UAS Safety and Integration Initiative

FAA UAS Symposium and NASA TCL4
Open for Business (2018)

- Lack of Sufficient Regulation
- Case by Case basis

Getting Down Business (2019)

- 2018 FAA Reauthorization Act
- Integration Pilot Program
- Google Wings BVLOS package delivery
- NPRM flight over people
- ParaZero’s Nationwide flight over people waiver
Important Announcements

• Drone Safety Awareness Week in November
• New UAS Related Contract Opportunity

Missing Topics

• Rulemaking on UAS – specific air carrier operations
• Section 2209
• Remote ID NPRM
FAA Broad Agency Announcement (BAA)

- Show partnership with commercial companies
- That are willing to match a $6 million FAA commitment
- to conduct additional UAS integration work
- at the seven UAS test sites across the country
Inner City UAS Testing

• drone communication,
• collision avoidance,
• safe landing,
• services that support UAS operations,
• and safety in an urban landscape

Hotel Information

• Omni Corpus Christi Hotel
  900 N. Shoreline Blvd.
  Corpus Christi, TX 78401

• 1-800-843-6664 (Omni Central Reservations #)
• Ernest Huffman has the discount code

UAS Safety and Integration Task Force
NASA TCL4 Testing Visit
Corpus Christi – August 13th 9:00am to 12:00pm
UAS Legislative Update

NICK ALLEN
UAS SAFETY AND INTEGRATION TASKFORCE
NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS
JUNE 25, 2019
Bills of Interest - Unmanned Aircraft

Dead by procedural action

SB 59 (Zaffirini) - Commercial delivery purposes (5/17/19)

HB 2512 (Miller) - Assessing unsafe environmental conditions (4/26/19)

HB 2912 (Zerwas) - Disaster preparation (5/9/19)

HB 3164 (Clardy) / SB 2034 (Hall) - 911 services or mapping project (4/8/19)
Bills of Interest - Unmanned Aircraft

Dead by procedural action

SB 1701 (Whitmire) / HB 4084 (Walle) - Restricts flight over schools (4/8/19)

HB 3494 (Cole) - Restricts flight over commercial airports, adds to current critical infrastructure in code; restricts cities and counties from enforcing UAS ordinances (4/25/19)

HB 4448 (Springer) - Allows images to be used for commercial purposes under FAA guidelines (5/8/19)
Bills of Interest - Unmanned Aircraft

**Vetoed by Governor**

- **HB 3082 (Murphy)** - Strengthens penalties for flying above critical infrastructure (6/15/19)
- **SB 2299 (Powell)** - Restricts flight over military installations, adds to current critical infrastructure in code (6/15/19)
  (SB 2299 amended into HB 3082)

**Passed**

- **HB 2340 (Dominguez)** - Creates a study for emergency and disaster management, response, and recovery
  Signed (5/29/19)
Questions and Comments

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Key Messages

• Weather can have significant impacts on future drone and air taxi applications.

North Texas has its share of bad weather.

• Nationally, weather observation, forecasting and alerting infrastructure is inadequate to meet the needs of this industry.

 North Texas is uniquely positioned to be a test bed for demonstrating key weather avoidance infrastructure and technology.

• We need to continue to invest in weather avoidance technology and work towards generating a Common Operating Picture of weather hazards.
Impacts on Air Taxi services

Infrastructure: What weather-related considerations should be made while deciding locations, designs and operations of skyports/mobility hubs?

Hail
P/C Fox4 News

Winds
P/C Fox4 News

Flooding
P/C Dallas Morning News
Impacts on Air Taxi services

**Routes:** How should air taxis operate during weather days? What should diversions look like?

**Business models:** How would weather impact projected operations, fares, profitability?

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**Hail**  
P/C Fox4 News

**Winds**  
P/C Fox4 News

**Flooding**  
P/C Dallas Morning News
Drone operations even more susceptible to weather!

“NASA’s First-of-Kind Tests Look to Manage Drones in Cities”, NBC DFW, May 2019

BNSF’s BVLOS operations, *Progressive Railroading*, April 2019

Bell NASA SIO Demonstration in Fort Worth, 2020

How do we provide UAS operators the weather information they need?
<table>
<thead>
<tr>
<th>WEATHER HAZARD</th>
<th>IMPACT ON UAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud base &lt; 900 ft</td>
<td>Part 107 regulation, VLOS impacts</td>
</tr>
<tr>
<td>Distance to cloud edge &lt; 2000 ft</td>
<td></td>
</tr>
<tr>
<td>Visibility &lt; 3 mile</td>
<td>Part 107 regulation, VLOS impacts</td>
</tr>
<tr>
<td>Fog, clouds and precipitation</td>
<td>Airframe load, short-circuiting of electronics, VLOS impacts</td>
</tr>
<tr>
<td>Icing</td>
<td>Critical performance and safety issue, loss of aircraft</td>
</tr>
<tr>
<td>Lightning</td>
<td>Dropped communication due to radio frequency interference</td>
</tr>
<tr>
<td>Wind/wind shear</td>
<td>Loss of control, inability to return home, mission failure</td>
</tr>
<tr>
<td>Moderate or greater turbulence</td>
<td>Reduced mission duration, loss of control possible</td>
</tr>
</tbody>
</table>

CASA records show ~140 days of rain across the DFW Metroplex (2018)

https://www.weather-us.com/en/texas-usa/dallas-climate#rainfall_days
Existing radars not optimized for low-altitude operations

72% of atmosphere <10,000 ft goes undersampled
Aviation weather observations optimized for airports...

But drones and air taxis will have operations all over the place (hospitals, garages, skyports)!
Optimizing node locations based on Noise considerations (Uber)

Source: “Driving eVTOL community acceptance”, Project Symphony, Uber Elevate Summit, Washington DC, June 2019
Optimizing routes based on Noise considerations (Uber)

Source: “Driving eVTOL community acceptance”, Project Symphony, Uber Elevate Summit, Washington DC, June 2019
Public-private partnership with North Central Texas cities, National Weather Service to improve severe weather preparedness and response

- CASA Engineering Research Center (universities, industry, government agencies)

- Partnering with NCTCOG, NWS, DFW Airport, Bell

- Deep rooted community connections (1000 EMs across 50 cities in N. Texas)

- Operate weather observation infrastructure, provide weather alerting services.

- Study user decision making and public response

- Develop operations and business models
Unique 7-node X-band radar network in North Texas
Low-altitude coverage across the Metroplex
CASA data being used by NWS for tornado warning

NWS used CASA data to spot ‘very strong low level rotation’ east of Eagle Mountain Lake and issue a tornado warning.
May 29, 2019

NWS used CASA data to track rotation, with street level precision, as it headed towards Alliance and DFW International Airport.
Pinpointing developing wind threats, minute-by-minute

High resolution radar velocity images help pinpoint high wind threats to airport tenants. **Case Study:** March 8, 2016. Strong winds caused the roof of one hangar to be blown off and another one to get damaged, north end of Meacham International Airport. CASA provided archived radar velocity data to pinpoint location of strongest winds within the storm.
Identifying location of hail within the storm

Hail product helps airport operations personnel prepare for impact. Case Study: March 17, 2016. Hail storm damage reported widely across the Metroplex. Airport Duty Manager continuously monitored the CASA hail product during the entire event and was able 'to alleviate the fear that the airport itself was going to be impacted by the hail'.
Identifying pockets of heavy rain within storm events

Knowing where the rain is the heaviest can help support flight operations, including divers, without having to land vehicles.
Alerts delivered on mobile app or via email/text messages

Users can decide what they want to be warned about, when and over what locations.
Last 30 days:
250000+ alerts processed
6 tornado warnings
25 severe weather
35000+ alerts sent out

Last year:
1.2 million incoming alerts
Features of CASA’s Weather Avoidance Software

• **Platform technology**
  - Large number of vehicles
  - Customized to individual vehicle performance characteristics
  - Customized to mission risk criteria

• Novel sources of **low-altitude** weather

• **Targeted**, route-specific weather alerts

• **Automated** weather guidance for integration into command and control systems

→ Builds on our existing **City Warn™** Hazard Notification System technology for motorists and emergency managers.
Action Items for the Task Force

- Gather weather requirements for air taxis and drones
- Create Inventory of local weather observation and forecasting assets
- Conduct regional weather Gap Analysis
- Develop strategy for creating a Common Operating Picture
- Plan for future Autonomous Operations

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UPCOMING SCHEDULE

• July 3rd – Working Group Meetings, Conference Call with Leaders – Conference Call, 888-909-7654, Participant PIN: 504571

• NCTCOG’s first floor will be going through construction from July 15th to September 30th. Because of this we have had to make some changes to the schedule
  • July 23rd, UAS Safety and Integration Task Force meeting – Building 3 Tejas Room
  • July 31st, UAS and Safety and Integration Task Force Working Group meeting – Conference Call, 888-909-7654, Participant PIN: 504571

• August 13th 9:00 AM to 12:00 PM, UAS Safety and Integration Task Force Day in Corpus Christi for the NASA TCL4 event ran by Lone Star UAS Center of Excellence & Innovation. (more details to follow)

• August 27th, UAS Safety and Integration Task Force meeting – Cancelled

• September 3rd, UAS and Safety and Integration Task Force Working Group meeting – Cancelled