

# Plant Tracker Feature

Save the operating plant state to a file

## What is “Plant Tracker”?

“Plant Tracker” retrieves the real-time process and control parameters of an actual plant and synchronizes them with a plant model running on the high-fidelity and fast Visual Modeler dynamic simulator. This allows for the creation and saving of an internal simulator state that is synchronized with the process and control states of the actual plant. Furthermore, the internal state can be used as the initial condition for operator training simulators.

## Why Plant Tracker?

Over the years, operator training simulator “OmegaLand” has been improved for numerous energy and process industries. Clients shared requests to start training based on various states of the plant during operation and to utilize the training simulator for purposes beyond just training. In response to these requests, Plant Tracker feature was developed.

By integrating Plant Tracker into existing operator training simulators, it is not only possible to provide training based on the current state of the plant, but also to validate interlocks and safety instrument control logic—areas that are difficult to verify during steady-state operation. Furthermore, optimization of tuning parameters for energy efficiency and productivity improvements can be carried out in an offline environment, while replicating the operational state in the training simulator.

Plant Tracker feature enables users to expand the potential applications of the operator training simulator.

## Key features of Plant Tracker

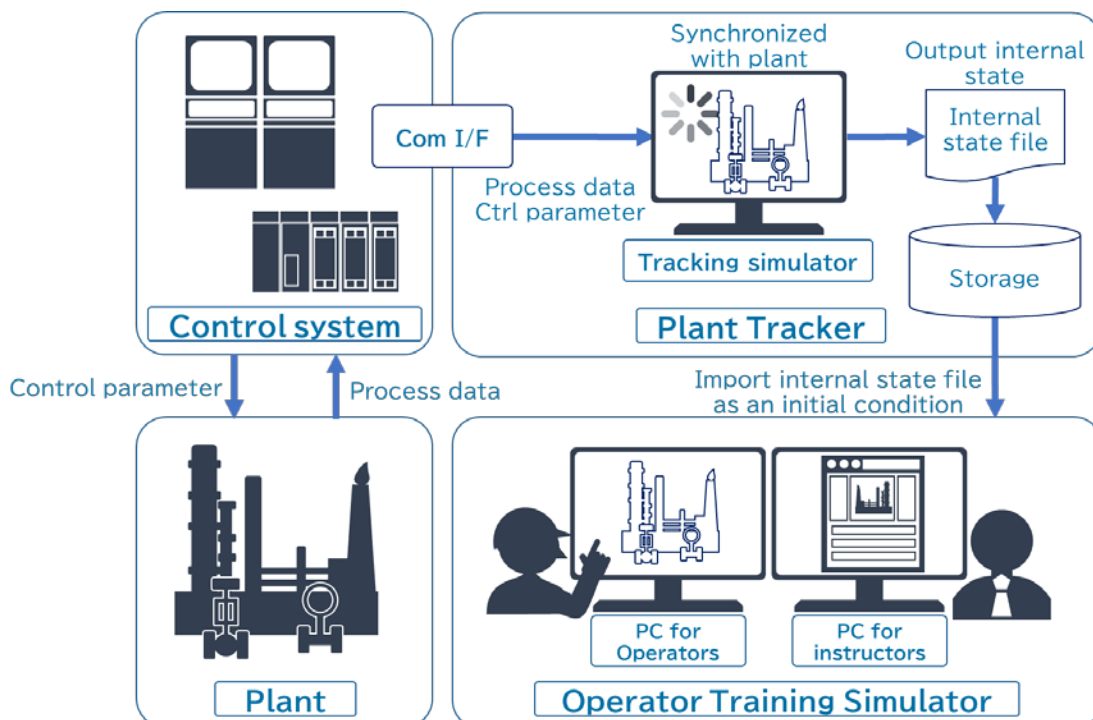
The key features of Plant Tracker are as follows:

- It allows for the extraction of process data and control parameters from the actual plant without affecting its operation\*, enabling the generation of the plant’s internal state.
- Using this internal state, the control logic of the DCS can be reproduced on the operator training simulator.
- By implementing Plant Tracker, it becomes possible to advance plant condition monitoring in the future (including plant visualization, state estimation alarms, predictive analysis, and case studies).

\* Please note that there are certain constraints regarding the timing of extracting process data and control parameters from the actual plant.

## Typical System Configuration

Here is an example of the system configuration for importing the current state of the actual plant into the operator training simulator using Plant Tracker.



An example of a system configuration using Plant Tracker

# Plant Tracker Feature

## Benefits of Implementation

The benefits of Plant Tracker are as follows:

- Previously, due to the numerous operating patterns of the plant, it took a considerable amount of time to create the initial state for the operator training simulator. Plant tracker can save the current state of the plant as initial state within a short time. It improves work efficiency and allows operators to begin training from a state that mirrors real-world operating conditions, resulting in more realistic and higher-quality training.
- Plant Tracker enables the capture and saving of the plant’s continuously changing state at any given moment, which allows for the storage of more information than what a process historian could offer. Additionally, by using this initial state, it is possible to recreate subsequent plant behaviors in the simulator. This capability not only enhances the initial state for operator training but also allows for ongoing plant performance analysis and the evaluation of control parameters based on various situations.

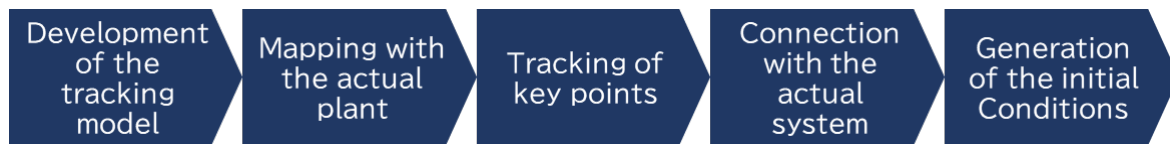
## Functions and Engineering for Plant Tracker Implementation

Plant Tracker is offered as an optional feature of OmegaLand. The following additional functions and engineering work are required for the implementation of Plant tracker. (Some details may vary depending on the customer’s implementation environment.):

- Selection of the actual plant’s tag information necessary for synchronization (Engineering)
- Communication interface with the actual system (such as process historians or OPC interfaces)
- Mapping of tags between the actual plant and the simulator
- Addition of process data tracking functionality to generate the control state of the existing operator training simulator
- Implementation of methods to transfer the internal state files of the simulator synchronized with the actual plant

## Maintenance Services for Package Products

The following outlines the flow of engineering work required for implementing Plant Tracker.



The flow of engineering work

Engineering Workflow	Descriptions
(1)Development of the tracking model	• A tracking model will be developed to follow the data of the actual plant. If OmegaLand has been installed, the plant model in the simulator will be reused.
(2)Mapping with the actual plant	• If measurements such as temperature, pressure, flow rate, and composition of raw materials, utilities, and external environments are available, tag mapping will be performed to import these values into the simulator. However, in cases where control actions, such as level control, are slow and cannot be tracked with the above mapping alone, the control variables from the actual plant will be mapped to the simulator’s setpoints. Additionally, the manipulated variables from the actual plant will be mapped as feedforward signals to the simulator’s manipulated variables.
(3)Tracking of key points	• In the actual plant, even if certain variables are not directly controlled, if they are important points for the simulator to track the plant, mechanisms will be built in the simulator to ensure it follows these points. For example, when the outlet temperature of a heat exchanger is a critical point, the simulator’s heat transfer coefficient parameters will be adjusted based on the actual plant’s heat exchanger outlet temperature, enabling the simulator to track the outlet temperature of the heat exchanger.
(4)Connection with the actual system	• The mapping and tracking mechanisms are connected to the communication interface of the actual plant’s control system. During this process, a communication interface that does not involve any write operations from the tracking simulator to the actual plant will be used, ensuring that there is no impact on the actual plant.
(5)Generation of the initial Conditions	• First, verify that data can be extracted from the actual plant according to the mapping. Next, confirm that the simulator operates in sync with the extracted data. Finally, ensure that the internal state of the tracking simulator is written to a file on disk.

For inquiries regarding OmegaLand technical support and package product maintenance, please contact us at:

**Omega Simulation Co., Ltd.**

TEL: +81-3-3208-4921

E-mail: sales@omegasim.co.jp