



Dynamic Information-centric Systems-of-Systems

PROJECT FACTS

Partners: Thales Naval Netherlands
 Noldus Information Technology
 Delft University of Technology
 Eindhoven University of Technology
 Free University of Amsterdam
 University of Amsterdam
 University of Maastricht
 Embedded Systems Institute

Period: June 2007 – May 2011

Capacity: 22 fte/year, 6 PhDs, 7 PostDocs

INDUSTRIAL CHALLENGE

The ever increasing capabilities for system interconnection and sharing of information, processes and resources, provides unparalleled opportunities to configure systems into more capable aggregate systems, called systems-of-systems, that open up more and more application areas. Future systems-of-systems will collaborate across former boundaries, be robust to configuration changes, and cope with unexpected changes in their environment.

The Poseidon project is a collaborative research project by the Embedded Systems Institute that rises to this challenge. Working with the industrial partner Thales, it aims to discover new ways to build dynamic information-centric systems-of-systems, deriving its research statement from the maritime safety and security domain.

Maritime safety and security systems support decision making and situation awareness in coastal areas. They are highly dynamic, provide a wide range of functions, use a variety of information sources for various purposes, and must be able to deal with elements of surprise.

RESEARCH OBJECTIVES

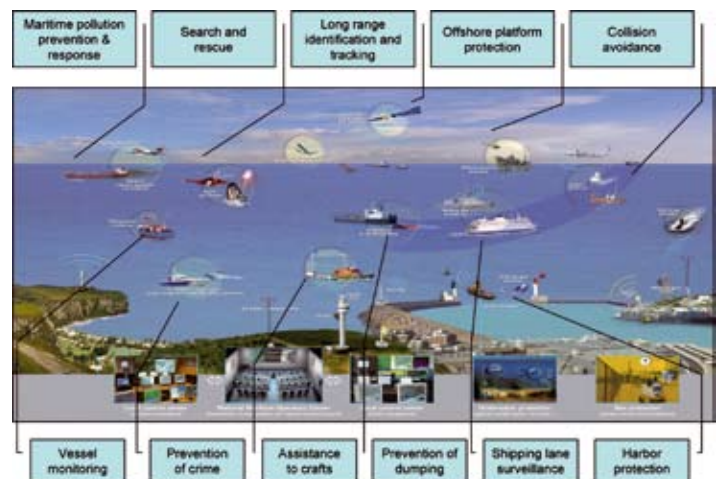
The challenge of developing advanced systems-of-systems is to gain flexibility, adaptability, and evolvability whilst retaining reliability. Changes in a system-of-systems' configuration need to be achievable with minimal efforts and the system should always remain operational and reliable, even in the context of unforeseen events or scenarios.

To achieve this, multi-disciplinary combinations of analytic, modeling, and implementation techniques need to be

developed, especially for integration, information analysis and visualization, and trustworthy information interoperability.

Altogether, these data-based operations require an information-centric approach to both system-of-systems design and also to operations that support the individual systems in achieving their principal goals.

This approach is a key factor for the emergence of higher level capabilities from lower-level interactions. Consequently, the needed higher-level information models and dynamic processes are also addressed as research objectives.



EXPECTED RESULTS

The Poseidon project partners will address the key aspects of design, integration, and information-processing required for dynamic systems-of-systems:

- System-of-systems information processing architectures beneficial to adaptability and evolvability;
- Run-time methodologies for the diagnosis, integration, and acceptance of dynamic systems-of-systems;
- Trustworthy fusion and processing of information originating from a variety of sources that differ in role, type, security level, syntax, and semantics;
- Intelligent information analysis and visualization for tasks within the maritime safety and security domain, especially for anomaly detection.

INFORMATION

For further information, please visit the website www.esi.nl