Liquid Delivery System

CASE STUDY

Engineering and manufacturing solutions provider thrives in high-complexity markets with **Siemens strategic partnership**

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SIEMENS

Customer: CollabraTech Solutions, Phoenix, Arizona
www.collabratech.com

Challenge:

Needed access to key automation and control components during global supply chain disruptions

Solution:

Turned to a trusted strategic, global supplier to ensure component availability

Results:

Gained shorter lead times, more competitive advantage, and opportunities with new customers

CollabraTech Solutions provides a wide range of critical gas and chemical delivery systems for the semiconductor manufacturing industry as well as for aerospace, life sciences, and other commercial and industrial sectors. In partnership with Siemens, it overcame post-pandemic supply-chain challenges for the automation and controls its systems use, resulting in delighted customers, increased market share, and a sharper competitive edge.

Semiconductors are at the heart of the microelectronics that operate everything from kitchen appliances to smart phones to cars, airliners, and, of course, much, much more. Without these devices, much of what the modern world takes for granted in day-to-day living would not have been invented. Communications, healthcare, manufacturing, logistics, transportation, energy, retail, agriculture, finance, and other key sectors would be crippled if not shut down completely.

Such a global apocalypse may sound far-fetched, but when the world emerged from the long pause in economic activity imposed by the 2020-21 pandemic, the resumption in demand overwhelmed global supply chains. Few industries were spared shortages in parts and feedstocks, semiconductor manufacturing included. The agility and resourcefulness of companies around the world were severely tested. Phoenix-based CollabraTech Solutions was one of them.

Challenge: Needed access to key automation and control components during global supply chain disruptions

CollabraTech Solutions is a full-service integration company of more than 60 employees that provides engineering, automation, manufacturing, and project management services for industrial processes and capital equipment for high-complexity markets.

According to President Steve Lemons, its top market sectors are solutions for microelectronics, life sciences, commercial, aerospace, medical, and industrial. “Microelectronics, particularly semiconductor manufacturing, is a large part of our business,” he says, naming all of the world’s top semiconductor producers as customers. In fact, the company is an industry leader in the design, engineering, manufacturing, installation and qualification of a variety of semiconductor tools, including particle-free gas and chemical delivery systems and automation.

Lemons adds: “What sets us apart from our competitors is our flexibility and willingness to develop effective solutions. Regardless of the challenge, our customers have a true partner that they can count on to work collaboratively with their engineering, procurement, and operations teams to develop the very best-performing, most cost-effective, and future-proof solutions possible.”

For semiconductor manufacturing, CollabraTech offers a wide range of systems for gas and chemical delivery. Engineering Vice President Tim Provencher explains that these distribution systems are used for high-purity materials, both inert and reactive.

They include source cabinets, valve manifold boxes, bulk chemical and reclaim systems, liquid and solid precursor vapor delivery systems, and highly accurate point-of-use blending systems, all with PLC-based control systems.

"All our systems must consistently perform to precise specifications and be ultra-reliable," he says. "Should a system fail anywhere along the semiconductor production process in a fab plant's clean rooms, the costs in lost work-in-progress can be astronomical — in the millions of dollars, especially if late-stage production."

As critical as Collabratech systems are to semiconductor production, the world's supply chain disruptions put the manufacture of its systems at risk. "We had to escape the vicious loop of limited component availability, so the production of the silicon chips that power those components could resume," Lemons says.

Solution: Turned to a trusted strategic, global supplier to ensure component availability

Prior to the pandemic, CollabraTech had started a transition from its traditional automation and controls supplier to Siemens as a way to enhance its offering portfolio in system capabilities, interoperability with third-party systems, and ever more sophistication in the future.

"Our semiconductor customers recognize the Siemens brand for the engineering and manufactured quality and reliability of their automation and controls, as well as their global support," says Provencher. "While that's especially true outside of North America, Siemens is increasingly recognized across the continent here, too. In all cases, our customers won't deploy any systems without top-tier automation and controls inside. The performance and reliability risks are just too great otherwise."

In retrospect, both Lemons and Provencher consider CollabraTech's decision to move the company's system automation and controls to components from the Siemens SIMATIC Totally Integrated Automation (TIA) portfolio to have been most fortunate in timing. "When the pandemic hit, our traditional suppliers couldn't meet our delivery requirements," Lemons says. "So Siemens stepped up and made our automation and controls supply a top priority. That worked out great for us because we had laid a lot of groundwork to evolve our systems and open them up to readily incorporate Siemens PLCs and other related technologies."

Today CollabraTech is using the following elements from the SIMATIC TIA automation and controls portfolio in its systems:

- **SIMATIC S7-1200 and S7-1500H PLCs:** These advanced PLCs provide the company's engineers with versatility and flexibility in designing system controls to accommodate the specific needs of their semiconductor manufacturing customers. Both PLC models offer integrated safety and security functions and are available in standard and failsafe versions. The compact S7-1200 saves space, while the S7-1500H PLC was designed and engineered with high availability in mind and provides more onboard memory to manage recipes for complex, point-of-use chemical blends.
- **SIMATIC ET 200SP Distributed I/O:** With a compact design of the ET 200SP baseline unit that's nearly 50 percent slimmer than other I/O systems, CollabraTech engineers can save space in systems using the S7-1500H PLC. Its plug-in companion modules provide for communications, integrated visualization, safety, and security, giving customers many configuration choices for flexible solutions.
- **SIMATIC HMI Comfort Panel and MTP700 Unified Comfort Panel:** These 12-inch TFT touchscreen color displays provide easy-to-read, human-machine interface (HMI). Their multiple communication interfaces enable CollabraTech systems to interoperate with different customer systems.
- **SIMATIC WinCC Unified:** This is the latest generation of programming for the graphical user interfaces of CollabraTech systems HMIs and Supervisory Control and Data Acquisition (SCADA) features and capabilities.
- **SIMATIC TIA Portal:** This serves as the common software engineering framework for the Siemens PLC, drives, HMI, and SCADA elements of CollabraTech systems. With its library of proven software code plus a drag-and-drop interface, company engineers can easily configure, program, test, and troubleshoot Siemens controls, saving much effort and as much as 30 percent or more in time compared to alternate programming methods.

In addition to these SIMATIC components, CollabraTech uses Siemens SITOP power supplies and SCALANCE unmanaged switches in their systems. "All of the Siemens technologies integrate easily and have open interfaces to ensure third-party integrations, too," says Provencher.

Importantly, he notes: "My senior controls engineers had decades of experience with our other supplier's portfolio but

quickly learned all they needed to know about the Siemens TIA Portal and portfolio with training, support forums, and direct communications with Siemens experts whenever needed. The migration has gone smoothly, and they now prefer the Siemens platform for its capabilities, flexibility, and future enhancements."

Lemons adds that the priority attention Siemens upper management gave CollabraTech during the supply-chain difficulties was exceptional and continues to this day. "Siemens put its global procurement scale behind us to ensure we got delivery of the devices we needed to meet our own customer delivery commitments," he says. "Even today, if our engineers have an issue, they can call their Siemens contacts directly and get the help they need. In fact, we consider our Siemens account manager a member of our team. We truly have a collaborative relationship in contrast a transactional one which is typical of other suppliers."

Results: Gained shorter lead times, more competitive advantage, and opportunities with new customers

By incorporating Siemens SIMATIC TIA components into all of its solutions, CollabraTech has realized numerous benefits. During the supply-chain disruptions after the pandemic, one of the most important ones was being able to make commitments to delivering equipment orders on time — in many cases, even shortening lead times. "Siemens prioritized our receipt of PLCs, HMIs, and the other automation and control technologies our systems need, so that helped us shine with our customers and stand out among our competition, who were suffering supply-chain issues of their own," says Provencher.

In turn, Lemons reports, CollabraTech picked up market share during that time. "We were able to launch some of our systems into very large, tier-one fabs, gaining the acceptance of our equipment that we wouldn't have historically," he says. "That provides us with internal references with the other fab plants of a particular customers as well as external references with new prospects."

Most recently, CollabraTech introduced an advanced liquid chemical delivery system for semiconductor manufacturers that has enabled a lead time reduction of more than 50 percent and an increase in output by 33 percent. "Our use of the Siemens S7 family of PLCs in our control systems has been a big enabler in cutting our lead times to an industry-leading 20 weeks, all while offering comparable performance, compatibility, and ease of integration with existing control systems," Lemons says, adding that the new system will also improve a fab plant's sustainability profile by reducing power consumption.

"Our new state of the art chemical delivery system will set new benchmarks for performance, efficiency, reliability, and flexibility while meeting the evolving needs of the semiconductor industry," he says. "It's a direct result of our strategic partnership with Siemens and the strong collaboration between our two firms, a value we reflect in our company name and one that Siemens clearly shares with us."

CollabraTech Solutions provides integrated services for procurement, engineering, integration and testing for major semiconductor capital equipment. Its team comprises experienced engineers and technical experts in deposition, metrology, ion implant, lithography systems and more.

- Customer focused/driven team with decades of design and manufacturing experience
- Diverse line of gas and chemical delivery products available and evolving
- Robust engineering team capable of exceling at simple to highly complex design challenges
- Proven electro-mechanical manufacturing outsource partner
- Embrace dynamic, highly configurable projects
- Streamlined operations and proven supply chain networks

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