Network for
MARITIME APPLICATIONS
satellite based navigation and logistics

Forschungshafen
Rostock

Research Port Rostock - Network for Maritime Applications

Photo:
HERO/Nordlicht

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Structure

- Organizational overview
- Existing infrastructures
- Projects
- Cooperations
- Obstacles
- Approach for improvements

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Site of Research Port Rostock

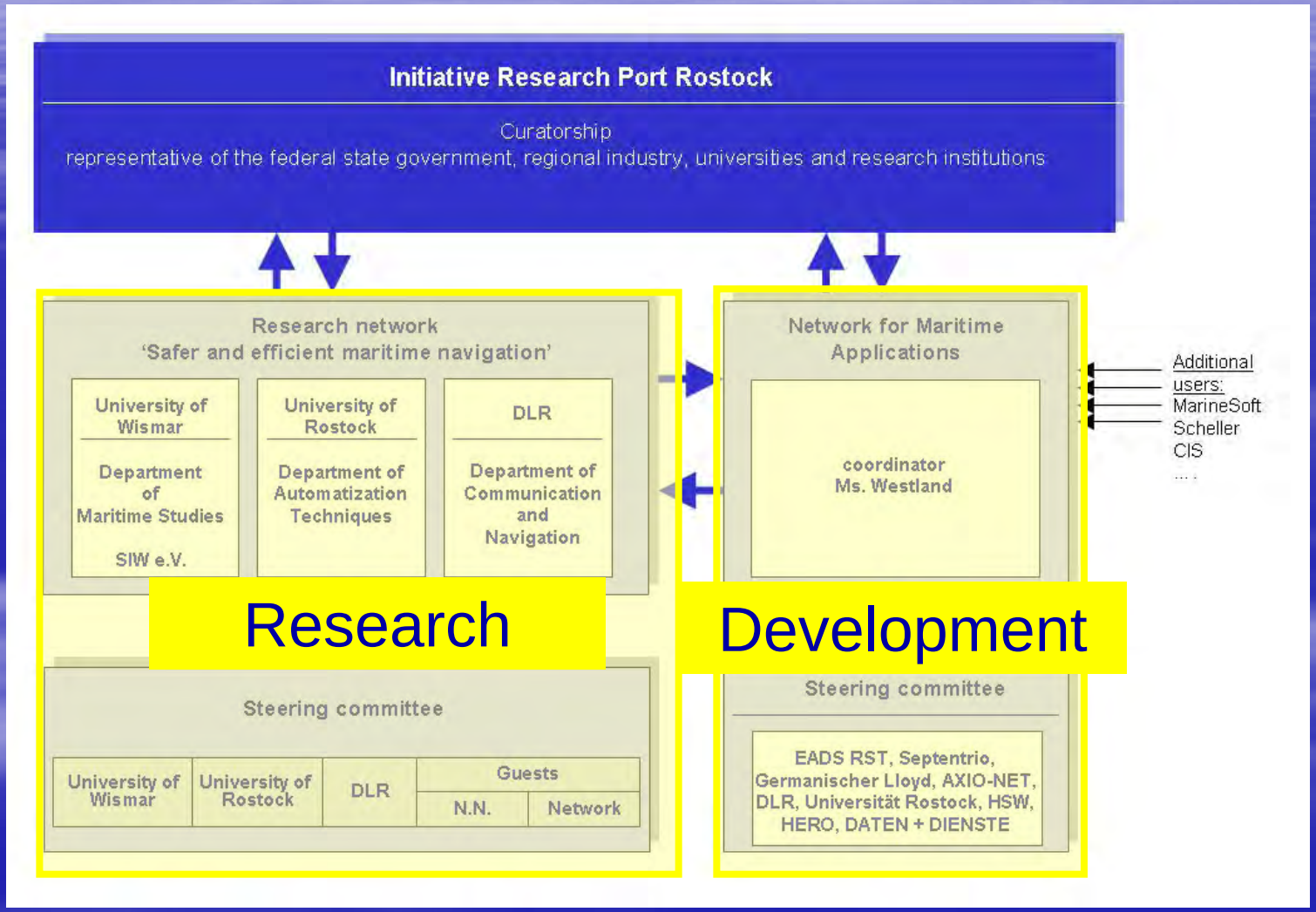
an initiative of the government of the German federal state Mecklenburg-Vorpommern in close cooperation with the regional industry, universities and research institutions

MECKLENBURG-VORPOMMERN

Unique Port Area

- complex user range
- critical local conditions
- high amount of ship traffic

Organization



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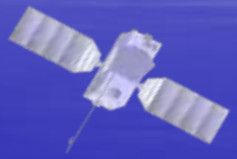
Members of the Network

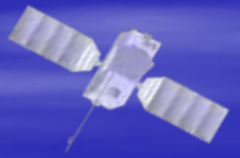
Commercial partners

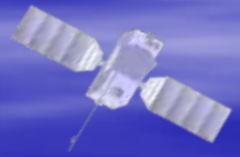
Research facilities

Combined with provider of infrastructure

Visions of the Network







- High-precise and reliable positioning within one decimeter in the entire port area in real time
- Automation of ship control systems via GNSS applications
- Automation of the intermodal transport of goods
- Time and cost reduction as well as increase of user security under all operating conditions

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Working Groups

1. ‚Requirements and threshold of existing infrastructures SEA GATE und M-GBAS and reliable operation‘
2. ‚Requirements, characteristics and implementation of certification of existing infrastructures SEA GATE and M-GBAS‘
3. ‚Approaches for tracing cargo units, dangerous and heavy goods, project cargo and container‘
4. ‚Development of estuary and ship assistant systems and its certification‘
5. ‚Automation of crane handling and prediction‘
6. ‚Portal Research Port Rostock’

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Infrastructures

- Practical examples in the port area
- Solutions with existing infrastructures in the Research Port Rostock

Practical examples

Examples for required precise and reliable positioning and navigation in the port area

Photo: GCT GmbH

- Object handling with crane tandem processing
- container transport
- project and heavy cargo like Nordex wings of wind turbines

Practical examples

mixture for a certain recipe for the coal-fired power plant is very important for the efficiency

- Material transportation
- Precise positioning of charcoal scraper in saline air environment

Practical examples

- ship navigation
- precise maneuver like docking of a ferry

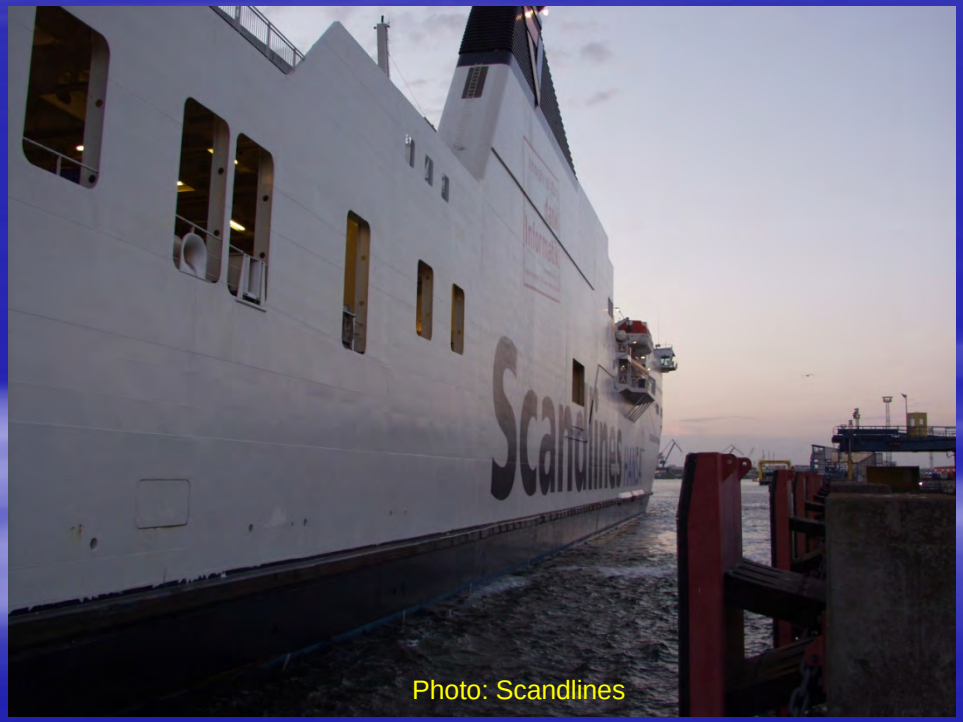

Photo: Scandlines


Quelle: Scandlines

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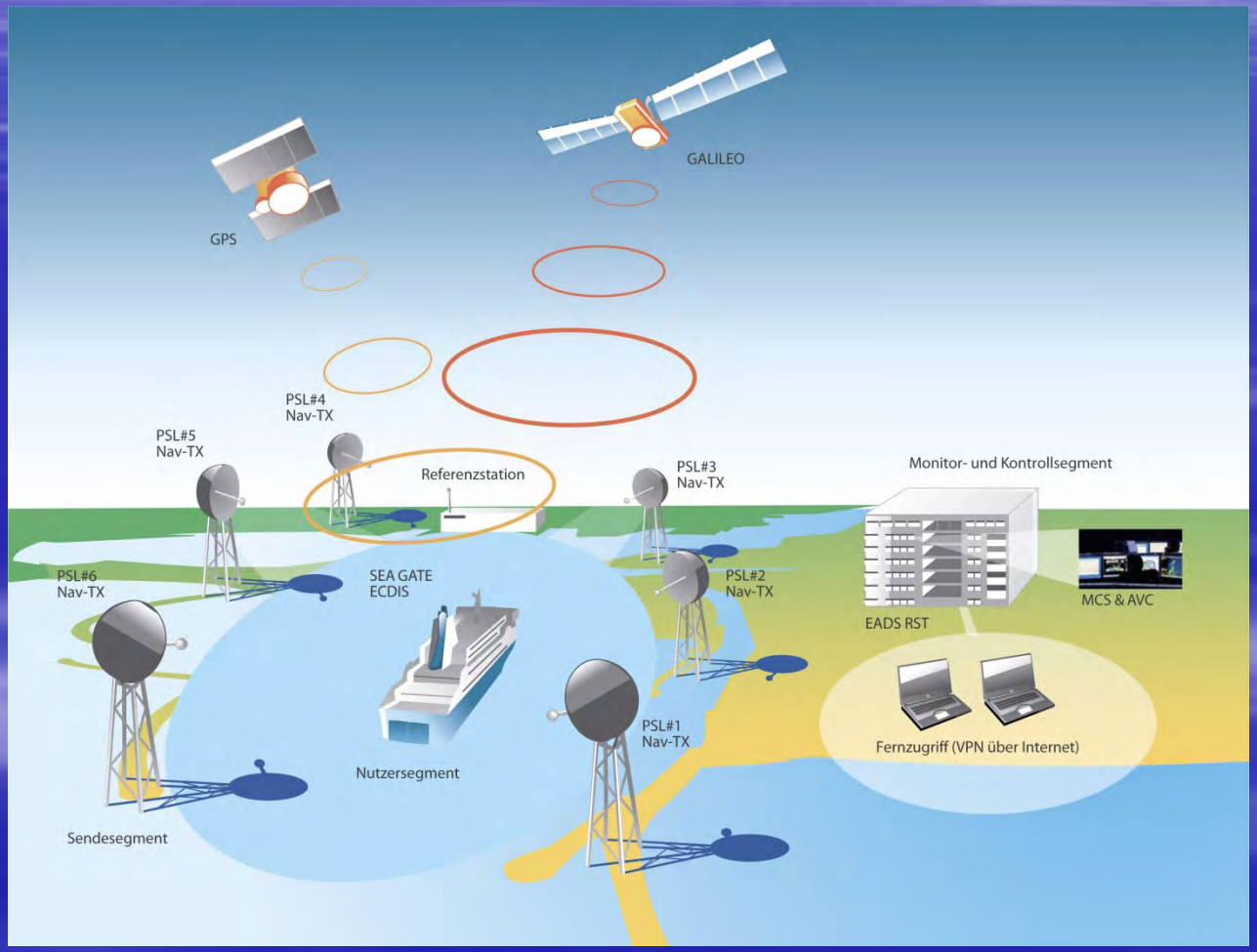
Infrastructures

Solution with GNSS-technology

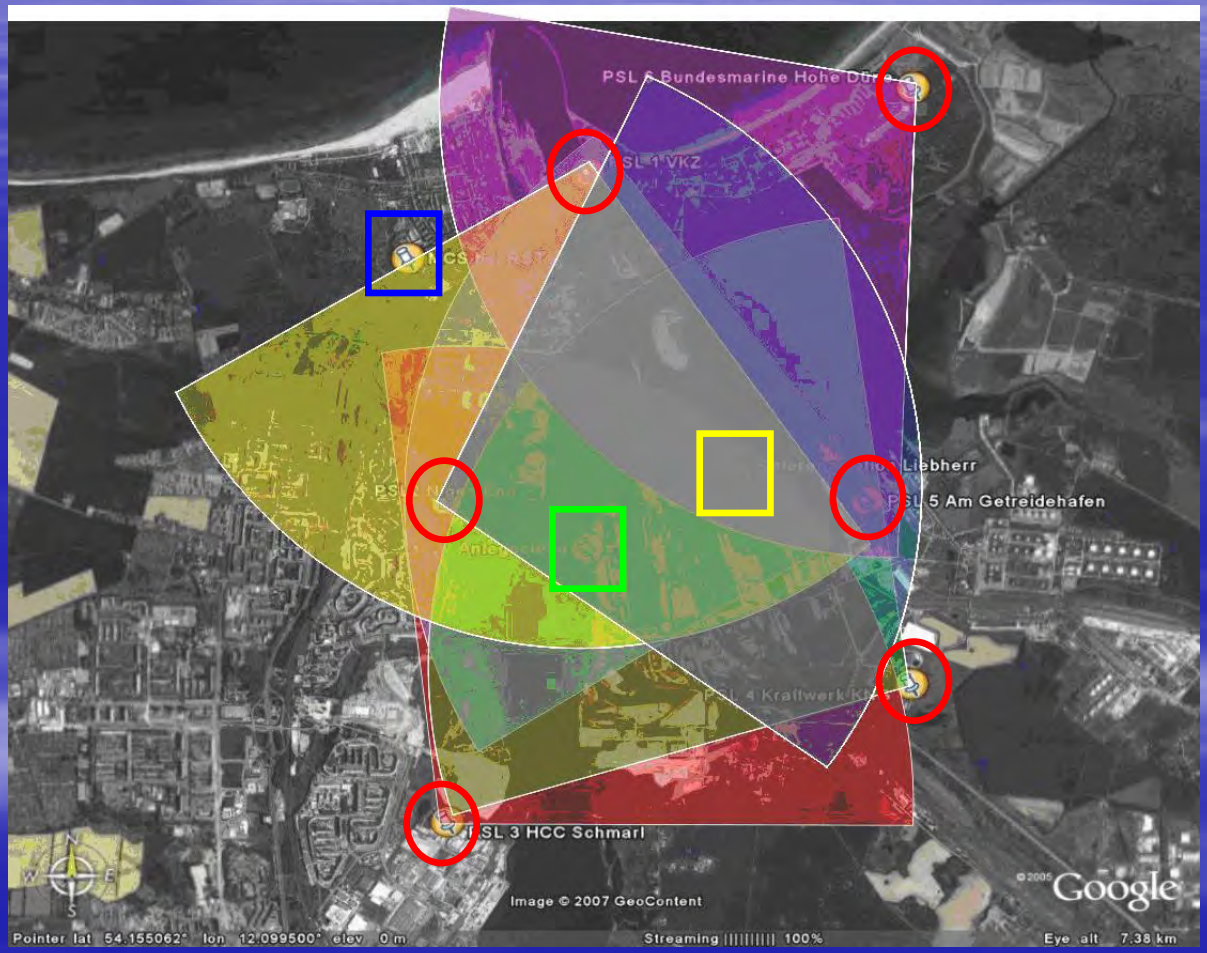
Maritime test and development environment

SEA GATE



Infrastructures

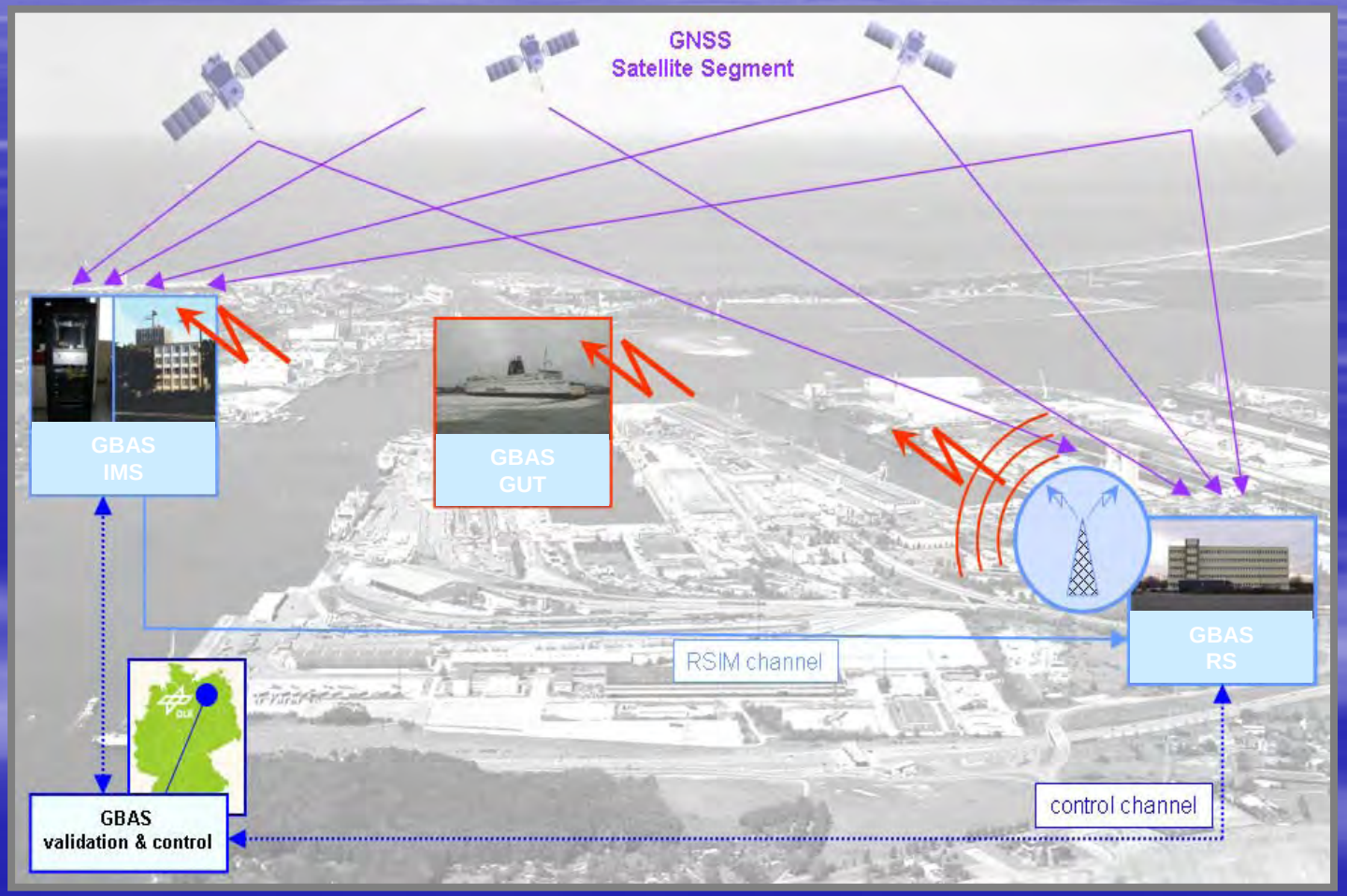
Maritime test and development environment **SEA GATE** with 6 pseudolites



Infrastructures

Maritime Ground Based Augmentation:

Phase-based DGNSS (RTK) with own Integrity Monitoring



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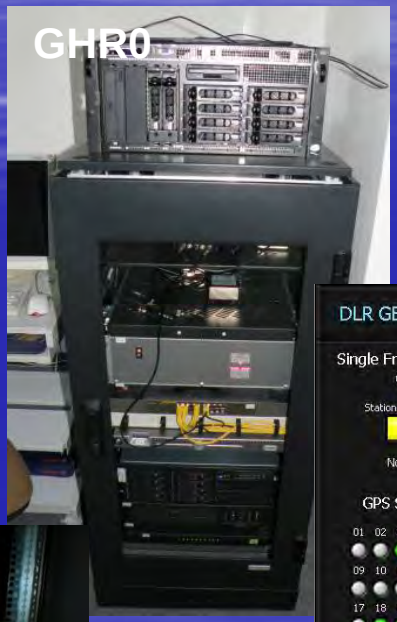
Infrastructures

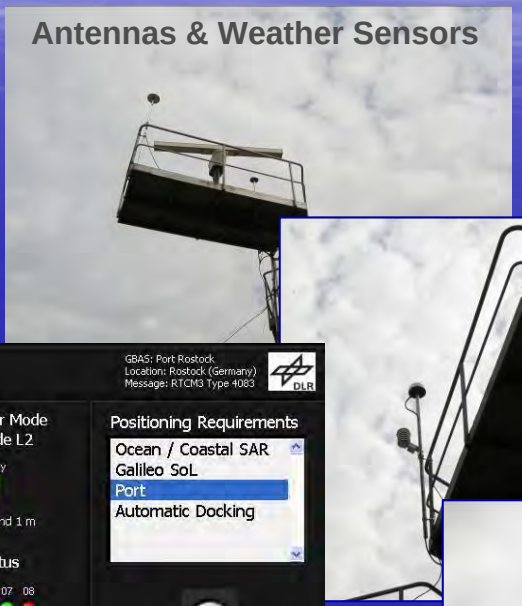
GHR1

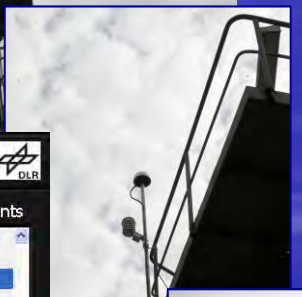
GHR0



GNSS-Empfänger (TOPCON NET-G3)

Antennas & Weather Sensors





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Experience in Projects

SEA GATE

EADS RST

Infrastructure of 6 transmit stations to send Galileo like signals (pseudolites)

M-GBAS

DLR

Evaluation of GNSS signal quality and provision of correction and integrity data (RTK)

AGaPaS

University Rostock

Self activating rescue system, which detects person who fell overboard and which allows a remote-controlled assurance of the survival conditions

ZuMANZ

Hochschule Wismar

maneuver simulation for prediction of ship performance while varying of ship parameter like helm, propeller etc.

MARSPEED

Hochschule Wismar

Training simulator for maritime high-speed vehicles, maneuver training

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Networking

German Aerospace Center (DLR e.V.)

- Gdynia Maritime University, Poland
- Maritime University of Szczecin, Poland

Rostock Port (HERO)

- Helsinki, Finland

EADS Rostock System-Technik (RST)

- Port of Trelleborg, Sweden

University of Applied Sciences Wismar

- World Maritime University, Malmö, Sweden

Networking

nereus

- **N**etwork of **E**uropean **Re**gions **U**sing **S**pace Technology
- three satellite systems:
  - navigation (GNSS)
  - earth observation (GMES)
  - telecommunication

- to explore the benefits of space technologies for the regions, forcing combined projects, strengthen the regional competence, increasing visiblity
- *Network for Maritime Applications* and *GMES-MV* are expert organizations for the federal state Mecklenburg Western Pomerania
- actively involved in the working group ‘Satellite navigation and implementation’

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Obstacles

- Small and medium-sized enterprises (SME) are not big enough for own research and development departments
- Cooperations with other companies and universities or members of networks for synergy effects
- National and international research funds often require great amounts of own contribution
- Great investment (manpower and money) with unknown results with have to be shared with other partners
- New GNSS technology beside conventional regional shipbuilding industry

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Improvements

- National and international political support to force the development and implementation of enhanced maritime technologies
  - >> e.g. Baltic Sea could be our cooperated test field for realisation and demonstration of IMO's e-navigation strategy
- International information exchange to find adequate partners for projects and to increase our contributions to European research programs
  - >> 7. FP, ERA-NET MARTEC….
- Demand for bi- and multi-national funding of initial R&D projects
- Networking to deploy added value chains with/within Research Port Rostock

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Contact

Thank you for your attention!

„Network for Maritime Applications“

Dipl.-Kffr. Silvia Westland
Phone 0049 - 381 - 56 524
Email sw@netmaritime.de

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List of Abbreviations

- **DLR** – Deutsches Zentrum fuer Luft- und Raumfahrt, German Aerospace Center
- **FP** – Frame Program
- **GNSS** – Global Navigation Satellite System
- **DGNSS** – Differential GNSS
- **Pseudolites** – Pseudo-satellite, ground-based transmitter of GNSS signals
- **RTK** – Real Time Kinematic
- **SEA GATE** – Maritime Galileo Test and Development Environment
- **M-GBAS –** Maritime Ground Based Augmentation System
- **AGaPaS – A**utonomously Acting Rescue Robot For Persons in Distress at Sea
- **ZuMANZ –** condition based maneuver display for consulting of ship navigation
- **HERO** – Hafen-Entwicklungsgesellschaft Rostock mbH
- **GMES** – Global Monitoring for Environment and Security
- **MV** – Mecklenburg-Vorpommern
- **IMO** – International Maritime Organization