

## Value Creation Story 03



# Driving the evolution of industrial infrastructure through digitalization

The suspension of cargo handling due to port crane breakdowns has a significant impact on logistics and port competitiveness. In order to prevent such situations before they occur, it is becoming increasingly important to detect and resolve the causes of abnormalities in cranes at an early stage.

There are also concerns about shortages of labor involved in port operations, and improving the efficiency of port operations is an urgent issue. As a solution to these problems, efforts are underway to achieve the actualization of AI terminals that support human operators, and there is a need for sophisticated crane status monitoring utilizing IoT and AI-related technologies.

We offer all-inclusive systems combining hardware with independently-developed software for the optimized management of container terminal operations. The development of technology for automation facilities is also in progress.

### Container Terminal Management System (CTMS)



System Image

CTMS is a total package system to realize smooth operation of container terminal. It centrally manages information and supports efficient terminal operation with an excellent user interface. Substantial options such as cooperation with the shipping company's EDI (Electronic Data Interchange) and customs' system, gate-in / out reservation system, and handy terminal for workers are available.

### Transtainer® crane for remote and autonomous driving development



Test area used for development work

In 2018, Mitsui E&S Machinery Co., Ltd. installed one test Transtainer® crane and one test lane area as an in-house facility at its Oita Works. Utilizing this facility, we have been developing remote operation and automation functionality for Transtainers®, for which we expect to see an increase in demand both in Japan and overseas. Orders for remote and automated cranes and AECS\* will be received in 2020 and delivered in 2022.

AECS: Automated Equipment Control System  
Automated (cargo handling) Equipment Control System. A system that provides cargo handling instructions to cranes between the yard-side terminal operation system (TOS) and the automatic TT. Formally, it is often referred to as middleware.

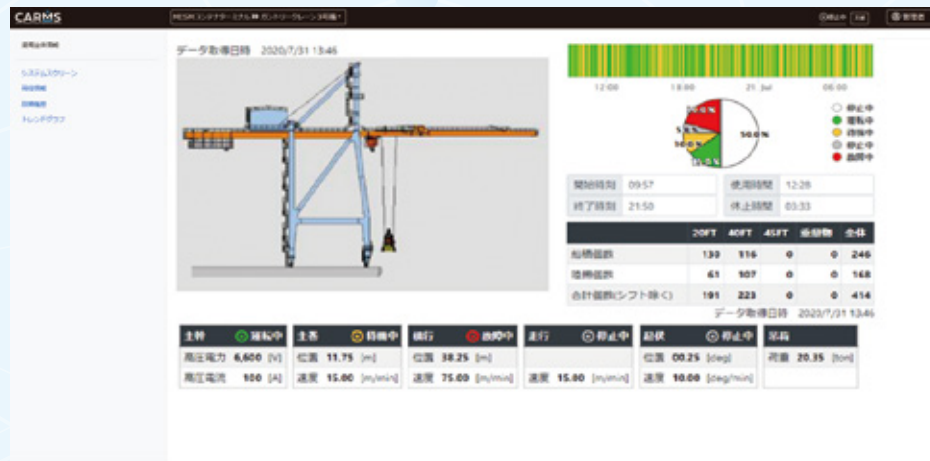
## Target / KPI

- We will contribute to PORT 2030, a medium to long-term policy for ports established by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT).
  - By improving the efficiency of gate processing, loading and unloading at container terminals in Japan, we will create an AI terminal with world-class levels of productivity and a favorable working environment.
  - We aim to virtually eliminate waiting in front of the gate for foreign / outside trailers by the end of 2023, while complying with the operation schedule when container ships become larger.

# Further Challenges for the Evolution of Industrial Infrastructure through Digital Technology

## Challenge Development of next generation remote monitoring system for container handling cranes (CARMS)

Mitsui E&S Machinery Co., Ltd. has developed a next generation remote monitoring system for container handling cranes (CARMS: Crane Advanced Remote Monitoring System), which monitors various conditions of cranes anytime and anywhere, through a joint development with a group company, Mitsui E&S Systems Research Inc. CARMS will be able to contribute to improve the reliability and efficiency of customer's terminal operations.



System Image

## Challenge Mitsui E&S Machinery Co., Ltd. and ZENRIN DataCom Co., Ltd. jointly established a new way of crane inspection by automated flying drone.

In May 2021, Mitsui E&S Machinery Co., Ltd. and ZENRIN DataCom Co., Ltd. established a new inspection technology for container cranes by automated flying drone. Thanks to this new technology, some structural inspections performed by experienced engineers in the past, can be replaced by the images taken by a drone. This drone inspection system uses AI image analysis for quantitative assessment, which can retain historical data to prepare a report on the cranes with recommendation on how to maintain its structural integrity.

Since July 2020, we have been conducting phased demonstrative tests of this new crane inspection system with the aim of a full-scale introduction of the system for container handling crane inspection by the end of FY 2021.



An inspection using an aerial drone



Image showing signs of age-related deterioration