

Sperry Marine

NORTHROP GRUMMAN

Sperry Marine

SperrySphere – Digital Services

Built for the 21st Century Digital Bridge

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- Leading global provider of secure software-defined mission systems
- Over 27,000 employees around the globe
- In all 50 U.S. states and more than 20 countries



Mission Effectiveness from Undersea to Space to Cyberspace

Commercial Product Portfolio

UK PROGRAMS



Navigation Bridge System



Platform Management Systems

SYSTEMS

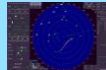


VISIONMASTER
Integrated Bridge System



Steering Control
Systems

PRODUCTS



Radar, ECDIS, Conning,
CAM, CCTV Displays



S- & X-Band
Radar Sensors



FOG, Spinning Mass
Gyro, Repeaters,
Heading Management
Systems



Autopilot



EM, Doppler & Satellite
Speed Logs



Magnetic
Compasses

PRODUCT SUPPORT

In Service Support,
Repairs & Spares

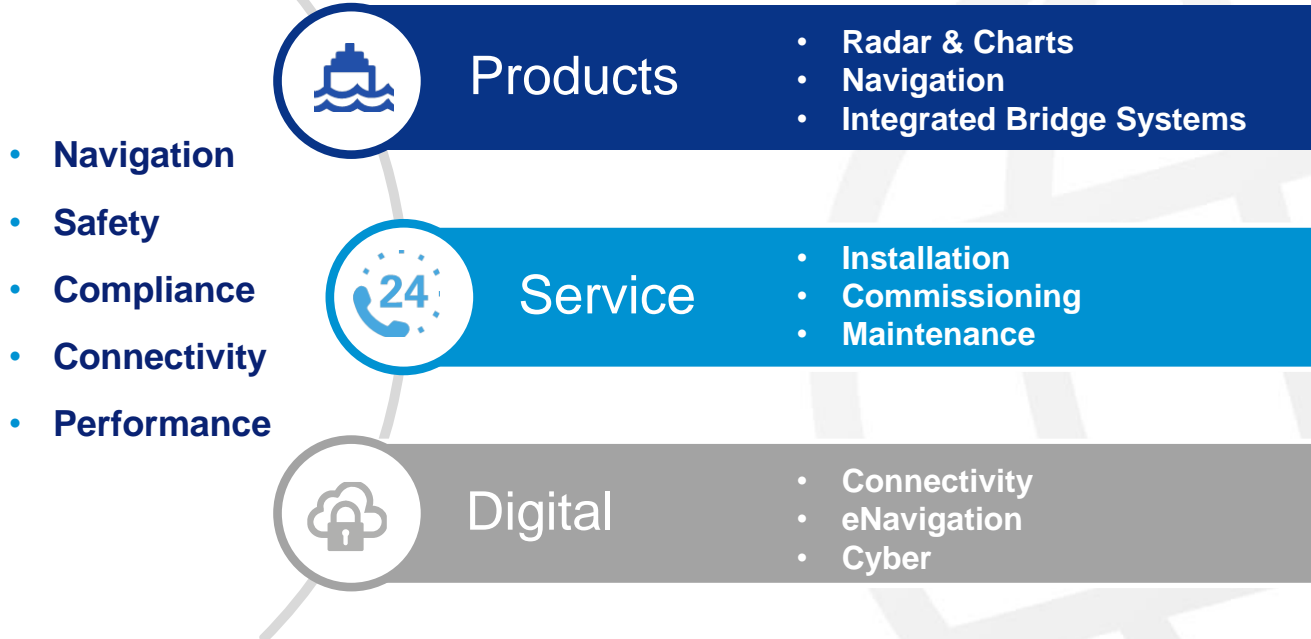


Global Service Coverage



In-house & On Board
Training

From stand-alone products to secure, connected maritime platforms



Fleet Operation Challenges

Key Trends in the Maritime Industry

- Digitalisation is driving the trend towards **remotely assisted and autonomous ships**
- Vessels are getting connected with **increasing satellite bandwidth** at lower costs.
- The **industrial internet (IoT)** is changing the maritime landscape enabling more systems be interoperable.
- Digitalisation is **driving industry boundaries** to optimize navigation and vessel performance



Fleet operation challenges

COVID-19

- Limited access to vessels and offices drives the need for remote access
- Increased pressure on ship-owners costs and volatile earnings environment

Efficiency and Sustainability

- New carbon regulations make operational efficiency and reduced emissions competitive commercial drivers

Risks and Safe Navigation

- Half of the 3,174 marine casualties in 2018 were related to navigation error (collision, contact, groundings/stranding)
- Human action (factor) represented 65.8% of accident events

Navigator Issues

- High admin workload, fatigue and shortage of well-trained crew
- Fragmented displays on the bridge -with stand-alone applications from several software vendors.

Cyber security

- ECDIS and Positioning systems are top 2 of most vulnerable shipborne systems (BIMCO IHS Cyber Security Survey)
- Virus in ECDIS can cost \$100k's (BIMCO) and risks the safety



Today's Navigation Bridge

Front of the Bridge

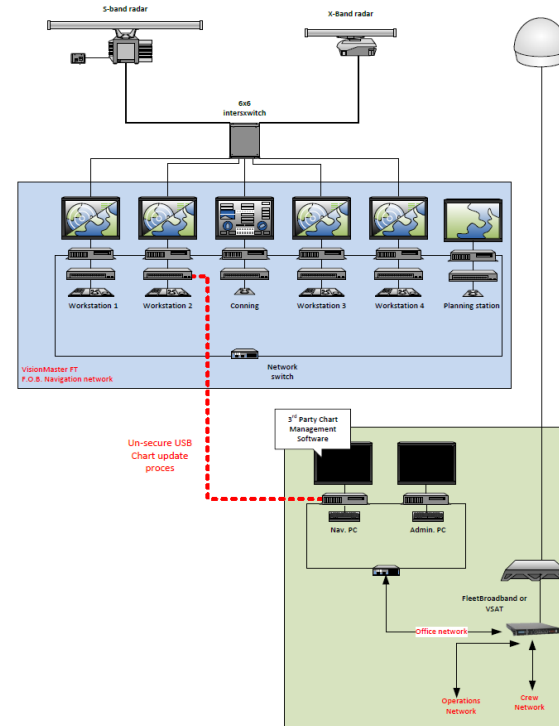
- Integrated Bridge System
- Fleet standard equipment for safety & performance
- IMO regulated - expensive and slow process to expand its capabilities

Back of Bridge

- Standalone CDUs, panels, LCDs, lights, etc.
- Array of office PC's
- Each PC runs a dedicated application
- Internet connection via vessel's office network
- Data transfer to front of bridge via USB process
- Navigators on bridge, engineers in the engine room

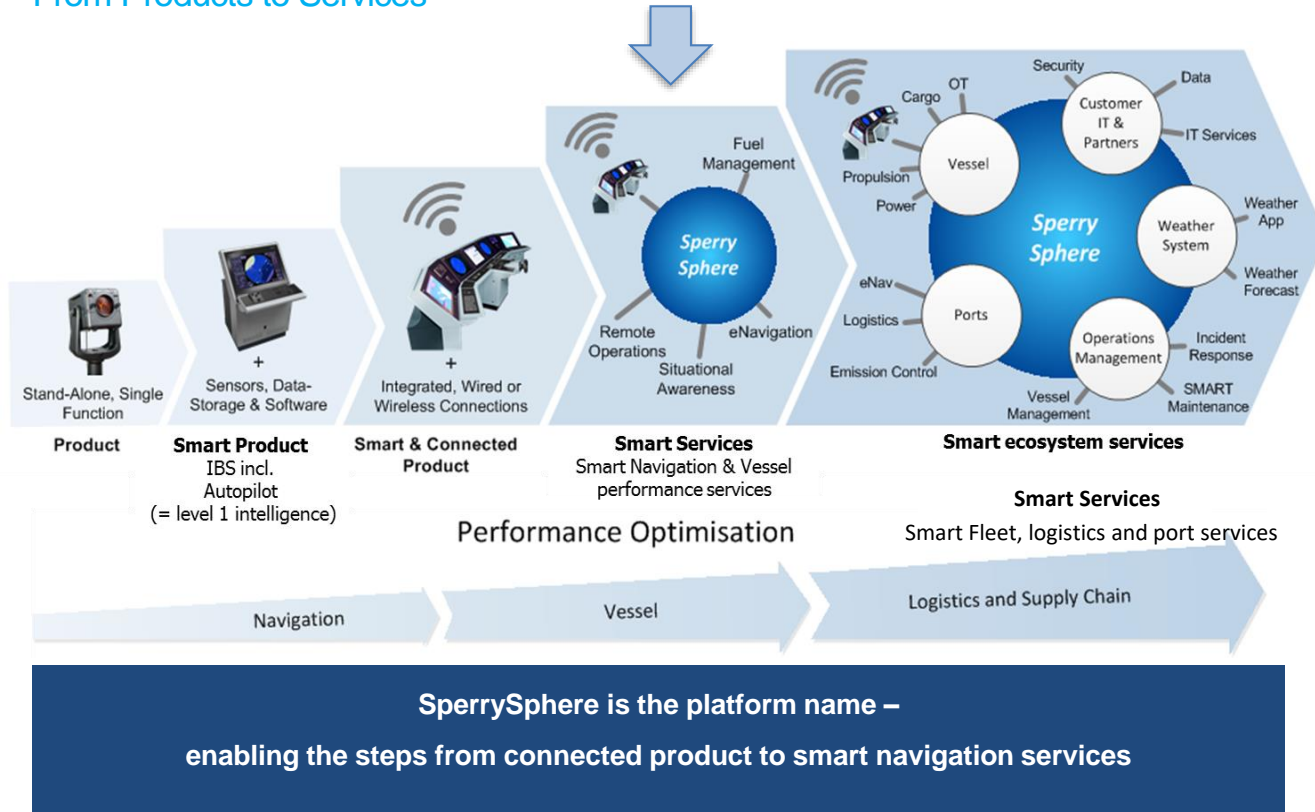
Challenge:

- Cyber security
- Integrate and manage bridge solutions from different providers
- Many displays
- How to take advantage of latest digital technologies



Digital is Driving Safe Navigation and Fleet Performance

Digital is driving safe navigation and fleet performance From Products to Services



SperrySphere

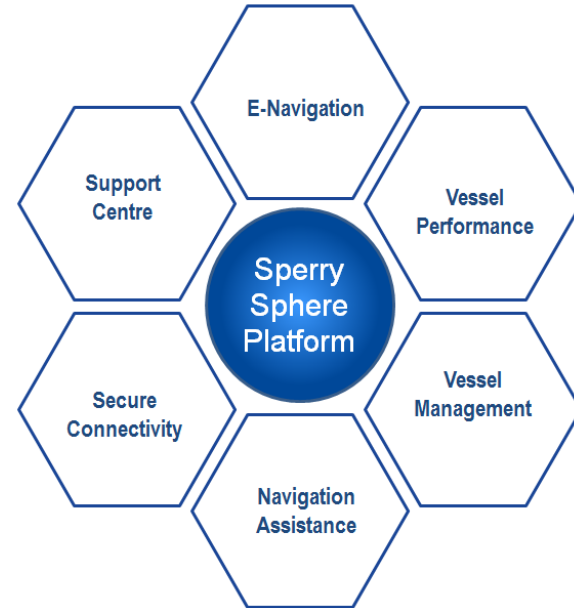
SperrySphere – The Smart Navigation platform for Ships

An open, back-of-bridge digital platform

- Provides a secure connection to the front of bridge and to shore for **data transfer**
- Capable of delivering a **wide variety of applications** enabling improved levels of cyber secure, safer, greener and more efficient navigation.
- **Bridge manufacturer agnostic** for better compatibility
- Builds capability for **digital partnering**



“All at the navigators’ and shore support team fingertips”



SperrySphere will be continuously developed and enriched with **new features and applications in 6 categories** based on feedback from users to mature the solution over time

SperrySphere Live in Operation

Powering safe and efficient navigation on one of the world's largest containerships (23.000 TEU's)



SperrySphere Live in Operation



SperrySphere – Smart Navigation Platform

Features

- ✓ Voyage Planning, Vessel Performance and Vessel Management are deployed, displayed and managed on **SperrySphere workstation**
- ✓ **Data updates including route and chart can be securely transfer** to ECDIS through Sperry's Secure Maritime Gateway which **exceeds** the standard requirements for a Gateway
- ✓ Choice of displays: 55 inch touchscreen
26 inch

Roadmap

- ✓ DNV GL Cyber Certification (IEC 61162-460 Gateway)
- ✓ Further integration of route and chart updates and application alerts into the VisionMaster to improve user experience

Benefits for Fleet Operator

- ✓ **Reducing** risk of virus/ ransomware/ corruption of ECDIS processor.
- ✓ **Integrated solution**
- ✓ One place for **smart navigation applications**
- ✓ Easy access to world leading applications for smart navigation
- ✓ **Reduced** hardware and maintenance costs
- ✓ Roadmap to **new Digital services** including remote support for navigation equipment
- ✓ **One stop shop** in Navigation



SperrySphere network overview



- Secure communication between SperrySphere and the shore using a ship's existing connections.
- A safe connection to the front of bridge via Sperry's Secure Maritime Gateway

SperrySphere – Connected ECDIS

Features

- ✓ Chart updates securely through Sperry's **Secure Maritime Gateway** from **any compliant chart provider**
- ✓ The Sperry Marine Secure Maritime Gateway exceeds the requirements for a Gateway as defined in the systems standard IEC 61162-460
- ✓ Option: **Automated chart updates into Gateway** for Navtor charts.

Benefits for Fleet Operator

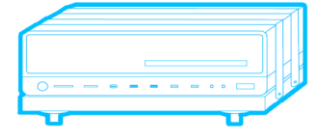
- ✓ **Increased cyber security**, reducing risk of virus / ransomware / corruption of ECDIS processor.
- ✓ For Navtor charts: **Automatic navigation data** solutions ensure regulatory compliance

Roadmap Connected ECDIS

- ✓ DNV GL Cyber Certification (IEC 61162-460 Gateway)
- ✓ Further integration of chart updates into the VisionMaster ECDIS to improve user experience

Future proof

SperrySphere – Connected ECDIS is a future-proof solution that **provides an upgrade path to roadmap of new features and applications**. New services will include remote support and remote diagnostics of the navigation equipment.



**STRONGER CYBER
SECURITY**



TIME-SAVING



STAY UP-TO-DATE

SperrySphere – Navigation Charts

NAVTOR's ENC

- ✓ Seamless distribution, update and optimisation of the customer's ENC portfolio
- ✓ 2 ENC's buy options:
 - ✓ Pay As You Sail
 - ✓ Subscription license By Route/Area
- ✓ NavTracker chart management tool
- ✓ NAVTOR ADMIRALTY Maritime Products & Services

Benefits for Fleet Operator

- ✓ **Increased cyber security**, reducing risk of virus / ransomware / corruption of ECDIS processor.
- ✓ For Navtor charts: **Automatic navigation data** solutions ensure regulatory compliance
- ✓ Increased fleet cyber security
- ✓ Easier regulatory compliance process
- ✓ Choice of subscription model

NAVTOR + Sperry Connected ECDIS

- ✓ Chart updates securely through Sperry's Secure Maritime Gateway avoiding the need for USB memory devices
- ✓ Automated chart updates into the gateway for an easy transfer to ECDIS



Powered by **NAVTOR** ★

SperrySphere – Voyage Planning

NavStation

- ✓ NavStation and Passage Planner is designed to off-load workload from the navigator, providing all the route planning tools in one application required to make a comprehensive passage plan.
- ✓ The solution is award winning Passage Planning Module, which is a part of Maritime Route Planning tool NavStation

Features

- ✓ Route planning tool
- ✓ Integrated with SperrySphere workstation
- ✓ Secure Route transfer with SperrySphere Secure Maritime Gateway
- ✓ Environmental regulations
- ✓ Weather forecast and weather routing
- ✓ Manoeuvring Assistant
- ✓ NAVAREA Warnings



Benefits

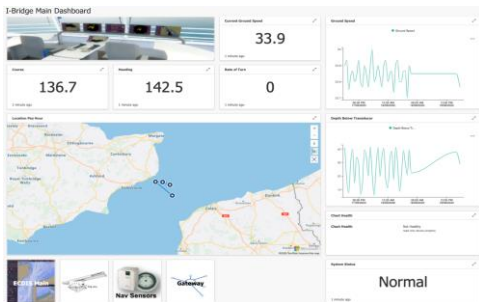
- ✓ Eliminating hours of administrative workload
- ✓ Automatic logging & calculations results in cut the paperwork
- ✓ Always compliant and ready for inspection
- ✓ Securely Integrated with ECDIS
- ✓ One stop shop Navigation from Sperry Marine

SperrySphere - Vessel Management (planned for 2021)

Features

Top level overview of the operational status of Sperry Marine Integrated Bridge System and chart updates

- ✓ Online health and status of your Sperry Marine Integrated Bridge System (VisionMaster)
- ✓ Navigation data: IMO number, vessel name, position, course, speed, etc.
- ✓ Remote trouble shooting



Benefits for Fleet Operator

- ✓ Remote awareness of vessel compliance and health status
- ✓ Start of the service evolution powered by digital transformation

Roadmap

- ✓ Expand domain for health status to all navigation equipment, including other makers equipment
- ✓ New services for customer
 - Asset Management
 - Digital Class Compliance powered by **DNV-GL**
- ✓ New features for Sperry Marine service network including Predictive Maintenance which creates additional opportunity to sell spare parts