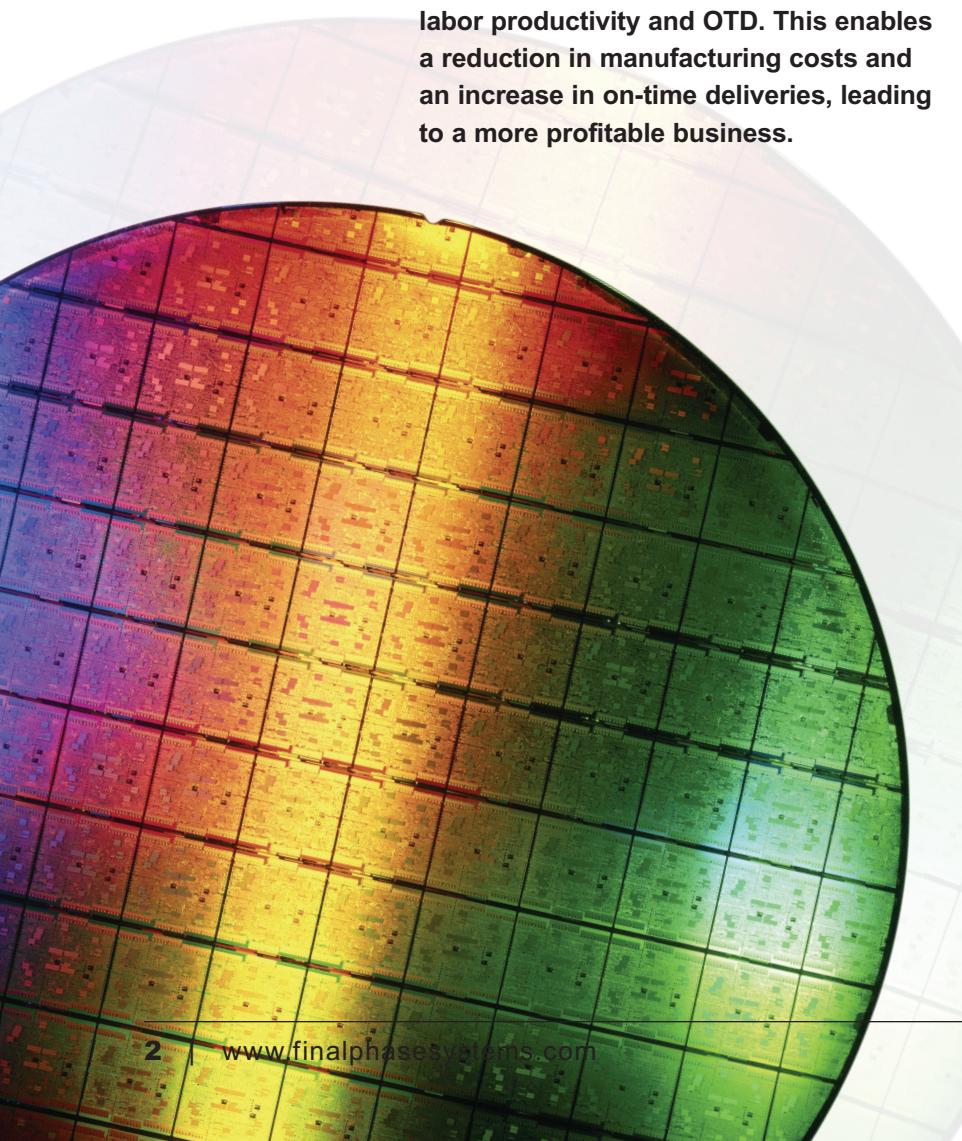


Advanced Manufacturing Software

Making your fab Smart, today.

 Final Phase Systems
An INFICON Brand

Intelligent Manufacturing Software Solutions



Today's factories face a multitude of manufacturing challenges. Manufacturing management needs timely information and analytical tools to make the right decisions at the right time. FPS provides software solutions designed to improve your company's operational and financial performance. Our comprehensive MES agnostic software suite includes the industry's most powerful line balancing fab scheduler and interactive fab dashboard which work together to deliver rapid results. Every FPS software solution focuses on and tracks your KPIs including: line linearity, turns, cycle time, equipment throughput and utilization, labor productivity and OTD. This enables a reduction in manufacturing costs and an increase in on-time deliveries, leading to a more profitable business.

EXPERIENCE

The Final Phase Systems team led one of the industries earliest virtual fab automation programs which led to Sematech and ISMI recognized best in class tool, operator and fab productivity levels. We have developed a software suite that enables clients to reach even higher levels of productivity at a fraction of the cost to develop and deploy like capabilities in house. Our team understands the critical components necessary to enable the realization of a world class manufacturing vision. We work directly with your leadership team to align on your specific vision and needs. Our clients are among the largest and most respected high-tech companies in the world.

FOCUS

We provide solutions that help our customers save time and money by improving their manufacturing processes with:

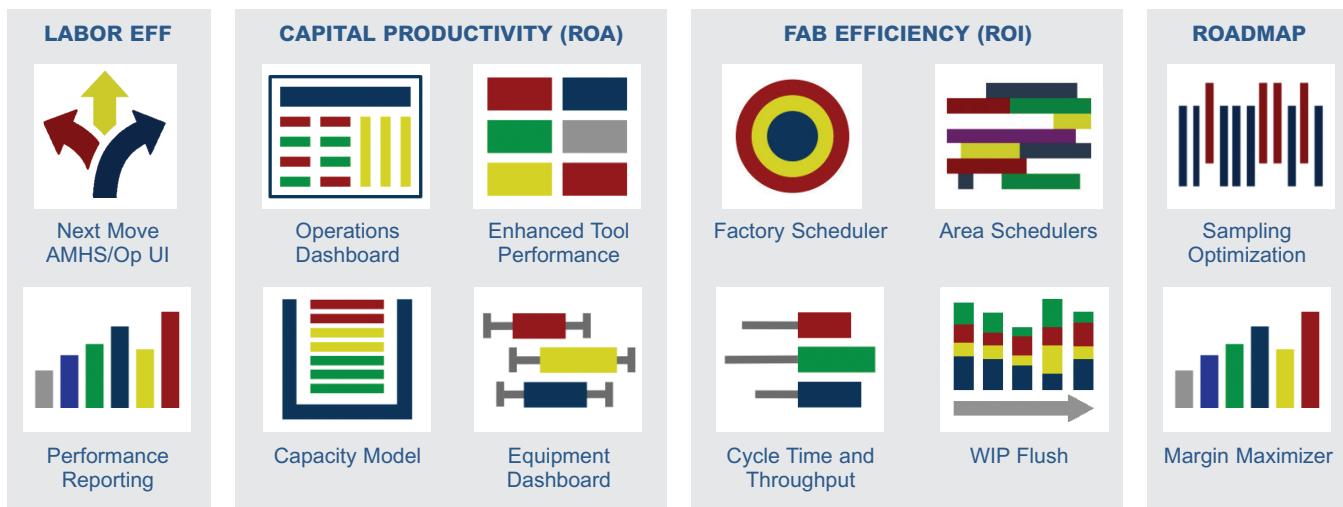
- **SMART Manufacturing Software**

Our manufacturing software suite addresses most critical manufacturing needs facing today's complex fabs. These solutions are designed to ID manufacturing losses and address them through visualization, automated decision support and improved operator/AMHS efficiency. We work with your team to integrate our solutions with your existing solutions.

- **Manufacturing Consulting Services**

We can provide consulting services and turnkey project leadership of Virtual Fab Automation projects which may include Recipe Management Systems (RMS), wafer location tracking, AMHS optimization and labor modeling.

INTELLIGENT MANUFACTURING SOFTWARE SOLUTIONS



Smart Manufacturing Software



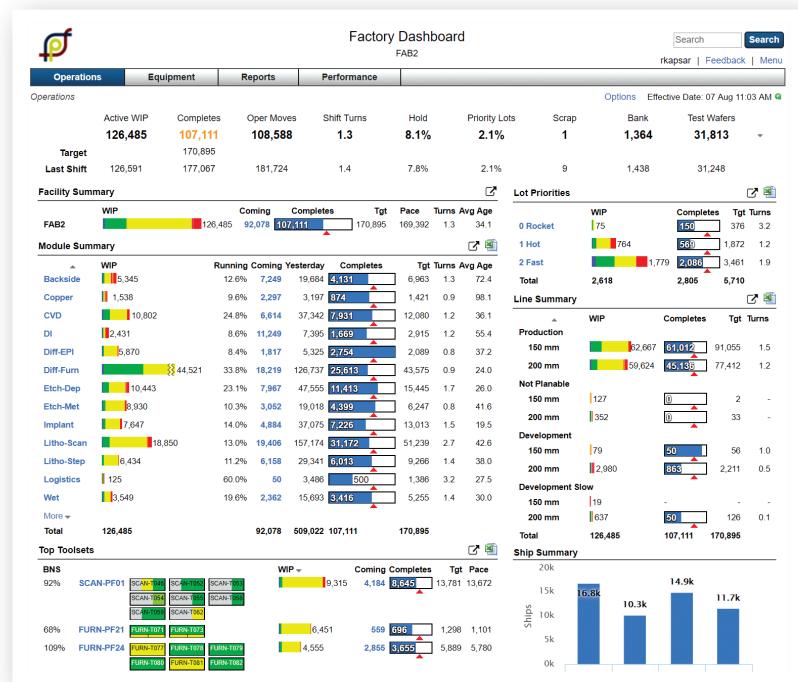
Final Phase Systems has developed a suite of software to help everyone in the organization stay more informed and make better decisions. Our applications provide a user-friendly web-based interface that is available anywhere on the company network, on any device that is connected to the company's VPN, including smart phones and tablets. We put valuable real-time data at your fingertips so you can respond to issues quickly and communicate effectively.

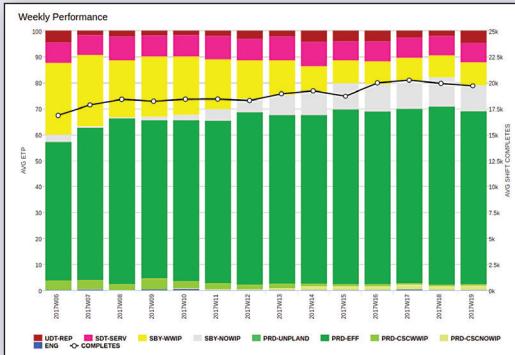
OPERATIONS DASHBOARD

Our Operations Dashboard application is designed to give you a user-friendly and concise overview of the factory in real time. You can also drill down on each module, toolset, and tool to see more details. Below are some examples of the metrics available on the Operations Dashboard.

- Activities
- Work in Process (WIP)
- Starts and Outs
- Tool or Machine Status
- Historical Gantt Charts

Our Operations Dashboard lets you know where to focus your efforts at a quick glance. It provides visibility of operations, maintenance, and engineering activities to everyone from managers to engineers to operators. Real-time or nearly real-time information can be provided so that immediate action can be taken to correct issues. Additionally, specific features can be password-protected or limited to certain users.





FPS Enhanced Tool Performance Model (ETP) data shows Standby and Missed Cascade with/without WIP

HISTORICAL PERFORMANCE

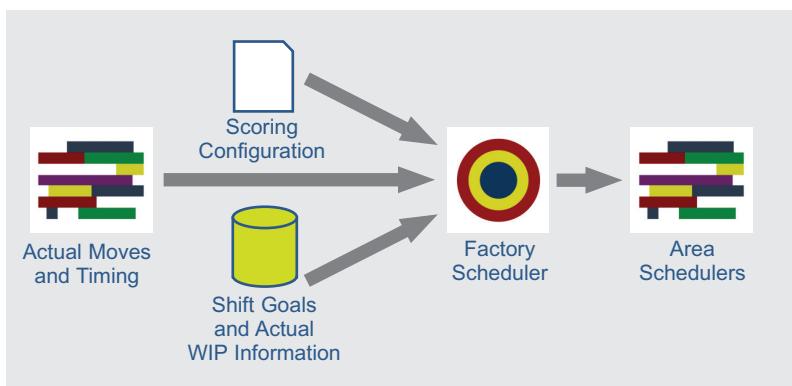
Our Historical Performance applications allows you to look at how your factory has performed on multiple metrics at the same time. This includes our most powerful metrics which uses our Enhanced Tool Performance Tool State Modeling providing insight into Standby – WWIP (Time when a tool was up with WIP which was not run), which can be combined with a line chart of Average WIP, such as the real example to the right or reviewed by module, tool, shift, etc.

Our Historical Performance Reports include:

- 30 Shift Reports
- 60 Day Reports
- 52 Week Reports

FACTORY SCHEDULER AND LINE BALANCER

The Line Balancer is a key portion of our Factory Scheduler application. It reviews the current fab wide WIP levels and compares them to an ideal modeled state. It determines the correct amount of WIP to move at each operation supported by a re-entrant tool. This helps address WIP bubbles by reducing the size of them by limiting incorrect moves and by reducing the time to consume them correctly. It also integrates with our Area Schedulers and provides them their respective goal targets. This can dramatically reduce your WIP levels, improve fab linearity and OTD.



AREA SCHEDULERS

In a manufacturing environment as complex as the semiconductor industry, dispatching rules are often not adequate to properly allocate material to the right resource. Our scheduling engine is designed with custom heuristic algorithms to handle resource scheduling in an environment with extremely complex business rules.

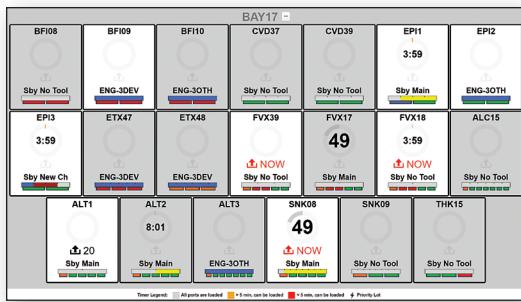


Our scheduler can schedule multiple areas or an entire facility in a matter of seconds or minutes. The schedule is constantly re-evaluated to improve the overall performance to goals. The goals of the scheduler are tied to the planning system and Factory Scheduler to help the facility meet its shift production goals.

Our Factory Scheduler is designed to work with a wide range of scenarios/inputs and can be configured to meet the specific needs of your manufacturing environment.

NEXTMOVE

Our NextMove product provides critical Operator GUIs—integrated with our Scheduler/Goal Planner solutions and/or your dispatch rules. It integrates the optimal lot level solutions created by the Factory and Area Schedulers with your actual fab layout, tool configuration/set up, etc. and provides the visual aides to inform an Operator when their Bay/Area's tools will go idle and which lot moves they need to make to ensure optimal tool utilization and avoid lapses in constraint tool operation.



DYNAMIC CYCLE TIME ANALYZER

Cycle time is a key metric used in manufacturing and it is important to understand the factors that contribute to delays in getting products to the customer. Our Cycle Time Analyzer software provides a full breakdown of cycle time into its components. High-level summaries allow you to see the big picture with drill down to see the details.

KEY FEATURES:

- Components of cycle time can be compared by product, by module, or by step within the product flow.
- Charts showing average WIP levels allow you to see the interactions between WIP and cycle time.
- Plan cycle time can be compared to actuals or edited directly from the site.

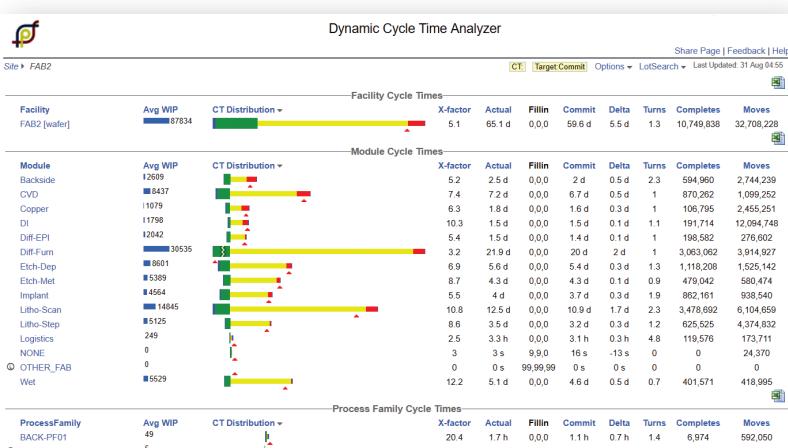
THROUGHPUT TRACKER

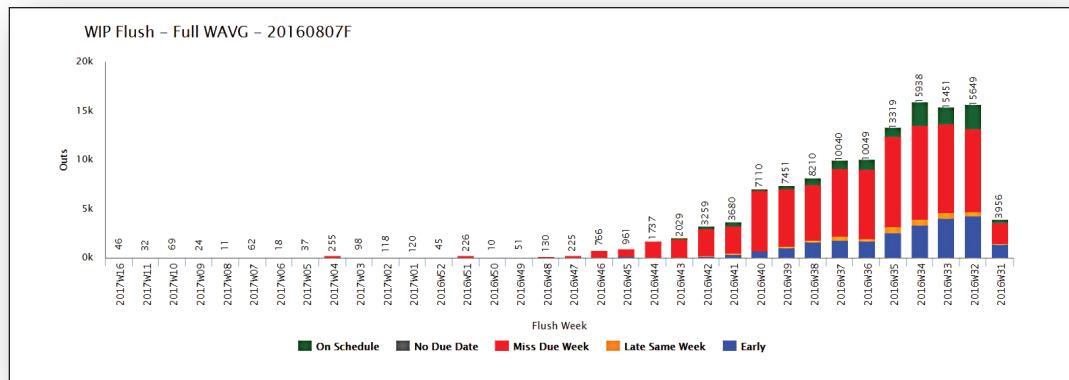
Understanding your machine throughput with accuracy is one of the most essential parts of improving your operational efficiency.

We have automated the complex calculations of throughput by taking advantage of the power of a relational database. Our statistical methods transform a history of begin and end events into expected first wafer time, wafer interval, and batch interval for each tool and recipe.

Our Throughput Tracker makes it easy to view the data and navigate to the machines and processes you want to see. The intuitive web interface allows you to view throughput by tool family, tool, recipe, and time period. The data can also be exported to Excel format.

- Goal Tracking
- Maintenance Issues
- Priority Material
- Rework
- Scraps

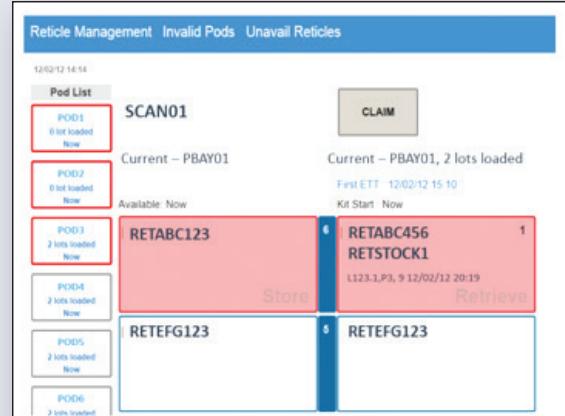




RETICLE MANAGEMENT

Reticle Management is one of the most challenging areas of a fab. Our Reticle Management application reduces the number of technicians required to manage multi-reticle Pods, by clearly directing technicians to the pods that need to be adjusted for a series of upcoming lots, based on the schedule created by FPS Area Scheduler.

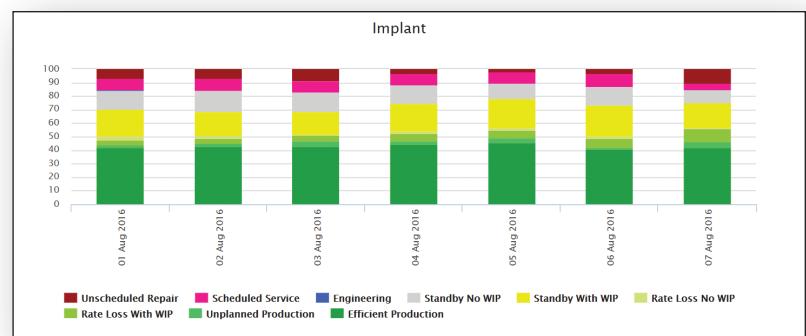
Using a tablet, we put this information in the hand of the technicians so they can see the location of the reticles required for kitting and the number of lots expected to run on that reticle. We display to the technicians if a qual or inspection is required soon which reduces the turn-around-time for those activities.



ENHANCED CYCLE TIME

Most cycle time analysis focuses only on the status of the WIP, including states, like processing, completed, queue, and staging. We have taken this analysis to the next step where we model cycle time based on priority status and tool based information. We know how long a lot was in queue because it was unable to run on a tool because all the tools were down or because none of the tools were qualified to run the lot. This information is vital for addressing the root cause of large cycle time variations.

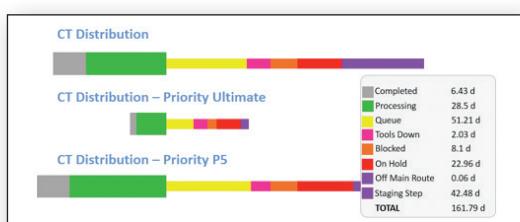
One other unique feature of ECT is that we are able to capture cycle time differences based on changes in priority status. Since we capture this information at the lot level it's possible to compare CT before/after priority changes.



ENHANCED TOOL PERFORMANCE

Enhanced Tool Performance is a powerful tool which translates your Tool State Model into an enhancement of SEMI Tool State standard. We combine WIP status, MES Tool status, WIP Locations, and Recipe information to assign more detailed tool states. This allows us to provide a much more comprehensive view of tool losses including missed cascades, down tool recovery time and operator induced losses.

With this information, Fab managers are able to make real time adjustments to labor deployment, while in the long run identifying: tool improvement and cross qualification opportunities, staffing changes, etc.





EQUIPMENT DASHBOARD

In a factory with a large set of machines to maintain, you need a system to help you keep track of critical repairs and complex maintenance schedules. Our Equipment Dashboard displays the relevant information in an easy to use format so that you can focus on the top issues and drill down to see the details.

The Equipment Dashboard displays information in a mixture of real time reporting with long term trends, providing you the information you need to address immediate needs and track long term progress.

FPS DATA WAREHOUSE

The data required to feed our software products comes from a wide variety of sources. We have designed a smart Data Warehouse that combines all of the data we need in a flexible format that will work in any facility.

This Data Warehouse combines the important information from your MES, AMHS, EI, APC, SPC, planning, and other systems.

To enable installation of our products at your facility, we first pull data from your

systems into our Data Warehouse. All of our software solutions run directly off of our Data Warehouse—we are MES Agnostic.

This approach is powerful for multi Facility and MES organizations, because this architecture also allows the same data and common calculations to be used on every web page or report. So you can be confident that a number on one report will match the same number on another report. You can also build your own reports or write queries against the FPS Data Warehouse.

