



PACECO® GROUP

Challenges Faced by Terminals Today

The port and shipping industry is changing and becoming more complicated, as container vessels size increases, supply chain requirements strain terminal operations, and larger terminals increase operations complexity.

Two major issues confronted by port terminals are:

1. Running operations with large container cranes while faced with global pressures to reduce emissions to counter climate change.
2. Efficiently increasing terminal operations and size using data generated from terminal equipment to manage maintenance, improve uptime of critical equipment.

The PACECO Group, as a major supplier of cranes and IT to the port industry, have a solution for these challenges.

History

As PACECO Group, we have been pioneers in the container handling equipment industry since 1958.

Today, we continue to be leaders in container handling equipment and in addition, new technology for Port Systems.



PACECO Group Global Deliveries



STS Portainer: 500+
RTG Transtainer: 2000+

STS Cranes Portainer

The PACECO brand of ship-to-shore cranes incorporate over 50 years of innovation, design, manufacture and delivery excellence.

We manufacture various sizes of cranes ranging from Panamax to Super-Post Panamax with twin 20' container handling operation.



RTG Cranes Transtainer

The PACECO brand of Rubber Tired yard cranes incorporates over 50 years of experience in the design, manufacture and delivery.

We manufacture the most reliable and sophisticated cranes with an all-electric w/o hydraulic devices for easy-maintenance and V-Roping anti-sway system for better operation.



Challenges Faced by Terminals Today

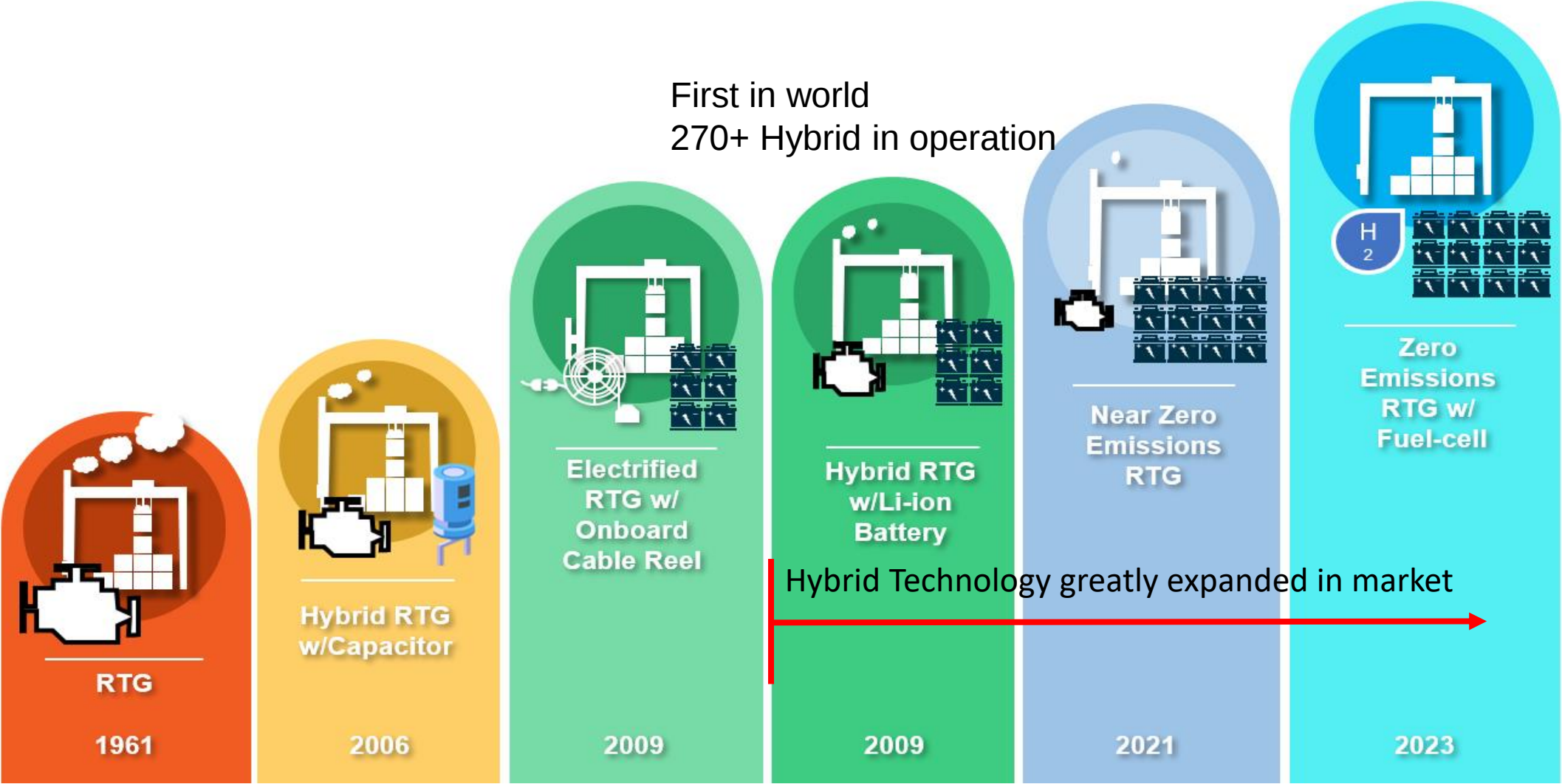
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PACECO Group Roadmap to Sustainability



1997 - Kyoto Protocols

2009 – Hakata Port – Japan’s most environmentally friendly port

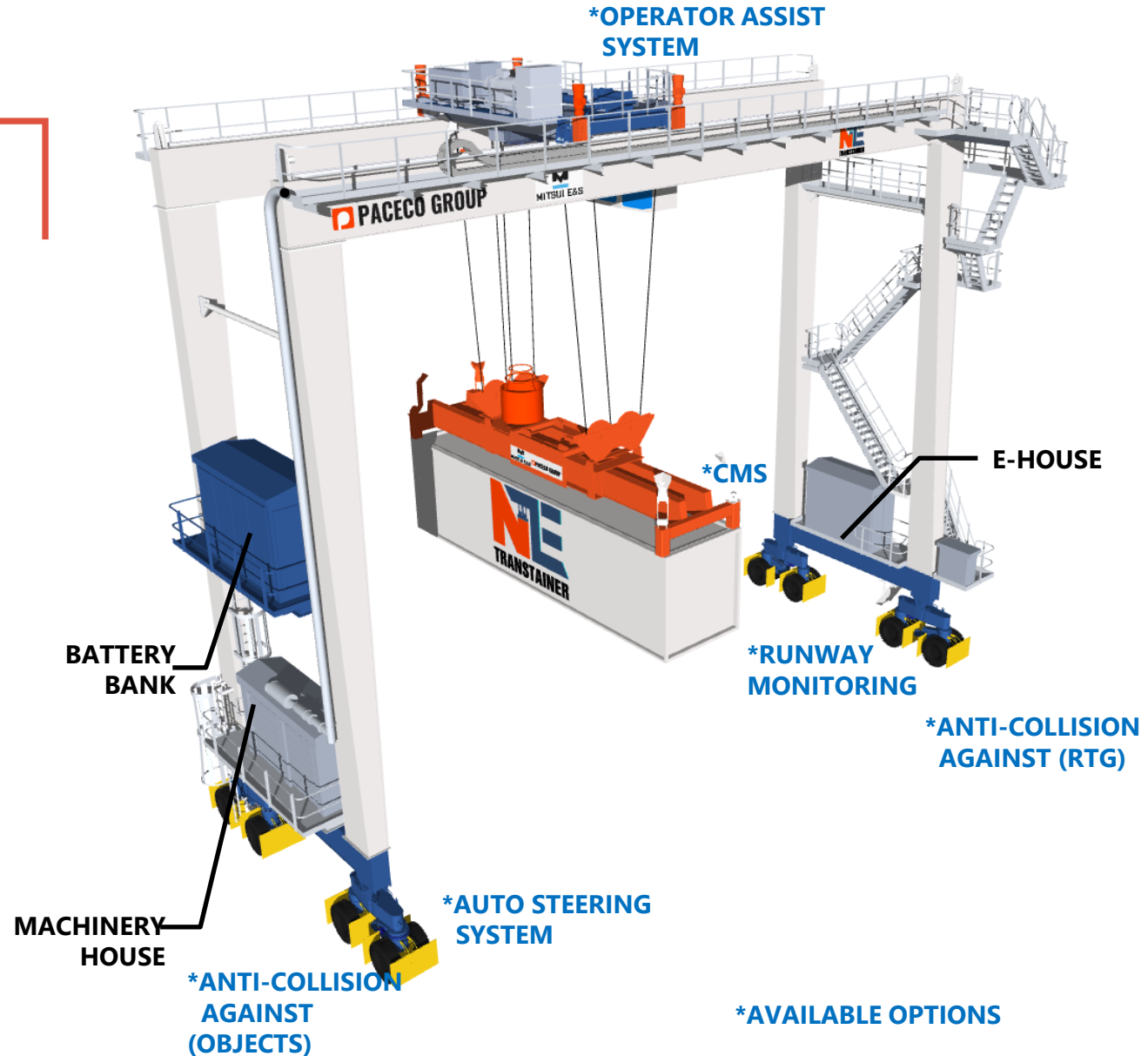
2004 - US and EU port goal emission reduction by 2030/2050

NZE

TRANSTAINER

Near Zero Emissions Transtainer

- Advantages
 - No Civil works required (Cable Reel/Bus Bar)
 - Same crane speed performance
 - No effect to current operations
 - Flexible yard configuration
 - Small 50kW diesel genset
 - Co2, NOx, PM emission and Fuel reduction
 - PACECO design and software integration



PACECO Group Roadmap to Sustainability

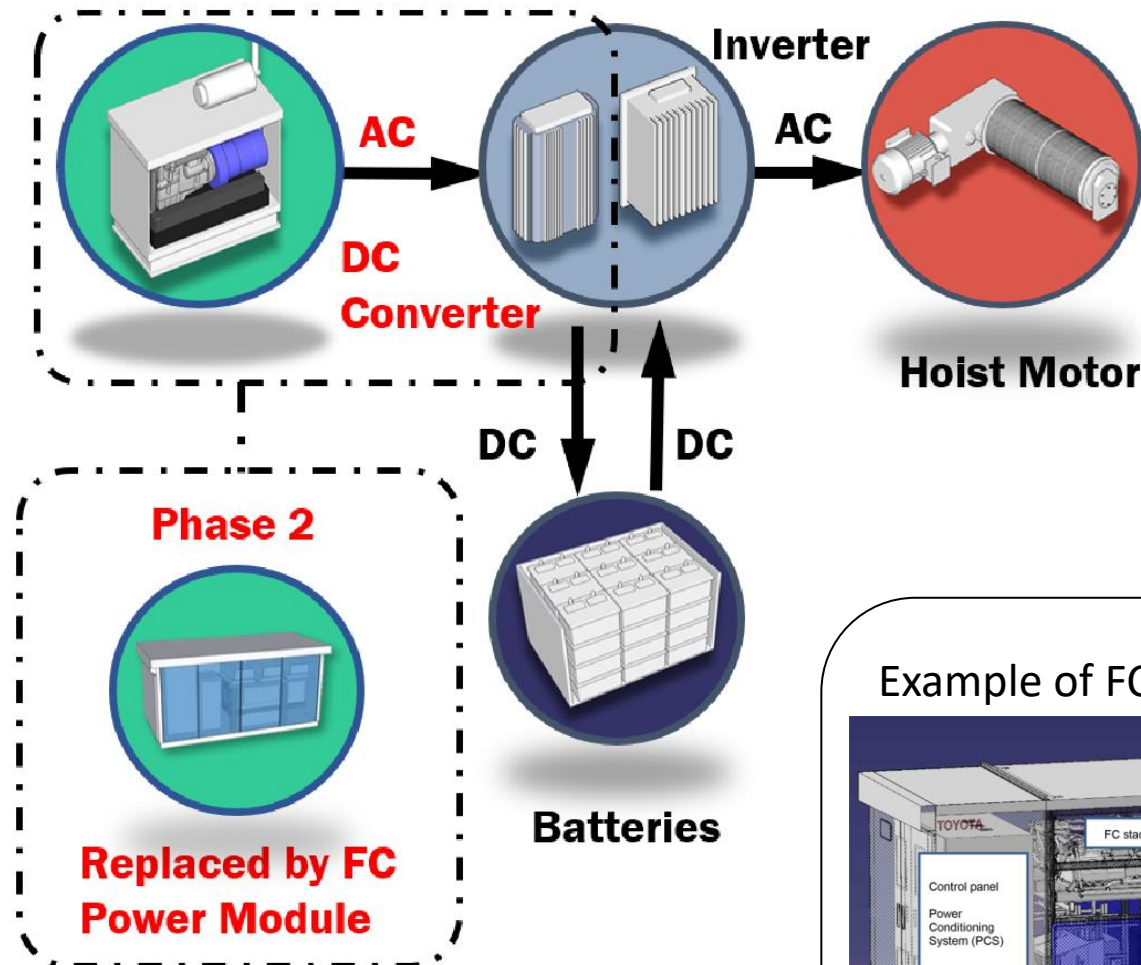
Our roadmap towards an ecological transition and contribution to the decarbonization of the port industry:



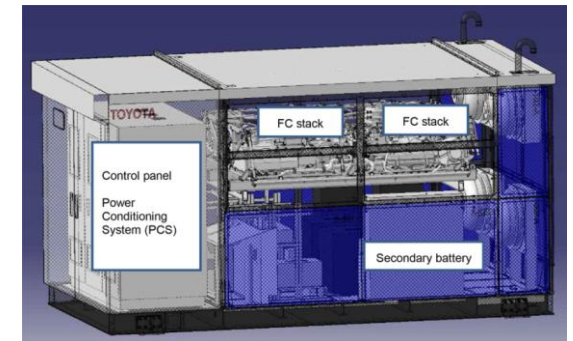
	RTG Convencional	RTG Híbrida Batería	NZE (Near Zero Emission RTG)	Zero Emissions RTG
	1961	2009	2021	2023
Generador y acumulador de energía	Motor Diesel	Batería de iones de litio + grupo electrógeno con motor diésel (1/2 el tamaño que RTG convencional)	Batería de iones de litio + grupo electrógeno con motor diésel (1/8 a 1/10 el tamaño que RTG convencional)	Pila de combustible de hidrogeno y Batería de iones de litio
Emisiones	Emisión total a la atmósfera	Reducción del 60% de las emisiones en comparación con la RTG convencional	Reducción del 70% de las emisiones en comparación con la RTG convencional	Libre de emisiones.
Reducción en consumo de combustible	0%	60%	70%	100%
Autonomía de la grúa	Depende de la capacidad del depósito de combustible	NO REQUIERE ENROLLADOR o BUS BAR, SIN NECESIDAD DE OBRA CIVIL		
Retrofitting			Ruta de conversión de bajo coste: sencillo cambio del grupo electrógeno diésel por una pila de combustible, sin necesidad de sustituir otras piezas o el sistema eléctrico	
Costes de Mantenimiento	\$\$\$\$\$	\$\$\$	\$	\$
Combustible fósil y aceites Costes de explotación	\$\$\$\$\$	\$\$\$	\$	0
Nivel de ruido		Menor nivel de ruido en comparación con la RTG convencional	Menor nivel de ruido en comparación con la RTG híbrida	Menor nivel de ruido en comparación con la NZE RTG
Rendimiento de la grúa	El rendimiento de la grúa no ha cambiado durante la evolución de nuestros diferentes desarrollos de RTG, por lo que se ha mantenido igual que nuestra RTG convencional con respecto a la carga nominal, la velocidad de elevación, la velocidad de traslación y la velocidad de desplazamiento.			
Sistema de alimentación	Motor Diesel: Abt. 500kW	Motor Diesel: Abt. 200 kW	Potencia del motor: Abt. 50kW Banco de baterías: 300% en comparación con la Transtainer híbrida. Recuperación de emergencia: disponible	Sin motor Diesel Pila de combustible de hidrógeno y baterías 300% en comparación con la Transtainer híbrida.

Near Zero Emissions Transtainer - **FUTURE-PROOF**

- The NZE Transtainer is designed to easily convert to ZERO EMISSION.
- Modification of PLC or drive is not necessary, only exchange 50kW diesel genset with zero emission power source.
- PACECO PLC software integration allowing smooth commissioning
- Hydrogen fuel cell genset possible. Working prototypes already exist.
- Timing will be when key infrastructure in place to support.



Example of FC Genset



Source: Toyota

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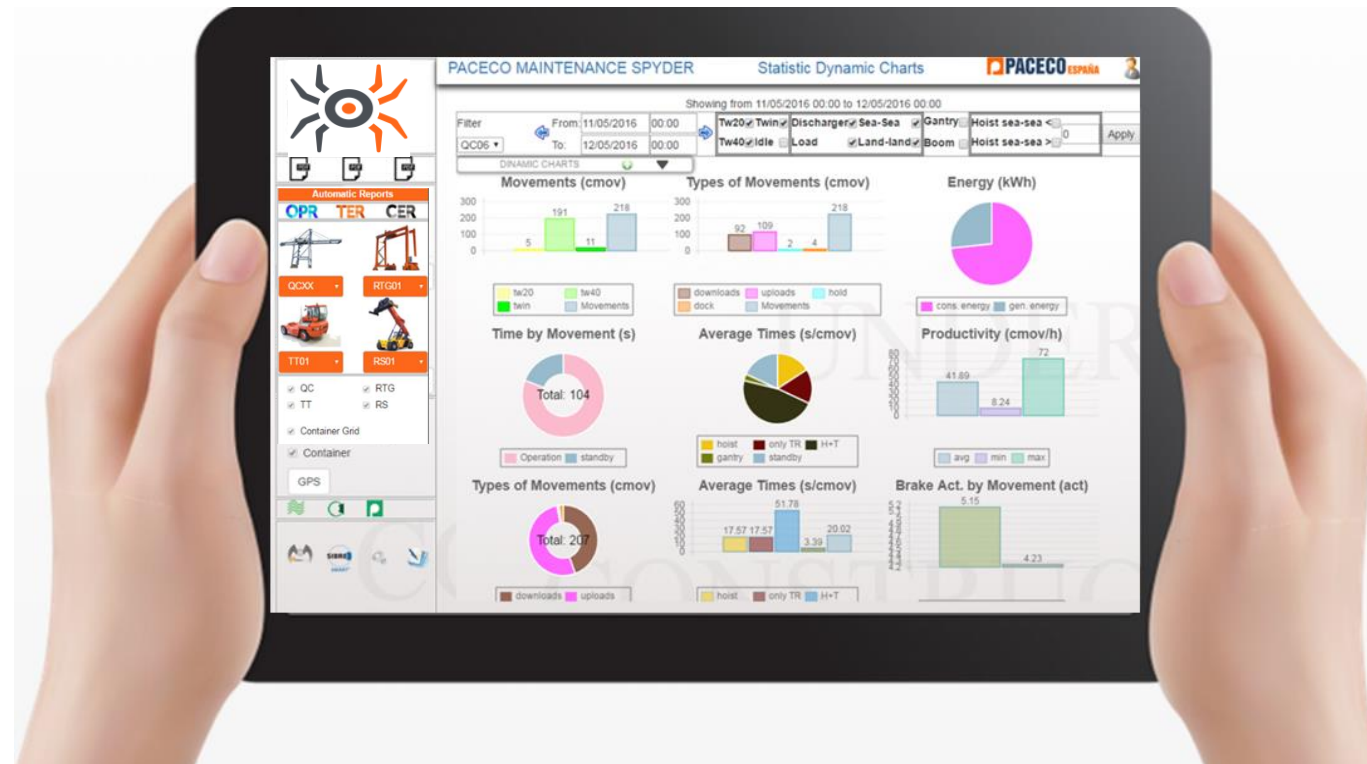
The PACECO Group, as a major supplier of cranes and IT to the port industry, have a solution for these challenges.

Improve operations using data from terminal equipment

PACECO Spyder is a tool to incorporate data to directly improve operations and maintenance



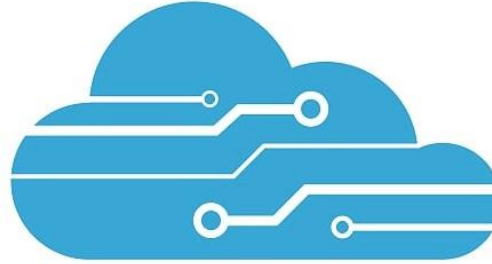
- Terminal operations are increasingly complicated
- Terminal equipment are increasingly "smart"
- Are you taking advantage of the data to improve operations?



Advantages of Digitalization



paceco
spyder



Digitalization

WHAT?



- ❖ OPERATIONAL DATA
- ❖ TECHNICAL DATA
- ❖ ECONOMICAL DATA
- ❖ PLANIFICATION
- ❖ EVALUATION
- ❖ KPIs.

RESULTS?



- ❖ PLANNING EFFICIENCY
- ❖ MANAGEMENT EFFICIENCY
- ❖ DECISION EFFICIENCY
- ❖ 24/7 NON STOP EVALUATION
- ❖ AUTOMATED REPORTS
- ❖ AUTOMATED DECISIONS

PACECO Spyder Concept



3rd Party Data

- Weather
- Vessel data
- TOS data
- Acct Data (costs)
- Asset Management



Possible to expand data sources as needed.

Terminal Data



SECURE CLOUD STORAGE
ALGORITHM GENERATOR
BIG DATA

PACECO SPYDER



SENSOR TECHNOLOGY

BUSINESS
INTELLEIGENCE

MACHINE-to-MACHINE
COMMUNICATION

AUTOMATION

Interaction with users



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spyder

Accessible on web. Alerts pushed to user



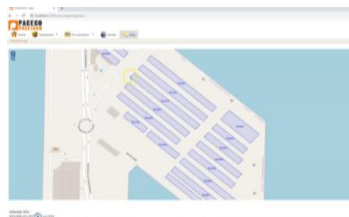
Harnessing Big Data Generated by Terminal

Data Input

Machine Data



Terminal Operation System (TOS) Data



Vessel & Berthing Data



Maintenance Data



Financial Data



Weather Data



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HR Data



Data Output

- ❖ AUTOMATED KPI'S.
- ❖ AUTOMATED ALGORITHMS.
- ❖ AUTOMATED MAINTENANCE PLANNING.
- ❖ AUTOMATED PREDICTION.
- ❖ AUTOMATED ANALYTICS.
- ❖ AUTOMATED REPORTS.

Example KPIs



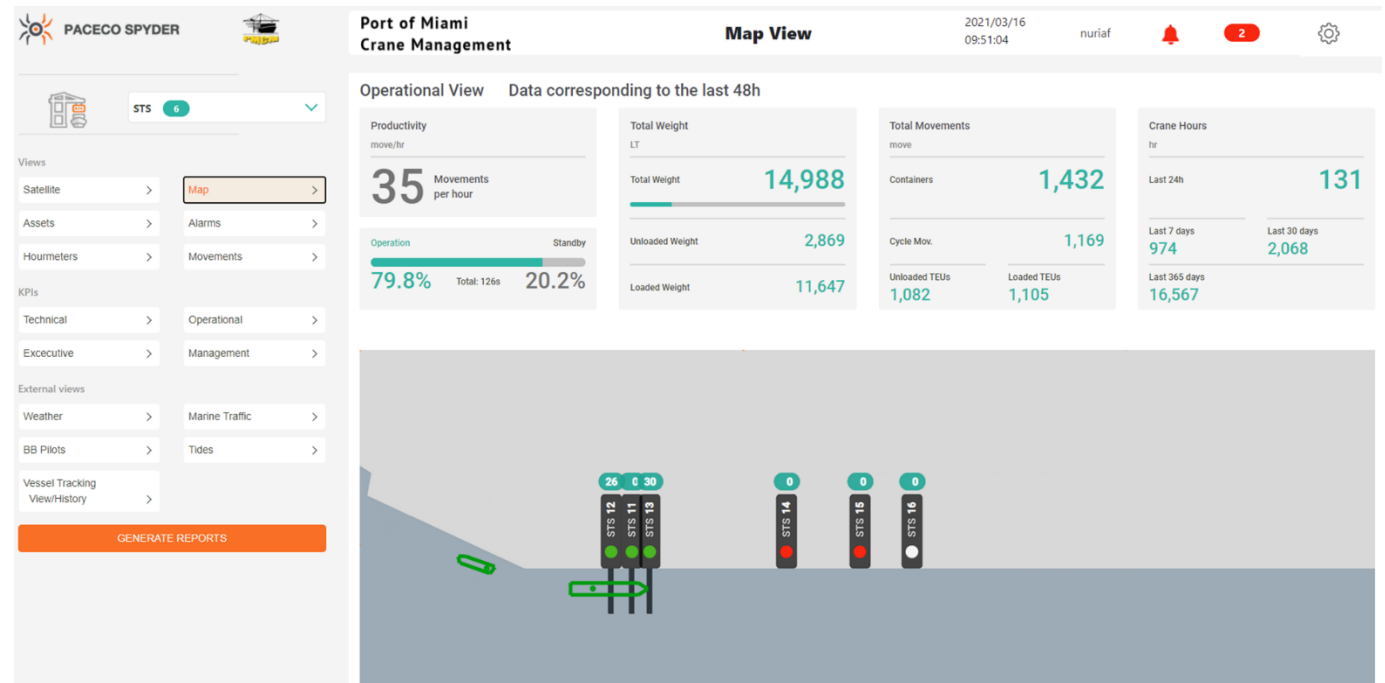
Equipment Hardware

HARDWARE



Install compact hardware on equipment to send data to cloud

SOFTWARE



Software and data store securely in cloud, ready to be accessed by authorized users

Solutions to Challenges Faced by Terminals

1. Running operations with large container cranes while faced with global pressures to reduce emissions to counter climate change.

PACECO's solution is a Near Zero Emission (NZE) RTG Transtainer to maintain yard flexibility and provide a future-proof crane capable of upgrading to Zero Emission.

2. Efficiently increasing terminal operations and size using data generated from terminal equipment to manage maintenance, improve uptime of critical equipment.

PACECO's solution is implement PACECO Spyder, a cloud-based intuitive program that will harness and analyze terminal data and provide direction for operational effectiveness and timely equipment maintenance.

All in one Solution for Maritime Terminals

