



Germany's New Sub-Hunter P-3 Orion Enters Service

Marco P J Borst looks at why the German Government replaced a 40-year-old aircraft with one designed in the late 1950s, and asks whether it will be able to fulfil the German and international needs for maritime patrol and surveillance capability

IN October 2003 Germany took the first steps towards buying Lockheed Martin P-3C CUP (Capability Upkeep Program) Orions from the Royal Netherlands Navy (RNLN) when it signed a Letter of Intent (LoI) for the purchase of ten aircraft. Although at that time the Dutch Parliament had not decided to sell the Orions, the LoI prompted urgent discussions between Parliament and the Dutch Ministry of Defence (MoD). The outcome, on April 28, 2004, was a decision to sell the P-3s and to close RNLNAS (Royal Netherlands Naval Air Station) Valkenburg (the home of the P-3 fleet). Hardly two months later, on July 20, 2004, an

agreement was reached for the sale of eight P-3C CUP Orions to Germany. The following month, two German Navy officers were stationed at RNLNAS Valkenburg to establish a German detachment. Within two years, the first German crews were trained to operate the P-3C CUP and all eight aircraft were delivered to Germany. The last remaining Breguet Br1150 Atlantic will be retired in 2010 and its signals intelligence role taken over by the Euro Hawk unmanned air vehicle. Only 18 months after the decision to buy the aircraft was taken, *Marinefliegergeschwader 3* (Naval Air Wing 3 - MFG 3) was fully equipped with the Orions, which it now uses for its long-range maritime patrol tasks.

Atlantic replacement

A joint German/Italian study to find a maritime patrol aircraft (MPA) replacement for the Atlantics was terminated in July 2003 because the two countries could not agree on the type of aircraft to be purchased. Both were flying first generation Atlantics and faced major problems in keeping their fleets airworthy. The German Navy also had a very limited defence budget which threatened the continued existence of its maritime patrol squadrons at NAS Nordholz. Hence the Dutch decision to sell its Orions in a €295 million (£200 million) package deal for eight aircraft, ground equipment, tooling, spare parts, simulators

Germany's first P-3C CUP Orion, 60+03, carried the preliminary registration 98+01 when this photograph was taken last year. The bulbous radome under the centre fuselage houses the new electronic surveillance measures sensors.
Jaap Dubbeldam

and crew training) came as a sudden, but very welcome, surprise. The aircraft, then undergoing an extensive mission suite upgrade, known as the Capability Upkeep Program (CUP), were offered as a package, together with training for flight crews and maintenance technicians at RNLNAS Valkenburg.

In selling its Orions, the Dutch Government lost its airborne maritime patrol capability. By contrast, the German Government recognized that there was a need for a maritime patrol aircraft to perform a variety of roles. These included the traditional anti-submarine warfare tasks, but also peace-keeping operations, over-land surveillance and communications missions.

Orion described

The Royal Netherlands Navy Orions were originally ordered from Lockheed in 1978 and delivered between November 1981 and September 1984 in the P-3C-II½ configuration: their mission equipment had been designed in the first half of the 1970s. Other than some self-defence changes and infra-red sensor updates to three aircraft in 1998/1999 (for overland surveillance missions over Kosovo), the RNLN aircraft were unmodified before the first examples entered the CUP programme in July 2002. This focused on replacing almost all the mission equipment, including the central computer system and the work-stations on board. The sensor operators gained complete access to the output from all the aircraft's sensors, giving maximum situation awareness at every work-station. Only ten of the 13 Dutch Orions underwent the CUP, and three of them received the wiring modifications for all the new systems but were fitted with a limited equipment suite. These three, of which only one (c/n 5745, serial 60+03) was sold to Germany (the other two were purchased by Portugal, together with the Dutch Navy's last three unmodified P-3C-II½ aircraft), were primarily intended for coast guard missions. During the CUP, the original AN/APS-115 radar was replaced

by the much more modern AN/APS-137B(V)5 with synthetic aperture and imaging capability, which not only provides a threat location, but can also display the target's profile. Other important improvements were a completely new acoustic processor and sonobuoy receiver (AN/ASQ-78B), and an Intern communication system (AN/AIC-34). Furthermore, all aircraft received the same self-defence equipment as the three aircraft mentioned which served in Kosovo, (AN/ALE-47 chaff/flare dispensers and AAR-47 Missile Warning Receivers). A brand-new AN/ALR-95(V)2 electronic surveillance measures (ESM) system replaced the Update II½'s ESM system. Most of the new ESM hardware was installed during the CUP modifications, but the software development was slightly delayed and could only be exported after being approved by the US Navy. The same ESM system became available for the US Navy's P-3C AIP (Anti-Surface Warfare Improvement Program) Orions from October 2006. Currently the ESM systems on the German Orions are not operational. ESM system training for the German Navy operators, by American instructors, is planned to start in April. The first completed P-3C CUP Orion was delivered to the Dutch Navy at Valkenburg on May 23, 2004.

German training squadron

The German Navy established the Naval Air Systems Training Squadron on July 1, 2004, at Valkenburg. Training began the following month, at which time the RNLN had only one completed P-3C CUP available from the modification line at Lockheed Martin's facility at Greenville, South Carolina. The remaining aircraft were in various stages of the CUP modernization programme or had still to enter it. Despite selling the Orions, the Dutch Government maintained its contract with Lockheed Martin to modernise all ten aircraft through the CUP, and these were accepted by the RNLN before delivery to Germany. Perhaps one of the biggest challenges was the fact that the RNLN instructors had to be trained to operate the P-3C CUP themselves before



A German technician working on one of the P-3's Allison T-56 turboprops. The combination of greater reliability and longer periods between scheduled maintenance will give the Orion a higher availability.

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they could instruct the German crews. Transitioning from the Br1150 Atlantic to the P-3C CUP Orion was a big step, especially for the pilots. Compared to the Orion, the Atlantic is an exceptionally easy-to-fly aircraft – its crews often compare it to flying a Cessna 172. The short programme timescales brought their own problems – only seven months elapsed from first talks about the possible purchase of then Orions to the formation of the training detachment. Whereas the normal selection and preparation procedures for a new MPA would have taken seven to ten years, the German

Navy had to complete them in only ten months. Nor was it an easy period for the RNLN instructors, who saw their squadrons being disbanded, their Orions being sold and their future being destroyed, while at the same time they were tasked with training German crews...who would get 'their' aircraft.

A P-3C CUP crew usually consists of eleven personnel: two pilots, a flight engineer, a tactical co-ordinator, a navigator/radio operator, two 'wet' sensor or acoustic operators, a 'dry' sensor operator (radar, infra-red detecting set, ESM), a flight engineer and two observers. The first German P-3C CUP crews (two instruction crews and two operational crews) and maintenance personnel completed their training in June 2006, after which all aircraft were flown to Germany (seven from Valkenburg and one direct after CUP completion from the US), the last Orion departing Valkenburg on June 22. Eight days later, Naval Air Wing 3 disbanded its Naval Air Systems Training Squadron at NAS Nordholz and the same day 1 Squadron was re-activated as Germany's first P-3 Orion squadron.

In addition to aircraft and the initial training programme, Germany also bought spare parts, tooling, equipment, mission support systems and the two flight simulators from the RNLN. These simulators – a full motion cockpit simulator with day and night vision, known as the Operational Flight Trainer (OFT), and a full-scale copy of the P-3C-II½ mission trainer (OTT), are the only P-3 simulators in Europe. The majority of the spares will be held by Dornier Flugzeug Werft (DFW) in Manching/Ingolstadt, which will carry out heavy maintenance work on the German Navy Orions.

As the original manufacturer of the RNLN P-3C Operational Flight Trainer (OFT), CAE was contracted to dismantle the OFT at Valkenburg and transfer it to CAE's German facility in Stolberg, where it will be upgraded to the latest P-3C CUP configuration. CAE technicians will be working on the OFT at night, so during this modification

Tactical co-ordinators are able to send data to land-based command centres or to commanders in the field.

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A requirement for two 'wet' sensor operators is probably driven more by the system complexity than the numbers of anti-submarine warfare sorties flown. Indeed, the focus is changing from anti-submarine warfare to anti-surface ship warfare.

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German P-3C CUP Aircraft

Lockheed c/n	US Navy BuNo	RNLN serial	German Navy serial	Type
5737	161369	301	60+01	P-3C CUP
5741	161370	302	60+02	P-3C CUP
5745	161371	303	60+03	P-3C CUP
5754	161373	305	60+04	P-3C CUP
5765	161376	308	60+05	P-3C CUP
5769	161377	309	60+06	P-3C CUP
5774	161379	311	60+07	P-3C CUP
5776	161380	312	60+08	P-3C CUP

Note: 60+03 was initially registered 98+01

programme it will be available for use by German Navy crews in the daytime. Training at Stolberg began last October and the OFT is scheduled to be fully updated by this summer. Next year it will move to Nordholz.

Like the OFT, the RNLN's Operational Tactical Trainer (OTT) had not been upgraded to P-3C CUP standard either. In December 2006 the German MoD contracted CAE (teamed with Lockheed Martin and EADS) to design, manufacture and maintain a new OTT to train the Orion mission crew. When this is modified it can be coupled to the OFT in order to simulate a complete P-3C CUP Orion mission. The OTT is scheduled for delivery to MFG 3 at NAS Nordholz in the autumn of 2008.

Operational status

Forty-eight RNLN personnel (eleven flight crew plus technical staff) will support the introduction of the Orion at NAS Nordholz until this summer. Subsequently, all training will be carried out by German Navy instructors. No.1 Squadron is looking forward to taking part in Exercise *Noble Manta '07*, the world's largest anti-submarine exercise at NAS Sigonella, Sicily, this month (April) with a P-3C CUP and the squadron is also planning to carry out a number of over-land mission trials over Germany later this year. Achieving initial operational capability is planned for this summer, when the German Navy expects to re-establish an MPA deployment with a P-

3C CUP Orion in Operation *Enduring Freedom* (out of Djibouti) or Operation *Active Endeavour* (out of NAS Sigonella). Full operational capability is expected by 2009.

Although the German Navy has had its MPA fleet significantly reduced, from 20 Atlantics to eight Orions, the reliability and systems capability of the P-3C CUP will enable MFG 3 to achieve at least the same number of missions and flight hours. With 12 Atlantics MFG 3 was flying some 3,200 hours. All maintenance for the Br1150 Atlantic was based on flight hours: that for the Orion is based on calendar inspections. This will result in a higher aircraft availability rate, allowing MFG 3 to increase the number of flight hours with the P-3C CUP from a planned 2,000 this year to 3,500 hours in 2009. Five of the eight Orions will be available for operations at all times.

Although the German Navy has not released details of the Orion's operating costs, the total fleet costs are likely to be less than those for the Atlantics because of their higher utilisation. From a logistic perspective it will be easier, and less expensive, to maintain the P-3C CUP, because more than 440 aircraft are still in operational service with 15 nations. This compares with much fewer numbers of first generation Atlantics that entered service. Direct benefits of scale include better access to spare parts and technical support.

When MFG 3's aircraft are fully upgraded to P-3C CUP standard, their state-of-the-art mission avionics suite will give the German Navy a significant increase in operational capability. In addition to their traditional maritime patrol role, they will be able to carry out long-range reconnaissance over land and water, and joint operations with national and allied ground, air and maritime forces including communication support and direct support. Despite its age, the P-3C CUP Orion is scheduled to remain in German service until at least 2025. With a number of service life extension programmes, which could go as far as replacing the wings and empennage, being developed by Lockheed Martin and L-3 Communications, the Orions could still be giving sterling service in 2050. ☉



MFG 3 presented its new maritime patrol aircraft to the public at the Nordholz Open Day on August 27 last year, when its first P-3C CUP Orion was displayed as part of a mixed formation with three Br1150 Atlantics (the ELINT variant of which is seen here).

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