

Dragoness Progress Meeting, Qingdao, 8 - 10 Sept 2009

D2.1 Chinese and European Spaceborne Ocean Observing
Systems and Onboard Sensors

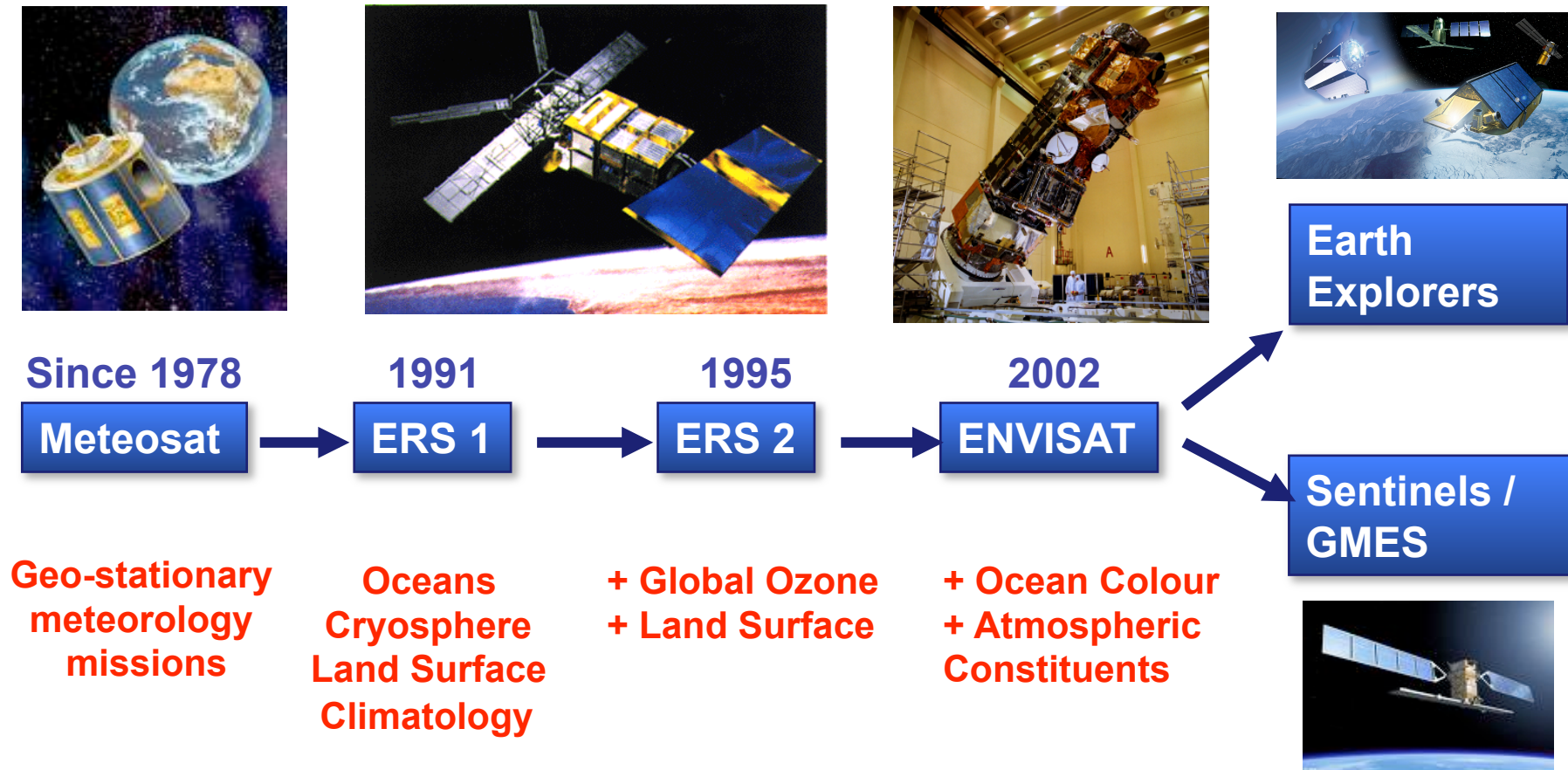
Werner Alpers

Update on ESA Earth Observation Programme

Based on the presentation of Stephen
Briggs (ESA, ESRIN) at the DRAGON 2
Symposium in Barcelona, 22 June 2009

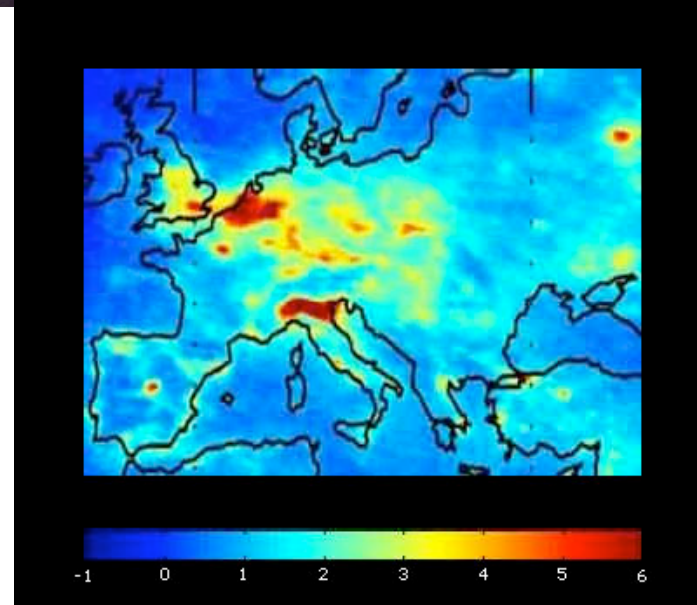
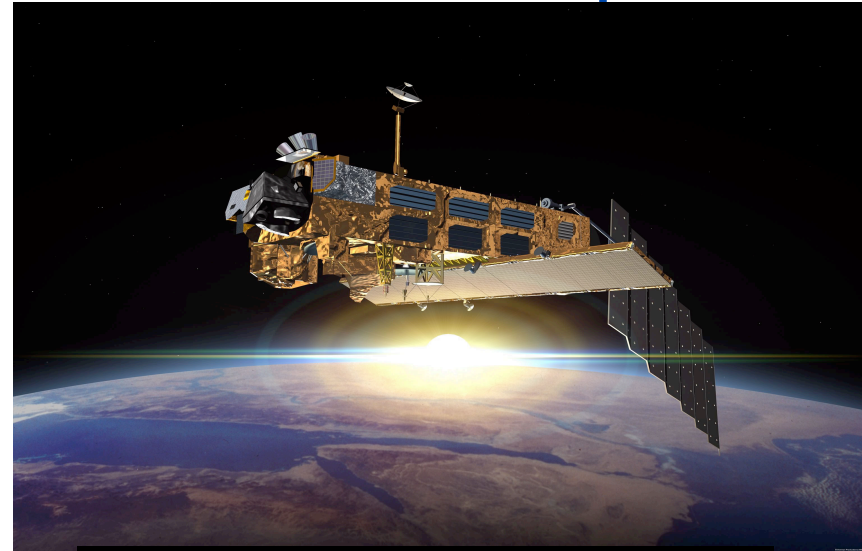
From past to present

Europe's expanding EO capability

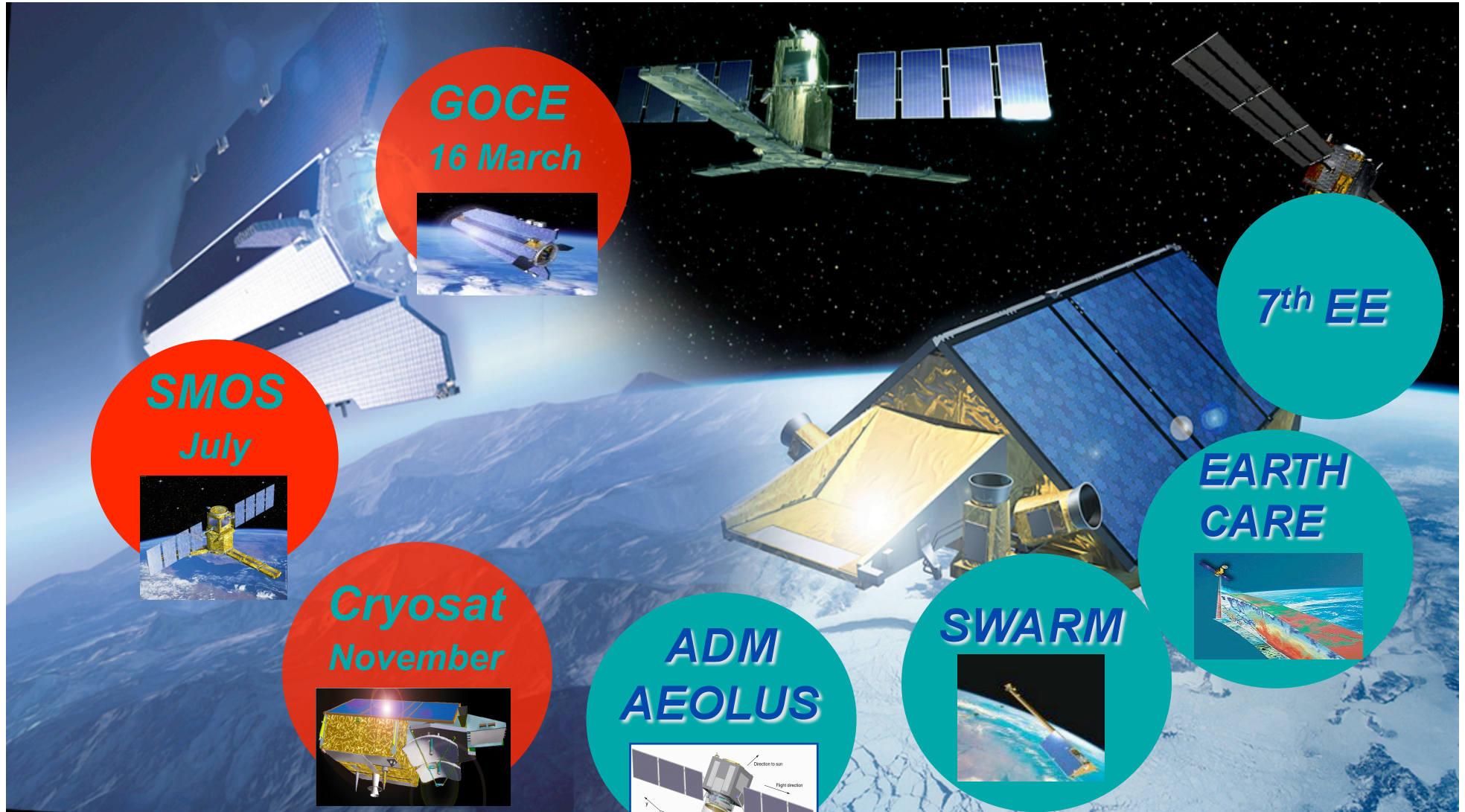


EO missions and exploitation

- **Envisat** 7th year in operation, **ERS-2** 14 years in space



ESA Earth Explorers



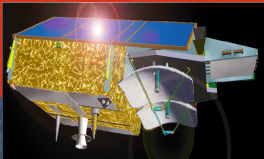
GOCE
16 March



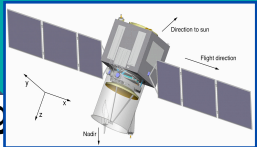
SMOS
July



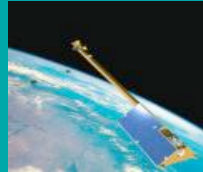
Cryosat
November



**ADM
AEOLUS**

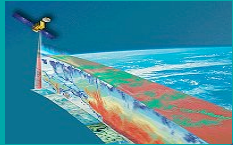


SWARM



7th EE

**EARTH
CARE**



ESA's Gravity Mission

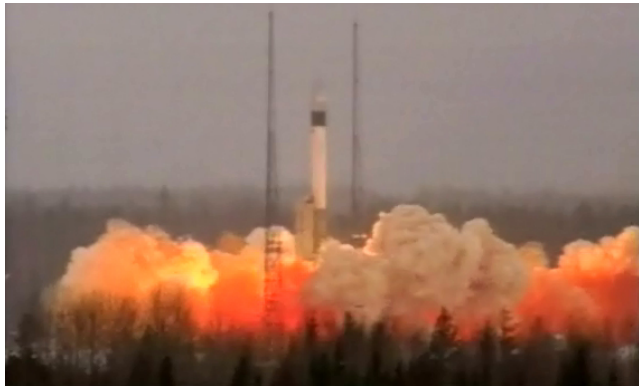
GOCE *(Gravity field and steady state Ocean Circulation Explorer)*

- First ESA Earth Explorer Core Mission
- dedicated to the exploration of the Earth gravity field
- Several satellite technology **world premiers**: most sensitive gradiometer ever flown, first drag-free flight with ion thrusters, extremely low orbit



ESA's Gravity Mission

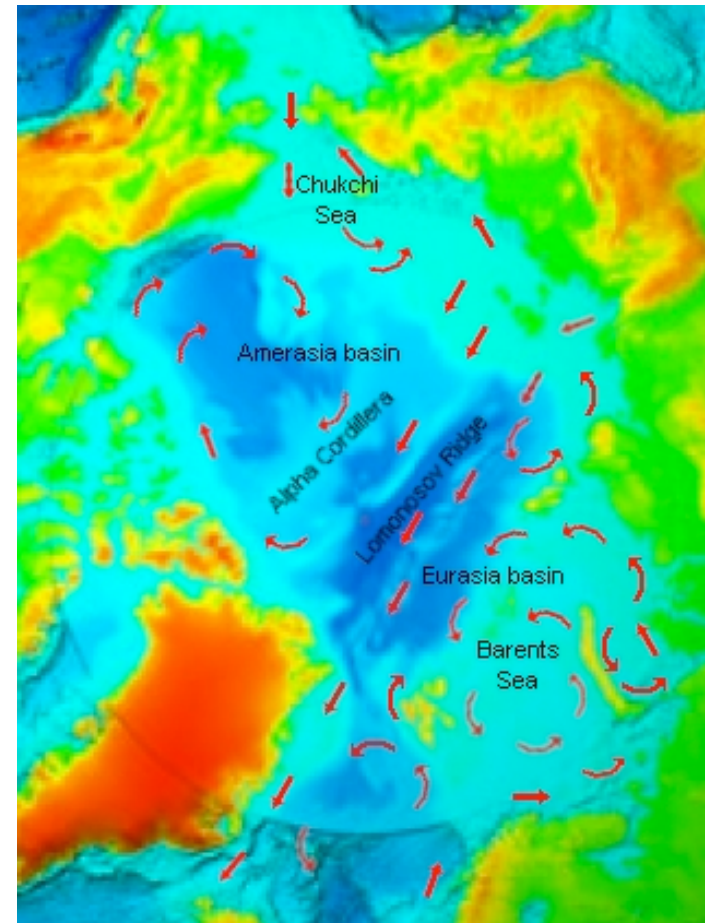
GOCE: successful launch on 17 March 2009



- GOCE was successfully launched from Plesetsk on 17 March.
- Commissioning of the satellite started on 20 March, commissioning of the gradiometer on 6 April.
- Both the satellite and the ground segment are in very good shape and fully functional. At satellite level, drag-free flight and instrument calibration activities are continuing.

GOCE: what to do with its data

- Improved understanding of ocean circulation and energy distribution
- Gravity field map and improved global geoid models
- Global unification of height systems



Low sensitivity of brightness temperature on sea surface salinity (SSS)

Sensitivity:

0.7^o K/psu at 30^o C

0.2^o K/psu at 0^o C

Further launches

Two more Explorers set for launch in 2009

SMOS (Soil Moisture and Ocean Salinity), ESA's water mission

November



CryoSat, ESA's ice and snow mission

December



Aquarius

US – Argentina cooperation, launch 2010

L band radiometer: not interferometric, polarimetric channels, accuracy :
0,1 0 K

L band scatterometer: accuracy : 0.1 degrees

3 beams, 3 horn footprint

390 km swath

4 repeat cycles per month

Selection of next Earth Explorer Mission

- Almost thirty proposals, six candidate missions
- End of industrial Phase 0 studies in September 2008
- User Consultation Meeting **January 2009 in Lisbon**
- Selection of three missions for pre-phase A studies: BIOMASS (P-band SAR), CoReH2O (snow mission, Ku and X band SAR), PREMIER (upper troposphere)



The International Charter on Space and Major Disasters

- Unified system of space data acquisition & delivery in case of natural or human-made disasters
- Data delivery to civil protection agencies, emergency & rescue services



Examples of activations:

- Bam Earthquake 2003
- Darfur Crisis 2004
- Tsunami Catastrophe 2004/2005
- Hurricane Katrina 2005
- Sichuan earthquake / China, 12 May 2008
- Cyclone Nargis, Hurricanes Gustav, Ike 2008



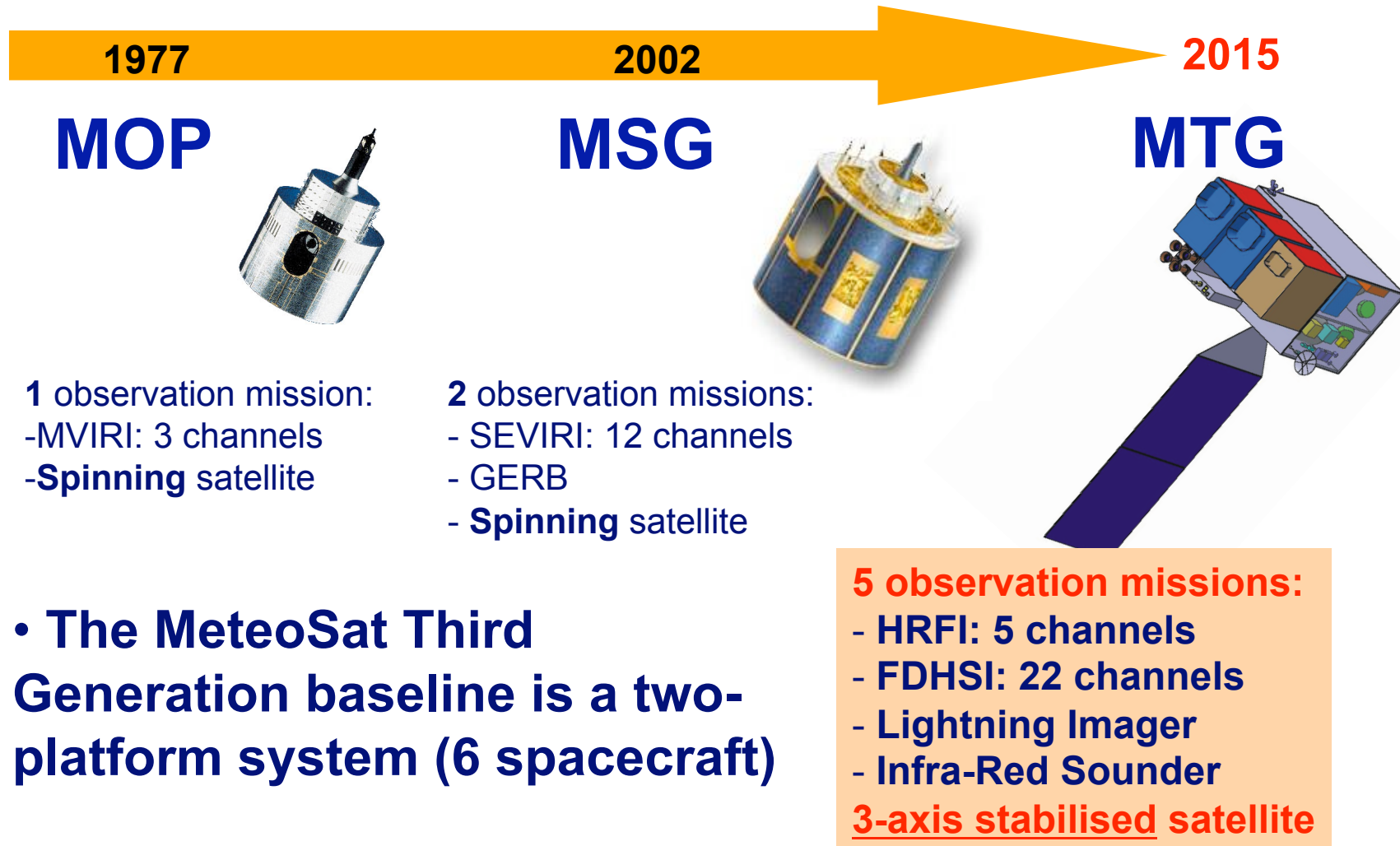
ESA Ministerial Council 2008

- **Earth Observation: 3 elements have been endorsed:**
 - **METEOSAT Third Generation**
 - **GMES Segment 2**
 - **Climate Change Initiative**



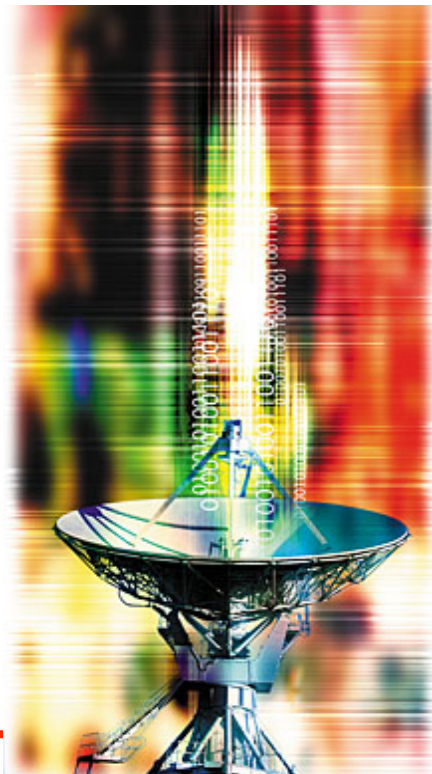
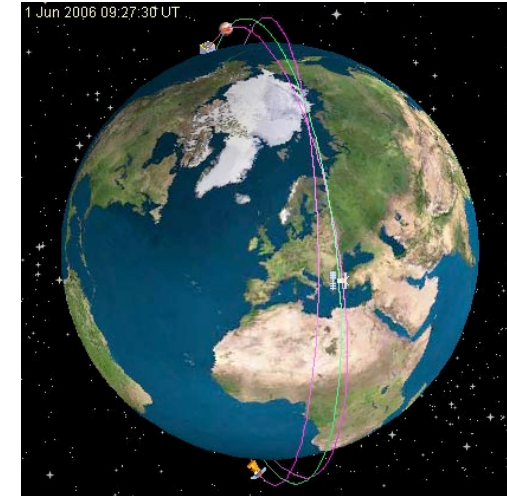
Meteorological Programmes

- Development of the meteorological programmes:



- The MeteoSat Third Generation baseline is a two-platform system (6 spacecraft)

Global Monitoring for Environment and Security



European **independence** in data sources for environment and security monitoring *and*

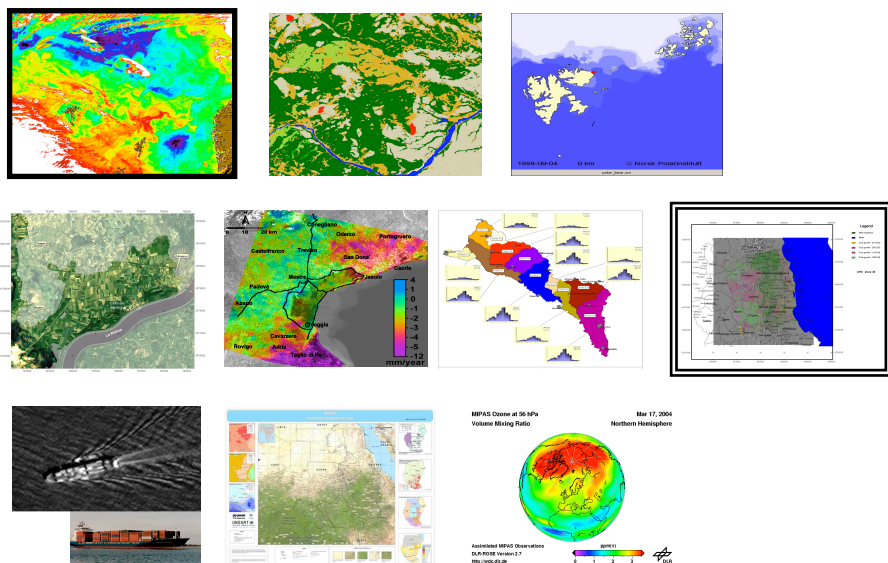
The European **contribution** to the Global Earth Observation System of Systems (GEOSS)

Services: From ESA to EC

GMES Service Element



Fast Track Services



100 M€ by ESA MS

Period 2003-2008 (2009)

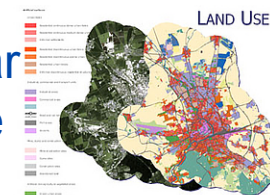
330+ user organisations

EC has invested another 100 M€

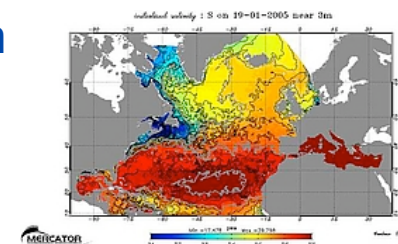
■ **Emergency Respond Core Service** respond to crises and emergencies



■ **Land Monitoring Core Service** regular independent satellite coverage of Europe



■ **Marine Core Service** ocean forecasting, monitoring & reporting and applications on environment & safety



Availability – Reliability - Affordability

The GMES Space Component Programme

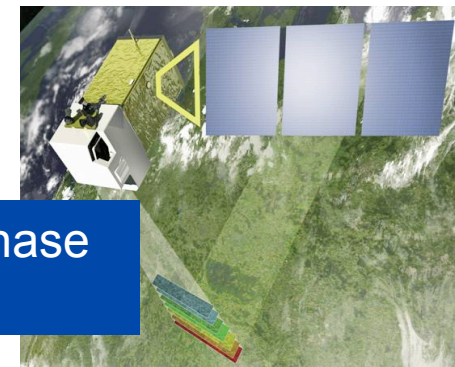
▪ Development, launch and IOV of the Sentinels

- S1: SAR imaging
- S2: Superspectral imaging
- S3: Ocean monitoring
- **S4 (on MTG) atmosphere (GEO)**
- **S5 (on Post-EPS) atmosphere (LEO), preceded by a S5 pre-cursor**

Industrial phase running

▪ Ground Segment & Coordination

- Access to data from ESA, EUMETSAT, Member States' missions
- Development of Sentinel GS



Thank you for your attention

谢谢！