

# TRANSPORT SYSTEM MONITORING

Indispensable in fisheries and aquaculture



**UNIT45**  
INTERMODAL INNOVATORS



In the world of fisheries and aquaculture, the transport of live fish and shellfish is a crucial link in the supply chain. However, its complexity is often underestimated. What is involved in ensuring optimal living conditions during transport? Recently, JUMO, in collaboration with UNIT45, Ocean Perfect, and J. Hoogvliet, delivered a complete solution for transporting shellfish. Transport takes place worldwide every year, from Canada to Europe, from Norway to China, and even to Australia.

## Global fish and shellfish production

The global production of fish and shellfish amounts to tens of millions of tons annually. According to the Food and Agriculture Organization of the United Nations (FAO), global fisheries and aquaculture production reached a total of approximately 178 million tons in 2020. Of this, about 90 million tons came from wild fisheries and 88 million from aquaculture.

## Transport of live fish and shellfish

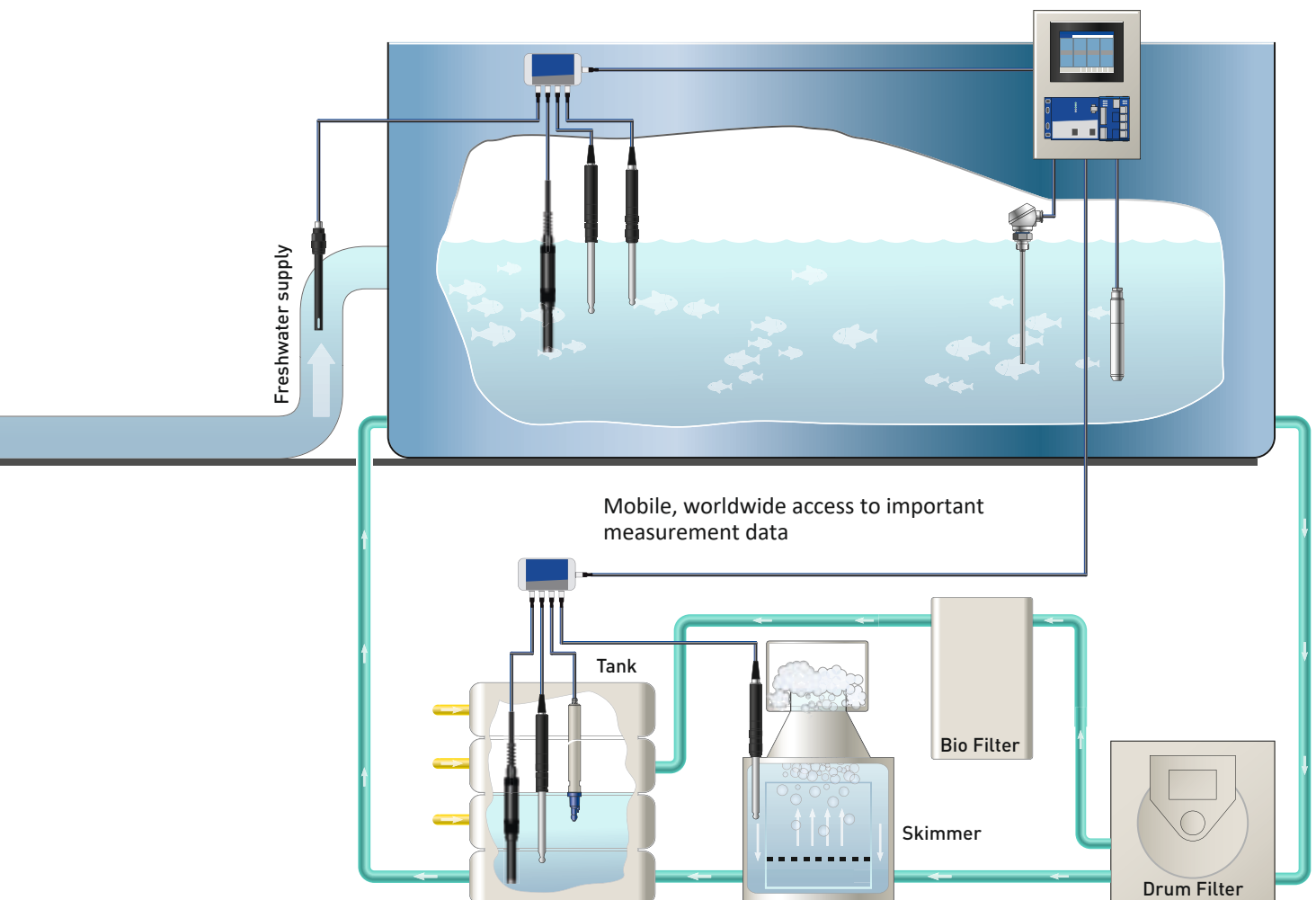
The sector uses special containers equipped with salt watertanks to ensure optimal living conditions for the animals during transport. This application utilized the expertise of UNIT45 from Rotterdam in collaboration with Ocean Perfect from Yerseke and J. Hoogvliet from Puttershoek. These companies have over 30 years of experience as specialists in building containers for livestock purposes.

## Container construction

The containers are equipped with JUMO systems to monitor water quality for temperature, pH, EC, and the concentration of  $O_2$ ,  $CO_2$ ,  $CL$ , and  $NH_3$ . They also have controlling equipment that detects deviations from target values. For this project, custom insulated containers were made with space for the product and a separate area for the technical installation.

A container can hold thousands to tens of thousands of live animals, depending on the type and size of the fish or shellfish. For larger fish species, this number is naturally lower.

The use of advanced technology to monitor and maintain optimal living conditions during transport, is an increasing trend that further reduces mortality rates and quality loss. →



## Temperature and pH monitoring

The water temperature in containers during transport is perhaps the most critical parameter. Deviations can lead to stress, disease, and mortality. JUMO's modern temperature sensors continuously measure the temperature and transmit this data in real-time to the manager thanks to digital technology. This allows cooling systems and heating elements to be automatically adjusted so that they can maintain the target values. Besides temperature, the pH value also plays a significant role. A pH value that is too high or too low can cause skin and gill irritations as well as a reduced resistance to disease. Because JUMO's digital sensors are connected to an analysis readout unit, the pH value remains within the optimal range and is increased, if necessary.

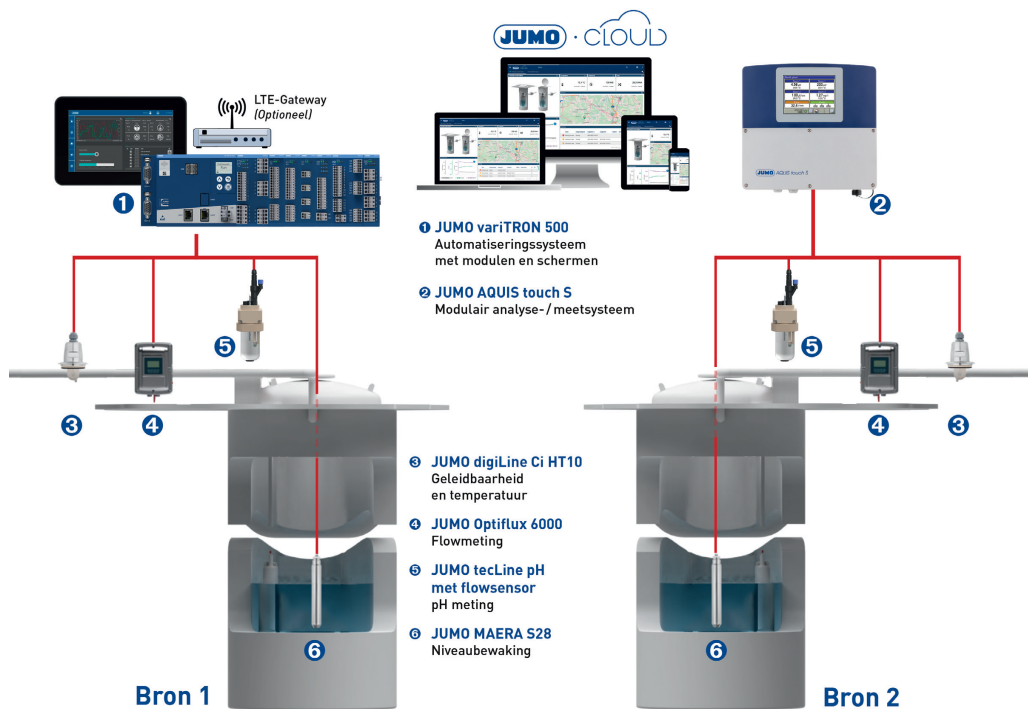
## Water quality

The electrical conductivity of the water provides insight into the amount of dissolved salts and minerals. A deviation in EC can indicate pollution or an unbalanced ion equilibrium, which can be harmful to the fish. JUMO's digital EC sensors continuously measure water quality and issue warnings if values fall outside the set limits.

## Oxygen measurement are vitally important

Like temperature, the oxygen level is essential for the survival chances of fish and shellfish during transport. JUMO's precise oxygen sensors continuously monitor the oxygen level and activate an oxygen generator when the concentration is too low.

### JUMO water treatment from sensor to cloud



## Innovative process technology

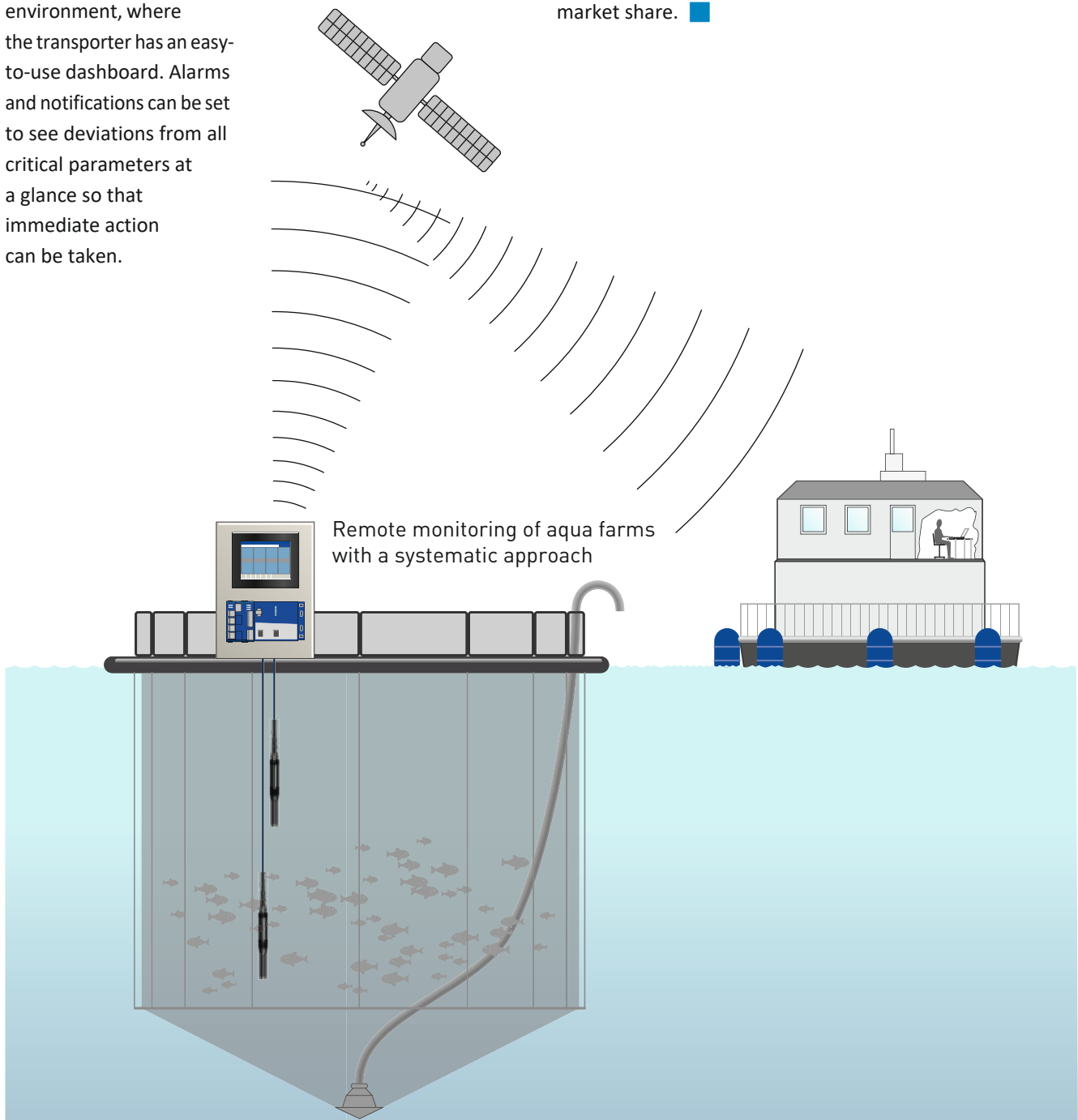
Thanks to innovative process technology, all parameters are not only measured accurately but also controlled and managed in the JUMO variTRON control platform.

Advanced monitoring equipment, such as the JUMO AQUIS touch, collects real-time data on temperature, pH, EC, and oxygen levels, as well as the pressure system in the container. These are then processed and displayed via the JUMO Cloud IoT platform or the SCADA environment, where the transporter has an easy-to-use dashboard. Alarms and notifications can be set to see deviations from all critical parameters at a glance so that immediate action can be taken.

## Economic impact and sustainability

The importance of monitoring and maintaining optimal living conditions in transport containers for live fish and shellfish cannot be overstated. The welfare of the animals is of primary concern, but economic efficiency and ecological sustainability are also important.

High mortality rates and quality loss lead to financial losses for the sector. Moreover, poor handling during transport can lead to reputational damage and loss of market share. ■





## Conclusion



The containers from UNIT45, in collaboration with Ocean Perfect and J. Hoogvliet, are equipped with automation solutions from JUMO, to contribute to the further development of sustainable transport, that is in line with the growing global emphasis on environmental protection and responsible consumption.