

Improving Device Utilization Capturing Accurate Part Metrics

INDUSTRIAL CASE STUDY

LMI Aerospace, Inc. is a leading supplier of aerospace structural assemblies, kits, and components, and a provider of design engineering services to the commercial, business and regional, and defense aerospace markets. LMI fabricates, machines, finishes, kits, and assembles machined and formed close tolerance aluminum, specialty alloy, and composite components. Manufacturing more than 40,000 products for a variety of platforms and providing turnkey engineering capabilities to support aircraft lifecycles, LMI offers complete, integrated solutions in aerostructures, engineering and program management. Based in St. Louis, LMI has 24 operations located across the United States and in Mexico, the United Kingdom and Sri Lanka.

VIMANA's technology enables you to monitor and manage manufacturing productivity. VIMANA's software identifies periods of production losses using a sophisticated classification engine and provides users with the information and insight needed to improve utilization.



LMI's Washington, MO location was seeking a machine monitoring solution to connect their MTConnect compliant and legacy machine tools. They had four primary goals for their machine monitoring initiative:

- Capture accurate utilization metrics.
- Create a work environment that drives performance by displaying the utilization data on the shop floor.
- Generate condition-based email alerts to ensure quick action and prevent extended downtimes.
- Understand part production trends and cycle times through analytics.

VIMANA's software quickly exceeded LMI's expectations to meet these criteria.

VISIBILITY-BASED IMPROVEMENTS

LMI Washington immediately increased the utilization of the 13 machines connected to VIMANA's software. The improved utilization was primarily a result of displaying Dashboards on monitors on the floor. Screens on the shop floor enabled operators to visualize and better understand their machines' performance and reduce unnecessary downtimes.

Previously, the production team relied on red-yellow-green stack lights mounted on each machine to assess their status. Now, VIMANA Elevate enables them to view a machine's status at a glance or check it remotely on a mobile device. The system also alerts them via email to indicate prolonged downtimes - insight that a stack light cannot provide. Nicholas Mueller, System Analyst at LMI Washington, stated "We saw a 10 percent increase in utilization just by displaying VIMANA Elevate's Dashboard on the shop floor. We were able to identify that the actual cost per machining hour varied from the calculation previously used, helping us reassess our competitiveness in the market."



IMPACT

- The visibility provided by VIMANA Elevate resulted in a 10% increase in Producing Efficiency immediately after it was installed, and on sustained usage in more than a 20% improvement on some machines.
- Operators created healthy competition amongst themselves by following the VIMANA Elevate's Dashboard which is displayed on a shop floor monitor.
- Engineers are able to view accurate part metrics that enable them to provide more accurate quotes to their customers.
- The Part Metrics report has provided better insight into the actual time and cost to make a part, helping the company make cost estimates and more accurate planning to reassess market competitiveness.

SUMMARY

LMI has leveraged the capabilities of VIMANA's advanced analytics in improving their manufacturing competitiveness. The deep understanding about the part runtimes has helped the plant in better planning for their work orders. The visibility offered by the realtime dashboards has resulted in an increase of their average utilization. The continuous engagement with Client Services ensured a steady improvement in the alerts and rules configuration, as well as feedback and adoption of new features.

VIMANA Elevate's downtime classification capabilities were able to accurately capture the states of the equipment, including Producing, Standby, Planned Downtimes, and Unplanned Downtimes. The introduction of the Standby state in VIMANA Elevate helped LMI tease out the difference between machines that were down, and machines that were on standby because of upstream blockers. This granularity in understanding the machine states helped them prioritize and make effective decisions to improve machine utilization.

- Overall, the plant has shown an **improvement of more than 15% in efficiency.**
- The best performing machine has shown more than a **20% improvement in average utilization.**
- The palletized lines have seen an **improvement of around 20% in utilization.**

USING VIMANA ELEVATE'S PART METRICS TO INCREASE CAPACITY

VIMANA Elevate's Part Metrics Report gives detailed information about how a part was made, including information on the production time and setup time that went into making the part.

LMI Washington was able to use Part Metrics to accurately obtain the part cycle time for their costing calculations. Work orders at LMI Washington are typically one week in duration. The duration taken to make a Part is compared across three categories - Estimated, CAM Analysis, and Actual Runtime. VIMANA Elevate provides Actual Runtime which helps in improving the estimation for the upcoming work orders.

Managers at LMI use an internal tool called the Capacity Chart to assess the duration taken by a machine to make a part. Data from VIMANA Elevate's Part Metrics report is populated in the Capacity Chart. VIMANA Elevate automatically identifies which part is running on the machine by analyzing the G-Code during runtime, and provides the actual duration of time that went into Producing the part. The report also identifies the Planned and Unplanned downtimes associated with the part, along with the Setup time, which enables the team to identify the setup duration for each part across various devices. This fine-grained understanding of the actual time to make the part has dramatically improved the abilities of LMI to cost parts accurately and have clarity on the actual cost per machining hour.

On one of their most valuable 5-axis machines, Nicholas Mueller added "we were able to identify that the actual cost per machining hour was lower than what was previously used, making us more competitive in the market". VIMANA Elevate helped LMI understand how much value was being added by their work-centers, and what is the cost of operating the work-center, making their cost-estimates and planning more accurate.