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INSTRUCTIONS FOR AUTHORS OF POSTER EXTENDED ABSTRACTS

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ABSTRACT

L3Harris seeks to evaluate their current production plan and capacity for the upcoming Tech Refresh 3 (TR3) production launch. Specifically, the simulation team seeks to assess the resource plan, determine bottlenecks, and predict the program's ability to meet the contract schedule. The simulation covers each of the 3 product lines within TR3.

1 INTRODUCTION

L3Harris seeks to evaluate their current production plan and capacity for the upcoming Tech Refresh 3 (TR3) production launch. Specifically, the simulation team seeks to assess the resource plan, determine bottlenecks, and predict the program's ability to meet the contract schedule. The simulation covers each of the 3 product lines within TR3.

2 MODEL AND SOLUTION

The simulation was developed in 2 distinct pieces; Circuit Card Assembly (CCA) and Module/Top-level. This approach allows high visibility and analysis capability for each of the two processes separately. Both models utilize the current Material Requirements Planning (MRP) schedule.

The CCA simulation begins at the Surface Mount Technology (SMT) area and includes wash, bake, selective solder, manual/offline placement, various ruggedization steps, and integrated circuit test. The model incorporates the timing and quantities of each batch according to the MRP schedule. Actual performance data from SMT is incorporated, including total job run time, each CCA's placement time, and changeover time. Furthermore, Malabar failure data was used to accurately reflect first pass yield performance and measured turnaround time to correct those failures.

The top-level simulation covers the building process of modules, receptacles, cartridges, and chassis alongside the required test processes. Parts are combined in various steps to produce these top-level products. Batching logic allows for parts to take on specific batch sizes based on their part type. Failure rates are broken down granularly at various points in the test process to be able to accurately experiment on potential differences between product lines and specific tests. Models of the circuit cards and assemblies are used as debugging tools to quickly identify CCAs and their associated top-level assemblies within the simulation.

A set of what-if scenarios were simulated by changing controllable properties to assess the impact on performance measures and key indicators. For example, the CCA model can include or exclude the utilization of a supermarket after SMT, adjust first pass yield rates, reduce estimated cycle times, or change assumptions of minimum load quantities into the Parylene coating machine. For the top-level simulation,

acceptance levels can be manipulated along with key processing and rework times. We can then compare the impact of each scenario on metrics such as resources utilization, average time a CCA waits for processing, total lead-time of each CCA through the system, work-in-process quantities, and completion dates for CCAs and completed top-level assemblies.

3 RESULTS

Through the creation of various custom designed Excel spreadsheets, the results of simulation experiments can quickly be inputted to generate presentation-ready metrics for managers to make decisions. Specifically, a dedicated utilization spreadsheet takes the standard experimental output and provides the utilization of various human and machine resources on the floor. By comparing with heuristic thresholds of utilization, we can identify bottlenecks and overutilized resources. Additionally, by exporting completion dates for different parts to Excel within Simio, the team was able to create a completion dates spreadsheet to see all the parts completed in each month. By comparing with the number of parts due in a given month, we can quickly assess our ability to comply with internal deadlines. The spreadsheet then labels points of zero safety stock in yellow, and points of missed demand in red. From this, the production release schedule can be optimized to reduce the probability of missed demand. The spreadsheet also provides insight into level loading to smooth resource demands.

4 TEAM

The CCA portion of the model is being developed by Ryan Hines, e3 Lead for Mission Avionics. The module / top-level portion is being developed by Oscar Candanoza, TR3 Senior Manufacturing Engineer. The development of both models is supported by simulation expert, Patricia Buchanan PhD (former L3Harris employee and current Professor at the University of Washington), Manufacturing Engineering Intern, Ivan Iturriaga, and sponsored by Engineering Director, Pete Diskin.