



LEONARDO HELICOPTERS

PROTEUS

TECHNOLOGY DEMONSTRATOR

Autonomous.
Collaborative.
Modular.



A COLLABORATIVE APPROACH

Proteus is the latest programme in over a decade of collaborative development with the UK MOD and Royal Navy. Proteus has been designed from the outset to prove autonomous large VTOL UAS can deliver or contribute to the delivery of military maritime effect. The latest iteration of the programme will conduct early flight trials of an autonomous Technology Demonstrator that validates the functions necessary to realise the vision of a fully autonomous uncrewed rotorcraft.

Leonardo is developing Proteus with the vision to collaborate on shared military and industrial objectives in the delivery of a next generation autonomous uncrewed rotary wing capability. Proteus is underpinned by a roadmap that will deliver one of the most advanced, integrated and connected autonomous Uncrewed Air Systems in the world.

MODULAR BY DESIGN

Proteus is modular by design with the major structural elements of the platform able to be replaced individually and the ability to rapidly re-role with specific mission modules as required. With a large standardised modular payload bay designed for the carriage of 1,000kg+ of payload or up to 2 standard NATO Pallets.

The Open Systems Architecture is Pyramid inspired and will enable collaboration on the development of modular mission payloads that can be sovereign to the capability or industrial requirements of individual countries. The Open System Architecture will enable third party mission software to be hosted and updated in short time periods without impact to the high integrity flight software.



ANTI SUBMARINE WARFARE FOCUSED

The primary focus for the Technology Demonstrator has been placed on the delivery of autonomous Anti-Submarine Warfare (ASW) FIND operations in harsh and hostile environments. Dedicated teams have been established across industry to investigate how the Proteus system can deliver autonomous ASW FIND whilst lowering the manpower and support costs associated with crewed operations. Achievement of an ASW FIND capability is aligned to the aims of the Maritime Aviation Transformation (MATX) strategy that forms the basis of the RN submission to the 2025 Strategic Defence Review. The target is a Minimum Deployable Capability in early 2030's.

Modular payload concepts have been designed for the carriage and operation of ASW mission equipment including Sonobuoys, Magnetic Anomaly Detector (MAD) and Dipping Sonar. The Proteus Mission System has been developed to facilitate autonomous functionality on ASW operations with significant processing of data on-board to generate tracks with the potential to perform initial classification.

AUTONOMOUS BY DESIGN

Autonomy is fundamental to the operation of Proteus.

Proteus has certifiable high integrity flight software, an ultra-intelligent mid integrity autonomy core and low integrity mission software specific to the mission role requirements.

Autonomy functions will be developed to enable Proteus to deliver military effect with appropriate operator oversight when required. Autonomy functions are aligned to specific flight elements (e.g. start, take-off, transit to area of operation), perform mission tasking, process data, disseminate information, transit to landing point, landing and shut down).

Leonardo has created an Autonomy road-map that defines the individual functions for which an autonomous equivalent needs to be developed and matured. Leonardo is investing, either independently or in collaboration with selected third parties, to develop the autonomous functions which will be tested individually before they are integrated and tested as sub-systems and at system level.

In the Proteus UAS solution the sensor is not controlled or operated by a person but rather the sensor determines, within its performance constraints, how to achieve the task set by the mission operator. Proteus UAS requires a task to be defined by the mission operator and uploaded remotely uploaded. Proteus UAS will perform the task autonomously and output information that will be relayed back to the mission operator via compressed secure data-link using whatever bearer is available.



AUTONOMY DEVELOPMENT VISION

The Proteus Technology Demonstrator Programme is the reference project to support delivery of Leonardo's Industry leading autonomy development road map prioritising the development of safe autonomous flight, delivery of autonomous mission effect, and reduced cost of ownership and maintenance burden through on aircraft health monitoring utilising AI and Machine Learning technologies.



FLIGHT

Flight control management is achieved with high integrity computing hardware running innovative proven software solutions. This software draws on established flight control algorithms from the family of rotorcraft that Leonardo produces. Hover hold, automatic take-off and landing, autopilot, start up and shut down is all standard functionality in our portfolio and is reused and refined in the Proteus aircraft. New functions such as collision avoidance, autonomous operation in denied, night and all weather capability is all part of our extensive flight autonomy roadmap.



MISSION

Mission capability is multi-faceted given the aircrafts ability to operate multi-domain, multi-mission. Automatic objective planning & task prioritisation using AI is a key enabler to permit denied environment operation. The aircraft mission system manages its stores and fuel load, dynamically re-planning as the mission tasking inevitably changes as scenarios develop. On-board acoustic processing of sonobuoy data relieves work load of remote operators, advanced optical and radar best perception give the aircraft and its allies broad situational awareness.



HEALTH

Automatic aircraft health management allows it to adapt for best possible mission outcome no matter what challenges it faces. Reduced operator burden results in faster decision making and less risk to aircraft survivability in peace and wartime operation. The aircraft builds on conventional flight reference cards by providing simple decision options to the operator. When operating fully autonomously it chooses courses of actions based on mission objectives without intervention, based on complex AI developed decision engines.

PROTEUS PROGRAMME PRINCIPLES

Today a Technology Demonstrator known as Proteus is beginning the transition to operations with autonomous uncrewed systems. Informing a comprehensive road map for the spiral development of military capability.



MILITARY CAPABLE

The technologies that are being developed in Proteus are key to future military operations. Designed to integrate into existing and future customer networks, secure national interests and enhance military and security cooperation.



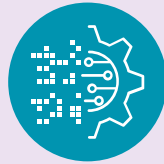
ECONOMIC BENEFITS

Proteus is creating intellectual property, sustaining and growing skilled jobs and is being designed to foster economic growth.



COLLABORATIVE BY DESIGN

Proteus is designed to bring together industrial expertise from potential partner nations leveraging on the already developed strengths in region to deliver the most capable uncrewed air system in the world.



ADVANCED TECHNOLOGIES

Utilisation of AI and Machine Learning Technologies, Novel Manufacturing Techniques and the integration of autonomous systems in a system of systems.

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