



# Connecticut Center for Advanced Technology, Inc.

## Value Stream Mapping Linked with Factory Modeling



GKN Aerospace Services Structures Corporation, located in Cromwell Connecticut, is an independent part of GKN Aerospace Services, the aerospace component of GKN plc, London. GKN Aerospace Services is recognized as one of the world leaders in primary composite structures for the civil and military aircraft markets, helicopters and space vehicles. They have more than 40 years experience in composites with facilities in North America and Europe. GKN Aerospace Services Structures Corporation uses carbon, glass and silicon carbon fiber composites as well as Advanced Resin Transfer Molding™ and Compression Molding processes to manufacture air inlets and engine vanes for the F-35 Joint Strike Fighter.

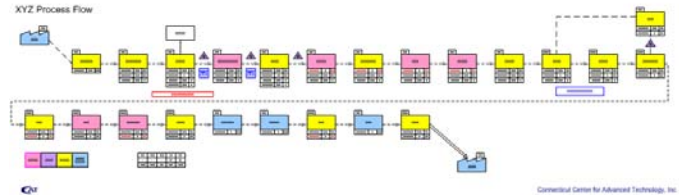
### Introduction

In 2007, CCAT engaged with GKN Aerospace Services Structures to demonstrate how eVSM™ (an electronic Value Stream Mapping software) and DELMIA QUEST® (a Discrete Event Simulation software) integrated together to help allocate resources in their facility, identify process flow constraints and reduce waste based on the increasing customer demand for the Joint Strike Fighter (JSF) fan inlet cases. The eVSM™ software was designed to be an easy to use tool for implementing the Lean Enterprise Institute methodologies associated with “Learning to See”, “Seeing the Whole”, “Making Material Flow”, and “Creating Continuous Flow”. DELMIA QUEST® is a comprehensive three dimensional digital factory environment that is used to process flow simulations and analysis. The forecasted production requirement schedule ranges from six assemblies in 2007, 152 assemblies in 2014 to 284 assemblies in 2021. GKN’s goal is to go from 1 engine set per month to 1 per day with minimal staff additions, to minimize inventory and WIP and to maintain a significant surge capacity.

### Methods / Procedures

CCAT worked directly with GKN Aerospace Services Structures Engineering, Operations and Production associates. With the use of the collected historical data, CCAT compiled model assumptions for each process. The processes included cutting, preforming, debulking, cooling, trimming, assembly and all subsequent post injection and curing operations. Distributions were fit to the preform cycle time, number of preforms per vacuum table and the debulk oven time to be used for the Discrete Event Simulation model. CCAT created a

current state Value Stream Map, shown in the figure below.



GKN Aerospace Services Structures – Current State Value Stream Map

A Spaghetti Diagram was also created using eVSM™. It illustrated the flow of the product through the processes, as well as, the total overall distance of travel.

CCAT used their internally developed interface software macros and all model assumptions to build the QUEST® model. This Discrete Event Simulation was used to identify process flow constraints based on the current production requirements and the forecasted increased yearly production requirements. The model then incorporated the “what-if” future state factors in the analysis.

### Conclusions

The future state factors that were discussed and evaluated were: adding resources (associates and equipment), cycle time reductions, process eliminations, new technology improvements and combinations of all. GKN proposed model changes were also evaluated, including a laser guidance system for cutting, table top debulking system and the integration of a bar coding system to be incorporated into the part number/preform identification and oven programming. At the end of the project, a recommended capital acquisition schedule was provided to GKN to allow them to meet the ramp-up requirements.

### References

*“Regarding the Shop Flow Modeling and the Mold Assembly Modeling and Visualization that CCAT did for us, these were absolutely very helpful and effective tools and they provided valuable data, knowledge, and understanding which helped to progress our business.”*

**Steven Hayse**

**VP of Engineering and New Business Development**

### For more information

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