

CASE STUDIES



DSI Innovations LLC

BETTER iDEAS

Helping Manufacturers Solve Automation Problems through
Better Ideas and Solutions!

CASE STUDY



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Customer

Ennis-Flint

Project

Continuous Mixing Process - Ignition
with Perspective & Edge



The Challenge

Ennis-Flint had developed a new continuous mixing process for a material that had previously been produced in single batch kettle mixers. These mixers will use up to 20 different raw material feeders (vibratory, screw, or volumetric disk feeders) to continuously feed the mixer at the correct ratios determined by the recipe. Due to the nature of a continuous process, fluctuations in feed rates could result in bad product. By trending several tags for each feeder, Ennis-Flint is now able to diagnose and fix such issues as they arise. Ignition is also used to track alarm history and record campaign data at the end of every batch to record raw material consumption.

One of the more difficult aspects of this project involved Ignition development happening in three different cities across the south and southeast, and DSI needed to rapidly re-create and manage environments that allowed developers to work in tandem with each other and in a format that more highly resembled the customer's environment.





The Actions

A combination of PLC controls and Operator SCADA systems, in conjunction with Ignition, allowed DSI to help develop a much more heavily automated system that allows the customer to automate the flow of recipe information, as well as material consumption, in their ERP. Ignition is architected in a hub and spoke configuration, where the Ignition Edge devices are running locally on OnLogic IGN-600 Edge Onboard devices, which communicate with the central Ignition hub in the cloud over the gateway network. All the data is visualized through Perspective in a mobile-responsive and dynamic application that allows operators and employees to view historical batch information, as well as machine trends.

The tag structures for the project in the PLC were created with Ignition Perspective in mind, and the ability to dynamically look at different facilities and equipment without the need to create duplicate custom screens for each different plant was imperative. Each perspective screen is built in a completely dynamic fashion that is based on the equipment located on each premises and allows the ability to rapidly add new equipment with little to no changes to the Perspective application. This design allows for cost-effective scalability, as well as a cleaner product that feels more consistent for the users.

To solve the issue of rapidly re-creating development environments, DSI employed the use of Ignition through Containerization. Utilizing Docker, we created several Ignition images that allowed us to rapidly deploy and recreate our user's environment, including their full Ignition Network (all 4 gateways), SQL Servers, DNS, Active Directory, and simulated OPC data. This allowed our developers to spin up an exact copy of the customer's environment locally and to test changes and fixes more thoroughly before first introducing them to the staging and then production environments on the customer network. With this infrastructure in place, Ennis-Flint can add new mixing systems into the Perspective application in a matter of hours instead of days or weeks.



The Results

The image shows how historical trending was used to trouble shoot motor current issues. Feeder 5 was recording small, momentary increases in weight when the feeder should have been losing weight. As a result, the PID loop controlling the flow out of the feeder would over feed the materials, causing a spike in agitator current and resulting in bad product. These small “bumps” in weight were determined to be the root cause of the motor current faults and bad product. An issue with the shield grounding was discovered, and PLC program modifications were made to make the system less susceptible to bad weight data. With Ignition, they were able to quickly and easily identify the issue and start on a fix to resolve the issue.



CASE STUDY



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Customer

Undisclosed

Project

FactoryTalk Historian and View Studio
Migration



The Challenge

DSI was tasked with migrating and updating the Rockwell FactoryTalk applications running on a Windows Server 2003 OS. The original system was using a FactoryTalk View Studio 6.1 network distributed application for their operator interface, FactoryTalk Historian 2.2 for data trending, and SQL Server for logging production data to a corporate database for campaign reports. The customer also had three client PCs that were used for operator interfaces in the main control room, the quality lab, and a remote operator station.

The customer wanted:

1. to migrate these applications to run on Windows Server 2016 operating systems and also update the clients to Windows 10 operating systems.
2. to test both systems running in parallel for two weeks in order to make sure that the new system was running the same (or better) than the old system.
3. to compare the data in the Historian and SQL databases to make sure they matched. It was also important that all archived data was transferred to the new system.





The Actions

The Rockwell FactoryTalk SE application was migrated and updated from v6.1 to v10. Using the backup and restore procedure, the application was transferred to the new server and updated without any issues.

The Rockwell Historian application was migrated and updated from v2.2 to v6.0. This migration was more complicated and time consuming. First, the original application needed to be migrated from a v2.2 application running on Server 2003 to a v3.1 application running on Server 2008 R2. This procedure was done following the Rockwell Knowledge base article 491889, which include a 96-page PDF file containing the required migration steps. This process took up to 2 days and was dependent on the size of the archives and errors that came up during the migration steps. After the 2.2 application was fully migrated to v3.1 and was running on the 2008 server, we then had to upgrade the application again to v5.1 by installing the 5.1 software and rebooting the server. From version 5.1, we then upgraded the application to v6.0 following the same procedure. At that point, we performed a backup and restore from the Historian 6.0 application running on the 2008 server to the Historian 6.0 application running on the new 2016 server. Once we had a fully migrated the application, we confirmed that the services were running, the data was being received, and the user permissions were correct.

Once the new Historian application was running, the Historian Clients (Process Book) needed to be reconfigured to point to the new Historian server. We also needed to update any historian tags that were used for trending on the View Studio application.

The new SQL server was installed on the new Server 2016 OS and the existing table data was migrated. Also, the production datalogging in the FactoryTalk application was reconfigured to point to the new server.

Finally, we configured the new Windows 10 client PCs to point to the new FactoryTalk Server and tested the HMI client applications.



The Results

The migration was scheduled to last 4 weeks. The first two weeks were dedicated to the configuration of the new server and client PCs and the migration of the application. The second two weeks were dedicated to testing both systems running in parallel before the final change over. By the end of the second week we had the entire system migrated to the new 2016 server and running in parallel with the old 2003 server. The new client PCs were also running in parallel with the old clients, and the operators began testing the functionality of the new system. By the end of the fourth week, we were ready to schedule the final change over with the customer's IT department. After one final week of uneventful onsite support, the job was completed with minimal downtime and zero loss of critical archive data.



CASE STUDY



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Customer

Fuji Foods

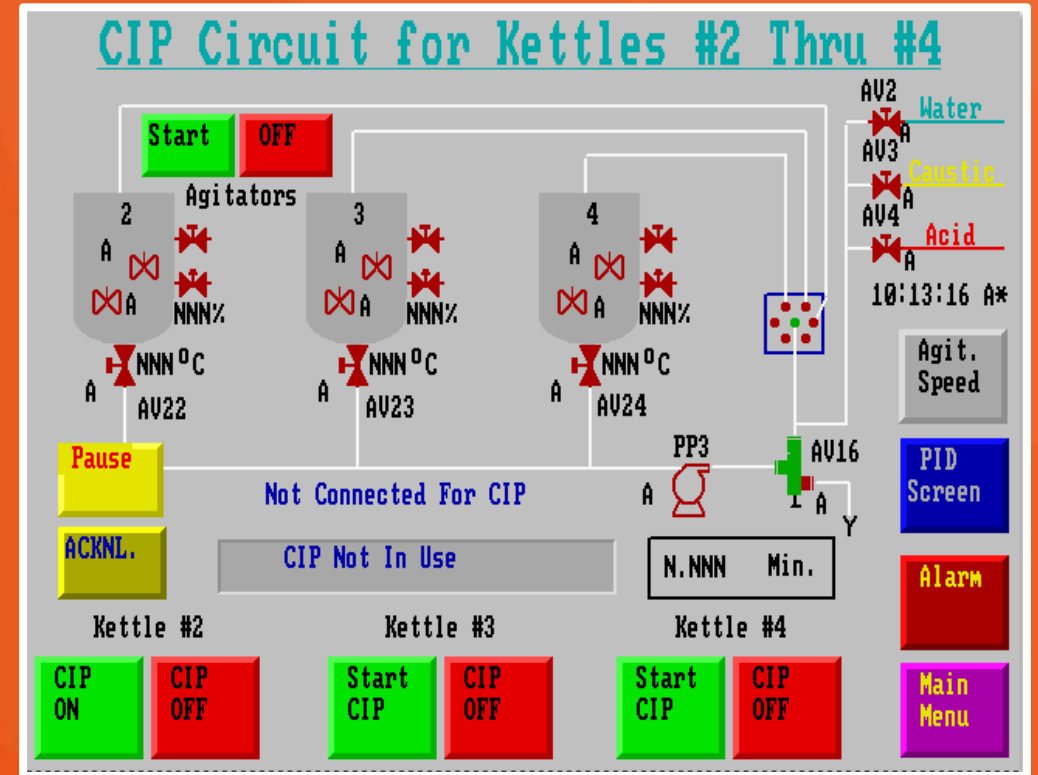
Project

PLC 5 Process Controls System
Upgrade to PlantPAx with FactoryTalk
View



The Challenge

DSI was tasked with updating the controls for an existing food seasoning process controls system. The original controls system used 3 racks of Allen-Bradley PLC-5 hardware with one central processor. The operator interface was a PanelView ME and a single FactoryTalk SE Station developed by an out-of-country integrator using custom process control graphics. In addition, the customer's existing recipe control system wasn't being used. Much of the operation was controlled manually by forcing valves open and closed. The operators would monitor flow rates and temperatures before manually manipulating pump speeds and temperature setpoints. The customer understood that updating the process controls system from a manual operation to a fully automated system would increase consistency, efficiency, reliability, and quality.





The Actions

New System Features

The new system uses a CompactLogix 5069-L340ER with remote IO over Ethernet IP. The PLC program was rewritten using Rockwell's PlantPAx Process Control Library v3.5 AOI's. DSI created a new FactoryTalk SE Station application using the PlantPAx graphics library and replaced the PanelView with a Panel PC running the same FactoryTalk application.

System Installation Approach

DSI Innovations worked closely with the customer to develop a control architecture and approach that would address their immediate and future requirements and concerns. Our engineers used the following approach:

- Obsolete hardware was replaced with a new, readily available Rockwell product line.
- A standard process control library was developed and can be supported by a wide range of Rockwell Integrators.
- PlantPAx process control library allows more control and configuration from the operator interface without needed to go online with the PLC. Built-in security protections provide easy-to-use interface for designing, commissioning, maintaining, and operating process control devices.
- PlantPAx diagnostic features, such as device status, faults, interlocks, and alarms, allow operators and maintenance staff to quickly identify and diagnose issues in the system.
- An easy-to-use recipe control system was developed to automatically add and mix raw materials and to control tank temperatures and flow rates. Improved graphics helped operators run production more easily and consistently from one batch to the next.
- FactoryTalk SE TrendPro was implemented using the built-in datalogger to track batch data, such as temperatures, flow rates, etc. TrendPro allowed the customer to easily modify existing trends and build new trends for improved process data visibility.



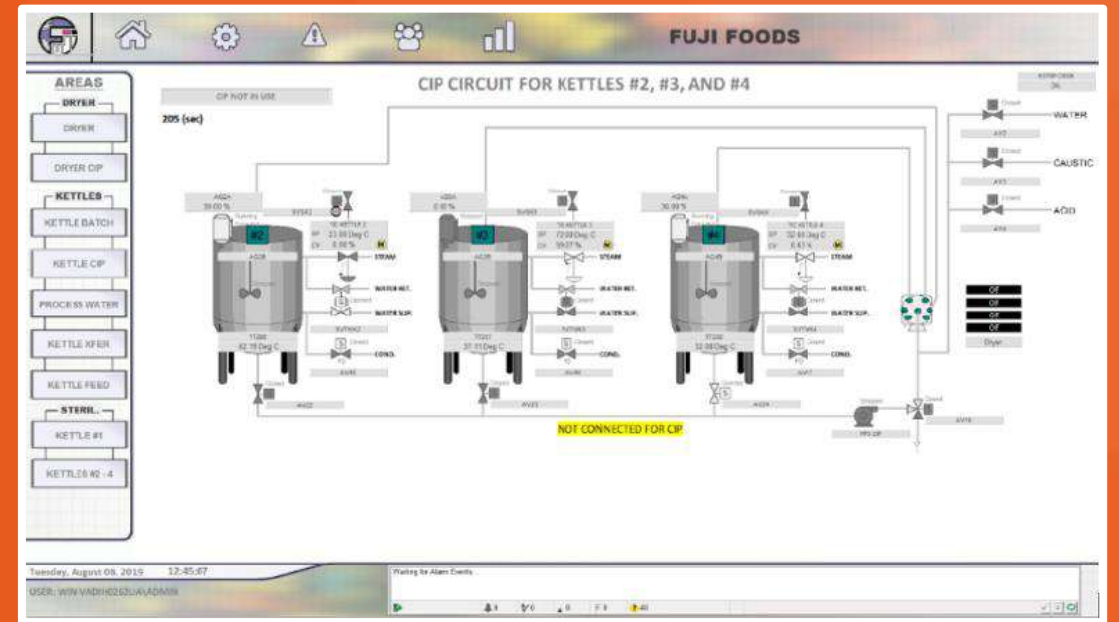
The Results

The installation and testing were scheduled to last two weeks, with full production to start on the Monday of the third week. The wiring and IO checkout were completed at the end of the first week and water batch testing was completed by the end of the second week. On the Monday of the third week, the customer was able to run full production without any downtime.

The improved recipe controls allowed the operators to reliably run multiple batches without manual intervention and constant supervision. This led to improved batch times and more consistent product results from the quality control lab.

The new operator interface controls and PlantPax graphics gave the operators better visibility of the process so they could respond quickly to variations from normal operation. Start up, shut down, and CIP sequences were made easier to follow by incorporating pop-ups notifications and checklists for the operators to follow.

DSI also provided improved tuning for the PID loops controlling temperature, pressure, and product flow. These improvements reduced the need for operators to manually manipulate pump speeds and control valves to achieve the desired results. For instance, prior to the upgrade, the chamber inlet temperature would overshoot the setpoint by almost 10°C and take several minutes to stabilize. After DSI tuned this temperature loop, the overshoot was limited to 2°C while reducing by half the time it took to stabilize.



CASE STUDY



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Customer Forsyth County Detention Center

Project Lock and Control Upgrade

The Challenge

DSI Innovations LLC was hired to complete a large-scale, multimillion dollar security-based project that included upgrading the lock and control systems of the 11-floor Forsyth County Sheriff's Detention Center. The new security system had to control locks and doors, lighting, and fire equipment in the 400,000 square foot facility. In addition, the new system had to make the lock-up less vulnerable to power surges and potential escapes by the 1,000-plus people housed there.



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The Actions

DSI installed a fiber optic system with an Ethernet backbone. This system was chosen because it required less maintenance than the Detention Center's old system and it would not be as vulnerable to downtime due to power surges or other problems. The control system network consisted of 14 PLCs and HMIs on a fiber ethernet Network with one PLC and HMI per inmate area, a PLC and HMI in several common areas, and one PLC and HMI in the Master Control area. DSI programmed the system so that the Master Control could override the other areas as needed in the event of a lockdown. The system was designed to operate locks and doors, intercoms, PA systems and lighting controls throughout the 400,000 square foot facility. The system was installed one floor at a time. As each floor was re-wired, inmates were moved to other floors for increased security. In addition to cell floors, the project included ancillary services, the medical intake area, and the master control. The center's fire control system was also integrated into the new security system.





The Results

For this project, it was imperative that DSI design the system and plan the installation so the Detention Center's old security system would remain operational throughout the install. *“Lock & Control is the most important function of the Detention center,”* said Captain Stewart Yale, Forsyth County Sherriff's Office. *“Our doors need to stay locked at all times. DSI was able to keep our old system operating while installing the new system to assure that we were secure. I can't say enough about the precision and work ethic of this company.”*

According to Captain Yale the success of the project was also due to the close collaboration between everyone who worked on it. *“We had all the right teams on this project,”* said Captain Yale. *“The installation process was safe and meticulous. The result is a new, cost-efficient system that will assure increased security and ease of operation at the Detention Center.”*

The project was such a success that the Forsyth County Sheriff's Office awarded DSI with an Excellence in Service award.

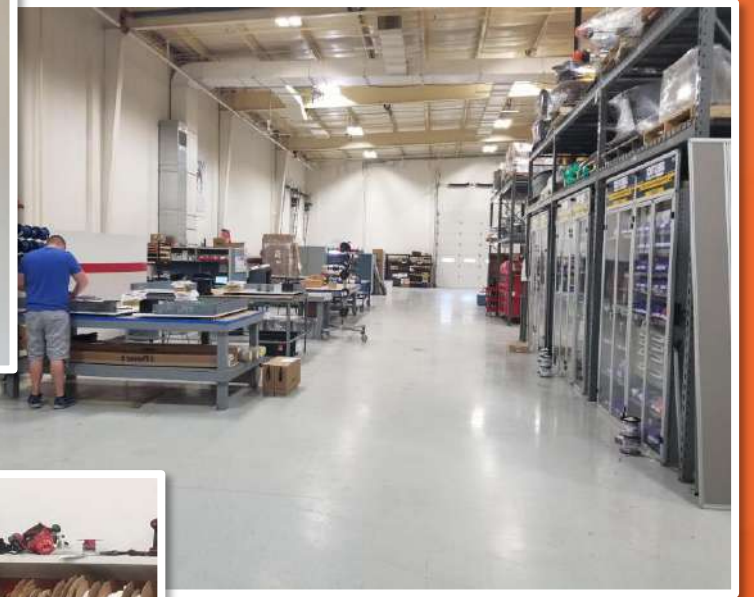


About DSI

DSI Innovations is a technical services company specializing in all aspects of system design, implementation, and commissioning for industrial control and data systems.



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Core Belief

"There's A Way To Do It Better – Find It!"

- Thomas Edison

About DSI

DSI is committed to delivering better ideas and solutions to solve the most challenging automation problems with the highest quality of service.



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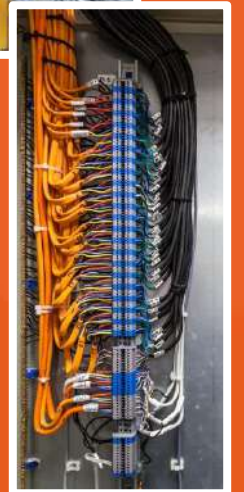


Capabilities



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- ✓ Process Control System & Batch Process Design
- ✓ Manufacturing Intelligence, MES / OEE
- ✓ IIoT Smart Manufacturing Integration & Applications
- ✓ Legacy Control Systems Upgrades & Program Conversions
- ✓ SCADA & HMI Design
- ✓ Machine Vision Systems
- ✓ Process Analysis & Improvements
- ✓ Servos, VFD Systems, & Motion Controls
- ✓ Robotics & Turnkey Robot Cells
- ✓ Panel Fabrication & Installations
- ✓ Field Service, Support Contracts, & Commissioning
- ✓ Historian, Data Collection & Reporting
- ✓ And more...



Experience



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- ☑ PLC Systems: Rockwell, Siemens, Schneider, Omron, others
- ☑ HMI Systems: Rockwell, Siemens, Schneider, Maple, Red Lion, others
- ☑ SCADA Systems: Ignition, FactoryTalk, Wonderware, iFix, WinCC, Citect, others
- ☑ VFDs: PowerFlex, Parker SSD, Altivar, Siemens, others
- ☑ Machine Vision: Cognex, Keyence, others
- ☑ Robotics: Turnkey Cells, Yaskawa/Motoman, Fanuc, Omron, KUKA, others
- ☑ Motion Controls: all major brands
- ☑ Plant Historian: PI, Wonderware, FactoryTalk, Citect, others
- ☑ Database: Oracle, SQL Server, MySQL, others
- ☑ Custom Coding: VB.NET, VBA, C++, Python, JavaScript, others
- ☑ UL 508a Certified, Panduit, Phoenix Contact, others
- ☑ And more...



Industries We Serve

Cruise Ships & Lines
Water\Wastewater
Pharmaceuticals
Automotive
Chemical
Tobacco

Energy & Natural Resources
Consumer Products
Data Centers
Trucking
Plastics
Paint

Discrete Manufacturing
Food & Beverage
Life Sciences
Railroad
Textiles
Dairy
and more...

Projects In



23 STATES

15 COUNTRIES

0 ACCIDENTS

Company Info



Office Locations

Thomasville, NC (HQ)

Knoxville, TN

Jacksonville, FL

Raleigh, NC Area

Charleston, WV

Sarasota, FL

Contact Us

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Find Us Online



www.dsiinnovations.com

Feedback

“I can’t count the number of times I’ve had to argue with other controls groups over issues like how operator interfaces are designed, as-built cadd drawings and documents, debug issues, field electrician support, etc. With DSI, it has never been an issue... I recommend them for any project(s) you have!”

Edward C. Hunter III
Senior Staff Engineer American Snuff Company, LLC
Clarksville, TN

“Thank you to the DSI team for all of the support they have provided Dean Foods. I have worked with many of DSI’s employees on large projects, small projects, late nights, extended weekends, and I have never had an issue that they didn’t solve. I am amazed at the number of extremely talented employees at DSI that can answer any call...”

Thank you DSI team for all you do.”

Michael Hardcastle
Operations Manager Dean Foods
Winston-Salem, NC

Thank You!



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