The SeaGuardian for Persistent Maritime ISR

The SeaGuardian is maritime version of the MQ-9B SkyGuardian from General Atomics Aeronautical Systems, and is slated to become the world's most advanced RPA when the first variant is delivered to the Royal Air Force as the *Protector RG Mk1* in the early 2020s. "Protector will be a step change for us in terms of capability," stated RAF Group Captain Lyndon Jones, "the new aircraft will offer greater range and endurance, and will be certified to fly in UK airspace."

On 11 July, 2018 the MQ-9B became the first Medium-altitude, Long-endurance (MALE) RPA system to complete a trans-Atlantic flight when it landed at the Royal Air Force airfield at Fairford in Gloucestershire, the flight having originated from GA-ASI's Flight Test and Training Centre in Grand Forks, North Dakota, USA.

As the RAF awaits its first delivery, demand from other parts of the world continues to increase. In addition to the UK and the United States, countries such as Italy and France have GA-ASI MQ-9A systems in their inventory, and the United Arab Emirates operates the Predator RPA, while Spain and the Netherlands have MQ-9 systems on order. In November, the Government of Belgium announced its selection of MQ-9B SkyGuardian to meet this RPA requirements and the Australian Government has announced GA-ASI to provide the Armed RPA system under Project Air 7003. Discussions are ongoing with several other countries.

A mature system

The MQ-9B leverages the mature system architecture of the legacy MQ-9A, with more than two million flight hours, while incorporating enhancements that support mission capability, global industrial expertise, and its goal of achieving unfettered access to national and international airspace. Nine external hard points on the MQ-9B offer great configurability to meet diverse mission requirements. In the basic Intelligence, Surveillance, and Reconnaissance (ISR) configuration, the standard SeaGuardian is equipped with a high-definition Electro-optical/Infrared (EO/IR) sensor and a high-performance 360° multi-mode maritime radar to support maritime patrol and surveillance missions.

In contrast to the MQ-9A, the MQ-9B's wings have been extended by four metres to a total length of 24m to accommodate additional fuel capacity, while also providing greater lift and endurance. The wing extension adds two hard points for a total of nine that can accommodate a maximum external payload of 2,155 kg.

The SeaGuardian has a range of 6,000-plus nautical miles with an endurance of more than 40 hours. GA-ASI flew an MQ-9B for 48.2 hours on 2,721 kg of fuel in May 2017, thus "providing greater endurance at lower operating cost, the SeaGuardian being ideally suited to complement manned maritime patrol aircraft in performing wide area maritime surveillance."

Endurance and Persistent Maritime ISR

In addition to its exceptional endurance, the SeaGuardian's state-of-the-art sensors offer "unparalleled ISR capabilities for a wide range of operational and threat environments". Capable of operating at Beyond Line of Sight (BLOS) ranges at altitudes over 40,000 feet and in inclement weather conditions, the MQ-9B can also provide EO/IR Full Motion Video (FMV), Synthetic Aperture Radar (SAR) imagery, and Ground Moving Target Indicator

In October 2017, GA-ASI demonstrated remote detection and tracking of submerged contacts. The MQ-9A used sonobuoys to gather acoustic data and track underwater targets. The demonstration successfully paired sonobuoy receiver and data processing technology onboard the MQ-9A.

(GMTI) data about potential threats to military commanders in real-time from stand-off ranges without harm to the aircrew.

The platform can also be equipped with a multi-mode maritime search radar, an Inverse Synthetic Aperture Radar (ISAR) capability, and an Automatic Identification System (AIS) detection capability that provides a true Maritime Wide Area Search (MWAS) and allows for the identification and interdiction of maritime targets. These maritime capabilities, for long in use by the United States, are critical to confront maritime threats before they reach population centres.

ATLC and All-Weather Performance

SATCOM Auto Takeoff and Landing Capability (ATLC) is part of the SeaGuardian package, designed to help minimise the aircraft's launch and recovery footprint, and reduce manning and equipment requirements at a Forward Operating Base (FOB). This capability allows aircrew on a Main Operating Base (MOB) to land, taxi and launch the aircraft from a separate FOB, requiring only a small team equipped with a ruggedised laptop at the FOB.

Both SeaGuardian and the MQ-9B SkyGuardian are capable of all-weather day/night operations, their cold weather engine start capability allows ground operations down to -41°C. It also has an Electro-expulsive De-icing system (EEDS) for wing leading edges, anti-ice heated engine inlet, heated pitot tube and static ports, and lightning protection.

As the MQ-9B is a ground-up redesign of earlier variants, which was done to earn certification for flying in non-segregated airspace and integrate seamlessly with manned aircraft, GA-ASI expects MQ-9B to achieve certification in the early 2020s. The aircraft will initially meet NATO STANAG-4671 airworthiness standards, and subsequently will meet commercial

The GA-ASI-developed Detect and Avoid (DAA) system is made up of an Air-to-Air Radar, TCAS II, ADS-B IN/OUT, and a Conflict Prediction and Display System. The DAA system provides pilots with real time situational awareness about proximate traffic and real time guidance to 'remain well clear'.