2.5 Smart Management GRI 2-25, 3-3

Impact Topics

Enhance efficiency with automated processes, workforce simplification affects the right to work.

2024 Achievements

Promoted six projects:
Construction of the DCS + field data system, real-time vibration condition monitoring and development for high-pressure reactors, AI-based quality prediction, black smoke detection system, digital graphic and text management system, white smoke and open flame recognition system, and an energy dashboard system.

2025 Goals

Promote two new projects.

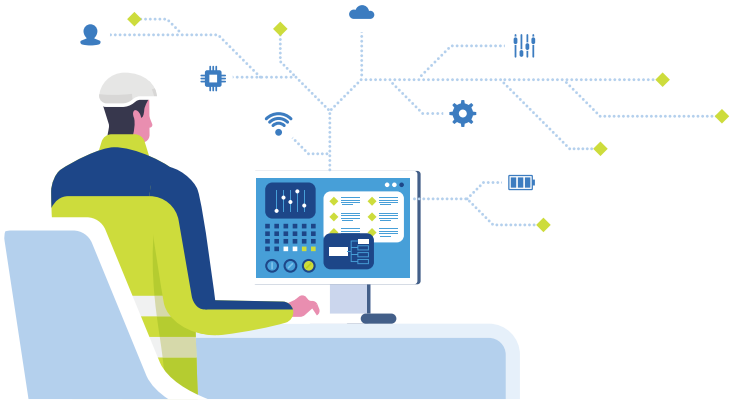
Medium- & Long-Term Goals

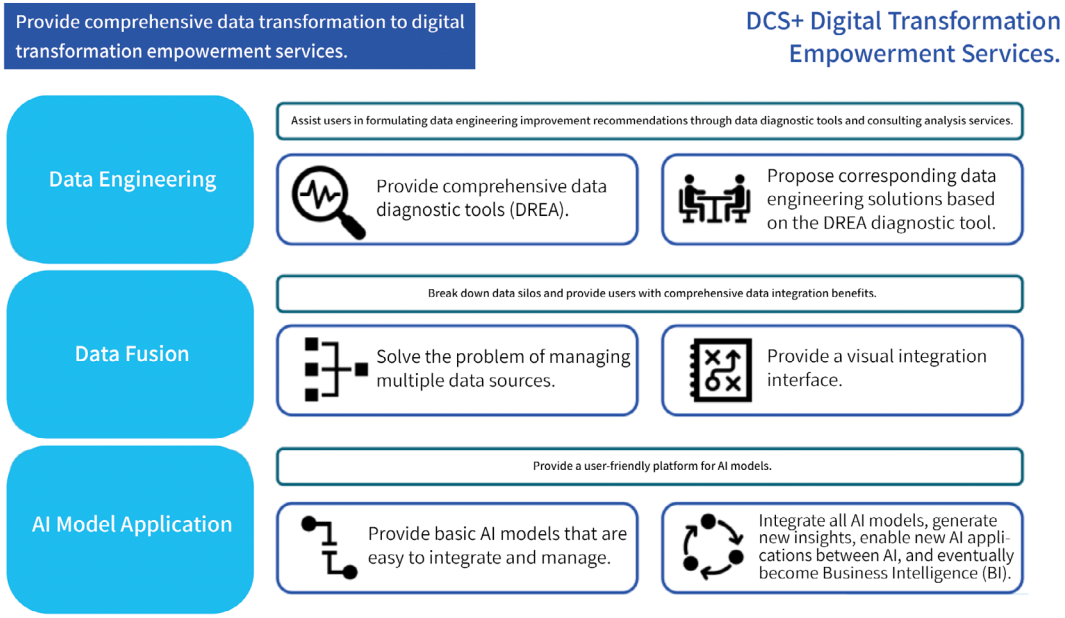
1. Optimize various AI models to enhance prediction accuracy.
2. Enrich the data management knowledge of employees to enhance analysis efficiency and optimize strategy implementation.
3. Invest in developing smart management applications to enhance production management efficiency.

In recent years, we have been actively promoting the use of various smart management systems in the smart predictive maintenance of key equipment, production data integration and analysis, AI model analysis and predictive maintenance, quality prediction, factory safety maintenance, energy management and carbon platform.

DCS+ Field-based Data System Implementation:

DCS+ breaks down data silos by integrating on-site field data through data engineering, solving the problem of multiple data sources, and providing an integrated data platform for the development of AI model applications. This project was completed and officially launched in 2024.





The Real-Time Monitoring of the High-Pressure Reactor's Vibration Status and the Development of AI Model Analysis for Predictive Maintenance

Implement real-time monitoring of the high-pressure reactor's vibration, integrate process operation parameters, and develop an AI model to analyze the real-time operating status of the high-pressure reactor. Utilize a visual interface system to monitor the health status of the high-pressure reactor at any time, predict the operating life, determine the shutdown timing, reduce the probability of process deviation, lower the risk of occupational incidents, and enhance operational safety. Currently, the AI model is undergoing continuous training and optimization to improve the accuracy of prediction.

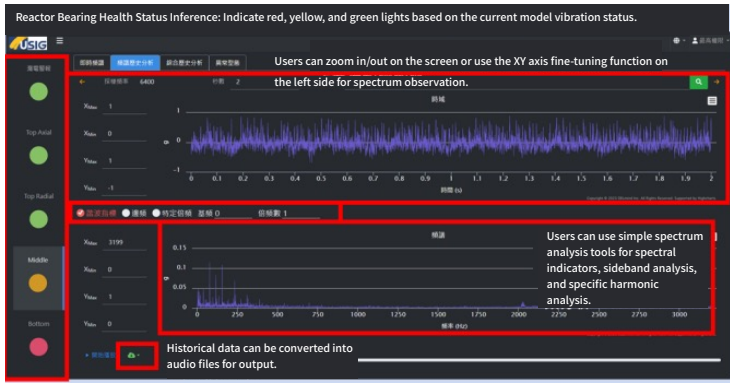
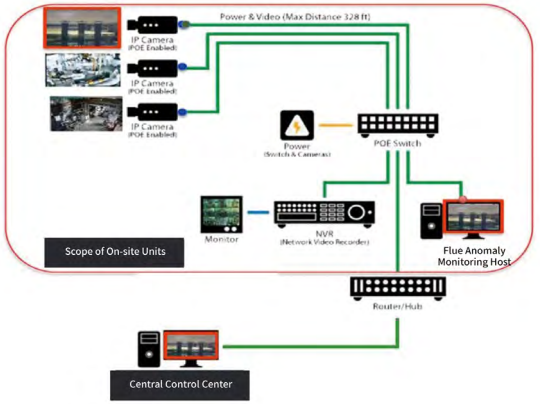


Diagram: Visualization of Operational Status System

Soot Detection System

Previously, the monitoring and judgment of abnormal chimney emissions were manually performed by operators, but on-site personnel were too busy to monitor screens 24/7. By introducing a Soot detection system, the burden on manpower is reduced. When soot is emitted from the chimney, the system immediately notifies on-site personnel to make adjustments, preventing continuous occurrence of soot. After a year and a half of learning, the AI system has achieved a recognition rate of 90%, effectively controlling and avoiding soot emissions, thus reducing production losses. The system was introduced into the plants in 2024.



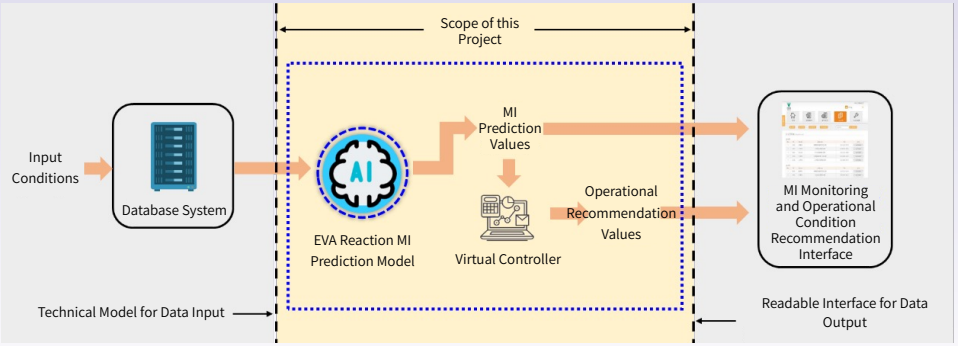
Chimney Smoke Detection System

Reduce Defective Outputs with AI Quality Prediction

Through collaboration with the National Taiwan University and National Taiwan University of Science and Technology, we implemented the cyber-physical integration technology development industry-academia collaboration project to predict quality with AI.

Prediction is run with the process quality prediction model developed with Python, DCS dynamic data, QC data, and product type operation conditions and through GRU sequence neural network model. We also developed the cyber-physical integrated control architecture to make recommendations for factory process operation.

This plan is expected to be implemented in three phases. The second phase has been completed in 2023, and the third phase is expected to be completed in 2025.



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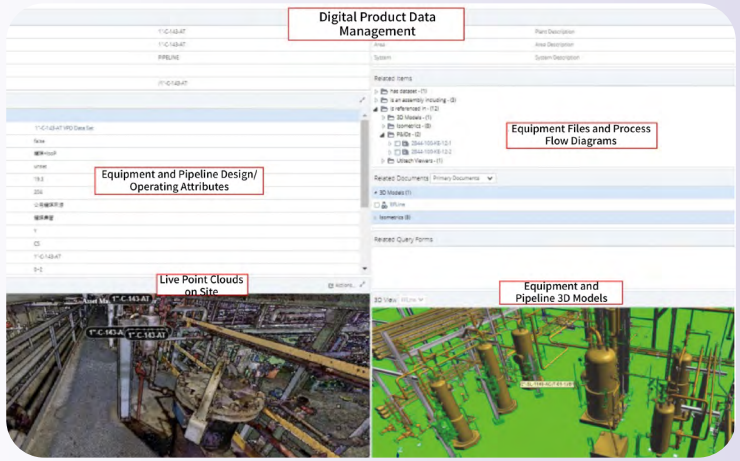

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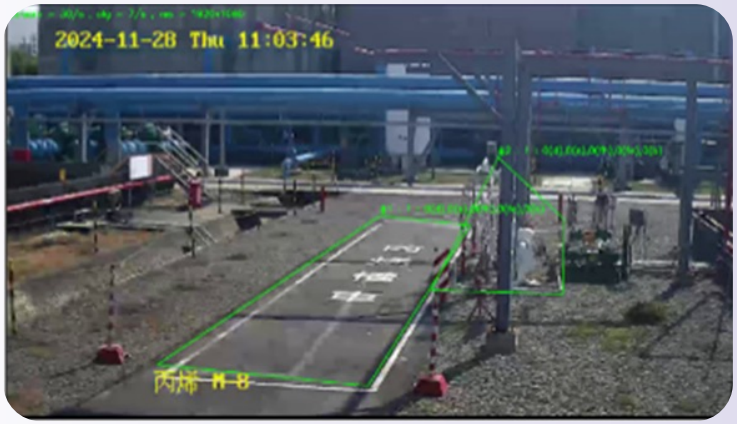

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Digital Product Data Management System (Image 1)

In 2023, the completed pipeline and equipment reverse scanned 3D models, along with corresponding files and process diagrams, were linked to the digital graphics and text management system. This integration, which was completed in 2024, will enable linking and interaction between 3D models, live point clouds, related drawings, data files, design and operating attributes, process diagrams, and other data. The goal is to establish digital data management and visualization capabilities, achieving effective integration of equipment, pipeline, and process data.

White Smoke and Open Flame Detection System: Introducing Model Learning (Image 2)

Previously, the monitoring and judgment of any abnormality were manually performed by operators, but on-site personnel were too busy to monitor screens 24/7. By introducing this detection system, the burden on manpower is reduced and the personnel can be alerted immediately to make adjustments. Currently, model training is used to improve the accuracy of model prediction.

Energy Dashboard System (Image 3)

After applying to the IDB for the Factory Smart Energy Management Demonstration Guidance Program in 2020, and after years of use, the Group has commenced in-house development to establish a traceable energy dashboard system by integrating various data on raw material usage, production, and energy in the plants. It is expected that the system will be introduced in two phases, the first phase of which is the energy dashboard monitoring function, and the second phase of which will include the functions of analyzing energy usage and tracking trends.

Construction of Carbon Data Management Platform

In order to enhance the timeliness and accuracy of carbon emissions data, USIG has been promoting the construction of a carbon data management platform since 2024 to strengthen the internal carbon inventory process and data integration capabilities within the Group. The first phase of the platform covers five plants in Taiwan, mainly focusing on the systematic collection of Scopes 1 and 2 carbon emissions, and gradually incorporating some Scope 3 items. The system design combines the existing monthly reporting mechanism and certificate uploading process to ensure the consistency and traceability of activity data and original information. The platform is equipped with a flexible output function that supports the output of corresponding formats required by different specifications. Through this platform, USIG can manage carbon emissions more effectively, demonstrating its commitment to data-driven carbon management and enhancing information transparency and climate resilience.

Promotion Plan

Stage 1 2024	Stage 2 2025	Stage 3 2026
· Carbon emission reporting · Carbon fee estimates · The target is 5 Plants of MOE · Scope 1 & 2	· 5 Plants of MOE are operational · Expand to all Taiwan plants	· Expand to all overseas plants · Incorporating some Scope 3 items · OCR Technology

*OCR (Optical Character Recognition):Optical Character Recognition is a program that converts text images into a machine-readable text format.