



## Right on target with CADSTAR

C A S E S T U D Y

**BAE SYSTEMS**

BAE Systems is a global company engaged in the development, delivery and support of advanced defence and aerospace systems in the air, on land and at sea. The AS90 is an armoured self propelled Howitzer which was initially designed for combat in the cold war and now supports troops in Afghanistan and Iraq, it finds itself in a whole new battlefield with a whole new purpose.

The AS90 is supported through a single CLS (Contractor Logistics Support) contract, the Equipment Support Agreement (ESA), a 5 year contract on BAE Systems, who supply spares and repairs on demand over the 5 years, along with technical support. The objective of the ESA is to improve availability and reduce support costs. The ESA was set up to ensure the MoD could continue to support AS90 in a cost effective manner, and both parties are incentivised to save money, which is a step change from traditional firm price contracts. This partnered approach is a strategic objective for both the MoD and BAE Systems. The AS90 ESA is the first of its kind in the Land domain, and it is planned to expand the concept to other platforms in due course.

BAE Systems is presently in the process of performing a “midlife” update of the TCC (turret control computer) in all 146 AS90’s in service with the British Army. The TCC is a compact unit consisting of 9 PCBs. A major challenge of the re-design was to reduce the large amount of wires used in the unit to interface the PCB’s to the external connectors on the unit.



The main objective of this midlife update of the TCC is to address any obsolescence within the unit's design, electronics and components, and to reduce the assembly manufacturing costs. Initially the timescale was 36 months, however, the update has just been completed, 12 months ahead of schedule thanks in part to CADSTAR technology.

BAE Systems Land Systems based in Barrow-in-Furness, design, develop and maintain the AS90, and this is where the TCC re-design was undertaken by a small project team including leading draughtsman Paul Carr. Without previous experience with CADSTAR technology, having not even laid out a PCB before, Paul had quite a learning curve to climb, and so employed the services of Quadra Solutions' CADSTAR training centre, where he enrolled on a four day course with one of their CADSTAR specialists.

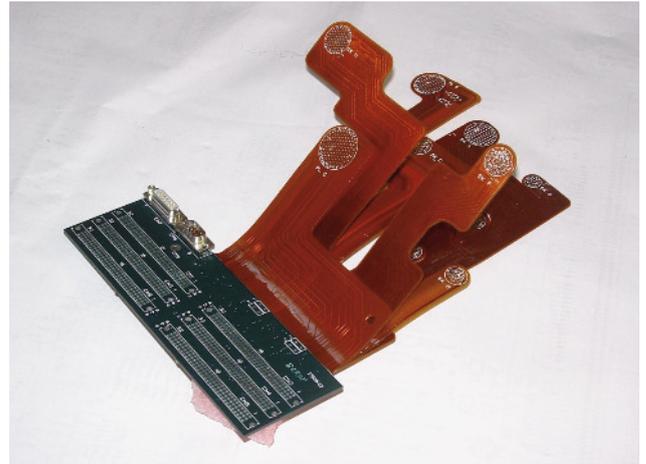


The complex wiring in the old TCC unit

*"The majority of my experience when I came into this project was with electricals for combat systems and wire harness systems, I had never done a PCB layout before and had never used CADSTAR. As you can imagine this was quite a daunting prospect for me, knowing what was ahead and the timescale I had to play with. A colleague of mine is very well associated with the guys at Quadra and suggested I get booked onto their CADSTAR training course, which I did. Their technician spent four days taking me through all the functionality and the tools available and then I got started. At BAE Systems we employ the technical support from Quadra as well so I knew I would be able to consult with them if I needed to."* Paul Carr, Leading Draughtsman.

When considering what technology would be needed to complete this project, other leading PCB design tools were evaluated but CADSTAR was chosen as the best tool for the job. CADSTAR also had the ability to migrate all their legacy data from Visula saving valuable time and preserving sensitive data.

The project has by no means been straight forward, with a 24 layer, flexi rigid circuit to incorporate to reduce the wiring requirements, whilst maintaining and improving the signal integrity of the unit.



Flexi rigid

Working closely with the mechanical team, Paul was able to develop a very intricate PCB, with 24 layers, and 4 flexible tails, that when folded into position, mated to all of the front panel connectors within the unit.

The TCC now houses 98% less wiring than before, and with the new circuit boards it takes just a few hours to assemble, whereas before, a new unit would have taken around 2 weeks to wire up completely.

As well as the challenging mechanical constraints, there were some demanding PCB design issues to be incorporated into the design. These included differential pairs with tightly matched lengths and guard tracks around some very sensitive communication signals with complete over-under shielding. All of these were achieved with CADSTAR using the highly sophisticated Constraint Manager to drive the powerful P.R.Editor XR 2000 HS routing tool.



The new TCC unit

With 9 PCBs and a flexi rigid to complete along with all the stringent environmental trials to be undertaken, Paul knew that time would be very tight. When required, he knew that he could contact Quadra technical support and get straight through to a technician who would be able to resolve any issues he was having with the design.

*"In my opinion, the technical support is what sets Quadra Solutions apart. I have an excellent relationship with Quadra and found that any problems I had with this project were quickly and easily resolved. Anyone who is looking at CADSTAR technology should definitely look at getting the CADSTAR maintenance program with it, as it is, in my opinion, an invaluable resource. From the beginning of this project, to the completion, Quadra have provided the software, training, support, advice and consultation when we needed it and to tight deadlines,"* said Paul Carr, Leading Draughtsman.

Now that this section of the project is complete, Paul is looking forward to developing the next stage of the maintenance project. This will involve updating the wireless transfer of data from the turret to the chassis using low powered wireless comms.

### BAE Systems CADSTAR Software Configuration

- CADSTAR Platinum S Plus
- CADSTAR Variant Manager
- EMC Advisor for CADSTAR
- P.R.Editor XR 2000 HS
- CADSTAR SI Verify

Case Study created in association with:



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