Demonstrator of a Data Processing Centre (DPC) for satellite-based AIS services

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gfabritius@cls.fr

Overview of the presentation

- Introducing CLS
- Introducing AIS / SAT-AIS
- Scope of the EU SAT-AIS DPC project:
  - Background
  - Technical implementation
  - Users' perspective
- Project status & planning

Introducing CLS

Created: 21 April 1986

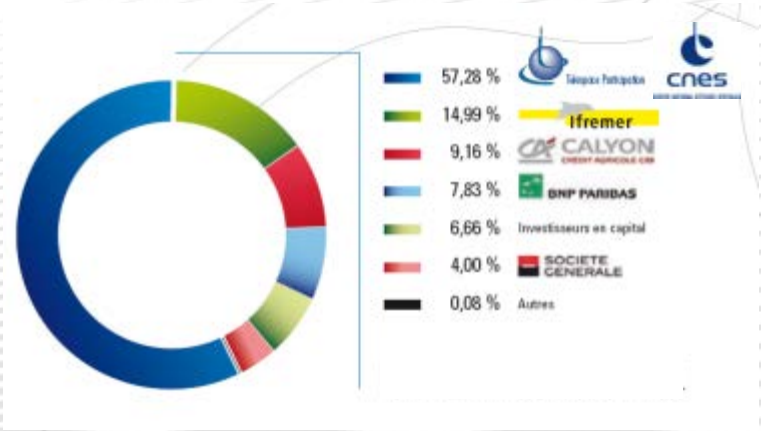
Core activities:

- Commercial operation of satellite systems for positioning, data collection, ocean observation and surveillance
- Developing added-value applications and services based on satellite remote-sensing data;

Sectors of activity:

- environmental surveillance
- sustainable management of marine resources
- maritime security
- oil and gas

Shareholders:



2010 turnover: €60 M

Introducing AIS / SAT-AIS (1/2)

As per IALA (International Association of marine aids to navigation and Lighthouse Authorities) and IMO (International Maritime Organisation) definitions:

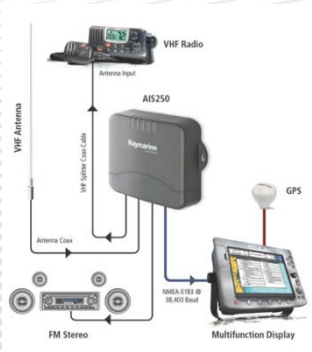
- AIS (Automatic Identification System) is a **communications system based on a protocol using the VHF maritime mobile band**, for the exchange of navigation data. There are numerous AIS devices, known as stations, which use this protocol to communicate.

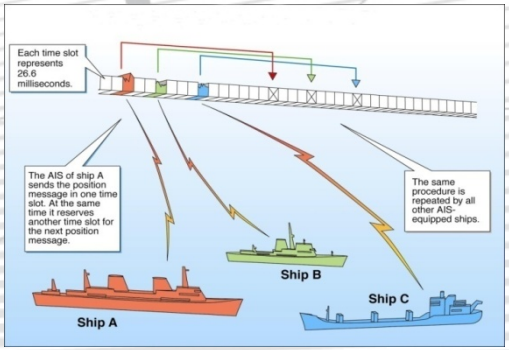
- AIS enables the **automatic exchange of shipboard information from the vessel's sensors (dynamic data), as well as manually entered static and voyage related data, between one vessel and another and between a vessel and a shore station(s).**

- AIS devices are required **internationally on most commercial vessels** as identified by the International Maritime Organization (IMO) in the Safety of Life at Sea Convention (SOLAS), Chapter V. In addition, AIS is often required domestically on other vessels by some administrations.

- AIS improves the safety of navigation and protection of the environment by assisting in the effective navigation of ships and the operation of VTS, by satisfying the following functional requirements:

.1 in a ship-to-ship mode for **collision avoidance;**
.2 as a means for **littoral States to obtain information about a ship and its cargo**; and
.3 as a VTS tool, i.e. ship-to-shore (**traffic management**).





Introducing AIS / SAT-AIS (2/2)

The collection of AIS messages by satellites (SAT-AIS) is a very promising technology with current service capabilities + on-going research/projects to further improve the technology and develop related applications.

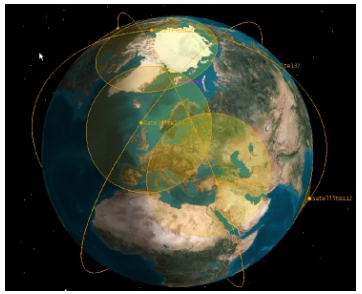
The main technical issue is **intra-system collisions**. 2 different approaches for improvement are today under study:

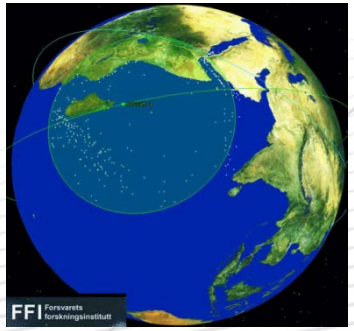
- large constellation, with low performance payloads
- improved constellation, with high performance payloads

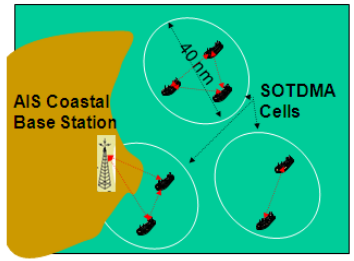
Main objectives are:

- global fleet monitoring
- detection probability > 90%
- ship data refreshment rate ~ 2 hours or less

⇒ ESA and EMSA are consolidating EU User Requirements.





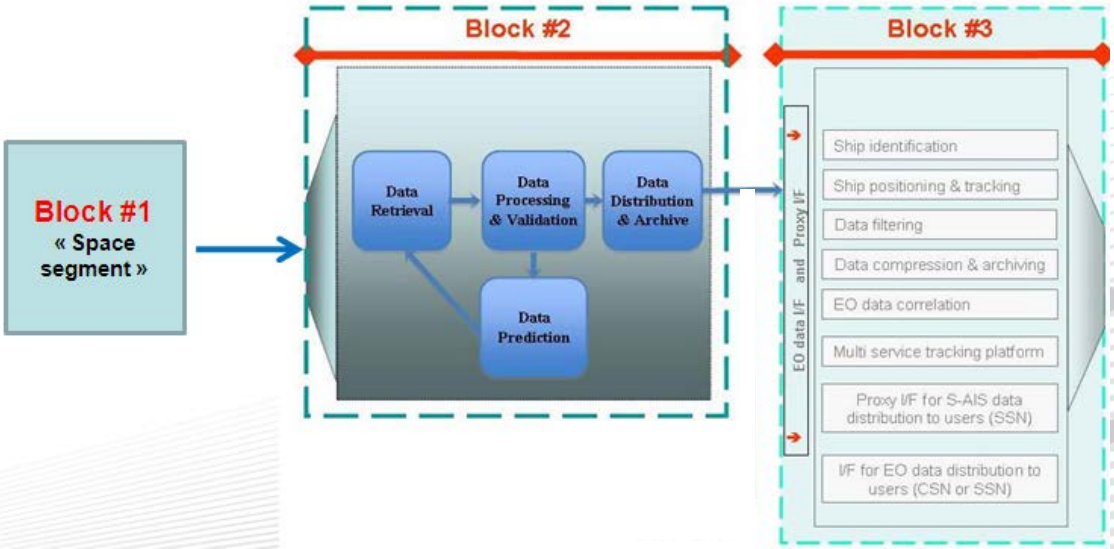


Background of the Project

The SAT-AIS Data Processing Centre (DPC) Demonstrator is a development co-funded by EMSA and ESA. The DPC will collect SAT-AIS messages, ancillary and auxiliary information for generating and distributing enhanced data services to the maritime community.

The ARTES 20 demonstration project aims to **develop the ESA component of the DPC which shall receive SAT-AIS and ancillary data from satellite providers, process and correlate them with Earth Observation data, then store and distribute the enhanced data to EMSA (European Maritime Safety Agency) component of the DPC**.

The EMSA DPC component on the other hand forms part of the Integrated Maritime Data Environment (IMDatE) that ingests AIS data received from terrestrial and satellite sources with other data sources (e.g. LRIT) in order to **distribute the enhanced data to the maritime community**. The 2 Blocks form the EU SAT-AIS DPC.

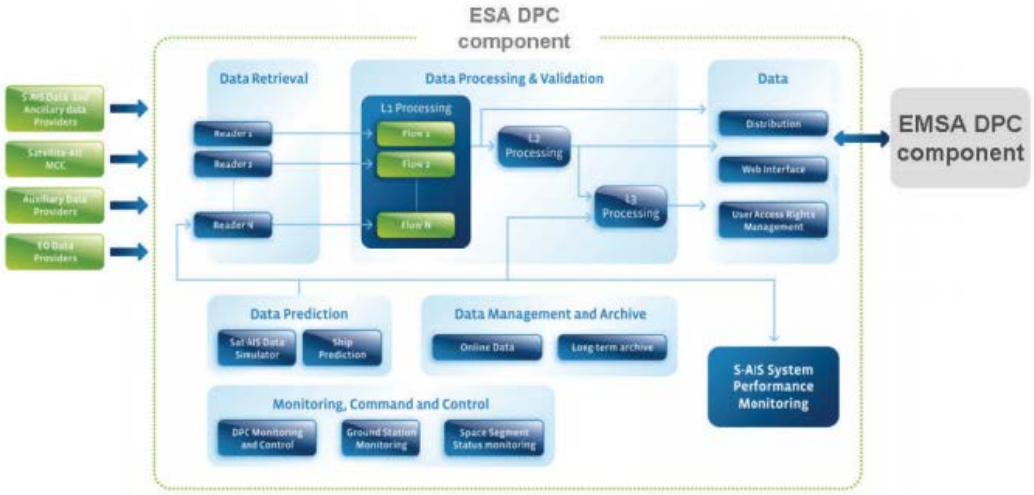


Scope of the Project (1/2)

Key facts:

Challenges:
- Capability to achieve **near real time data feed** to the EMSA component of the DPC (timeliness)
- **Scalability** of the solution to process the large volume of data that will be generated by ANY future SAT-AIS space segment (global, more detected ships, more messages/ship)

DPC block 2 functionalities:
-Retrieving SAT-AIS data, together with ancillary information such as the Doppler shift and ship detection reports derived from Earth Observation imagery
-**Validation of AIS message position**
-**Forecasting** ship positions and expected ship visibility from the space segment
-Generating **warning messages** when AIS information has not been detected, or when the system has lost contact with a ship.



Scope of the Project (2/2)

Key facts:

Consortium:

Scope:

- Design and Development of “Block 2”
- Integration with “Block 3”
- Pre-operations and validation over 8 months

Users' perspective

Pre-Operational use:

Currently, the SafeSeaNet (SSN) operated by EMSA ensures the effective tracking of vessels and hazardous cargoes based on the data received by coastal stations. From the coastal stations, the AIS messages are transferred via national stations to four regional AIS servers that provide the data to the EMSA SafeSeaNet server.

The **SAT-AIS DPC will provide an additional data stream for EMSA's IMDatE**. The provision of SAT-AIS data would bring value added to existing maritime information services by providing ship detection capabilities at distances from coastlines that cannot be covered by land-based AIS.

Additional benefits to the user communities lay in the **validation of the positional information included in AIS messages** which will provide an effective means to identify and counteract illegal (maritime related) activities. SAT-AIS information will support European entities and institutions in **law enforcement, fisheries control campaigns, maritime border control operations, maritime safety and security issues including marine pollution response, search and rescue and anti-piracy**.

Conclusions and next steps

Demonstration project:

Planning:
-24 months project
-FR: Aug. 2013
-FP: Sept. 2013

Current status:
-on-going design
-CDR: 27/04/12

Next steps:
-System development activities, first prototype available in Nov. 2012
-Start of pre-operations: Jan. 2013

Questions ?

Thank you !

Gaëtan FABRITIUS

www.cls.fr
www.lrit.fr
www.sat-ais.org