

Blue UAS for First Responders in Urban Environments

Assessment QuickLook

February 2025

BLUE UNMANNED AIRCRAFT SYSTEMS FOR FIRST RESPONDERS

Over the past decade, first responders have begun integrating small, unmanned aircraft systems (UAS) as a resource for a variety of operational needs. UAS provide first responders with an aerial view of their environment and can be outfitted with various sensors tailored to address different applications. UAS, often referred to as “drones,” are used by first responders in support of public safety activities such as search and rescue, firefighting, and post-incident reconstruction or recovery. “Blue” UAS are those systems that have undergone cybersecurity testing by the Department of Defense’s (DoD), Defense Innovation Unit (DIU). Platforms on the “[Blue List](#)” are cyber-secure, safe to fly, and compliant with Section 848 of the National Defense Authorization Act (NDAA) for Fiscal Year 2020, which prohibits the use of UAS or related services or equipment from certain foreign entities. This equipment falls under the Authorized Equipment List (AEL) reference number O3OE-07-SUAS titled “System, Small Unmanned Aircraft.”

Assessment Overview

In November 2024, the National Urban Security Technology Laboratory’s (NUSTL) System Assessment and Validation for Emergency Responders (SAVER®) program, with the support of DAGER Technology, conducted an assessment of Blue UAS for first responder use in urban environments. The assessment was conducted in Miami, Florida, with the support of the City of Miami Fire Rescue and Miami Police Department. Assessment activities and evaluation criteria were based on recommendations from a focus group of responders with UAS expertise. The focus group report can be found on the [SAVER website](#). Eight emergency responders, each subject matter expert evaluators on UAS for response operations, from California, Colorado, Georgia, Massachusetts, Michigan, New York, Texas, and Virginia, assessed five platforms in simulated operational scenarios in full and low light conditions. This included preparing drones for deployment, flying them to collect information, changing batteries, testing redeployment, and conducting maintenance that responders would perform with routine use. Within the SAVER categories of capability, deployability, usability and maintainability, the evaluators assessed 15 evaluation criteria: electro-optical (EO) camera visual acuity, infrared (IR) camera visual acuity, command and control link quality, covertness, customizable safety features, ease of use, flight duration, ground control station (GCS) interface, GCS legibility in full and low light, in-house maintenance, latency, portability, time to deploy, and time to redeploy. Evaluators found key differences that are presented in this report.



Figure 2. An evaluator flying the Ascent AeroSystems Spirit UAS



Figure 1. Freefly Systems Astro in flight during night operations

Products Assessed

The five small UAS shown below were assessed. The following images were supplied by the products' manufacturers. The pricing, rounded to the nearest whole dollar, is based on General Service Administration (GSA) pricing as applicable* in their stated configuration without additional accessories.



Ascent AeroSystems Spirit
GSA Price: \$56,195



Parrot Drones ANAFI USA GOV
GSA Price: \$13,964



Skydio X10D
GSA Price: \$28,382



Teal Drones Teal 2
GSA Price: \$15,073



Freefly Systems Astro*
Price: \$47,018

Overall Results

Overall scores for the Blue UAS ranged from 4.0 to 2.7, with a maximum achievable score of 5.0. The table below presents the overall assessment score and category scores for each product and lists the products in order from highest to lowest overall score.

Manufacturer	Model	Overall Score	Capability	Deployability	Usability	Maintainability
Skydio	X10D w/ VT300-Z & NightSense	4.0	3.8	4.2	4.1	4.3
Freefly Systems	Astro w/ LR1 EO/IR & laser range finder	3.5	3.4	3.8	3.6	3.4
Ascent AeroSystems	Spirit w/ Nighthawk2-UZ EO/IR	3.1	3.5	2.8	2.8	3.4
Parrot Drones	ANAFI USA GOV	3.1	2.8	3.3	3.3	4.0
Teal Drones	Teal 2	2.7	2.4	2.7	2.7	4.8

* The Freefly Systems Astro currently doesn't offer GSA pricing; therefore, cost included is based on quote received for procurement.

Key Takeaways

Scores for four select criteria — EO camera visual acuity, IR camera visual acuity, latency, and command and control link quality — are displayed in Charts 1, 2, and 3. In each chart, products are listed alphabetically by manufacturer name. These criteria highlight key findings from the assessment. Evaluators found pronounced differences among the assessed products camera performance in differing lighting conditions and in the reliability of the connection between the GCS and aircraft.

Chart 1: Camera Visual Acuity

Evaluators considered camera visual acuity of utmost importance due to the standoff nature of emergency response operations via UAS and the inherent need to collect information. The Skydio X10D received the highest score for EO camera visual acuity, which was attributed to the zoom and autofocus. Evaluators scored the Spirit, outfitted with the NightHawk2-UZ EO/IR payload, the highest for IR camera visual acuity. They appreciated the thermal resolution and contrast, as well as the ability to retain resolution when zoomed in optically. The Teal 2 received the lowest score for EO, while the ANAFI USA GOV received the lowest score for IR visual acuity. Evaluators noted a poor contrast range for the Teal 2 and low IR resolution for the ANAFI USA GOV. Evaluators found the imagery produced to only meet some of their expectations as they would need to alter their operations (i.e., descend to a lower elevation to increase legibility) to achieve their mission goals.

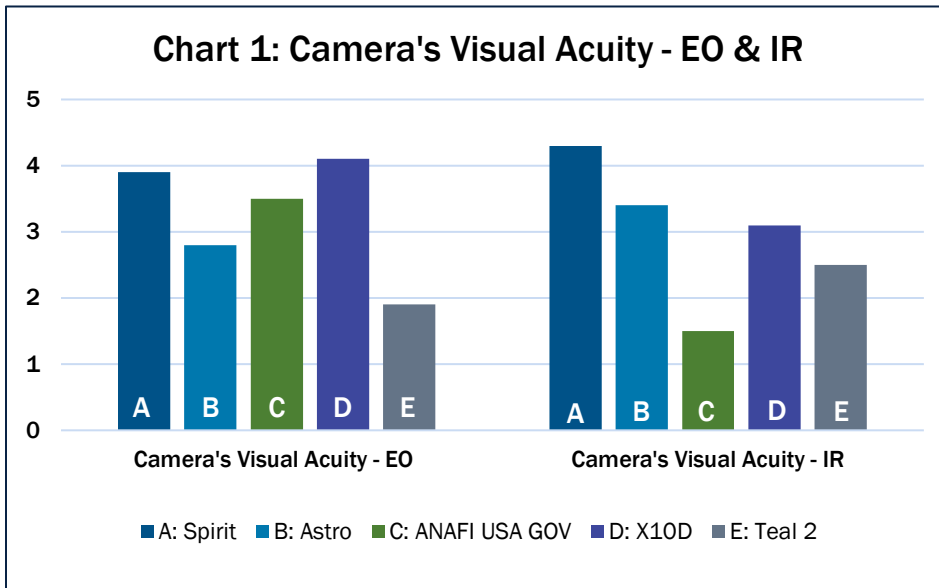


Figure 3. Visuals from the Skydio X10D during day operations



Figure 4. Visuals from the Spirit outfitted with the Nighthawk2-UZ during night operations

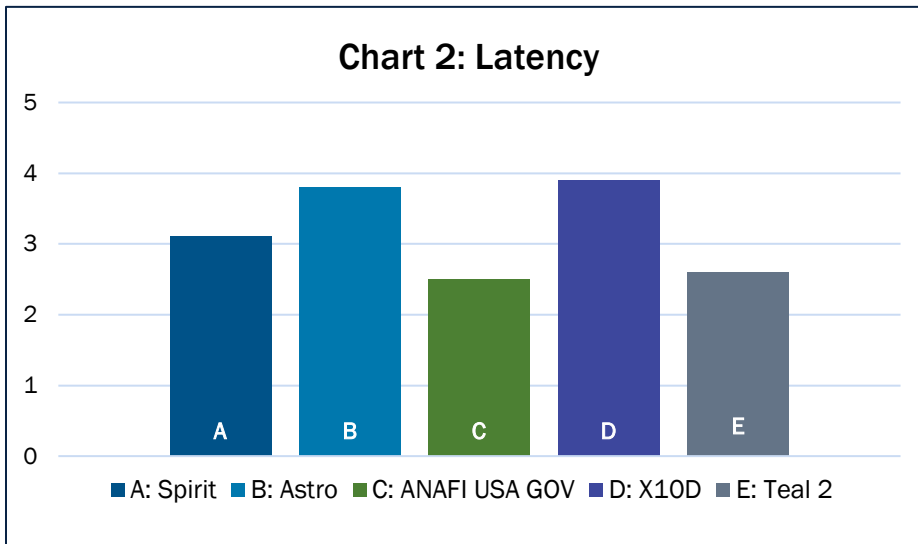


Chart 2: Latency

Timely transmission of data between the drone and GCS is vital for timely response operations. The Skydio X10D received the best latency score; however, evaluators still experienced unpredictable responsiveness to control inputs, video skipping, and non-linearity between inputs and outputs. The Teal 2 received the lowest score, which was attributed the delay experienced from when a command was sent to when the action was taken. Evaluators noted the imagery would pixelate and lag, particularly in complex environments, which would impact their response operations.

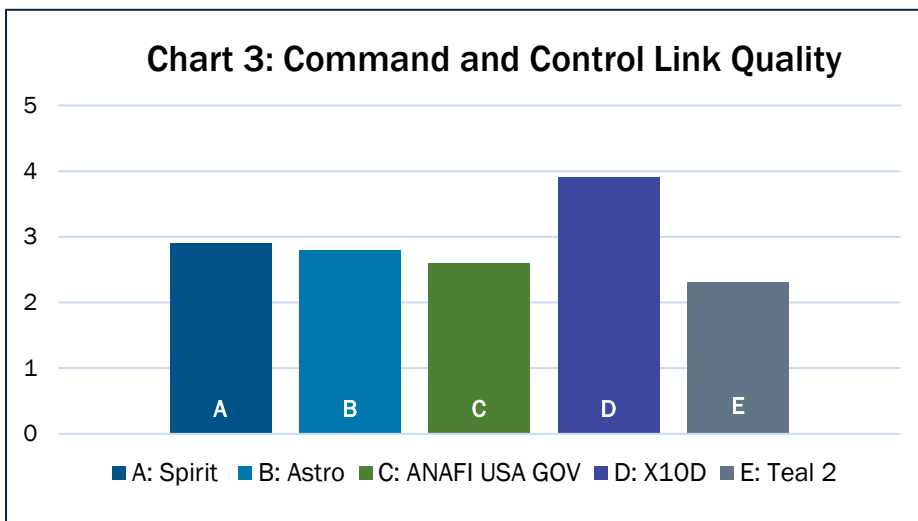


Chart 3: Command and Control Link Quality

Evaluators deemed command and control link quality as a key factor for maintaining operations. The Skydio X10D scored the highest in this criterion as most evaluators experienced minimal connection issues; however, some had difficulty identifying the appropriate frequency for use. This could impact a response operation when time is of utmost importance.

The Teal 2 received the lowest score due to lost connections, particularly when a physical obstruction (i.e., trees or a wall) was present.

For More Information

This document provides high-level information on the operational assessment methodology and a limited comparative analysis of results. Detailed information on the assessment activities, evaluation feedback and all comparative results will be published in a final report on the SAVER website, specifically on the “Blue UAS for First Responders” page at “ www.dhs.gov/science-and-technology/saver/blue-uas-first-responders .”

More than 1,100 publications can be found on the SAVER website at www.dhs.gov/science-and-technology/saver. For more information on the National Urban Security Technology Laboratory please visit our [website](http://www.dhs.gov/science-and-technology/saver) or contact us at NUSTL@hq.dhs.gov.

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