

Department of the Navy SBIR/STTR Transition Program

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ONR Approval #

Topic # AF171-124
Ultra-Endurance UAV
Platform Aerospace

WHO

SYSCOM: ONR

Sponsoring Program: Low Cost UAV Swarming Technology (LOCUST)

Transition Target: Airborne Intelligence, Surveillance, Reconnaissance (ISR)

TPOC:

Mr. Lee Mastroianni
lee.mastroianni@navy.mil

Other transition opportunities: Other defense use cases include maritime patrol, anti-submarine warfare, early-warning signals intelligence (SIGINT), secure communications relay, and command & control over other assets with lesser endurance. Potential customers outside the U.S. Navy include the U.S. Army, Department of Homeland Security, and NASA.

Notes: Vanilla Unmanned Aerial System (UAS) holds the world record* for long-endurance flight with heavy fuel and is capable of carrying and powering multi-intelligence (multi-INT) payloads for up to 10 days. Vanilla's modular payload design enables rapid swap-out of payloads and the ability to operate multiple sensors on a single flight (multiple payload bays). The aircraft is Satellite Communications (SATCOM) enabled for beyond visual line of sight (BVLOS) operations globally, with the ability to transmit sensor data in real-time. To support forward operations, Vanilla is truck-launched (see photograph) and does not require an established runway. Vanilla UAS has the endurance and flexibility to support a wide spectrum of missions over land, sea, and ice. Operational readiness was proven during a simulated deployment in 2020, requiring 30 days of continuous flight operations and active ISR sensor payloads.

*Unofficial record; October 2017 121hr continuous flight was not observed by an independent review body



Image courtesy of Platform Systems, Inc., 2019

WHAT

Operational Need and Improvement: Military commanders and the intelligence community require persistent overhead surveillance at an attritable cost point. Persistent multi-intelligence coverage of 'gray zone' regions (e.g., South China Sea) and geographic choke-points is necessary to deter armed conflict and inform warfighter decisions. An improved endurance technology would mean more of ISR budgets result in "on target" coverage with less sunk costs in aircraft transit time. Additional defense requirements include targeting, swarm vehicles command & control, and trusted communications relay.

Specifications Required: Line of Sight (LOS) and BVLOS UAS operations in support of ground or surface missions and Tactical Operations Centers (TOC). Airborne ISR, command & control, and/or communications relay support requiring continuous or near-continuous coverage of a target area. Single UAS endurance over 5 days and up to 10 days, with payloads ranging from 20 to 100+ pounds and the capacity to carry multi-intelligence sensors on a single flight. Fully autonomous launch, recovery, and flight. 30% reduction of on-site manning and logistics compared to existing UAS systems.

Technology Developed: Vanilla is a fixed-wing Group III UAS capable of greater than 7 days of continuous flight with an operational payload and a 15,000NM operational range. Vanilla also serves as a heavy-lift unmanned vehicle relative to other Group III aircrafts on shorter duration flights. Vanilla's minimalist sailplane design greatly reduces and simplifies Operations and Maintenance (O&M) costs, and the modular airframe can accommodate various multi-intelligence sensors and communication payloads. A ruggedized launch system enables deployment from poor surface conditions and high crosswinds. Launch, flight, and recovery are all autonomous.

Warfighter Value: The Vanilla UAS presents a step change in Group III UAS endurance and design, with corresponding O&M cost reductions. At a Maximum Gross Takeoff Weight (MGTO) of 620 lbs., Vanilla can carry 100+ lbs of payload, fly in excess of 7 days, and climb to altitudes up to 15000ft. 10 day endurance can be reached with lighter payloads, representing a 15,000NM operational range. Vanilla's sailplane design and modular payload enables unbroken ISR operations with the ability to carry various multi-INT sensors on a single flight. Payloads can be rapidly swapped and include: full motion video, RADAR, wide area motion imagery, signals intelligence (SIGINT), magnetic anomaly detection, and secure communications.

WHEN

Contract Number: N68335-19-C-0257 **Ending on:** July 5, 2022

Milestone	Risk Level	Measure of Success	Ending TRL	Date
121 hour (>5d) world-record flight	N/A	World-record flight duration (unofficial)	5	1st QTR FY18
First operational payload	N/A	Integrate and fly TASE400 EO/IR payload	6	3rd QTR FY18
Truck-based launch	N/A	Prove launch system for high crosswinds and poor surface conditions	6	1st QTR FY20
Autonomous launch & recovery in austere environment	N/A	High-altitude desert launch and recovery with fully autonomous system	6	2nd QTR FY20
30-day Demonstration	High	30 days of continuous flight operations	7	1st QTR FY21
Weather hardening	High	Successful arctic multi-day flights	7	3rd QTR FY21

HOW

Projected Business Model: Vanilla UAS is designed and manufactured by Platform Aerospace. It is currently in low-rate production and will transition to full-rate production in 2021. Platform intends to scale production and its operational capacity in order to service multiple contractor-owned, contractor-operated defense and commercial operations. Platform continues to evaluate alternative business models, to include government-owned, government-operated and commercial leasing arrangements.

Company Objectives: Platform's goal is to deliver a true multi-sensor, multi-mission, ultra-long endurance UAS that can provide persistent data and quickly convert in response to rapidly changing conditions. Platform continues to mature the Vanilla technology in response to lessons-learned from endurance flight operations, customer feedback, and a list of key development targets to further endurance and ruggedness. Vanilla development and production is progressing along a block roadmap that phases in performance and manufacturability improvements, modular swap capabilities, and a vertical lift variant. By focusing on the vehicle endurance and modular flexibility, Platform will meet the needs of a wide variety of government and commercial organizations.

Potential Commercial Applications: Vanilla UAS is designed for maximum flexibility and endurance with 100+ lbs. payload capacity, making it ideal for various commercial and defense applications. Potential commercial applications are most promising in markets where data collection needs require long distance or wide area flight coverage, such as geospatial surveying and infrastructure inspections (e.g. oil & gas, electric transmission). Vanilla can carry lidar and multispectral sensors in place of standard electro-optic and infrared (EO/IR) gimbals and has the physical space and power capacity to perform on-board processing. Vanilla would also be useful in natural resource monitoring, command & control in disaster situations (e.g., forest fires, post-hurricane damage survey), and immediate post-disaster communications relay provisioning.

Contact: Greg Pappianou, Chief Growth Officer
greg.pappianou@platformaero.com 301-863-9253