



**P.1HH**  
HAMMERHEAD









**P.11H**  
**HAMMERHEAD**



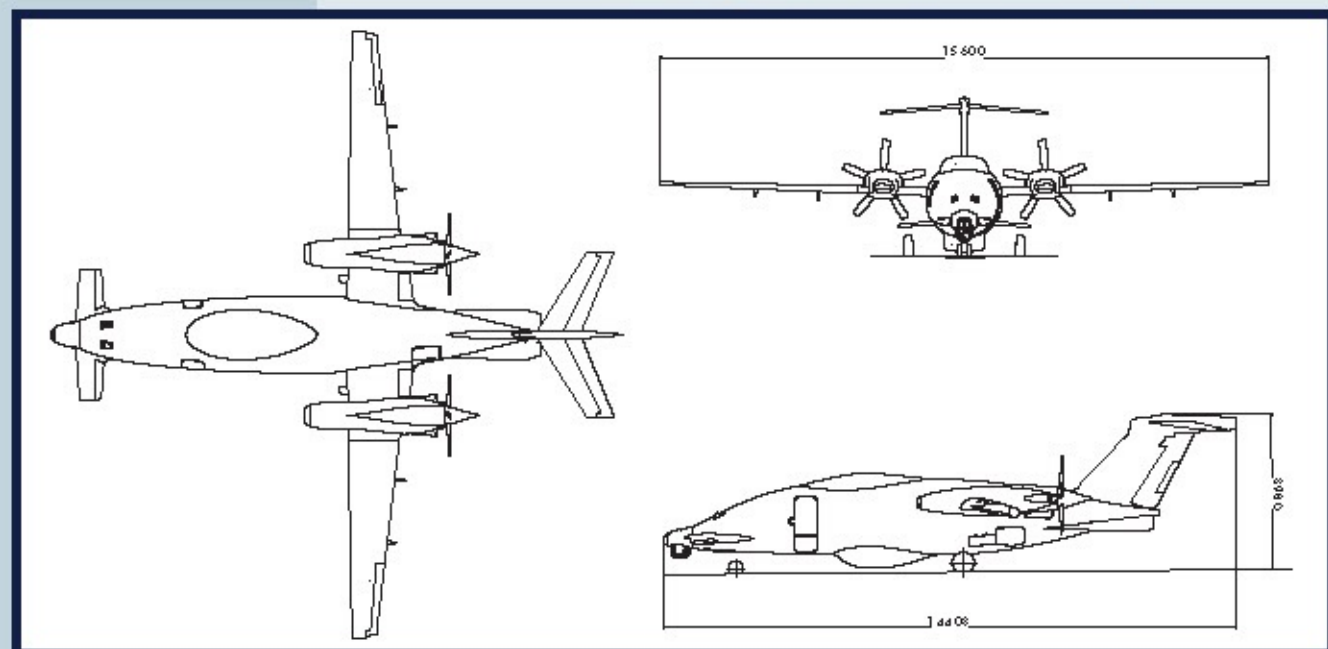
# PIAGGIO AEROSPACE P.1HH HAMMERHEAD UAS

MEDIUM ALTITUDE  
LONG ENDURANCE  
ISR UNMANNED  
AERIAL SYSTEM

Capable to perform  
ISR missions  
All-Weather Operations  
Automatic Take-Off & Landing  
Compliant with STANAG-USAR 4671  
Full redundancy – Safety requirements  
Cat. Event Prob. 10<sup>-6</sup> FH, SW Critical  
functions DO-178B level B  
System is ground/sea/air transportable  
(removable wings)  
24 hrs deployment capability



DIMENSIONS		
Span	15.600 m	51.18 ft
Length	14.408 m	47.27 ft
Height	3.980 m	13.05 ft
AREAS		
Wing	18.00 m <sup>2</sup>	193.75 ft <sup>2</sup>
Horizontal Tail	3.83 m <sup>2</sup>	41.27 ft <sup>2</sup>
Vertical Tail	4.73 m <sup>2</sup>	50.92 ft <sup>2</sup>
Forward Wing (Exposed)	1.30 m <sup>2</sup>	13.99 ft <sup>2</sup>
WEIGHTS		
MTOW	6,600 Kg	14,550 lbs
POWERPLANT		
2 x Pratt & Whitney Canada PT6A-66B 850 SHP (ISA, sea level)		
2 x Hartzell Propellers		
PERFORMANCES		
Maximum speed	395 KTAS	
Cruise speed	320 KTAS	
Loiter speed	135 KTAS	
Max Range	3,800 NM plus	
Max Endurance (500 lbs payload)	15 hours	
Endurance (500 lbs payload) @ 1,500 km from takeoff & landing base	9.5 hours	
Service Ceiling	45,000 ft	
Mission system	Leonardo (Selex ES) Sky/STAR® with: Leonardo (Selex ES) Radar "Next Generation Gabbiano T80" EO/IR Sensor Suite	





## **P.1HH HAMMERHEAD THE SUPER MALE UAS**

## **P.1HH THE UAV**

The Piaggio Aerospace P.1HH-XP HammerHead is a new Unmanned Aerial System (UAS) designed for Intelligence, Surveillance and Reconnaissance (ISR) missions. Its combination of performance and operational characteristics is at the top end of the UAS MALE (Medium Altitude Long Endurance) category. An unmatched combination of range, wide operative speeds, fast climb and descend gradients, high operative ceiling and potential variety of payloads, provides end-users with a powerful yet flexible Defense System that outperforms other MALE systems, identifying the P.1HH-XP HammerHead as a Super MALE UAS. P.1HH-XP HammerHead is suited for a wide range of ISR, Defense and Security missions, defines an efficient mission role flexibility and complies with state-of-the-art CONcept of OPERationS (CONOPS) for Defense.

The P.1HH-XP HammerHead is derived from the successful Piaggio Aero P.180 Avanti aircraft, one of the fastest twin turboprop aircraft in the world with a proven service record of more than 25 years and more than 900,000 flight hours.



The design of the P.1HH-XP HammerHead aims at being a unique ISR platform, able to climb up to 45,000 feet, loitering quietly at low speed (135 KTAS) for an endurance of up to 15 flight hours and dashing at very high speed (up to 395 KTAS) to target.

Its capabilities include being able to host several payload combinations and to perform multiple missions: aerial, land, coastal, maritime and offshore security. Based on P.180 Avanti proven architecture and technologies (tested and certified for passenger transportation), P.1HH-XP HammerHead is designed to be an all-weather aircraft with twin turboprop propulsion to provide maximum safety, operational reliability and the lowest mishap rate in its category. The P.1HH-XP HammerHead design is fully compliant with STANAG USAR 4671 standards to fly in both restricted and unrestricted flight areas, according to the permission of the relevant authorities.

## **P.1HH THE UAV PLATFORM**

The P.1HH-XP HammerHead platform has an aerodynamic configuration largely similar to P.180 Avanti, very effective thanks to its unique 3 lifting surfaces configuration and high aspect ratio laminar wings, adapted for the P.1HH-XP design by moderately increasing the wing span to sustain larger vehicle masses and allocating a quick detachable joint to the outer wings for rapid aerial deployment of the UAS in remote areas. Being based on a certified Mach 0.70 aircraft, P.1HH-XP HammerHead is one of the fastest MALE UAS. The P.1HH-XP HammerHead power plant has two, highly reliable Pratt & Whitney Canada PT6A-66B turbine engines integrated with constant speed 5-blade propellers. The Power Plant is controlled by two Engine Interface Units that receive commands from the FCC to drive the turbine and the propeller governors while managing engine and propeller data. A large upper fuselage tank, supported by a robust yet efficient carry-through beam, is integrated to provide the required fuel quantity for long range and endurance. A smart fuel system is designed to control and minimize the movement of the aircraft center of gravity for maximum operational flexibility in a wide range of mission payloads.

The triple redundant 28VDC electrical generation and distribution system supplies energy for all aircraft functions with adequate operational reserve through the envelope, and fully satisfies large power demands from a range of mission payloads.

Hammerhead inherits service proven systems, e.g.: anti-ice, with hot air on main wing, electrical on forward wing and pneumatic boots on the engine nacelle inlet. It has an hydraulic dual pressure system for landing gear extensions/retraction, nose wheel steering and brakes actuation, plus other ancillary systems like fire detection and extinguishing for the engine nacelle area. These subsystems are all commanded by the VCMS, via a fail-safe Remote Interface Units.

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## **P.1HH VCMS THE UAV BRAIN**

P.1HH-XP HammerHead features a technologically advanced Vehicle Control & Management System (VCMS) that when combined with the Mission Management System (MMS), manages the UAV and its mission specific equipment.

The VCMS, commanded from the Ground Control Station (GCS) via an airborne data-link system, conducts the vehicle commanding aerodynamic control surfaces and manages on-board equipment with a triple redundant Flight Control Computer (FCC) system and multiple remote multi-lane Servo Interface Units (SIU), developed to achieve the required level of safety and mission reliability.

Position, attitude and air data are guaranteed by triple redundant Inertial Sensors (INS) and Air Data Probes (ADS), integrated in the VCMS.

P.1HH-XP HammerHead VCMS features an Automatic Take-Off and Landing (ATOL) system served with dual redundant external sensors for required reliability and safety.

All VCMS LRU's are installed inside fuselage, in a protected and optimized operative



environment, in a optimized lay-out that provides zonal separation and temperature control to achieve a state of the art operative temperature range, highest VCMS reliability and finally, P.1HH-XP HammerHead safety.

## **P.1HH GROUND CONTROL STATION & DATALINK SYSTEM**

An advanced Ground Control Station (GCS) is the P.1HH-XP HammerHead UAS's Command & Control center. The GCS is hosted in an autonomous shelter with wide space for crew equipment and consoles necessary to manage three UAVs (two operational, one in transfer mode) and their related payloads. The crew processes functions necessary to execute tactical unmanned missions and stand-off surveillance unmanned missions, remotely commanding and controlling through VCMS and MMS the on-board surveillance system with an advanced human/ machine interface integrating display and control system.

The GCS is provided with multiple Ground Data Terminals (GDT) that when coupled with the associated Air Data Terminals (ADT) on the vehicles provide Line Of Sight (LOS) and Beyond Line Of Sight (BLOS) Link for Vehicle and Payload Control.

The Links System allows LOS & BLOS air vehicle Command & Control and payload digital encrypted data transmission via redundant, multi-frequency, high bandwidth RF links and via Ku/Ka Band SATCOM.

Mission data is eventually relayed to the headquarters either via ground communication systems or eventually with the same LOS/BLOS data link.

VCMS/GCS is developed and supplied by Leonardo thanks to their long experience in Avionics for many different aerial platforms and Unmanned Aerial Systems.

# P.1HH MISSION MANAGEMENT SYSTEM

The P.1HH-XP HammerHead Mission Management System is based on Leonardo (Selex ES) SkylSTAR® innovative technology, which redefines the concept of patrolling and ISR missions, to encompass threats that range from terrorist attacks to illegal immigration, as well as protection of Exclusive Economic Zones (EEZ), infrastructures and critical sites. The on board airborne Mission Management System (MMS) manages sensors, video and data, communications, and ISR functions and is capable of recording video and mission data. The MMS is modular and reconfigurable with effective and fully integrated open system architecture possessing significant growth capability. Sensor fusion technology, data management and exploitation features of SkylSTAR® enable highly effective border control, wide area surveillance, targeted surveillance environmental and disaster control missions.



# P.1HH MAIN COMPETITIVE CHARACTERISTICS

## P.1HH-XP HammerHead MALE ISR Unmanned Air System

Twin turboprop, all weather, proven system architecture and technologies

A combination of performances for range and operational speed:

- Operational Ceiling: 45,000 ft
- MMO: 0.70 Mach
- Climb to 35,000 ft in 20 minutes at maximum weight
- Loiter at 135 KTAS (1 to 3 NM turning radius)
- Maximum speed up to 395 KTAS
- Endurance: 1.5 hrs with ISR payload
- Range: up to 3,800 NM plus

Vehicle Control  
Management System  
compliant with STANAG USAR 4671  
standards with Automatic  
Take-Off and Landing

LOS/BLOS wide/narrow  
band Datalink



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