Marine & Offshore
Sustainability, Safety & Security

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DSM 19 - SEPTEMBER 3rd – 4th, 2019

Bengt Sangberg
Marine Chief Executive Nordic

Sustainabilty

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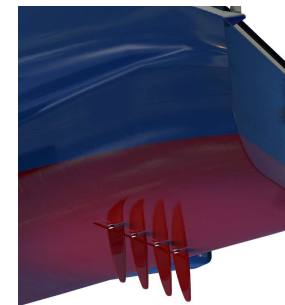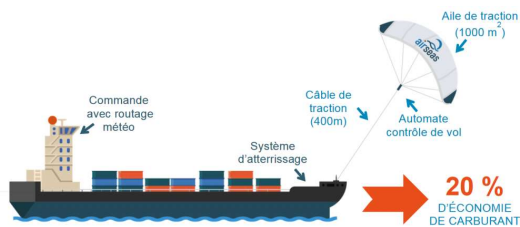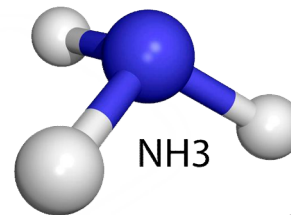*Move Forward with Confidence*

Million Dollar Question…!

How do you decarbonise
an industry built on

1. Set-up Strategic Partnerships

Industry Partners & Innovative Projects

NH3

Commande avec routage météo

Aile de traction (1000 m²)

Câble de traction (400m)

Automate contrôle de vol

Système d'atterrissage

20 % D'ÉCONOMIE DE CARBURANT

1. B-front & Frontliner

Leading the way with the market leaders
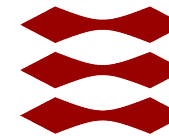
2. Incentivize the industry & the society

Mandate Biofuels Uptake

Keep an eye on the other industries…

Aviation

"European Advanced Biofuels FlightPath" initiative was set up as a roadmap to achieve an annual production of two million tons of sustainably produced biofuel for aviation by 2020.

Road

The Renewable Energy Directive (RED) mandates that at least 10% of all energy in road transport fuels, to be produced from renewable sources by 2020. Alongside the RED, it is required the road transport fuel mix in the EU to be 6% less carbon intensive than a fossil diesel and gasoline baseline by 2020.

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Green transportation should be part of Bio-pricing
Society is ready to pay more…

SHOPPING FOR ORGANIC FOODS

The percentages of people willing to pay 20% more or higher for organic groceries:

- **44%** Fresh vegetables
- **37%** Chicken/turkey
- **36%** Fresh fruits
- **36%** Beef
- **34%** Frozen fruits
- **32%** Dairy milk
- **32%** Yogurt
- **31%** Cheese
- **30%** Pork
- **27%** Granola/cereal bars

SOURCE Hartman Group

USA TODAY

Organic food prices versus non-organic

A random sample of Chehalis, Wash. retail grocery prices.

Non-organic ▢   Organic ▢

Source: Capital Press research

Product	Non-organic Price (dollars)	Organic Price (dollars)
Bananas (Per pound)	$0.69	$0.89
Onions, yellow (Per pound)	0.59	1.29
Roma tomatoes (Per pound)	1.29	1.49
Baby carrots (Per pound)	1.29	1.89
Onions, red (Per pound)	1.69	1.99
Chicken drumsticks (Per pound)	1.24	2.29
Plain yogurt (Per quart)	2.59	4.59
Baby spinach (10-oz. serving)	1.99 ($2.99/5-oz. package)	5.98
Peanut butter (16-oz. serving)	3.59	6.59
Whole milk (Per gallon)	2.99	6.99
Maple syrup (12-oz. serving)	9.19	15.19

A New Dimension on Ships' Design & Life Cycle Management

- Lifespan

- Convertibility

- Multi fuel engines

Future of the Marine Transportation
Containerization and smart logistics…

A Watchlist for The Energy Transition

Transformation of businesses

Retailers will become energy producer

As transport as a service eclipses car ownership, an OEM becomes a service provider.

Producers of fossil fuels will move into new energy types

New market dynamics

New forms of competition emerge—eg, energy systems become giant network economies.

Consumer preferences shift increasingly to green products and circular solutions.

Value chains transform—eg, utilities operate and maintain their own wind turbines instead of outsourcing to OEMs.

Government policy & regulation

Climate change mandates affect energy costs and alter the balance sheet of carbon-intense sectors.

Bans—eg, on plastics or diesel—constrain business operations.

Performance standards—eg, forced efficiency improvements for cars or appliances—accelerate adoption of next-generation technologies.

Safety

Bureau Veritas

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Safety of Ships and Offshore Units

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Tankers
Main Safety Aspects

→ Safety aspects are key for oil and chemical tankers

- Flammable, hazardous and dangerous products carried on (oil or chemical products)

- Protection of the asset, the crew and the environment

→ Aspects that may impact safety are covered by regulations

- IMO: SOLAS, MARPOL and IBC Code. Focus on safety and environment protection

- Bureau Veritas NR 467 covers also structural assessment

  - Chapter 7 for Oil tankers and FLS tankers

  - Chapter 8 for Chemical tankers

- IACS

  - Common structural rules (2006) and Common structural rules harmonized (2015)

  - Other unified requirements and interpretations (UR, UI, etc)

Statutory Requirements
Class Often Involved as R.O.

→ Non-specific for Oil Tankers

- SOLAS 1974 and Safety Codes

    Life Saving Appliances (LSA) Code

    Fire Safety Systems (FFS) Code

    Fire Test Procedures (FTP) Code

- MARPOL 1973
- LOADLINES 1966
- TONNAGE 1969
- COLREG 1972
- PSPC (Performance Standard for Protective Coatings)
- Resolution MSC.215(82) AFS (Anti Fouling Systems) 2001
- Code on Noise Levels on Board Ships. Resolution MSC.337(91)
- …

→ Specific for Oil Tankers: Marpol Annex I

→ Local regulations (USCG, EU Directives)

Statutory Requirements – Marpol Annex VI
Class Involvement

$\rightarrow$ Recognized organization for statutory certification

$\rightarrow$ Specific regulations and notations for the ship's class certificate

| Regulation	Scope	Notations
NR.529	Assessment compliance with low flash point fuels (LNG, LPG, CNG)	-dualfuel / -gasfuel
NR.627	Assessment compliance with preparation for low flash point fuels (LNG)	GAS PREPARED
NR467, Part F Ch.9, Sec.1 and sec.2	Assessment compliance with MARPOL Annex VI	CLEANSHIP / CLEANSHIP SUPER
NR467, Part F, Ch.9, Sec.3	Assessment compliance with MARPOL Annex VI	EGCS-SCRUBBER
NR.644	Assessment compliance with preparation for MARPOL Annex VI	SCRUBBER READY
NR.586	Assessment compliance MARPOL Annex Vi	SEEMP

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Focus on Structural Analysis
Special Attention Given to Large Tankers

CSR-H
The IACS core regulation for structural assessment of Tankers and Bulk carriers
Ships above 150 m Rule Length
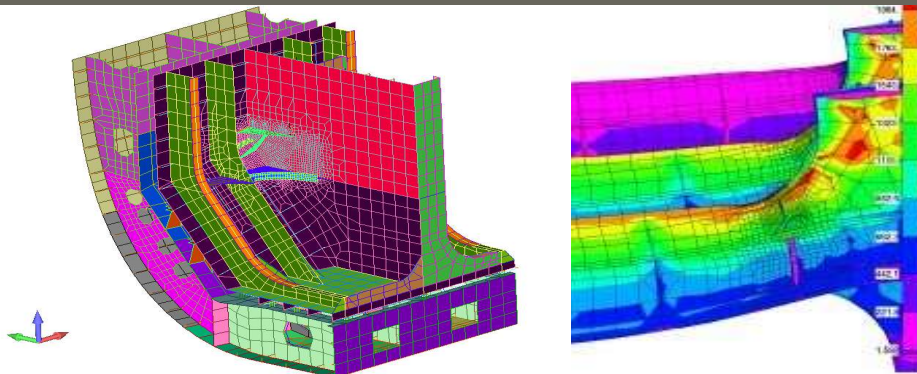
→ Experience available through the notations **VeriSTAR HULL** and **Fatigue Plus** (fatigue crack avoidance). More locations studied, more potential causes analyzed.

→ BV offers advisory services

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The Most Sophisticated Tankers & BV
Polar Class MR tankers

Main dimensions:

Length	214 m	Cargo and slop tanks	59,800 m³
Breadth	34 m	Service speed	13.0 knots
Draught design	11.7 m	Propulsion units	2 × 11 MW
Draught ice	12.0 m	Main diesel generators	31.36 MW
Draught scantling	12.9 m	Ice class	Arc7 (RMRS)
Deadweight	43,400 t	The tanker will have dual classification	
	(with condensate cargo)	provided by Bureau Veritas (BV) and	
	49,700 t	Russian Maritime Register of Shipping	
	(with oil cargo)	(RMRS).	

→ BV provides classification services for two ships

→ Gained experience in R&D in Arc7(PC3) LNG carriers

→ Most innovative project within the MR segment nowadays

- Ice breaking and propulsion tests (pods)

- Winterization (-52 C)

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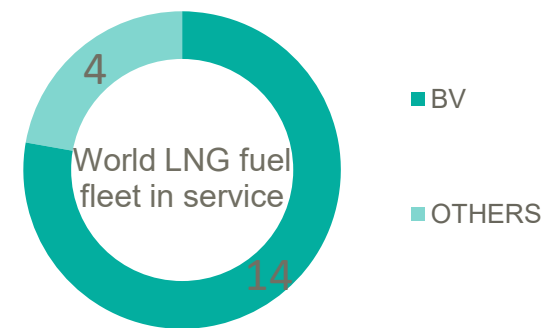
Gas Fuel Tankers
BV Leadership

→ World fleet: Mainly small tankers

→ Deep involvement of Bureau Veritas

- Specific Regulations

- 14 + 10 on order oil/chemical tankers classed by BV

- Many other larger ships prepared to be retrofitted

World LNG fuel fleet in service

- BV
- OTHERS

4

14

Source: Clarksons

Bergen Viking - 4.500 dwt Chemical/Oil tanker

Conversion for Bergen Tankers

TERNSUND - 15.000 dwt Chemical/oil tanker

New built in Avic Dingheng for Terntank AS

FURE WEST - 17.400 dwt Chemical/oil tanker

Conversion for Fure Tank

Security

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Cyber Resilience

New technologies bring new opportunities

Drivers creating value

Safety
- Reduced probability of human failure
- Less crew exposure to hazardous situations

Environmental impact
- Lower emissions and probability of spills

OPEX
- Reduced crew and maintenance
- Improved fuel efficiency

What needs to change?

- Technology
- People
- Processes on board and ashore
- Regulatory framework
- Industry confidence
- Public acceptance

TODAY

- **Remote monitoring** and **decision support** for ships at sea
- Bureau Veritas **guidelines for autonomous shipping** (NI 641)
- Bureau Veritas rules for **cyber safety** and **cyber security**
- **Remotely operated vessels in national waters** under individual flag state control
- **IMO regulatory framework for autonomous ships** engaged in international voyage

TOMORROW

- **IMO Conventions** and relevant codes to be revised/updated Remotely operated vessels at **open sea**
- **Autonomous and low-manned** vessels under international regulations
- **Unmanned** autonomous vessels (niche market in short term)

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Cyber performance – Building the temple

Measure and improve health and performance of asset with data
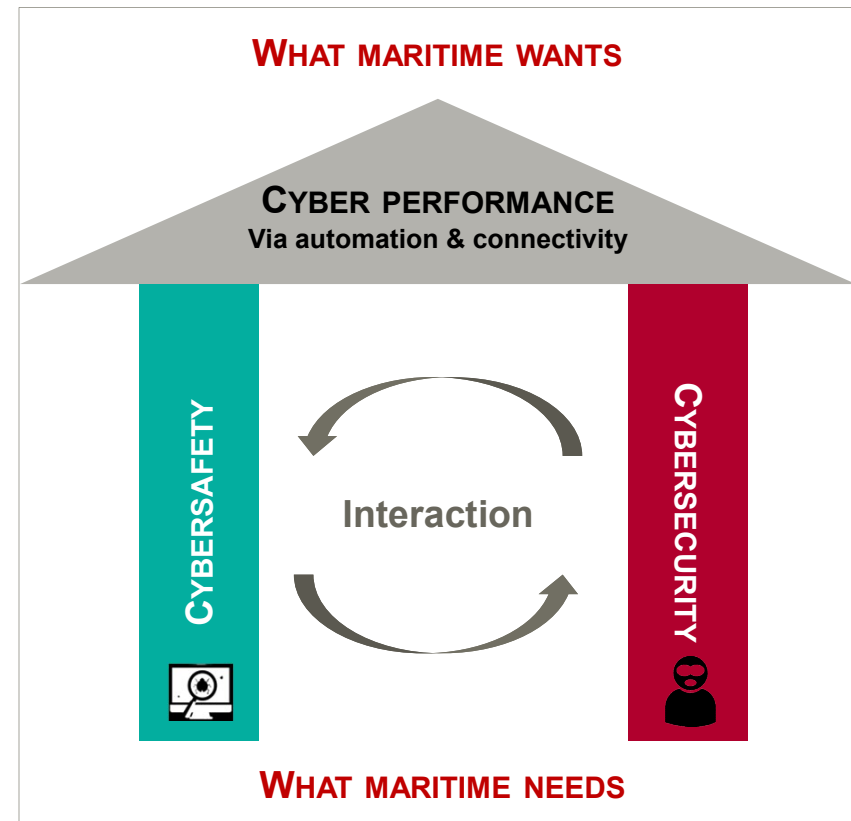
Objective
- Anticipate future conditions based on **historical data** by using **digital model** or **predictive methods**

Services
- Condition monitoring
- Maintenance optimization
- Fuel consumption & emission control
- Fleet energy efficiency performance
- Remote survey and inspection
- Continuous verification

Enablers
- Data platform
- Cyber-physical systems & IoT
- Computerized model of environment & asset
- Remote access/connectivity

WHAT MARITIME WANTS

CYBER PERFORMANCE
Via automation & connectivity

CYBERSAFETY

Interaction

CYBERSECURITY

WHAT MARITIME NEEDS

Bureau Veritas Smart Ship Program

Cyber Safety
Prevent Involuntary Accidents/Mistakes

CLASS NOTATIONS
- SW-Registry
- Safety of computerized based system (NR 467)
- Advance System Verification-HWIL

CERTIFICATION
- System hardware
- System software
- Cyber safety solution

- Digital inspection and assurance of complex systems
- Safety risk analysis
- HIL & SIL testing
- Software V&V testing

Cyber Security
Prevent Intentional Malicious Actions

CLASS NOTATIONS
- CYBER MANAGED (NR 659)
- CYBER SECURE (NR 659)
- SYS-COM (NR 467)
- Cyber security risk analysis guidelines

CERTIFICATION
- System hardware
- System software
- Cybersecurity solution
- Organization

- Cyber security risk analysis
- Maturity risk assessment
- Crisis management
- Emergency response plan
- Software V&V testing

Cyber Performance
Measure Performance/Health

CLASS NOTATION/SURVEY SCHEME
- STAR-MACH (-SIS)
- Planned Maintenance Survey (PMS) scheme
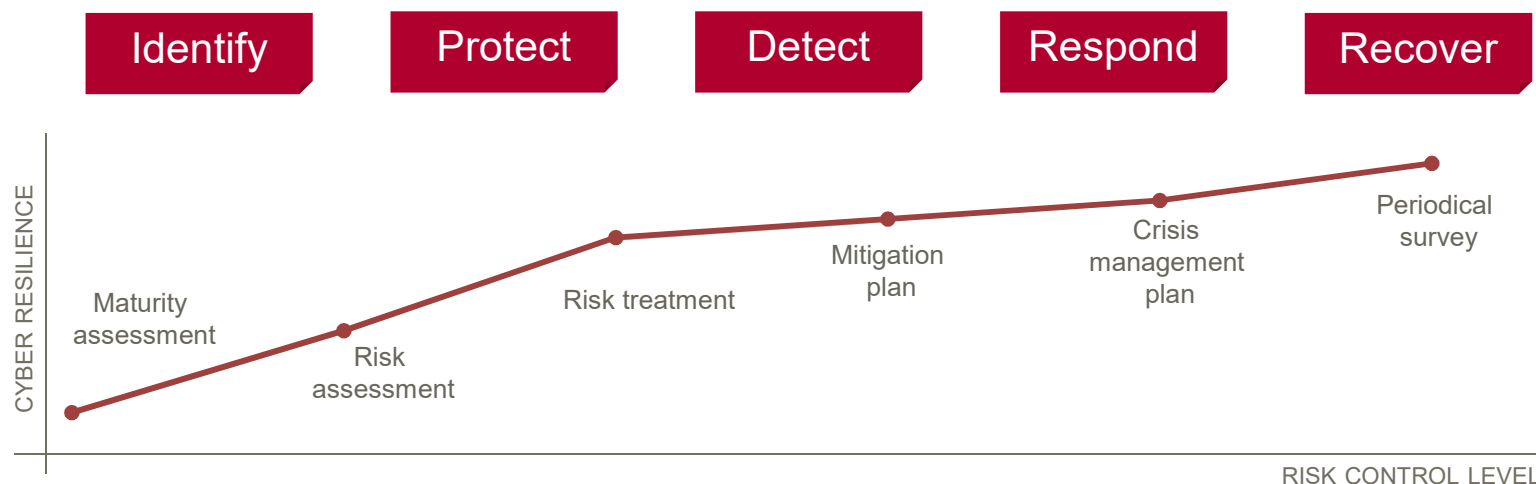- CM/CBM (under redevelopment)

CERTIFICATION
- System hardware
- System software
- Maintenance solution

- Maintenance strategy and spare parts optimization
- RCM training
- Energy efficiency optimization
- Reliability, availability & maintainability

REFERENCES AVAILABLE

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BV cyber resilience approach

Identify **Protect** **Detect** **Respond** **Recover**

CYBER RESILIENCE

Maturity assessment

Risk assessment

Risk treatment

Mitigation plan

Crisis management plan

Periodical survey

RISK CONTROL LEVEL

Assuring IS, business continuity & organizational resilience

Are you cyber resilient?
Use our app to find out
Available on our website

icheck
for Cyber Vessel

BY BUREAU VERITAS

Managing cyber security threats

A risk-based approach

CYBER SECURE: SECURITY IN DESIGN

CYBER MANAGED: POLICY, TRAINING, CHANGE MANAGEMENT

SYS-COM: SECURITY OF REMOTE ACCESS

EQUIPMENT

- Equipment certification
- Software cyber solutions

New responsibilities
- Cyber Security Officer on shore
- Cyber Security Responsible

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CYBER MANAGED

CYBER SECURE

SECURITY
System compliance
Attack detection
Events recording
Type approved equipment

SOLUTIONS

SUPPLIERS

HARDENING
Operating system
Software vulnerabilities
Hardware threats
Type approved equipment

INTEGRATION
Vessel secure by design
Networks architecture
Equipment integration

Security solutions

Inspection and decontamination gate

Events and logs recording (critical equipment)

Compliance and software registry

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CYBER MANAGED vs CYBER SECURE

① Cyber managed
Additional class notation
for Shipowners

② Vessel integrator
Approved (option)
for shipyard or any third parties

③ Cyber Marine Instructor
Approved (option)
for any third parties

① ⚓ Cyber secure
Additional class notation
for Shipyards / Shipowners

② ⚓ Cyber secure equipment
Type approved certificate (or recognized)
for equipment suppliers

③ ⚓ Cyber secure service provider
Company recognition
for remote access service providers

④ ⚓ Cyber secure security solution
Type approved certificate (or recognized)
for security solution provider

⑤ ⚓ Cyber secure software evaluator
Company recognition
for evaluation of software hardening

Thank You

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