

COST VERSUS CREDIBILITY

While a maritime patrol capability is important for many countries, not all can afford aircraft that provide a full spectrum of capabilities. However, inexpensive but effective is a difficult goal to attain in what is often a multi-mission domain.

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When the British government announced that it was to buy nine Boeing P-8A Poseidon Maritime Patrol Aircraft (MPA) from the United States government through the Foreign Military Sales (FMS) process during the 2016 Farnborough air show held in southwest England, it signalled the end of a very embarrassing gap in Britain's national defences. The United Kingdom's 2010 *Strategic Defence and Security Review* (SDSR), which stipulates the UK government's strategic and defence procurement priorities made the decision

to scrap the ongoing Hawker-Siddeley/BAE Systems Nimrod MR4A MPA programme, an act which was expected to save the Ministry of Defence (MOD) more than \$2.4 billion over the following ten years, according to media reports.

However, a report issued by the House of Commons Defence Select Committee, which examines MOD expenditure, administration and policy on 11 August 2011 stated: "We deeply regret the decision to dispense with the Nimrod MR4A and have serious concerns regarding the capability gaps this has created in the ability to undertake the military tasks envisaged

in the SDSR. This appears to be a clear example of the need to make large savings overriding the strategic security of the UK and the capability requirements of the armed forces." It went on to underline that the Committee "(is) not convinced that UK armed forces can manage this capability gap within existing resources."

Since the cessation of the Nimrod MR4A programme on 19 October 2010, the UK, a historically world renowned maritime power since the formation of the Royal Navy in 1660, faced the ignominy of having to rely on French naval aviation on occasions to help support the monitoring

US Navy



The UK's airborne maritime patrol capabilities which have atrophied since the cancellation of the Nimrod MR4A will receive a much-needed shot in the arm with the acquisition of the P-8A.

of Russian submarines. For example, in November 2015, the *Daily Telegraph* reported that an *Aeronavale* (French Naval Aviation) Breguet/Dassault ATL-2 *Atlantique* MPA had been requested by the Royal Navy to be deployed from RAF Lossiemouth airbase in northern Scotland, to assist the search for a Russian Navy submarine which the former had detected in the seas off the north of Scotland.

This submarine may have been gathering intelligence regarding the Royal Navy's HMNB Clyde naval base on the River Clyde on the west coast of Scotland where the Senior Service's 'Vanguard'



Saab has developed its Global-6000 based MPA designs in a response to an increase in global submarine procurement anticipated by the firm.

class nuclear-powered ballistic missile submarines are home-ported. The *Daily Telegraph* revealed on 9 January 2016 that foreign assistance had again been called upon to assist the hunt for the errant submarine, on this occasion using two Lockheed Martin P-3C Orion MPAs, also deployed to RAF Lossiemouth, from the US Navy. However, the MOD would only state to the media that: "We can confirm that the UK recently requested assistance from allied forces for basing of maritime patrol aircraft ... The aircraft have been conducting maritime patrol activity with the Royal Navy; we do not discuss the detail of maritime operations." In contrast to the taciturn statement of the MOD, the Russian Navy has been more forthcoming about its sub-aqua machinations, with its then commander Admiral Viktor Chirkov articulating in a statement in April 2015 that: "For the period from January 2014 to March 2015 the intensity of patrols by submarines has risen by almost 50 percent as compared to 2013."

Therefore, it was with some relief that the UK's then Prime Minister David Cameron announced at the 2016 Farnborough air show that the MOD would acquire nine P-8As for the Royal Air Force. The MOD has announced that the aircraft will be based RAF Lossiemouth, and will be acquired as an off-the-shelf purchase. Interestingly, Japan's Kawasaki P-1 MPA flew to the UK to participate in the Royal International Air Tattoo in July 2016 and

had been considered by some members of the UK defence community as a potential late addition to the UK's options, with other possibilities discussed by the UK defence community including refurbished Lockheed Martin C-130J turboprop freighters configured for maritime patrol or the Airbus C-295 Persuader MPA.

Nevertheless, not every nation can afford to go with the expense of buying a fleet of P-8As. As an example of the aircraft's cost, the UK government estimated a price tag for the nine aircraft of \$4 billion over the first ten years of their acquisition and subsequent service life. By contrast the Norwegian MOD, media reports during November 2016 have noted, intends to buy five P-8As at a cost of \$1.1 billion. This gives the aircraft a unit price of between \$300 million to over \$400 million. The UK MOD expects the first P-8As to be delivered to the RAF from 2019.

MPA ALTERNATIVES

Just how broad a subject is maritime patrol? The Johns Hopkins University's Applied Physics Laboratory's *Technical Digest* journal provided a useful definition of the MPA's role in the current era. John Keane and Alan Easterling's article '*Maritime Patrol Aviation: 90 Years of Continuing Innovation*' published in 2003 stated that "maritime patrol aviation has recognised the importance of long-range, persistent, and armed intelligence, surveillance and reconnaissance in support of operations afloat and ashore," since 1912 when the US



Diamond

Maritime patrol can be an expensive business, although Diamond's DA-42MPP design promises a platform which can perform many surveillance tasks. An example of the aircraft's ground station is shown here.

Navy performed its first experiments flown from Guantanamo Bay in Cuba to visually locate submarines from aircraft. Following the end of the Cold War in 1991, Messrs. Keane and Easterling argued that the focus of the work of MPAs moved from the "high seas to the littoral environment," with the emergence of threats such as political violence and illegal weapons proliferation which MPAs are called upon to counter.

Gary Shand, an Anti-Submarine Warfare (ASW) solutions specialist at Saab argues that: "ASW will always be a complex challenge. Searching for a dynamic target under the surface that you can't physically see is a difficult task. Factor in variable oceanographic conditions, which alter the submarine's sound propagation path and the ocean's own ambient noise and the job gets even tougher. However things like improved small target detection radar modes (to help spot submarine periscopes), multi-static sonobuoys (where several acoustic projectors and receivers are dispersed over a large area to detect a target) and better situation awareness via a (command and control) system and acoustic processors (to provide accurate target discrimination) mean greater detection ranges and ultimately a higher possibility of detection." Therefore, the airborne task of

finding a submarine, then tracking it takes both technology and skilled aircrew who are well trained for the task, again not an inexpensive option.

SWORDFISH DUO

Recent events such as the Royal Navy's experiences with an alleged Russian submarine in 2015 underscore the continuing need for MPAs. Back in February 2016 at the Singapore air show Saab announced that it could install its

Swordfish MPA mission system on two new platforms: Bombardier's Q400 turboprop and Global-6000 business jet. The option of a turboprop or turboprop platform with the Swordfish system brings an element of flexibility for countries with varying defence budgets. Jonas Hjelm, head of Saab's support and services business area said that the choice between turboprop or turboprop platform gave potential customers the option "to select the platform that best serves their operational needs." Saab's understanding of defence, the firm revealed during its presentation of this new offering, has led it to the conclusion that submarine numbers will continue to increase from the current estimate of 600 deployed globally to a corresponding need for specialist MPA to detect them. The company suggests that up to 100 submarines will be operating in the Asia-Pacific alone by 2020.

According to Saab, the Swordfish mission system combines: "proven, operational COTS (Commercial Off-The-Shelf) sensors from several suppliers, with Saab's own specialist electronic warfare and command and control mission management systems," the firm's official literature states, with tactical information presented on interchangeable work stations. Mr. Hjelm added that not only was the company a systems integrator, but its traditional understanding of aviation through its own historic aircraft manufacturing programmes gave Saab: "a deep understanding of how to design and



Airbus

With the world's tenth largest EEZ to patrol, the Portuguese air force has been an avid user of the C-295 Persuader MPA.

Members of the C-295 Persuader owner's club include the Chilean Air Force which has acquired a variant of the aircraft optimised for ASW with the addition of two under-wing hard points.



build for the air domain.” He added that the company’s further knowledge of the maritime domain through its submarines, surface ships and underwater systems gave it: “total familiarity with the air and maritime environment.”

SMALL DIAMONDS

The Diamond Aircraft Industries DA-42MPP Guardian is perhaps a surprising aircraft to find included among the more renowned MPA mentioned elsewhere in this article, albeit designed more for coastal surveillance rather than long-endurance deep ocean coverage. The platform is fairly unique in that it comprises elements from several of the company’s own divisions into one package. Based on the firm’s in-house designed carbon composite DA-42NG airframe. The aircraft is powered by Diamond’s AE-300 Austro turbo diesel engine, and the DA-42MPP also features sensing technology from Diamond’s airborne sensing division. As Markus

Fischer, Diamond’s sales director for special missions aircraft explained: “The concept of the Guardian is to provide a full maritime airborne solution to a fixed price against illegal fishing and piracy.”

The aircraft can be fitted an Automatic Identification System (AIS) receiver. Mandated by the International Maritime Organisation (the United Nations agency responsible for regulating shipping) under the International Convention for the Safety of Life at Sea, the AIS transmits details of a vessel’s position, course and speed using a Very High Frequency (30 megahertz/MHz to 300MHz) radio frequency link, and is required for all vessels on international passage displacing over 300 gross tons. An AIS receiver, which has a range of 36 nautical miles (66 kilometres) for the Neptun system used onboard the DA-42MPP can depict this information on its screen denoting the position and identification of vessels in the aircraft’s *locale*. For sharing information,

the firm adds that the aircraft can make use of Diamond’s Kopernikus Satellite Communications (SATCOM) system which transmits across the Inmarsat and Thuraya SATCOM networks. A ground station for the DA-42MPP can receive live video, telemetry and voice communications. With an endurance of up to twelve hours, according to the company, the DA-42 MPP could operate offshore to a range of around 150nm (277.8km) where it could remain on station for several hours. In November 2016, Alexander Hauthaler, Diamond’s technical director revealed that the company had: “successfully tested Neptun and Kopernikus over the Mediterranean Sea for about 200 hours.”

THE PERSUADERS

One of the more attractive aspects of the C-295 Persuader would be its cheaper operating costs compared to a more complex platform such as the P-8A. A report published in 2015 by the RAND Corporation

think tank entitled *Metric to Compare Aircraft Operating and Support Costs in the Department of Defence*, stated that the hourly operating costs for a P-8A were in the region of \$4200. Meanwhile, in 2014, Airbus stated that its operating costs for the C-295 Persuader solution it was offering for the UK's maritime patrol aircraft requirement in the wake of the Nimrod MR4A cancellation was circa 25 percent of that of the P-8A, resulting in an hourly operating cost of approximately \$1050.

The C-295 Persuader, being a turboprop aircraft is slower than the bigger turbofan platforms such as the P-8A which has a cruising speed of 440 knots (815km/h), while the C-295 has a cruising speed of 260 knots (480km/h), with Airbus claiming an endurance of over eleven hours and a maximum range of 3040nm (5,630km). The company has installed six under-wing hard points on the C-295 Persuader which make it a multi-mission aircraft capable of not only maritime patrol, but also ASW and anti-surface warfare (ASuW). The hard points can support torpedoes, air-to-surface missiles, mines and depth charges. Users of the C-295 Persuader include the *Força Aérea Portuguesa* (Portuguese Air Force) which possesses five examples that are used to patrol Portugal's huge Economic Exclusive Zone (EEZ). EEZs, prescribed by the UN's Convention on the Law of the Sea, denote national rights regarding exploration and exploitation of marine resources. Canada's Sea Around Us maritime research organisation states that Portugal has the tenth largest EEZ in the world with a size of 503,631.5 square nautical miles (1.7 million square kilometres). The aircraft's surveillance activities are performed using the company's Fully Integrated Tactical System (FITS) mission system, which can be installed in either a permanent or palletised fashion.

ASIA-PACIFIC

Both New Zealand and the Philippines are in the market for new MPAs. The *New Zealand Defence Capability Plan 2016* published in November 2016, articulates the New Zealand government's planned investments into the country's defence capabilities reflecting the nation's strategic and defence procurement priorities disclosed in the New Zealand MOD's 2016 *Defence White Paper*. The former stipulates the need for: "a future air surveillance and response capability that meets the

increased surveillance demand within New Zealand's maritime domain, and represents a highly valued contribution to international coalition operations"

As part of this, the paper further underlines the requirement to maintain: "air surveillance operations beyond the withdrawal of the current (Lockheed Martin) P-3K2 Orion based capability, planned for the middle of the next decade." A request for information to this end was issued by the MOD on 17 August 2016 and closed barely one month later on 30 September. The RNZAF (Royal New Zealand Air Force) currently operates six P-3K2s that have been regularly upgraded but now their remaining airframe hours are low. Platforms that the RNZAF may consider include the P-1, P-8A and C-295 Persuader. It is interesting to note that the Japan Maritime Self-Defense Force deployed a P-1 to the Royal New Zealand Navy's 75th anniversary celebrations in November 2016, and during the RNZN's multilateral Exercise SEA LION naval exercise performed that same month. P-1 aircraft, media reports noted, also supported damage assessment following the major earthquake that struck the Kaikoura region of New Zealand's south island on 14 November 2016.

Away from New Zealand, the Philippines' Department of National Defence (DND) has been looking for new MPA to monitor in particular its vulnerable maritime territories in the South China Sea. The Philippines and the People's Republic of China dispute the sovereignty of maritime claims made by the latter in the South China Sea. The Japanese government has already stepped in to fill the Philippine's shortage of MPA with the lease of up to eight Beechcraft King Air TC-90 turboprop MPAs which was announced by the media in October 2016. Media reports have stated that the DND has a budget of circa \$120 million to purchase two MPAs. As the Philippines Air Force currently operates three Airbus C-295M turboprop freighters, Airbus has revealed that it is proposing its C-295 Persuader for this requirement. In fact, the Philippines' and New Zealand's requirements for new MPA is illustrative of the potentially bullish nature of the global maritime patrol aircraft market with Mordor Intelligence, a market research company, claiming in its *Maritime Patrol Aircraft Market 2015-2025* report that the value of such acquisitions could reach \$46.5 billion by the end of the forecast period. ■



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