Too often, technology projects are viewed solely through the IT lens. While it is, of course, essential that specifications and requirements for a solution are congruent with current and future capabilities, many companies fall short in their singular IT focus and lack of holistic thinking. The most perfectly executed software implementation is doomed to failure if the people tasked with its daily use lack understanding or acceptance of its existence and what it means for their respective roles. For this reason, the “people” aspect of a technology implementation is just as critical as ensuring the proper requirement checkboxes are ticked.

In this Executive Case Study, LNS Research details the process and timeline that BAE Systems’ electronic systems, a U.S. based A&D subdivision of a larger global organization, followed to ensure a successful roll-out of its Manufacturing Execution System (MES) across its organization. We also examine course corrections and the criticality of placing emphasis on the people element of its project.

About BAE Systems

BAE Systems, plc, a British multinational conglomerate, is one of the largest Aerospace & Defense (A&D) companies in the world—the product of a 1999 merger between British Aerospace (BAe) and Marconi Electronic Systems.

One of the company’s numerous global subdivisions is its U.S. based electronic systems division, which manufactures components and systems for the U.S. defense sector as well as various commercial industries.

Much like its parent organization, the BAE Systems electronics systems division has a legacy of several mergers and acquisitions, which has today produced a heterogeneous culture with numerous and disparate locations and more than 10,000 employees under its purview.

The company decided to update its MES earlier in the decade. At that time, it discovered that emphasis on communication and change management across its many sites and employees was just as important for project success (if not more so) than taking its time to identify all of the business requirements and technical specifications that would enable it to create its products.
The Project Journey: Leaving Plenty of Runway

One of the first notable aspects of BAE Systems’ MES journey is the length of time from project commencement to completion. When viewed from a high level, the company chose a highly phased approach reflecting the enormity and complexity of the project.

BAE Systems has a broad geographical footprint (with sites in Texas, Virginia, New Jersey, New York, Massachusetts, and New Hampshire), sizeable workforce, and significant complexity across the company’s products. As a result, the firm had a massive undertaking in deciphering the capabilities and aspects of an appropriate MES to implement across its operations.

Moreover, BAE Systems’ products consist of highly complex electronics systems. The core technology built into products serve diverse end functions across both defense and commercial applications. The company’s six target markets include solutions for:

- Survivability & Targeting
- Intelligence, Surveillance & Reconnaissance
- Commercial Aircraft
- Communications & Control
- Electronic Combat
- HybriDrive® (Public Transport)

While some MES projects may be possible to implement from start to finish in less than 18 months, the number of locations, people involved, complexity of manufacturing and number of product lines, external forces, and others will all translate into additional time and resources to effectively complete each phase of the project. This expectation of an extended timeline was certainly the case with BAE Systems.

For example, the company’s initial project phase of documenting its current state and desired future state began way back in the latter half of 2010. The first year they focused primarily on developing requirements and evaluating product demos. They dedicated subsequent years to distilling technical requirements from the business case requirements, sandbox training for a subgroup of users, application integration testing, gap requirements, scope, and phased pilot testing over subsequent several years, with the first go-live period occurring four years after the project began.
The Criticality of the “People” Aspect

With such a large workforce across diverse locations and market sectors, BAE Systems quickly learned the importance of capturing the necessary engagement across functions within the project lifecycle, from the generation of requirements to scenario testing and gap identification, to training and post go-live support.

Indeed, a phased approach incorporating increased engagement was a major course correction the company implemented before its MES roll-out in 2015. BAE Systems originally envisioned a “Big Bang” roll-out that included a simultaneous five-site go-live, which was an unsuccessful strategy largely due to the unwieldiness of the project’s people component, as well as a perception of too much risk to the entire business. With such a monolithic approach, there also existed no way to model and pilot new processes to evaluate and make any necessary adjustments based on collaboration and feedback.

This experience mirrors much of the research LNS Research has collected on the meeting strategic objectives in manufacturing, topping the list according to our 2016 Manufacturing Operations Management (MOM) survey responses, completed by 200+ respondents to date.

What are your company’s top operational challenges in achieving strategic objectives?

- 8
- 7
- 6
- 5
- 4
- 3
- 2
- 1

8% 11% 11% 18% 23% 25% 30% 35%
The company decided to move to a more gradual, incremental roll-out, starting with two smaller sites going live initially and followed by three remaining sites in the following six months. This phased approach allowed for much greater real-time evaluation of the effectiveness of the project and flexibility for any necessary adjustments required. It also allowed extra people resources to be deployed in a concentrated fashion to devote to different phases of the project.

“People will think it’s a technology based project—it’s really a people project,” said Steve Rubenfeld, Manager of Operations Systems at BAE. “Think of who's touching that software—it's all people. People need to become accustomed, they need to be trained, they need to understand, and they need to embrace that change. You have to get them involved throughout the project lifecycle.”

The company set up a matrix of leaders covering functional areas across the project, including solution training, information training, supply chain integration, performance excellence, and especially—change management.

By bringing in dedicated change management assistance, the company was able to gain a clearer view of the current and future-state organizational fabric, and to better anticipate the impacts of project change on people and processes.

In evaluating the cycles of change, people involved within the project had a variety of differing professional and locational characteristics, including:

- Many different sites, with 5-25 factories of various sizes
- Skillsets
- Legacies
- Toolsets
- Processes
“From an IT perspective, we could be chugging along and have the perfect technical solution,” said Ryan Spurr, Manager, Information Management, “but really the question was how does that technical solution line up with the organization, and the people that we have.”

In placing the proper emphasis on change management the company understood the necessity of being able to anticipate the full spectrum of reactions from its workers across roles and put in communication processes as well as dedicated assistance to overcome this.

With the recognition of the higher degree of change management needed to tackle the MES project successfully, BAE developed a change management model to encompass the different project phases, and how each would need to be communicated and engaged with the company’s peoples, including:

- Building the case for change
- Assessing current state
- Design future state
- Analyze potential problems and opportunities
- Communicate vision
- Develop knowledge, ability, and culture
- Assess implementation results
- Sustain change

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Ryan Spurr
Manager, Information Management
BAE Systems
The company wanted to attach concrete meaning to some of the levels of these phases that contained abstract or "soft" concepts. To meet that need it created deliverables where necessary that needed to be updated throughout the process to prove that change was enforced.

**Go-Live Considerations**

**Communication Plan**

The most critical point of the go-live phase is a plan around communication. For BAE Systems, no single method of communication proved to be superior, and the company used an array of communication methods to roll messaging out to its people, including emails, electronic signage, website, and direct people-to-people interaction. The in-person communication is particularly important for plant floor workers who may not have the time or inclination for the other methods listed.

**Training**

The company developed role-based training guides as well as hands-on training classes by role with a top-down approach, “train the trainer” in MES functionality with intensive boot camps. In these sessions, the trainers were educated across many roles and functions to ensure cross-functional understanding and to avoid the creation of any silos. Role-based guides created for:

- Operators
- Supervisors
- Process Engineers
- QA Engineers
- Tech
- Customer

**Lifeguards**

The company defines a “lifeguard” as a subject matter expert (SME) that had completed the boot camp and designated as a go-live resource. BAE Systems deployed multiple lifeguards across each factory representing various functions and areas. The company then created a rating system for lifeguards to capture the feedback of workers across locations. In addition to supporting the go-live transition, their responsibility was also to form the basis for post go-live support as the first point of contact for resolving issues.
Schedules and Readiness Assessment

BAE Systems held daily meetings with lifeguards and management to receive timely feedback on any go-live issues to be able to adjust quickly, as necessary.

Additionally, the company prepared detailed completion schedules and program readiness assessment for each factory to ensure proper support was in place. The company leveraged the pre-authoring work instructions feature of the solution to slowly roll-out new work instructions live.

Centralized Communications

BAE Systems created a centralized Web portal offering quick references, training videos, and announcements as a guide for its constant stream of new users.

Customization

To integrate optimally with the company’s existing ERP system, the company implemented the ability to move serial numbers independently, with the ability to view orders by serial numbers.

BAE also created a customization around Engineering Change Order (ECO) control, whereby open work orders related to previous revisions placed automatically on production hold, and new work orders for the new revision automatically placed in work order create hold.

Another feature BAE Systems created to help with customer communications is what it refers to as a route card report. The company flows its MES data through a data warehouse to a real-time report for customers to view by an assembly or serial, and as a one-stop shop for information on that particular serial.

What Comes Next?

In its second phase of MES go-live BAE Systems has accomplished many things that have increased the flexibility, agility, and visibility of its manufacturing processes, including:

- Developing an interface for test equipment
- Enhancements for part traceability
- A way to perform manufacturing audits using the next release of its MES backported to its current version
- A way to communicate special instructions without alterations to orders
- The ability to print labels directly off the work order
- The ability to handle Bill of Materials specific alternate parts
The company’s next phase is to systematically implement the top 10 enhancements off of the MES forum, delivered in three packages. Future projects include updating the client browser to be more user-friendly as well as updating to the next version of the MES release.

**Considerations and Recommendations**

When undertaking a major software solution implementation like MES, it is critical that organizations engage and incorporate the feedback of the full spectrum of the affected workforce at the very onset of the project, not at the end. Adequate time and project runway—the degree to which will be conditional on the size, scope, and complexity of the implementation—must be accounted for at the project’s start.

To ensure the right level of engagement from the workforce, careful consideration must be given to change management, including the creation of SMEs to work cross-functionally within the workforce to educate employees, effectively handle project backlash and misunderstanding, and escalate concerns as necessary. It requires close attention to the perspective and perceived value of plant floor employees as well as management to ensure they embrace a new system without reservation and that role-based value is communicated and accepted.

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