



ULTRA.




AWE manages the UK's stock of nuclear warheads



Challenge maintaining availability of ageing safety systems



Ultra developed options to secure another 15 years of system life



Critical systems sustained helping AWE deliver its commitment



Full lifecycle management of critical safety systems now in place



Maintaining the safety of nuclear facilities and maximising the lifetime value they deliver

Extending the life of AWE's critical systems

Customer

Supporting the UK's defence by managing its nuclear deterrent

AWE is an organisation funded by the UK's Ministry of Defence (MOD) to support the country's nuclear deterrent. This includes manufacturing, maintaining and developing its stock of Trident nuclear warheads. Ultra has worked with AWE for more than 20 years, assisting its operation with radiation detection monitoring solutions and other safety systems.



Challenge

Maintaining the availability of ageing and obsolete critical systems

AWE's work is mainly carried out across two large sites, Aldermaston and Burghfield in Berkshire. The sites are located close to one another and cover an area of almost 1,000 acres. Both sites feature multiple buildings, each having been specially constructed and equipped to safely carry out AWE's highly specialist activities.

The systems within some of its buildings were manufactured in the 1980s. Because of their age, maintaining their continuous availability was challenging. The people who built the systems had long since left the industry so their knowledge and expertise were unavailable. New spare parts were rare.



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Repairing failed parts was difficult, as they were manufactured using technologies, standards and processes that are now obsolete. Any faults risked causing significant system downtime, which could compromise AWE's ability to meet its commitments to the MOD.

While the development of new safety critical systems had been initiated, it can take decades for such work to progress from scoping requirements to opening a fully equipped modern facility. Complex development and engineering programmes are required for systems to be delivered that meet AWE's requirement for safe, effective and economic operation, and gain the approval of the Office for Nuclear Regulation.

The challenge for AWE was how to keep its existing, many decades old systems running in a safe and controlled manner until new systems could come online. Additionally, with the lifecycle of a nuclear deterrent system being at least 100 years, the issue of ageing and obsolescence (AO) in critical systems is one that will repeat over time. A solution to lifecycle management was required.

Solution

Practical options to secure a further 15 years of systems life

Given the technological change that will occur over the long time periods associated with nuclear programmes, maintaining the effectiveness of critical systems over the full lifecycle of the programme is a significant challenge for the entire industry.

Ultra has unparalleled depth of experience and expertise in supporting nuclear companies in this area. We lead the market in our ability to determine requirements and specifications in accordance with the latest standards, as well as refurbishing, reverse engineering, redesigning and remanufacturing electronically controlled systems. Due to this capability, AWE contracted Ultra to extend the service life of its critical systems.

To help AWE effectively assess and move forward with preferred solutions, we framed our programme to comply with AWE's own 'gated' project structure. Proposals need to pass AWE-defined criteria associated with a development milestone for it to be approved for the next phase of development and gain funding. Ultra consultants were embedded within the organisation to support AWE team members through this internal process.



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The first phase of the programme was analysing what was in place. This included reviewing existing requirements documentation associated with each element of the systems to understand the engineering choices that had been made in the past. Where documentation was only partially complete or unavailable, we reverse engineered systems to generate new documents.

With a complete portfolio of requirements documents, our team was able to progress to a technology discovery phase. In this, where replacement technology existed that met the defined requirements, Ultra was able to recommend that AWE purchase it 'off the shelf'. However, where it did not exist, new electronics were needed. Ultra's report proposed a range of practical options to ensure any electronics components or circuit board assembly replacements would sustain the systems for 15 years.

With AWE selecting its preferred options from the report, our design and manufacturing specialists undertook to produce and deliver the required outputs.

Benefits

Critical systems sustained to help AWE deliver its MOD commitment

Ultra has ensured AWE can now manage the AO of its critical systems so that they can be relied on to help the organisation deliver its commitment to the MOD. AWE now has certainty that its existing systems will remain operational for at least 15 years, removing the significant risk associated with developing and delivering new systems in a short time frame.

Future

Complete lifecycle management of nuclear deterrent safety systems

Ultra's help securing the availability of AWE's existing critical systems, as well as further support in designing and building the systems that will succeed them, provides the organisation with the long-term management plan it requires. AWE is now on a more sustainable path to fulfilling its responsibilities for managing the country's nuclear deterrent over its full lifecycle.



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About Ultra Energy

Organisations working with nuclear technologies have a responsibility to safeguard people, the environment and infrastructure. We provide solutions that give our customers complete, long-term protection and control of safety critical systems, while helping them increase the net value derived from nuclear investments over their total lifespan.

Part of Ultra Group, Ultra Energy has worked with nuclear customers for over 60 years. We're embedded in strategic national infrastructure and helping organisations develop future nuclear applications. We support continuous operation of nuclear sites with protection and control solutions that monitor and manage factors such as radiation, neutrons, temperature and pressure within safety critical systems.

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