Product Realization for aerospace and defense

Enabling companies to meet production schedule and cost targets while delivering high-quality products

Benefits
- Enables early manufacturability evaluation of design alternatives
- Creates comprehensive manufacturing plans
- Integrated change management for increased collaboration between design and manufacturing
- Supports effective communication with production and shop floor systems
- Monitoring and control quality

Summary
Aerospace and defense programs are becoming increasingly complex to execute. Not only is the number of available programs decreasing, but customers are demanding greater accountability when it comes to
meeting program requirements, budgets and timelines.

Aerospace and defense companies compete in a global marketplace and execute programs with multiple partners and suppliers. To be successful in this environment, they must demonstrate their ability to execute programs across the extended organization, delivering products that meet scheduling and budget requirements. Programs often fail due to late discovery of design and manufacturing issues when it is most costly and time consuming to implement changes. The solution is to enable manufacturing engineering to assess design alternatives starting in the early stages of program concept development.

Product Realization, a Siemens PLM Software solution, allows manufacturing engineering to do just that, not only
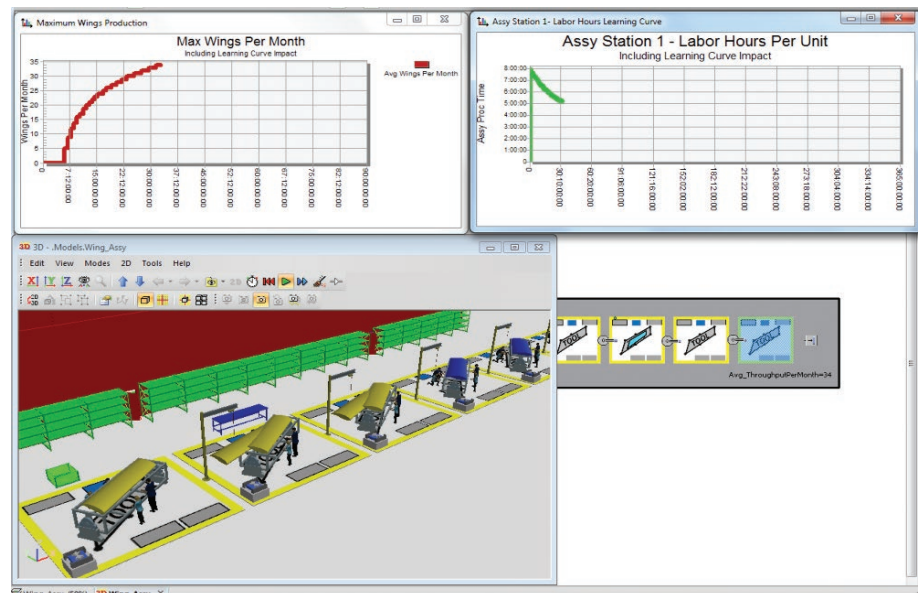
# Product Realization for aerospace and defense

Features

- Use 3D simulation tools for validating assembly and part manufacturing methods

- Digital simulation and assessment of human factors and ergonomics studies

- Simulation analysis for throughput, buffer, layout and learning curve impact

- Develop and commission NC machining, robotic and inspection programs

- Author, manage and share electronic work instructions with shop floor

- Manage as-designed, as-planned and as-built BOM in a single environment

enabling them to assess design alternatives, but also to accurately plan on-time project launches and communicate effectively with the shop floor.

Producing significant opportunities for optimization

When an analysis of manufacturing impact is conducted during the concept phase, aerospace and defense firms can gain confidence that program costs and schedules will be achieved. When the manufacturing definition is allowed to evolve continuously until the design is finalized, it can produce significant opportunities for optimizing design and manufacturing processes.

Product Realization enables you to evaluate alternative design concepts to determine the impact on assembly processes, tooling changes and plant layouts. By simulating manufacturing processes, production rates can be validated and downtime minimized by allocating the necessary buffers. In addition, you can estimate the effects of new concept designs on operational costs and the learning curve. This type of analysis significantly improves
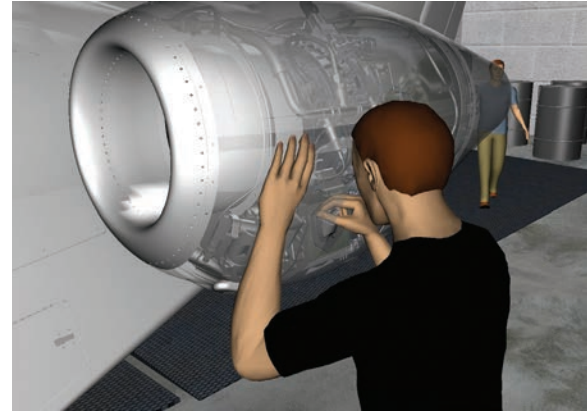

visibility into manufacturing costs and production viability.

Synchronized design and manufacturing

The ability to improve preliminary design based on manufacturing requirements can produce significant enhancements when a program reaches the detailed design stage. Production Realization helps manufacturing engineers perform tolerance analyses and check for causes of dimensional variations. This enables them to predict if design specifications will cause any build problems. Furthermore, ergonomic studies of manual assembly processes can be performed to check for worker safety and compliance issues. Part fabrications, machining process steps and numerical control (NC) programs can even be generated for complex aerospace parts. An integrated change management platform ensures that necessary design and manufacturing changes can be performed in a collaborative manner.

Providing virtual production verification

Product Realization relies on simulation capabilities to validate production processes. Aerospace and defense companies can start by creating a bill-of-process (BOP) outlining the manufacturing steps. Tooling designs are finalized and requisitions are sent via managed workflow. Detailed 3D work
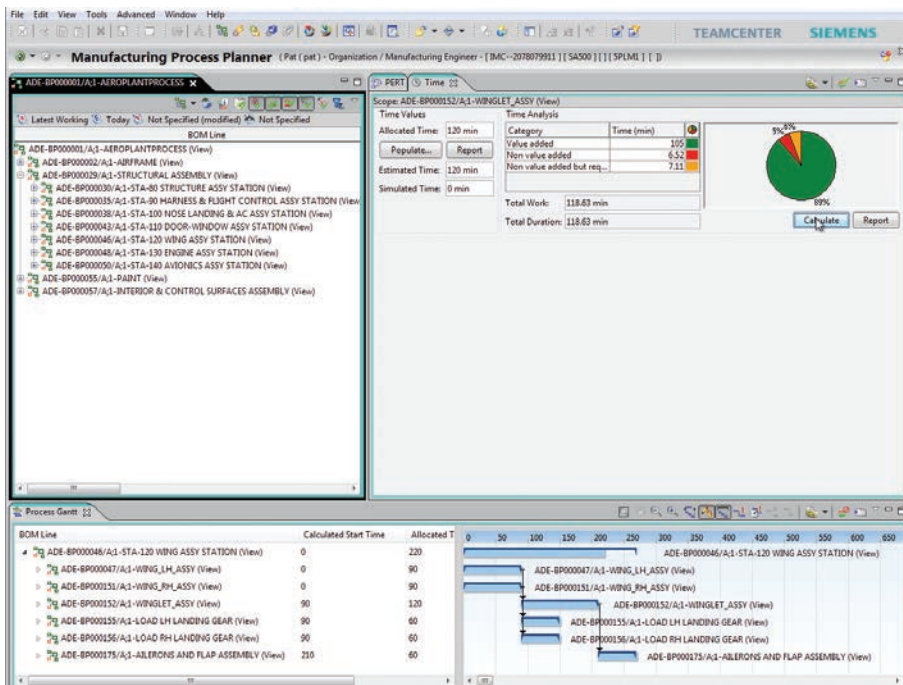
instructions are derived automatically from the assembly process definition. Subsequently, quality engineers can develop inspection requirements and programming.

Facilitating traceability to the shop floor

Product Realization provides capabilities to connect directly to shop-floor applications, thereby enabling manufacturing engineering to communicate accurate and up-to-date release data to the operators. Shop-floor integration drives traceability of customer and regulatory requirements from design to the production system. You can save significant time and costs when comparing as-designed and as-built configurations when delivering the Material Inspection and Receiving Report form of the United States Department of Defense (DD250) and similar regulatory certificates. The 3D work instructions can be sent directly to manufacturing execution system (MES) terminals to ensure error-free assembly on the shop floor. Similarly, quality requirements can be sent directly to inspection points on the shop floor, ensuring all quality requirements are being met.
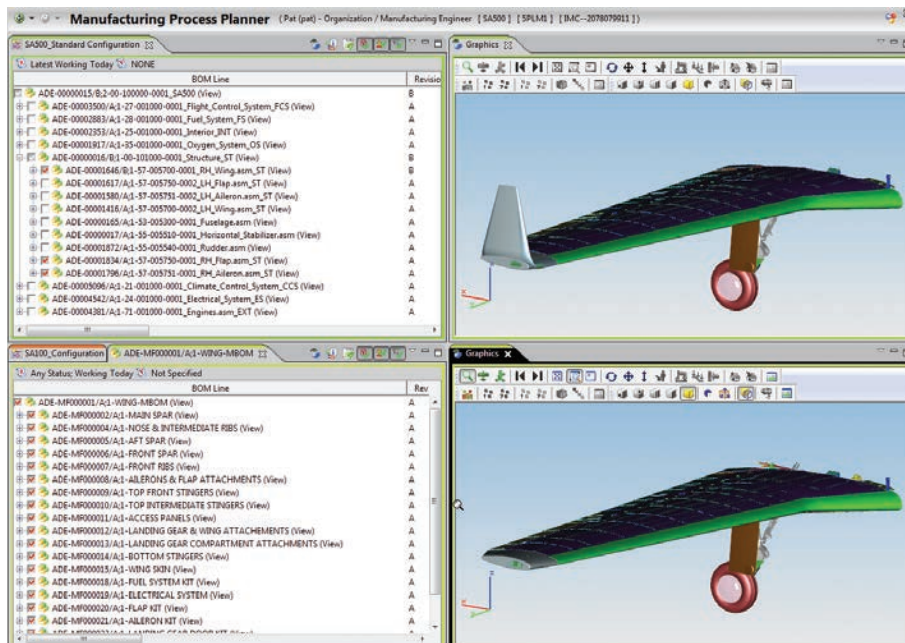

Delivering a quick resolution

A single source environment for design and manufacturing allows aerospace and defense companies to quickly generate the sell-off data package. Such a managed environment ensures that continuous compliance requests can be traced and resolved quickly. All program libraries, templates and documentation are kept in a managed environment for future program pursuits and continuous learning.

Conclusion

The Product Realization solution empowers aerospace and defense companies to pursue and execute programs successfully. Using a process-driven approach, product and manufacturing decisions can be taken collaboratively and synchronously. Aerospace and defense companies can validate the manufacturing feasibility of aircraft systems during the design stage, thereby significantly improving program profitability and reputation.