

# Digital Twin Refresh Service

- Receive annual expert assessment
- Mitigate maintenance risks
- Update core functions of system
- Reduce future expansion costs



Maintain peak Digital Twin simulator system performance.

## Introduction

Relevance is critical to maintaining peak performance of your Digital Twin system. As things change on the production system, the Digital Twin must remain reliable to continue providing benefits throughout the operation lifecycle. The Digital Twin Refresh Service provides expert assessment and services to give you confidence in the relevancy of your system year over year.

Emerson performs a prescribed set of assessments to the current status of the Digital Twin and provides a core set of updates to delivered models. With this program, you can keep your simulator functional while continuing to capitalize on new technology and features.

## Benefits

- **Receive annual expert assessment of Digital Twin** – Each year, Emerson will evaluate changes made within that time to the Digital Twin. Historical information of changes is provided in a summary report – shared and documented for further reference.
- **Mitigate maintenance risks** – Performing annual assessments reduces the risk of compounding changes causing the system to become obsolete. The checks also decrease the chance of unexpected malfunction or failures.
- **Update core functions of the system** – Apply key updates to previously delivered components and identify potential issues to keep the Digital Twin operating reliably and current with the latest technology. Proactively assess simulator configuration to maintain alignment with the current production system.
- **Reduce future expansion costs** – Gradual assessment and updates delivered with the Digital Twin Refresh Service provide digestible step-change updates. With those updates, Emerson can provide future expansions quicker and at a much lower cost to your operation. Without consistent annual updates, future expansions may require high investment FEED studies to determine strategic direction.

## Service Description

Emerson simulation engineers first assess the current status of the Digital Twin and then provide a core set of updates to bring the system to a functioning state.

### Assessment

Annually, Emerson assesses the current state of the Digital Twin system compared to the state in which it was delivered or the state of the previous assessment. Emerson initiates the scheduling of the planned assessment with your plant's designated contact person. Emerson simulation engineers work in advance to access the necessary system data to be used in completing the work. During the assessment component, data is collected to assist in reviewing the offline DCS and simulator.

### Data Collection

Emerson collects old and current system databases for comparison. Information included in that comparison is simulation model data, training data, SIO data, and control system data. Possible inputs include:

- Databases
  - Current Production Control System
  - Current Offline Control System
  - Current Mimic Simulation
  - Delivered Offline Control System
  - Delivered Mimic Simulation
- P&IDs – old and new
- Control system modules & graphics
- Equipment and valve data sheets
- Pipeline drawings

### Offline DCS Review

#### Modules

Emerson checks each control module, performs visual review, and uses the DeltaV FHX Utility generated databases for differences post-delivery, including changes to the module count and I/O points/ranges.

#### Graphics

Using visual checks and interviews with the customer, Emerson determines any modifications made to delivered graphics and if any new graphics are needed.

#### I/O

A list of changes in I/O is generated using DeltaV I/O sheets and the FHX Utility in Mimic. Those changes are reviewed to determine what needs to be carried over to the new system.

#### PLCs

If the delivered system includes any PLC control logic emulated in the simulation software, Emerson looks at both logics: delivered and currently running. The differences are recorded and required updates are determined. Safety Instrumented System (SIS) PLCs and Original Equipment Manufacturer (OEM) Skid Equipment PLCs are excluded from the assessment and alignment process.

### Simulator Review

#### Snapshots

If the system utilizes snapshot control, Emerson restores the previously delivered snapshot to determine initial changes to the system, as identified in the log. As not all changes are detected re-running snapshots, some manual examination is required to generate change reports.

#### Equipment, Valves, Pipelines, Transmitters & I/O

Coupled with end-user knowledge of changes, Emerson reviews documented data in P&IDs, equipment and valve data sheets, pipeline drawings and more to determine differences. A list of changes made to each of the related fields is generated to determine the effect to the overall simulator.

#### Training

If the system utilizes training functions within Mimic, Emerson compares differences in the SOPs or new documents from the end-user to the exercises built in Mimic. Also, previously taken snapshots are reviewed to determine if modifications occurred and if snapshots need to be retaken.

#### Graphics

Emerson checks modification dates in the database directory as well as performs visual review of changes made to simulation graphics – including training screens and trends. Graphics are often tied to other parts of the simulator and dependent on changes made there.

#### Test Bench

If the system utilizes Mimic Test Bench and the features available within that license, Emerson performs a check on script changes and determines if new scripts are recommended for continued use.

#### Assessment Report

A summary report is produced to show what changed since Emerson last delivered an update to the Digital Twin installation. The report is used to discuss the best course of action moving forward for the system.

**Alignment Services**

After the assessment is completed, Emerson provides alignment updates to the system as it relates to the delivered Digital Twin.

DCS Update	
Version Alignment	If the DCS was updated to a new version in the past year, it should be updated on the delivered simulation system. Emerson compares the current simulation system version with the latest production system version to determine if this is a necessary step. All minor hotfixes are applied to the simulation control system machine. A build revision (i.e. LTS to FP1) or version upgrade (i.e. v13 to v14) could create issues with snapshots, control strategies, and I/O communication. Build revisions and version upgrades need to be further assessed for project impact before moving forward.
Modules	For changes to block parameters and rewired blocks, Emerson provides updates to the offline system. DeltaV system SIS modules and graphics are converted to BPCS where applicable.
Graphics	Emerson delivers updates to the graphics that were modified since last checked and imports them into the simulation database. Further services can be added to create new simulation-specific graphics, if requested.
I/O	Changes to the I/O may need to be carried over to the new system. Emerson removes old and/or adds new OPC and VIM I/O, as the modified system requires, to realign the simulator to the current state.
PLCs	Up to 20% of subroutines/PLC logic will be updated for PLC(s) emulated in the simulation software. Safety Instrumented System (SIS) PLCs and Original Equipment Manufacturer (OEM) Skid Equipment PLCs are excluded from the assessment and alignment process.

Simulation Update	
Version Alignment	There is typically one new revision of Mimic per year. The final step of the simulator portion of the assessment is identifying new available features that would enhance the end-user experience and upgrading the system to that latest version.
Snapshots	Emerson retakes the previously delivered snapshots utilizing the updated control system configuration.
Models	New transmitter & I/O models connected to process models are created, where necessary.
Training	Emerson updates the original training exercises to account for changes made to other parts of the system.
Graphics	Changes to models and the offline control system may require changes to graphics. Emerson applies updates to the corresponding graphics including training screens and trends.
Test Bench Scripts	Emerson applies updates to the Test Bench scripts, if necessary.

### Service Availability

Digital Twin Refresh is a Lifecycle Services offering for systems originally delivered by Emerson's Project Services. The service supplements the hardware & software infrastructure checks delivered in the Digital Twin Preventive Maintenance service.

### Ordering Information

Contact your local Emerson sales office or representative for a quote or to explore alternative requirements. Must have an active Guardian Support for Mimic contract & Digital Twin Preventive Maintenance to utilize this service.

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