

Academic

Research

Services

Innovation

Excellence



Laboratory for Maritime Transport, NTUA



General Description

Laboratory for Maritime Transport

- **Faculty** Assoc.Prof. Dimitrios V. Lyridis, Head
Assoc.Prof. Nikolaos P. Ventikos
- **1 Special Research & Teaching Staff**
- **10 Ph.D. Students**
- **~7 Research Staff**
- **1 Administrative Staff**



RESOURCES

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LMT

Laboratory for Maritime Transport

- **8 Undergraduate Courses**
- **3 Graduate Courses**
- **Up to this Day:**
 - **7 Ph.D. Theses**
 - **> 200 Diploma Theses**
 - **> 60 projects (EU, GR, International)**
 - **> 12 M. euros handled**
 - **> 8 M. euros for LMT**



RESOURCES

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Indicative Research Areas

- *Shipping Economics*
- *Shipping Finance*
- *Shipping Management*
- *Transport Logistics*
- *Transport Systems Optimisation*
- *Fleet Deployment*
- *Port Management*
- *Operations Research*
- *Sustainability Analysis*
- *Energy*
- *Environmental Analysis*
- *Oil Pollution*
- *Ship and Port Safety*
- *Marine Accident Analysis*
- *Risk Engineering*
- *Maritime Security*
- *Human Factor & Training*
- *Maritime Policy*
- *Maritime Clusters*



Research

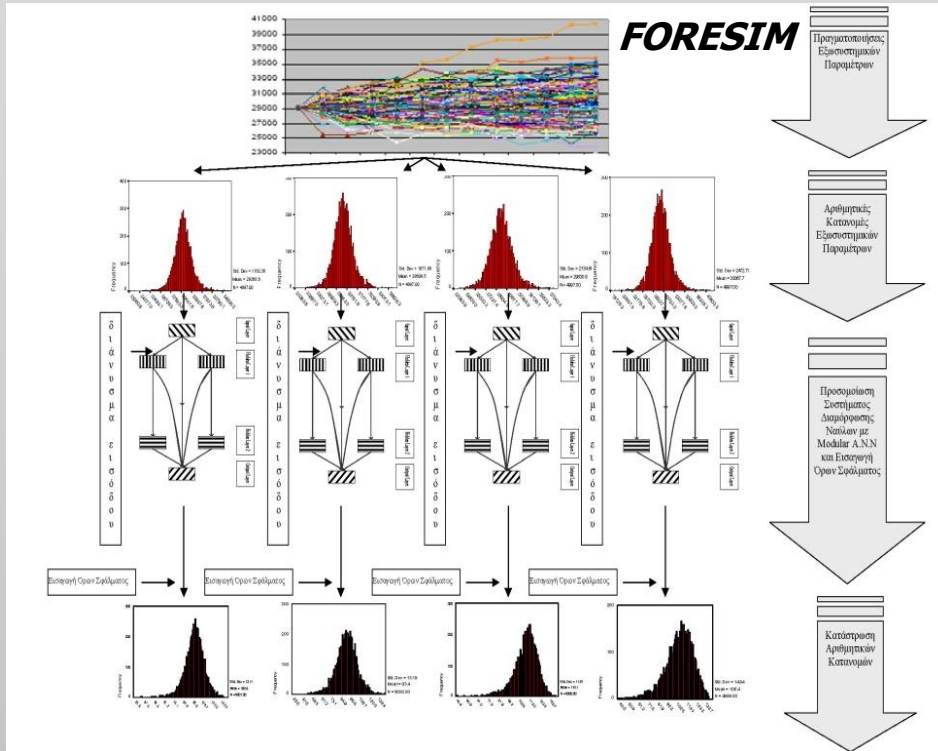


LMT

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Economic Models



Εξωσυστημικοί Παράγοντες:

- Επίπεδο παγκόσμιας οικονομίας και ανάπτυξης
- Γεωπολιτικά γεγονότα.
- Στρατιωτικά γεγονότα.
- Αποθέματα καυσίμων ή λοιπών αγαθών.
- Κλιματολογικές συνθήκες
- Εκμετάλλευση νέων κοιτασμάτων πετρελαίου
- Τιμές Προϊόντων - Arbitrage

Παραγωγή:

- Πετρελαίου
- Σιδήρου
- Σιτηρών κτλ

Ζήτηση Θαλάσσιας Μεταφορικής Υπηρεσίας

Κατάσταση Ναυλαγοράς:

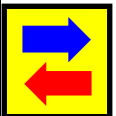
- Επίπεδα ναύλου
- Προσφορά Μεταφορικής Ικανότητας
- Παραπλοισμένα πλοία
- Υπολιειτουργικά πλοία
- Διαλύσεις πλοίων
- Πλοία Μεικτού φορτίου
- Απώλειες Πλοίων
- Παραδόσεις Πλοίων
- Δελτίο Παραγγελίας
- Συμβόλαια μεταφοράς
- Τιμές νεότευκτων πλοίων
- Τιμές μεταχειρισμένων πλοίων
- Τιμές διαλύσεων πλοίων

Μοντέλο Γένεσης Ναύλων

Επίπεδα Ναύλων

ΕΟΙΚΟΝΟΜΙΑΣ

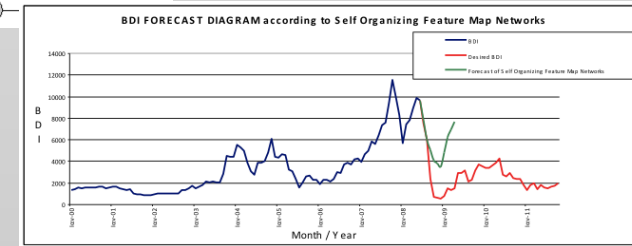
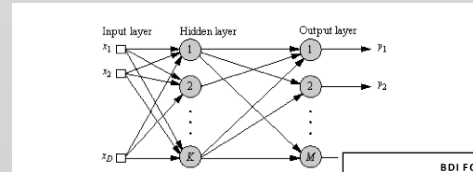
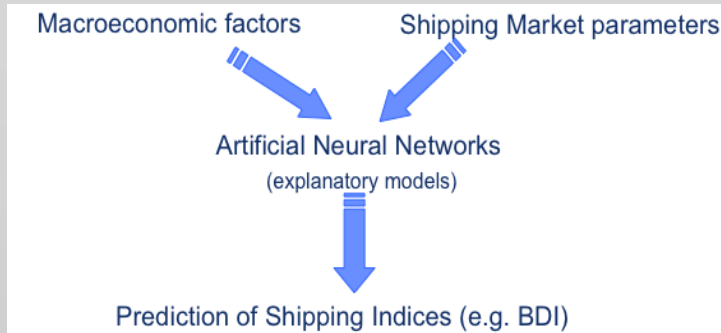
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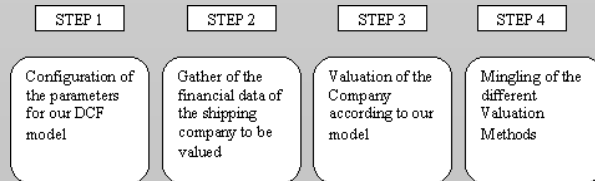
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Economics & Finance

Modelling Shipping Indices Using Artificial Neural Networks



Enhanced Valuation Models

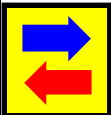


Mingling of Valuation methods



ECONOMICS

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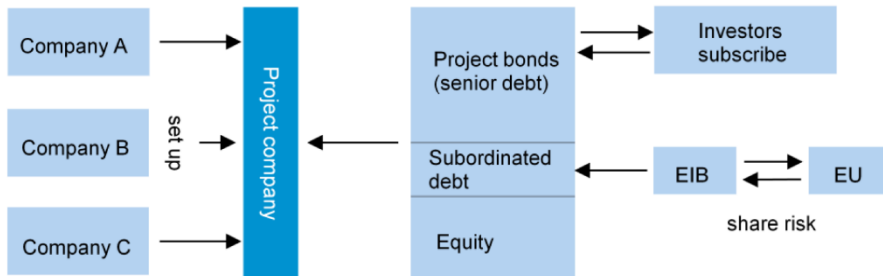
Economics & Finance

Study of innovative financing schemes and tools for shipping companies and port infrastructure projects

Syndicated Investment - Negotiation of Terms

- Equity (Ports, Municipalities, etc.)
- Private Equity companies
- Investment & Development Banks
- European Union

Project Bond Initiative



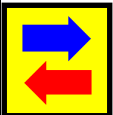
Sources: European Commission, EIB, DB Research schematic interpretation

Blockchain ICOs & crowdfunding applications



ECONOMICS

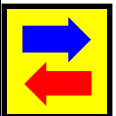
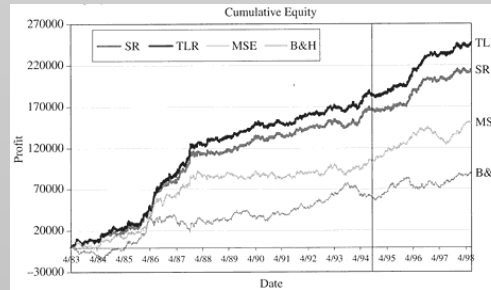
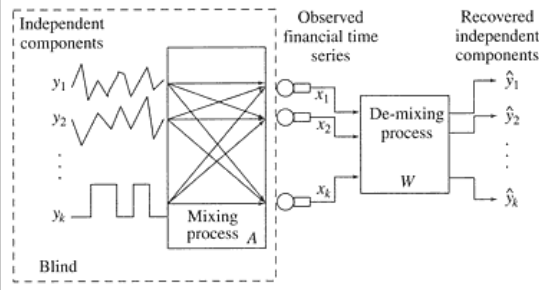
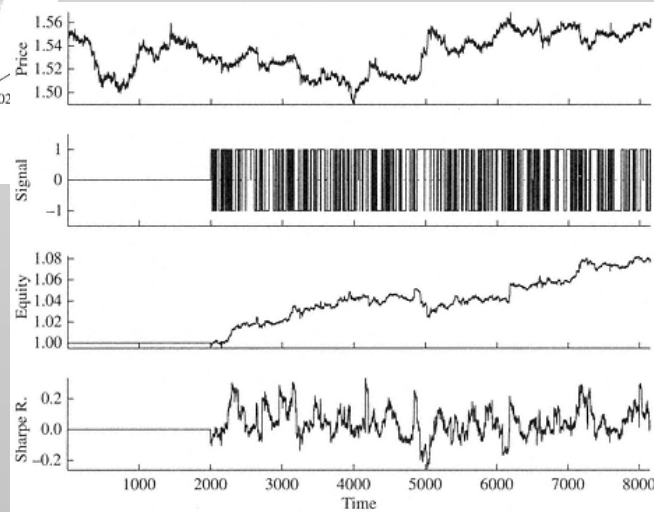
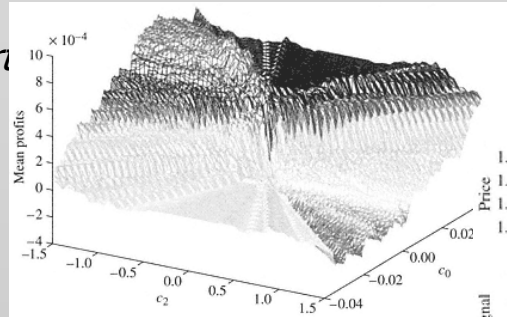
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Financial Engineering & Statistical Arbitrage

- *Statistical behavior of Total Returns of listed equities*
- *Trading algorithms via diversified long/short portfolios*
- *Algorithm utilizing Mixed Integer Linear Programming*
- *Kelly criterion risk management rule*
- *Pairs trading based on statistical clustering method with heuristics trading rules*
- *Neural network based time series prediction*



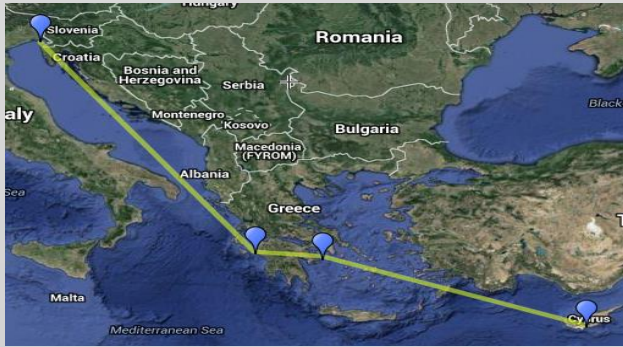
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Finance

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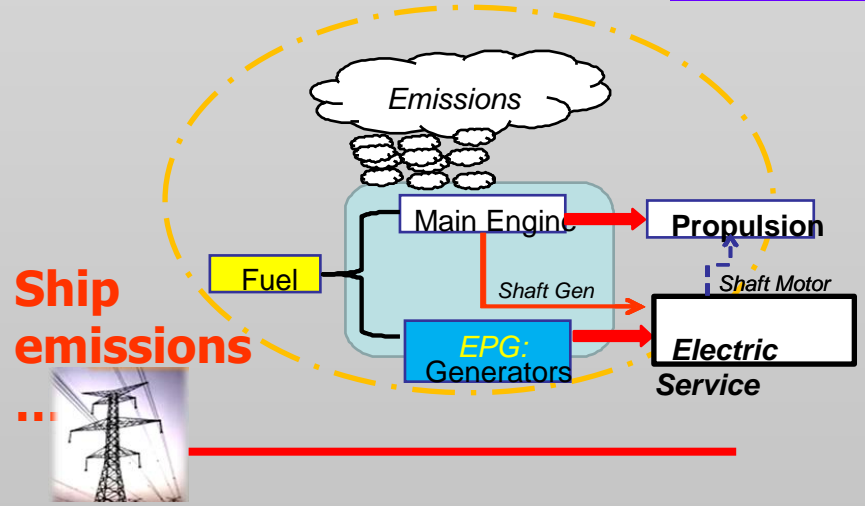
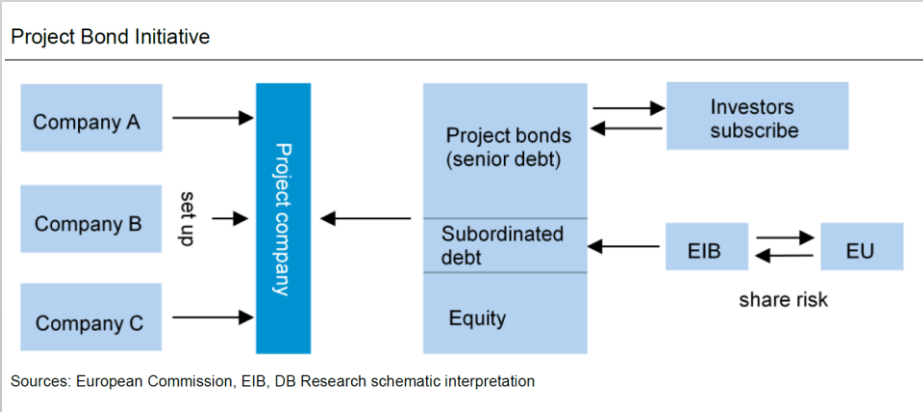


Regional Development



Installing OnShore Power Supply in the East Med Corridor

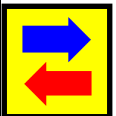
Innovative Financing Tools for Infrastructure Investment



NTUA



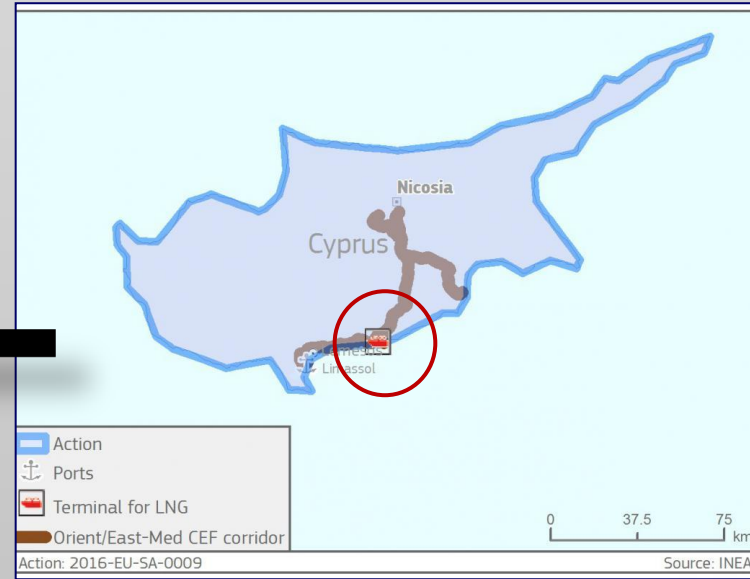
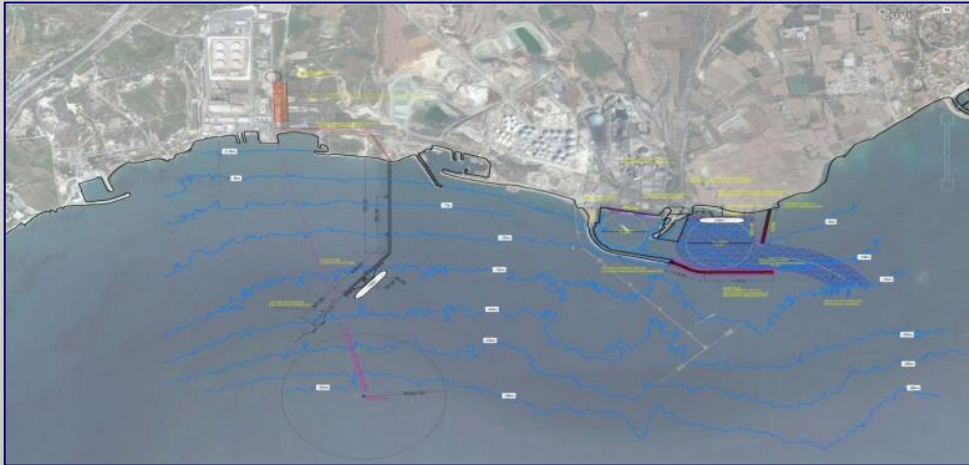
Investment Advice



LMT

Regional Development

A holistic approach for the development of Natural Gas network in Cyprus. Studies for the licensing, acquisition and financing of an FSRU for electric power generation.



Investment Advice

NTUA



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Regional Development

- Feasibility Study for the deployment of an FSRU at Ag. Theodoroi, Greece by private investor.
- The project supports the Energy Sustainability and the Emissions Reduction targets, through larger use of LNG for power & Renewables.
- The project supports the European Union strategy for Diversification of supply sources and routes and adds to the European energy security and integration.



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Investment Advice



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Regional Development

Scientific Support to the Regulatory Authority for Energy



Design and economic evaluation of the technical solutions and infrastructure for the natural gas supply to the islands of N. Aegean.



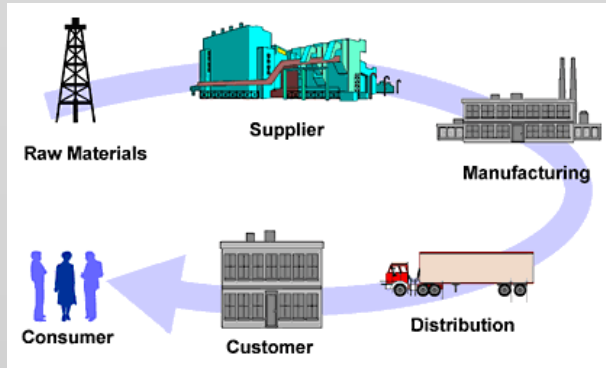
Scientific Support

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Supply Chain Optimization & Planning

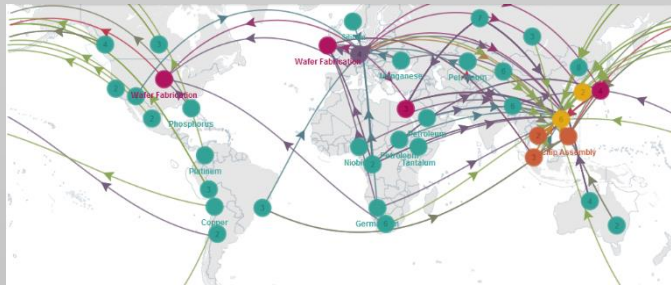


What (volume) to produce?

Where to produce?

Where to distribute?

Which transport modes to use?

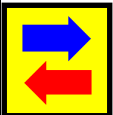


Operations Research for Optimum:

- Network Design
- Fleet Deployment
- Production plan
- Distribution plan

Supply Chain

NTUA



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LNG Supply Chain

- Strategic and tactical planning of the stakeholders of the LNG supply chain.
- Optimisation and Simulation Methods.
- Real-life Case Studies. Exploitation of the results for future investment on LNG vessels, charter rate quotes, and/or redeployment of existing fleet.
- Quantifying future fleet costs, both for the ship-owner/manager and the charterer, is an alternative approach, which may contribute to the independent planning of each stakeholder.

Data Insertion

Preliminary Calculations

Optimization Processing

Assignment & Scheduling

**Results Display to
GUI**

Supply Chain

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Intermodal Logistics

- Achieve a coordinated approach in the development of intermodal transport in the Adriatic-Ionian region.
- Equalize the condition of transport infrastructure in the Region
- Equalize and raise the level of service reliability in the ports
- Research in order to produce solutions to all bottlenecks, both on national or regional level.



Supply Chain



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Green Maritime Logistics

Green Maritime & Ship Logistics Leanwind Project

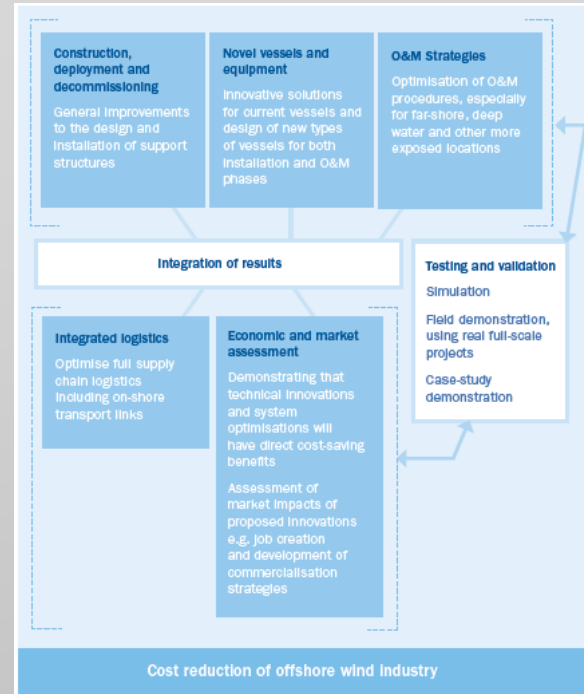


Optimization of logistics in wind farms for reducing the cost of energy.



Selection of design parameters for a novel vessel optimizing the wind farm supply chain

Logistics & green energy



Design a more effective way for logistics in wind farms could decrease the cost of renewable energy



- Reduction in fossil fuel consumption
- Cleaner environment

Lean Logistics



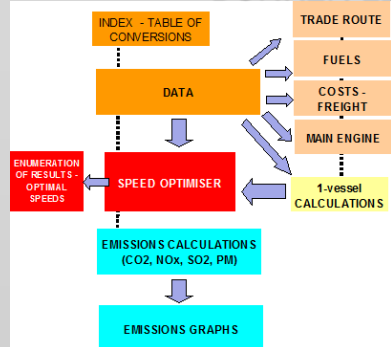
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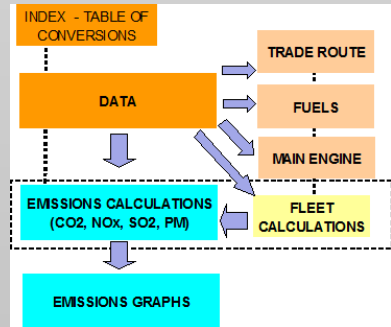


Ship Air Emissions

MODELLING THE OPERATIONAL EFFECT OF A BUNKER LEVY

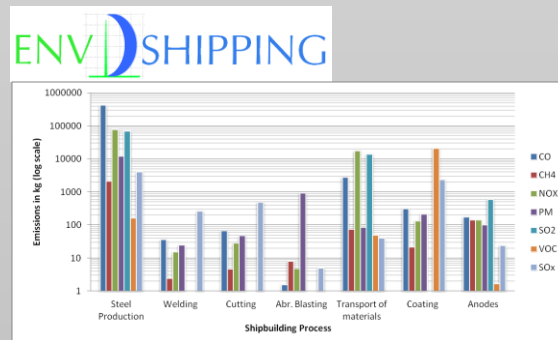
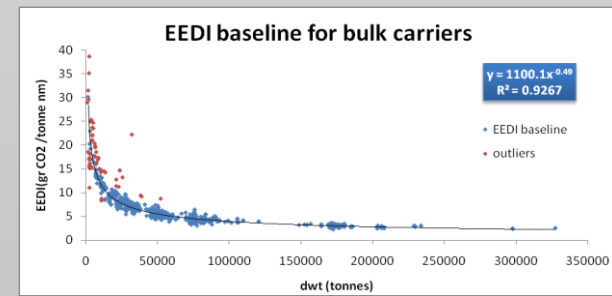
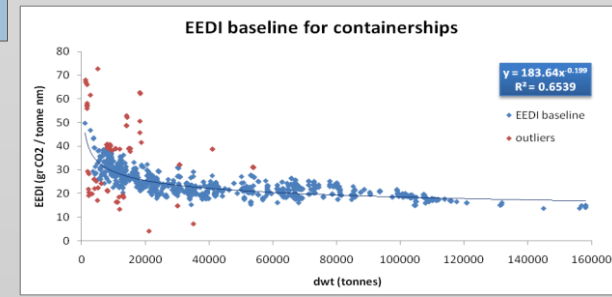
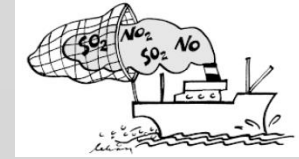
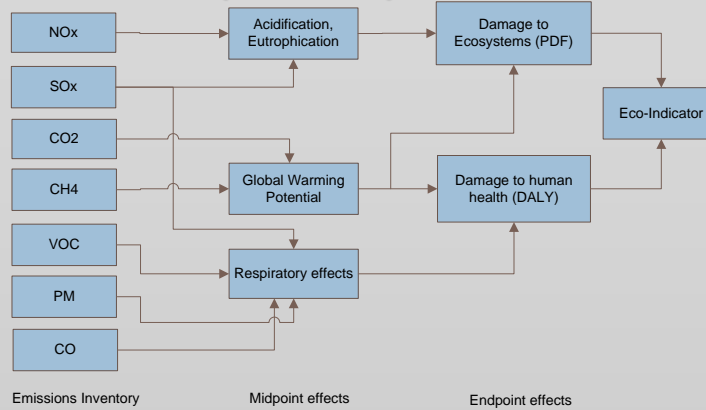


Speed optimisation tool



Fleet segment calculator

Ship Life Cycle Impact



IMO discussion on energy efficiency

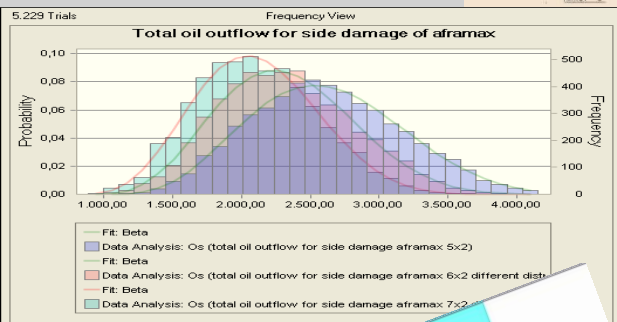
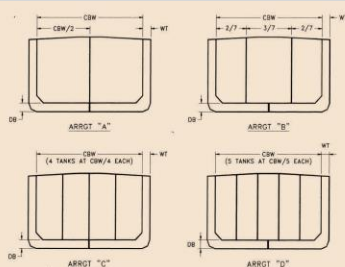
Environment

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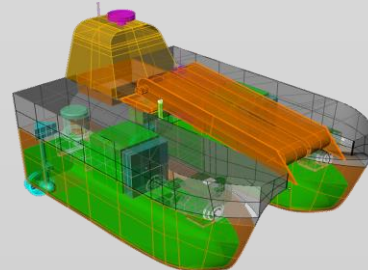
Probabilistic oil outflow from tankers

Midship sections for tankers



Overlay of computed oil outflows (in m³) from collision of Aframax tankers

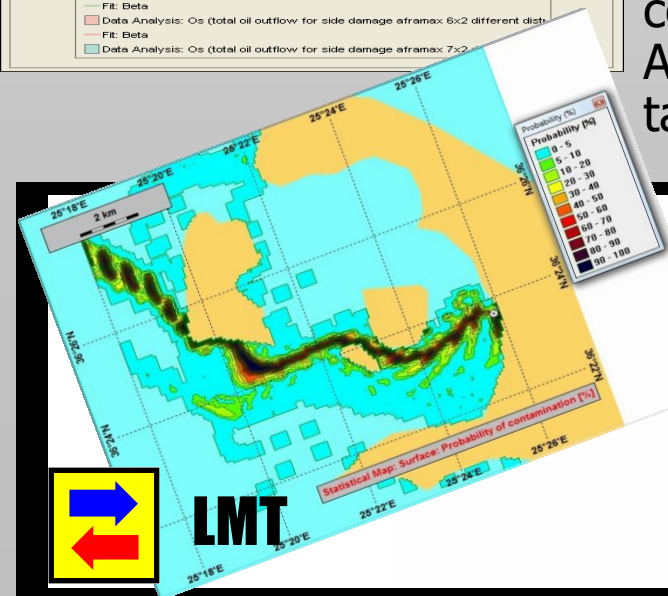
Innovative clean up vessels



EU-MOP:
an autonomous clean up unit



Oil Sea Harvester: An oil clean up vessel

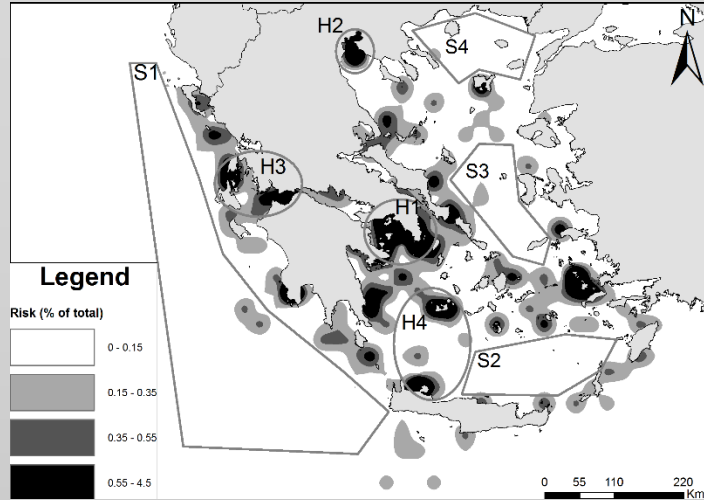


OIL SPILLS

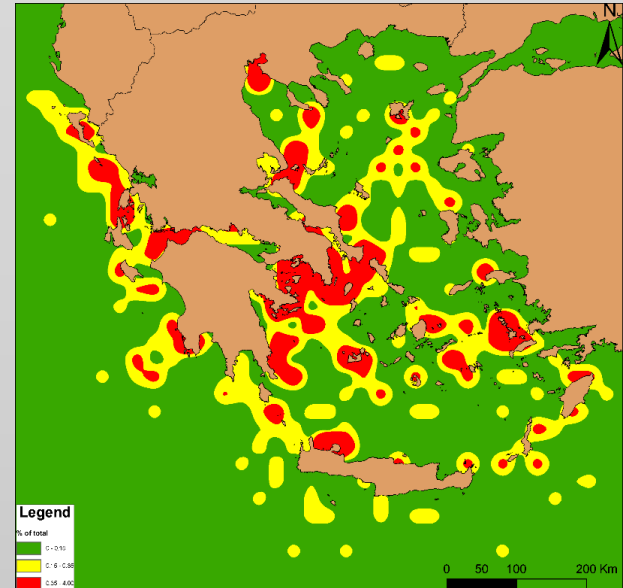
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Environmental Impact of Accidents



Risk Concentration
Hot – Safe Areas



Danger of oil release from
shipwrecks

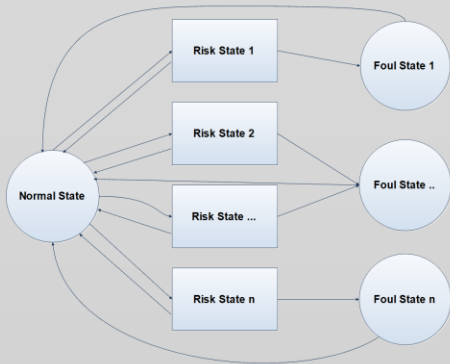
Marine Accidents

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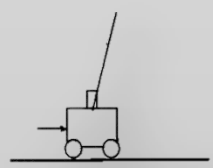


LMT

Risk Engineering in Maritime Transport



Risk theory, analysis, assessment, management



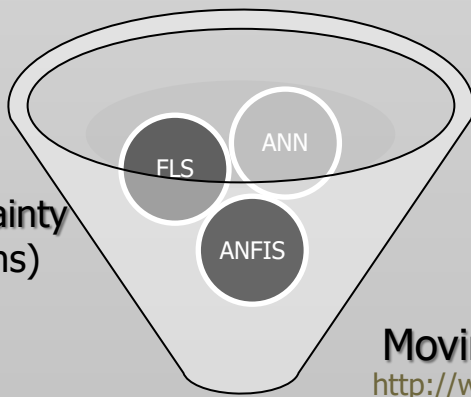
Sea Traffic Management

European Maritime Simulator Network will run a large number of tests and exchange routes



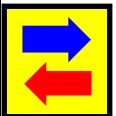
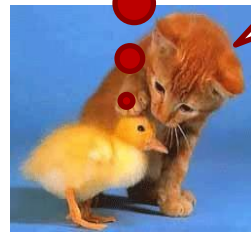
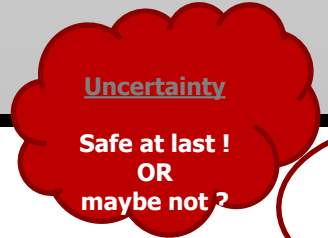
Improving Safety

Search and Rescue Courses and training programs for seafarers and shipping staff



Advanced techniques – uncertainty analysis (e.g. for STS operations)

Moving shipping into a digital era – MONALISA 2.0
http://www.youtube.com/watch?feature=player_embedded&v=ITPqzlhOBJU

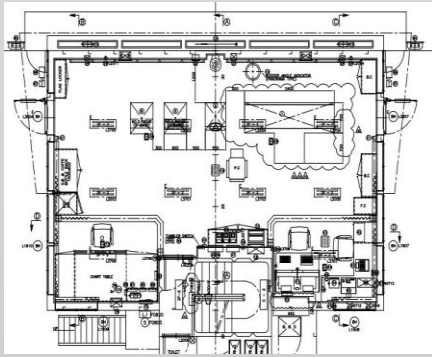


safety

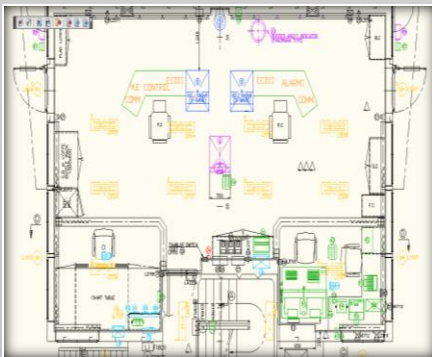


Human Centered Design for Ships

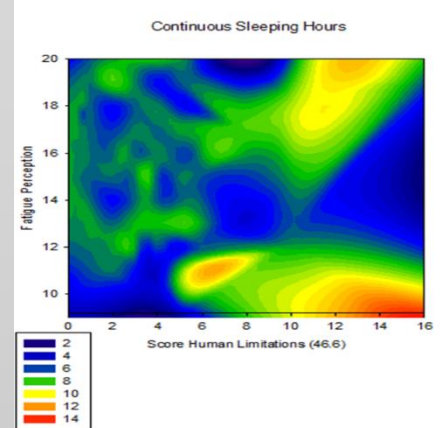
Human Element and Total Safety



Conventional bridge layout

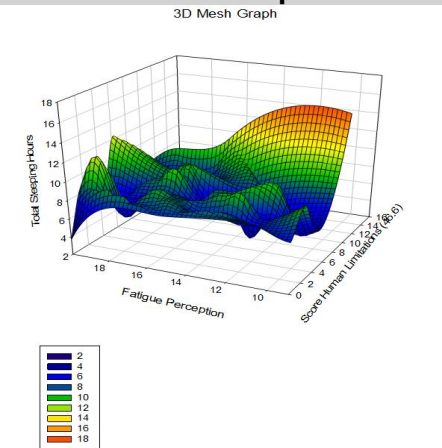


Redesign of the bridge layout according to HCD principles



Human limitations and fatigue perception against uninterrupted hours of sleep

Human limitations and fatigue perception against total hours of sleep



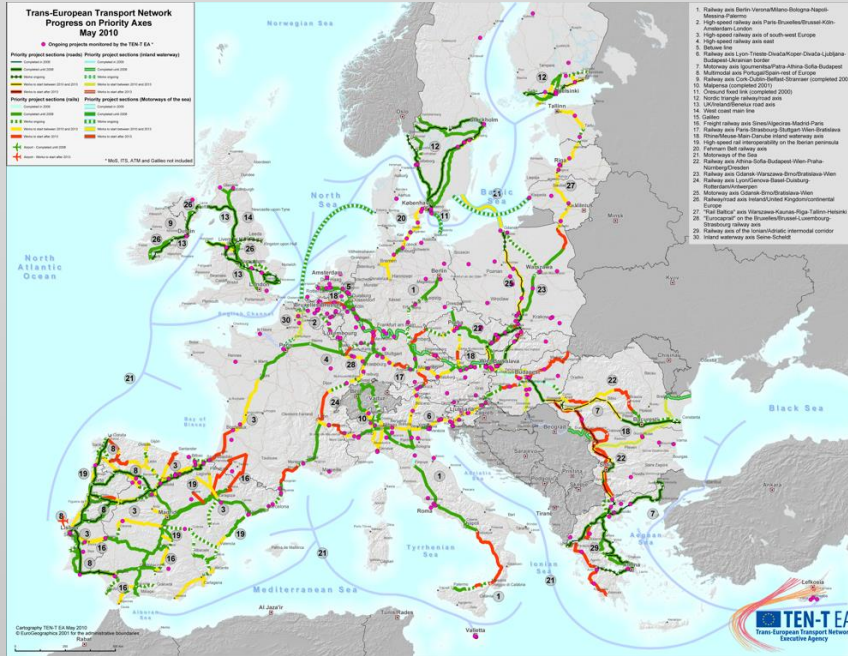
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HUMAN FACTOR

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Training in Motorways of the Sea



**Stakeholders,
Target Groups**

**EU
Universities
/ Training
Centers**



**Knowledge
Base / Library**

**Electronic
Training
Platform**



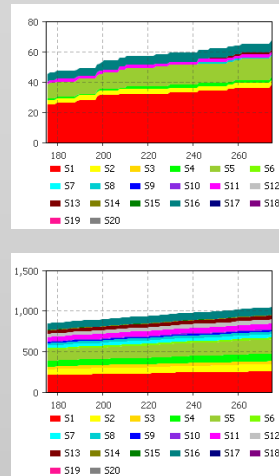
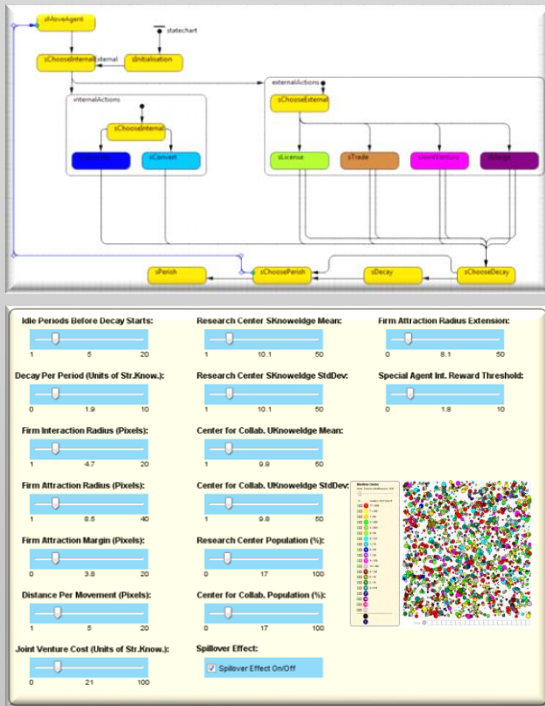
Training

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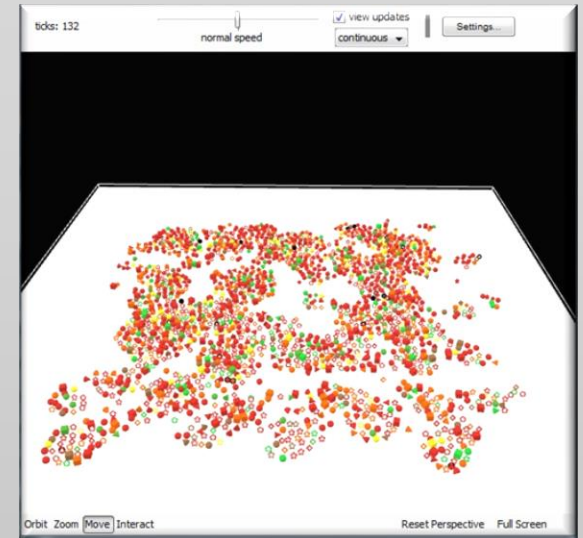


Networks & Industrial Clusters

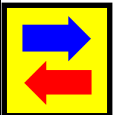
Modeling the Maritime Cluster



Cluster Metrics and Market Response to Policy



Agent Based Simulation



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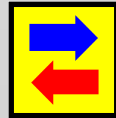
POLICY

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And Much More!!!

We will be happy to explain!



Laboratory for Maritime Transport

www.martrans.org

9 Iroon Polytechniou st.
15773 Zografou
+30 210 7721410
+30 210 7721115

Assoc. Prof. D. V. Lyridis, Director
dsvlr@mail.ntua.gr

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