

# European Space Agency activities of importance for e-navigation

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# ESA activities

✈️ ESA IAP programme

✈️ New Radar satellites

✈️ AIS satellites

✈️ GNSS Summit Munich 2009



# ESA IAP

- ✚ ESA Intergrated Applications Programme IAP
  
- ✚ Combination of existing space assets for at least two areas i.e;
  - Earth Observation
  - Navigation
  - Communication
  - Human Space flight
  - .....
  
- ✚ e- navigation
  - Earth Observation
  - Navigation
  - Communication



# ESA IAP timeshedule

<i>Phase</i>	<i>Timescale</i>	<i>Overall goal</i>
<i>1. Preparatory phase</i>	2006-2008 (until MC 2008)	Short-term work plan aimed at: <ul style="list-style-type: none"><li>• Developing awareness and integrated projects candidates representative to the IAP concept</li><li>• Defining a IAP programme proposal to be submitted to the Ministerial Council in 2008</li></ul>
<i>2. IAP programme</i>		Mid-term work plan aimed at:
<i>Phase 1</i>	2009-2013	Implementing and running a 5-year work plan meant to generate integrated applications and based on 2 main elements: <ul style="list-style-type: none"><li>• Basic activities</li><li>• Demonstration activities</li></ul>
<i>Phase 2</i>	2012-2016	

**Table 1: IAP overview**

# IAP elements

## 1. Element 1: 'Basic activities' which aim at generating and assessing ideas for projects.

- This element will comprise two steps:
- • IAP awareness activities
- • Feasibility studies

## 2. Element 2: 'Demonstration activities' which aim at demonstrating the ideas

generated in the first element as well as spontaneous and mature concepts submitted to IAP. This element will comprise two steps: projects and pre-operational activities.

# ESA IAP

- 🚀 Space for Health
- 🚀 Space for Energy
- 🚀 Space for Development
- 🚀 Space for Safety
- 🚀 **Space for Transport**



# ESA IAP

<i>Activities aimed at</i>	<i>Outline</i>
<i>European partners</i>	<ul style="list-style-type: none"> <li>• Further federation of user needs through the EU:               <ul style="list-style-type: none"> <li>◦ European Commission services (Directorates General MARE, SANCO, RELEX, etc.);</li> <li>◦ European agencies (e.g. European Defence Agency (EDA), European Centre for Disease Control (ECDC))</li> </ul> </li> <li>• In line with ESP implementation and Space Council Resolutions, engage a dialogue on:               <ul style="list-style-type: none"> <li>◦ Regulatory framework, industrial policy and public service policy, interoperability, IPR, data policy, etc.</li> <li>◦ IAP-related technical issues/ projects (mainly with JRC)</li> <li>◦ JRC is involved in all joint EC-DGs/ESA activities</li> </ul> </li> <li>• Space applications forum</li> </ul>
<i>National partners</i>	<ul style="list-style-type: none"> <li>• IAP awareness meetings/workshops in countries where a need is still seen.</li> </ul>
<i>Regional partners</i>	<ul style="list-style-type: none"> <li>• Further federation of users through regional entities e.g. Eurisy and NEREUS</li> </ul>
<i>ESA (Internal)</i>	<ul style="list-style-type: none"> <li>• Internal coordination with the other directorates through thematic/transversal activities</li> <li>• Where useful, additional ESA thematic Working Groups (Energy, Safety etc.) following planned ESA Space for Health Working Group (S4HWG)</li> <li>• Websites and other communication material (thematic, IAP, space assets etc.)</li> <li>• IAP Advisory Group</li> </ul>

**Table 2: General activities**

# ESA IAP

- ✚ Space for safety and/or transport
- ✚ Joint DG MARE/ESA Space and Ocean Workshop

## MARISS IAP Extension

The MARitime Security Service (MARISS) is a GMES Service Element (GSE) initiative that integrates near real time satellite Earth Observation (EO) data with conventional vessel tracking data to deliver an understanding of the maritime situation in Europe. The objective of the project is the following one:

- The integration of Long Range Identification and Tracking for vessels beyond the transmission range for coastal AIS.
- The integration of satellite-based AIS to extend AIS beyond coastal waters.
- Utilisation of telecommunication satellites to improve inter-operability and information exchange.

# ESA other activities

## ✈ GNSS Evolution

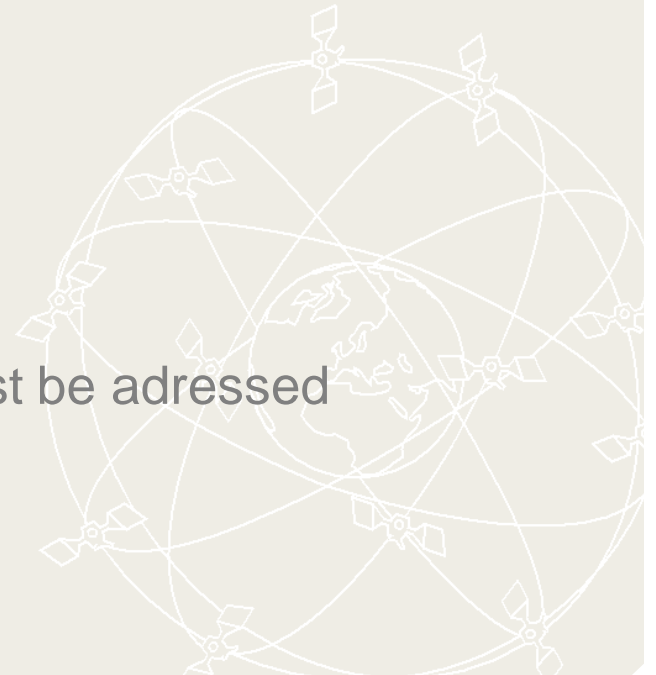
- Next generation Galileo
- Arctic MRS

## ✈ ESA support for SESAR

## ✈ New ATM structure in Europe

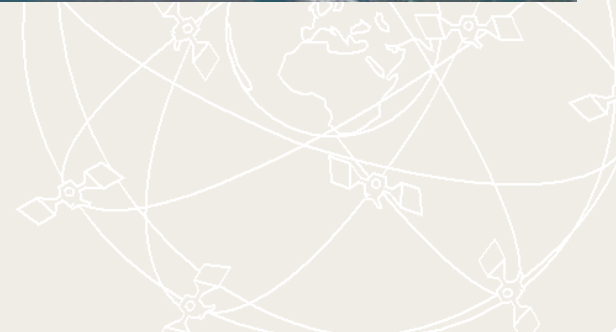
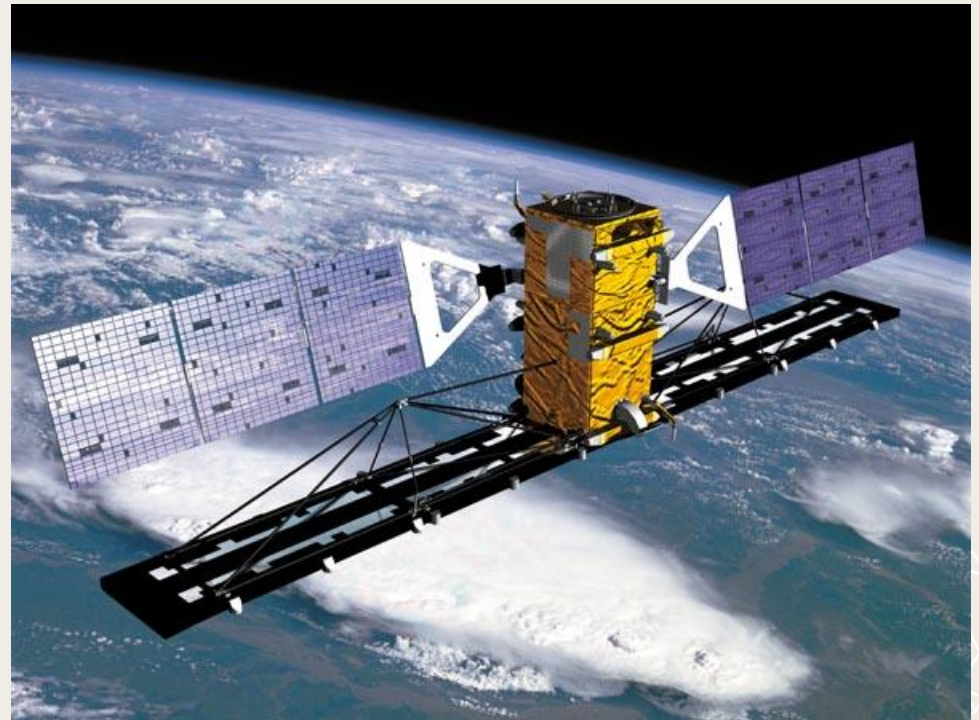
## ✈ ESA ARTES 20 IRIS

- Satcom
- Including GEO
- Requirements for transpolar flights must be addressed  
HEO/Molniya satellites
- GNSS including Galileo and GPS



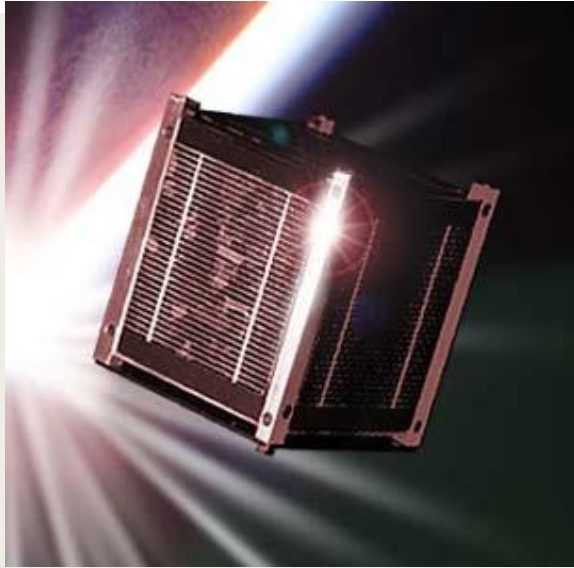
# New radar satellites

- ✦ ENVISAT (2002)
- ✦ Radarsat-2 (2007)
- ✦ Sentinel-1A (2011)
  
- ✦ COSMO Skymed
- ✦ TerraSAR-X
  
- ✦ Radarsat follow on
  
- ✦ HMETOC
- ✦ Ice forecasting
- ✦ Ship detection

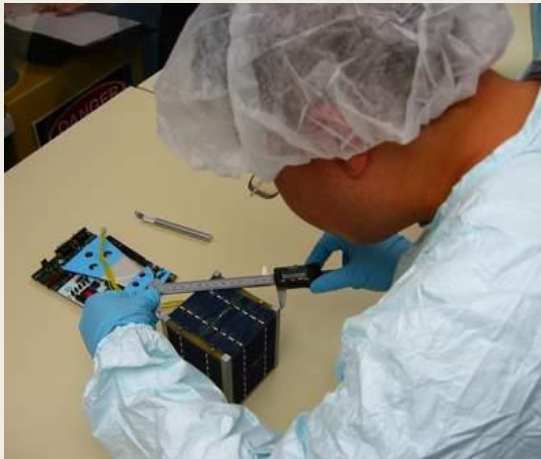




# AIS - Norway

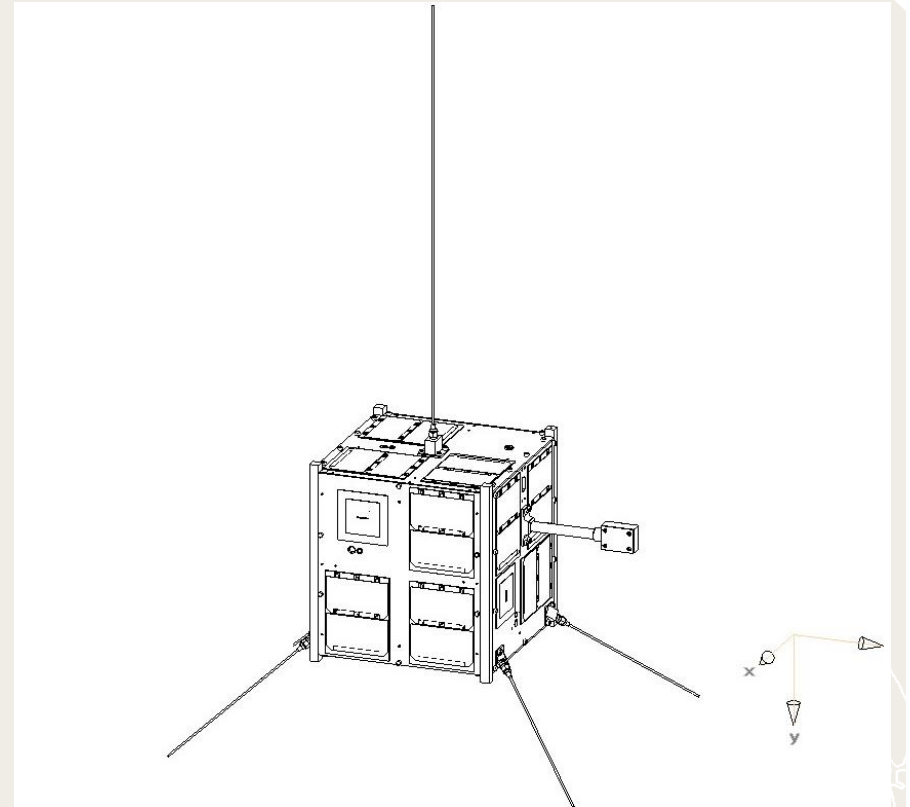
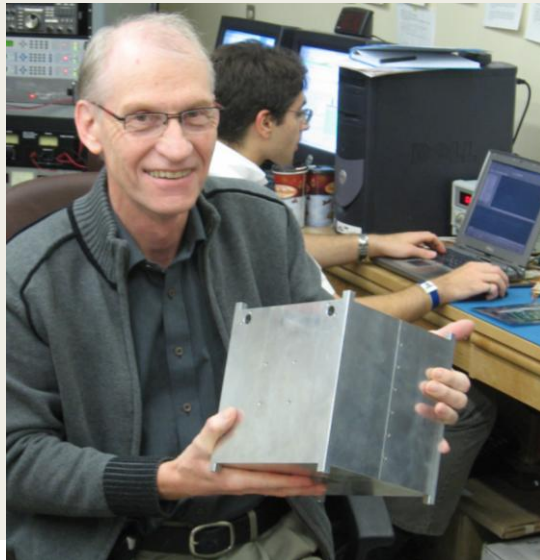


- ✂ Coastal AIS chain is operational
- ✂ Some airborne AIS is available
- ✂ Student satellites with AIS have been built
- ✂ National small AIS-satellite has being studied and designed
- ✂ Construction of the AIS satellite is ongoing
- ✂ Launch 2009

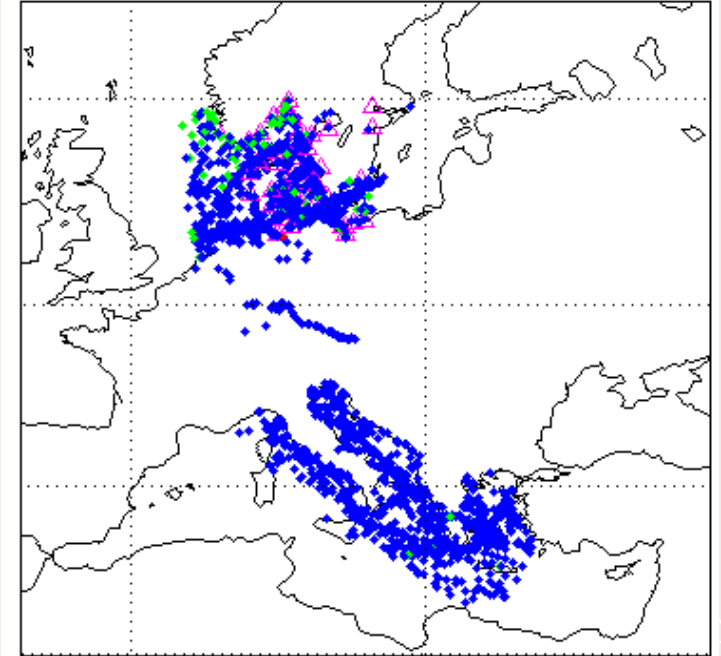
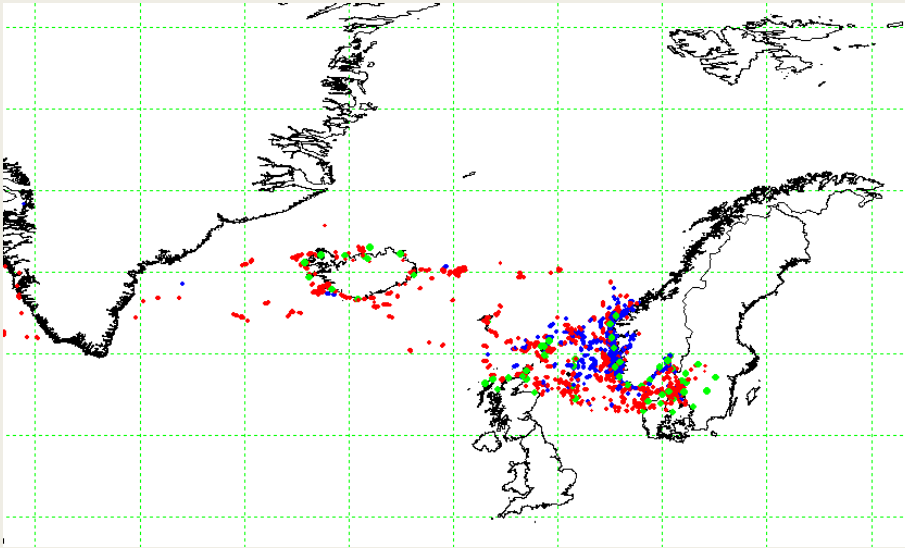


# The Norwegian AIS satellite

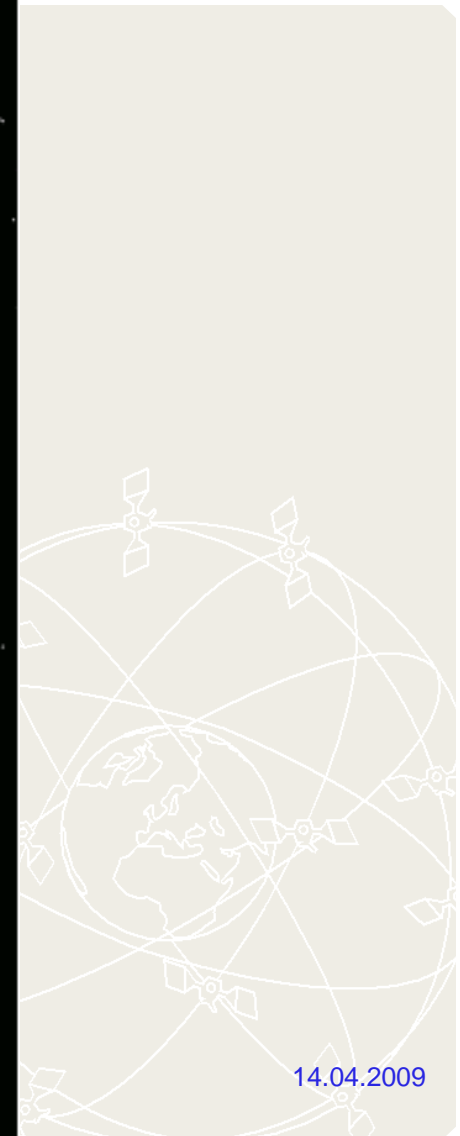
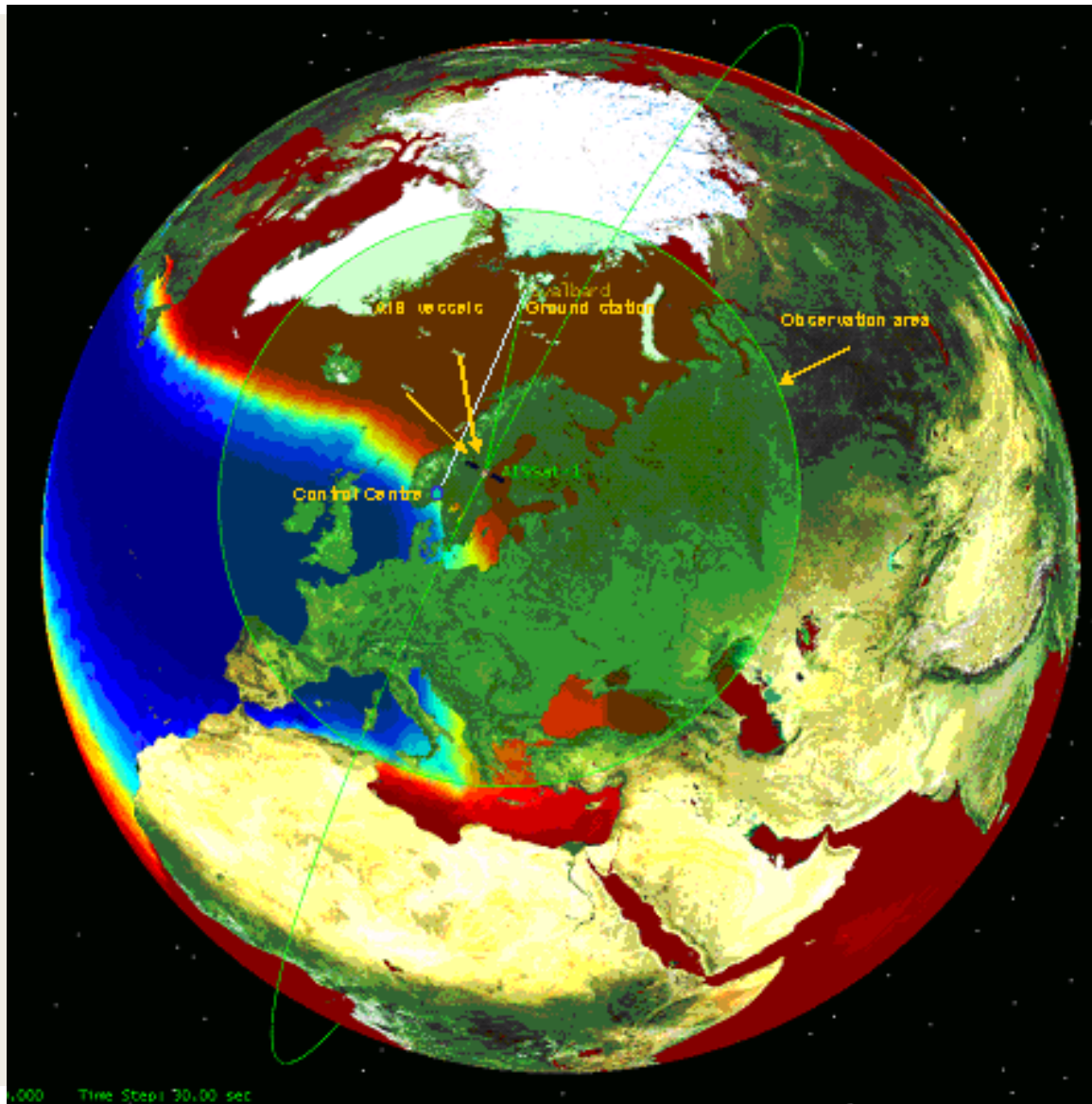
- ✎ 20 x 20 x 20 cm + antennas
- ✎ 6 - 7 kg
- ✎ Norwegian AIS payload
- ✎ Bus from University of Toronto



# Airborne AIS measurements



# Norwegian AIS-satellite performance



14.04.2009

# The Munich Satellite Navigation Summit 2009

## GPS

- 31 satellites operational
- New ground infrastructure
- GPS III first launch 2014

## Galileo

- 2013 FOC

## GLONASS

- 19 operational satellites
- 3+3 planned for launch second half 2009



# The Munich Satellite Navigation Summit 2009

## COMPASS/Beidou

- 5 GEO + 30 MEO satellites
- Scheduled launch of 10 first MEOs
- Regional in Asia Pacific 2010
- Global later

## GNSS

- Mobile telephones 95% of GNSS use
- Combination with other location systems
- L1 only
- Smart phones



**Questions ?**

