



MARITIME

Vessels for the Future – embracing digitalization

Digital Ship Singapore

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- **Massive change**
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Massive change is ongoing

Big Data

- Increasing volume
- Increasing velocity
- Increasing variety
- Increasing veracity

Internet of Things

- Things become smart
- Smart products will radically change product boundaries and competition

Connectivity

- People are connected
- Things become connected

Computing power

- Moore's law turned 50 this year.
- Experts expect continuation to 2020

Automating knowledge services

- Opportunity and challenge

Data will change ship development and production

Trends and impacts

Towards open product performance

- More sensors will be installed and their data streams will be available and become analysed

Towards model-based approaches

- Data models will be used to complement and eventually replace document-based system descriptions

Towards the digital twin

- Every physical item will have a digital twin which can be used for simulation

Towards cyber-physical systems

- Systems become smart and connected and will be targets for cyber attacks

Opportunities

Product development

- Integrate operational experience
- Speed up development cycle

Production

- Smarten logistics
- Simulate and automate assembly

After sales

- Offer condition-based maintenance
- Develop new business models addressing life-cycle and cyber risks

Data will change ship operation

Impacts

Towards open product performance

- More sensors will be installed and their data streams will be available and become analysed
- Ships will be transparent

Towards the digital twin

- Near-real time simulation of ship performance

Towards cyber-physical systems

- Ships will be more automated and may become unmanned.
- Ships will be targets for cyber attacks

Opportunities

Fuel saving

- Ship and fleet performance management
- Routing

Asset integrity and downtime

- Condition-based maintenance
- Condition-based survey

Safety and environmental performance

- Asset safety status
- Emission inventories

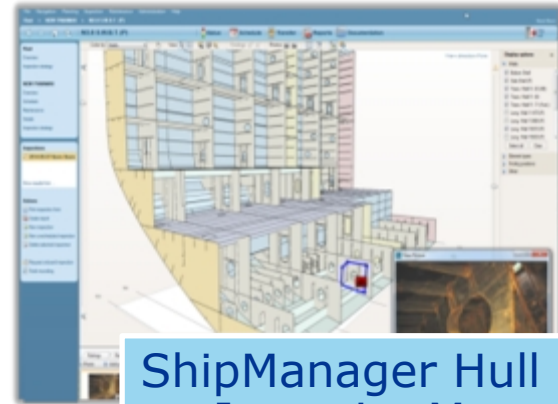
Asset utilisation

- Route-, season- and voyage-specific flexibility

DNV GL already uses big data to provide customer value



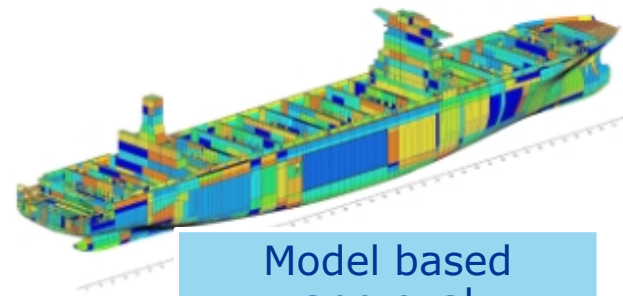
ECO Insight – Performance Mgt



ShipManager Hull – Integrity Mgt



Safety Dashboard



Model based approval

- what we are

- A new European research association to coordinate and promote **maritime technology** development & innovation
- Addressing societal challenges for **safer, cleaner and efficient transport** and the industrial challenge to **competitiveness**
- Convinced that **sustainable growth** can be achieved with maritime innovations
- Aim at **private-public partnership** to ensure long-term commitment



Sustainable Growth through Maritime Innovation

By 2050, we will be using our **maritime space and inland waterways** for transport, food and energy production, mineral exploitation, but also for urban dwelling, leisure, tourism and manufacturing.

The increased use of our **ocean space** requires that it is well organized, secure and supported by **safe and clean vessels**. Challenges relate to

- vessels operating with **drastically reduced emissions** and meeting strict **safety requirements**
- industry **rapidly implementing** new technologies, building advanced vessels and operating more complex vessels
- industry **training** highly specialized manufacturing and operating personnel
- industry providing **innovative and digital services** in a more competitive waterborne environment
- industry **adapting** to the ever faster changing business environment

Sustainable Growth through Maritime Innovation

- addressing societal and industrial challenges

Safer maritime transport

- **Working on new built ships becoming as safe as equivalent onshore operations**

Cleaner and efficient maritime transport

- **Meeting required IMO and proposed EU emission reductions**
- **Supporting modal shift and blue growth**
- **Delivering more fuel-efficient vessels**

A competitive industry to create new jobs

- **Sustaining leadership in ship and ship system development and production**
- **Using the innovation potential of SMEs**
- **Embracing digital business opportunities**

- a strong and growing partnership

Vessels for the Future represents **all stakeholders** of the maritime value chain: ship owners, ship yards, system suppliers, classification societies, research institutes and academia.

Today, **61 members from 15 EU Member States** have joined – with half of the members representing industry.



Board members

Sustainable Growth through Maritime Innovation

Embracing digitalization

- **Change will never be as slow as today**
- **Data is nothing, algorithms matter**
- **Adopt rapid prototyping**
- **Cooperate and share**
- **Explore new business models**



Thank you for your kind attention.

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