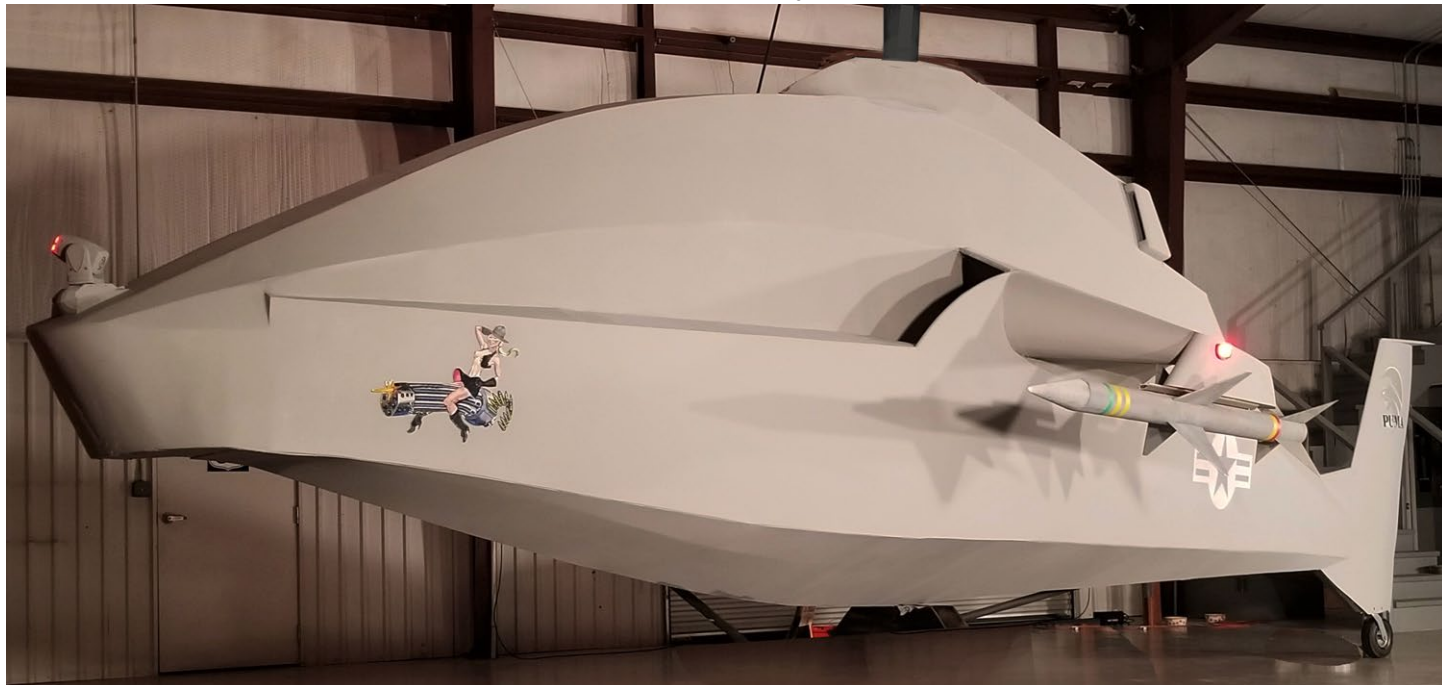


# BOSS LASER SHARK CO-AXIAL VTOL-UAV SPECIFICATION

SPECIFICATION SUBJECT TO CHANGE WITHOUT NOTICE

REVISED 1 MAY 2022 -



## BOSS CO-AXIAL VTOL-UAV OBJECTIVES:

- Provides a rugged, super quiet and cost effective all-weather, very heavy lift turbine powered VTOL-UAV helicopter designed for Surveillance, fire fighting, EMS, Sky Crane, tactical operations etc. She is designed to be stealthy with a low heat signature.
- Puma Aero Marine of Florida has developed an inexpensive, very quiet, reliable and environmentally friendly VTOL-UAV (co-axial drone helicopter). Using an in-house designed co-axial rotor system, which has greatly enhanced stability in all ranges of flight.
- The BOSS is designed to be easily operated by anyone with computer gaming skills. The BOSS co-axial VTOL-UAV receives its commands from a computer keyboard and override control by a fly by wire joystick. Operation could be from any operational base, dispatch center, mobile based unit, a vessel or carry around hand-held unit.
- Airframe consists of aluminum and carbon fiber skin, hand lay-up vacuum infused. With stainless steel used for the exhaust high-temperature areas.
- Rotor blades are 2 X 4 bladed co-axial rotor system with 204 cm by 3.65 meter blades, chord 202 mm 100% carbon fiber asymmetrical rotor blades: NACA 0012
- Dimensions & Weight:
  - ✓ Fuselage Length overall: 9.90 meters (32' 6")
  - ✓ Fuselage Length: 9.32 meters (30' 5")
  - ✓ Fuselage Width includes wing: 3.04 meters (10') includes wing
  - ✓ Height under fuselage 0.60 meters (1' 9")
  - ✓ Height overall: 2.89 meters (9' 6")
  - ✓ Rotor Diameter: 8.62 meters (28'2")
  - ✓ Current estimated empty wt: 878.4 kg. (1,936 lbs.) with Laser
  - ✓ Gross takeoff wt: 3,064.8 kg. (6,754 lbs.) @ sea level /ISA +20°
  - ✓ Internal Fuel: 428 US gallons 1,310.7 kg.(2,889 lbs)

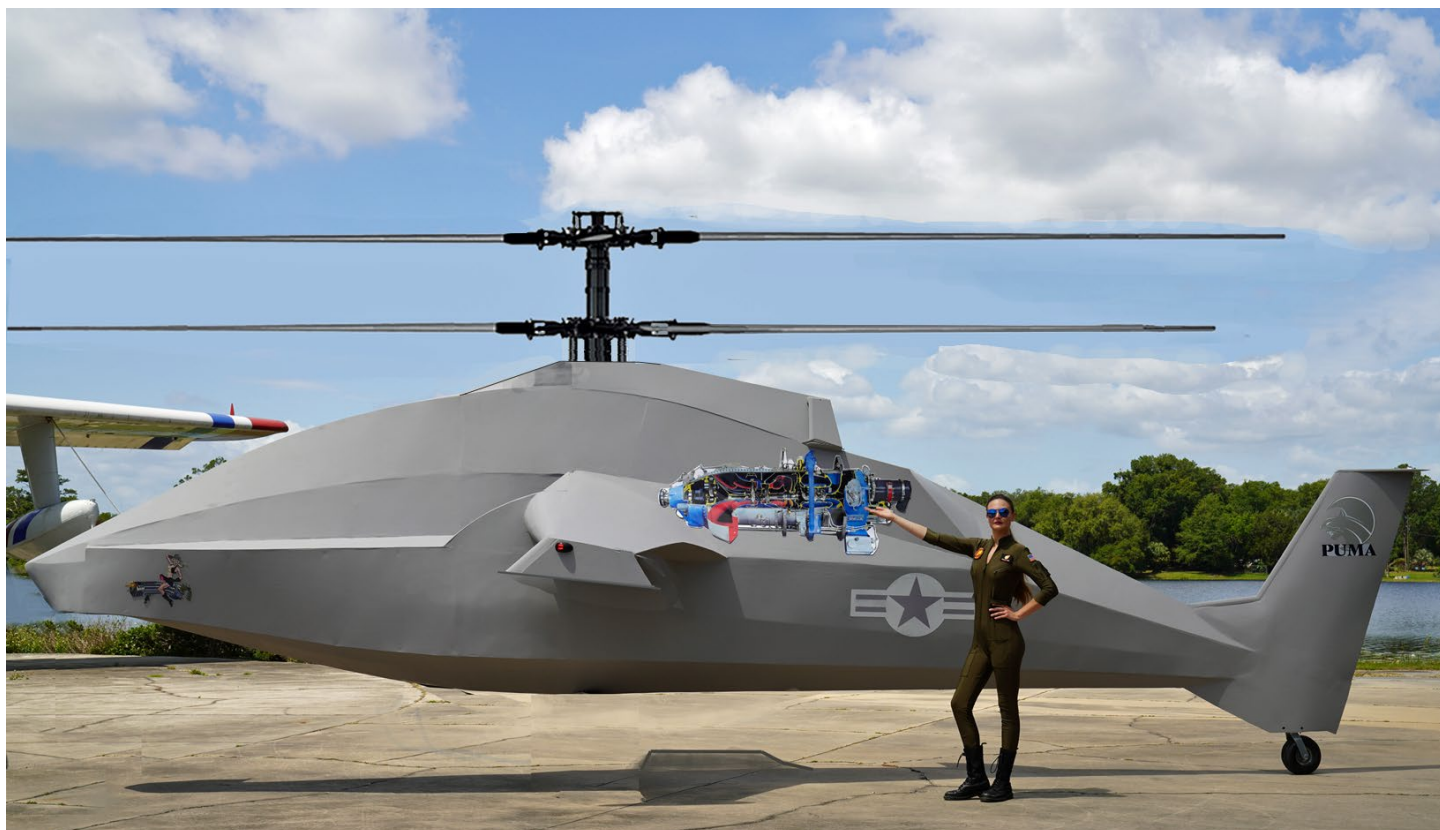


## Performance

- ✓ Maximum Sling Load (1 hour of Fuel) 2,002.8 kg. (4,413 lbs.) with Laser installed
- ✓ Service ceiling: 15,800 ft (4,800 m)
- ✓ Hover ceiling OGE: 7,300 ft (2,225 m)
- ✓ Hover ceiling IGE: 11,800 ft (3,597 m)
- ✓ Maximum speed: 130 knots
- ✓ Normal Cruise: 125 knots
- ✓ Operating loiter speed: zero to 105 knots
- ✓ Endurance – 8 hour mission capability @ 105 knots.
- ✓ Normal Cruise Range: 829 nautical miles with 30 minutes reserve
- ✓ Normal Fuel Burn Between: 153.1 kg. (337.5 lbs.) to 183.7 kg. (405.0 lbs.) per hour

- Powered by

- ✓ The GE H75 Turbine engine, manufactured in the Czech Republic, features sophisticated technologies to reach higher levels of performance than preceding engine models.
- ✓ These technologies deliver sustained shaft horsepower capability for hot-day takeoffs and high-altitude performance, which is combined with improved engine fuel efficiency and increased temperature margins.
- ✓ Surplus power, 100shp (74.5 KWs) to power payload requirements, like high powered laser, used on LiDAR missions and/or requiring a powerful tactical laser.
- ✓ In addition, the unique configuration of the engine simplifies maintenance by eliminating the need for recurrent fuel nozzle maintenance and periodic hot section inspections.
- ✓ With the standard auto start and limiting unit for ground operations, along with linear throttle response, the GE H75 eases the drone fly by wire systems workload and enhances engine value and operability.



- Optimal Main Rotor Transmission Design:
  - ✓ Puma engineers have over fifty of experience with the co-axial configuration and has made many improvements in the design of this very efficient and stable rotor system. The inherent feature of splitting the power input into two paths, results in a transmission design internally balanced, compact, and capable of handling greater horsepower input than any other configuration.
  - ✓ The symmetry of the rotor system and the transmission reduces, by approximately one half, the total number of individual components.
  - ✓ The spiral bevel gears forged from 8620 gear steel and heat treated is an important component on co-axial rotorcraft drive systems. These components are required to operate at high speeds, high loads, and for a large number of load cycles. In this application, spiral bevel gears are used to redirect the shaft output from the “Boss” engine to the vertical rotors.
- Electrical System:
  - ✓ Powered by 28V DC
  - ✓ A 28V DC external power receptacle just aft of the right landing gear
  - ✓ Starter-generator switch with line contactor limiter.
  - ✓ DC electrical power distribution system through a circuit breaker system
  - ✓ Landing gear electrically retracted and extended
  - ✓ Pitot and static system heat 28V DC
  - ✓ 74.5 KW available to power payloads
- Flight Control System:
  - ✓ MicroPilot's Helicopter Drone Autopilot provides extraordinary user definability.
  - ✓ Integrated GPS (including GPS receiver, gyros, all sensors, and GPS antenna)
  - ✓ Autonomous takeoff and landing supported by AGL
  - ✓ User definable PID feedback loops (for camera stabilization etc)
  - ✓ RPV and UAV modes
  - ✓ Change altitude at waypoint, change airspeed at waypoint
  - ✓ User definable holding patterns
  - ✓ User definable error handlers (loss of GPS, low battery etc.)
  - ✓ Equipped with an ultrasonic altitude sensor, supports autonomous takeoff and landing
  - ✓ 150 mips RISC processor accommodates your current needs and tomorrow's requirements
  - ✓ GPS waypoint navigation with altitude and airspeed hold
  - ✓ Powerful command set
  - ✓ Fully integrated with 3-axis gyros/accelerometers, GPS, pressure altimeter, pressure airspeed sensors, all on a single circuit board
  - ✓ Extensive data logging and telemetry collects the data you need
  - ✓ Includes HORIZON<sup>mp</sup> ground control software.
- Drone Control and System DATA Link
  - ✓ On encrypted microwave backed up by UHF
- Transponder: Mode-S, ADS-B out Transponder

### Wing

More than one option for the wing depending on the mission.

### Landing Gear

Main gear is retractable with the tail wheel fixed.



**High Intensity LED Flood Lighting:**

The high intensity LED flood lights produce 860 lumens each and are arranged in two rows, paired with high purity optics to produce a 20 degree spread spot beam approximately 228 meters (750') long by 23 meters (75') wide.

**Pilot Operator's Camera**

Pilot Operator's POV (Point of View) camera mounted in the nose, a fixed day and night camera.

**System Operator's Camera**

System Operator's POV (Point of View) camera mounted for direct sight of acquiring target, an either day or night camera.

**Air to Ground LRAD**

Long Range Acoustic Device (LRAD). Power Sonix 2X1200 watt PSAir32N a non-lethal crowd control tool, communication device, acoustic hailing, and siren.

**Thermal Night Vision Technology:**

The new color FLIR M364C-LR captures high-definition visible imaging and uses a 30x optical zoom to monitor distant targets. M364 dedicated thermal cameras capture excellent vision in complete darkness, blinding glare, and light fog, combine visible and thermal sensors, leveraging FLIR Color Thermal Vision™ (CTV) and MSX

NOTE: FLIR M364C LR featuring a high-definition low light camera and one of the most advanced FLIR thermal imaging systems, provide an elite level of awareness. Both cameras use multispectral imaging to deliver exclusive FLIR Color Thermal Vision™ (CTV) technology when used with Raymarine Axiom™ MFDs. Color Thermal Vision blends visible camera details with a thermal image, overlaying vital color imagery that allows operators to positively identify objects in the thermal scene. Outstanding imaging performance and enhanced gyro-stabilization make the FLIR M364C LR an indispensable tool for law enforcement professionals and commercial operators.

**FLIR M364C LR Range Performance**

- ✓ Person in the Water 4,900ft (1,494m)
- ✓ Small Vessels and/or Vehicles 2.1nm (3.9km)

NOTE: HD Cyclone Doppler Radar provides over the horizon target acquisition as far as 96 mi around the Boss. The new six-foot open array radar weighs only 26 pound This radar was inspired from an aircraft wing with a 100-knot wind rating. Provides operators targets as small as birds, providing the targets direction, range and speed.

- ✓ Tracks multiple targets
- ✓ AIS automatic identification system of other marine vessels is incorporated
- ✓ Very high definition
- ✓ FLIR M364C LR a premium Multispectral with active gyro-stabilization

**Tactical Operations Recognition Lights:**

High intensity strobe lighting system (Blue & Red) to identify in day and night conditions that the "BOSS" is on a Tactical Operation or mission if required.

**Cargo Hook:**

Hayabusa 6K remote cargo hooks: Design Load 2,722 Kg (6,000 Lbs) A heavy lift capacity sling lift requires no footprint. Ideal for disaster relief, available for rescuing victims from structure collapses.

**Aerial Brush and Structure Fire Fighting Response:**

BB-4453 BAMBI BUCKET, for the ultimate in aerial firefighting, capable of handling 2,000 liters (530 US gallons) of water 2080 kg. (4,580 lbs.).

Rapid initial attack air tanker for the front lines of fire suppression. As an initial attack air tanker, the Boss VTOL-UAV” is appreciated among aerial firefighting circles as fast and maneuverable, as well as both operationally effective and economical. Designed to fight wildfires and structure fires



Many Optional Payloads



#### **Additional Equipment:**

- Handheld encrypted UHF controller
- Rotor Blade slings & straps
- Engine inlet plugs
- Fuel sump and oil drain wrenches
- Tow Bar
- Pitot tube covers
- System test and diagnostic unit

#### **Documentation and Technical Publications**

- Operating Manual/Drone Flight Manual
- Operators check list with performance information
- Airframe, Engine & Rotor Maintenance Manuals
- Airframe, Engine & Rotor Parts Manuals
- Maintenance Logs: One Airframe & Engine
- Auto Pilot Operators Guides

## Warranty Program and Training

- Training of Initial drone pilots, system operators and maintenance personnel
- Training simulation software and hardware
- Airframe: 3-Year Limited Warranty Program
- Avionics: 1-Year Limited Warranty
- GE engine 1,000 hours / 1,000 cycles, whichever comes first.
- Rotor System: one year / 1,000 hours / 1,000 cycles, whichever comes first.

## Drone Inspection Program/Computer Maintenance Tracking

- First year of Maintenance Tracking



**Optional Equipment:**

- ✓ Optional Mobile Command Post: all in one; enclosed drone transport, mobile drone command post and support tandem axles gooseneck trailers.



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