Survival of the fittest: pods and pylons still in vogue for fast jet self-protection

Add-on countermeasures systems continue to make an important contribution to combat aircraft survivability in hostile airspace. *Richard Scott* reports

Substantial numbers of so-called 4.5 generation fighters – in the mould of the Dassault Rafale, Eurofighter Typhoon, and Saab JAS 39 Gripen – are now in service with air arms across Europe; a fifth generation – in the low-observable shape of the Lockheed Martin F-35 Lightning II – will proliferate in the years ahead. One common feature across these generations is the adoption of fully integrated, software-driven electronic warfare/defensive aids system (EW/DAS) suites integral to the airframe.

At the same time, there is a recognition that many older-generation fast jets – notably Panavia Tornado and Lockheed Martin F-16 mid-life upgrade (MLU) fleets – will continue to serve with European air forces and other allied air arms for some time. Thus, as anti-air guided weapon threats continue to advance, significant attention is being paid to the means by which to update the self-protection capabilities of these legacy platforms.

Terma's MCP-8.5 AIRCM pod (seen under the port wing of the aircraft closest to camera) was introduced to service on RAF Tornado GR4 aircraft in 2009. The aircraft behind carries the legacy Skyshadow-2 jamming pod. (Jamie Hunter/AVIACOM)

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Since 2001, there has been an emphasis on improving the survivability of aircraft flying close air support (CAS) missions in the face of a proliferating and qualitatively improving threat from man-portable air-defence systems (MANPADS). The proliferation of more advanced infrared (IR) seekers

associated with later-generation MANPADS, enables them to acquire and approach from the front, homing in on airframe radiation rather than jet exhaust. This has driven the need to fit missile warning systems (MWS) capable of near-360° spherical coverage to automatically cue IR countermeasures. It has also driven requirements to increase magazine capacity for expendable countermeasure devices given the need to dispense pre-emptive flare patterns and more complex decoy 'cocktails' (including forward-firing flares).

More recently, there has been a renewed focus on the radio frequency (RF) threat. NATO's Operation 'Unified Protector' over Libya in 2011 provided a rude awakening to those who assumed that radar-guided surface-to-air missile (SAM) threats had all but disappeared with the end of the Cold War. Almost overnight, offensive air components were required to dust down tactics, techniques, and procedures developed to 'evade, counter, and exploit' in an RF-hostile environment. Moreover, the threat faced in Libya pales in comparison to some of the advanced integrated air-defence systems now being fielded worldwide.

When it comes to updating the self-protection suites in older fast jet types, there are a number of inherent attractions to introducing podded or pylon-mounted defensive aids solutions, rather than embodying fits internal to the airframe. These include the reduced cost, complexity, and time associated with qualifying an external load on existing hardpoints; rapid integration and qualification, reflecting relatively 'lean' integration with other aircraft systems; interchangeability between aircraft without the need for fleet-wide airframe modifications; and the latent flexibility to modify pods or pylons to accept technology insertions to meet future requirements. Pylons bring the additional advantage that enhanced platform protection is provided without loss of weapon stations.

Modular pod

During the early 2000s, Danish systems and sensors house Terma recognised the increased sophistication of the MANPADS threat. Accordingly, the company began engineering development work on a generic Modular Countermeasures Pod (MCP) that integrated missile warning devices with countermeasures dispensers in a modular and self-contained installation controlled through its cockpit-mounted AN/ALQ-213(V) EW management system.

Terma achieved early success providing add-on self-protection for large tactical aircraft and helicopters, but in the mid-2000s found opportunities emerging for fast jets as a number of air forces raised requirements to replace existing bulk countermeasures dispensers such as BOZ and Phimat. With the potential to capture a new market share, and keeping users of the Tornado foremost in mind, the company re-engineered the MCP so that it was shaped and stressed for the speeds and loadings associated with carriage on a supersonic-capable platform.

Marketed as MCP-T at the outset, this variant retained the core modular architecture of earlier MCP systems but was reconfigured aerodynamically with suitably modified nose and aft sections (modelled on those in the existing BOZ pod) and fitted with a strongback for the aircraft's structural interface. It was designed to accommodate up to eight dispenser magazines, with its modular design enabling the integration of other DAS components, such as a multi-MWS or a towed decoy.

Terma was awarded a contract in 2007 to supply its MCP-8F pod to fulfill the Luftwaffe's Einsatzsofortbedarf Special Dispenser System (ESB SDS) requirement. This necessitated the fast-track integration of a new bulk flare dispenser to equip a detachment of six Tornado aircraft from Aufklärungsgeschwader 51 'Immelmann' being deployed into Afghanistan to fly reconnaissance missions.

Controlled using Terma's ALQ-213(V) EW management system, the MCP-8F variant delivered to meet the ESB SDS requirement featured eight magazines: two fixed downward-looking magazines and a further six magazines configured as pairs in three barrel modules. These barrel modules were able to rotate in 15° increments to fire sideways, or at any downwards angle, and achieve the optimum flare pattern according to the threat conditions.

In the case of the Luftwaffe's ESB SDS fit, the MCP-8F pods were hybrids employing a standard MCP centrebody mated with nose and aft sections removed from legacy BOZ pods. Although the pod was provisioned to integrate missile warning sensors, there was no requirement in this specific case for a missile warner fit.

The ESB SDS was developed and tested in co-operation with EADS (now Hensoldt) and the WTD 61 Bundeswehr Technical Center for Aircraft and Aeronautical Equipment inside three months during the second half of 2007. More than 10 pods were delivered.

In late 2007 an urgent operational requirement (UOR) was raised to equip Harrier GR9 aircraft of the UK's Joint Force Harrier (JFH) with an automated and fully integrated DAS capability. At this time, Harriers from JFH – a combined Royal Air Force (RAF)/Royal Navy force – were deployed to Kandahar as part of Operation 'Herrick', primarily to provide CAS to coalition forces.

With the pedigree of the MCP pod already established within the RAF – the variant having earlier been introduced for the Nimrod MR.2 maritime patrol aircraft – an MCP-H variant specifically tailored for the Harrier (known internally by Terma as MCP-8.2) was conceived in a short timeframe to meet the UOR. As well as having eight Advanced Countermeasures Dispensing System (ACMDS) magazines (two forward-firing and three lateral pairs in barrel modules), the MCP-H was configured with a BAE Systems' Electronics and Systems Integration AN/AAR-57 Common Missile Warning System (CMWS) incorporating five sensor heads (angled to cover each quadrant and downwards). BAE Systems also undertook software development to support pod control and DAS integration into the aircraft avionics system.

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