



Making Maintenance Smarter

Through Digital Transformation



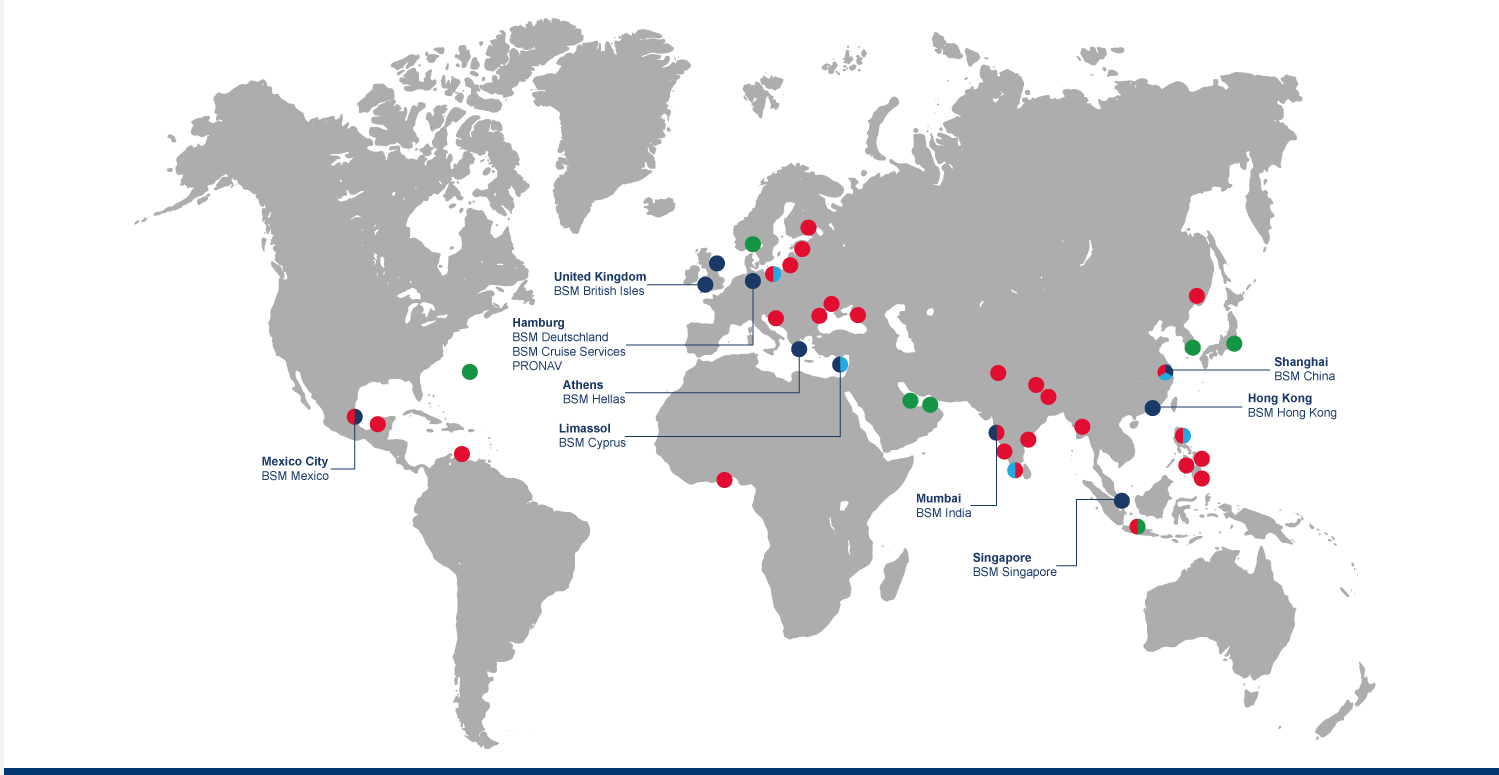
BSM Overview



Dedicated service from more than 30 locations worldwide

430 vessels in full management **220** vessels in crew management **30+** locations globally **20,000** BSM seafarers **2,000** shore-based employees

- Leading ship manager with more than 140 years of experience
- Family-owned business, valuing long-lasting relationships and preserving our reputation
- Client-centric service through 11 regional ship management centres
- Experience with all major vessel types
- Extensive crew recruitment network and world-class training facilities



○ 11 Ship Management Centres (SMCs) ● 28 Crew Service Centres (CSCs) ○ 5 Maritime Training Centres (MTCs) ● 7 Representative Offices



Schulte Group Brand Architecture



SCHULTE GROUP

Ship owning

Maritime services

Ship owning & asset management

Ship management

Digital solutions

Other maritime services

BERNHARD SCHULTE

BSM



Other maritime services include:

100% owned 100% owned but branded as independent Partly owned

100% owned 100% owned but branded as independent Partly owned

100% owned but branded as independent Partly owned

100% owned Partly owned

BS OFFSHORE 

INNOPORT

HANSEATIC CAPITAL MANAGEMENT

unigas

windea

NAVIGO SHIPHOLDING AG

SMC SCHULTE MARINE CONCEPT

SEACHEF

BSM CRUISE SERVICES

BSM YACHTING

HANSEATIC CHARTERING LTD

PRONAV

ETN

HANSEATIC MARITIME ADVISORY

BCD energy resources & marine travel

HURTIGRUTEN EXPEDITIONS

GENPRO MARITIME & COMMERCIAL PROCUREMENT

Rawabi  BSM

ULA SHIP MANAGEMENT

rescompany

ONBOARD SOFTWARE

MEMPHIS MARINE & OFFSHORE

HANSEATIC CONNECT

Waypoint PORT SERVICES

TECHCLEAN

VPI CREW

HANSEATIC MARITIME HEALTH

sea chefs



Agenda



- 1. Making Maintenance SMART**
- 2. Condition Based Monitoring**
- 3. Remote Support**
- 4. Diagnostic**
- 5. Smart Reporting**



Procedures

1. Maintenance & Spare Part Strategy
2. Maintenance Planning
3. Recording of Maintenance Activities
4. Maintenance KPI

Technology

1. Condition Monitoring
 - Vibration
 - Thermographic
 - Liquid Analyses
 - Engine Analytics
2. Augmented and Virtual Reality
 - Real Wear
 - Microsoft SmartGlass
3. Remote/ Digital support
 - WinGD, Alfa Laval, Furuno



Condition- based Maintenance (CBM)



Objectives

- Introducing Condition-based maintenance onboard vessels
- Bring in various condition-monitoring methods
- Interface PMS with the CBM findings
- Class approvals for MPMS(CM) notation
- Reduction of OPEX, increase of TBO
- Increased safety and productivity of crew and vessels



MPMS : Machinery Planned Maintenance System
CM: Condition Monitoring
OPEX: Operating Expenses
TBO: Time Between Overhauls



Condition-based Maintenance (CBM)





Condition- based Maintenance (CBM)



Solutions Provided

- All BSM managed vessels are subscribed under fuel, water and oil analysis
- Implemented vibration analysis on **+60** vessels
- MPMS(CM) notation for **+5** vessels
- Introduction of training courses CM through our MTCs
- Training sessions on CM to all our fleet teams

Success Stories

- Optimized machinery condition by **40%**
- Calculated savings from avoidance of breakdown through vibration analysis of **USD 27,000/per vessel** on the first year of implementation
- Pre-Drydock vibration measurement resulted in a confirmed saving of **USD 35,000/per vessel**

MPMS : Machinery Planned Maintenance System
CM: Condition Monitoring
MTC : Marine Training Centre



Objectives

- Provide infrastructure capable to support shipboard troubleshooting/surveys/audit jobs with remote assistance
- Provide reliable and stable wireless network coverage both close to shore and while sailing
- Connect in real-time on the vessel and with the crew on a 24/7 basis





Remote Support



The image displays a remote support session. The main area is a video feed showing a close-up of a mechanical part, possibly a valve or actuator, with a greenish-grey metal surface. On the right side, there is a vertical sidebar with three circular avatars. The top avatar is labeled 'DC' and 'Dogan Chelman...'. The middle avatar is labeled 'Charalambos Geo...'. The bottom avatar is labeled 'Theodore Ioanno...'. The background of the sidebar is black.



Solutions Provided

- Internet availability in ER, Bridge and Monkey island, Upper deck
- Viability of conducting troubleshooting with remote assistance, remote shipboard surveys
- **+25** vessels in our fleet with Remote Support capabilities
- Cooperation with Wordlink and Starlink for better internet connectivity and packages

Success Stories

- 3 days off-hire avoided with Remote Survey resulting in **USD 30,000** savings
- Carbon footprint reduction, on average **475 kg** of CO₂ reduction per case, less travelling



Diagnostics



Objectives

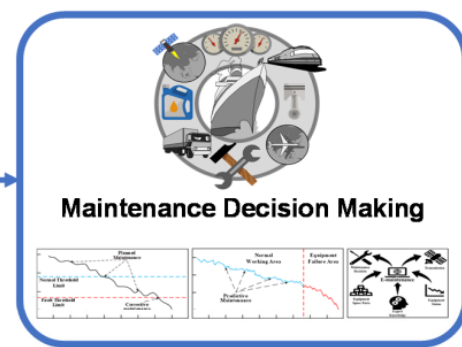
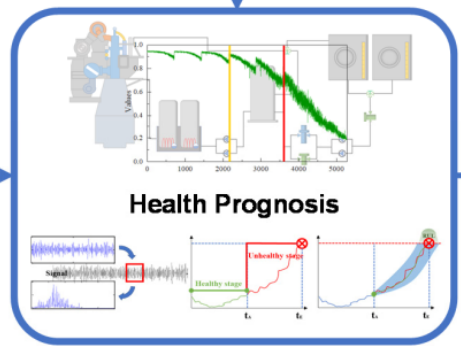
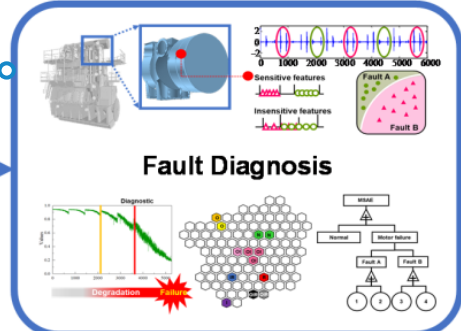
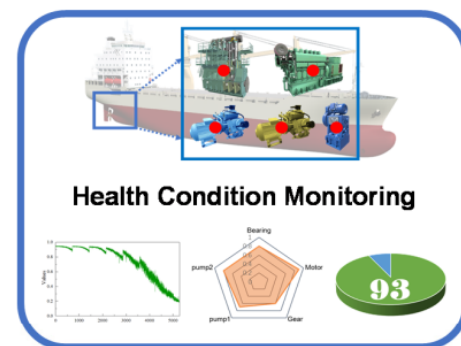
- Analytics and Automated Diagnostics tools for our fleet teams

- In  Rotating Machinery  vendors towards  Main Engine

- PAL integration with multiple vendors seamlessly

- WinGD
- OceanAI

- Main Engine Fault Diagnostics
- Image Fault Recognition

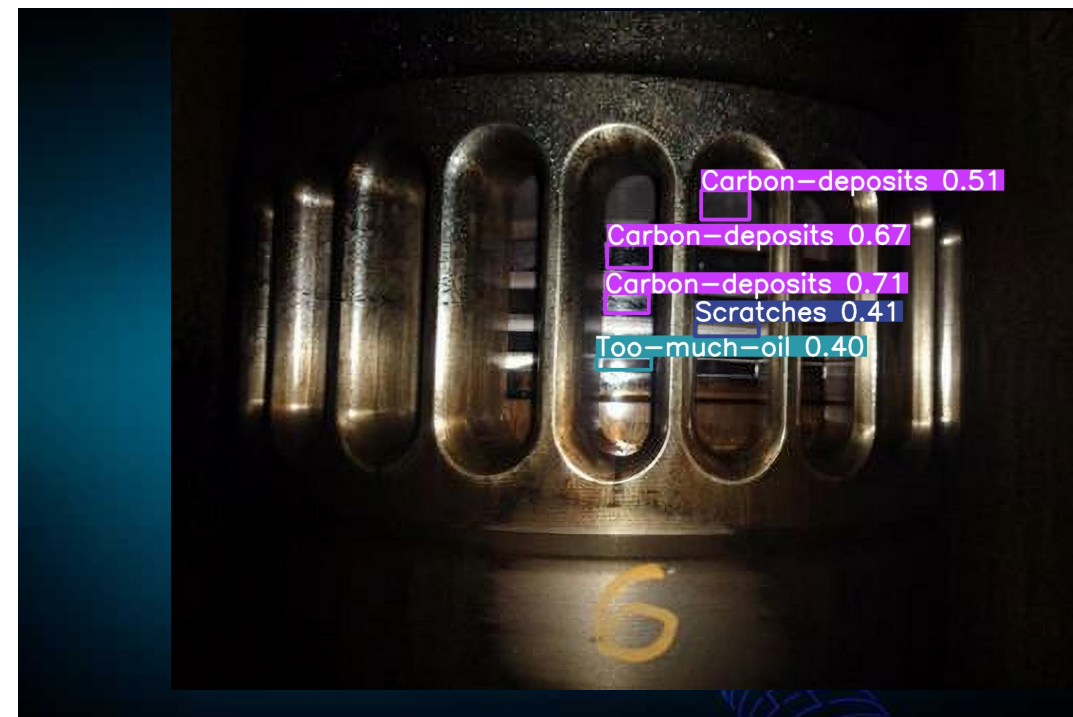


- Automated job orders in PMS



Solutions Provided

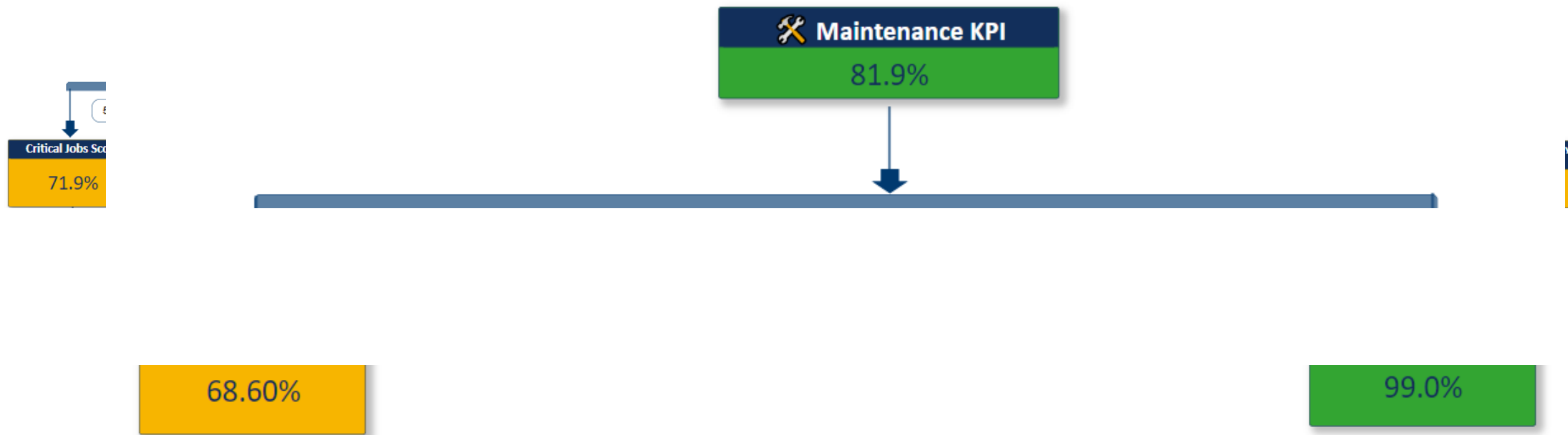
- Interface with vendors APIs
 - Storage Inspection Images & Fault Detection
 - Main Engine Makers
 - Liquid Analysis laboratories



API : Application Programming Interface



Solutions Provided





Objectives

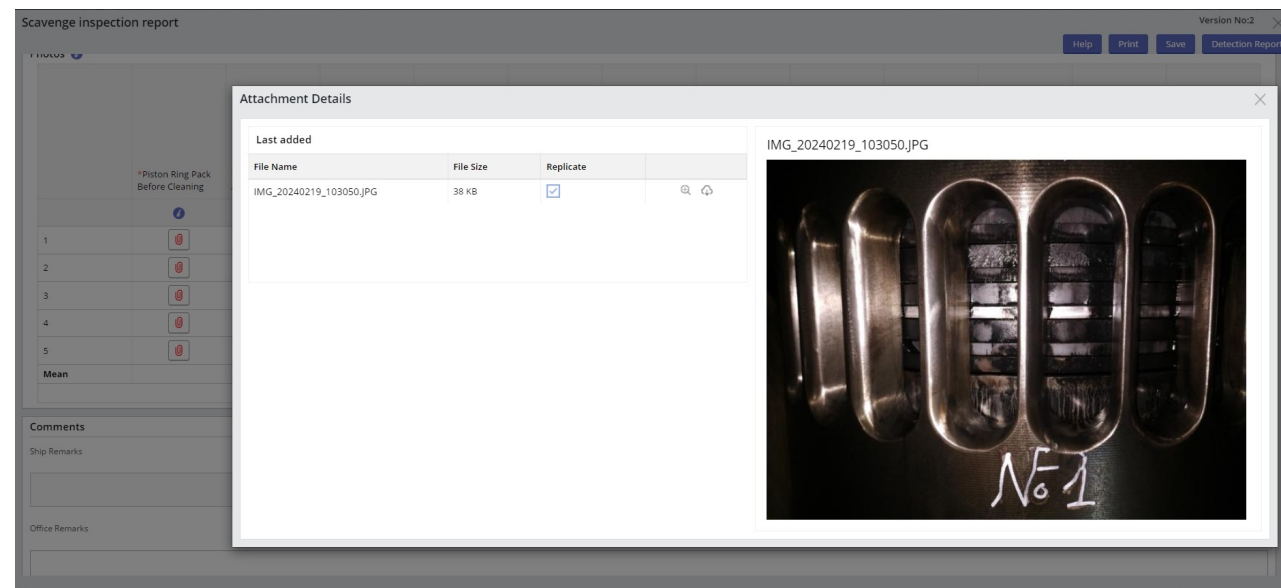
- Digitizing maintenance activity reporting forms
- Validation and Improving data quality
- Generating smart Reports
- Data Analytics





Solutions Provided

- Any technical reporting form can be digitized with no development effort
- Dynamic and vessel specific smart forms
- Guidance on crew how to fill the form and avoid data quality issues
- Attachment of photos within the forms
- Data analytics at any time with convenience w/o handling excel off-system reports



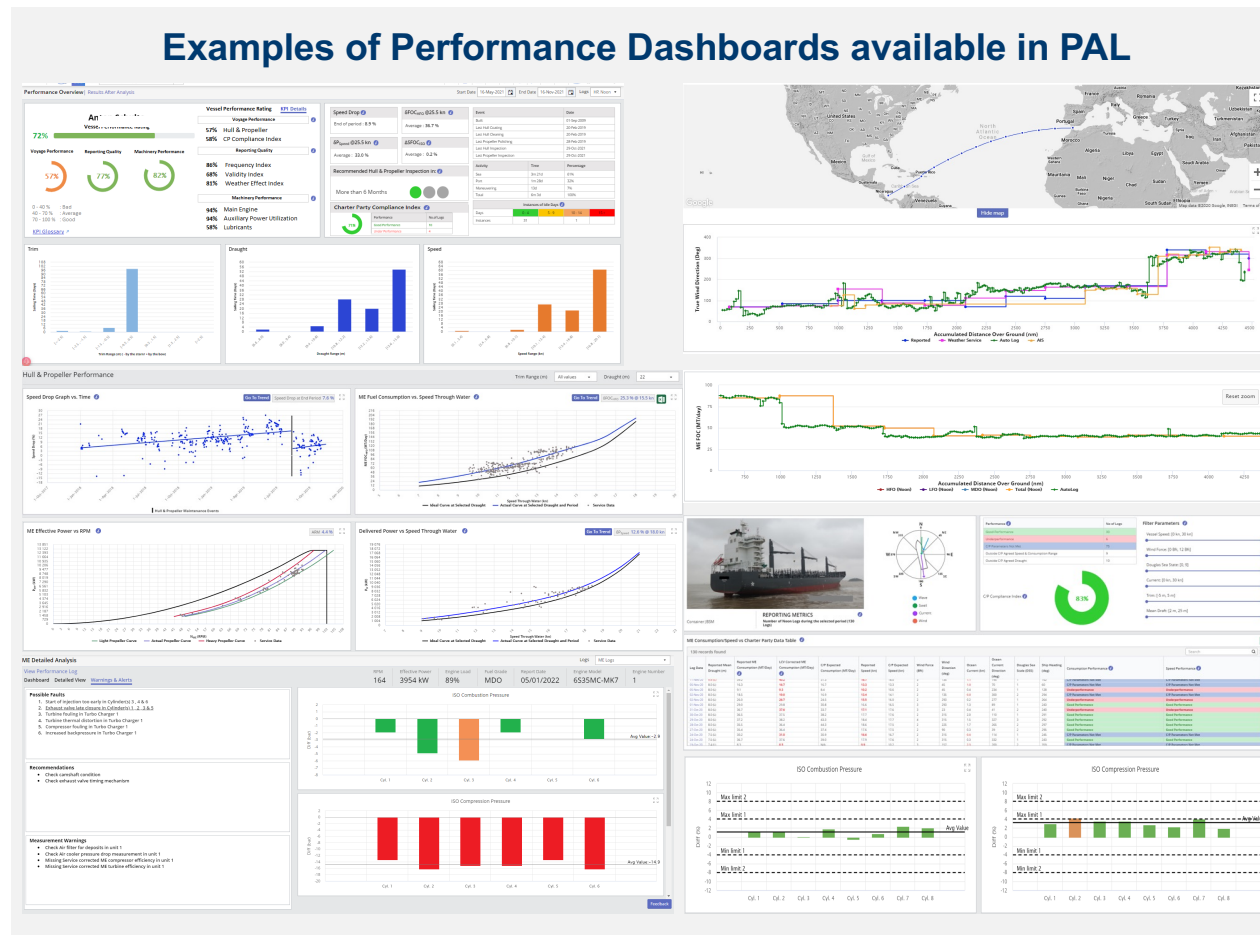
Fleet performance tools and dashboards

Vessel performance tools & dashboards developed by FPC and Mariapps are available to BSM fleet teams and crew via our ship management system PAL.

Performance tools and dashboards

- Voyage Optimisation
- Hull & Propeller Performance
- Voyage Execution & Charterparty Monitoring
- Engine Performance
- Fleet Benchmarking
- Auxiliary Engine Utilisation
- Specific Fuel & Cylinder Oil Consumption
- Fleet CII Overview/ CII Recommendation reports
- EU ETS Dashboard

Application of advanced technology: New products are developed with focus on telemetry & high frequency data, artificial intelligence and edge computing





Thank you

Theodore Ioannou, M.Sc.

Group Technical Superintendent – Maintenance Strategy

Bernhard Schulte Shipmanagement

Theodore.ioannou@bs-shipmanagement.com

www.bs-shipmanagement.com

Member of the SCHULTE GROUP