **FDC 7/7282..FDC SECURITY SPECIAL SECURITY INSTRUCTIONS** FOR UNMANNED AIRCRAFT SYSTEM (UAS) OPERATIONS FOR MULTIPLE LOCATIONS NATIONWIDE APRIL 14, 2017 APRIL 13, 2019 LOCAL.
- **PURSUANT TO 49 U.S.C. § 40103(B)(3),** THE FEDERAL AVIATION ADMINISTRATION (FAA) CLASSIFIES THE AIRSPACE DEFINED IN THIS NOTAM AS 'NATIONAL DEFENSE AIRSPACE'. OPERATORS WHO DO NOT COMPLY WITH THE FOLLOWING PROCEDURES MAY FACE THE FOLLOWING ENFORCEMENT ACTIONS:
- THE UNITED STATES GOVERNMENT MAY PURSUE CRIMINAL CHARGES, INCLUDING CHARGES UNDER **49 U.S.C. § 46307**.
- THE FAA MAY TAKE ADMINISTRATIVE ACTION, INCLUDING IMPOSING CIVIL PENALTIES AND THE REVOCATION OF FAA CERTIFICATES OR AUTHORIZATIONS TO OPERATE UNDER **TITLE 49 U.S.C. §§ 44709 AND 46301**.
- **PURSUANT TO 14 C.F.R. § 99.7, SPECIAL SECURITY INSTRUCTIONS (SSI), ALL UAS FLIGHT OPERATIONS, INCLUDING PUBLIC, CIVIL, AND MODEL AIRCRAFT, ARE PROHIBITED WITHIN THE AIRSPACE OVER SELECT NATIONAL SECURITY SENSITIVE FACILITIES, SURFACE TO 400 FEET AGL, EXCEPT AS PROVIDED FOR BELOW.** THE LIST OF SELECTED FACILITIES, DEFINITIONS OF THE ASSOCIATED AIRSPACE IN WHICH UAS OPERATIONS ARE PROHIBITED, DESIGNATED FACILITY CONTACTS, AND OTHER IMPORTANT INFORMATION ARE PROVIDED AT THE FOLLOWING FAA WEBSITE:
  - **HTTP://UAS.FAA.OPENDATA.ARCGIS.COM**

NOTAM Content

- UAS OPERATIONS ARE AUTHORIZED WITHIN THE DEFINED SSI AIRSPACE IF IN COMPLIANCE WITH THE REQUIREMENTS LISTED BELOW:
- THE UAS FLIGHT OPERATION HAS BEEN PRE-APPROVED BY THE DESIGNATED FACILITY CONTACT BASED ON CRITERIA ESTABLISHED BY THE SPONSORING FEDERAL AGENCY IN COORDINATION WITH THE FAA; OR
- IF THE UAS FLIGHT OPERATION IS CONDUCTED IN DIRECT SUPPORT OF AN ACTIVE NATIONAL DEFENSE, HOMELAND SECURITY, LAW ENFORCEMENT, FIREFIGHTING, SEARCH AND RESCUE, OR DISASTER RESPONSE MISSION, AND PRIOR NOTIFICATION HAS BEEN PROVIDED TO THE DESIGNATED FACILITY CONTACT; OR
- IF THE UAS FLIGHT OPERATION IS CONDUCTED IN DIRECT SUPPORT OF A SIGNIFICANT AND URGENT GOVERNMENTAL INTEREST AND IS APPROVED BY THE FAA'S SYSTEM OPERATIONS SUPPORT CENTER (SOSC) IN ADVANCE OF ENTERING THE DEFINED SSI AIRSPACE; AND
- THE UAS FLIGHT OPERATION COMPLIES WITH ALL OTHER APPLICABLE FEDERAL AVIATION REGULATIONS.

***Unauthorized photography and surveillance of sensitive areas of military installations or equipment violates federal law (18 USC 793-798).**

Unauthorized Reporting

Basic Law Enforcement Response D.R.O.N.E.

Direct attention outward and upward, attempt to locate and identify individuals operating the drone. (Look at windows/balconies/roof tops).

Report incident to the FAA Regional Operations Center (ROC). Follow-up assistance can be obtained through FAA Law Enforcement Assistance Program special agents.

Observe the UAS and maintain visibility of the device, look for damage or injured individuals. **Note:** Battery life is typically 20 to 30 minutes.

Notice features: Identify the type of device (fixed-wing/multi-rotor), its size, shape, color, payload (i.e., video equipment), and activity of device.

Execute appropriate police action: Maintain a safe environment for general public and first responders. Conduct a field interview and document ALL details of the event per the guidance provided by the FAA. www.faa.gov/uas/resources/law_enforcement/

Always follow agency policies *– Take appropriate action based on the facts and circumstances of the incident and site/area-specific laws and rules. The FAA's enforcement action does NOT impact ANY enforcement action/s taken by law enforcement.*

Local ordinances that may apply include, but are not limited to: *Reckless endangerment, criminal mischief, voyeurism, inciting violence.*

Unauthorized Reporting

FAA Drone Incident Reporting

Document and provide the following information to FAA:

- Identity of operators and witnesses (name, contact information)
- Type of operation (hobby, commercial, public/governmental)
- Type of device(s) and registration information (number/certificate)
- Event location and incident details (date, time, place)
- Evidence collection (photos, video, device confiscation)

Contact your FAA LEAP agent or an FAA Operations Center for assistance.

FACILITY	STATES	PHONE NUMBER	EMAIL
Western ROC	AK, AZ, CA, CO, HI, ID, MT, NV, OR, UT, WA and WY	425-227-1999	9-WSA-OPSCTR@faa.gov
Central ROC	AR, IA, IL, IN, KS, LA, MI, MN, MO, ND, NE, NM, OH, OK, SD, TX and WI	817-222-5006	9-CSA-ROC@faa.gov
East ROC	AL, CT, FL, GA, KY, MA, ME, MS, NC, NH, PR, RI, SC, TN, VI and VT	404-305-5180	9-ESA-ROC@faa.gov
East ROC	DC, DE, MD, NJ, NY, PA, VA and WV	404-305-5150	9-ESA-ROC@faa.gov

Questions?

CDR Pete “Lang” Morgan
FAA Central Service Area NAVREP

817-222-5931

peter.morgan@faa.gov

UAS SAFETY AND INTEGRATION TASK FORCE

WORKING GROUPS

WORKING GROUPS

Education and Public Awareness 

Legislation 

Training 

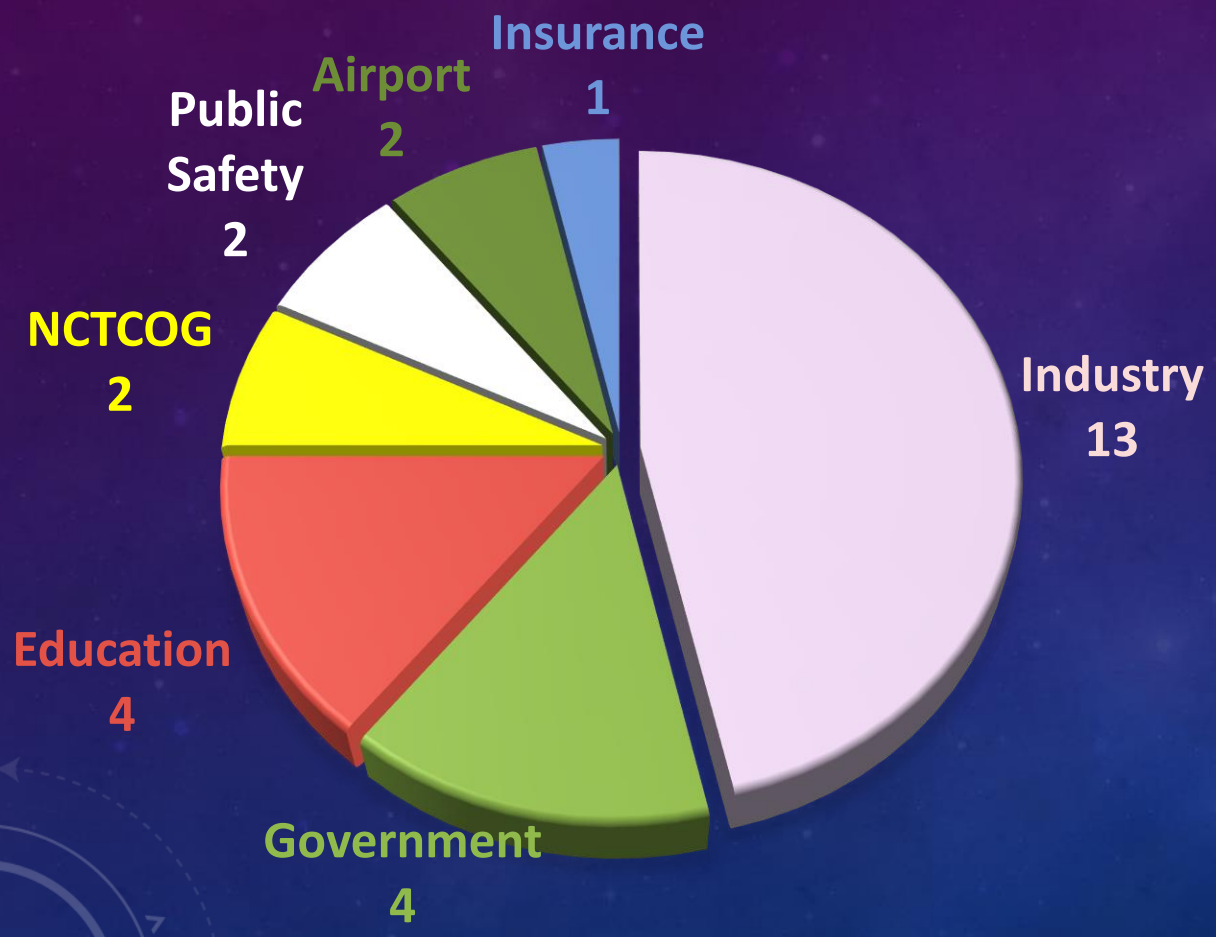
Integration 

Each Working Group is tasked with the following:

1. Identifying Issues
2. Provide Recommendations
3. Who on the Task Force can act on solution?
4. Is the Solution Scalable?
5. How could the solution be funded?
6. Determine Working Group Leaders
7. Report all findings to Task Force

EDUCATION AND PUBLIC AWARENESS

WORKING GROUP MEMBERS - 28



Top 3 Issues

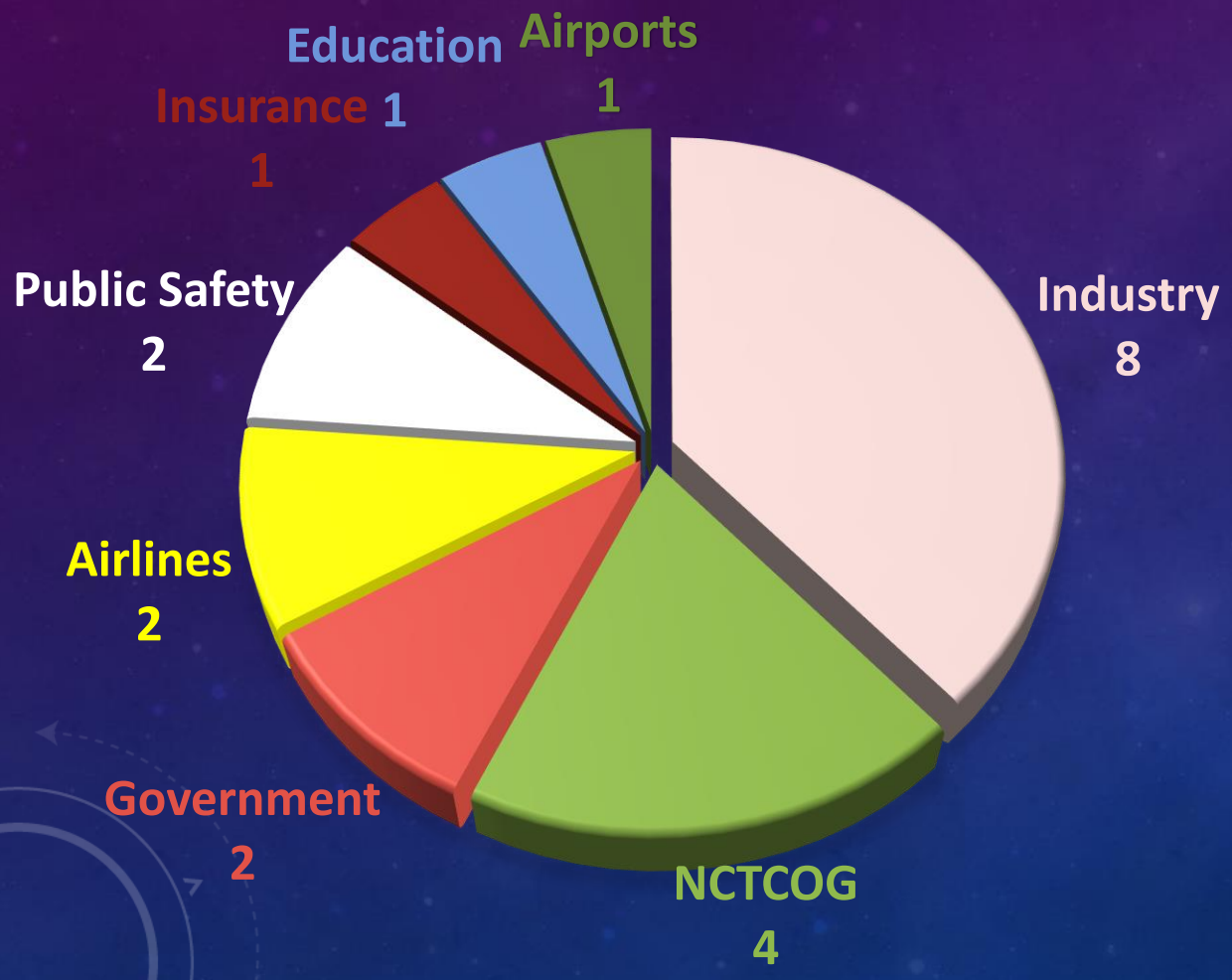
- Lack of Pubic Outreach
- Getting UAS into schools
- Lack of Designated flying areas

Solutions

- Create Public Outreach Strategy
- UAS Industry Outreach at Career/youth events, youth interest groups/teams
- Bring your drone to the park day at various locations regionally

LEGISLATION

WORKING GROUP MEMBERS - 21



Top 3 Issues

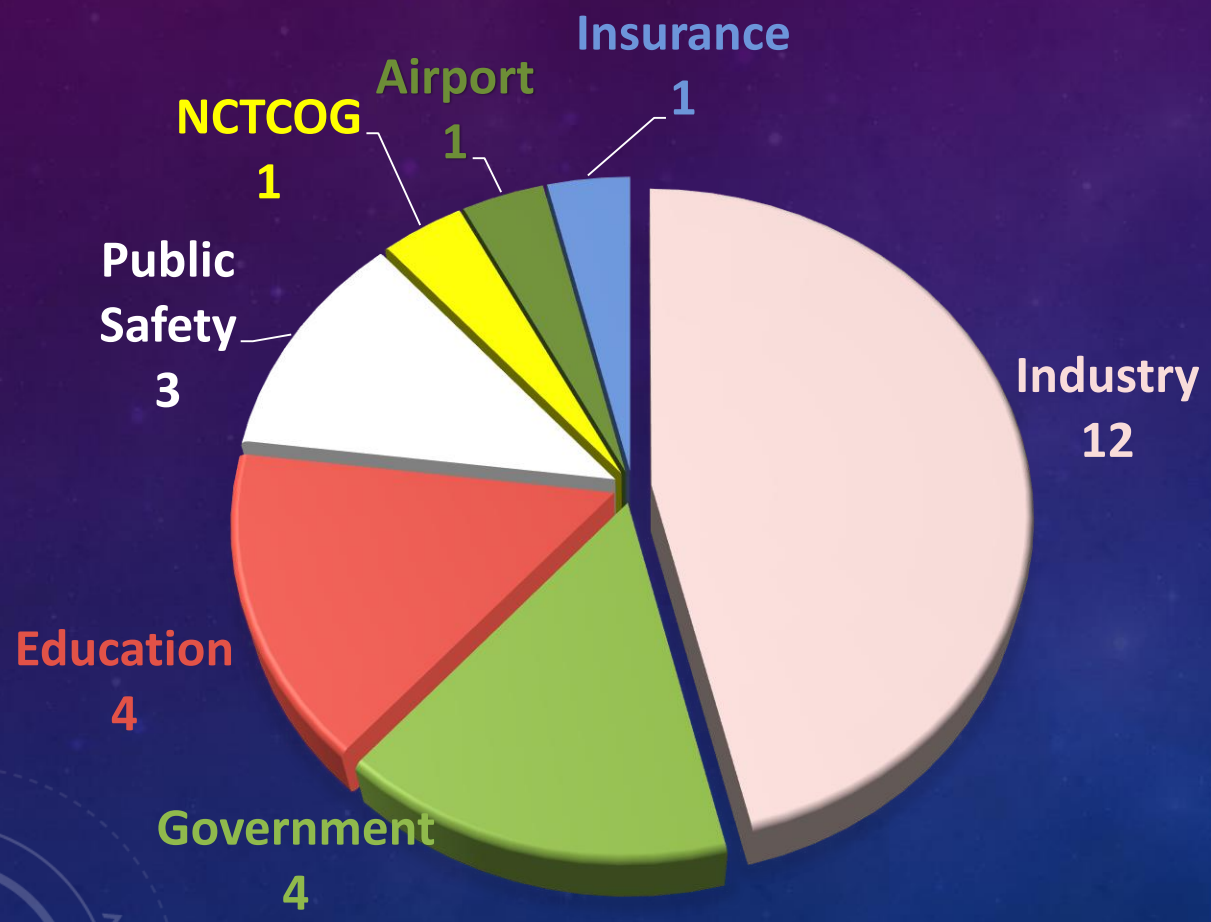
- UAS Law education for state legislators
- Education of law enforcement members
- Industry Weigh in on proposed law

Possible Solutions

- General informational session
- Utilize FAA's document to create a platform to educate law enforcement
- Provide comments, letter of support and letters of non support for proposed State and Federal Laws

TRAINING

WORKING GROUP MEMBERS - 26



Top 3 Issues

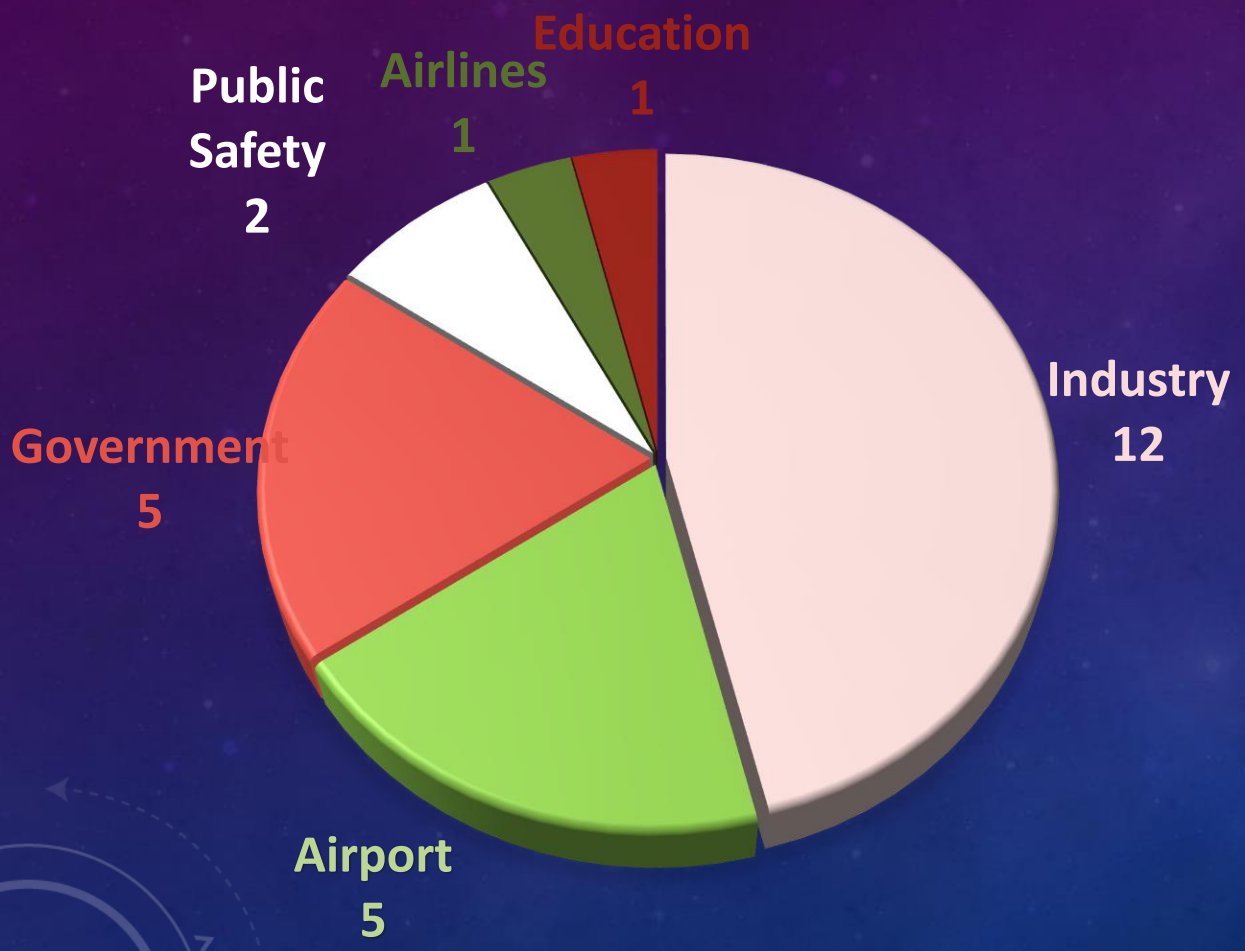
- Lack of baseline training curriculum
- Credentialing without flight demonstration
- Getting job titles/categories assigned appropriately

Possible Solutions

- Establish baseline curriculum
- TOP Model, create standard curriculum to submit to FAA
- Survey companies in region on current needs

INTEGRATION

WORKING GROUP MEMBERS - 26



Top 3 Issues

- Lack of special rules/regs for aircraft certification & airworthiness
- Lack of test sites/ranges
- Operation of Small Unmanned Aircraft Systems over People

Solutions

- Endorse an airworthiness/certification standard
- Designate test areas, emulate other test sites' modeling
- Provide comments for the NPRM for Operation of Small Unmanned Aircraft Systems over People

WORKING GROUP LEADERS

Education and Public Awareness
Maggie Schuster,
Your Aerial View

Legislation
Michael Hill,
Cumulus Imaging

Training
Wes Jurey,
UAS Werx

Integration
Russell Julian,
RMS Aerospace

NEXT STEPS

Working Group Meetings – February 27th

i. Education and Public Awareness, 9:00 am – 10:00 am
ii. Legislation, 10:30 am – 11:30 pm
iii. Training, 1:00 pm – 2:00 pm
iv. Integration, 2:30 pm – 3:30 pm

QUESTIONS?

Ernest Huffman

Principal Transportation Planner

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UAS Safety and Integration Task Force: Legislative Update

REBEKAH HERNANDEZ

NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS

FEBRUARY 18, 2019

Operation of Small UAS Over People

FAA, USDOT Notice of Proposed Rulemaking

- Proposes allowing for operation of small UAS over people at night without obtaining a waiver.
- Proposes requiring operator to present their Remote Pilot in Command certificate and identification upon request.
- Proposes amending the knowledge testing requirements to require training every 24 months.
- Would allow expanded small UAS operations and reduce knowledge testing burden.

Comments due April 15, 2019

https://www.govinfo.gov/content/pkg/FR-2019-02-13/pdf/2019-00732.pdf

Safe and Secure Operations of Small UAS

FAA Advanced Notice of Proposed Rulemaking

- FAA considering additional rulemaking in response to public and national security concerns.
- FAA is seeking public comment on:
  - Should FAA require stand-off distances, additional operating & performance restrictions, the use of UAS Traffic Management, additional payload restrictions?
  - Should FAA prescribe design requirements?
  - Should UAS be equipped with critical safety systems?

Comments due April 15, 2019

https://www.govinfo.gov/content/pkg/FR-2019-02-13/pdf/2019-00758.pdf

Unmanned Aircraft System Legislation

86th Texas Legislature

SB 59 (Zaffirini) Relating to certain images captured by an unmanned aircraft.

- Bill would allow an image to be captured for the purpose of delivering packages, including for the purpose of navigation or ensuring public safety.
  - Referred to Senate Business and Commerce

Other Upcoming Committees of Interest:

- House Defense and Veteran's Affairs; Feb. 19 at 2 pm
- Senate Veteran Affairs and Border Security; Feb. 20 at 1:30 pm

(UAS Military Encroachment)

Questions

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Kyle Roy
Communications Coordinator
(817) 704-5610
kroy@nctcog.org

https://www.nctcog.org/legislative