Long Endurance/High Altitude Maritime & Land UAS Assessment Event

USSOCOM SOF AT&L PEO TIS

Problem Statement: SOF requires long endurance/high altitude unmanned aircraft systems (UAS) that can operate in both confined space maritime with moderate sea state and dense urban environments for intelligence, surveillance, target acquisition, and reconnaissance (ISTAR) operations with the air vehicle being capable of at least or greater than 8-hours of endurance with 20 lbs. of total payloads while maintaining altitudes above 8000 ft. MSL.

Operational Use/Conditions: SOF will use long endurance/high altitude maritime capable (saltwater infused air environment to include salt fog or saltwater splash) ISTAR UAS to achieve mission autonomy, autonomous multi-vehicle cooperation, automated transit to/from the target and over-the-horizon operations in both confined space maritime with moderate sea state and dense urban environments. UAS should possess the ability to control multiple air vehicles, shifting the human's role from operator toward mission manager and navigation capabilities that are ideally capable of operating in environments where GPS signals are spoofed, jammed or otherwise unavailable. The UAS must be capable of safe takeoff/landing without operator handling/touching aircraft to minimize any unnecessary risk. System must include OEM provided electro-optical/infra-red (EO/IR) full motion video (FMV) capabilities for day and night operations and be able to support future integration of USSOCOM Modular Payload interface for additional payload(s). Imagery sensor may be a single or multi-imager (e.g., day only, night only, or day/night combined). Air vehicle should operate on a variety of energy sources that can be produced or recharged in an austere environment and are approved for use on Naval surface ships (DoD/NATO standard Heavy Fuel JP5, JP8, or other energy sources such as batteries and fuel cells if approved for naval surface ships). System should be designed and built for safe failure as much as possible, accounting for specific hazards of maritime operations. Further, it must operate in adverse weather conditions to include gusty wind, rain, sleet, and light snow. Signature reduction techniques should be employed as much as possible to reduce detectability of SOF.

Desired Operational Characteristics and Performance Attributes for System *(whitepapers should reference <u>ALL</u> characteristics and performance attributes below and annotate their system's abilities to meet the desired technology and capture deficiencies that could be achieved in a rapid six-month development effort as well as those that are impossible to meet with these time constraints)*:

- Technology Readiness Level (TRL)
- OEM country/system production facility country
- Operationally proven maritime system that has been/is currently fielded
- MGTOW
- Air vehicle dimensions/wingspan
- Requires additional launch/recovery equipment
- Ability to takeoff, operate, and land in confined space maritime and dense urban environments encumbered by vertical obstructions such as ships, buildings, utility infrastructure and large industrial equipment.

- Ability to launch, operate, and recover in both day and night conditions
- Ability to launch and recover from a moving platform ≤ 10 knots
- Ability to launch, operate, and recover on small maritime vessel with deck space ≤ 10'x15'
- Ability to launch, operate, and recover in moderate sea state conditions
- Ability to takeoff, fly, and land with 20 lbs. total payload capacity (including FMV) when fueled for an 8-hour mission (the 2+ payloads may be distributed as needed across multiple payload mount points)
- OEM validated system level flight cruise speed with 20 lb. payloads
- Ability to launch and recover with sustained relative winds up to 20 knots, and gusts up to 25 knots
- OEM validated Command and Control (C2)/Data Link range (nautical miles)
- OEM validated maximum Mean Sea Level (MSL) operational ceiling with 20 lb. payloads
- OEM validated ground control station (GCS) options to include any potential static, mobile, and body worn variant
- Fuel approved for use on Naval ships (DoD/NATO standard Heavy Fuel JP5, JP8) to include energy sources such as batteries and fuel cells if approved for naval surface ships
- OEM provided baseline electro-optical/infra-red (EO/IR) full motion video (FMV) payload specifications
- NSA-certified Type 1 encryption with NSA-certified Commercial National Security Algorithms (CNSA)
- Other C2/data link encryption (i.e. AES 256)
- Air vehicle capable of automatically switching to an alternate C2 link when the air vehicle identifies pre-defined anomalies with the primary C2 link
- Daytime Ground Resolved Distance (GRD) of 2" for target discrimination of limb movement detection with OEM provided FMV payload
- OEM stated system setup time for operations
- Signature reduction attributes (includes acoustics)
- Ability to takeoff, maneuver, and land using non-GPS navigation sources
- OEM validated Ingress/Protection rating
- Able to withstand operations and storage in conditions as defined by MIL-STD-810G
- Equipment directly exposed to the environment during maritime operations designed to resist corrosion from salt spray/fog
- Open Architecture meeting STANAG 4586 compliance standards
- KLV metadata format specifications
- Air vehicle provides a minimum of 150 watts at 28VDC continuous power dedicated to payloads
- Transportability doesn't exceed 84 linear inches and the weight of any one container is equal to or less than 164 lbs.
- Flight operations don't require more than two trained operators which includes unpacking, assembly, setup, pre-flight, takeoff, maneuver, and landing.
- Anticollision lighting system
- Air vehicle's capabilities for autonomous real-time find, fix, and track without transmitting or receiving:
    1. Observe: Real-time sensor data is provided to the onboard flight planning subsystems.
    2. Orient: Onboard flight planning subsystems can simultaneously localize and

map sensor inputs and positional data
3. Decide: Onboard payloads and flight planning subsystems can select targets based on pre-defined parameters
4. Act: Conduct area search to find, characterize, fix, and track commodities of interest; Report (transmit) intelligence to operator as assigned
5. Act: Loss of C2. The UAS shall have a contingency management ability to execute pre-planned maneuver due to loss of C2

- Provides mission autonomy, autonomous multi-vehicle cooperation, automated transit to/from the target, and/or over-the-horizon capabilities
- Capabilities allow operators to focus on higher-level control or supervision of multiple unmanned assets simultaneously and will increase effectiveness by reducing the operator's cognitive load, allowing operators to make command decisions, and perform other high-level tasks
- Navigation capability that is sufficiently resilient and capable of operating in environments where GPS signals are spoofed, jammed, or otherwise unavailable
- Control interfaces supports a range of control options whereby the human can be either "off the loop" with no control over an autonomous system, "on the loop" supervising the unmanned systems, or "in the loop" exercising commands to control a particular vehicle's path/payload
- Ability to integrate/implement modular payload to support additional USSOCOM payloads (https://apps.dtic.mil/sti/citations/AD1167779) into existing design
- Company full rate production capability
- Company management experience with Department of Defense efforts, contracts, logistics, and procurement activities

Desired operational characteristics and performance attributes above will be captured by USSOCOM SMEs through both observations and discussions during the Long Endurance/High Altitude Maritime & Land UAS Assessment Event

Long Endurance/High Altitude Maritime & Land UAS Assessment Event Conditions: Vendor will bring and operate a production ready, off-the-shelf system to a maritime daytime environment. Participants will be allotted a 2-day one-on-one session with the USSOCOM evaluation panel to demonstrate their capability on a USSOCOM chartered maritime vessel using OEM/vendor provided equipment/operators. Selectees will be provided an opportunity to demonstrate the UAS air vehicle's ability to launch, operate, and land within a confined space maritime environment on a government provided vessel at sea from the sterns deck with dimensions of approximately ≤ 10'x15' (which must support all launch and recovery) while the vessel is moving at speeds of ≤ 10 knots with a moderate sea state and sustained relative winds up to 20 knots/gusts up to 25 knots (flight altitudes are dependent on demonstration location and will be provided at a later date). Collection target and goals will be provided in advance of event to accomplish desired mission scenario. The demonstrator will be provided a boundary to secure and/or a target to collect. The UAS will launch and collect information on target using EO/IR/FMV/etc. payload sensors available from the vendor. In addition, if time/airspace is available then selectees may also demonstrate land-based launch, operation, and recovery of their system.