



# Integrated Device Technology (IDT)

## Designed for Success

### Results

- 100-percent fab uptime
- 33% of the cost of a conventional system
- Meet cleanroom standards without compromise
- New fab automation system completed within tight nine-month deadline
- Easy-to-use graphical interface
- Built-in alarm management
- Scalability for growth

*"The overall cost of installing the GE Fanuc system was one-third the expense of a conventional distributed control installation. This initial investment has yielded returns to make the IDT Winfab one of the most cost-effective, competitive fabs in the Pacific Northwest."*

**Jim Stewart**  
Director of Site Services  
Integrated Device Technology, Inc.

## Safer Wafers

Integrated Device Technology (IDT) (Hillsboro, OR) needed to construct a new submicron, Class 1 fabrication facility or "fab" in a short timeframe. In addition to speedy construction, IDT also needed to stay within its \$1,750/square-foot budget—significantly lower than the average \$3,000 to \$4,000/square-foot cost of a new modern fab. To help meet both cost and speed constraints, without compromising cleanroom specifications, IDT installed an automated monitoring and control system from GE Fanuc.

### Cleanroom Control

Without adequate control to maintain cleanroom standards, particle contamination can cause a high percentage of wafer defect densities. Fabs have improved wafer quality by maintaining cleanroom standards at a submicron, class-1 level. However, these strict specifications have the potential to complicate and lengthen new fab construction, as well as mire production and escalate downtime in the completed facility. To prevent this, IDT installed the automated monitoring and control system within a tight nine-month deadline. The resulting system eases fab management by quickly alerting operators to changes in environmental conditions and support systems, allowing them to respond with actions designed to keep the cleanroom within acceptable levels.

Project integrator, Industra, Inc., designed the control system around GE Fanuc Series 90™-30 programmable logic controllers (PLCs), which offer the industrial ruggedness to support 100-percent uptime. More than 3,000 I/O points measure cleanroom variables such as pressure, temperature, flow, and relative humidity, and send data to the PLCs.



Industra designed the system to put power in the hands of the operators in charge of the critical facility support systems. If operators have appropriate clearance, they can monitor and adjust cleanroom conditions and equipment through GE Fanuc's graphical user interface, CIMPLICITY®\* HMI (human-machine interface) Plant Edition. This software permits equipment adjustments such as starting and stopping motors, opening and closing valves, putting control loops in auto or manual mode, as well as PID loop tuning online.

Additionally, CIMPLICITY provides IDT with built-in alarm management. The fab operates with three levels of alarms. Some alarms trigger an automatic response such as starting a backup pump or increasing fan speed. In other cases, the alarm alerts operators for human intervention. For all control points, facility technicians receive indication from CIMPLICITY along with a graphics pinpointing the problem.

The operational goal of IDT is 100-percent uptime. The control team designed the automated monitoring and control system to support this standard by supplying the highest reliability. Following a strict definition of distributed control, the team broke the system down into independently controllable parts. If any PLC faults or fails, the rest of the control system not only continues to operate but also alerts operators to the problem.

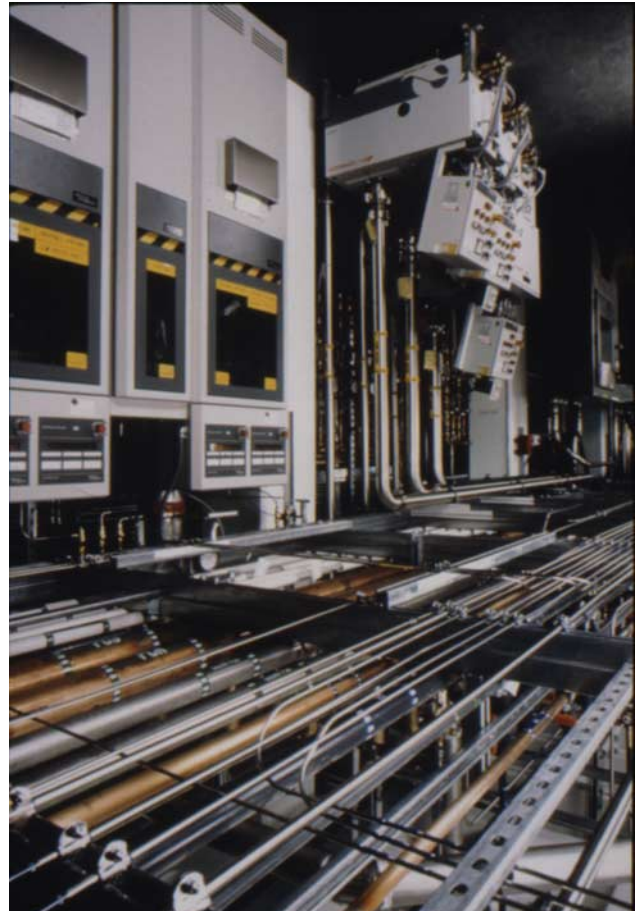
#### Speedy Startup

IDT's flat organizational style results in informed decisions made quickly by a minimum number of players. An early key decision involved selecting an integrator who could install a control system that IDT could expand and customize on the fly. After selecting Industra, the control team chose GE Fanuc PLCs and CIMPLICITY for customizability and scalability. With equipment additions during fab buildout, the new control system continues to develop and grow.

IDT implemented the facility controls on a staggered schedule. Temporary equipment was installed when deliveries did not meet construction deadlines. Construction focused on bringing the fab online by cleanroom zones, which required the facility energy center to be online early and make-up air handlers, air handlers, terminal units, and cleanroom modules to be commissioned in a parallel schedule. After installing the first bay's equipment and instrumentation, the team completed subsequent zones in quick succession. Checkout and commissioning occurred in one area while installation took place in another.

Startup was handled system by system. Critical systems such as hot and chilled water were commissioned first before bringing air-handling equipment online. Next, acid scrubbers and solvent exhaust fans were brought online. As the control team started make-up air handlers, corridor air handlers, and cleanroom modules, construction personnel went to an abbreviated "clean construct" protocol.

After all systems were running, technicians set up the facility with preliminary tuning. The control system permits modifications and refinement as the fab continues to grow and change. During each



construction phase, this meant that CIMPLICITY screens could be developed on the fly. If a problem occurred during expansion, the team then modified the control screens to accommodate more data or control points to solve the problem.

Today, the GE Fanuc monitoring and control system has scaled up to encompass every function in the facility. Hundreds of screens have been developed to account for every significant point. IDT can create a complete report on any important system: tracking, trending, multiple-level alarming, logging, and monitoring facilitate cleanroom analysis. Critical outputs are incorporated into a reporting structure. Weekly reports are charted out and examined for preventive maintenance. In daily operation, alarms are fed into a 24-hour security system, where they are relayed to the appropriate technician for quick response.

Along with reliability and scalability, economy has also been a big plus. The overall cost of installing the GE Fanuc system was one-third the expense of a conventional distributed control installation. The cost of the original project was \$1,200 per point, including hardware, software, installation, and engineering. This initial investment has yielded returns to make the IDT Winfab one of the most cost-effective, competitive fabs in the Pacific Northwest.

\* Part of Proficy Intelligent Production Solutions from GE Fanuc.

## Semiconductor Automation and Process Control

Chip making places unprecedented demands on manufacturing. From climate control and clean-room filtration to control of fabrication processes, the submicron geometries of advanced semiconductors give new meaning to the term precision.

GE Fanuc solutions for the semiconductor industry give you precise control, from wafer fabrication through final assembly and testing. Our experience with leading semiconductor fabricators and with equipment OEMs and system integrators gives us the expertise to design control solutions for every aspect of the process, from HVAC to chemical vapor deposition.

GE Fanuc expert consulting services can help you choose the best mix of hardware, software, and integration. Our commitment to open solutions means you get what best meets your application, along with the flexibility to ensure room to grow as technology evolves.

### Precise Control

- Contamination and drifting parameters are unacceptable. GE Fanuc's open solutions give the power of precise control, no matter how many I/O you need to monitor and control. Coupled with our motion control products, HMI software, and automation controls, we give you the power to create new levels of silicon technology.

### Maximum Uptime

- Reliability is critical, and proactive response must ensure all systems remain within tight tolerances. GE Fanuc automation control systems are designed with Six Sigma quality for long-term reliability and with the performance you need to keep production running full steam ahead. Our PACSystems programmable automation controllers (PACs) are perfect for mission-critical systems requiring redundancy.

### Better Information

- Our Proficy HMI/SCADA, Historian and Real-Time Information Portal software suite gives you superior control of processes, with monitoring, control, and data logging, trending, and multilevel alarms so that you are on top of every step of your process. Powerful, graphically based programming tools mean fast development, while Internet capability puts global control and reporting within easy reach.
- Proficy software also supports semiconductor equipment communications standard (SECS) to provide the widest compatibility for data exchange with SECS-compliant equipment.

### Scalable Solution

- Building processing and support equipment? Building or renovating a fab line? GE Fanuc's open solutions easily scale with your needs, from OEM equipment to global manufacturing at multiple fab sites. And, open solutions mean it's easy to connect different subsystems - from HVAC to processing line - into a comprehensive solution.
- For the equipment OEM, GE Fanuc Open Solutions mean it's easier for users to integrate your equipment into their overall control strategy.
- For the semiconductor maker, GE Fanuc's open solutions offer the breadth of product to cover virtually every need, the capability to link various systems together flexibly, and ability to tailor the solution to your exact needs.

### GE Fanuc Automation Information Centers

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1- 800-GE FANUC  
or (434) 978-5100

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(352) 727979-1

Asia Pacific:  
86-21-3222-4555

### Additional Resources

For more information, please visit the GE Fanuc web site at:

[www.gefanuc.com](http://www.gefanuc.com)

