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**VIGILANT
AEROSPACE
SYSTEMS™**

Developing DAA for Large and Military UAS

THE FUTURE OF AUTONOMOUS
SAFETY SYSTEMS

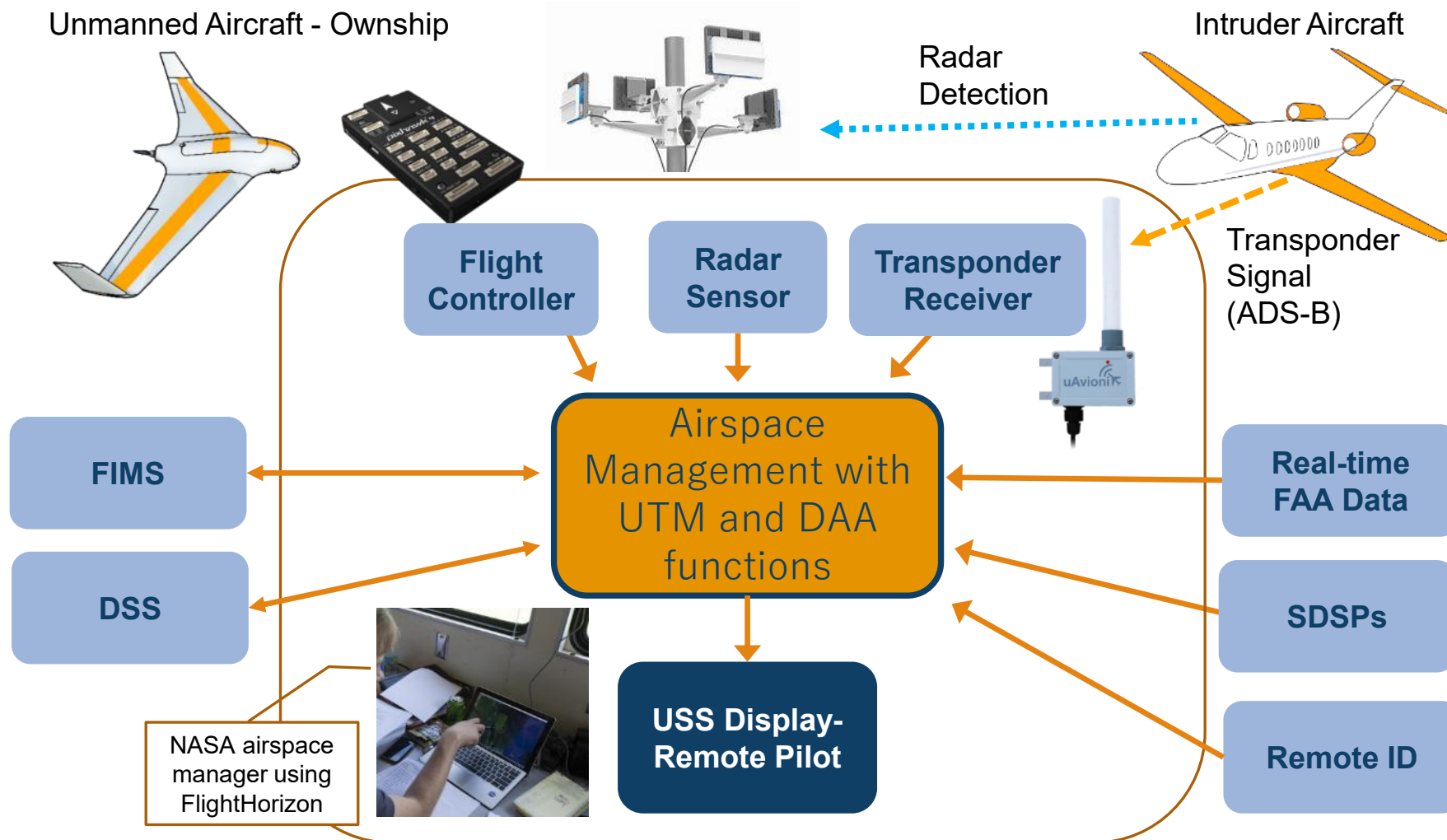
Oct 10, 2023



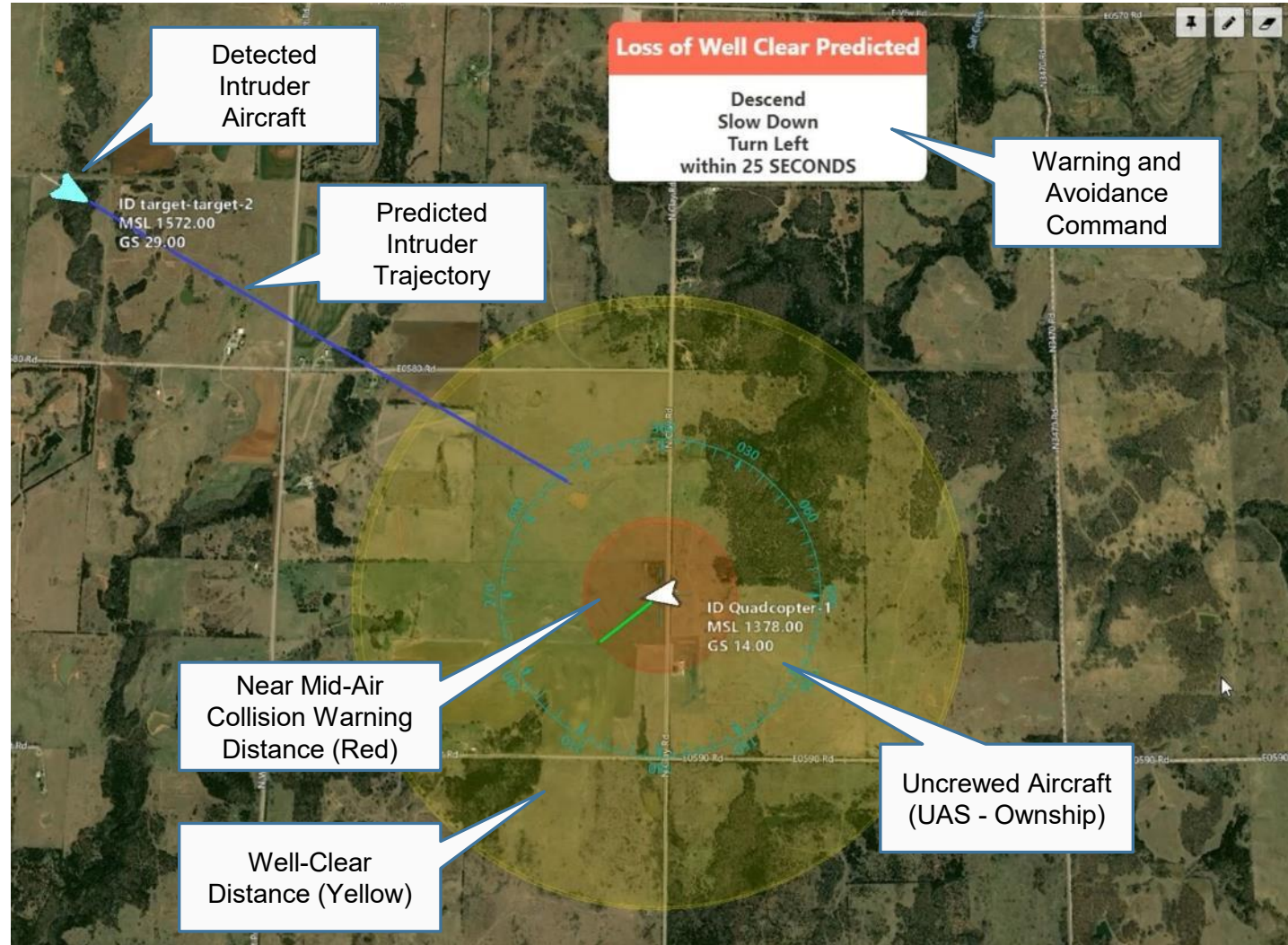
Introduction

- Vigilant Aerospace focused on developing **multi-sensor detect-and-avoid** and **uncrewed traffic management (UTM)** software for UAS and AAM
- Based on **two NASA patents**; Winner of **NASA Commercial Invention of the Year 2021**
- Uses data from multiple sources to display a **real-time picture of air traffic** for both **ground** and **onboard** versions
- Automatic **collision avoidance commands** for remote pilots or autopilots for any aircraft
- Provides safety for **beyond visual line of sight drone flight (BVLOS)**, large **UAS, AAM**
- Projects with **NASA, FAA, USAF, NPUTS, ACUASI, MAAP, OSU, others**

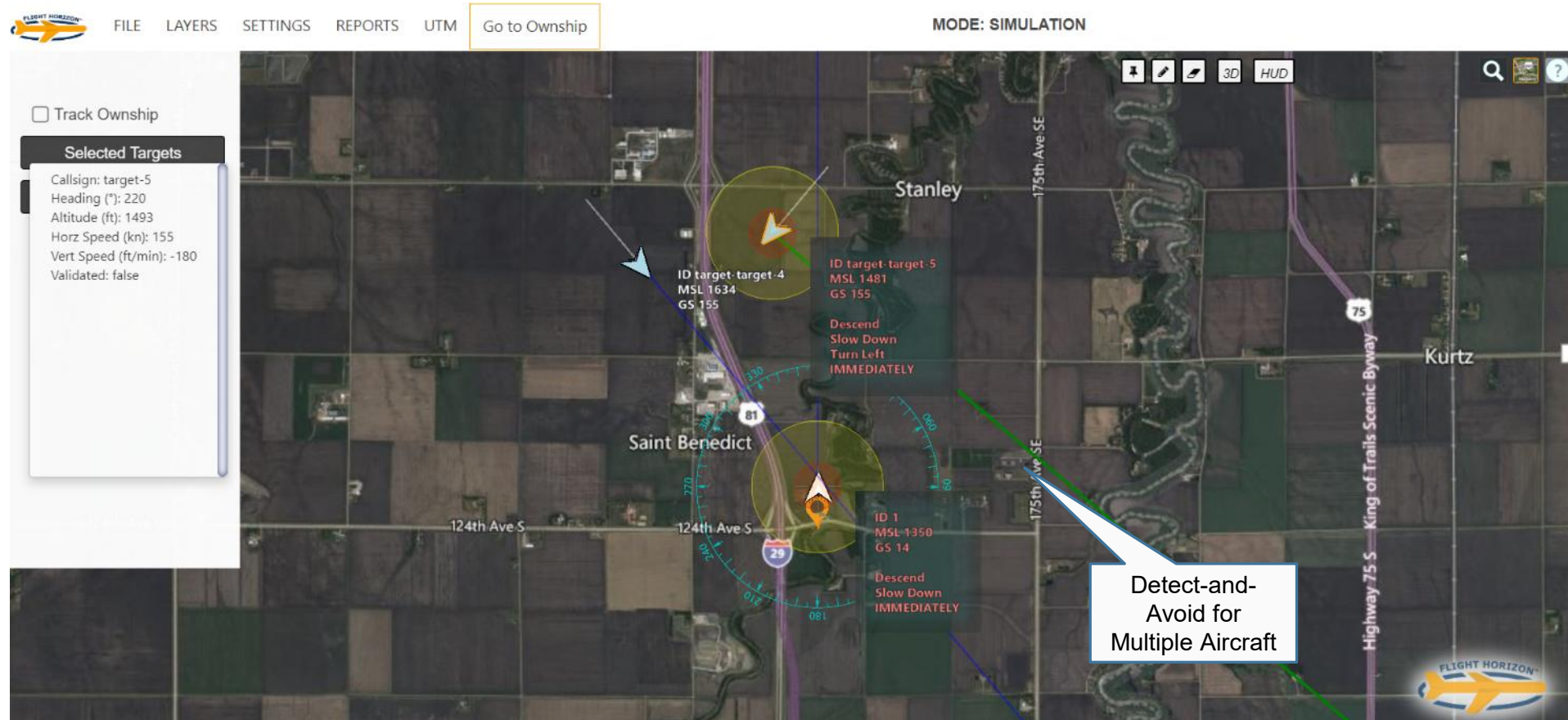
FlightHorizon System



Detect-and-Avoid User Interface

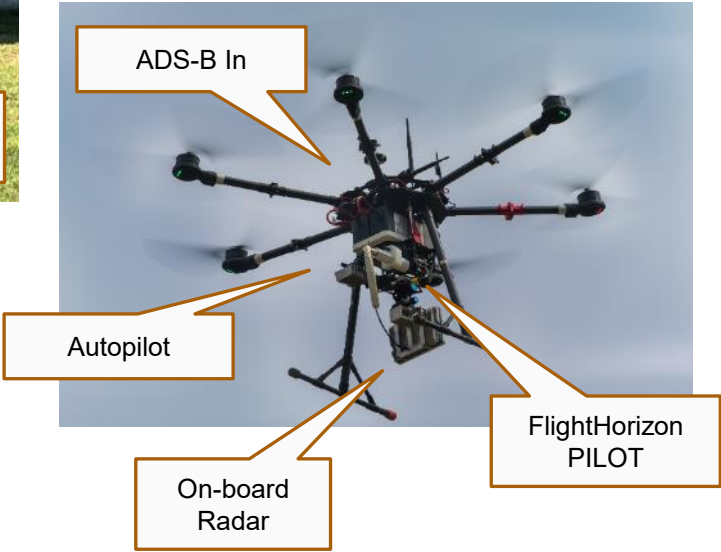
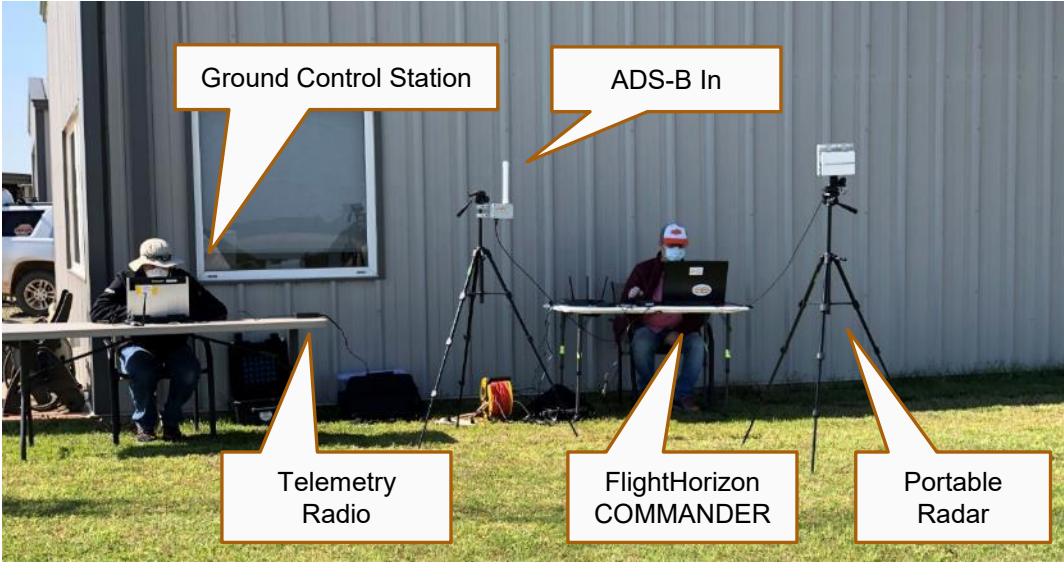


Multi-Aircraft Detect-and-Avoid



Multi-Aircraft Airspace Management with Collision Avoidance

Ground-Based or On-Board



Three Different Projects - Similar Requirements



Install of FlightHorizon at Northern Plains UAS Test Site - 2021

USAF AFRL – DAA for Long Endurance Drone

- Ability to avoid collisions
- Both cooperative and non-cooperative targets
- Both pilot in-the-loop and automatic

AAM Air Taxi Manufacturers

- Seeking onboard DAA, Multiple sensors
- Tracking air traffic, data logging
- Automatic warnings, alerts

NPUTS Airspace Monitoring in Grand Forks

- Multiple radars, track correlation
- Tracking air traffic, data logging
- Distributed airspace management solution

USAF – DAA for Long-Range Drone



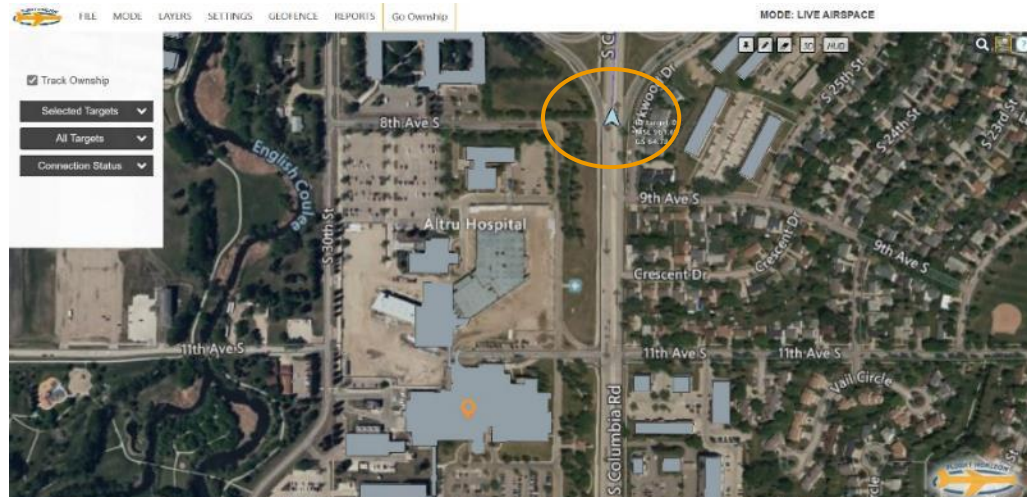
- Developing Long-Range Drone (from the solicitation)
 - Need detect-and-avoid for collision avoidance
 - Group V fixed-wing UAS for long endurance
 - Operational environment is Visual Flight Rules
 - Improve pilot situational awareness
- Requirements
 - Standards compliance – DO-365C
 - Both piloted and automatic DAA modes
- Development Work
 - DAA system integration and testing
 - Flight testing
 - Certifications and waivers



AAM – Air Taxi DAA Projects

- Developing Air Taxis & Cargo Drones
 - Electric vehicles, multi-rotor
 - Moving people and goods
 - Room for onboard DAA
 - Require standards compliance
 - Highly connected, coordinated
- Requirements
 - Automatic warnings, alerts
 - Data logging
 - UTM Coordination
- Development Work
 - Radar testing and integration
 - Standards compliance
 - Flight testing and system logging
 - Certifications and waivers

DAA for Hospital Delivery Drones



- Developing Hospital Delivery Drone Network
 - Deliver goods, medicines, samples via drone - someday
 - Need multi-radar ground-based DAA system
 - Require standards compliance
 - Highly connected, coordinated
- Requirements
 - Automatic warnings, alerts
 - Data logging
 - UTM Coordination
- Development Work
 - Radar testing and integration
 - Standards compliance
 - Air traffic monitoring and logging
 - Certifications and waivers



Where Do the Solutions Intersect?

- Focus on knitting complex, distributed sensors into a seamless, easy-to-use system
- Similar sensor requirements – radar and others
- Overlapping algorithms
- Similar standards being utilized
- Sensor track correlation needs
- Both pilot-in-the-loop and automatic mods
- Ground-based sensors and infrastructure
- Similar network and C2 requirements
- Similar testing and certification processes
 - 44807, ACAS Xu, Xr, 8040.6a Safety Risk Management, August 2023 UAM Blueprint



Product Roadmap



Currently in Use

FlightHorizon COMMANDER™

- Ground-based detect-and-avoid and airspace management designed for airports, droneports and UAS fleet managers
- Cloud-based or on-premises installation or laptop use
- Software-based solution fuses UAS telemetry, aircraft transponders, radars and online data

2024

FlightHorizon USS™

- Full UTM and USS System
- Fully hosted, managed SaaS to provide flight coordination for UAS and airspace management
- Suitable for single facilities, cities, states, national users

FlightHorizon PILOT™

- Onboard system connected to the autopilot and onboard transponder receiver and radar
- Expected to fill important technology gap for advanced air mobility (AAM) operators
- Designed to be compliant with ASTM F3442 and DO-365C

R&D Testing Now





Technical Frontiers

- New radar integrations – esp. DeTect Harrier
- Integration of new weather data sources and hazard models – esp. TruWeather and NASA ULI
- New C2 models – esp. Botlink XRD2
- Remote ID integration – Pierce Aerospace
- Self-contained, portable UTM platform
- SDSP standards compliance
- Integrations to popular military and civilian GCS software
- FlightHorizonX for commercial spacecraft

Contact Us

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Detect and Avoid technology wins NASA's Commercial Invention of the Year 2021 award

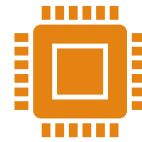
April 5, 2022 UAM infrastructure, UTM

NASA has announced this week that the technology licensed to Vigilant Aerospace and used in the company's FlightHorizon detect-and-avoid and airspace management product has won NASA's Commercial Invention of the Year 2021 award.



Built for You

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Enterprise UTM Solutions

Hosted or installed UTM
Integration to on-site sensors and networks
Standards-compliant



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