

## CCC EMULATOR

# Turbomachinery Controls Emulation

for Multi-Purpose Dynamic Simulation and Operator Training Stations

From system design through ongoing optimization, turbomachinery controls emulation plays a pivotal role in each stage of a successful industrial project. A versatile tool for minimizing risk, the CCC Emulator equips multi-purpose dynamic simulators and operator training stations with the best tool for designing, tuning and testing turbomachinery control across the project lifecycle.

## Software Architecture

With the CCC Emulator software application, operators can execute the full suite of CCC control applications in a Windows OS environment that allows for interfacing with third-party process simulation software. The CCC Emulator supports both the S5 Emulator and Prodigy Emulator subprograms, allowing it to seamlessly emulate as many as 16 instances of CCC Pro Built® controllers. A full plant CCC control system can now be emulated in a single Emulator!

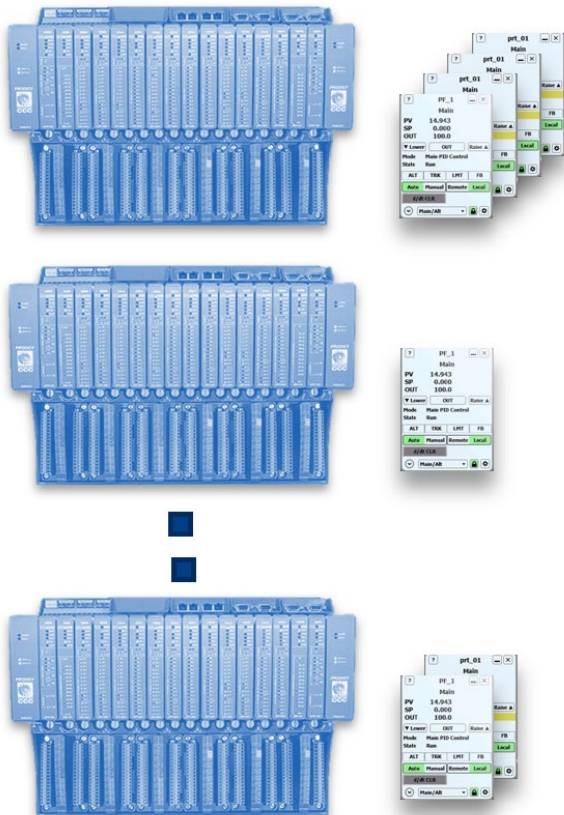
### S5 Emulator can be used with

- S5 Vanguard
- S5 Reliant
- S5M real controllers

### S5 Prodigy Emulator can be used with

- Prodigy
- S5P real controllers
- Any future CCC controller based on Codesys runtime

For operations leveraging Series 3 or Series 4 controllers, CCC can create an equivalent S5 or Prodigy configuration to emulate platforms including S3++ and S4.



## Lifecycle Applications

Operating in tandem with third-party process simulation software, the CCC Emulator fulfills the role of a Multi-Purpose Dynamic Simulator (MPDS) for your turbomachinery controls system throughout the plant project lifecycle.

- **FEED:** Engineering studies to correct system design
- **EPC:** Engineering studies for control strategy testing and validation
- **Pre-Commissioning:** Control system pre-tuning and Operator Training Simulators (OTS)
- **Operation and Optimization:** Digital twins for real-time model-based optimization and engineering studies with as-built configuration, “what if” scenarios or future design change validation

During engineering studies, the CCC Emulator can evaluate control dynamics during a wide range of scenarios including turndown operations, sequencing of the machine, fast-transient upsets, and normal operations based on design conditions and gas composition. Equipped with emulator data, organizations can assess and optimize critical aspects of their turbomachinery controls strategy:

- Overall control system design, configuration and tuning
- Steady state and turndown operation with different gas compositions
- Protection from surge during fast disturbances, leveraging Recycle Trip, Safety On and Derivative Responses
- Verification of antisurge valve sizing
- Protection from over and under pressure with proper combined response of multiple limiting loops, pressure override control and set point depression
- Layered response coordinated with other DCS and SIS controls and protections
- Operating procedures and machinery sequencing including purging, pressurizing, startup, load, unload, normal stop and emergency shutdown

## Features and Benefits

From reducing startup time to enabling more seamless training, the CCC Emulator was designed for the unique challenges of industrial operations. We leveraged decades of specialized expertise and the world's most advanced turbomachinery controls solutions to deliver value that's only possible with CCC. Our experienced engineers become an integral part of the overall project design team, contributing to minimizing risks and improving design.

### Key Capabilities

- Utilizes the same TrainTools engineering tools and TrainView HMI as the control system
- Converts and rebuilds the CCC control system program for an Emulator target instead of real controller target
- Guarantees an exact replica of control system logic and responses to enable automated conversion
- Easily transfers snapshot with configuration and tuning parameters from real controllers to the CCC Emulator and vice versa
- Supports up to 16 instances corresponding to 16 real controllers

### Proven Value

- Validates real control solutions in a dynamic mode
- Enables extensive tuning in extreme scenarios that cannot be tested in the field
- Enables virtual startup and tuning, reducing commissioning time in real plant
- Provides operator training with identical interfaces
- Reduces project risk and startup time, which is critical due to the large number of personnel working in a plant simultaneously

## Compatibility With 3rd Party Process Simulation Software

The CCC Emulator can interface with leading third-party process simulation software via OPC.

Standard interfaces such as links or connectors have been developed by many industrial process simulation software vendors and are readily available for use on projects. Although CCC may have been involved in providing technical information, guidance and validation for their interface development, these interfaces are owned and maintained by each third party company.

The partial list provided in the table below is for informational purposes and may not be up-to-date. We recommend that you contact the vendor directly during the proposal phase to verify the current state of the interface with the Prodigy Emulator or S5 Emulator.

COMPANY	SOFTWARE	S5 EMULATOR	PRODIGY EMULATOR
AspenTech	HYSYS Dynamics	V2006.4, v7.1, v7.2, v7.3, v8.6 and later	V11.0 or higher
Honeywell	Process Training Simulator (former UniSim Operations)	R400 and higher with CCC Toolkit & Adapter	R521 and higher with CCC Toolkit & Adapter
Omega Simulation	OmegaLand	Yes	Yes
Emerson	DeltaV Simulate	Yes	No
Emerson	Mimic Simulation	No	Yes
AVEVA	Dynamic Simulator (former Dynsim)	Yes	Yes
Kongsberg	Asset	Yes	No
Kongsberg	K-spice	Yes	Yes
CORYS	INDISS	Yes	No
CORYS	INDISS PLUS	Yes	Yes
BHGE	Predix	Yes	Yes
Inprocess	Inprocess Infrastructure Suite	No	Yes

# The Trusted Name for Turbomachinery Optimization.



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Hours



10,000+  
Machines



40+  
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150+  
Turbomachinery  
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