Innovations for Maritime Security

Jeronimo Dzaack

... a sound decision

ATLAS ELEKTRONIK
A joint company of ThyssenKrupp and Airbus DS

ATLAS ELEKTRONIK
... a sound decision

Submarines

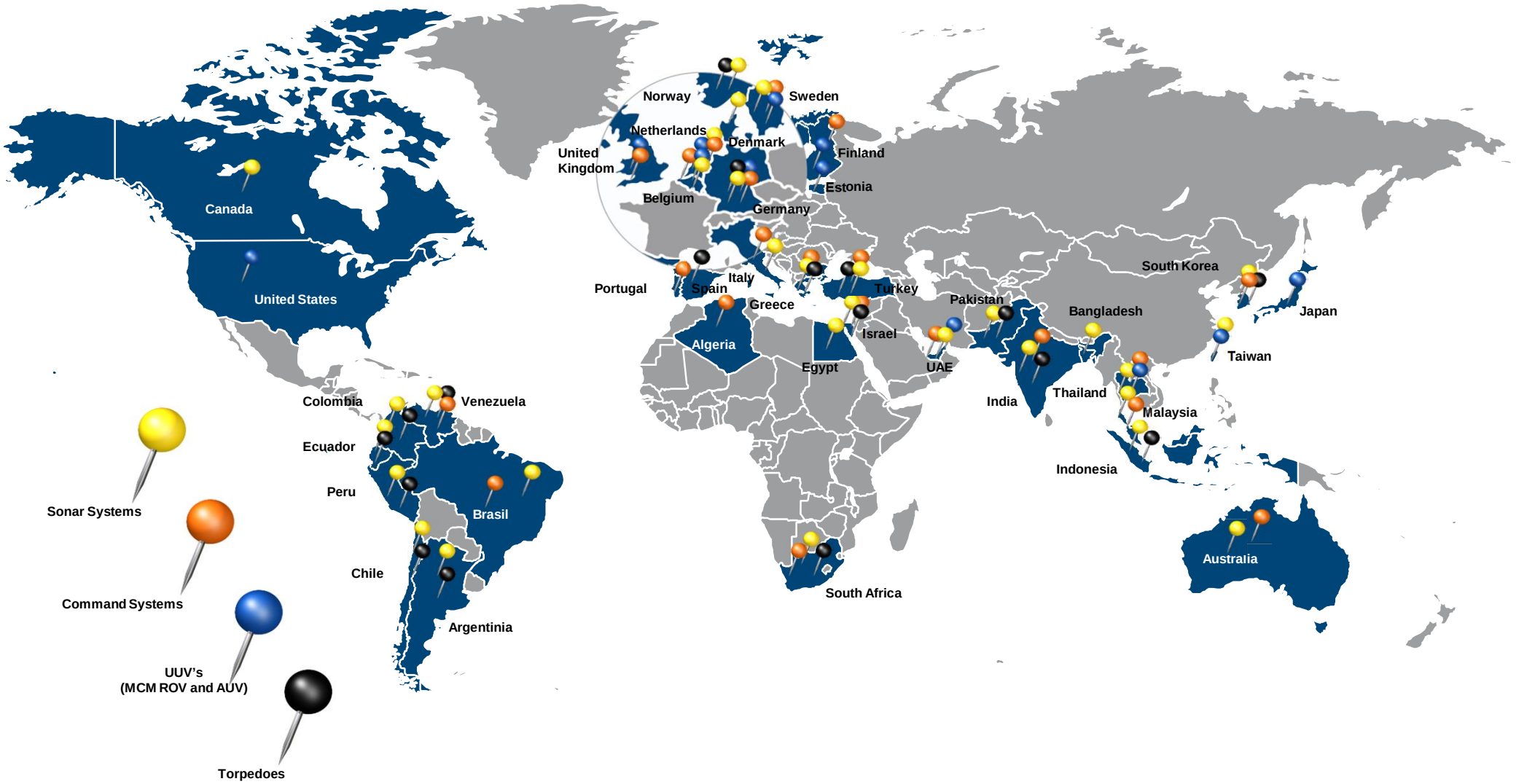
Surface Vessels

Maritime Security

Torpedos

Unmanned Vehicles

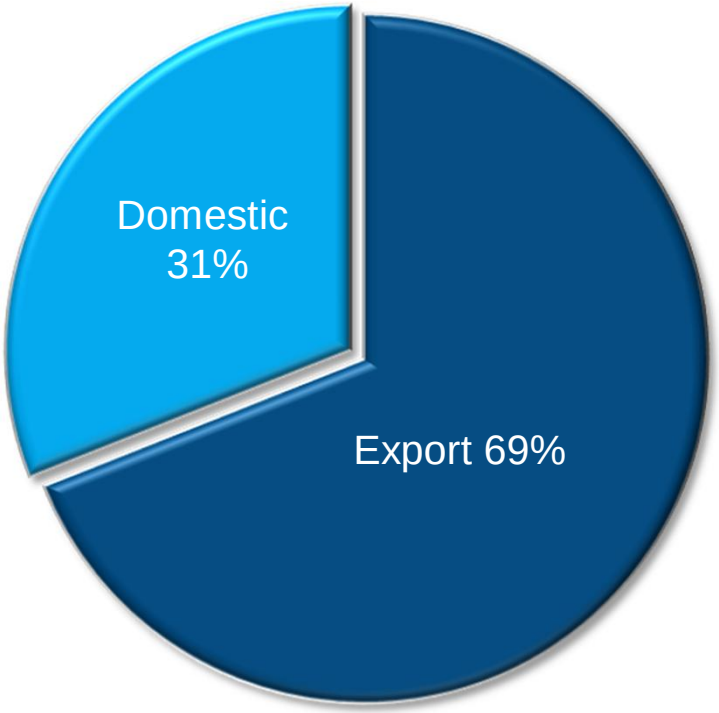
A world-wide Customer Base



ATLAS ELEKTRONIK
A joint company of ThyssenKrupp and Airbus DS

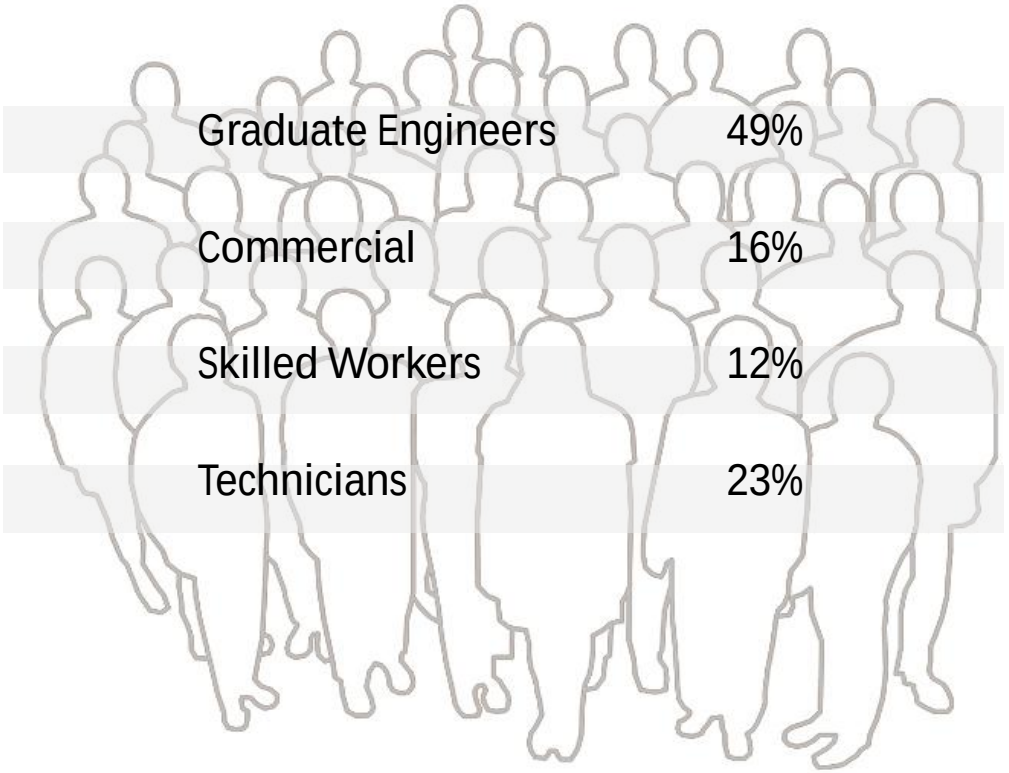
Turnover and Employees (ATLAS group)

Sales of the Company: 440 Mio. €



1970 employees worldwide

approx. 1300 in Bremen (approx. 1600 in Germany)



Locations in Germany

Hagenuk Marinekommunikation
A company of the ATLAS ELEKTRONIK Group

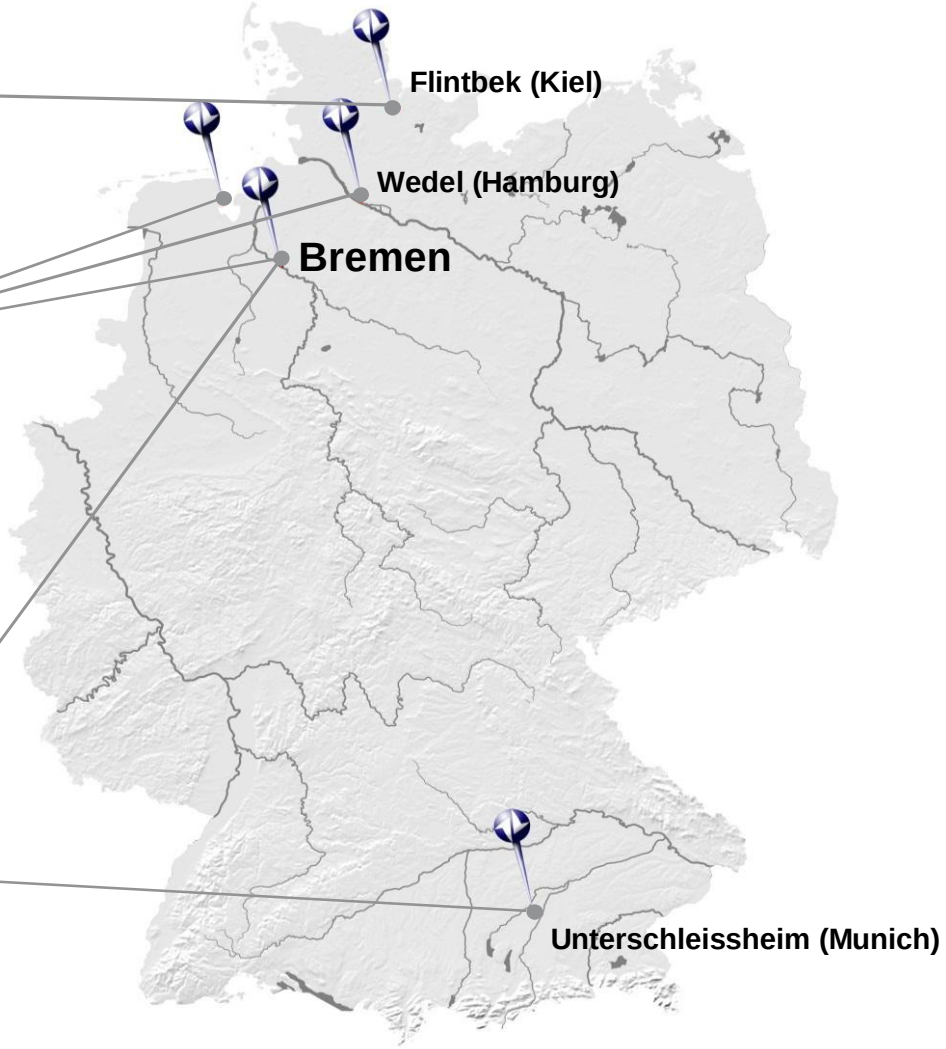
Flintbek

ATLAS ELEKTRONIK
A joint company of ThyssenKrupp and EADS

Bremen (Headquarter), Wedel, Wilhelmshaven

SIGNALIS
A CASSIDIAN and ATLAS ELEKTRONIK company

Bremen; Unterschleissheim



Subsidiary

Holding

ATLAS ELEKTRONIK
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Locations world-wide

ATLAS ELEKTRONIK UK
A company of the ATLAS ELEKTRONIK Group
United Kingdom: Winfrith; Newport

ANEC KOREA
A company of the ATLAS ELEKTRONIK Group
Korea: Chungbu-Dong

ATLAS ELEKTRONIK INDIA
A company of the ATLAS ELEKTRONIK Group
India: New Delhi

ATLAS ELEKTRONIK CANADA
A company of the ATLAS ELEKTRONIK Group
Canada: Victoria BC

ATLAS NORTH AMERICA
A company of the ATLAS ELEKTRONIK Group
USA: Norfolk, Virginia

ATLAS MARIDAN
A company of the ATLAS ELEKTRONIK Group
Denmark: Hørsholm

ATLAS ELEKTRONIK FINLAND
A company of the ATLAS ELEKTRONIK Group
Finland: Helsinki

SONARTECH ATLAS
A company of the ATLAS ELEKTRONIK Group
Australia: Macquarie Park

ATLAS ELEKTRONIK UAE
A company of the ATLAS ELEKTRONIK Group
UAE: Abu Dhabi

CybiCOM ATLAS Defence (Pty) Ltd
South Africa: Simon's Town

ATLAS Naval Support Centre Ltd
Thailand: Bangkok

Advanced Lithium Systems Europe
Defence Applications S.A.
Greece: Athen

Subsidiary

Holding

Agenda

Innovation

Definition, Assumptions, Scenarios, R&D

Maritime Security

Key Interests, Challenges

Innovations at ATLAS Elektronik

Diver Detection, AUVs, User Interfaces

Conclusion

Future Scenario

Innovation

„to renew or change“

©Apple

Why innovations at ATLAS ELEKTRONIK?

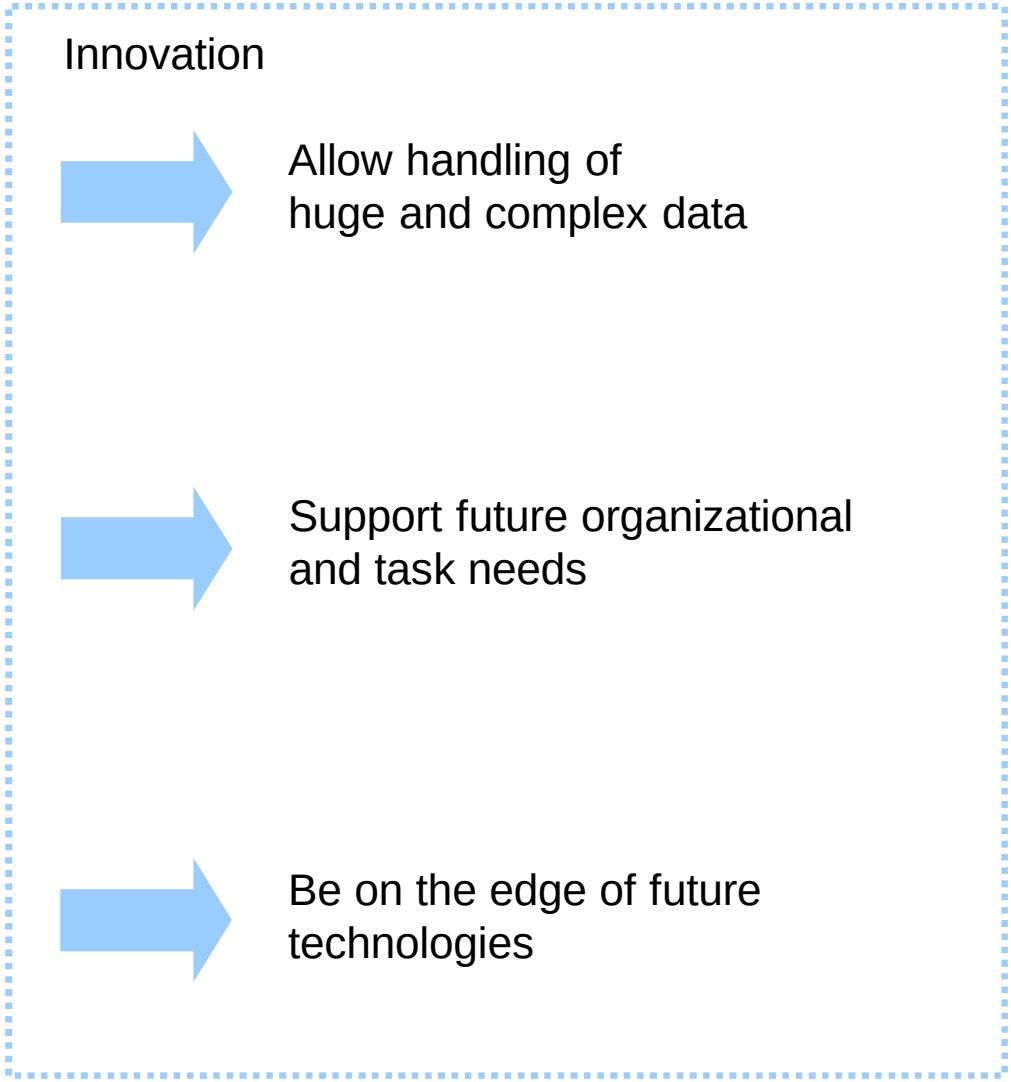
(Schumpeter, 1936)

Innovation
Why Innovation? Assumptions

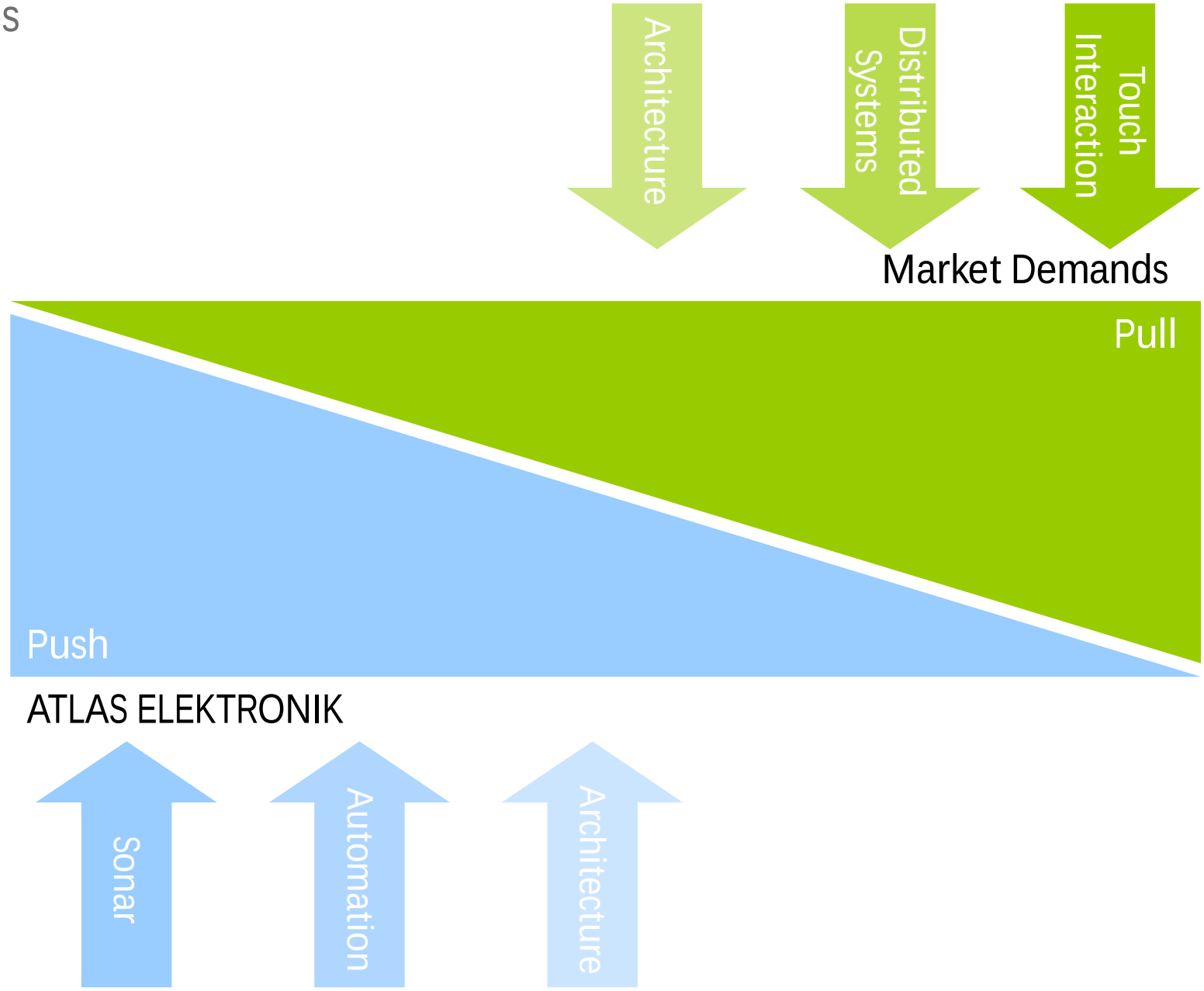
Data
- More complex data structures
- More automation aids
- More monitoring tasks

Operator
- Mixed groups
- Smaller number of crew members
- Less constant training

Competitors / Market
- Provide new concepts

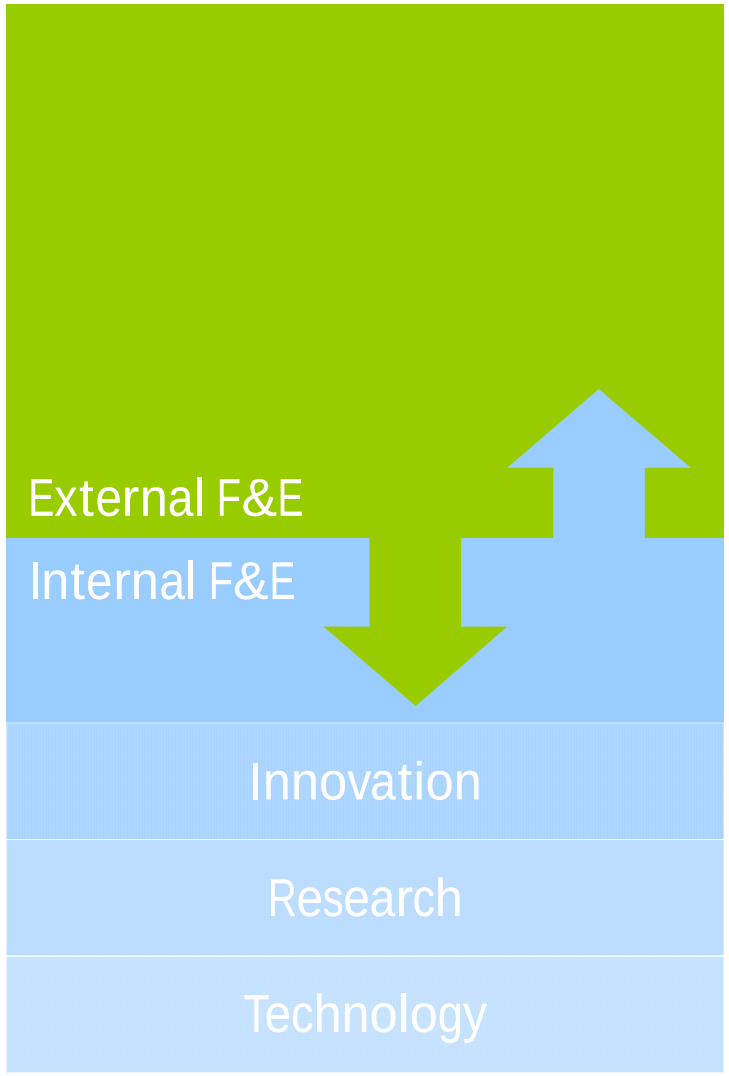


Innovation
Scenarios



Innovation

Research and Development at ATLAS ELEKTRONIK



PhD Theses
Master Theses
Bachelor Theses

EU Projects
National Projects

Demonstrations
Experimental Systems
Prototypes

Fraunhofer

Deutsches Forschungszentrum für Künstliche Intelligenz GmbH

EADS INNOVATION WORKS

DLR Deutsches Zentrum für Luft- und Raumfahrt e.V. in der Helmholtz-Gemeinschaft

National and International Universities

Industrialization (TRL 7-9)

Maritime Security
Key Interests

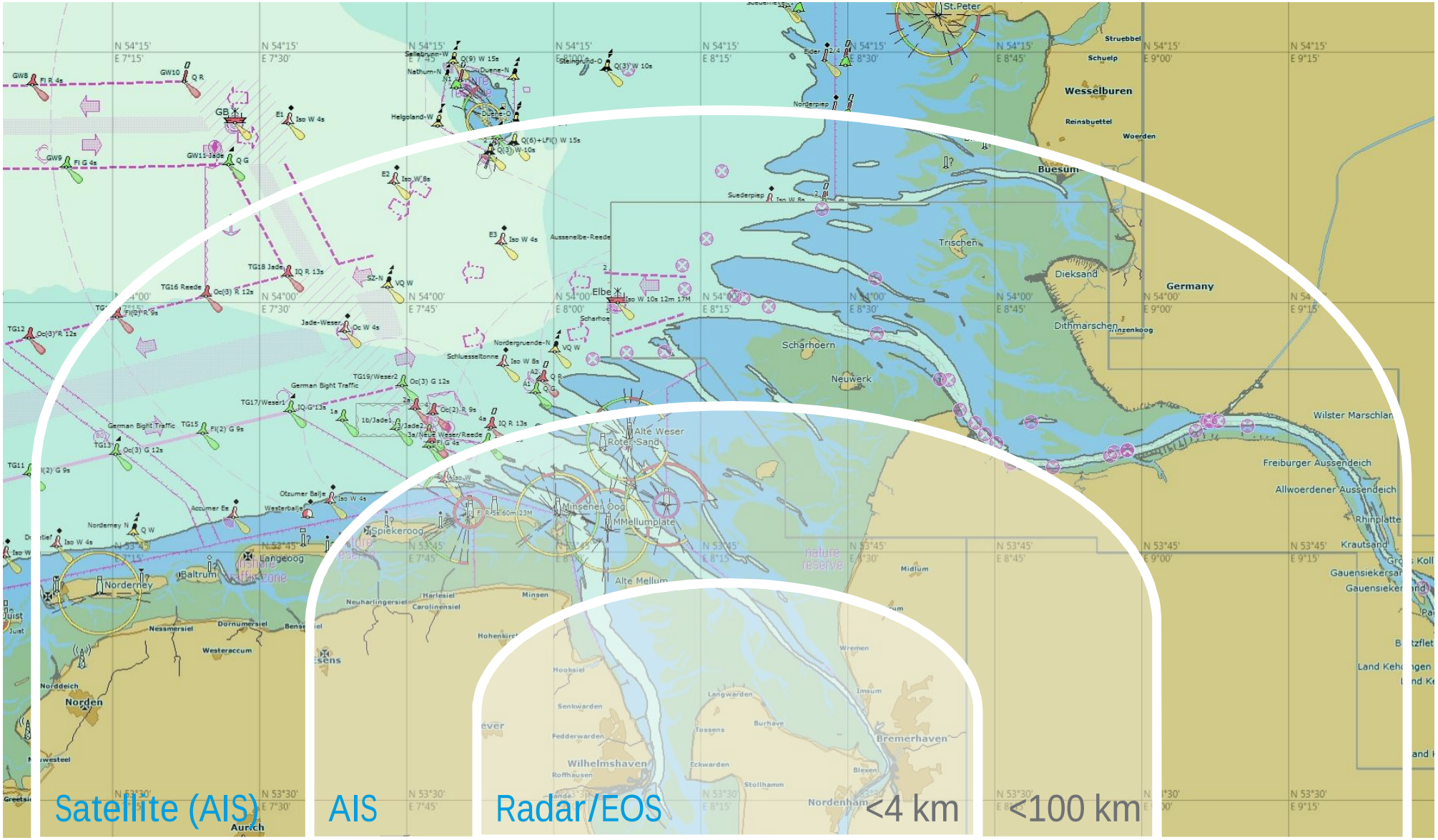
- Protection of critical maritime infrastructure such as ports and terminals, off-shore installations and underwater pipelines and cables
- Control of maritime areas to prevent illegal activities (e.g. piracy, pollution)
- Protection of the global supply chain, the freedom of navigation and the safety and security of seafarers and passengers
- Prevention of illegal, unregulated and unreported fishing




(EU, 2014)

Maritime Security

Challenges: Protection of Maritime Infrastructures, Coastal Areas and Open Sea



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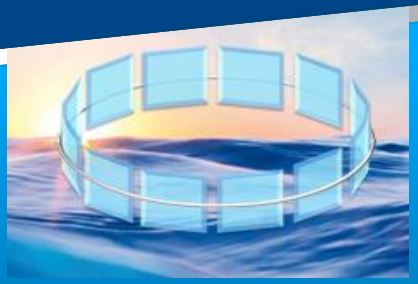
Maritime Security
Innovative Technologies

Unmanned Vehicles

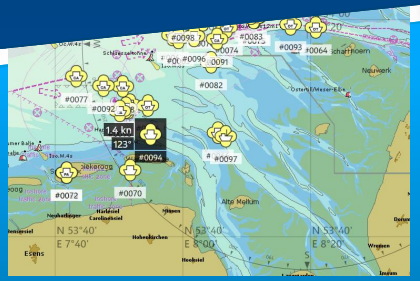
Diver Detection Sonar

Long Range Acoustic System

ATLAS Data Link System



User Interfaces



Cerberus – Diver Detection Sonar
Surveillance of nearby Areas

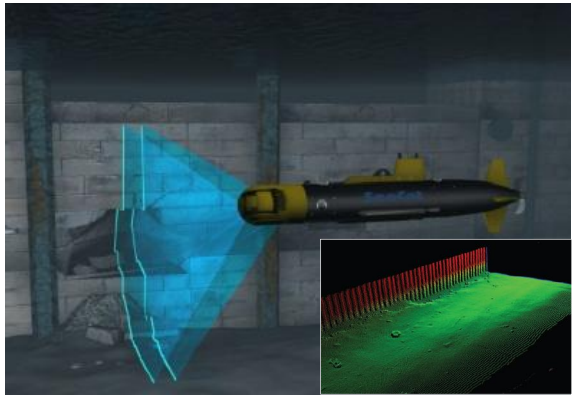
Detection and tracking of

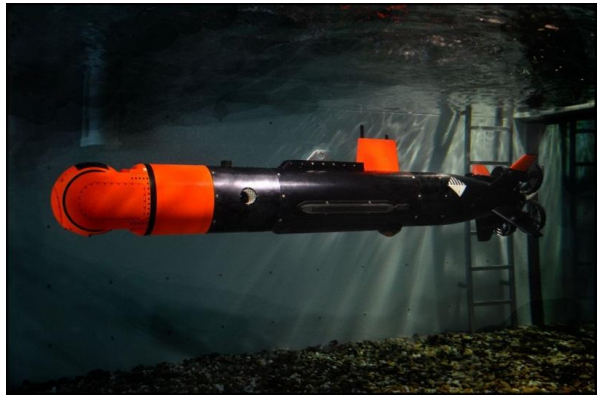
- „Open Circuit“-Diver: 900 m / 850 m
- „Closed Circuit“-Diver: 750 m / 675 m
- Swimmer: 600 m
- Swimmer Delivery Vehicle: 900 m / 850 m

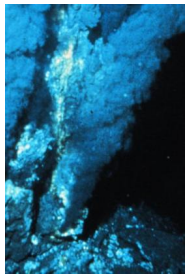
AUV / ROV

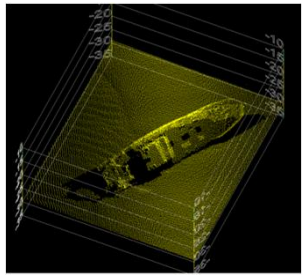
Autonomous Unmanned Vehicles

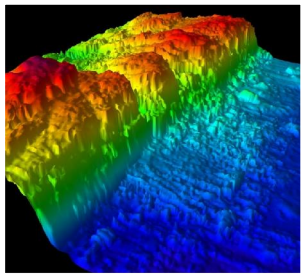
Remotely Operated Vehicles











AUVs
Applications for Maritime Security I

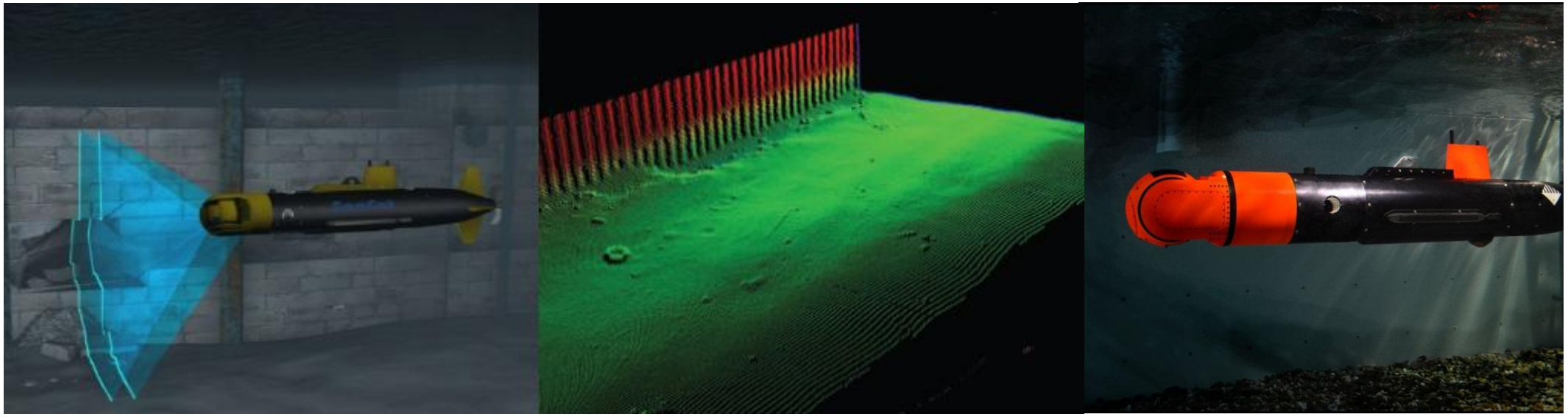
MORPH

KAPITAS

Inspection of ground structures (e.g. harbor walls, riffs, pipelines)

Mission Goal

- Locate target area
- Provide detailed information
- Give results back during mission
- Generate underwater awareness

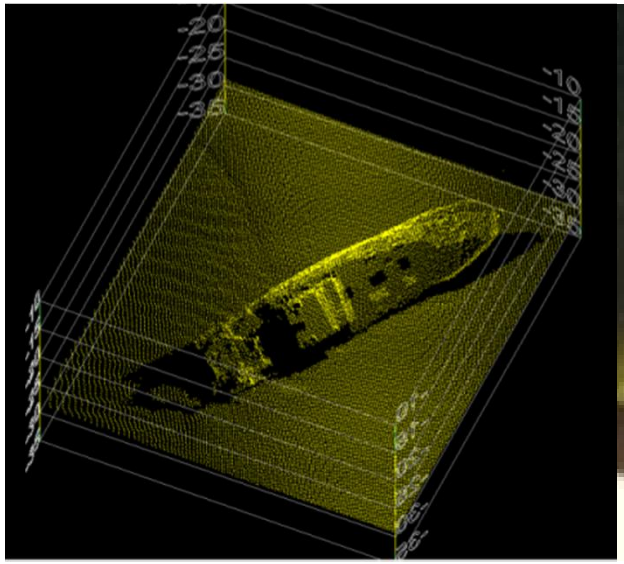


AUVs
Applications for Maritime Security II

Search and Rescue, Inspection & Identification

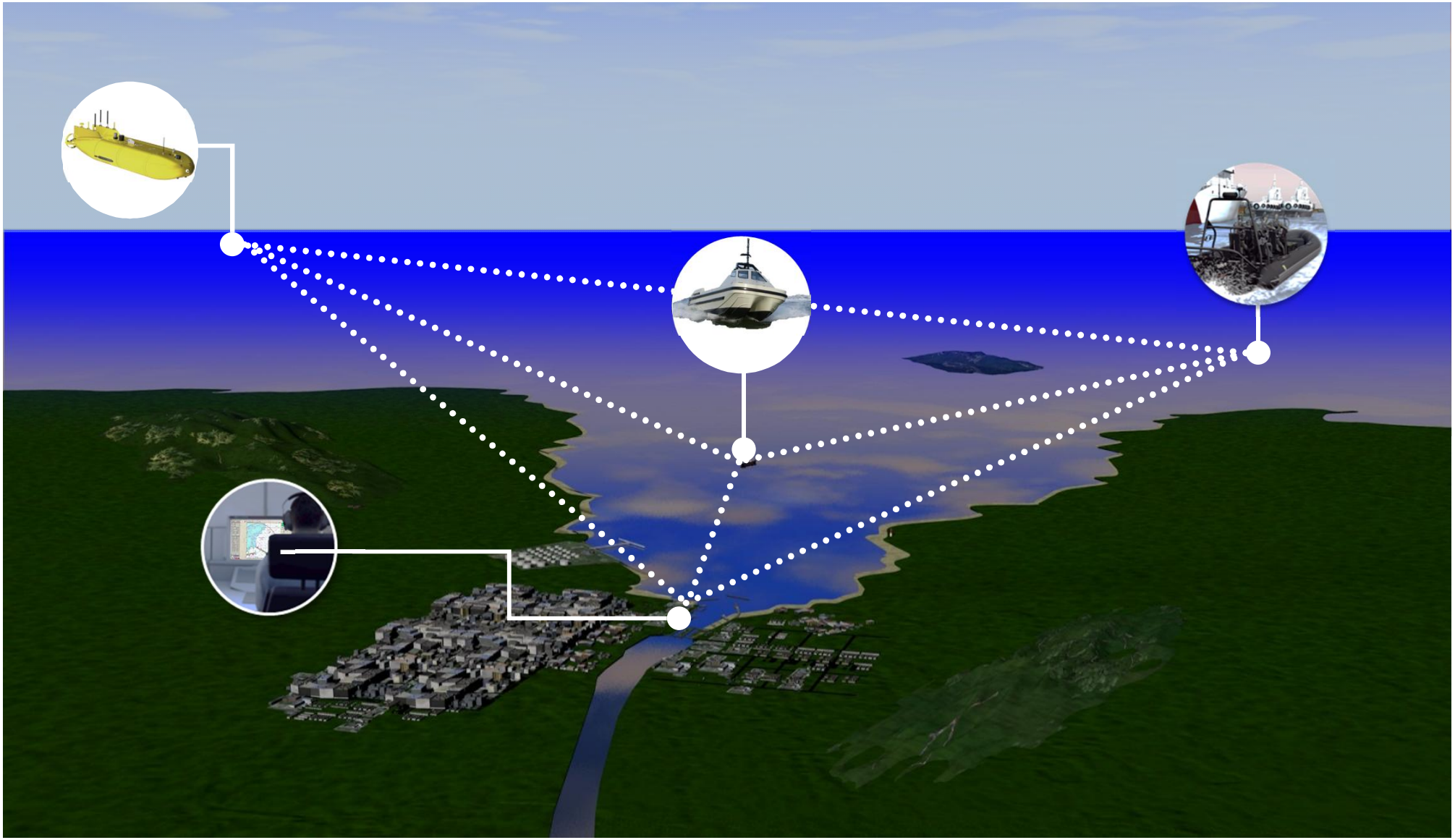
Mission Goal

- Search for targets in inspection area
- Provide detailed information
- Detect and classify targets
- Give results back during mission

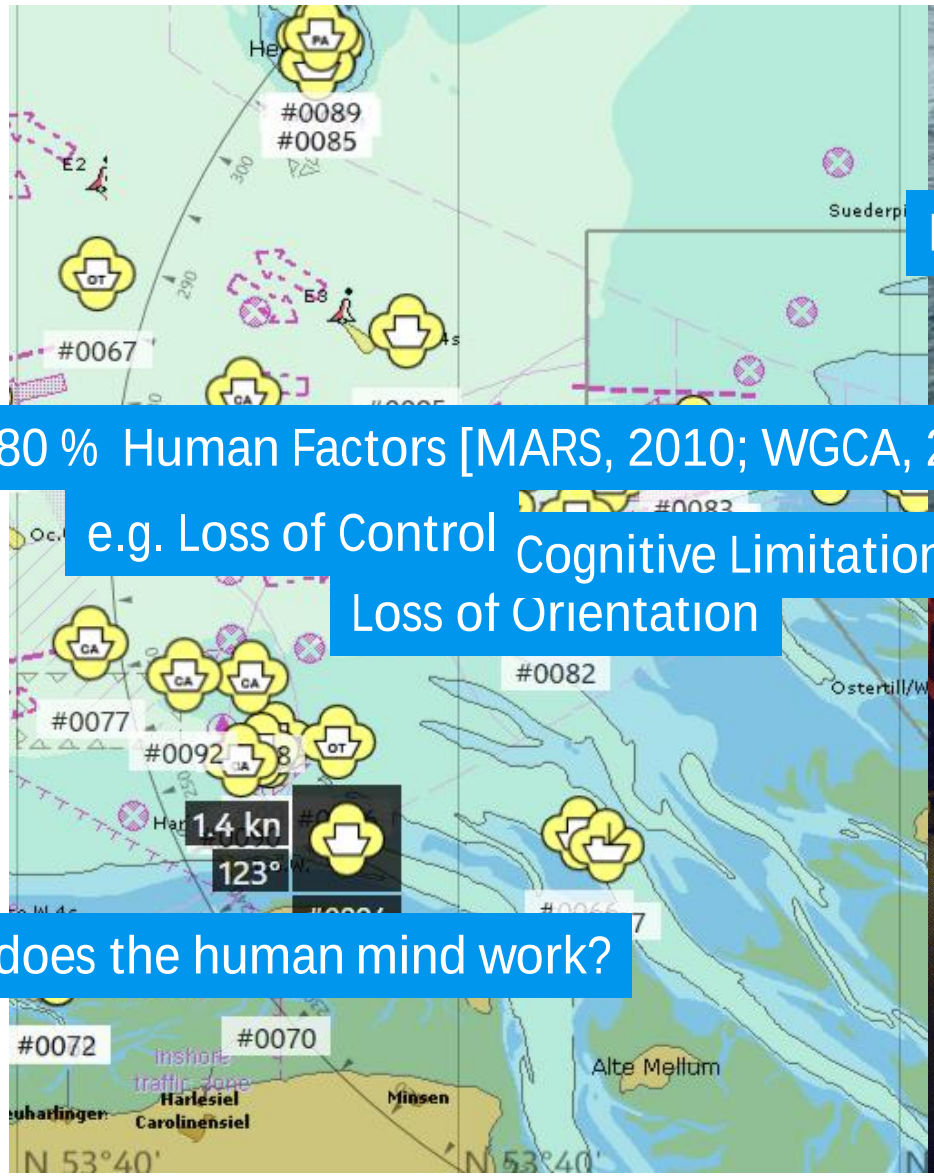


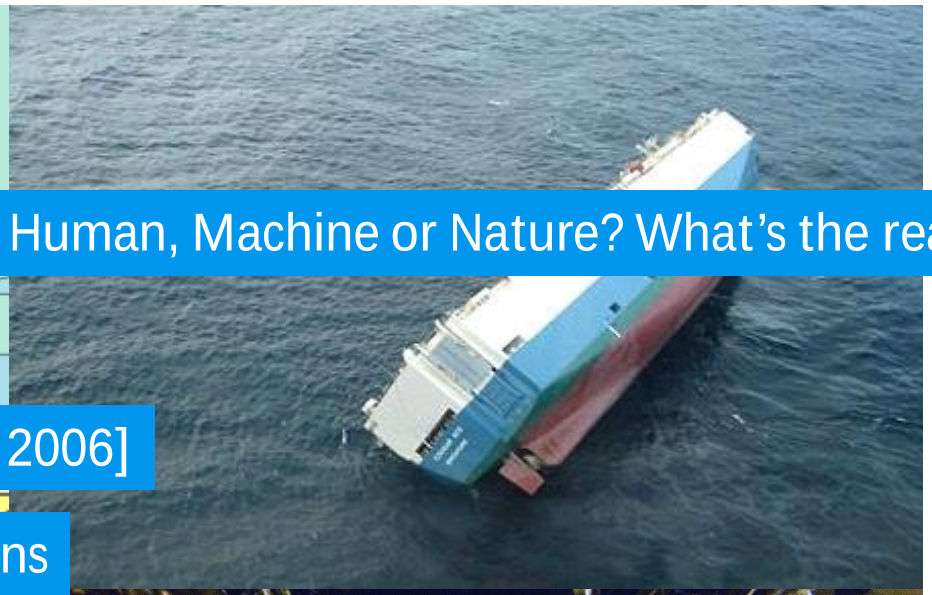
Communication and Data Exchange

Shared Operative Information and Pictures



User Interfaces





Human, Machine or Nature? What's the reason?

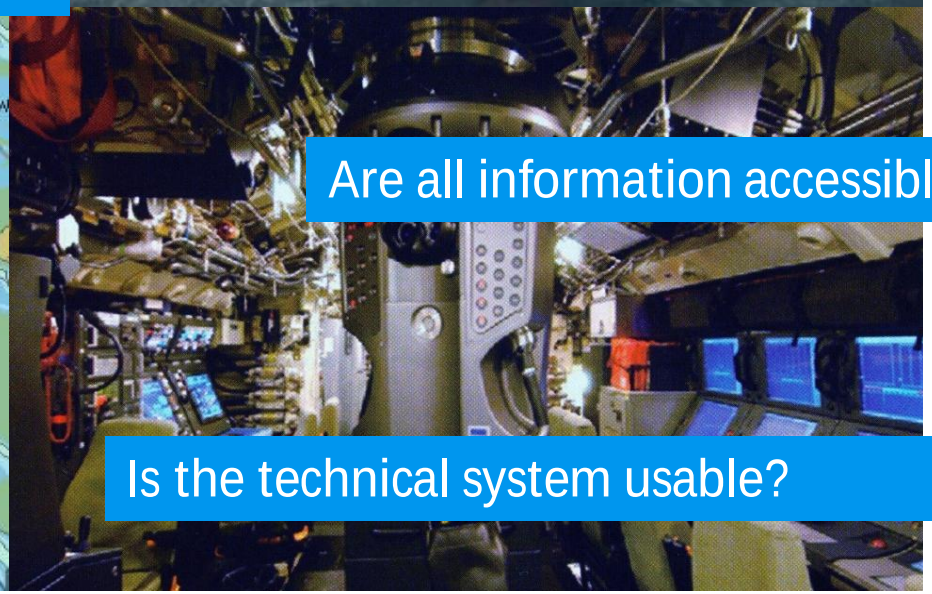
50 – 80 % Human Factors [MARS, 2010; WGCA, 2006]

e.g. Loss of Control

Cognitive Limitations

Loss of Orientation

How does the human mind work?



Are all information accessible?

Is the technical system usable?

User Interfaces

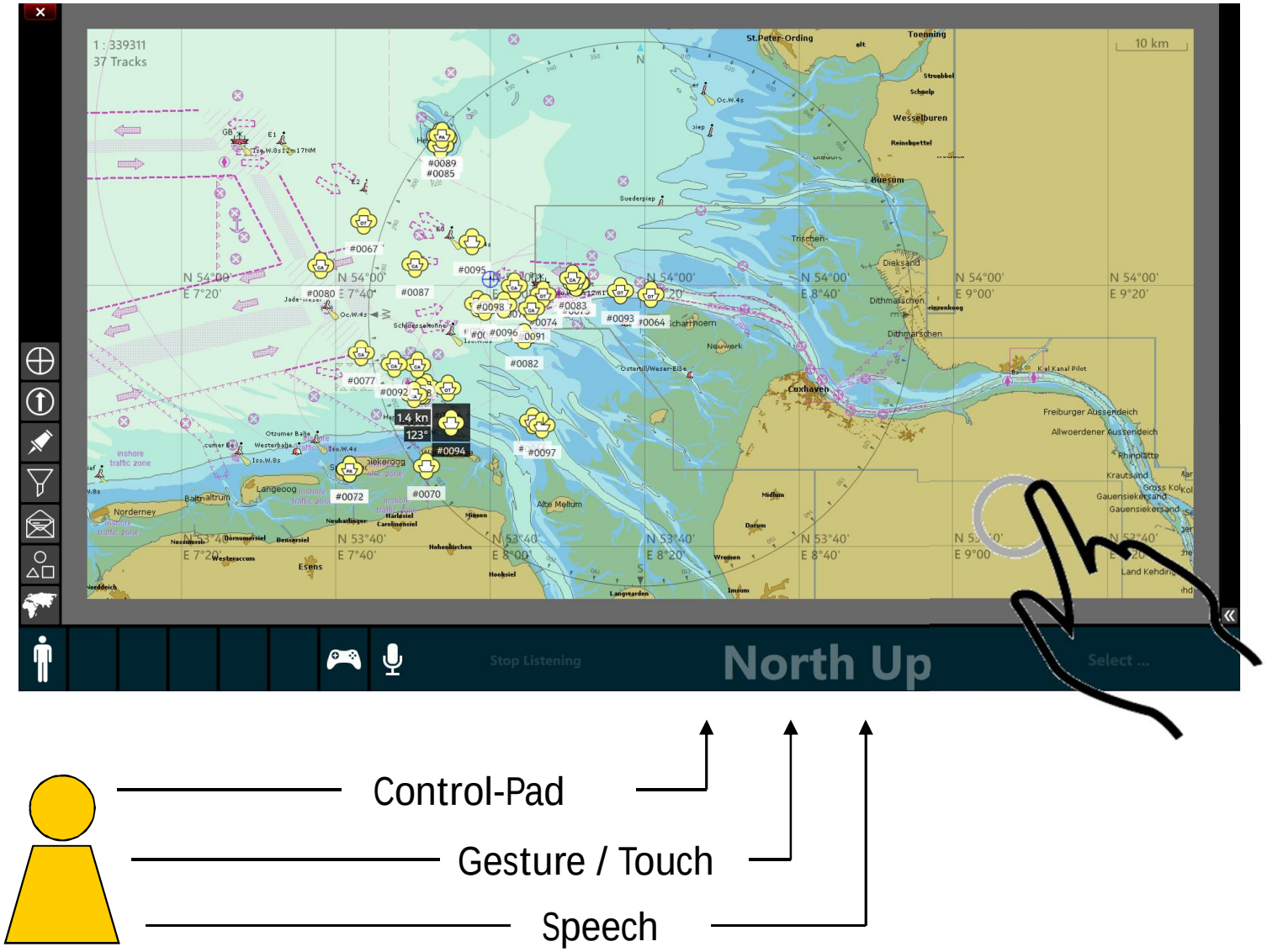
Control Room - Concept Study

User Interfaces
Multimodal Interaction I

Zoom in / out
Left / right
Up / down

or

Select A1176
Select + Pointing



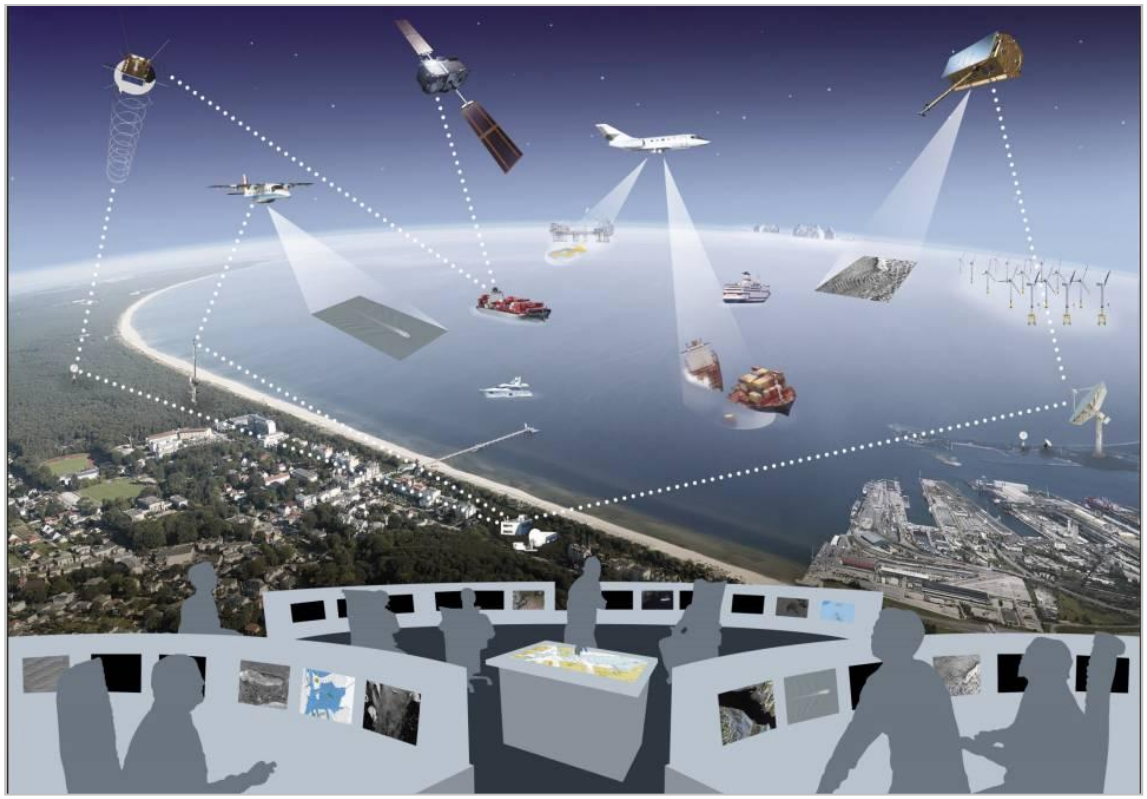
User Interfaces
Cognitive Systems

EMSec
ECHTZEITDIENSTE FÜR DIE MARITIME SICHERHEIT security

Real-Time Services for Maritime Security

- Cognitive user interfaces
- Surface und subsurface view
- Data fusion
  - Sonar
  - Satellite
  - Radar
  - Environment (e.g. timetables, weather)

→ Customized services for
  → Distributed systems
  → Several users



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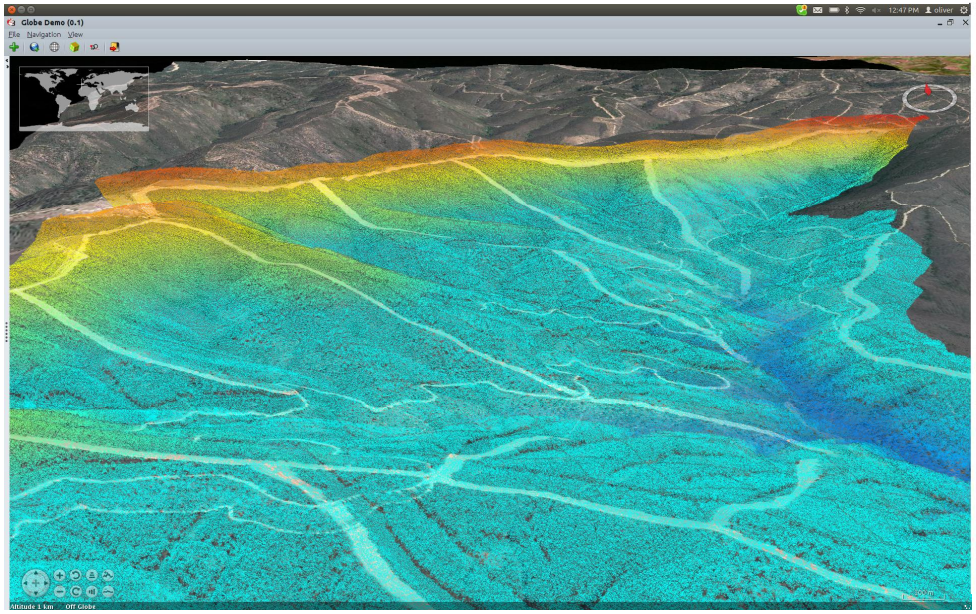
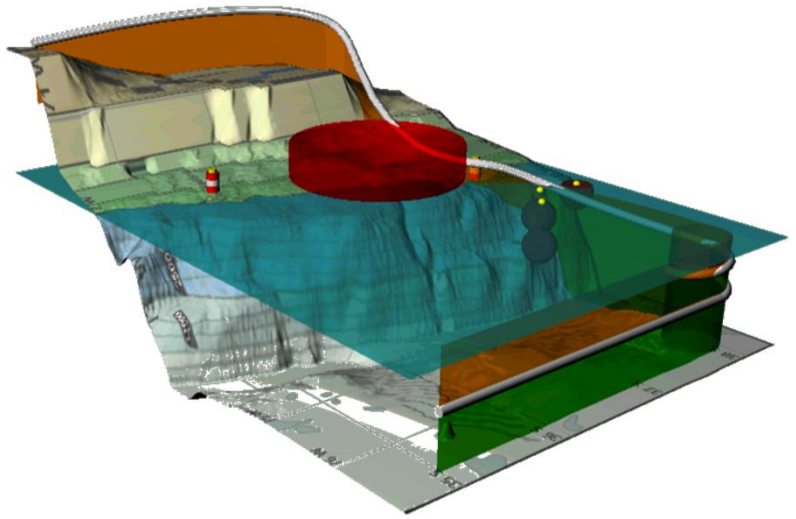
User Interfaces
3D Charts

- Easy correlation with real views
- Change of viewing angels

→ situational awareness
→ assessment of tactical situations
→ General and detailed view

- Integration of subsurface views into the 3D view
- Integration of video data into the 3D view
- Visualization of additional data and information (e.g. sonar data, satellite images)



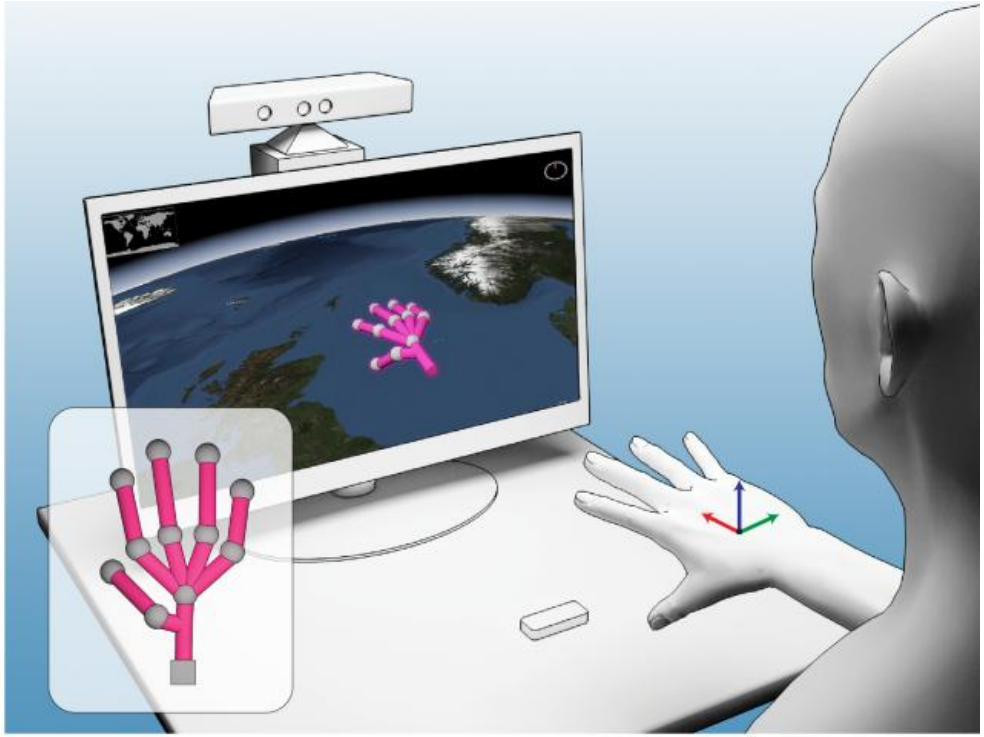


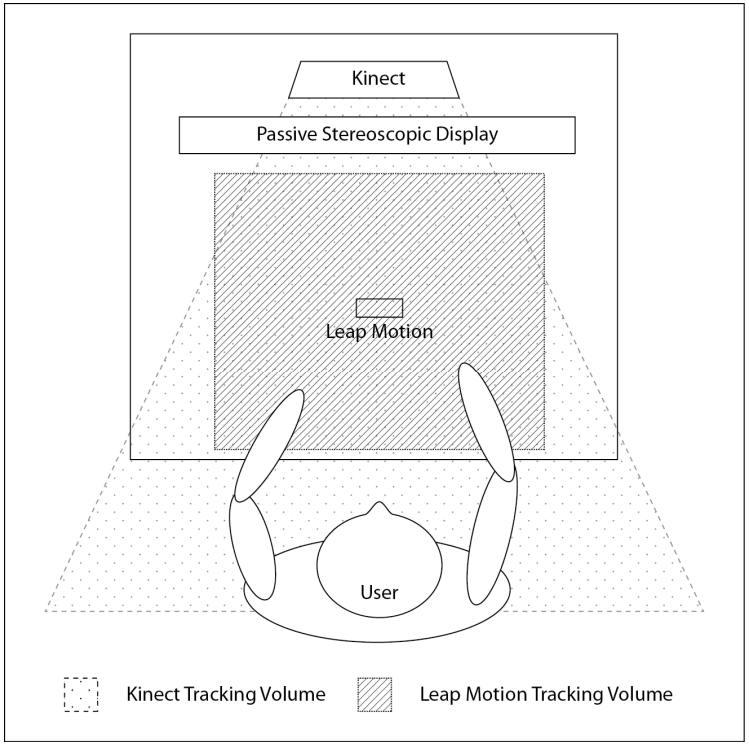
User Interfaces

Stereoscopic Displays and Interaction in 3D Spaces

Chair and Institute of Industrial Engineering and Ergonomics IAW

- Development of an interaction model for 3D interaction spaces
- Application
  - Analysis of offshore data
  - Planning of AUV missions
  - Selection of points of interest



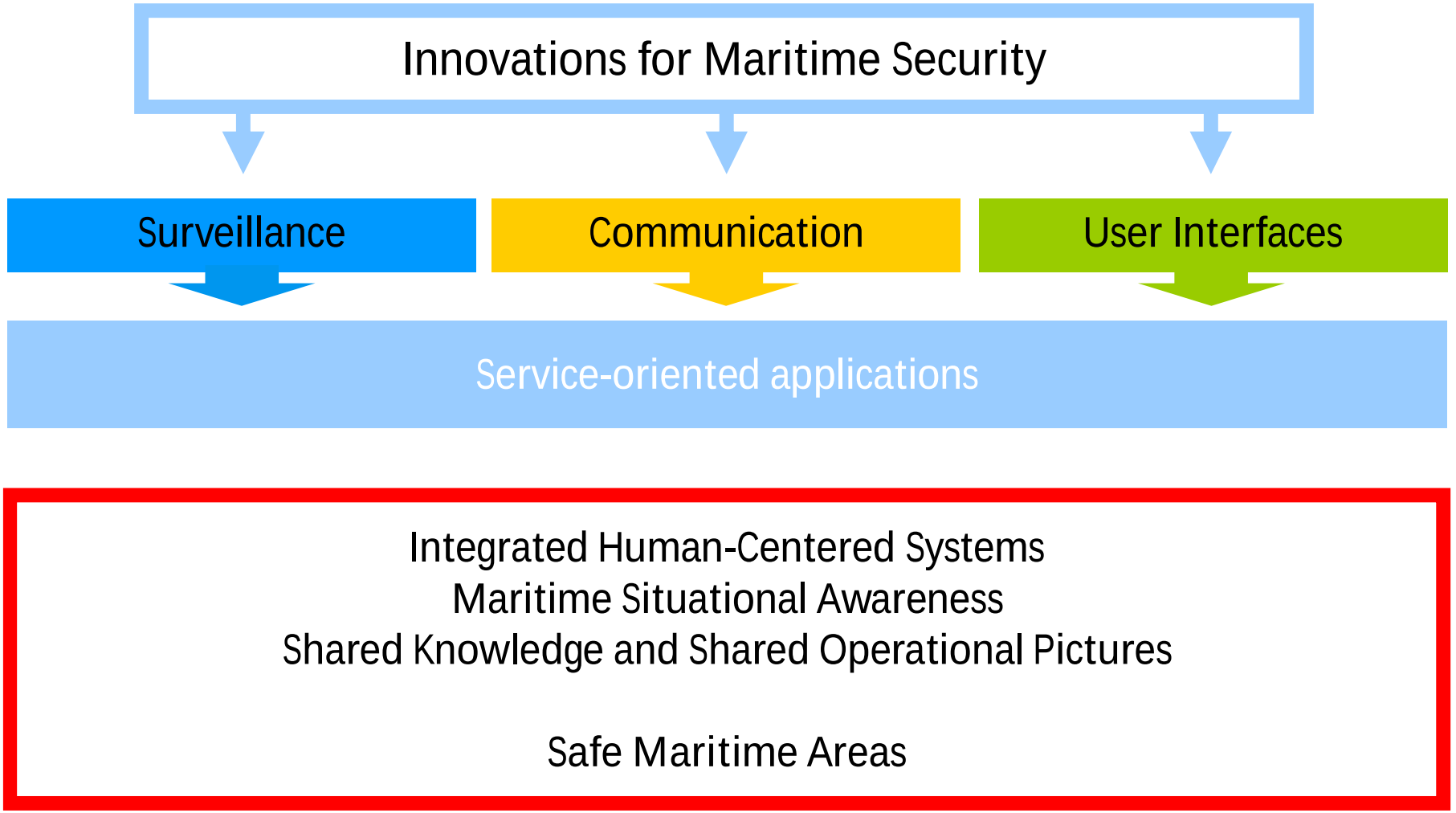


Innovations for Maritime Security

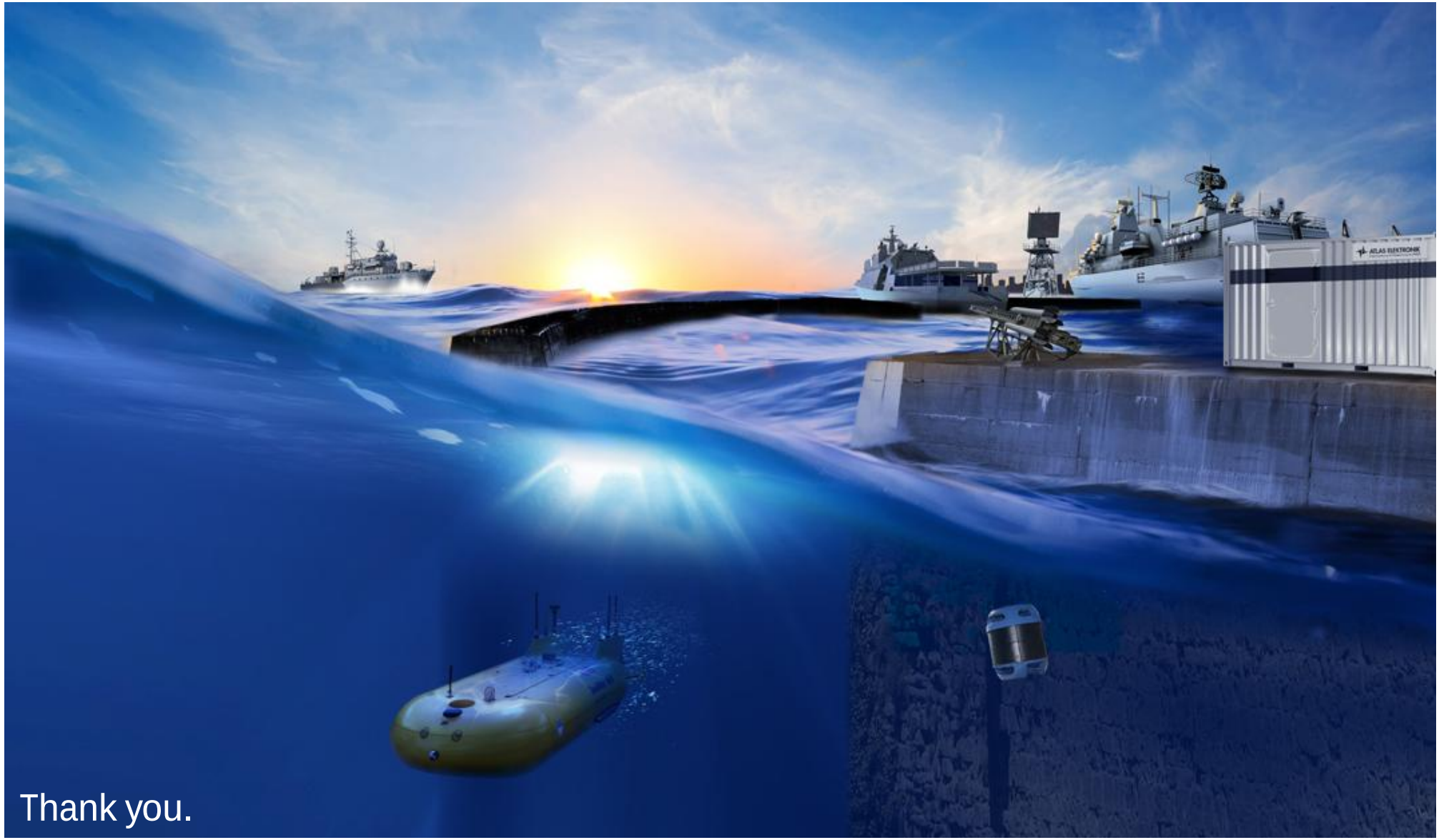
Trends we see...

- Integrated Services
- Containerized Solutions
- Task Automation
- Maritime Robotics
- Context-based Systems
- Sensor Networks
- Modular and generic Architecture

Conclusion



Conclusion
Future Scenario



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