Challenges in Maritime and Supply Chains' Security

MITIGATE

1st NMIOTC CYBER SECURITY CONFERENCE

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…the evolution (2009-2018)….

- **S-Port (**national project**)** and E.C. project **CYSM**: Static Ports' RM methodology and tool (ISO27001, 27005, ISPS, CIIP)
- E.C. project **MEDUSA**: Static SC RM' methodology and tool (ISPS, CIIP, ISO28000)
- E.C. project **MITIGATE**: Dynamic evidence-driven Maritime SC RM environment (simulation, crowd-sourcing, open data) (ISO27001, 27005, ISPS, CIIP, ISO28000)
- E.C. project **FASTPASS** on Automated Board Control systems

The Policy / Legislation Challenge

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- **IMO: MARPOL** for the *sea protection;* **SOLAS** for the *safety* of the ships, passengers and cargo and the **ISPS** (formulated in 2004) address the organisational aspect of security.
- WCO SAFE Framework of standards (2015) to Secure and Facilitate Global Trade
- **USA**, 2016 House of Representatives H.R. 3878, "Strengthening Cybersecurity Information Sharing and Coordination in Our Ports Act of 2015"

- CIIP Directive (2012) Critical information infrastructure protection: towards global cyber-security
- The Cybersecurity Strategy for the European Union (2013) and the European Agenda on Security (2015) provide the overall strategic framework for the EU initiatives on cybersecurity and cybercrime.
- eIDAS Regulation (2014) on electronic identification and trust services for electronic transactions in the internal market
- European Parliament 2015 concerning measures to ensure a high common level of network and information security across the Union
- NIS Directive 2016 applies only to those public administrations which are identified as operators of essential services
- cPPP Initiative 2015 ensures that Europe will have a dynamic, efficient and effective market in cybersecurity products and services.
- Enhanced Privacy Directive, 2016 Mandatory reporting of security breaches

PLETHORA OF STANDARDS

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- ISO/IEC 27001:2005 / ISO/IEC 27001:2013 (building a SM system)
- ISO/IEC 27005:2011 guidelines for information security risk management
- NIST SP 800-128, 2011 Guide for Security-Focused Configuration Management of Information Systems
- ISO 31000:2009 - Principles and Guidelines on Implementation
- ISO/IEC 31010:2009 - Risk Management - Risk Assessment Techniques
- ISO/IEC 27002:2005 (best practice recommendations)
- AS/NZS 4360:2004 (Australian/New Zeland standard for RM)

The above standards are supported by a variety of methodologies (see ENISA repository)

- ISO 28000:2007 ISO 28001:2007, ISO 28003:2007, ISO 28004:2007 for supply chain security

- IMO 2016 cyber security guidelines for maritime companies and ships

THE SECURITY AWARENESS CHALLENGE

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- We have enough security standards/policies/regulations, we need targeted Market-driven **"easy to use" risk assessment tools** for maritime operators assessing and mitigating their physical/cyber risks. **Insurance companies** and auditors may require risk assessment and mitigation of cyber risks in their insurance policies.
- **Collaboration** among maritime and security regulators standardization bodies and associations (IMO, NATO, EMSA, IPCA, EPCSA, ENISA, DGMARE, DGMOVE, DGCONNECT etc.)
- **Enhanced academic programs** in the maritime academies and universities
- **Open IMO/NATO/EMSA cyber/physical exercises** targeted to the commercial maritime sector (ports, maritime companies, ships, industry etc).

THE RISK ASSESMENT CHALLENGE FOR PORTS' CIS

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Holistic Risk Assessment

CYSM

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THE RISK ASSESMENT CHALLENGE FOR MARITIME SUPPLY CHAINS

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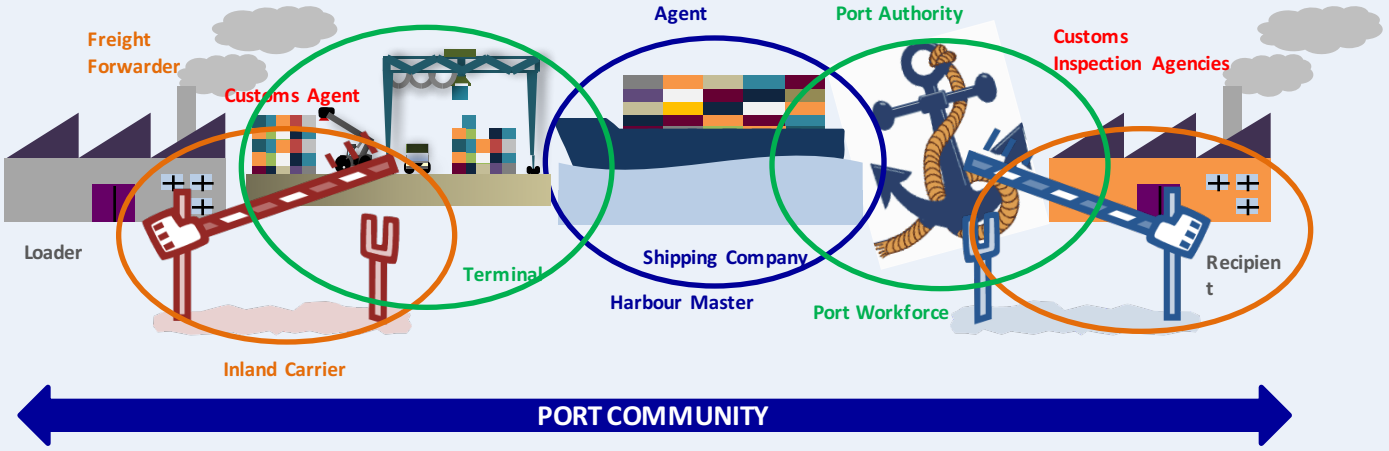
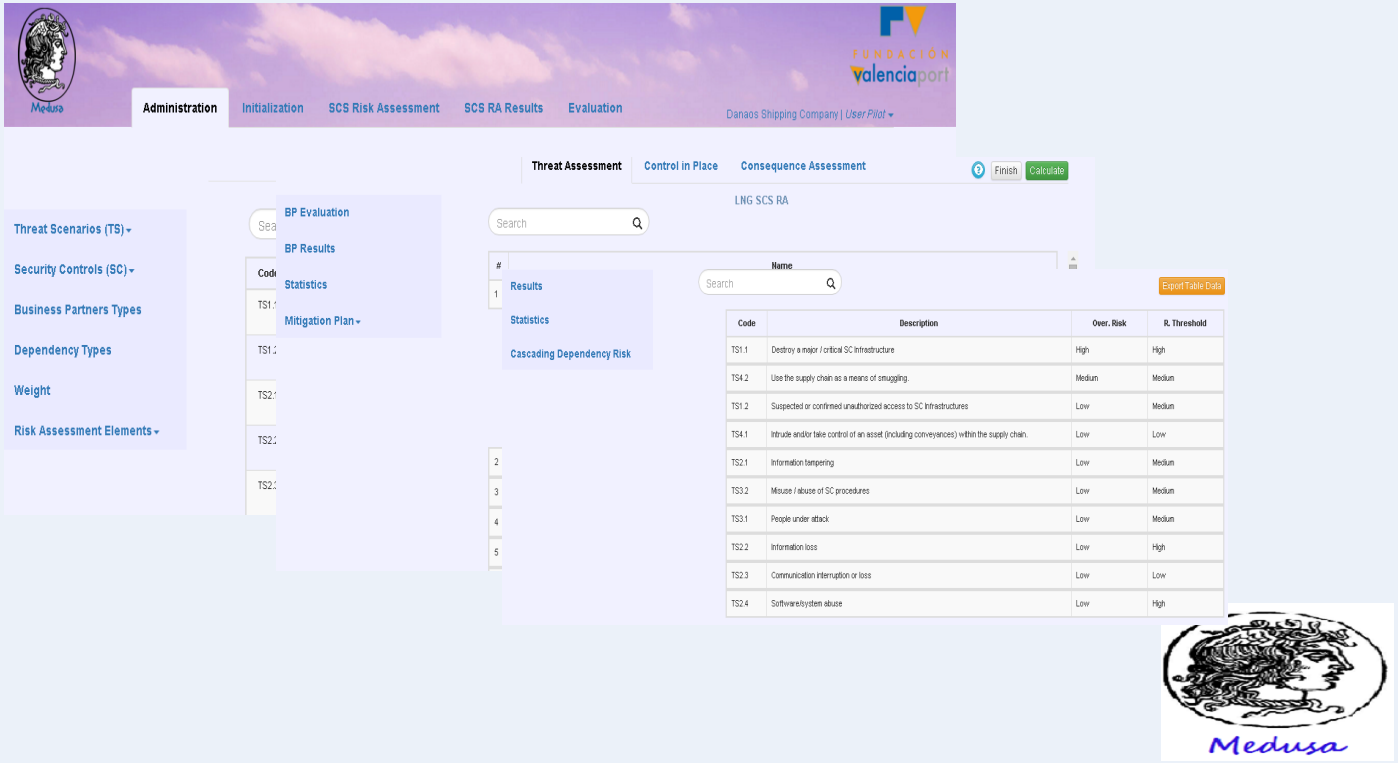


MEDUSA

MITIGATE



THE RISK ASSESMENT CHALLENGE FOR MARITIME SUPPLY CHAINS' INTERCONNECTED CYBER ASSETS

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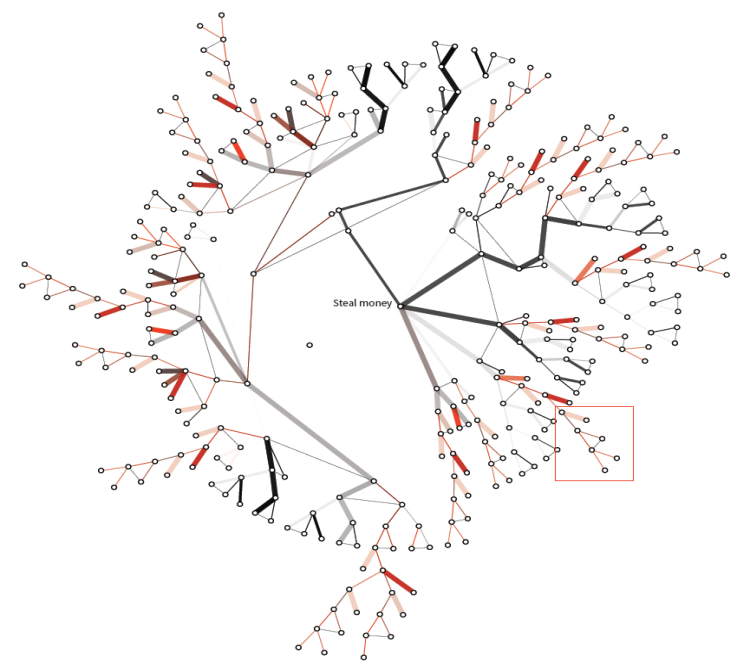

MITIGATE PROJECT

- **MITIGATE methodology** for assessing the complex, propagated risks of the interconnected supply chains' cyber assets
- MITIGATE dynamic, risk assessment **tool**
- MITIGATE forecasting, simulation, crowed sourcing and risk assessment **services** utilizing open security data

www.mitigateproject.eu

THE CHALLENGE OF PHYSICAL-CYBER MARITIME RISKS

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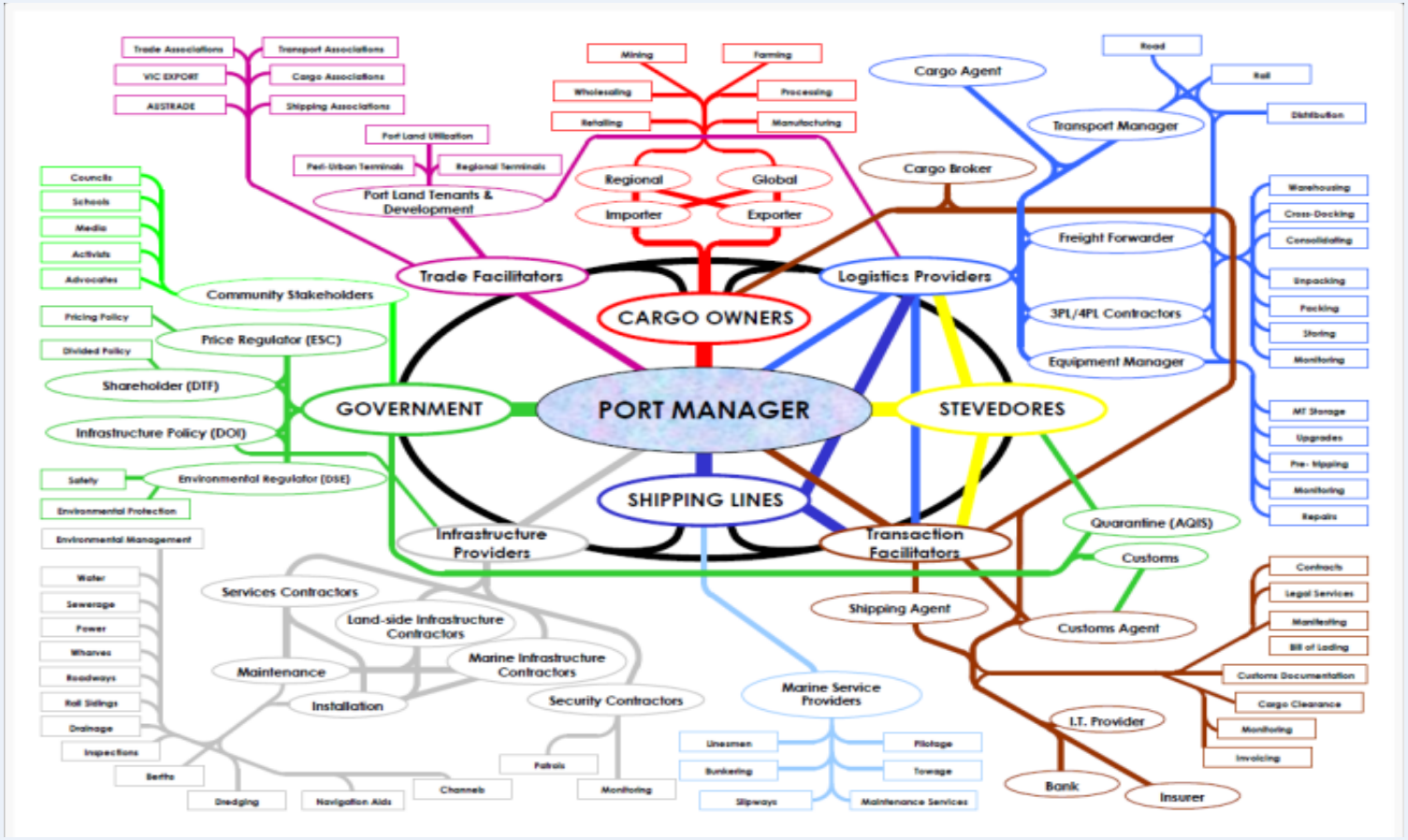

MARITIME COMPUTER INCIDENT RESPONSE CENTERS

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The national or European CERTs do not guide maritime operators on how to manage security incidents. A trusted body need to undertake this role in order to:

- thoroughly assess the vulnerabilities
- forecast and evaluate the probability of hybrid attacks;
- access/receive warnings for upcoming attacks and vulnerabilities;
- recreate, visualize and forecast propagation/ cascading effects;
- provide guidance on investigating and handling complex, interrelated physical/cyber maritime security incidents;
- combine and analyze all security incident
- receive guidelines, share information and warnings

AUTOMATED BORDER CONTROL SYSTEMS (ABCS)

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The FRONTEX requirements (FRONTEX, 2012) for the ABC systems need to be enhanced in order to address the remaining challenges:

- **Mobility**
- **Interoperability**
- **Multimodality-Interconnection**
  - Indoor ABC gates
  - Mobile ABC gates
  - ABC portable devices held by the patrol controllers
  - Large ABC gates for vehicle
  - ABC systems for cargo

The E.C. **FastPass project** is considering the above needs

FastPass

MARITIME SOFTWARE CODE AUDITING

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- **Innovative maritime source code auditing tools are required in order to find security flaws** (e.g. authentication, access control, cryptography problems).
- **Maritime software** (for ship management, marine navigation, shipping ERPs,..) need to be audited by certification bodies
- **Port Community Systems** / National Single Windows security is treated as a "**black box**".

COST IS A CHALLENGE

- **Accountability needs to complement Security**. Commercial maritime CIs (ports, companies etc) can not afford to become military camps. Security needs to be viewed as a shared responsibility.

(e.g. If a navigation system is vulnerable to interruption, the provider is responsible for the mitigation of its vulnerabilities and not the maritime company or the port authority)

Accountability technologies, **enhanced SLAs** and **insurance policies** are proposed measures.

- **Security & Privacy as Cloud Services** hosted and operated by a trusted party (e.g. IMO, EMSA, NATO) will minimize the security costs of the commercial maritime entities

CONCLUSIONS

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Thank You

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