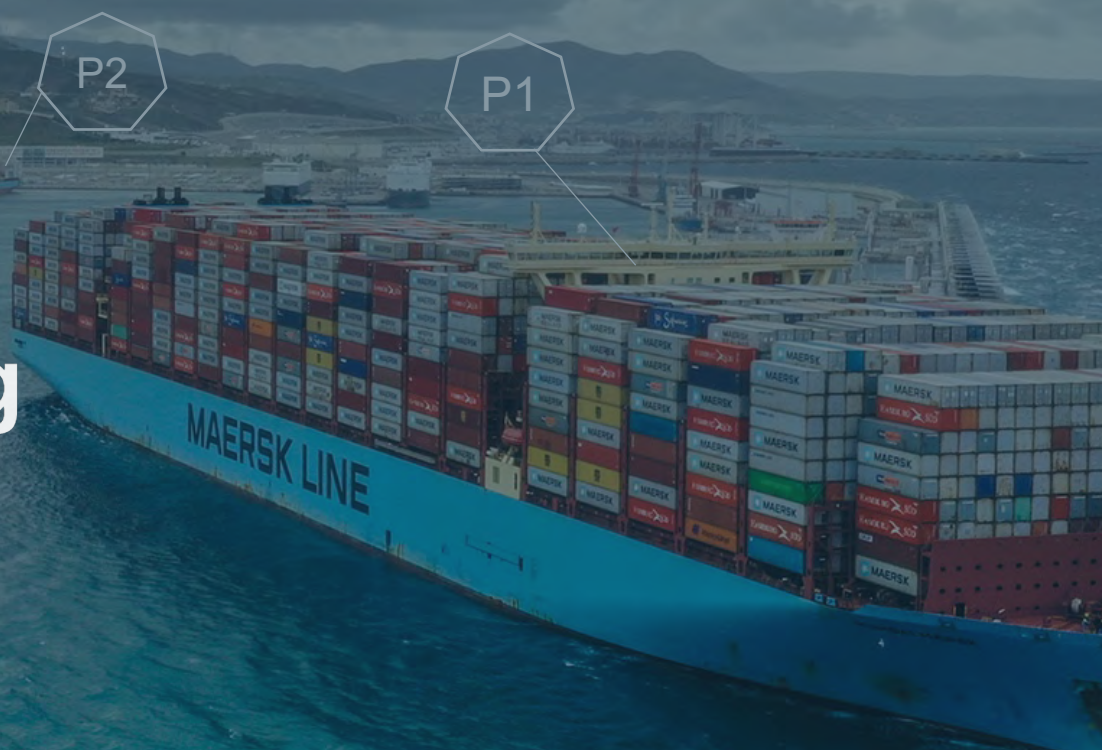**BRUNEI DARUSSALAM INDONESIA MALAYSIA PHILIPINES EAST ASEAN GROWTH AREA CONFERENCE 2022:**

Port Call Optimization with Slot Management & Smart Ship Movement Sequencing Model

PORT CALL OPTIMIZATION

The optimization of port process through digitization, automation and the collaboration between stakeholders, service providers and the port community.

SLOT MANAGEMENT

Collecting and processing all available data (Terminal Berth Plan, Weather Prediction, Availability of Resources, etc.), to confirm slots for arriving vessels allowing the involved parties to plan, monitor and coordinate their activities with the goal of higher predictability for vessel calls

SMART SHIP SEQUENCING MODEL

Upon vessel approach, the Ship Sequencing Model collects and processing all available "real-time decision data" (Unified Berth Plan, Met/Hydro Data, Vessel Traffic, Pilot Availability, Physical Resources, Tug, Mooring Team, etc.). The model then applies business rules to create the vessel priority level.

P3
ARRIVAL

PCO USE CASE: TANGER MED PORT AUTHORITY

Providing a use case of a project with one of the most efficient ports in the world where digitization and process automation was used to facilitate Port Call Optimization

DIGITIZATION JOURNEY

Wärtsilä and Tanger Med team up to co-develop next generation Port Management Information System

Wärtsilä Corporation, Press release, 28 April 2021 at 10:00 UTC+2

Wärtsilä has partnered with Tanger Med, the largest Mediterranean and African container port, to take a new step forward in global port efficiency by co-developing a new cutting-edge Port Management Information System (PMIS).

Both organisations sealed their long-term commitment to deploy modern Smart Port tools for port operations and digitalisation – including implementing Just-In-Time (JIT) solutions, machine learning and AI as well as other innovative solutions.

This partnership positions Tanger Med and Wärtsilä as champions of the Smart Marine ecosystem, whereby data exchange will improve operational efficiency, port safety, and environmental sustainability in shipping, including reducing carbon and greenhouse gas emissions.

Upgrade Vessel Traffic Services (VTS) System

Provide Web-Based VTMIS

Enhance Port Community System (PCS)

Provide "Next Generation" Port Management Information System (PMIS)

TANGER MED PORT AUTHORITY

Morocco's Tanger Med Ranked Third Most Efficient Port in the World
The ranking reflects the leading role of Tanger Med in African and global trade.

Souad Anouar Mar. 21, 2022 2:52 p.m.

Morocco's Tanger Med Ranked Third Most Efficient Port in the World

Rabat- Morocco's Tanger Med import and export hub has ranked as the third most efficient container port in the world as well as the first efficient African and Arab port.

APM Terminals Tangier Wins World's Best Terminal Award for 2021
With this award, APM Terminals Tangier aims to further boost its competitiveness worldwide.

Oumaima Latrech Dec. 14, 2021 2:03 p.m.

APM Terminals Tangier Wins World's Best Terminal Award for 2021. Credits: APM Terminals.

Rabat – Moroccan terminal operator APM Terminals in Med Port Tangier has been awarded the "Best Terminal in the World" prize for 2021, outclassing 75 Port Operator APM Terminals worldwide.

Total TEU's
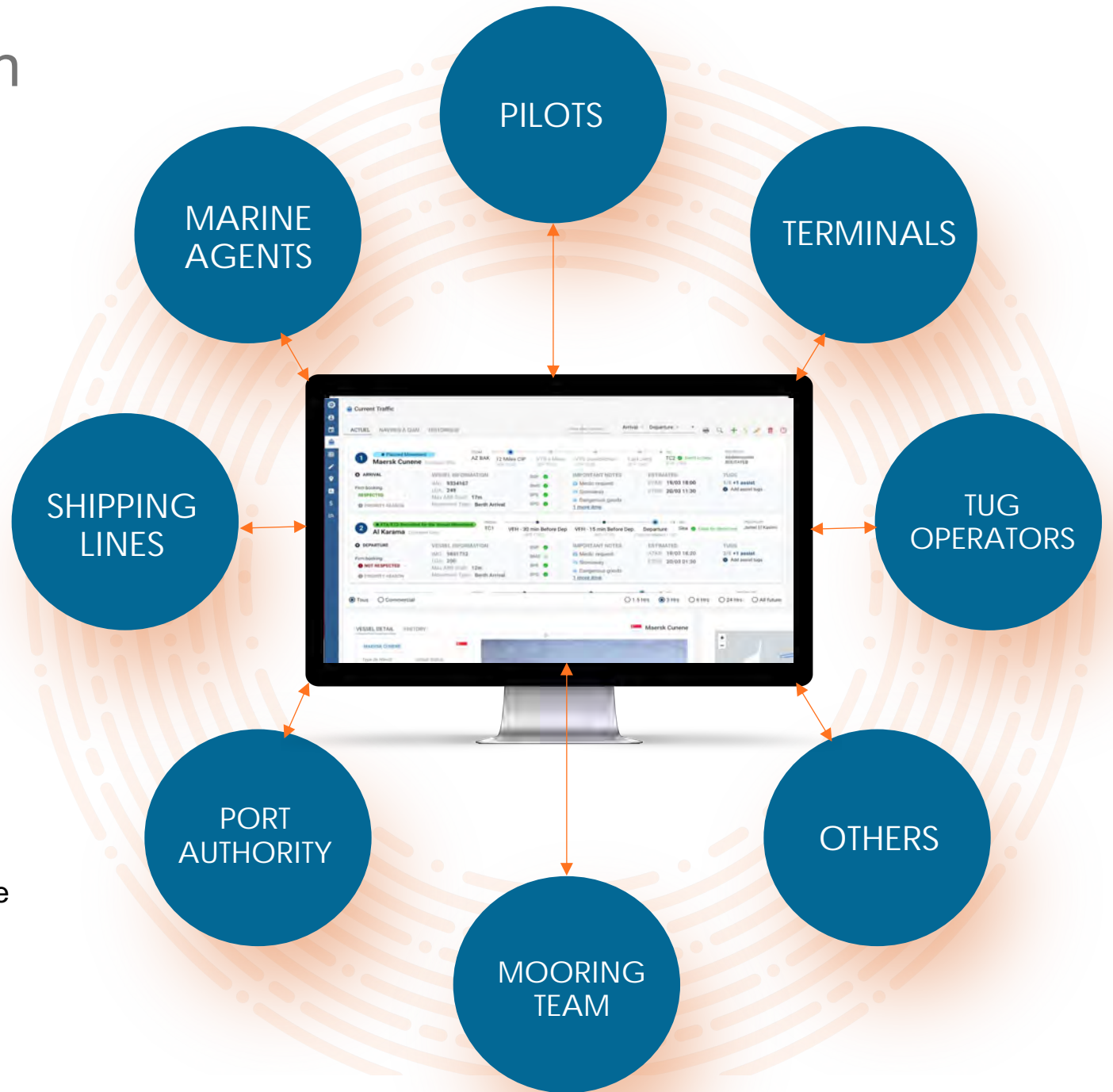**7.17M**

Overall Tonnage
101 M

Total Vessel Calls
10,902

Smart Port Solution

Port Management Information Systems (PMIS) are enterprise solution designed to facilitate the planning and management of port operations. PMIS provides a complete end-to-end solution that is used for planning, scheduling, pre-arrival, arrival, at port, pre-departure, departure, vessel call summary, reporting, billing and more.

Port Community Systems (PCS) provides an advanced platform for the electronic exchange of information between the Port and various stakeholders. PCS's are the most advanced way to exchange information within a single or national port network. With a PCS, the secure and intelligent exchange of information makes it possible to optimize, manage and automate port/logistic processes making for an efficient process that enhances the competitive position of the Port.

SLOT MANAGEMENT & SMART SHIP MOVEMENT SEQUENCING MODEL

High-level workflow for Wartsila's Port Call Optimization Solution

"Give me six hours to chop down a tree and I will spend the first four sharpening the axe"

-Abraham Lincoln

SLOT MANAGEMENT & SHIP MOVEMENT SEQUENCING MODEL WORKFLOW

Terminal / Actor request vessel "A" arrives at Terminal "X" Monday at 0700 and departs Tuesday at 0400

Port reviews request against all available "decision data" and sends confirmation and/or an alternative slot for Terminal / Actor to review

Once confirmed, vessel progress constantly monitored for deviations or possible scenarios that may require the slot to be altered. (e.g., late departure from previous port)

As vessel approaches port jurisdiction the "Ship Movement Sequencing Model" provides a priority number for the vessel based on:

- Consolidated Berth Plan & Vessel Traffic

- Availability of Services (Pilots, Tugs, Mooring Team, etc.)

- Real-Time Weather Conditions

- Business Rules (e.g., livestock to may preference over container vessels, outbound priority over inbound, etc.)

- Others

At the same time, due to digitization efforts, documents / information from arriving vessel are sent to the relevant departments for review / processing. (e.g., vessels under sanctions will required vessels to have different arrival procedures and this information is automatically sent to the vessel agent).

SMART VOYAGE TOOL

Wartsila's SMART Voyage Tool includes an advanced ETA prediction tool which collects multiple data sources and utilizes ML to provide accurate as possible ETA's. This module's goal is to assist Port's to optimize resources and enhance operational efficiency.

VESSEL DEPARTS PREVIOUS PORT

ETA PREDICTOR:
SYSTEM CAPTURES AIS VOYAGE DATA CHANGED TO PORT AND PUTS THE VESSEL ON DYNAMIC VESSEL SCHEDULE LIST. USES ETA FROM SHIPS AIS.

DURING VESSEL TRANSIT

CONTAINERIZED CARGO CONSORTIA ETA
SYSTEM CONNECTS WITH EXTERNAL DATA SERVICES TO COLLECT & DISPLAY PREVIOUS/NEXT PORTS ALONG WITH ETA TO PORT

VESSEL APPROACHING PORT JURISDICTION

MACHINE LEARNING
EMBEDDED ML ALGORITHM PROVDES REAL-TIME ETA BASED ON LOCAL WATERS, SCHEDULE, WEATHER, ETC.

VESSEL IN TRANSIT

JUST-IN-TIME:
SYSTEM SPEAKS DIRECTLY TO CONNECTED VESSEL TO GET ETA FROM VESSEL'S ECDIS AND UPDATES THE SYSTEM

DURING VESSEL TRANSIT

SHIP AGENT UPDATE
SHIP AGENTS CAN UPDATE THE ETA IN THE PORT COMMUNITY SYSTEM WHICH WILL BE SHOWN ON THE PMIS SOLUTION

KASI GROUP Established 1979
WÄRTSILÄ
Crucial solutions for a digital, sustainable future

VESSEL INSIDE PORT JURISDICTION

PRIORITY SYSTEM
PRIORITIZE VESSEL MOVEMENTS BASED ON AUTOMATED RULES AND RESOURCE AVAILABILITY. RULES CAN INCLUDE – PRIORITIZATION FOR CONNECTED VESSELS, ETC.

VESSEL DEPARTING

VESSEL SUMMARY
SUMMARY OF ALL VESSEL ACTIVITIES WHICH ARE CAPTURED USED FOR BILLING, REPORTS, STATISTICS, KPI'S AND MORE.

AT SEA

VESSEL AT PORT (BERTH, ANCHORAGE, ETC.)

PORT OPERATION MODULES
RECORDING OF DIFFERENT EVENTS (FIRST LINE / ALL-FAST, OPERATION START, ESTIMATED COMPLETION TIME, CALCULATION OF ESTIMATED TIME OF DEPARTURE, DEPARTURE CLEARANCE, LAST-LINE, VESSEL DEPARTURE TIME). ALSO INCLUDES THE ACTIVITY MANAGEMENT (SERVICE REQUESTS, REPAIRS, DG HANDLING, ETC.)

RESULTS OF PCO IMPLEMENTATION

Enhanced efficiency of operations facilitating JIT operations.

- Through the implementation of Wartsila's PMIS, PCS & VTS, TMPA has been able to arrive several vessels Just-in-Time.

- Reduction of idle times due to ability to constantly monitor and quickly react.

- Digitization efforts have improved resource & asset utilization.

- Improvement of information delivery for management – KPI Dashboards, etc.

Wärtsilä and Tanger Med enable first real-life digital port call for Hapag-Lloyd vessel

Wärtsilä Corporation, Trade press release, 29 June 2021 at 11:00 UTC+2

Within the framework of a partnership previously announced between Tanger Med Port Authority and Wärtsilä Voyage - which aims at digitalising maritime port calls -Tanger Med, Hapag-Lloyd, and Anglo-Eastern Ship Management have succeeded in enabling the world's first digitally controlled port arrival. The 'Kobe Express', a container ship owned by Hapag-Lloyd and managed by Anglo Eastern, docked safely and on-time at Tanger Med port in Morocco on June 25 using the Wärtsilä Navi-Port system.

WÄRTSILÄ CREATES ADDED VALUE IN ALL MARINE SEGMENTS

PRODUCTS & SOLUTIONS

MARINE POWER
Decarbonisation
Energy efficiency

Engines Propulsion Parts Field services Performance agreements

MARINE SYSTEMS
Zero unplanned maintenance
Performance-based agreements

Gas systems Exhaust gas scrubbers Marine electrical systems Seals and bearings

MARINE VOYAGE
Towards autonomy
Voyage optimisation

Smart Port solutions NavCom Simulators Voyage optimisation software Automation and Dynamic Positioning

KASI GROUP

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A group of thinkers, innovators, problem solvers and visionaries, providing custom strategic solutions that leverage deep domain of knowledge in strategy, business organization and assets.

OPERATIONS MANAGEMENT
Employing a highly trained and engaged workforce, proven technology and strategy, knowledge and experience in operations and facilities management, so clients can focus on what they do best.

DESIGN-BUILD
Providing proven design resources, design and construction quality, cost and schedule from a single point of responsibility for technology and maritime projects.

PROGRAM & CONSTRUCTION MANAGEMENT
Working seamlessly with clients to coordinate multiple, related projects to achieve our clients' goals and help them realize their vision.

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THANK YOU

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