Zero-Downtime SCADA Modernization

Large-Scale Wonderware to Ignition Migration at a Multi-Train Midstream Gas Plant

Executive Summary | Texas Automation Systems (TAS)

The Situation

For many midstream operators, legacy SCADA systems remain deeply embedded in daily plant operations. While these platforms often continue to function reliably, they can limit scalability, have large and growing licensing costs, and make future digital initiatives more difficult.

A large **five-train midstream gas processing facility** faced this exact challenge. Their existing Wonderware-based SCADA environment had served the plant for years but had become increasingly difficult to expand and modernize.

Leadership wanted to transition to a more flexible and scalable platform without risking operational stability. The decision was made to migrate the system to the **Ignition platform from Inductive Automation**.

The entire system transition needed to occur while the facility remained fully operational.

The Challenge – Large-Scale Data Migration

Migrating a SCADA platform while a plant continues to operate introduces significant technical and operational risks.

In this case, the scope was substantial:

- **Five operating gas processing trains**
- **Approximately 500,000 SCADA tags**
- **More than 750 operator view pages**
- Continuous plant operations that could not be interrupted
- Strict requirements for **data accuracy and validation**

Every migrated tag and every screen element needed to behave exactly as expected before operators could rely on the new system.

The project required an approach that would ensure:

- Zero operational disruption
- Absolute data integrity
- Seamless operator adoption

Rather than relying solely on automated conversions, TAS combined automation with engineering oversight to ensure accuracy and usability within the new system.

The TAS Solution

- TAS designed a **parallel migration strategy** that allowed the new SCADA system to be developed, tested, and validated alongside the existing system before final operator transition.
- **Architecture Designed for Reliability**
- The Ignition deployment utilized **four gateways in a redundant architecture**:
- **Redundant Frontend Gateways** supporting operator visualization and user sessions
- **Redundant Backend Gateways** handling tag processing, communications, and historical data
- This architecture provided:
  - High availability
  - Failover protection
  - Scalability for future plant expansion
- The result was a SCADA infrastructure capable of supporting the operational scale of a large multi-train gas facility while ensuring long-term maintainability.

Tag Validation and System Integrity

Because the plant remained online throughout the project, **data validation was critical**.

Every migrated data point had to be verified to ensure:

- Correct real-time values
- Accurate engineering units
- Proper alarm configuration
- Reliable historical logging
- Correct operator display behavior

The validation process included:

- Parallel system comparisons
- Operator review sessions
- Controlled testing of view pages and navigation structures
- Incremental commissioning of system components

This method ensured operators maintained complete trust in the system before relying on the new SCADA environment.

Operator Experience Matters

Beyond technical migration, TAS placed strong emphasis on **operator usability**.

With more than **750 view pages**, the system needed to maintain familiar workflows while improving clarity and consistency.

Enhancements included:

- Standardized the navigation framework and implemented integrated search capabilities to allow operators to quickly locate assets, alarms, and system views
- Optimized navigation workflows by reducing the clicks required to access critical screens and functions
- Improved overall screen performance through view optimization and efficient data loading strategies
- Implemented a structured ISA-style Layer 1–4 visualization hierarchy to provide clear operational context from enterprise overview down to equipment-level detail
- Standardized alarm and trend visualization components to ensure consistent operator experience
- Simplified layouts and visual structure to enhance operator situational awareness and reduce cognitive load

These improvements ensured that operators could transition smoothly to the new platform without disrupting day-to-day plant operations.

Zero-Downtime Execution

Perhaps the most significant accomplishment of the project was the **complete migration without shutting down the plant**.

Through careful architecture design and phased validation, TAS was able to:

- Build and test the new system in parallel
- Validate data points while operations continued
- Transition operator usage incrementally
- Maintain uninterrupted plant production

For a facility of this size and complexity, this approach dramatically reduced operational risk while enabling modernization.

Results

The project delivered measurable operational and strategic benefits.

Operational Outcomes

- Successful migration of **~500,000 SCADA tags**
- Deployment of **750+ Ignition view pages**
- Implementation of a **redundant four-gateway architecture**
- **Zero operational downtime** during migration

Business Outcomes

- A modern, scalable SCADA platform
- Improved maintainability and flexibility
- Enhanced operator visualization capabilities
- Reduced long-term lifecycle risk

Most importantly, **the customer was highly satisfied with the results**, recognizing the project as a major step forward in the plant's digital infrastructure.

What This Means for Operators

Large-scale SCADA migrations often carry significant perceived risk—especially when facilities cannot tolerate downtime.

This project demonstrates that:

- **Even extremely large SCADA systems can be migrated safely**
- **Parallel migration strategies eliminate the need for shutdowns**
- **Modern platforms like Ignition can support massive industrial environments**

With the right engineering approach and project discipline, modernization can occur without compromising operational stability.

Why Texas Automation Systems

Texas Automation Systems specializes in complex industrial automation projects where **reliability, scale, and operational continuity are critical**.

Our approach combines:

- Deep Oil & Gas industry experience
- Proven SCADA and control system architectures
- Rigorous validation methodologies
- Close collaboration with plant operations teams

The result is modernization projects that deliver measurable value while maintaining the operational confidence that industrial facilities depend on.

Let's Talk

If your facility is facing:

- Rising cost to support your legacy SCADA platform
- Large data environment migration
- Concerns about downtime during migration
- The need for scalable industrial visualization

Texas Automation Systems can help you modernize with confidence.