

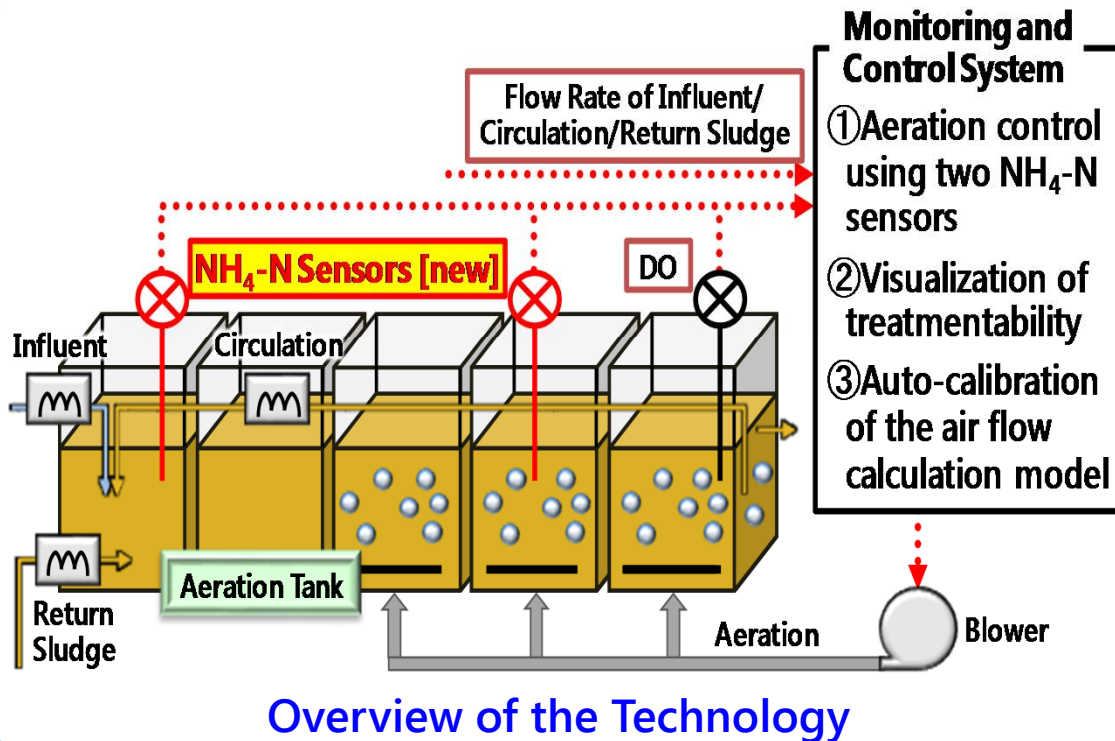
# Demonstration of Efficient Nitrification Control with ICT

**Demonstration Project Implementer:** Consortium between Hitachi, Ltd. and Ibaraki Prefecture

**Demonstration Site:** Ibaraki Prefectural Kasumigaura Purification Center

## **Demonstration Overview:**

- (1) Using existing Dissolved Oxygen (DO) sensor and adding two  $\text{NH}_4\text{-N}$  (ammoniacal nitrogen) sensors (one is in aerated zone in the reaction tank and the other one is in the influent part to the aerated zone), the system controls aeration to the tank.
- (2) Its feature includes ① **Aeration control using two  $\text{NH}_4\text{-N}$  sensors**, ② **Visualization of treatmentability**, and ③ **Auto-calibration of the air flow calculation model**. It is designed to optimize energy usage, to stabilize the effluent water quality, and to support operation and maintenance tasks.
- (3) A plant with recycled nitrification/denitrification method was selected as a demonstration plant that the control has been difficult because of large flow fluctuation at the reaction tank caused by circulation flow.



## **Features of the Proposed Technology**

- ① **Aeration control using two  $\text{NH}_4\text{-N}$  sensors:** Considering the predicted  $\text{NH}_4\text{-N}$  concentration at the intermediate point, it stabilizes nitrification process and suppresses excess/insufficient aeration.
- ② **Visualization of treatmentability:** Visualize the current ability of microorganism with a graph indicating the relevance between amount of  $\text{NH}_4\text{-N}$  nitrified and cumulated air flow in the tank.
- ③ **Auto-calibration of the air flow calculation model:** The relevance between  $\text{NH}_4\text{-N}$  and cumulated air flow is forming a model that can be regularly calibrated with the latest values and used to determine the air flow rate to the tank.