

simulation
knowledge
profit

IIS Inprocess Infrastructure Suite

The Inprocess Infrastructure Suite (IIS) developed and licensed by Inprocess, is a software suite that enables deployments of applications powered by rigorous simulation tools.

From offline analysis to:

- Operator Training Simulators (OTSs)
- Online Digital Twins

The IIS offers its clients the possibility of interconnect multiple models.

Functionalities

Each of the IIS capabilities, provides a number of useful functionalities to a wide range of applications:

- **Communication Hub:** to establish, manage and control connections among different data nodes (applications, databases...)
- **Graphic Interface Builder:** powerful graphical design environment to develop solutions that require an HMI
- **Instructor Station for training applications:** from where the instructor leads and monitors the training sessions
- **Operator Workstation:** the environment used by students to interact with the training system, typically replicating Operator consoles from control rooms.

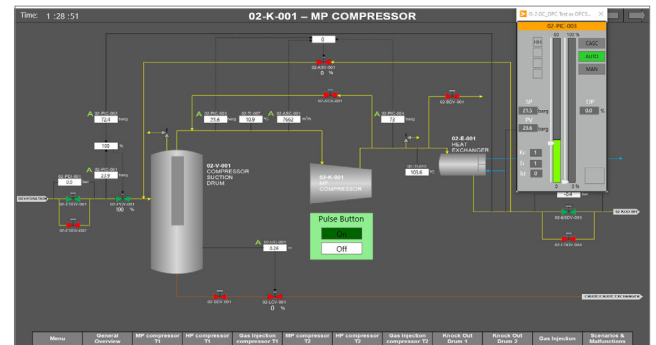
Communication Hub

The IIS communication layer allows synchronizing data with other software (regardless of their physical location), including model split management in multi-core computers, opening the door to incorporate third-party technologies to the training and Digital Twin solutions, such as:

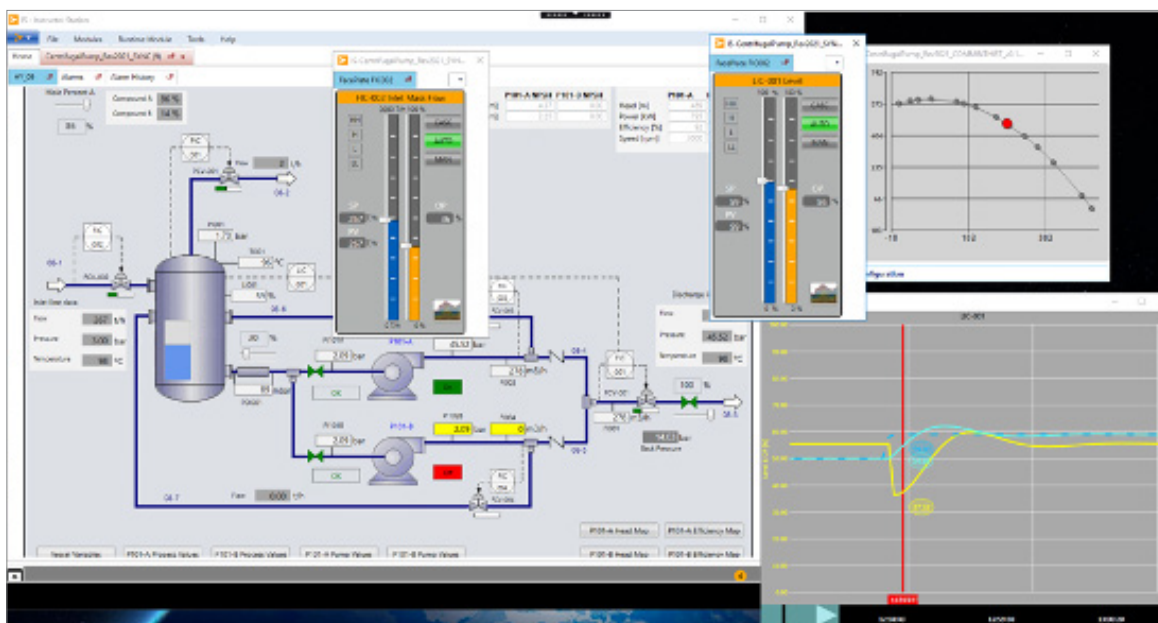
- Process Simulation software, both dynamic and steady state solvers
- External Databases, such as historical process data storage
- External Optimizers, for open-loop advisory tools, or for closed-loop ones
- DCS emulators, for direct-connect Operator Training Simulators, or for virtual DCS' FAT
- 3D VR plant simulators, for training field operators
- Artificial Intelligence models
- Existing Client-proprietary (or third-party) calculation routines - Inprocess can help in wrapping for use in IIS
- Internal Real-time Database: Digital Twins generate large amounts of data which needs to be stored for further analysis. IIS is deployed along with a powerful time series database for efficient storage and data sharing to external applications for data analysis (i.e. Grafana, PowerBI among others).

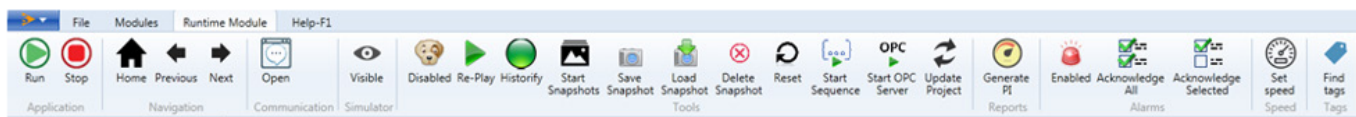
Graphics Interface Builder

The GUI Builder puts in the hands of development engineers a powerful design environment where Human Machine Interfaces of the Inprocess Digital Twins and OTSs can be built. It is the ideal tool for those in need of an independent Graphical User Interface development toolkit which is integrated with the plant and models variables.



It allows to easily configure multiple windows, scroll bars, pull down menus, icons, push buttons, dialog boxes, embedded trends, customized faceplates... and connects them to data managed by the Communication Hub for any digital twin project or OTS. Furthermore, if some graphic files do exist, they can be embedded into the HMI being developed.





Instructor Station

One of the key components of an OTS is the station from where the instructor leads and monitors the training sessions. The IIS Instructor Station allows users to:

- Mentor and Lead Training Sessions.
- Program and trigger scenarios, disturbances, malfunctions and emergencies.

It uses an intuitive graphics user interface to manage training features and permitting quality operator training, while allowing for OTS solutions or multiapplication frameworks and speeding up OTS development.

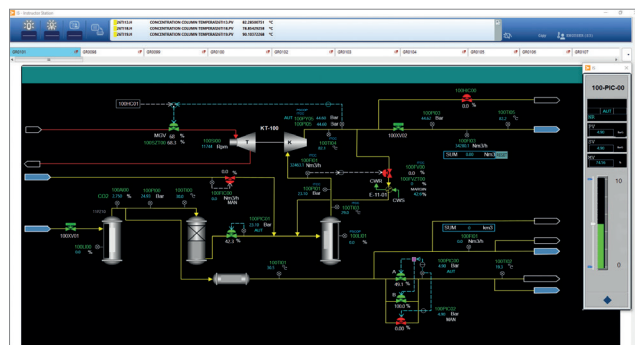
It allows the Instructor to navigate through process views, change parameter values, call up displays, load models, activate malfunctions, and perform other tasks during a training session. Through friendly displays, the instructor can monitor the status of the training session, apply perturbations, trigger scenarios and directly control selected malfunctions and remote functions. Furthermore, the instructor can see all the process information available to the trainee, as well as certain “key” internal process variables.

Multiple instances of the Instruction Station may be run interconnected and in parallel, allowing independent representations of e.g. a Field Operated Devices (FOD) Station or a Critical Action Panel (CAP). Any associated field operated devices such as field operated block valves, locally operated motorized valves, hand switches or field measurements which are involved in normal operations may be simulated. Such field functionality may even be developed in a virtual reality 3D environment.

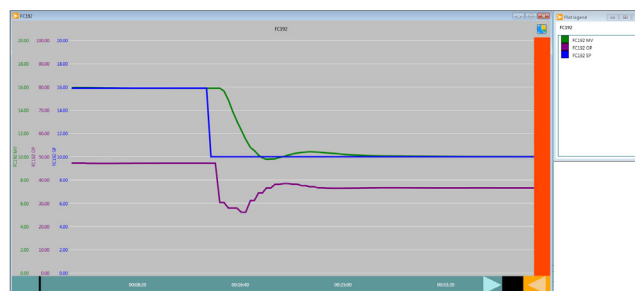
Operator Workstation

The IIS Operator Workstation is able to deliver a high fidelity replica of control room panels and their functionality, allowing the operator to navigate through various operation displays and perform usual control actions like faceplate access and changes in: setpoints, outputs, controller mode, alarm limits and control tuning parameters.

The Operator Workstation also includes an alarm management module, replicating the functionality of alarm lists, acknowledgement actions, logs and sounds that are typically provided by DCS.



Additionally, the Operator Workstation has a powerful trending tool to recreate the same trendlines used in control room or to dynamically create specific trendlines for extra information from the historized data.



IIS Summary of Features



Connectivity to commercially available:

- DCS soft-controllers: Emerson, Honeywell, Rockwell, Siemens, CCC, ABB, Yokogawa...
- Process simulators: Aspen Technology HYSYS, Honeywell UniSim Design, Yokogawa PetroSim, Schlumberger Symmetry.
- External Databases: OSI PI, Aspen Technology IP21, Honeywell PHD, Microsoft Data Lake
- Other Generic options such as OPC and Microsoft Excel
Ask Inprocess if you miss any in the list!



Critical Action Panel along with Control room and field operated devices functionality



Connectivity to 3D plant visualization for field operators and remote functions



Evaluation of Operators performance



Configurable instructor and operator screens and faceplates



Administrative functions



Alarm management



Data historization, with powerful trending tool

to recreate trendlines used in control room or specific trendlines for additional insights to Instructors or users of Online Digital Twins



Intuitive and user-friendly graphical user interface



Programmable scenarios, disturbances, malfunctions and emergencies



High fidelity replica of control room panels and their functionality

IIS Differentiators

- Scalability: From a simple emulated unit to a full plant, direct-connect OTS
- Multi-Interface: To communicate to data nodes by different means (e.g. through OPC, proprietary APIs or a combination) and with different workflows
- Multi-app: Supporting connections to Applications from multiple vendors (process simulators, DCS providers...)
- Open architecture to develop specific plug-in extensions to communicate to new data nodes (sinks or sources)
- Deploy solutions cloud based, or physically.
- Performance: Able to handle thousands of tags in multiple real-time
- Easy Licensing and maintenance
- Fast project development environment
- Deploys a popular time series database to store training session and digital twin execution information efficiently. This database is also used as entry point to external popular applications in the data mining, AI and dashboards fields (e.g. Loud ML, Grafana, Power BI...).

Typical IIS applications

- Direct-Connect Operator Training System
- Emulated Operator Training System
- Process Trainer
- Online Digital Twin
- Application Connection

IIS and Inprocess Benefits

- Reduced costs of investment and resources
- Increased operational efficiency
- One single environment for all your OTS and Digital Twins
- Easy-to-use training features and allowing quality operator training and assessment
- Full adaptability to client's plant characteristics: field operated devices may even be simulated in a virtual reality 3D environment
- Connections to most common ICSS and commercial Process Simulators
- Independent advisors for ICSS checkouts
- Effective Technology Transfer
- Development Agility: Able to develop specific demands in projects

Case studies

Scan this code to see our latest case study

