ACCSEAS: The Future of e-Navigation in the North Sea Region

Dr Alwyn I. Williams
ACCSEAS Project Manager

e-Navigation Underway North America

Vallejo, California, USA
3rd April 2014
Shipping Challenges in the North Sea Region

- Growth in off-shore Installations
- Increased shipping density
- Traffic pinch-points
- Reduced sea-space and manoeuvrability
What is ACCSEAS?

- **ACC**essibility for **S**hipping, **E**fficiency **A**dvantages and **S**ustainability
- Improving maritime accessibility to the North Sea Region
- Develop an innovative test-bed of e-Navigation solutions
  - Resilient positioning, navigation and timing (PNT)
  - Robust e-Navigation services
- April 2012 to February 2015
- Over €5M budget, part-funded by EU
- 11 partners from Denmark, Germany, Netherlands, Norway, Sweden and UK
Systems Engineering Approach

Requirements

- Focus on mariner
- Traffic analysis and prediction
- Risk analysis
- IMO, IALA, EU Initiatives

Architecture and Design

- Integrated ship and shore systems
- IHO S-100 data standard

Implementation, Verification and Validation

- Real & simulated environments
- User experiences
- Early detection of areas of improvement
- Influence institutional standards and policy

European Union
The European Regional Development Fund

The INTERREG IVB
North Sea Region Programme
Requirements: where are vessels going?
Requirements: analysing the region
Requirements: determining risk

Using IALA Waterways Risk Assessment Program (IWRAP)
Requirements: What about the future?
Design: Route Topology Model

- Flexible description of ship movement within constraints: maximize use of available sea space
- Help identify services to mitigate risks
Design: Maritime Services Portfolio

OPERATIONAL Services

TECHNICAL Services

Maritime Service Portfolios

The spectra of services

The spectrum of operational services

The spectrum of technical services
Design: Maritime Services Portfolio

- Resilient PNT
- Tactical Route Exchange and Route Suggestion
- Maritime Safety Information/Notice to Mariners
- No-go Area
- Augmented Reality Heads-up Display
- Automated FAL Reporting
- Vessel Operations Co-ordination Tool
- Dynamic Ship Movement Prediction
- Inter-VTS Exchange System
Resilient PNT

• Mitigation of GNSS vulnerability to natural and deliberate interference
• Independent and complementary backup system to GNSS
• Prototype Resilient PNT Processor
  – radar positioning and DGNSS “R-Mode”
  – integration of existing positioning sources (e.g. eLoran)
Design: Maritime Services Portfolio

- Resilient PNT
- Tactical Route Exchange and Route Suggestion
- Maritime Safety Information/Notice to Mariners
- No-go Area
- Augmented Reality Heads-up Display
- Automated FAL Reporting
- Vessel Operations Co-ordination Tool
- Dynamic Ship Movement Prediction
- Inter-VTS Exchange System

Maritime Cloud
www.maritimecloud.net
Services: Maritime Safety
Information/Notice to Mariners
Services: No-go Areas
Services: Exchange of Intended Routes

- Own ship route
- Another ship route
Services: Vessel Operations
Co-ordination Tool
Demonstration onboard vessels
Demonstrations onboard vessels
Demonstration in simulators
Demonstration in Simulators

GPS random walk simulator
Demonstration in Simulators
ACCSEAS Outcomes

• Geographic Information System (GIS)
• Ship equipment and shore infrastructure prototypes
• Evaluation of the technology and training analysis
• Support and advise EU initiatives, particularly e-Maritime
• Support e-Navigation and S-100 developments at IMO and IALA
• Future coordination of North Sea Region e-Navigation services
• Propose a sustainability workplan to enhance accessibility to the North Sea Region (2015 to 2020)
Conclusion

• Potential for making a real positive impact on maritime accessibility and safety in the North Sea Region and potentially, worldwide

• Many questions on the practical implementation of e-Navigation remain to be answered

• ACCSEAS is developing and will demonstrate innovative solutions in its testbed
Thank you