

# PMOS™

## Plant Monitoring & Optimization System



**Real-Time Operational Performance Visualization Through Process Digital Twin!**  
 Realize timely operation adjustment and maintenance by knowing plant's current state

### ① MONITORING Function

PMOS™ constructs a virtual plant by replicating the physical plant's operational state using a static process simulator. It automatically calculates data such as material and utility balances that aren't available through DCS, ensuring constant visibility of the latest operational performance.

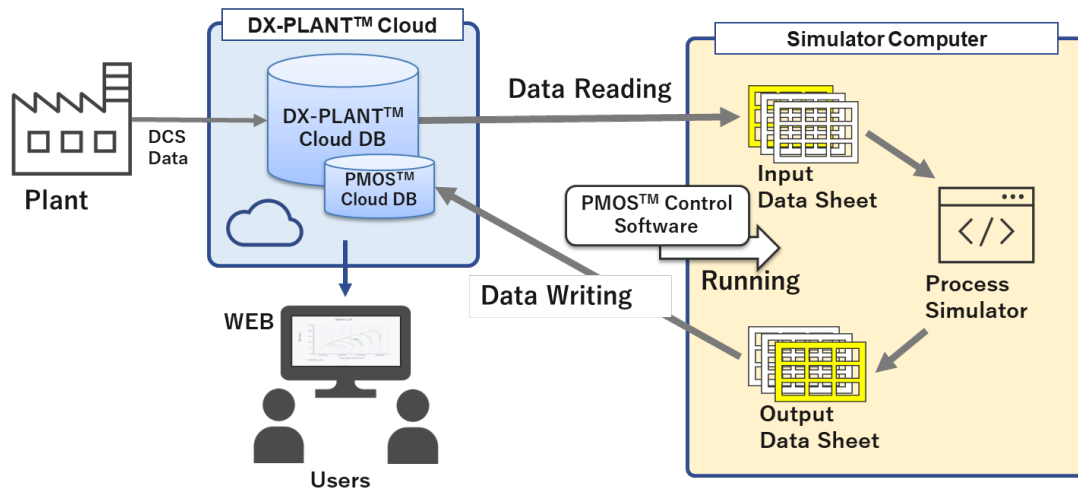
Comparing the latest operational performance with design data helps evaluate equipment and plant performance. Utilization of PMOS™ calculations to assess long-term performance degradation helps optimize maintenance planning.

### ② CASE STUDY Function

PMOS™ enables users to conduct detailed simulations and experiments within a digital twin of a plant or system where equipment performance parameters have been adjusted by MONITORING function. Users can customize operating scenarios, optimize performance, and assess various parameters.

A risk-free digital environment enabling in-depth process assessment and optimization.  
 Helping evaluate optimal operating conditions when considering changes in production volume.

### ■ Implementation of PMOS™

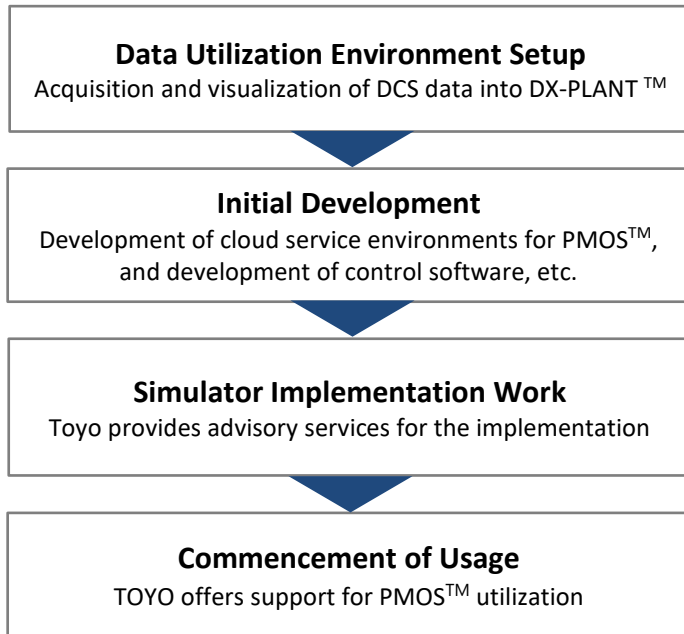


- The operation data obtained from the actual plant is periodically transferred to the simulator for calculation.
- Simulation results are stored in a database and web-based visualization is provided for easy access.
- PMOS™ allows on-demand simulations using historical data, enabling analysis or comparisons with past operations.

### ■ Potential users who might benefit from PMOS™

- **Plant owners** who aim to swiftly detect issues related to equipment performance and product quality early on and seek to speed-up their decision-making process.
- **Process licensors** who wish to offer additional valuable services to licensees and provide improvement recommendations.
- **Plant Operation and Maintenance (O&M) service providers** who are focused on advancing their services to a higher level.

## ■ Steps for the Implementation



Firstly, DCS data is collected on the DX-PLANT™ cloud-based environment to prepare for data utilization.

Required interfaces and execution software are adapted for the simulation.  
Your preferred simulators\* can be utilized.  
(\*confirmation of specifications required).

This includes creating interfaces for preprocessing input data. While you will be responsible for configuring your simulator, TOYO's engineers, experienced in PMOS™ implementation, will support your implementation efforts.

Toyo's service package includes license, a PMOS™ cloud environment, and inquiry handling services in an annual subscription format.

## ■ Addressing Challenges with PMOS™

### MONITORING Function

It's challenging to identify which equipment is experiencing a decline in performance among multiple equipment.

PMOS™ can help evaluate their performance, enabling you to prioritize effectively when planning maintenance!

It is necessary to know the composition for the operation improvement. However, it is difficult to take sample for the process points.

PMOS™ can estimate the composition, allowing you to fine-tune operations based on those estimates!

You want to assess the trend of equipment performance degradation and plan maintenance but lack the time and personnel required to process and record the performance.

Let PMOS™ automatically perform equipment performance calculations!

### CASE STUDY Function

You want to change plant load but are unsure about the impact on individual equipment when adjusting plant operations.

You can assess the condition of the equipment while changing plant load!

Considering switching to more environmentally friendly raw materials but uncertain about how it will affect your plant's performance.

You can conduct scenario studies of the changes in operating conditions using a digital twin on the cloud!

It appears that the heat exchanger's efficiency has recently decreased. Immediate maintenance isn't possible, but it is expected to reduce utility consumption.

You can explore optimal operating parameters based on the current state of the heat exchanger and make adjustments accordingly to minimize utility consumption!

## ■ Contact us for more information



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