

Small Unmanned Aircraft System Operational Trends: A Multi-Year Detection Study in Controlled Airspace

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Problem

- Limited access to empirical data showing *direct evidence* of the status of sUAS operations in the NAS



Objectives

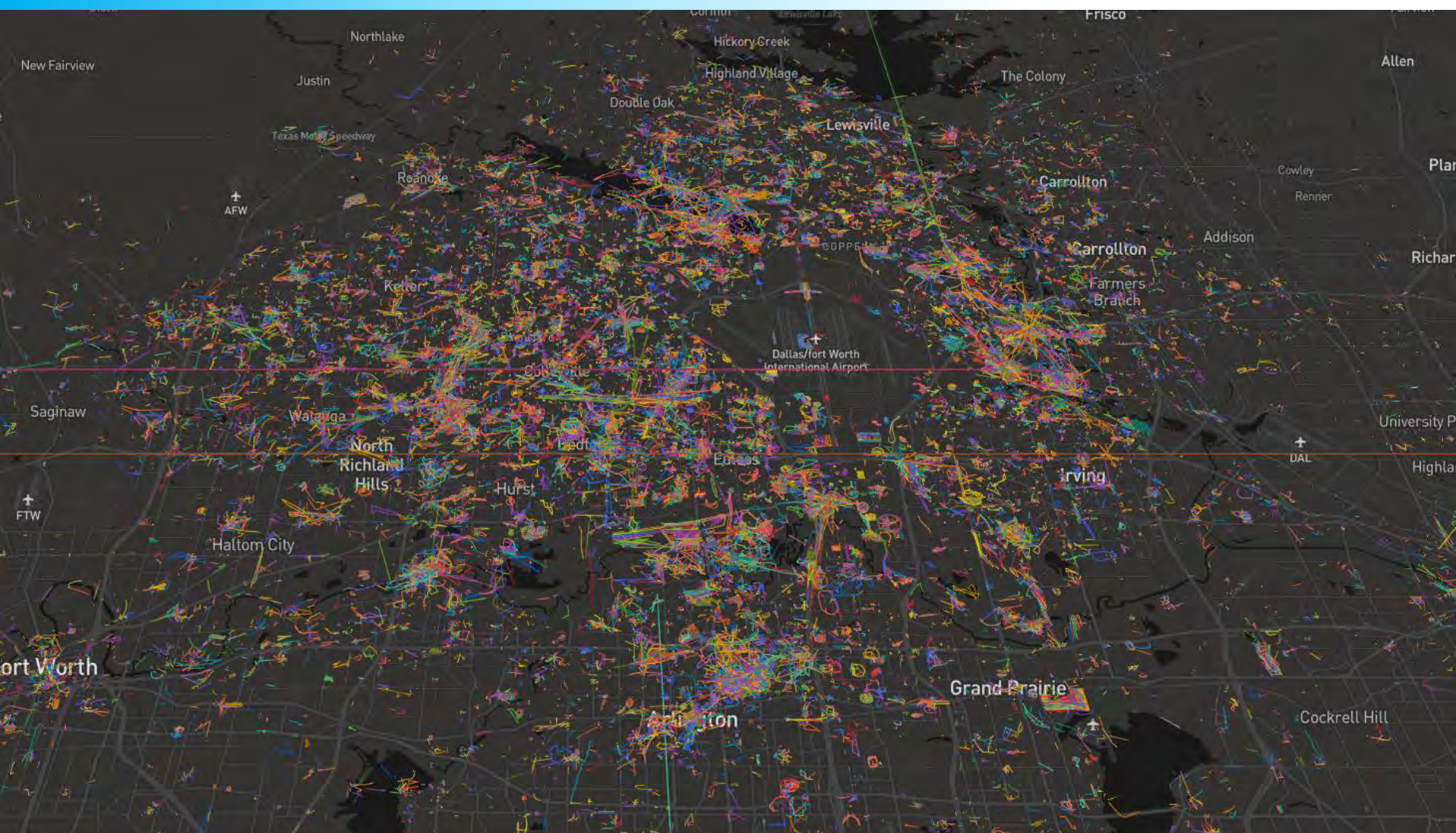
- **Leverage UAS Detection Tech**
 - Secure historical UAS detection data at a Top 10 (U.S.) airport to establish baseline, growth data
 - Collect long-term data to understand sUAS airspace use and operational conditions
- **Integrate Aircraft Traffic Data**
 - Traffic Flow Management System (TFMS)
 - Evaluate UAS encounters / UAS sighting report efficacy
- **Risk-Centric Data Evaluation**
 - Assess Operator Compliance

Methodology

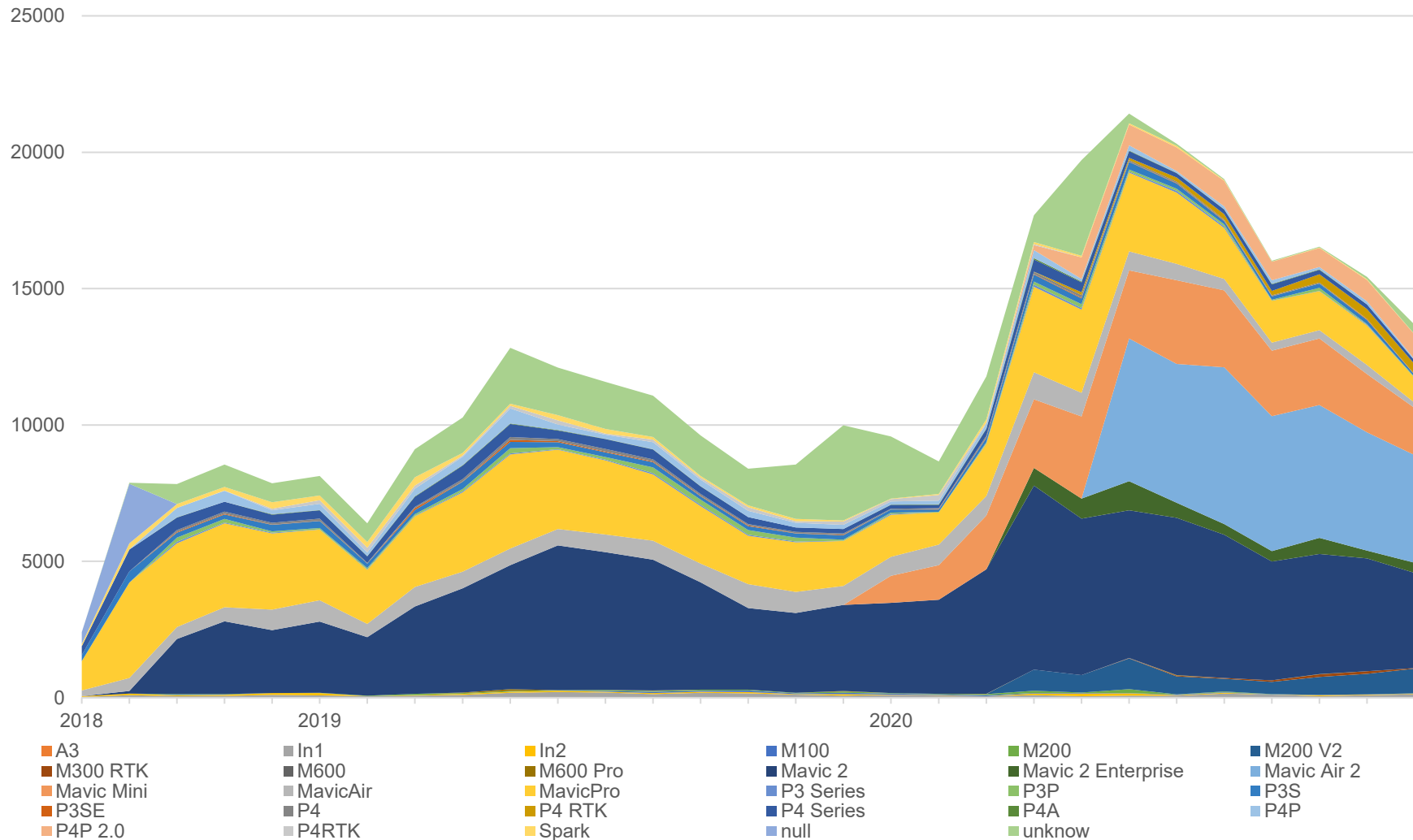
- **Instrument**
 - DJI Aeroscope G-16
- **Sample Period**
 - Aug 2018-Dec 2020 (29 months)
- **Sample Location**
 - Dallas-Fort Worth International Airport (DFW)
- **Sample Size**
 - 21,857 platforms
 - 342,410 operations
 - 125,298 Activations
 - 217,111 flights



UAS Telemetry (Jan 2019-Dec 2019)

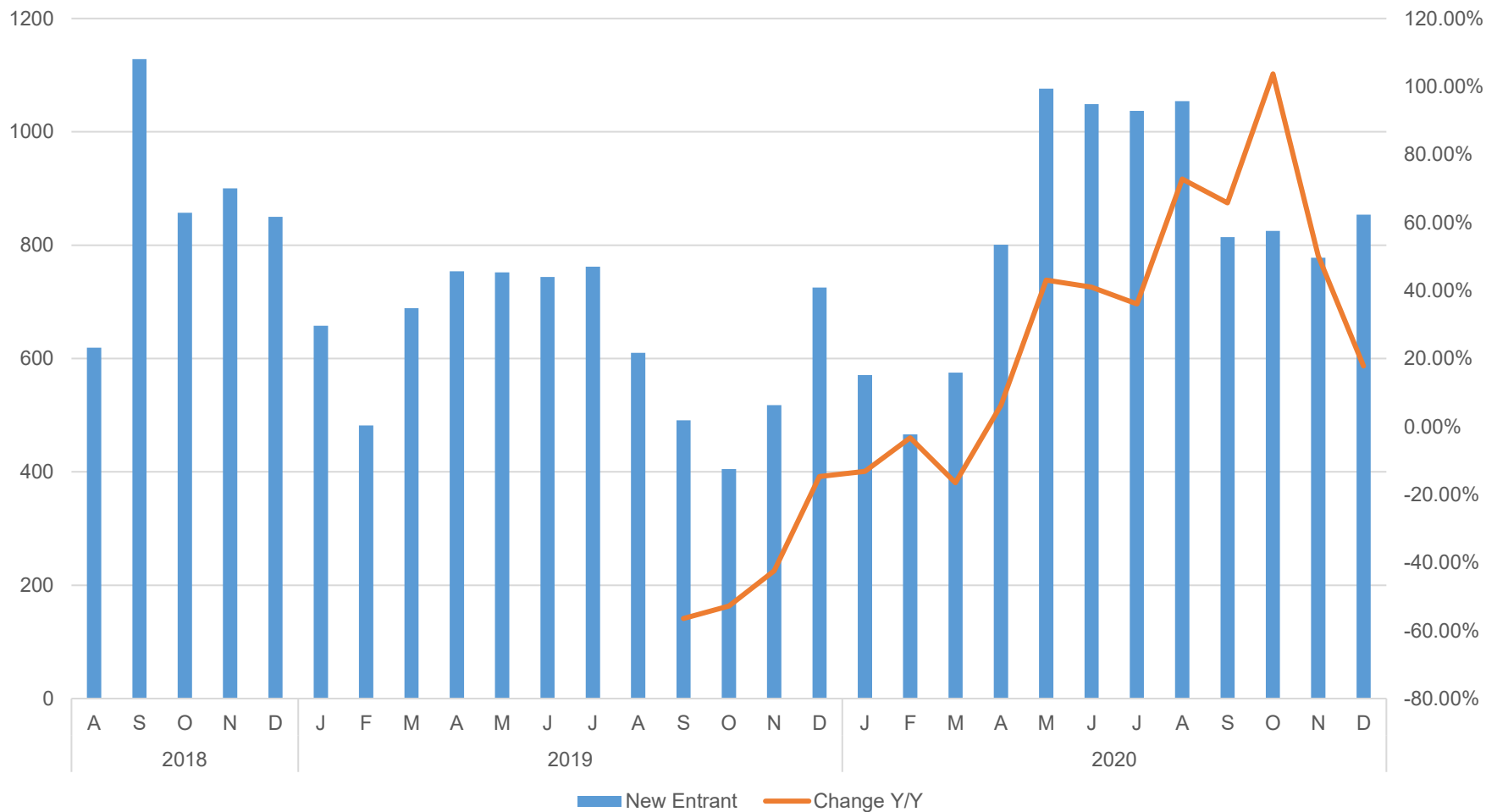


Industry Growth



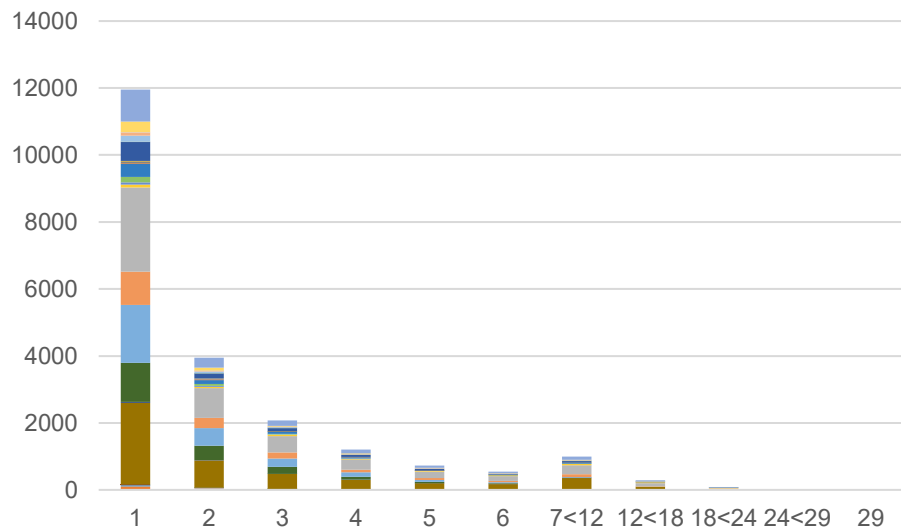
Industry Growth (~59.4% YoY)

New NAS Entrants by Unique UAS SN (DFW, Aug 2018-Dec 2020)

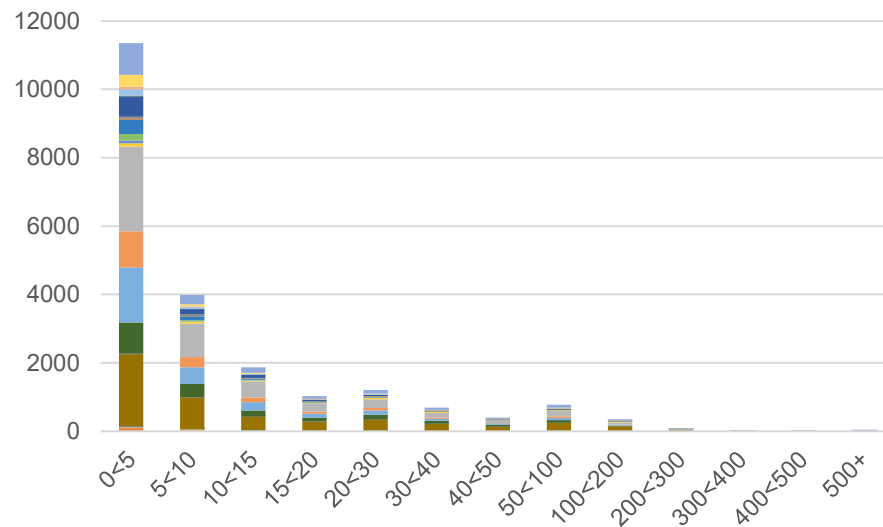


Frequency of Platform Use

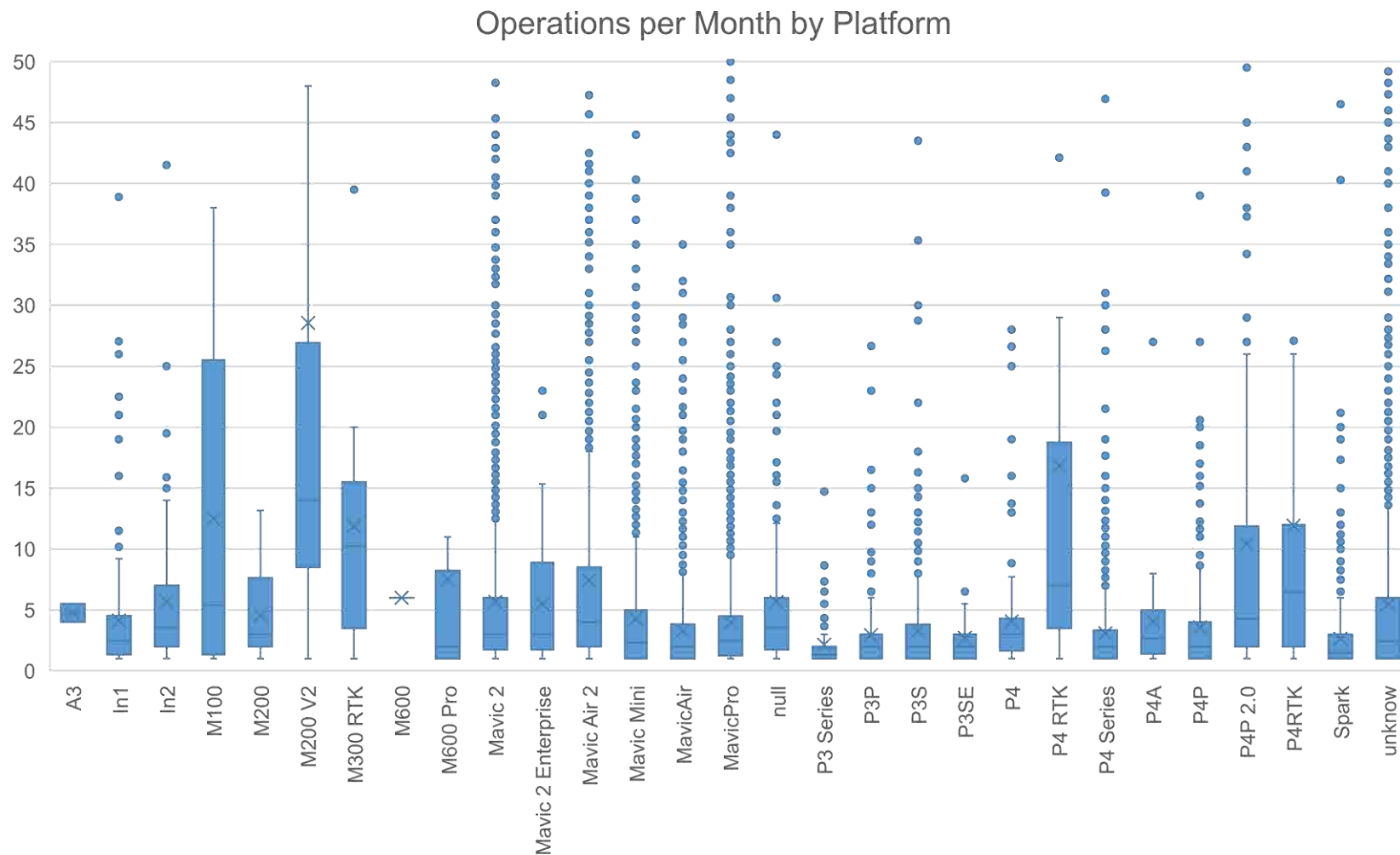
Months of UAS Activity by Platform



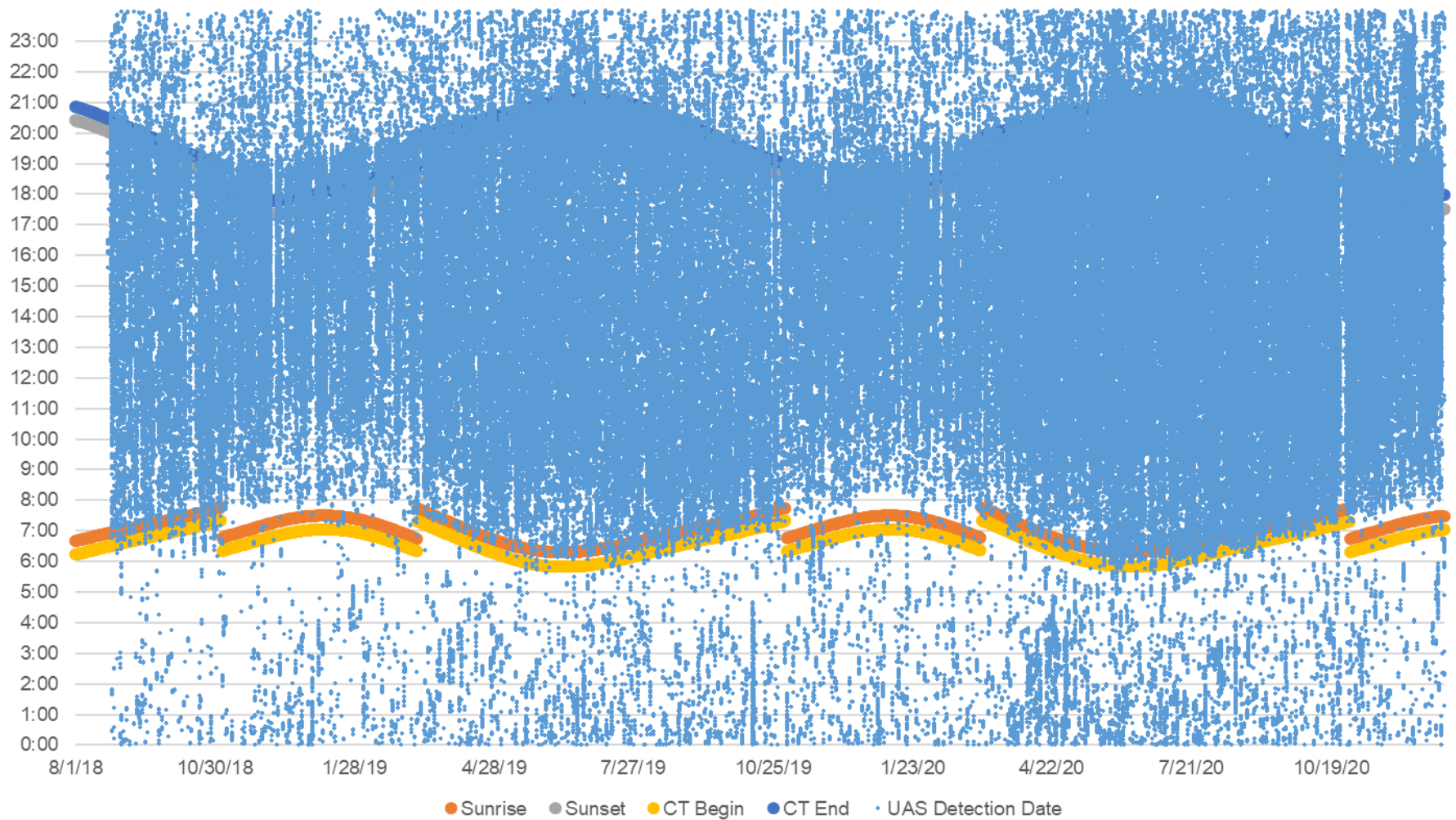
Flight Operations by Platform Type



Frequency of Platform Use

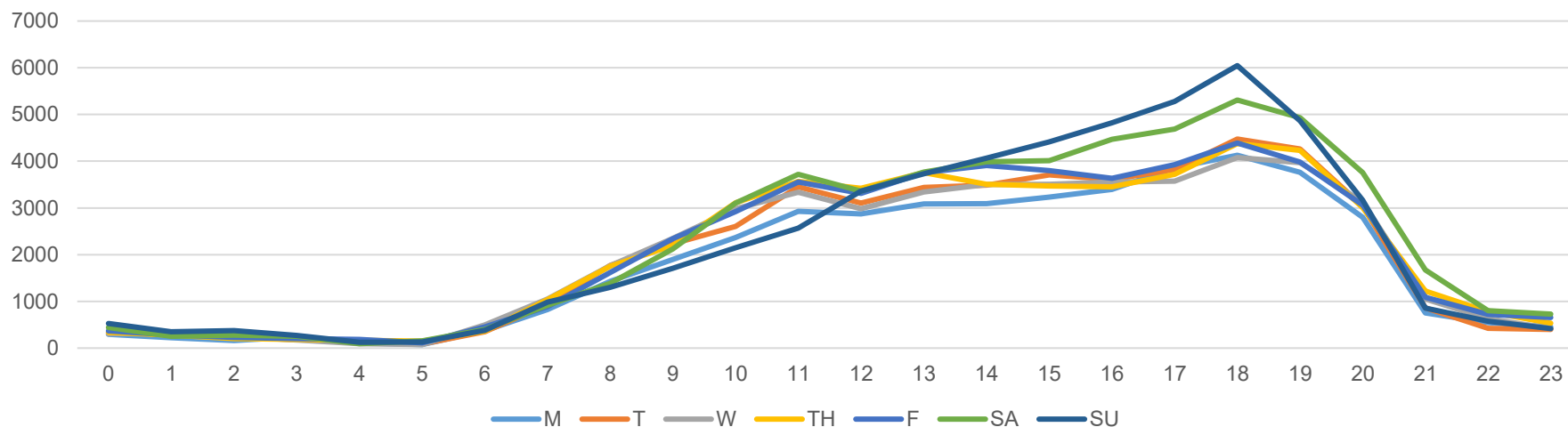


UAS Detections by Date & Time

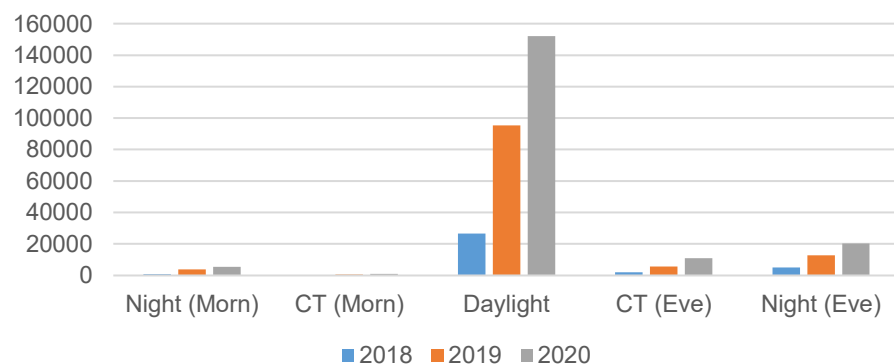


UAS Detections by Day & Time

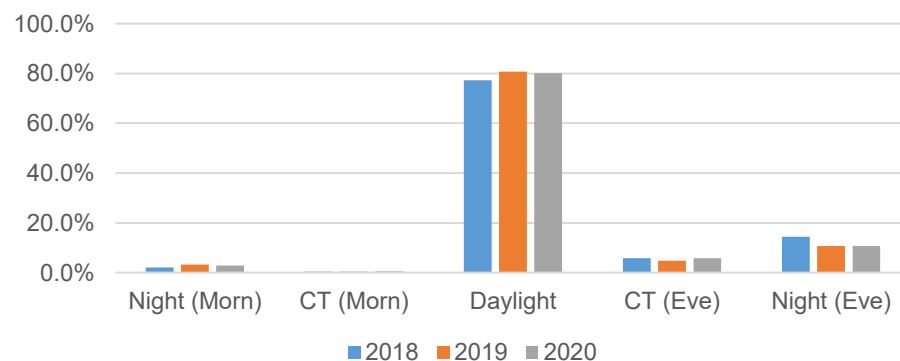
Historgram of Flight Activity by Day and Hour



Operations by Daylight Category (Cumulative)

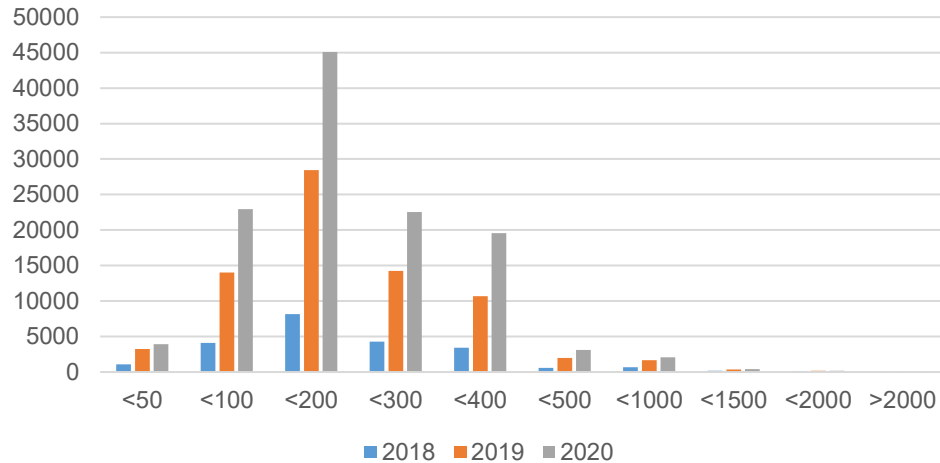


Operations by Daylight Category (Proportional)

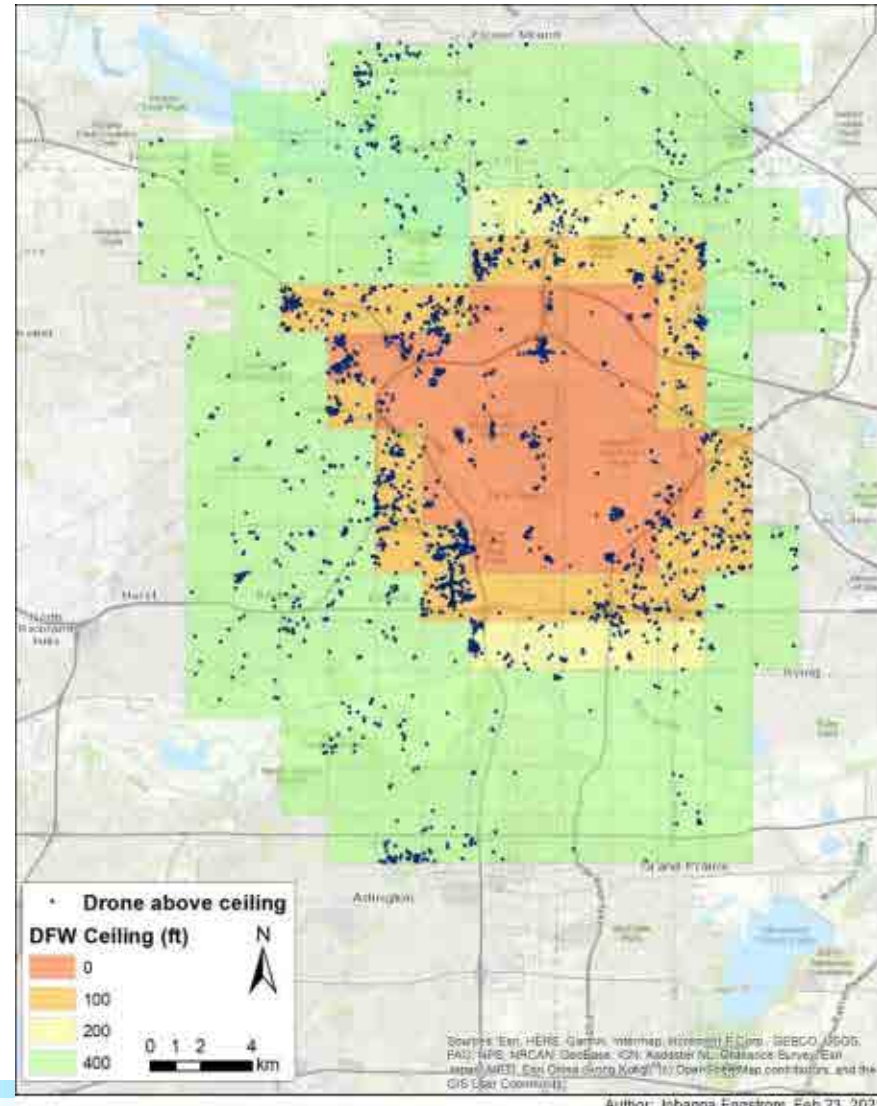
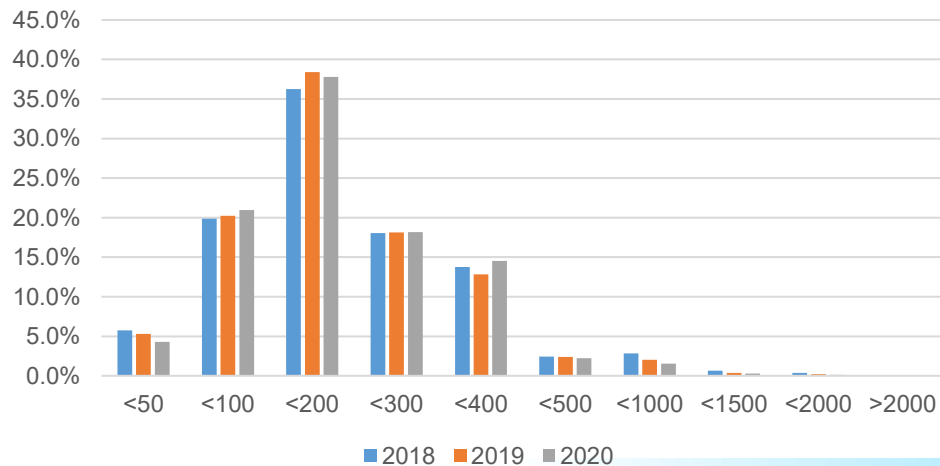


Airspace Utilization

Airspace Utilization (Cumulative)



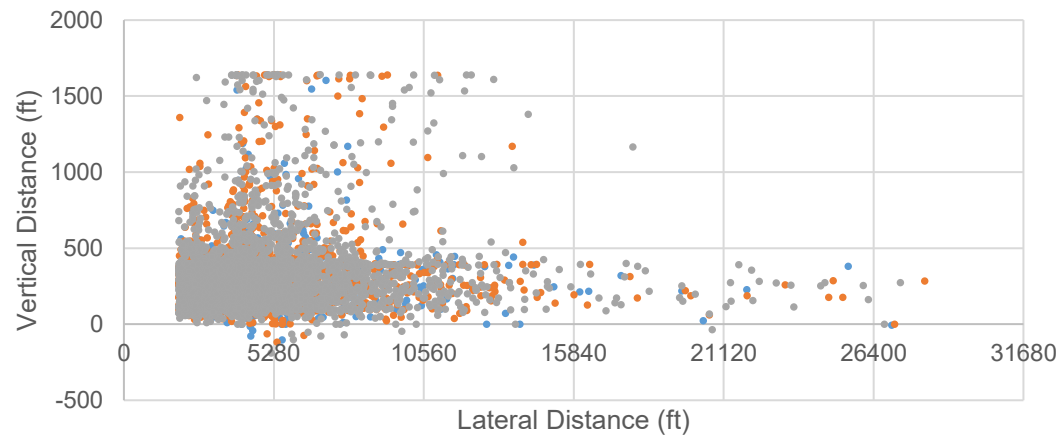
Airspace Utilization (Proportional)



Beyond Visual Line of Sight (BVLOS)

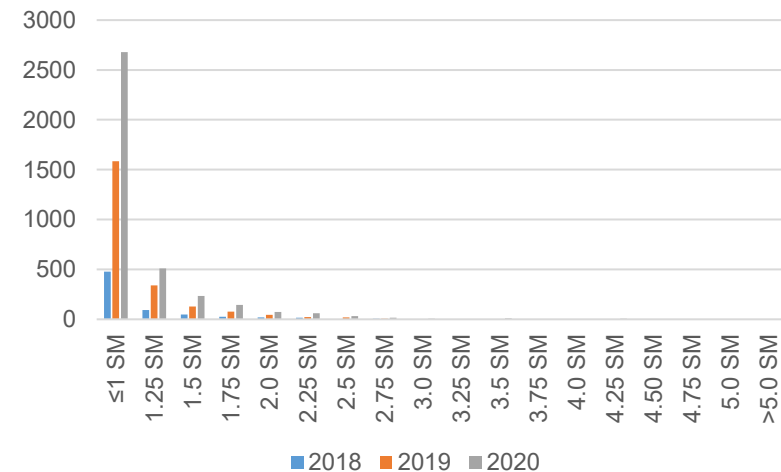


UAS Activity BVLOS by Distance & Altitude

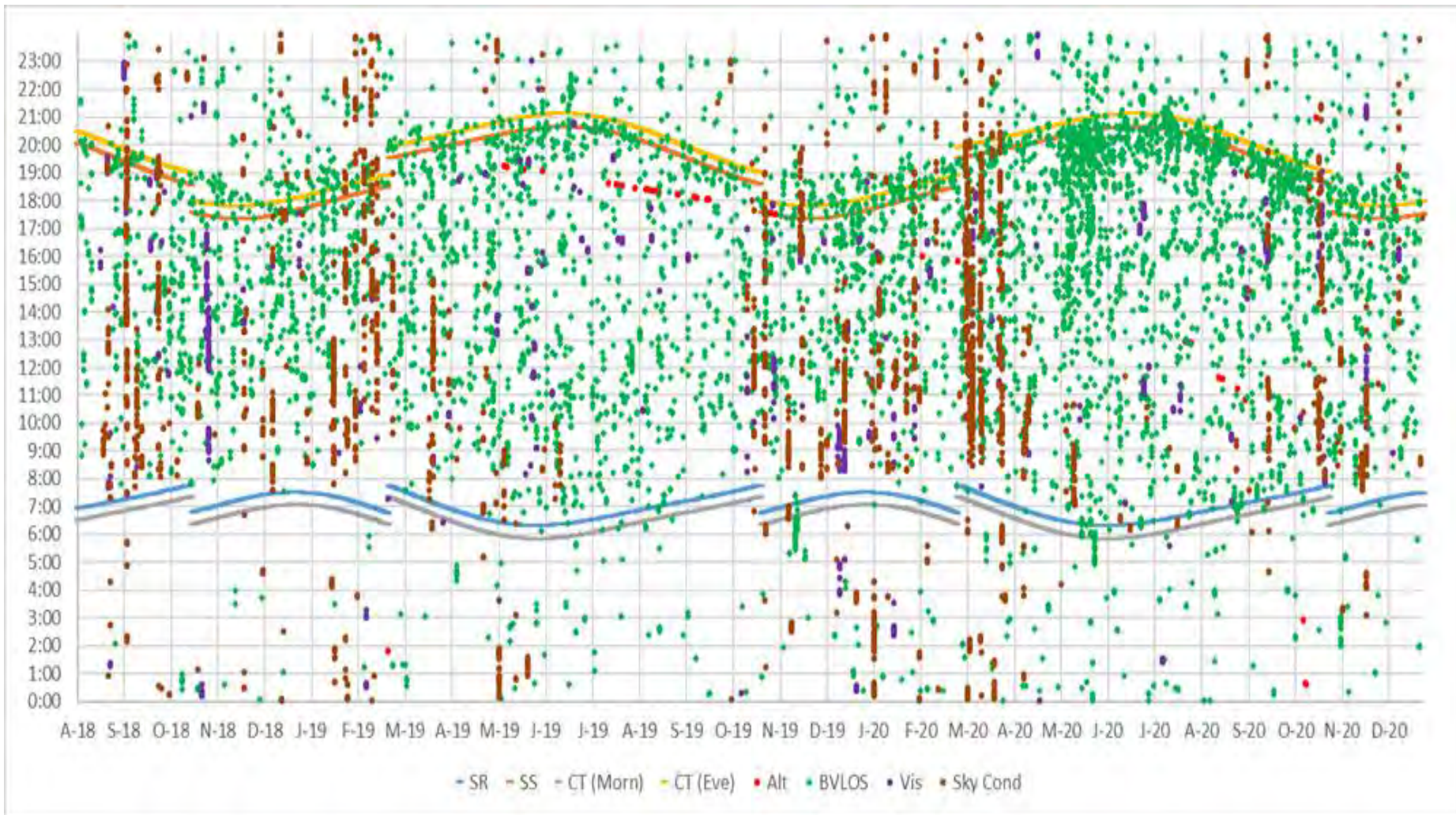


• 2018 • 2019 • 2020

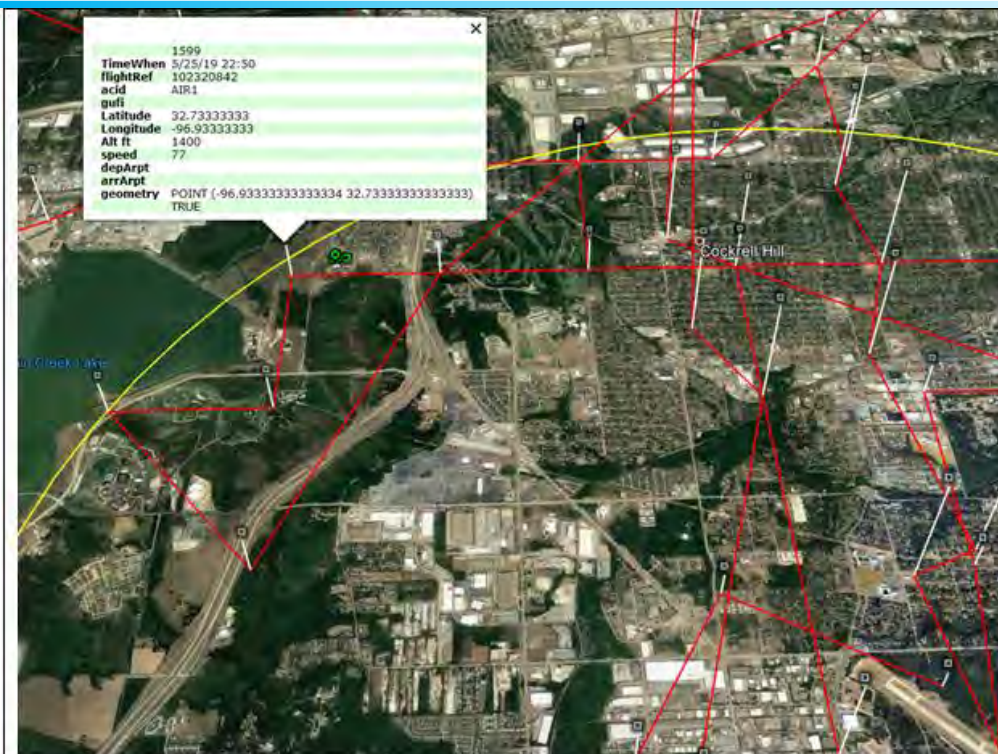
sUAS BVLOS (Cumulative)



Measuring Exceedances



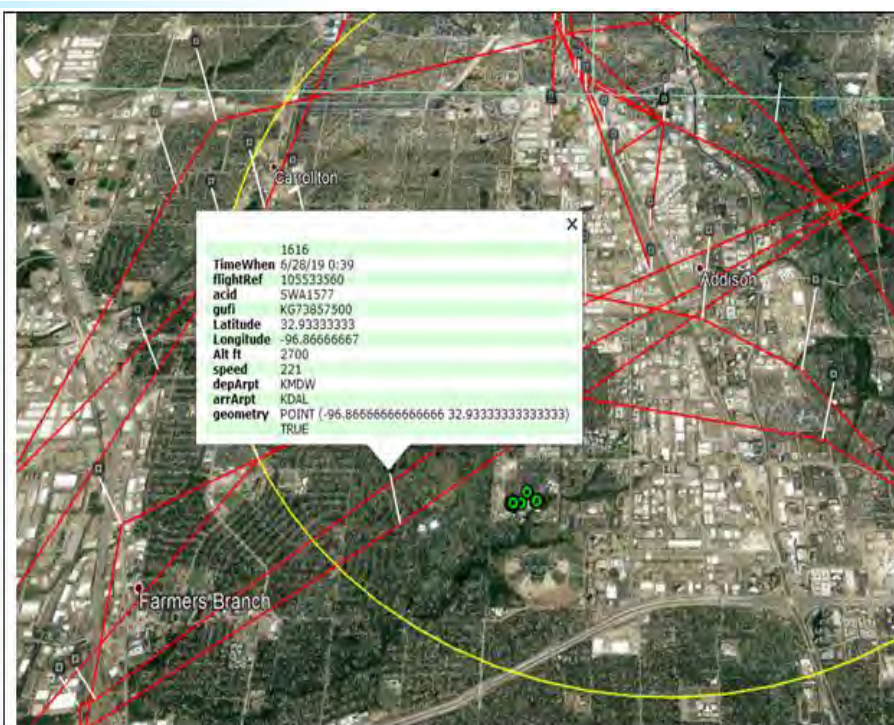
Fusing UAS Detection & A/C Traffic Data



PRELIM INFO FROM FAA OPS: DALLAS, TX/UAS INCIDENT/1729C/DALLAS FORT WORTH TRACON ADVISED EUROCOPTER EC135, OBSERVED A SILVER/ORANGE QUADCOPTER UAS FROM THE 6 O'CLOCK POSITION WHILE HEADING EASTBOUND AT 1,200 FEET 4 N DALLAS EXECUTIVE ARPT. NO EVASIVE ACTION TAKEN. DALLAS FORT WORTH DPS

UAS MOR Alert for D10
 Number: D10-M-2019/05/25-0002
 Type: Hazardous and/or Unauthorized UAS Activity
 Date/Time: May 25, 2019 - 2229Z
 A/C: (EC135)

Summary: EC135 RPTD UAS AT 1200' MSL 4 MILES NORTH OF RBD AIRPORT. RBD ATCT NOTIFIED. SILVER/ORANGE QUADCOPTER. NO EVASIVE ACTION OR INJURIES RPTD. LAW ENFORCEMENT CONTACT: DFW DPS.



PRELIM INFO FROM FAA OPS: DALLAS, TX/UAS INCIDENT/1946C/C-ROC ADVISED BOEING B737 REPORTED A DARK, QUAD COPTER UAS, OPERATING AT 2,500 FEET 3 W ADDISON AIRPORT. NO EVASIVE ACTION TAKEN. LAW ENFORCEMENT NOTIFICATION NOT REPORTED.

UAS MOR Alert for D10
 Number: D10-M-2019/06/27-0009
 Type: Hazardous and/or Unauthorized UAS Activity
 Date/Time: Jun 28, 2019 - 0046Z
 A/C: BOEING B737

Summary: BOEING B737 WAS BEING VECTORED FOR A VISUAL APPROACH TO DAL. APPROXIMATELY 3 MILES WEST OF ADS AIRPORT, THEY REPORTED SEEING A DRONE APPROXIMATELY 500 FEET BELOW THEM, DARK IN COLOR. ADS TOWER NOTIFIED DUE TO CLOSE PROXIMITY TO THEIR AIRPORT. NO OTHER SIGHTINGS WERE MADE

Key Takeaways

- **Continuing to gain understanding of UAS operational trends**
- **Discovering new ways to integrate empirical data into policy-making**
- **Identifying potential NAS safety issues**

Thank You!



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Questions?