MARITIME

Investing in Cyber Security - *Ensuring Operational Safety & Efficiency*

6th Annual Capital Link Maritime CSR Forum - London, 2nd November 2016

KNUT ORDING, PROGRAMME MANAGER DNV GL, DSI - CYBER PHYSICAL SYSTEMS

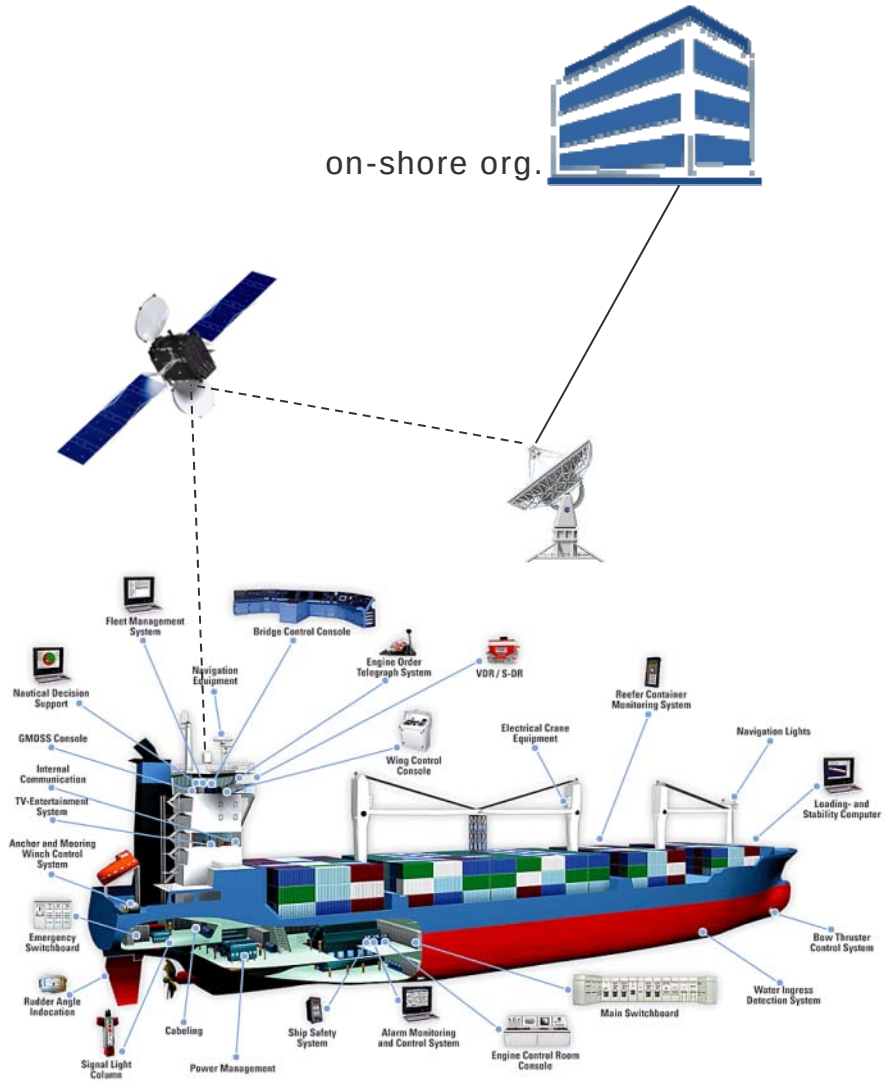
Agenda

- Cyber security trends
- Industry response
- Cyber security - how it works
- Recommendations

Cyber security trends

Why should we care?

Safety in shipping today heavily depends on cyber systems



Information Technology (IT)

- IT networks
- E-mail
- Administration, accounts, crew lists, …
- Planned Maintenance
- Spares management and requisitioning
- Electronic manuals
- Electronic certificates
- Permits to work
- Charter party, notice of readiness, bill of lading…

At risk:

Mainly finance and reputation

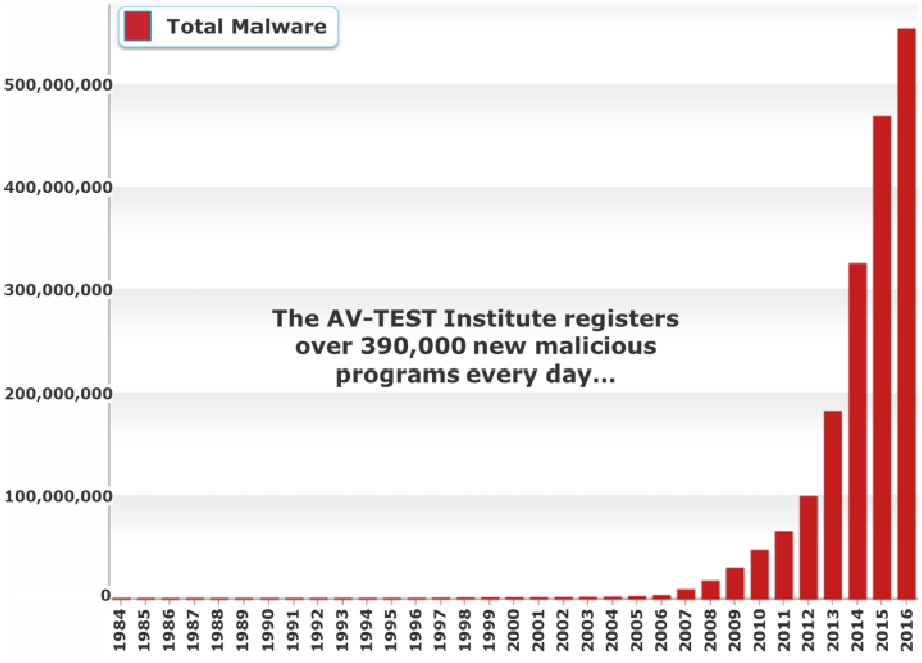
Operation Technology (OT)

- PLCs
- SCADA
- On-board measurement and control
- ECDIS
- GPS
- Remote support for engines
- Data loggers
- Engine & Cargo control
- Dynamic positioning, …

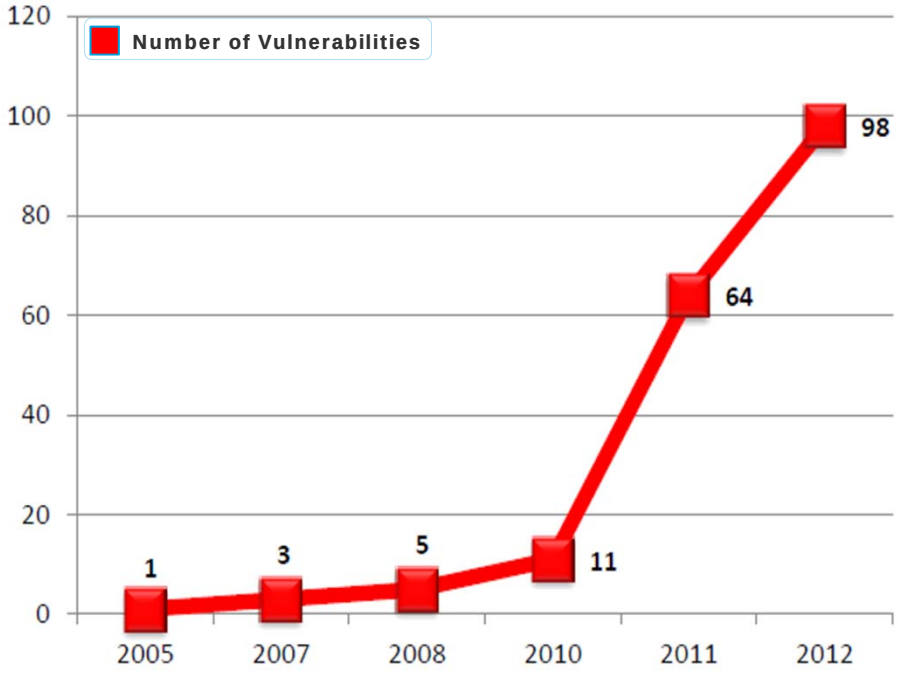
At risk:

Life, property and environment + all of the above

Cyber security issues are present and migrating to the OT world



Source: AV-TEST Institute, Germany



*Source (report extract): "**SCADA** safety in numbers" – Positive Technologies – October 2012*

OT: Operational Technology such as Industrial Control Systems, SCADA, PLCs, Sensors
SCADA : Supervisory Control and Data Acquisition (Operator control and monitoring systems)

Industry response

How has the industry reacted?

Industry response: Cyber Security guidance


DNV·GL

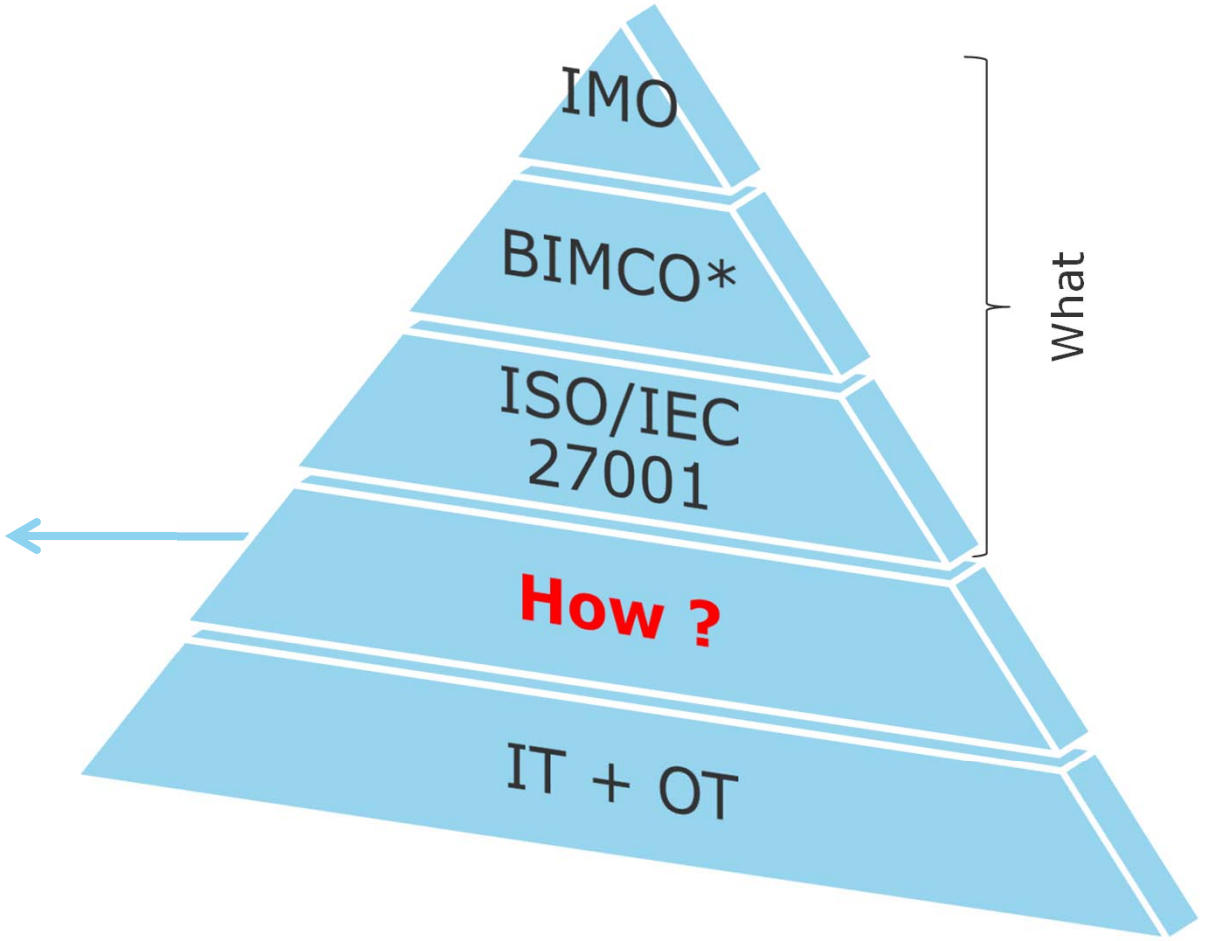
RECOMMENDED PRACTICE

DNVGL-RP-0496 Edition September 2016

Cyber security resilience management for ships and mobile offshore units in operation

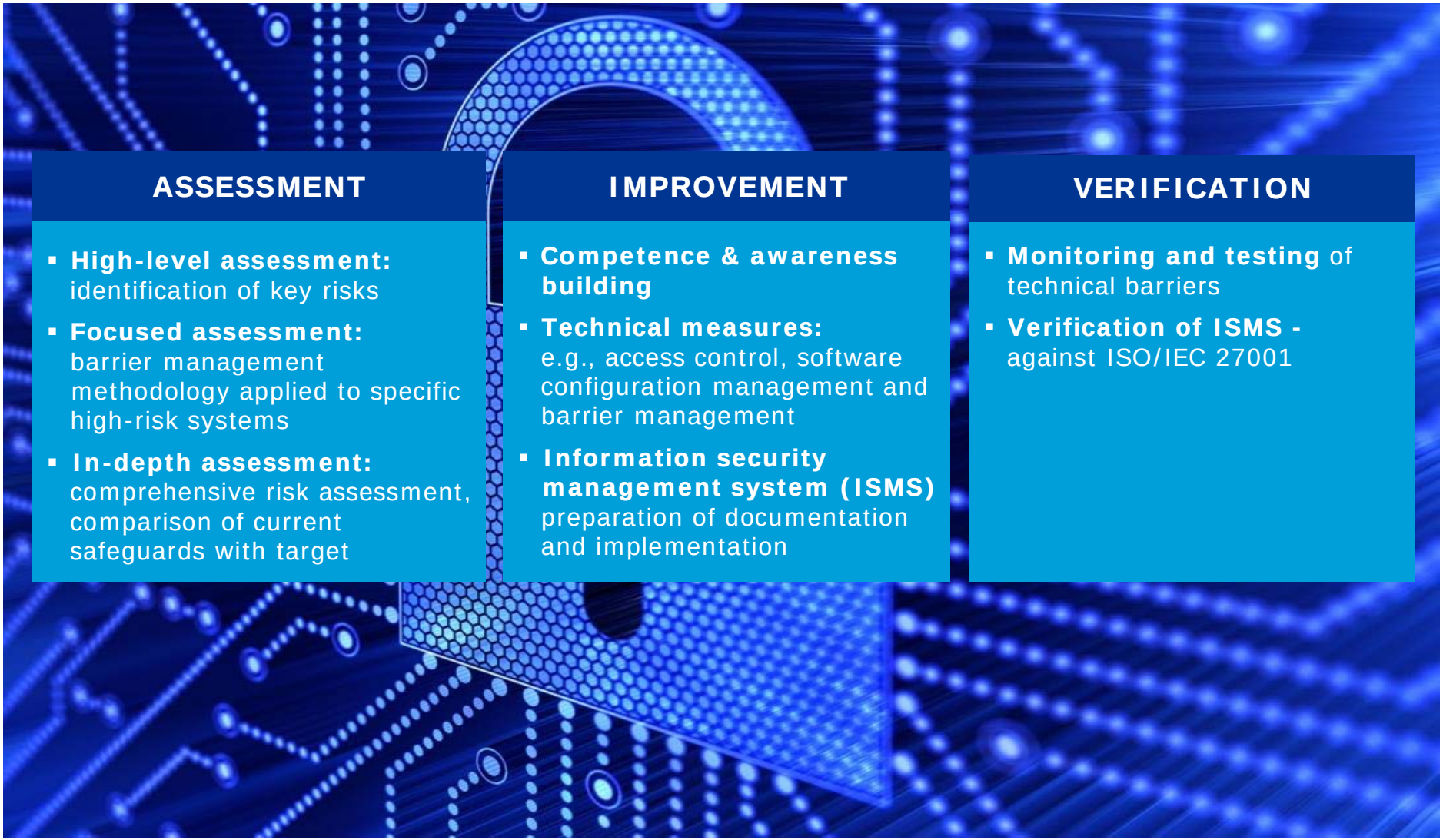
The electronic pdf version of this document, available free of charge from http://www.dnvgl.com, is the officially binding version.

DNV GL AS



*BIMCO: Baltic and International Maritime Council

CYBER SECURITY
DNV GL's Recommended Practice



ASSESSMENT

- **High-level assessment:** identification of key risks
- **Focused assessment:** barrier management methodology applied to specific high-risk systems
- **In-depth assessment:** comprehensive risk assessment, comparison of current safeguards with target

IMPROVEMENT

- **Competence & awareness building**
- **Technical measures:** e.g., access control, software configuration management and barrier management
- **Information security management system (ISMS)** preparation of documentation and implementation

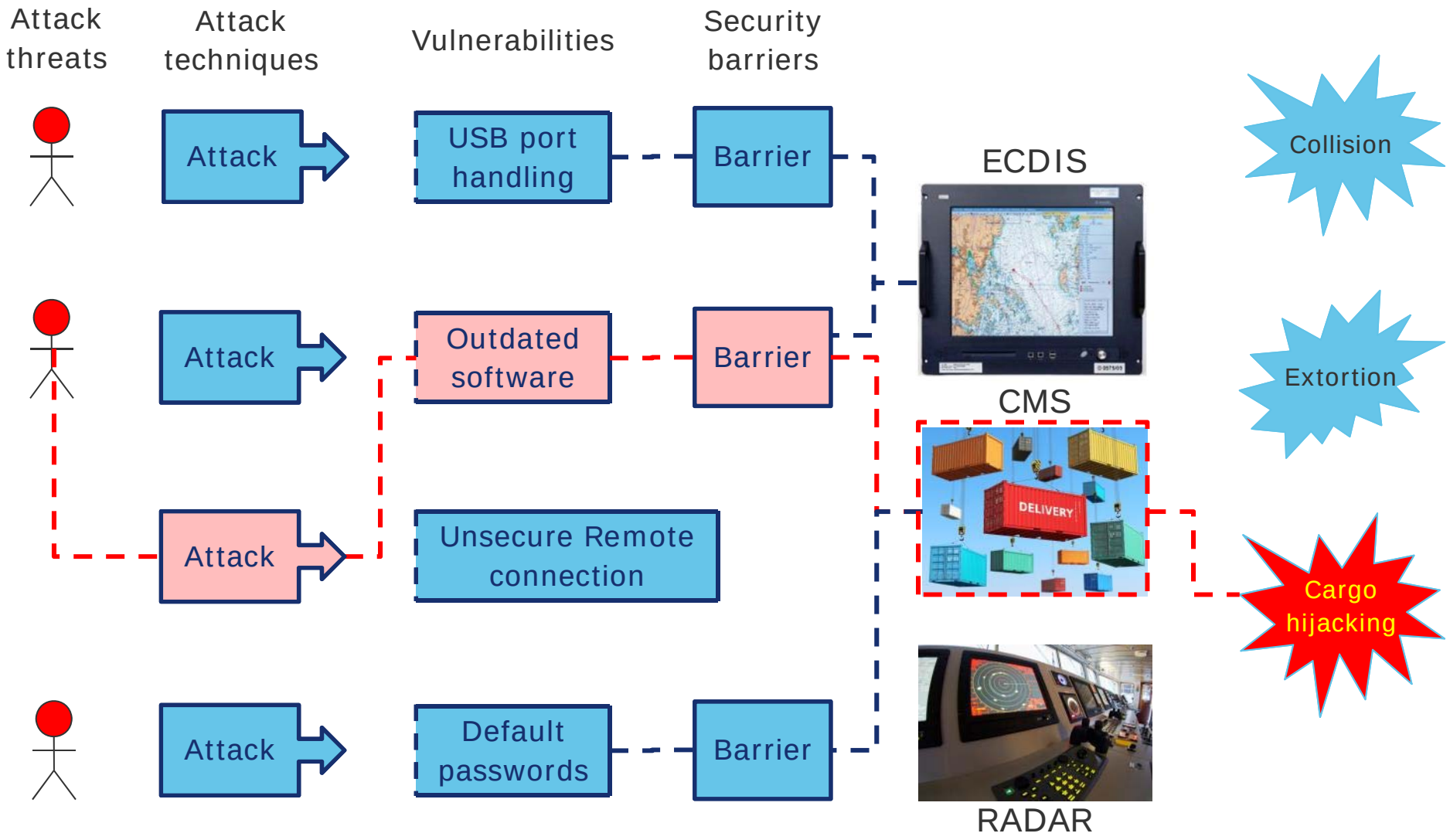
VERIFICATION

- **Monitoring and testing** of technical barriers
- **Verification of ISMS -** against ISO/IEC 27001

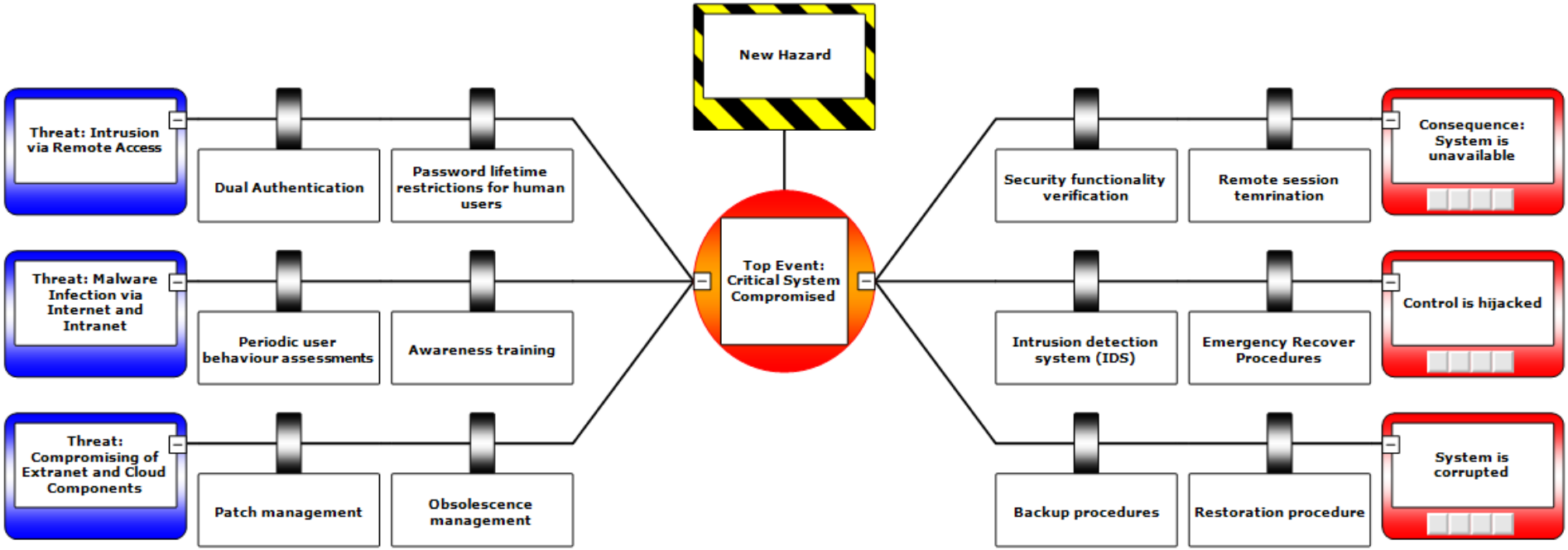
Cyber security resilience management

How does it work?

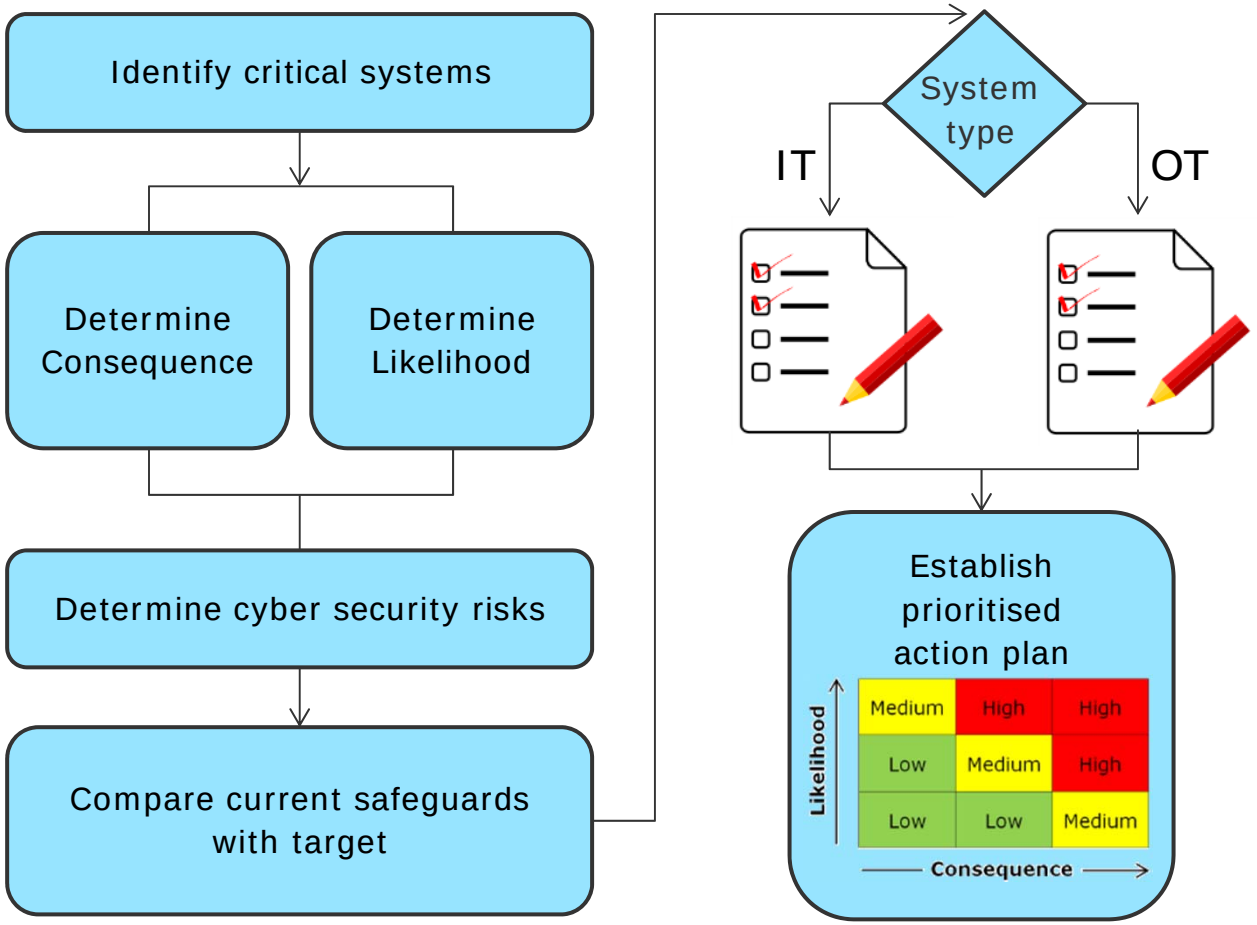
First: Understanding cyber attack mechanics: Attacker → Vulnerabilities → Barriers → Consequences



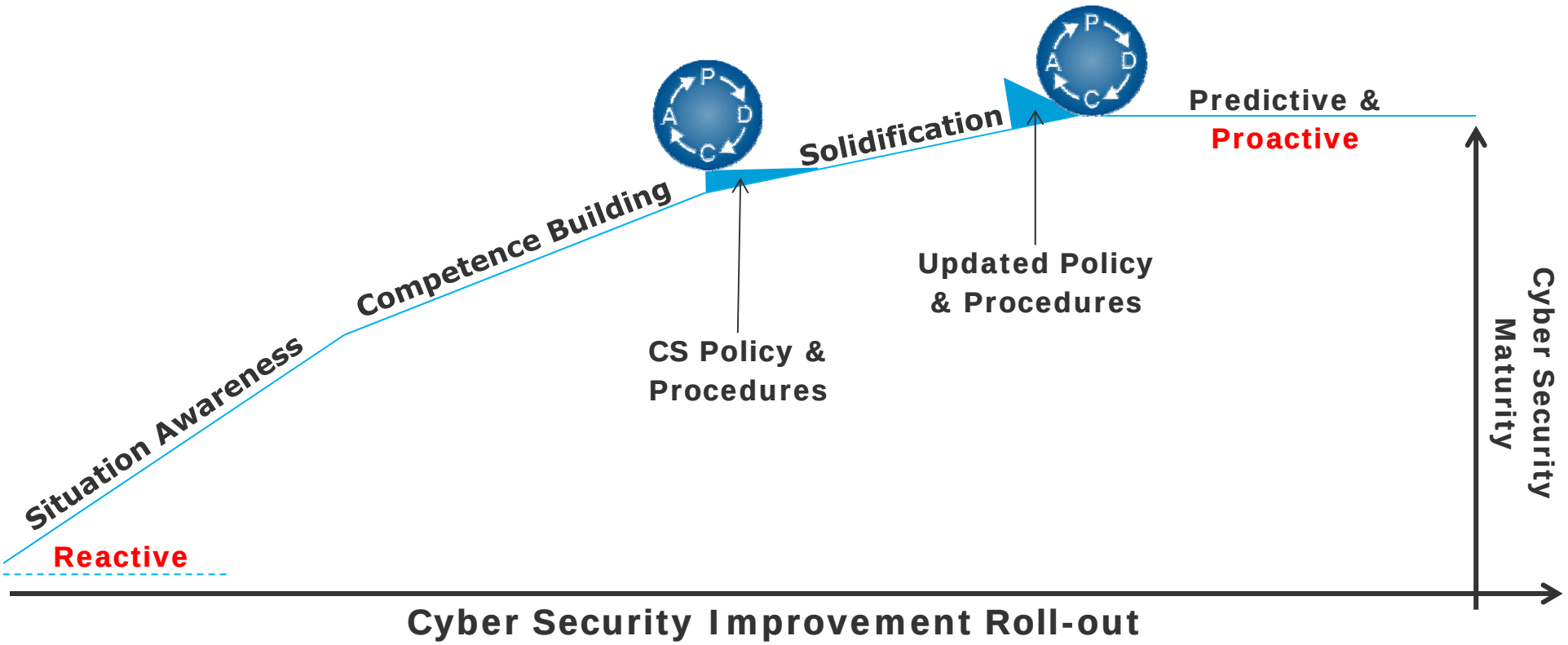
Focused assessment



Comprehensive, in depth assessment



Improvements



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Summary and Recommendations

Where to start?

Digital vulnerabilities in the Maritime sector

DNV GL assessment for Norwegian Authorities*/ Lysneutvalget , April 2015 *Ministry of Justice and Public Security

Top 10:

1) Lack of attention and training
2) Navigation Signals from a satellite is normally not protected against modification
3) Systems for identification of the vessel is normally not protected against modification
4) Remote Maintenance
5) A large number of parties are exchanging a lot of information on unsecured email
6) Separation of computer networks
7) Use of mobile storage devices
8) Booking systems and administration systems are vulnerable
9) Lack of physical security for server rooms, wiring closets, etc.
10) Limited user authentication against systems for public reporting

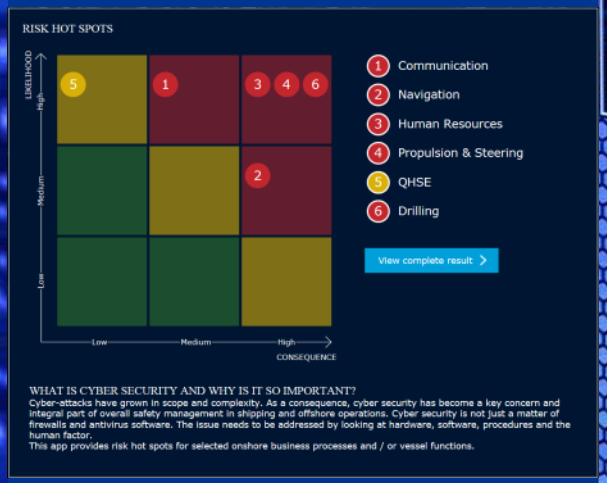
Participants:

Ship-owners, Authorities (Sjøfartsdirektorat, Kystverket), Interests Organizations (Ship-owners' Association, Norwegian port Association), Insurance (DNK), Supplier (Kongsberg Maritime), Lysneutvalget, DNV GL

CYBER SECURITY
DNV GL's Recommended Practice… and related services

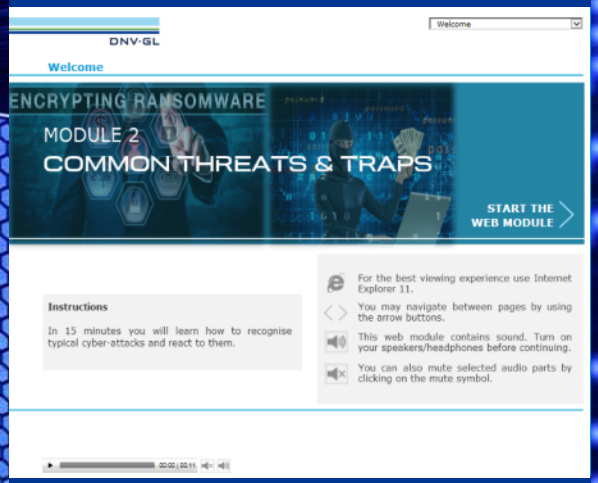
Assessment is key: Before spending money on a cyber security initiative, we recommend to carry out a structured and targeted assessment of the risk picture

ASSESSMENT



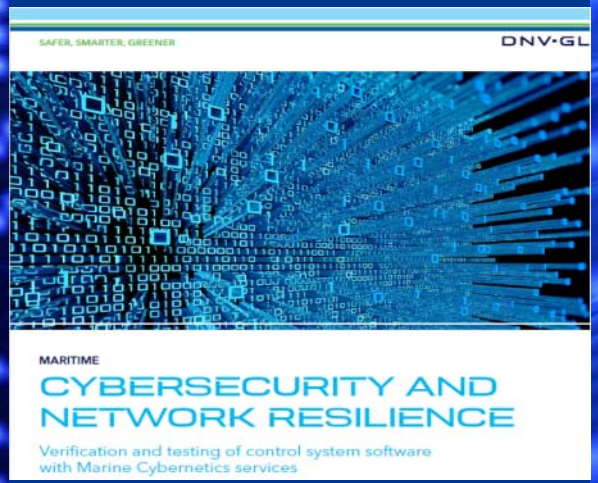
- **Self-assessment app in My DNV GL**
- **Cyber security assessment**

IMPROVEMENT



- **eLearnings**
- **Preparation for ISMS certification (27001)**
- **Consulting on cyber security enhancement**

VERIFICATION



- **Penetration testing**
- **ISO / IEC 27001**

Thank you for your attention !

Learn more, download the RP free of charge and get access to our Cyber Security services from:

www.dnvgl.com/cs

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