

Mission Critical Connectors for Military Operations

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The Customer

The Naval Air Warfare Center Aircraft Division (NAWC-AD) team supports research and development, engineering, and testing and evaluation of all U.S. Navy and Marine Corps air vehicle systems and trainers. NAWC-AD manages test ranges, test facilities, laboratories and the aircraft necessary to support U.S. military fleet acquisition requirements. NAWC-AD also provides a variety of services to the Department of Defense and other federal agencies, as well as non-federal customers. For this project, FilConn worked with the NAWC-AD department that oversees aircraft weapons systems, called Air Vehicle Stores Compatibility Branch.

The Challenge

The U.S. military was bringing decades-old OV-10 Bronco turbo-propeller planes out of retirement to use in the fight against ISIS. Broncos, first used during the Vietnam War, are slower and lower flying than newer aircraft, so military leaders thought they would better support ground troops in the Middle East. They are also more cost-effective to fly. However, because the aircraft were not initially designed to carry newer technology and weapons, NAWC-AD ran into major space and weight restrictions trying to get the vehicles back into flying and fighting service.

The project required electronic connectors that would fit in these tight spaces that were also as light as possible, which could not be found in Commercial Off-the-Shelf (COS) connectors. The team also required a quick disconnect between the aircraft's weapons carriage device - or pylon -- and the weapon, so the cable and interface could be retained once the store has been deployed. A custom solution was needed.

And they were faced with a rapid response project to update the technology and field the aircraft so it could be tested in a real wartime scenario.

The Solution

FilConn began communications with the NAWC-AD team, and traveled to the Maryland site to meet in-person with the engineering team, study the requirements and see for themselves the aircraft space restrictions and configurations. Immediately following the visit, the FilConn design engineers went to work, first developing a connector design and prototype, then a design that included the connectors with a low-profile custom integrated banding platform, to save on space and weight.

They sent the model to NAWC-AD, who printed it on a 3D printer in plastic for evaluation before metal was ever cut.

Of course, the connectors had to withstand harsh environments, and were tested for, among other things, shock, vibration, altitude, moisture, salt spray, immersion (water/fuel), and electromagnetic interference, vulnerability, and pulse (EMI/EMV/EMP).

In the end, partnering with the FilConn experts delivered a unique design solution with unmatched speed and precision, outfitting yesterday's aircraft with current state technology in only eight weeks.

From design to delivery, a timeframe that allowed NAWC-AD meet their operational goals.

The Outcome

FilConn delivered a highly tailored solution to a very aggressive timetable that integrated a new store on the aircraft that is not currently flown on any other Navy aircraft.

According to U.S. Central Command, the twin-engine OV-10 Broncos completed 134 sorties, including 120 combat missions, acting as cover for soldiers fighting ISIS terrorists on the ground, over a span of 82 days beginning in May 2015. The OV-10s' famously reliable nature was evident, with 99 percent of their planned missions completed. Central Command would not confirm where they were based, or the targets they attacked, but said they were part of Operation Inherent Resolve, the American-led initiative against the extremists in Syria and Iraq.

The NAWC-AD R&D team learned some valuable lessons on this project, for one, how to better handle this weapons interface. In addition, they now have quick access to a FilConn custom connector solution for future projects. And the use of the integrated banding platform (connector and backshell in one) simplifies the purchasing process as the solution is one part number with a smaller profile vs. two.

The weapons and counter-measures division has also passed learnings on to other NAWC-AD divisions who oversee flight controls, or aircraft equipment in general. As a result, this project may provide benefits beyond just getting the Broncos operational.