AWE case study

The day was opened by Hannah Carver, Project Leader in the PLM Group at AWE, who described her experience of a long-running project to manage materials information for the leading UK nuclear security organization. She began by outlining relevant technical challenges. The systems on which AWE works contain a wide variety of often-exotic materials (metals, ceramics, salts, organics) and require them to handle data on unusual properties and conditions (e.g., radioactive behavior, test results from explosive regimes or plasma). Simulation is an important component of their research, so efficiency in feeding data to and from computational tools is essential. Products have to be maintained over long periods of time, so robust PLM systems that can manage the product definition over lifetimes of 40+ years are a requirement, and materials is one key thread in that PLM story.

AWE must be able to manage the materials information lifecycle over these time periods—for example, tracking how materials age, and checking that they are behaving as expected. Control over this information is essential, but it is also important to distribute it in a secure manner to the scientists and engineers who need it, integrating with other systems for physics, electronics, manufacturing, and laboratory information management.

To meet the challenge of materials information management in this complex environment, AWE has had a project for over ten years using the GRANTA MI software. Throughout this time, AWE have been active members of the Material Data Management Consortium (MDMC), feeding their requirements into the development process for GRANTA MI and working with other members to understand best practice in this area. Hannah Carver stressed several points as important for a successful implementation, including:

- It is important to have good data quality metrics built into the system, so that users can have confidence in the data, and its pedigree and reliability can be assessed accurately many years down the line.
- It’s important to have a robust business case for the project that holds through changes in the business environment—AWE focused on issues such as 'de-risking' their engineering process through improved traceability and control over data.
- While tailoring some aspects, such as the database schema and data import tools, the AWE system has been built as much as possible on ‘out of the box’ software components, making it much easier to maintain than a custom system.
- People are important in the system as well as technology—effort has been invested in training staff on PLM principles, and why it is important to manage materials data.
• A staged approach to rolling out the technology makes sense, with clear milestones, agile interaction with the supplier (Granta Design) and active involvement of end-users in the design and requirements definition.

Today, the AWE system consists of two major databases: a Materials Science database, which underpins materials science assessments of chemical, physical, thermal, safety, and mechanical data, and the 'MATPROPS' database, used to provide mechanical property data for product engineering, design, and simulation.

With future stages in the roll-out likely to include systems for environmental compliance and Additive Manufacturing, the AWE project is active and successful, ensuring that staff with technical authority over materials data can control its quality, and providing a robust framework for distributing this data to authorized personnel in the science and engineering community.