

Integrated Operations

Spartan OnePlant™ – The best integration, is no integration

A consistent, efficient, and highly integrated process control system is essential to the safety and success of a plant's operations. Spartan Control's OnePlant™ solution for process control, skid integration, fire and gas detection, combustion, compression, MCCs, VFDs, and reliability are ever evolving and guide our contributions to being a leader in integrated operations.



Modular construction innovation has been leveraged in the past decade to significantly reduce the cost of construction while increasing the quality of process plants. Although this has provided many benefits, modular construction comes with its own challenges. One of these challenges is the creation of islands of automation, small process plants that must be operated separately from the rest of the facility or integrated with the Control System, leading to more time and resources spent.

Why “Islands of Automation” cost you time, money, and resources

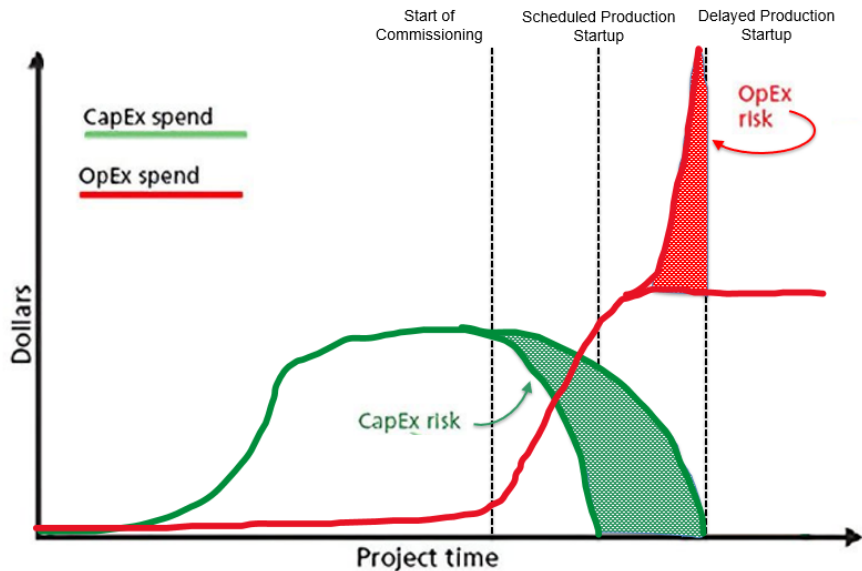
Facility owners lose access to rich data from smart instruments as only data essential for the project, such as Process Variables and fault statuses, are mapped. Key data that is critical for maintenance and optimization are missed. Therefore, many hours are spent during start-up troubleshooting wiring and solving problems pertaining to a communication protocol (Modbus or Ethernet/IP), and mapping. Going forward, **for the life of the facility**, any changes, additions, fixes, and testing will be performed **twice**. The changes will be made once in the skid controller,



and again in the control system, including adding shadow blocks to handle alarms, setpoints, and mode switching.

This is a costly and avoidable practice. In addition, the time and resources that go into this integration are often unscheduled and unbudgeted, leaving the site automation team to either perform this work on their own or justify an expenditure, as well as increasing OpEx risk for efficient start-up and optimization activities for the life of the facility. The real and lost opportunity costs are orders of magnitude larger than the small incremental up-front adder of integrated controls in the specification or FEED.

From the perspective of the team trying to deliver a project, which could last months to years; modularization is clean and effective. However, from the perspective of the operations staff of the running plant, one that can span several decades; these islands of technology are a challenge to integrate, maintain and optimize in the future. In short, decisions made for the benefit of the project, unintentionally handicap the operations of the process plant over its lifetime.



Other issues that arise with the integration of island technologies are:

- On-going management of multiple programs
- The creation and maintenance of redlined drawings
- The management of multiple hardware models and software versions
- Loss of diagnostics from Smart Instrumentation
- Requirement to continuously update TWO control systems – the host and the point control system
- Do It Yourself cyber-security
- Limited view of the plant
- Complex hardware fault tolerance
- No communication fault tolerance
- Upgrades can be more difficult, especially online. Some upgrades require controllers to be put in program mode



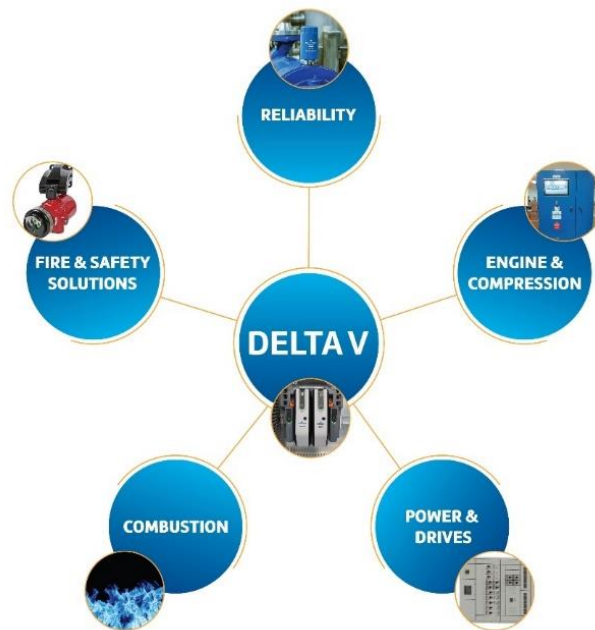
- Multiple vendors may be required for support & maintenance
- Elimination of wiring between the skid and the MCC building
- Multiple Hardware and Software FAT includes testing of skids integration into the plant control system

What can plants do to avoid falling into this trap?

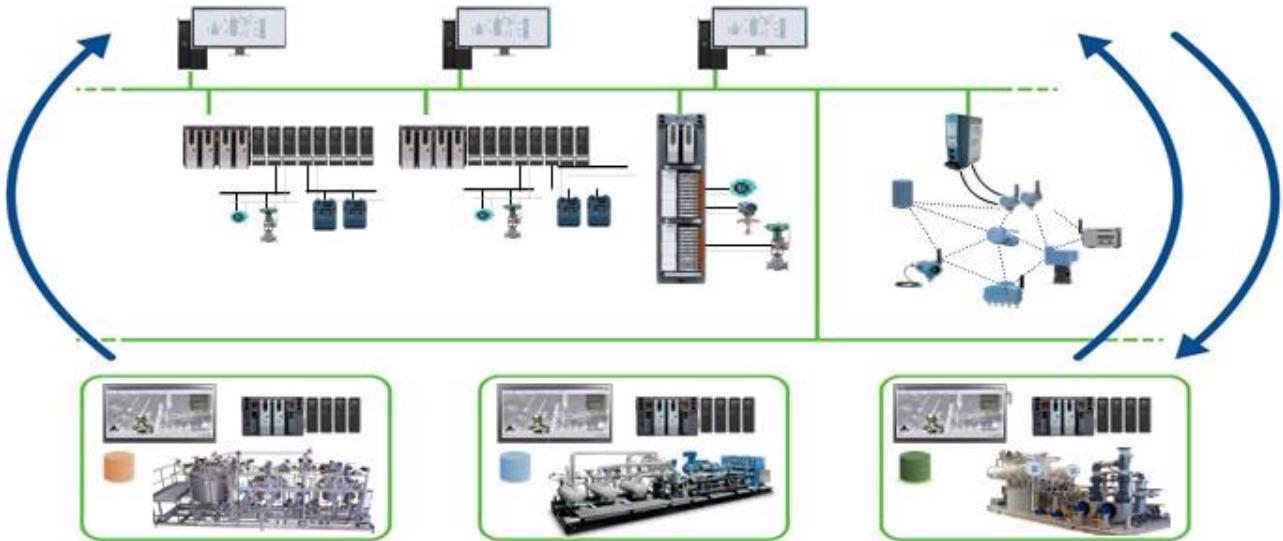
Standardize on a single control system by creating or updating an automation specification. Reject off-spec vendor package control systems – these are beneficial for the packager but mean lost time and money for the end-user ... you and your business. Recruit automation consultants to engage with equipment providers to adopt your standard system. Quantify “invisible” integration efforts so management can see the true costs of using third-party controls. These often far exceed the incremental increase in adopting facility standard control system components upfront.

The Spartan OnePlant Concept

Spartan Controls OnePlant approach, where all or some of the islands in the plant; compression, burner management, motor control centers (MCC), fire & gas detection, and reliability are all natively connected with Emerson’s DeltaV Control System. Thereby eliminating many of the major islands of technology, often termed “balance of plant”.



With OnePlant, all major plant operations share the DeltaV network and its associated cyber security. Operators can see any instrument across the facility, including secondary and tertiary variables, maintenance, and diagnostic data. Historizing data and trending are the same for all instruments connected to DeltaV. With OnePlant implemented, training is minimized for operations and maintenance.



Because everything happens in DeltaV and there are no mysterious “black boxes” to learn; this leaves operations with OnePlant to run. One software toolbox to learn. One set of machines to patch for security updates. One set of critical spare parts to carry. One call for support.

DeltaV: The nucleus / hub

Over the past few decades, facilities have been built using a DCS for the plant and dedicated controllers such as PLCs to control specific skids within the facility.

Though this approach is convenient for the project scope, since every packager is limited to their own skid, it is not the best solution for operations. Since every skid has its own PLC, it could be considered as an Island of Automation. Spartan Controls OnePlant solution allows Operations to run the plant as One Plant with a single control system.

Each project aims for a cost-effective construction and adopt a modular construction strategy. Spartan Controls understands the value of this strategy in the ability to deliver the lowest installed cost of the control system and the facility as a whole. The strategy is fully supported by DeltaV Electronic Marshalling, which is at the heart of our OnePlant solution. Allowing the use of standardized, location independent I/O panels that enable early deployment to fabrication yards. Removing the DCS hardware from the project critical path permits for greater schedule flexibility and enables pre-commissioning between the control system and each end device to

occur at the fabrication yard. Moving work from site to the fabrication yard reduces risk to the schedule and has been proven to provide cost savings in Western Canadian projects.



Within Spartan Control's OnePlant strategy, we integrate many packages that could be considered its own island

of automation, including the compressor panels (RemVue DeltaV), rail or truck loading systems (RailVue, TruckVue), burner management systems (DeltaV SIS), MCC's (PowerVue), and more.



OnePlant Fire & Gas Detection

Using the same platform for Basic Process Control System (BPCS), Safety Instrumented System (SIS), and Fire & Gas, the facility can leverage the same network and therefore cybersecurity benefits of DeltaV. The facility does not need to provide additional training or use different tools for configuration, commissioning, operations, and maintenance, improving their efficiency and reducing operational costs. Historization and trending of fire and gas becomes just as easy as any other device on the control system.

Fire and gas detection in DeltaV takes advantage of Smart Commissioning, which, prior to start-up of the facility, automatically identifies a fire or gas detector, binds it to the control strategy based on its device tag, configures the device, and performs a loop test. Since these tasks are executed by the system, documentation is automatic and readily available. These processes are done in parallel with many devices at the same time, appreciably reducing commission time when compared to the traditional workflow model. The basis of Smart Commissioning process allows the technology to do its work, automating manual tasks. This positively impacts the overall success of project execution by meeting strict and shifting deadlines.

Fire and Gas Detection Applications

DeltaV Distributed CHARMs are designed for fire and gas detection applications. Small, 12 I/O junction boxes can be deployed as either a star topology or a fault tolerant ring. These are installed near your detection, reducing cable runs and their associated costs significantly. Fire and gas detectors can be 2 wire, 3 wire or 4 wire connections.

Often with fire and gas applications, there are complex voting logic where a hazard must be confirmed by more than one detector. Similarly, it's important for operations to understand if there are too many detectors bypassed, in fault or undergoing maintenance in each area. DeltaV makes this potentially complex problem easy to solve through analog voter function block which allows end users to implement M out of N voting functions for up to 16 inputs.

Industrial applications for fire and gas detection have evolved over time into a complex, multi-system solution that is expensive to install and maintain. Hazards that are equivalent in their ability to harm human life are handled differently because of the interpretation of codes and/or the lack of codes that directly address the problem.

The DeltaV OnePlant approach to fire and gas detection leverages the existing DeltaV architecture,



standards, training, and familiarity on site. It provides the highest level of availability and reliability for fire and gas detection eliminating duplication of functionality and hardware. It is simple, straight forward and cost effective.

With a DeltaV OnePlant Solution for Fire and Gas detection, the Authority for Having Jurisdiction (AHJ) can be confident they will achieve the code compliance.

SIS – Integrated but separate

Regardless of what code you follow, or site specification you develop for your facility, DeltaV SIS can help you comply. DeltaV SIS certified to performance-based codes such as IEC 61511, and prescriptive codes such as NFPA 72, allowing connections to important systems such as suppression which typically follow other NFPA codes.

The merge capability of DeltaV allows the physical and functional separation you need for independent protection layers. The fire and gas detection system can be the first subsystem started before any other area of the plant. It can also run independently while the rest of the control system is down for maintenance or upgrade during a turnaround.

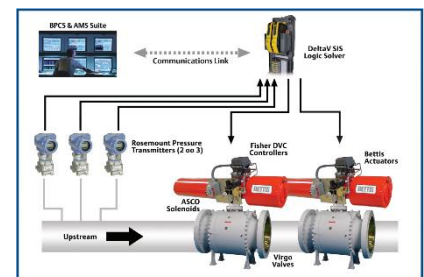


HIPPS – High Integrity Pressure Protection Systems

The HIPPS (High-Integrity Pressure Protection System) system is a safety instrumented system used to protect high-pressure pipelines and equipment from overpressure. A HIPPS system works by detecting when the pressure in the pipeline or equipment exceeds a pre-set limit, and then automatically closing a valve to prevent further flow of fluid into the pipeline or equipment.

A HIPPS system in DeltaV eliminates the need for a separate PLC. No data mapping, thereby increasing level of safety required for a HIPPS system.

Compliance with regulations: The HIPPS system can help companies comply with regulations related to overpressure protection in process industries. This can help companies avoid fines and penalties for non-compliance.



Overall, the HIPPS system can provide several benefits when installed with DeltaV, including improved safety, increased reliability, reduced maintenance costs, and compliance with regulations.

OnePlant Compression on DeltaV

Spartan Controls provides integrated solutions to address Customers challenges and ensures critical rotating and reciprocating equipment operates in a safe, reliable, and efficient manner.

Our engine and compressor control panels contain patented air-fuel ratio and vent capture systems, along with many other products we supply, such as ignition and catalyst upgrades.

Often seen as a standalone asset and an island to balance of plant. This critical asset can be integrated and a key part of the balance of a plant.

The benefit of having the compressor controls on the DeltaV platform is allowing all stranded diagnostics for field equipment to be available to plant operations.

Connected compression is getting the right information to the right people at the right time in your organization. This is key to maximizing profits and ensuring safe operations. The system is designed to continuously collect, analyze and report on unit, field and fleet analytics.



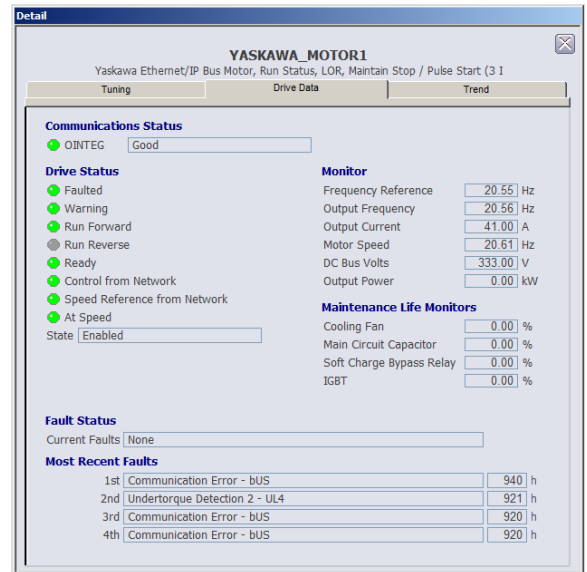
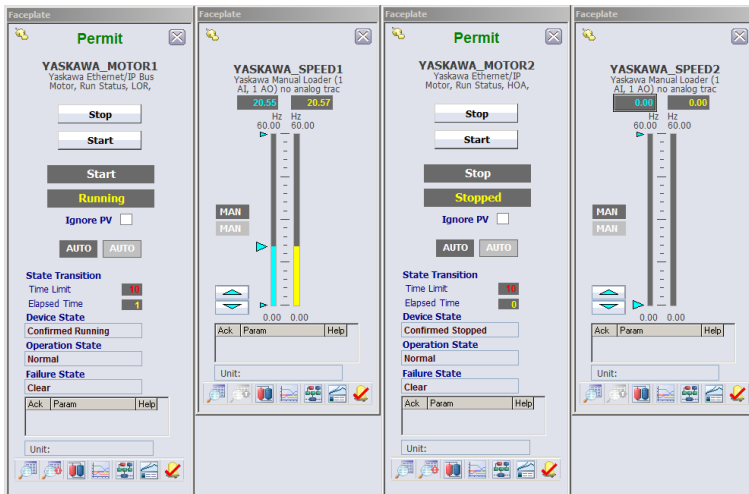
OnePlant - Power and Drives

Traditionally, projects had Motor Control Centers (MCCs), and Variable Frequency Drives (VFD), hardwired to the plants control system. Currently, projects utilize smart MCCs and VFDs to bring in the enriched data into the Distributed Control System.

The DeltaV Control System can natively communicate to any manufactures MCC or VFD, via Modbus, ModbusTCP, Ethernet/IP, ProfiBusDP. We commission, start-up, and maintain the electrical equipment natively without any integration.



The integrated approach of having the DeltaV installed directly onto the PowerVUE MCC, allows for pre-programming and loop checking prior to shipment, reducing onsite commissioning time in addition to providing rich diagnostics at the Operators fingertips through the standard interface. With this solution, no data mapping is required.



OnePlant - Combustion

In most industrial facilities, the steam generating facility (powerhouse) is often a standalone entity. Although considered to be an Island of Automation, it is often the nucleus of the plant. Without steam, there is no heat for process, building comfort, or a turbine for electrical generation.

Safe lighting and startup of fired equipment such as boilers, fired heaters, furnaces, and other combustion processes, are of utmost concern at sites that operate these processes. The Burner Management System (BMS) is designed to provide functionality to ensure safe start-up, operation, and shut down of a combustion process, focusing on preventing operator fatigue, enabling proper alarm management, and supporting troubleshooting to enable quick and proper decisions from operations. Incorporating a OnePlant philosophy throughout the BMS allows platform data sharing that can prevent unintentional shutdowns and communicate premature failures, preventing any hazardous situations that may occur due to dangerous combustible atmospheres. Site standards for the balance of plant and the boilerhouse should be the same for safety and to eliminate the island of automation.



Alarms and System Diagnostics

Extensive diagnostic messages are sent to alert operations personnel of potential combustion instability and improve process maintenance by providing quick identification and isolation of problems.

Diagnostic types include:

- First-out cause of trip
- Missing interlocks and permissives
- System hardware fault identification
- Field device failure.

OnePlant – Fluid Transport and Transfer

The TruckVue system from Spartan Controls is specifically developed to manage, measure, record, and report loading and unloading transactions at truck terminals or transfer points with precision, while complying with all local regulations and industry standards.

With extensive experience in fluid transport, Spartan provides versatile options to interface with plant control systems, such as the DeltaV PK Controller or Electronic Marshalling.



This interface can connect to plant permissives and alarms, including vehicle grounding, tank levels, pump control, fire and gas detection, as well as beacons and horns.

Contact us:

With 14 locations across Western Canada, Spartan Controls is proud to connect our customers with world-class technology, superior technical expertise, and full lifecycle services.

For more information on OnePlant contact your local Spartan Controls office:

<https://www.spartancontrols.com/contact-us/>