

DRAWING LESSONS FROM YEARS OF EXPERTISE TO SUPPORT THE EVOLUTION OF MILITARY COMPUTING

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Leonardo DRS has been involved in the UK Bowman project since the project's inception, having competed for and won a substantial contract for the vehicle-based tactical workstations in 2002. Key to the success of the program was the high degree of commonality between the three different workstation variants: VUDT (Vehicle User Data Terminal), BMDT (Bowman Management Data Terminal), and PBPU (PBISA Processing Unit), leading to economies of scale and making software and through-life support economic and effective. This initial modular and upgradable approach has proved to have long-term benefits to not only Leonardo DRS but also to the UK Ministry of Defence (MoD).

We here at Leonardo DRS provided more than 14,000 tactical user data terminals to General Dynamics UK (GD UK) for the initial Bowman implementation. The UDTs are installed in all tactical vehicles, wheeled and tracked, with the BMDT and VUDT (now referred to as CT1 and CT2) being dismountable for use within command posts or autonomously off the vehicle platform.

Leveraging Leonardo DRS' position as the major supplier of tactical computing to the US Army has been a core strategy of ours over a number of years. When we had the opportunity to re-compete for the Bowman UDTs in 2008, we took the approach that upgrading the delivered systems was the most competitive and impactful way to provide the enhanced capability that the British Army now required.

Key to this strategy was the high degree of re-use that could be made of vehicle infrastructure, including cabling and installation kits, which represented a significant saving to the customer. In winning the re-compete BCIP5.4/5.5 Bowman contract in 2008, we were able to draw together the product development roadmaps for both the US Army and the UK Army. We did so by leveraging technology drawn from the US Army FBCB2 contract that DRS had won and was being delivered at the time.

In 2016 we were once again presented with an opportunity to compete for the next spiral of Bowman technology insertion in the form of Bowman 5.6. This was a key phase of development as 5.6 would provide the tactical computing infrastructure on which the UK's Morpheus' evolution to a more open system is going to be built. Maintaining our incumbent position on Bowman was, and is, of great importance to Leonardo DRS and the Bowman 5.6 project provided another opportunity to deliver a value-for-money solution (built on the principles discussed above). Leonardo DRS was pleased

to be awarded the 5.6 contract continuing the highly successful partnership developed with both GD-UK and the British Army.

On this occasion, we were able to exploit the US Army MFCs contract that we had originally won in 2013 and again in 2018 in the form of MFCs II. US Army MFCs effectively replaced FBCB2 so this was a natural progression and once more allowed Leonardo DRS to align the primary US and UK brigade and below C4 projects by providing a solution which had a high degree of commonality across both programs. It also ensured that Leonardo DRS continued to deliver the benefits of ongoing technology insertion, underlying capability development and enhancement to both projects based on a significant degree of commonality in terms of the core computing, display and networking and security architecture. Leonardo DRS ultra-rugged tactical computers are designed to allow for ongoing technology insertion and upgrade. Over the course of a project the size of Bowman and MFCs, this means that we were able to utilize the same basic infrastructure to deliver ever-increasing amounts of capability as computing technology advanced. The Intel™ Core 2 Duo systems delivered back in 2002 have now been upgraded through two spirals to new Intel multi-core technology, maintaining legacy I/O and introducing new interfaces for future expansion.

The ability to utilize the current infrastructure and upgrade the current systems is more cost-effective than buying lower grade rugged COTS systems and ensures that there is no compromise regarding the environmental performance of the system. Modern Battle Management Systems are mission-critical and Leonardo DRS believes that there should be no compromise in their ability to perform in the harshest of conditions.

The nature of the capability that Leonardo DRS provides has changed considerably over the past 15-16 years since we first won the Bowman contract, and then soon after, the US Army FBCB2 contract. The original focus of our efforts was to ensure that we provided the very best tactical computing solutions that would stand up to the rigors of a battlefield environment.

Leonardo DRS' track record in this regard is unmatched. We have installed over 300,000 systems to date

and are delivering unparalleled performance in terms of reliability, availability and resilience. These product attributes remain constant today. However, the nature of modern fighting vehicle architectures has moved on and so our hardware and software have evolved as well.

MFoCS is much more about delivering an integrated networked capability, which can support a wide range of user needs and applications, as opposed to the previous stove-piped system which supported a single application. Although Bowman 5.6 may not mirror the multiple applications and network interfaces supported by MFoCS, the solution that Leonardo DRS is now delivering has the capability and capacity to migrate to the basis of a common vehicle architecture capable of supporting multiple applications. The MFoCS/Bowman LSU computing baseline will support multiple virtual machines and Local Area Networks, interface with a range of video sources, and support more complex security architectures and therefore provides the basis for capability growth. This positions Leonardo DRS to continue to develop our solutions as the MoD looks to the future and to Morpheus.

A key part of the Leonardo DRS product roadmap is the development of GVA-compliant versions of the MFoCS core computing products, which again leverage the common computing and display technologies and economies of scale with such a large US project of record while adhering to the requirements of standards such as Def-Stan 00-82 and 23-09.

Leonardo DRS is in a unique position. We have derived a great deal of experience in delivering tactical computing content into the two largest BMS/C4i projects conceived in the form of FBCB2, evolving to MFoCS in the US and UK Bowman over a 15-year period. This experience has provided us with a wealth of knowledge and capability that goes into everything we do.

Today Leonardo DRS is able to provide complete vehicle architectures that are both network and application-agnostic while delivering world-class networking, voice, video and tactical computing infrastructure. The development of Leonardo DRS' latest variant of Data Distribution Unit Gen 4 (DDU-4) is a prime example. The DDU-4 shares much of its DNA with the primary MFoCS II tactical server but builds in capabilities for additional functionality such as voice-crossing banding between radios with different waveforms, additional Ethernet and CanBus interfaces along with support for Tactical LTE and enhanced GPS capabilities.

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