

The Benefits of Applying Open Architectures

Private investment in the telecommunications industry has put defence communications equipment programmes under increasing pressure. Unable to spend enough to keep up with external technology development, the only realistic approach is to leverage commercial off-the shelf (COTS) items through the application of open interface standards.

Pre-defining the hardware and software communication systems architectures for diverse applications is an almost Sisyphean task. To make this more manageable it is helpful to consider iterative refinements (applied over a period of time) as an approach to refining technical standards.



*Pre-defining open architecture systems for diverse applications is a Sisyphean task!
(iStock.com/Ivan Bajic)*

Meeting the Challenge

In 2017, PPM Systems was challenged by UK MOD to bring together hardware and software technology developed under previous government programmes, into a ruggedised form-factor with the goal of delivering a supportable in-service signal analysis capability.

The technical scope and tight timescale meant 're-inventing the wheel' was out of the question. So, PPM selected and worked with a team of industry partners to collaborate on the project management and systems engineering, with the solution's sub-assemblies contracted out to a small ecosystem of suppliers.

Delivering in the required timeframes called for an open and collaborative approach between the industrial and government partners. The engagement of technical and user communities ensured

requirements capture could be conducted quickly. This allowed early creation of accurate sub-contractor work packages and facilitated the acceptance of finalised work. The flexible stance the commercial authority took allowed integrated logistics activities to work at pace alongside development, and potential issues to be handled before they became problematic.

The real challenge was the mandated use of components which had been developed for other purposes. These components formed the basis of the project and included signal processing elements (PE), RF front end devices (FED) and baseline signal decode applications (APPs), which provided the underlying analysis suite. As not all the elements were fully mature and some needed tailoring, component uplifts were made.

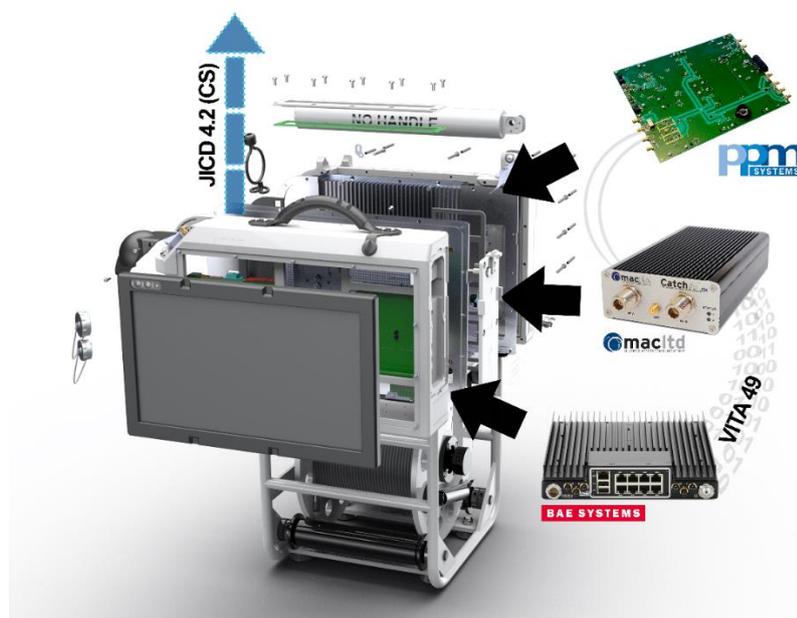
In addition to this, the final delivered capability also needed to co-exist with the other applications already using the components, be powered by an in-service fleet of LIPS10/12 batteries and work with the in-service PPM Systems' Rodent 4 remoted antenna platform.

The Solution

PPM Systems' implemented solution was an embryonic capability-delivery through the application of open standards.

Integrating all of the components was only possible due to the openly published standardised interfaces that governed them. These interfaces included Rodent 4's remote antenna RF over fibre connection to the FED signal capture cards, the VITA49 radio transport (VRT) protocol used to connect to the PE compute nodes, and the SW API that allowed application re-use. These employed standards allowed previous developments to be carried forward for this new use.

Bringing the COTS modules altogether, through the use of standard communications protocols, a containerised software orchestration layer and a generic vehicle architecture (GVA) inspired frame-based graphical user interface (GUI), resulted in the creation of PPM's 'Crossbow' signal analysis system.



PPM's Crossbow signal analysis platform

The working method undertaken by PPM not only sped up the development time – meaning the tight delivery timeframe was met, but also created a legacy of supportable and upgradeable equipment for the future; using open architectures. On project completion, the maturation activities were published back into their original defence programmes to ensure other programmes could benefit.

Defence EOD & Search Branch, Army HQ, commented: “PPM exhibited the sort of behaviours we’d expect other equipment suppliers to demonstrate.”

PPM added: “All of the staff at PPM gain great satisfaction from delighting the user community by exceeding their expectations of what a systems integrator can deliver.”

PPM is now working to expand Crossbow’s capacity and bandwidth, with upgraded hardware modules and an uplift to the operating software, to enable it to function as part of a network connected enterprise.

Future Benefits

PPM System’s work on this project has opened the door for other such in-service capabilities to be incrementally evolved in order to keep up with changing technology. The delivered capability is an example of how the benefits of open architectures can be realised; leaving the path open to extend and upgrade elements for the future’s as yet undefined features.

Please contact us for further information.

www.ppmsystems.com