

White Paper

Simplify Commissioning to Shorten Project Timelines

Smart Commissioning reduces the automation impact on a project's critical path



DELTA V[™]


EMERSON[™]
Process Management

Simplify Commissioning to Shorten Project Timelines

Up to 30 percent of anticipated value disappears during the turnover/commissioning and ramp-up phases of new asset lifecycles.

– “Effective Operational Readiness of Large Mining Capital Projects” Deloitte, 2012.

Across process industries, the success of major capital projects is jeopardized by traditional automation system commissioning practices and their associated problems: missed deadlines, errors, and stretched-thin personnel. Done right, commissioning can help teams meet schedule constraints and come in on budget. Choosing the right automation strategy can set you up for success.

Although automation expenditures are typically only three to four percent of the overall project, the automation system has a much larger impact on an overall project in areas such as process performance, adherence to schedule, and time to first product.

Because automation is always on the critical path for start-up, and delays can cost millions of dollars per day, facilities constantly search for ways to be more efficient in commissioning. At times, the automation system itself puts up the roadblocks through difficult technologies and methods, which cause problems:

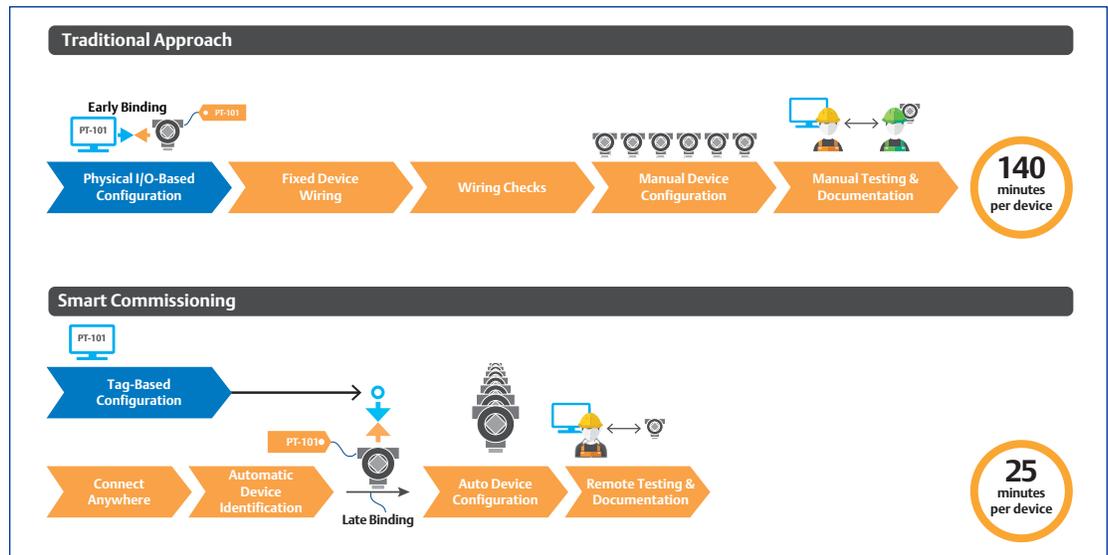
- **Missed deadlines** – Configuring intelligent field devices during commissioning demands a great deal of time from engineers, suppliers, and field technicians. Because everyone is stretched thin, both deadlines and opportunities are missed.
- **Manual errors** – With thousands of devices to configure, and dozens of parameters for each device, the potential for critical errors always exists. Managing the information required for device commissioning, finding available resources, and validating that configurations are correct pose significant challenges.
- **Staffing demands** – Traditional loop checking takes a coordinated testing effort from multiple people: technicians both in the field and in the control room. Step by step, the team goes through electrical and software loop validation. For each technician, the process holds a great deal of wasted, idle time.

Smart Commissioning

Smart Commissioning drastically reduces time and effort by providing an efficient progression from device installations to process startup. Laying the groundwork early in the process — before the binding of field devices — the method uses automation and field device data to streamline tasks all the way through loop testing and beyond.

Positively impacting the overall certainty of project execution, Smart Commissioning helps automation projects meet strict and shifting deadlines. Developments in the DeltaV™ distributed control system (DCS) and AMS Device Manager asset management software improve device binding and configuration, testing, and documentation.

The basis of the process relies heavily on automating manual tasks and letting the technology do its work. Smart Commissioning improves traditional project execution methods into these efficient steps.



Compared to traditional commissioning, Smart Commissioning requires a fraction of the time per device.

Tag-Based Configuration – Configuration without waiting for I/O allocation

As soon as the initial I/O definition is available, the project team can start configuring control strategies based on the device signal tags (DSTs). Each I/O function block is linked to a DST that is not assigned to any particular I/O channel. In a traditional configuration approach, I/O references within the control strategies are bound to specific channels. This creates detrimental dependencies in the project schedule. Smart Commissioning enables the team to delay binding I/O references until the field devices are wired at site – this delay is called late binding.

Connect Anywhere – Flexible I/O assignment independent of control design

The DeltaV Electronic Marshaling with CHARMS technology enables field cabling to be landed wherever it is required, regardless of signal type or control strategy. Each terminal block has a single channel CHARacterization Module (CHARM) that allows any field wiring signal type to be terminated in any location. Field wires are terminated on terminal strips, but the marshalling panel and the associated cross-wiring to I/O cards is no longer required. Each I/O channel is linked to its appropriate controller through the DeltaV system software. The ability for the DeltaV controllers to utilize I/O from different CHARM I/O cards (CIOC) simplifies design considerations for allocating devices to field enclosures.

Thanks to the broad range of I/O types, practically all field devices can be connected to the DeltaV CHARM I/O subsystem without requiring external components. A large variety of signal types, such as RTD, T/C, and 120VAC, can be used in the same field enclosure. The installer only needs to select the proper CHARM based on the signal type. All this field work can be done without any information about the logical I/O assignment within the control strategies.

Automatic I/O and Device Identification – Eliminate manual work

After the CHARMS have been installed in the system cabinet and each device wire has been terminated to a CHARM, each CHARM is automatically identified (or auto-sensed) by the DeltaV system. The user does not need to define the type for each I/O channel. HART devices are automatically identified when they are installed. The DeltaV DCS automatically retrieves device information such as manufacturer, model, and revision and can invoke AMS Device Manager to automatically configure it. The device tag is also retrieved from the field device.

Automatic Binding – Error-proof entries

Smart Commissioning automatically binds field device references to control strategies via the field device tag. For HART devices, the binding of I/O references is performed automatically after the device has been discovered by the DeltaV system. If the device tag matches a DST within the system, the proper I/O function block is bound to the right field device automatically. Automatic binding enables late changes to be made simply without impacting the project schedule.

Automatic Device Configuration – Save time with bulk transfer

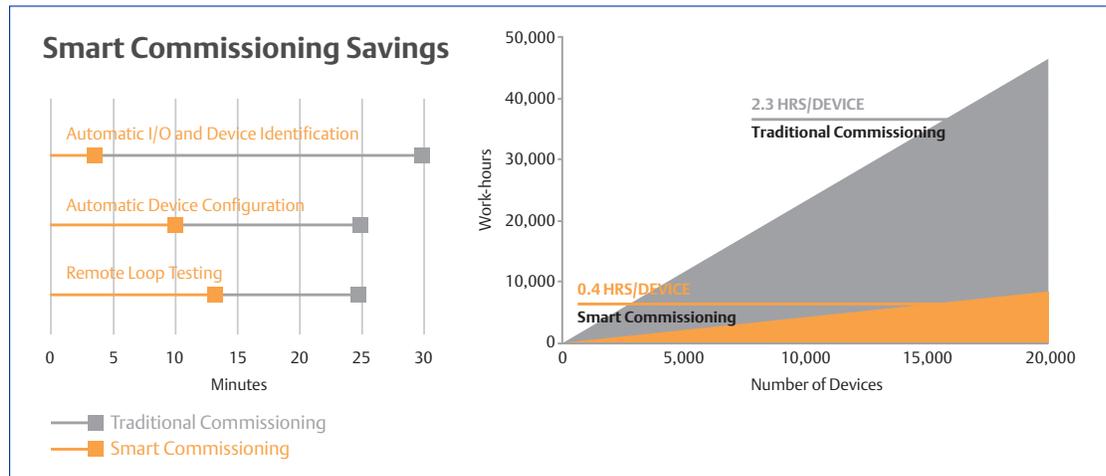
Smart Commissioning reduces time and errors associated with the traditional commissioning process. Using device templates and bulk transfer in AMS Device Manager, each configuration is defined once and used many times. Instead of applying to devices individually, configurations are applied to all common devices simultaneously, ensuring accuracy and consistency while saving hundreds of work-hours.

Automatic validation reports in AMS Device Manager make it easy to quickly verify that devices are configured correctly. Discrepancies are clearly indicated and highlight the exact parameters that do not match. Validation reports can also help manage project changes, ensuring configuration updates have been applied correctly.

Remote Loop Testing – Streamline testing with fewer resources

Once the device tag has been bound with the control strategies, the next step is to perform loop checks. Using AMS Device Manager, a single technician at a control room workstation can execute loop checks without another technician working in the field. The system automatically documents all the steps, saving time in producing test reports.

Smart Commissioning: A Best Practice for Project Certainty



Project Certainty is a transformational approach to project execution that eliminates costs, reduces complexity, and accommodates change in order to improve capital efficiency. Smart Commissioning brings this transformational approach to the automation system commissioning process. By shortening the time between device installation and start up, Smart Commissioning makes project success more certain and enables facilities to:

Eliminate Costs

Smart Commissioning eliminates costs by requiring fewer personnel to complete. Using Smart Commissioning, some Emerson customers have compacted device commissioning time by up to 82%, 140 minutes per device to 25 minutes per device. This means 10,000 to 20,000 work-hours for mid-size to large projects.

Reduce Complexity

Multiple EPCs, numerous personnel, and coordination of hardware and software increase a project's complexity — and level of stress. Smart Commissioning reduces the impact of these detractors by decoupling hardware and software design.

Traditionally the I/O configuration is always coupled to hardware and thus adjustments in hardware always affect the I/O configuration in the DCS database. In addition, an activity that demands the most effort during instrument commissioning is the configuration and setup of individual field devices. Traditionally, this is done one device at a time at the field. Smart Commissioning allows to create device configuration templates far ahead of the installation of field devices, and use as configuration standards beyond the project timeline and across different sites.

Functionality such as tag-based configuration, auto-sensing of devices, bulk device configuration, and auto-binding have reduced complexity in greenfield and brownfield projects around the world. For example, one international oil company (IOC) has used AMS Device Manager bulk transfer functionality to reduce commissioning time to save hundreds of work-hours.

Accommodate Change

Delays in start-up arise in part from late-stage changes. Attention to this area is critical because over 65% of projects greater than a billion dollars and 35% of projects under \$500M come in more than 25% over budget or 50% late.

While Smart Commissioning does not address all the problems leading to delays and project over runs, it addresses key automation-related elements in the project's critical path. Since Smart Commissioning allows the binding of hardware and software to be pushed later in the process, the project team can be more flexible in its response to late design changes. And when changes are made, they are accomplished with fewer errors and less rework.

Contact Emerson to Avoid Commissioning Overwork

Ask an Emerson expert to determine how much time and effort your team can NOT spend on commissioning. And discover just how flexible your team can be as they easily adapt to late design changes. We look forward to implementing Smart Commissioning in your organization and ensuring more certain project success.

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