Research Port Rostock as home base for the Network for Maritime Applications

Dipl.-Kffr. Silvia Westland
Management 'Network for Maritime Applications'

Nationwide exist a variety of consortiums to bring GNSS[1] applications and their commercialization forward. But with the initiative '*Research Port Rostock*', Mecklenburg-Western Pomerania not just demonstrates its high interest in the unique area of 'GNSS based maritime applications', but as well installed a maritime test bed for developing new products and services.

The '*Research Port Rostock*' is an endeavor of the German federal state Mecklenburg-Western Pomerania in close cooperation with the regional industry, universities and research institutions. Rostock is located in the northern part of Germany and borders the Baltic Sea. It has about 200,000 inhabitants.

But why was Rostock chosen? The final decision derives from the fact of a special topology. First of all a high amount of ships operate through the sea channel, which concludes challenging ship passages and additional time for arrival and departure. Furthermore ferries and cruise liners have to turn before docking onto the quay. This requires experience and preciseness of the master.
A complex user range is located in the port area. These are commercial entities like ferries and logistic enterprises, governmental institutions like maritime and federal border police, non-profit organization and as well the marine base as an additive security aspect.

Figure 1 Unique port area of Rostock

The initiative '*Research Port Rostock*' comprises of two major columns. On the one hand the research association '*Safer and efficient maritime navigation*' which has its focus on national and international research project to use high precision and reliable positioning data for maritime navigation. On the other hand the '*Network for Maritime Applications*' which will specialize in the commercialization of maritime GNSS application. Especially in the following areas such as high-precision positioning, automatization of the intermodal transport of goods and automatic cruise and docking control.

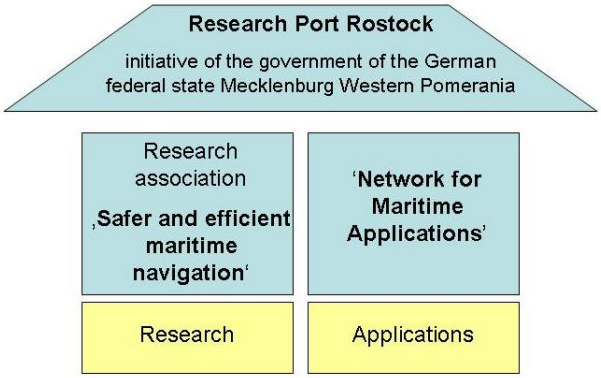

Figure 2 Columns of the *Research Port Rostock*

[1] GNSS – Global Navigation Satellite System

The members of the network gather national and international competence and are representatives of the corresponding value chain. This includes the following products and services:

- test bed usage and simulations of operations
- component manufacturing and system integration
- R/D and engineering
- certification of products, services and processes
- education and training
- project management and technology transfer
  within the frame of maritime GNSS applications.

A successful implemented infrastructure in the '*Research Port Rostock'* with core base technologies consists of the two completed projects 'SEA GATE' and 'ALEGRO'.

On behalf of the German Federal Ministry of Economics EADS RST installed a maritime test bed consisting of 6 transmit stations (pseudolites), one reference station, one user segment (the ferry "Mecklenburg-Vorpommern" of Scandlines) and one master control segment. This enables potential users to test future receiver technology with GALILEO frequencies before FOC (Full Operational Capability) of GALILEO in 2013. Furthermore it offers the possibility to develop new maritime applications based on GNSS signals. Preciseness within the range of one decimeter can be accomplished.

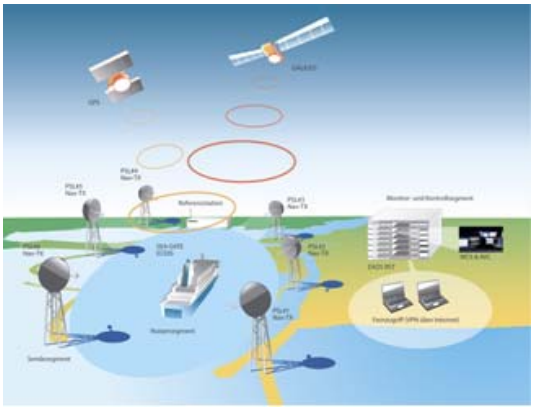

Figure 3 SEA GATE infrastructure with transmit, user and control segment

On behalf of the Ministry of Economics of the German Federal state of Mecklenburg Western Pomerania DLR developed with ALEGRO a local Ground Based Augmentation System (GBAS) for the assistance of high-precision and security relevant GNSS applications in the maritime sector. It evaluates real GNSS signal quality and provides correction and integrity data (dPGNSS[2]) for applications with demanding reliability and high-precision accuracy within one decimeter.

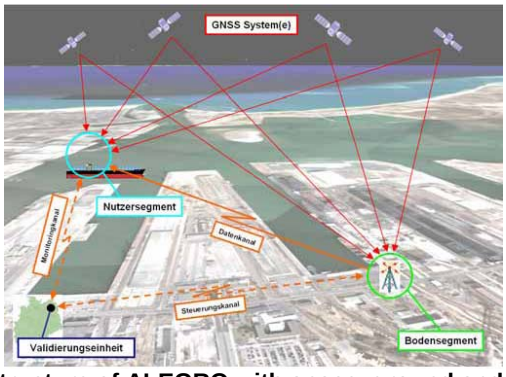

Figure 4 Infrastructure of ALEGRO with space, ground and user segment

The main interests of the '*Network for Maritime Applications*' are the usage of the installed infrastructure and the identification of GNSS based maritime application for the enhancement of

[2] differential phase-based GNSS

navigation and logistic processes in the harbor area. Members who joined the network via cooperation treaty and which are actively involved are:

AXIO-NET GmbH – provides satellite reference services for correction data for GNSS positioning
DATEN + DIENSTE GmbH Rostock – offers maritime software solutions and system integration
German Aerospace Center e.V. – Institute of Communication and Navigation develops GNSS validation and augmentation techniques
EADS RST Rostock System-Technik GmbH – delivers electronic devices for satellites and pseudolites as well as software solutions for simulations and process monitoring
Germanischer Lloyd (GL) – is a ship classification society and an international technical assurance, certification and consulting company. The company is active in the maritime industry as well as the energy sector (e.g. oil and gas, renewable energies)
Hafen-Entwicklungsgesellschaft Rostock mbH – provides the basic infrastructure for the '*Research Port Rostock'* and gathers the local user interests
Universitaet Rostock – research areas of the Department of Automatization Techniques are advanced control theory, model identification and simulation of maritime processes
Hochschule Wismar – University of applied science, Department of Maritime Studies, research areas are maneuver and ship performance as well as vessel security
Septentrio – European manufacturer of GNSS receivers for high-precision positioning, navigation and time information

Figure 5 Members of the 'Network for Maritime Applications'

Combining the experience in different sectors, the network is primary interested in developing new products, services and processes on the basis of GNSS signals (GPS, GLONASS, GALILEO, etc.) to enhance the vessel traffic and logistics chain in the maritime environment. This could improve the vessel traffic management with coordination and prediction, intermodal logistics for container and equivalents, assistance and route guidance on-board and groundside as well as port security and Search&Rescue implementations. This application areas require a evaluation and implementation of standardization and certification.