ESA Creating Value, Along the Value Chain

ARTES Applications Workshop
ESTEC, April 5th & 6th 2011

A. Ginati.
European Space Agency (*ESA*)

European Space Agency

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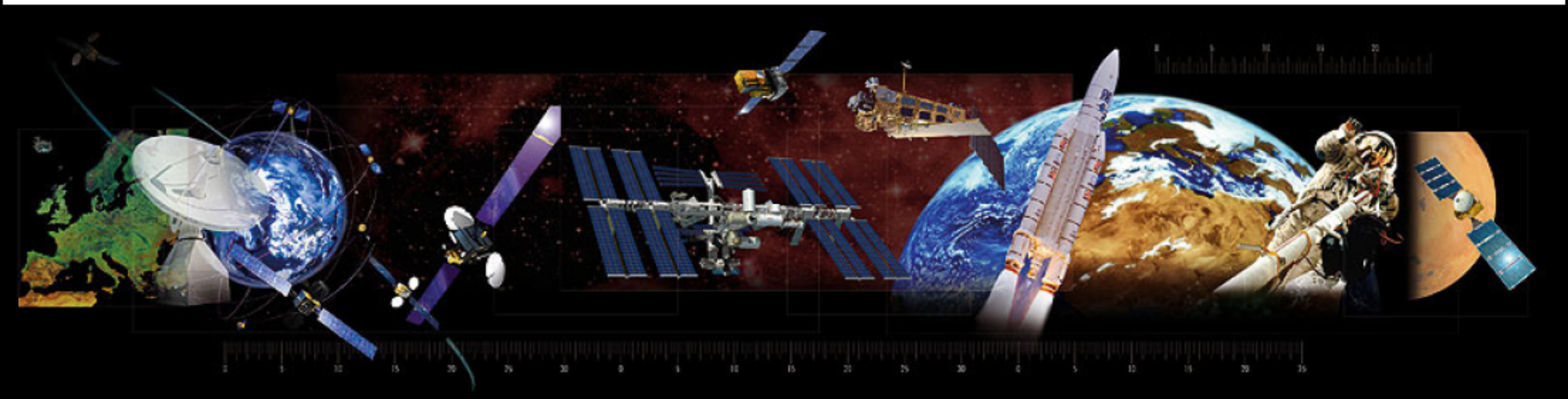
- ESA and “Applications Potential”
- ARTES Applications Programmes
- Examples of Established IAP Services
- User Driven Mission, SAT-AIS
- Partnership & 3rd Party Funding
- Conclusion

ESA Activities

ESA is one of the few space agencies in the world to combine responsibility in nearly all areas of space activity.

- Space science
- Human spaceflight
- Exploration
- Earth observation
- Launchers
- Navigation
- Telecommunications
- Technology
- Operations



ESA Facts and Figures

- Over 30 years of experience
- 18 Member States
- Five establishments, about 2000 staff
- 3.7 billion euro budget (2010)
- Over 60 satellites designed, tested and operated in flight
- 17 scientific satellites in operation
- Five types of launcher developed
- Over 190 launches

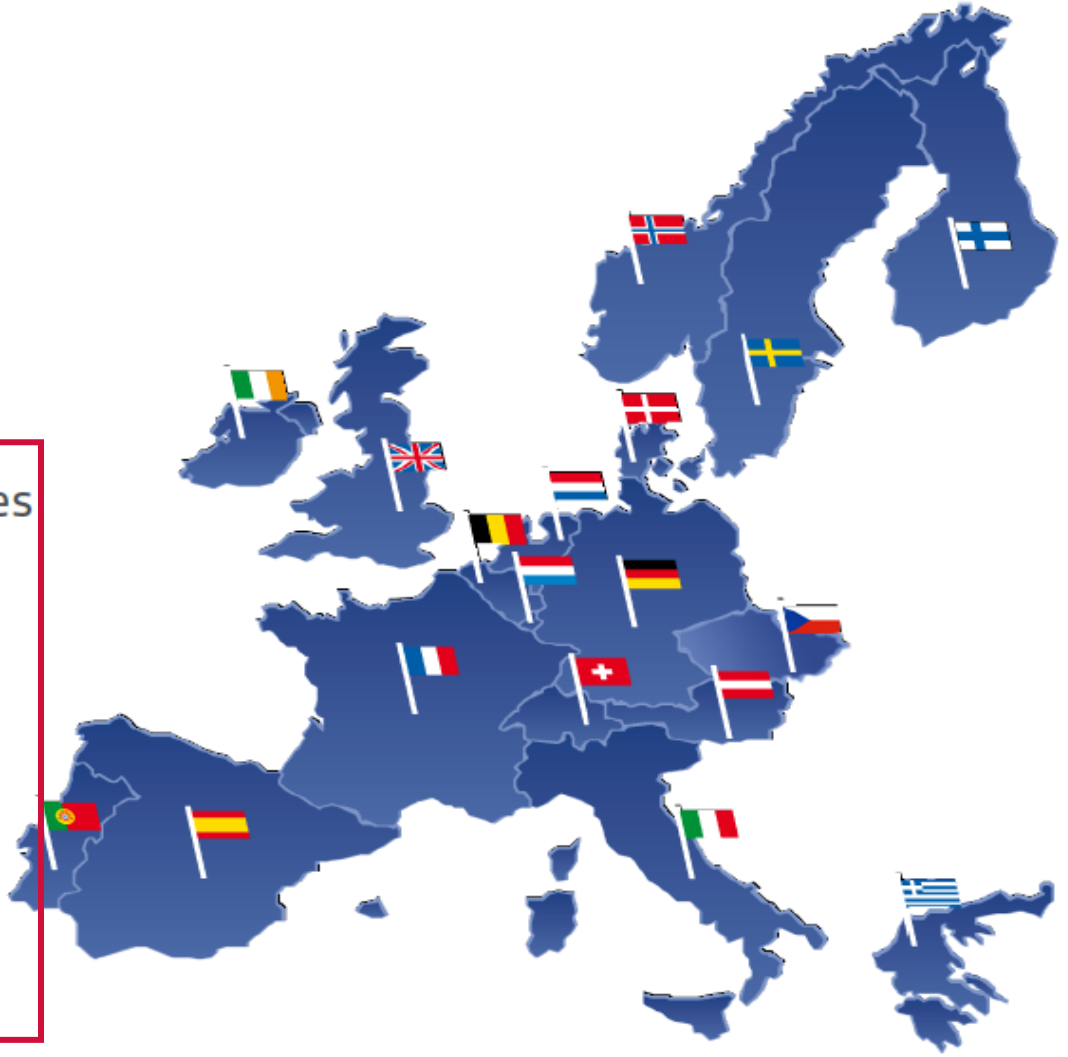
18 Member States

Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Norway, the Netherlands, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Canada takes part in some programmes under a Cooperation Agreement.

Hungary, Romania, Poland, Slovenia, and Estonia are European Cooperating States.

Cyprus and Latvia have signed Cooperation Agreements with ESA.



ESA Activities

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- Space science
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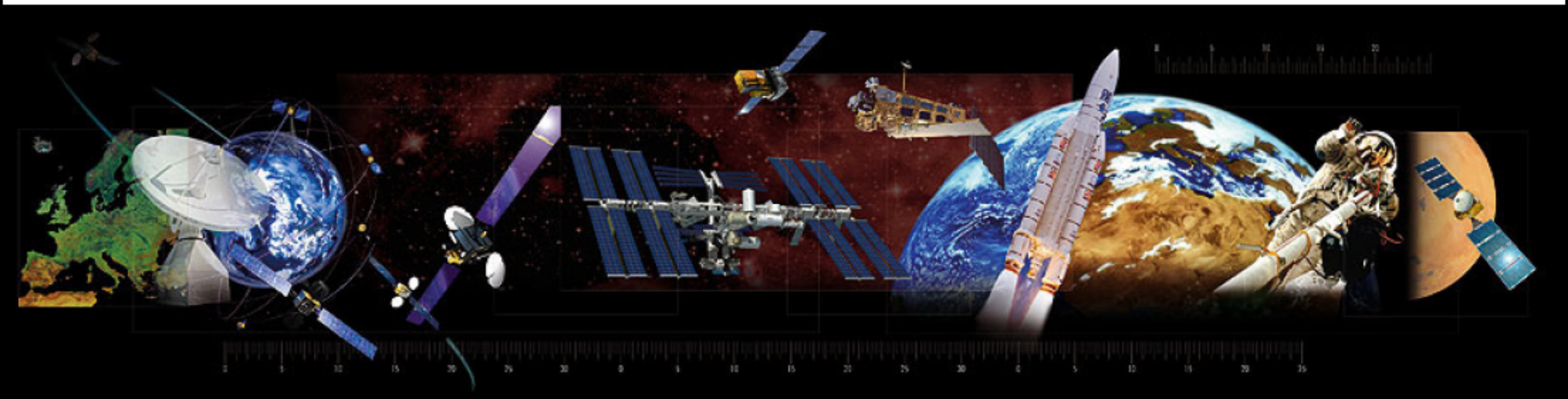
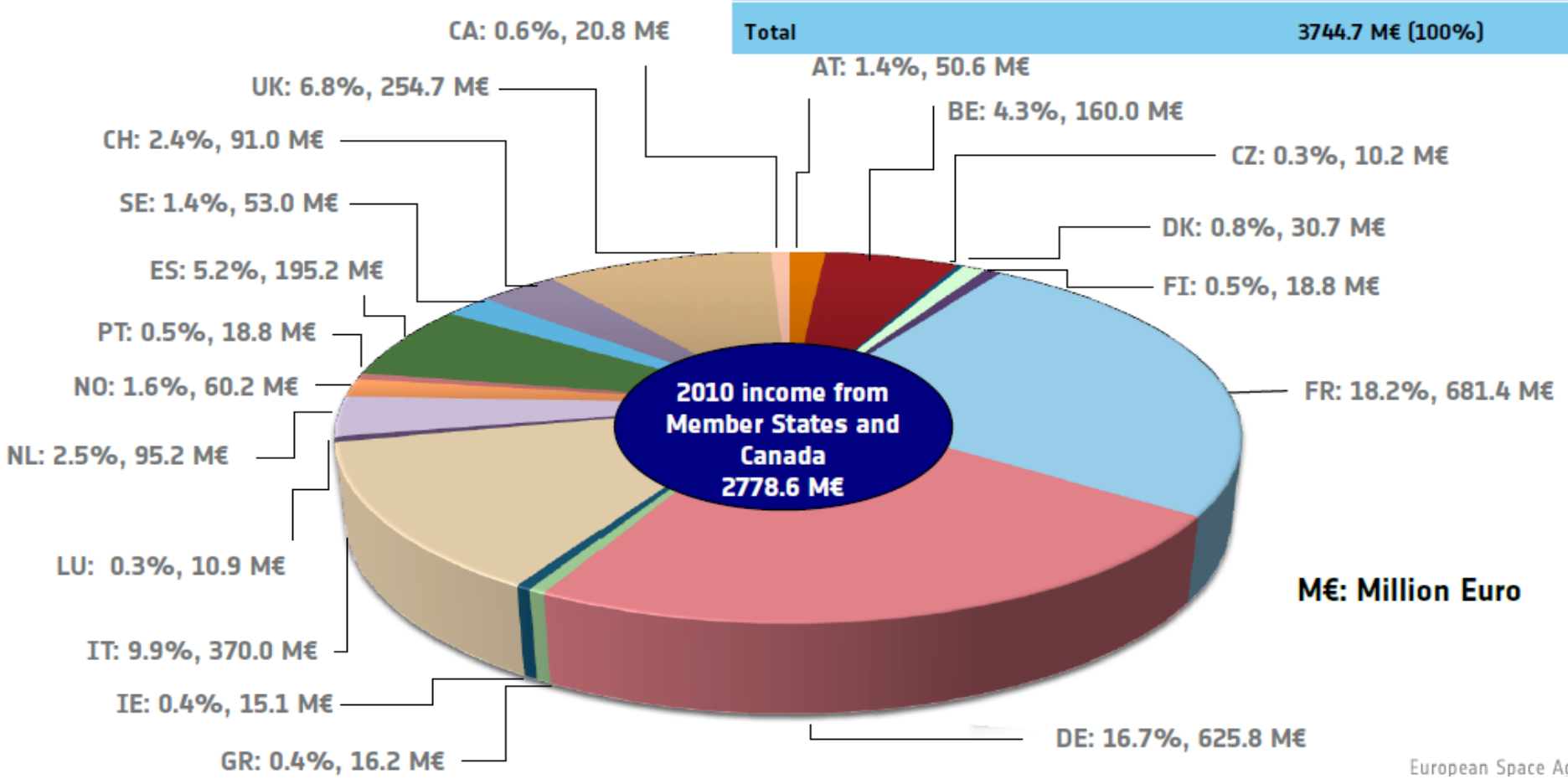
- Telecommunications
- Technology
- Operations
- **Applications: Sat-Com and IAP**



ESA Budget 2010

Income from Member States and Canada	2778.6 M€ (74.2%)
Income from EU	754.8 M€ (20.2%)
Income from ECSA	5.2 M€ (0.1%)
Other income	206.1 M€ (5.5%)
Total	3744.7 M€ (100%)



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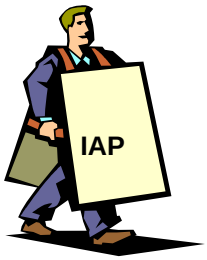
ARTES Applications & User Driven Missions



Awareness

ARTES 3-4

Satcom Demonstration

→ Product Driven Application

ARTES 20 (IAP)

Feasibility

Demonstration

→ User Driven Application

ARTES 21

SAT-AIS Initiative

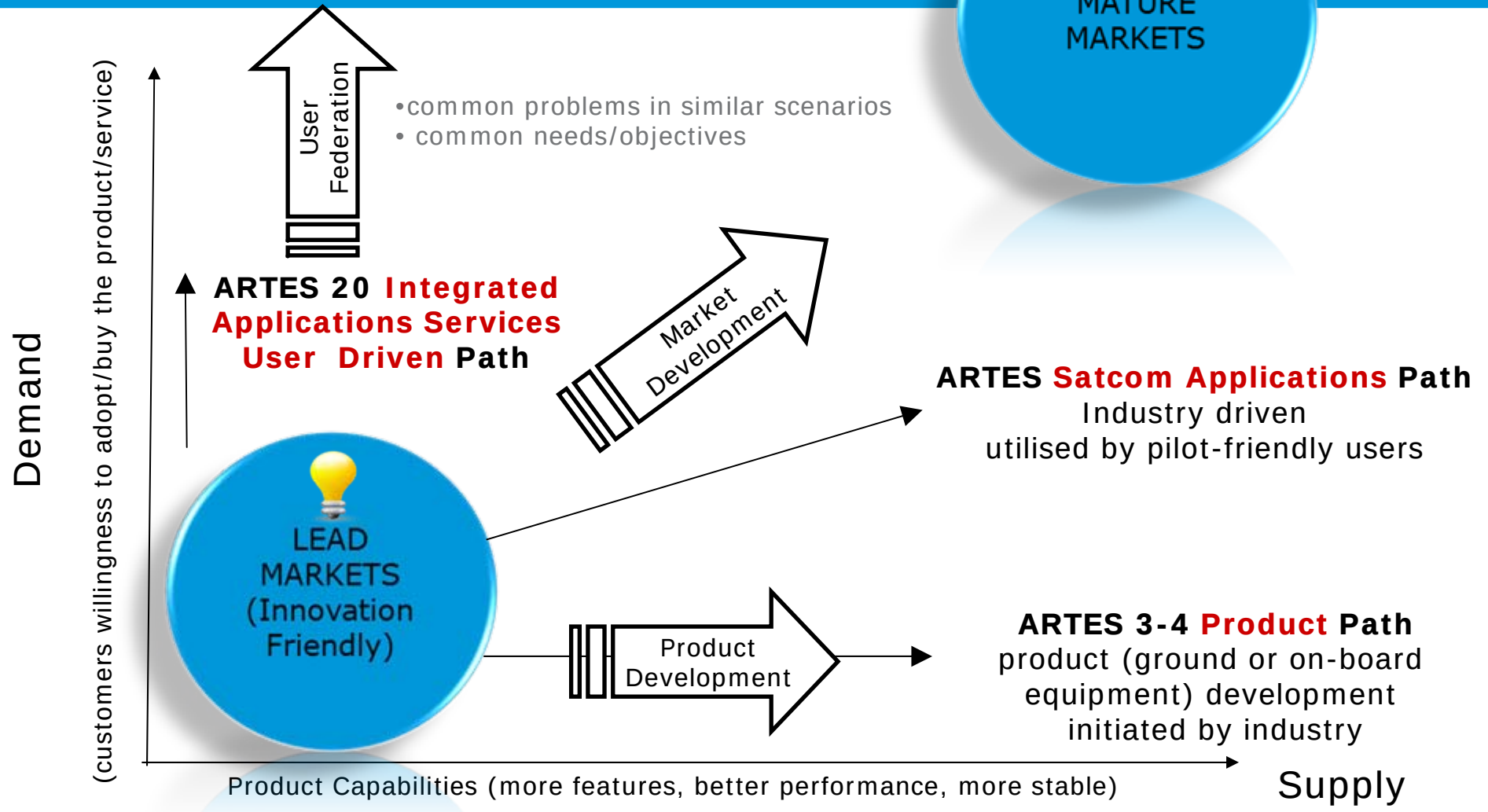
→ User Driven Mission

New Culture

Third-Party Funding /Innovation Fund

→ Co-Funding Approach

ESA applications programme approach to development



Thematic Areas addressed by ARTES Satcom Applications Projects

Telemedicine/ Medical Education

29 Projects
22.7 MEUR (ESA part)

Satcom Networks Systems & Services

37 Projects
31.2 MEUR (ESA part)

B2B / B2C

34 Projects
32.6 MEUR (ESA part)

Location Based Satcom Services

15 Projects
4.3 MEUR (ESA part)

Disaster Relief/ Emergency Management

11 Projects
3.6 MEUR (ESA part)

Community Information Services & Capacity Building

16 Projects
9.3 MEUR (ESA part)

Distance Learning

9 Projects
4.2 MEUR (ESA part)

eGovernment

2 Projects
1.9 MEUR (ESA part)

ARTES 3-4
Satcom Application Projects

12 Ongoing projects: total commitment of ^15 M€; 50% co-funding

- **ISIDE 4 Africa: educational Content in Africa, Project,** 800 k€, Coordinator: Microcinema (I)
- **Internet 4 Dev. Countries: Low Cost Hybrid Terminal Triple Play Solution,** 2.35 M€, Prime: Forsway (S)
- **TESHEALTH: Telemedicine for Prevention and Healthy Life-Style Coaching,** 1,5 M€ (Phase 1), Prime: Telbios (I)
- **Sensible: Satellite Enhanced Network Systems enabling flexible capacity management for closed user groups in the maritime community,** 1,4M€, Prime: ITS (I)
- **NXY: Local caching of multimedia content in a satellite based multicasting delivery system,** 1 M€, Prime: Avanti (UK)
- **COTV: Enhancement for Collaborative TV for New Multimedia Standards**, (CCN#3), 900k€, Prime: Cybercultus (LUX)
- **SatElections: Open eTraining Network for Millennium Development Goals,** (CCN#3), 4,672M€, Prime: Openet (I)
- **Stereoscopic Broadcasting,** 918k€, OpenSky (I)
- **REACT: Communication echange for emergency response,** 420k€, Skytech (IRL)
- **Planet (F), SMART (F), SmartPush VOD (NL), Three projects in the Newcomers Initiative:** total 932k

3 Planned projects: total commitment of 6.7 M€; 50% co-funding

- **TS4CI: Telemedicine for Correctional Institutions,** 1,8 M€, Prime: (TBC), Italy
- **SatBridge: Infomobility on S-Band,** 3,7 M€, Prime: ITS (TBC), Italy
- **SatADSL: Network for financial institution in Africa,** 1.2 m€ , Space&Sea, B

Synergy measures with ARTES 20 programme was implemented and mutual enrichment leading to revitalisation of ARTES 3-4.

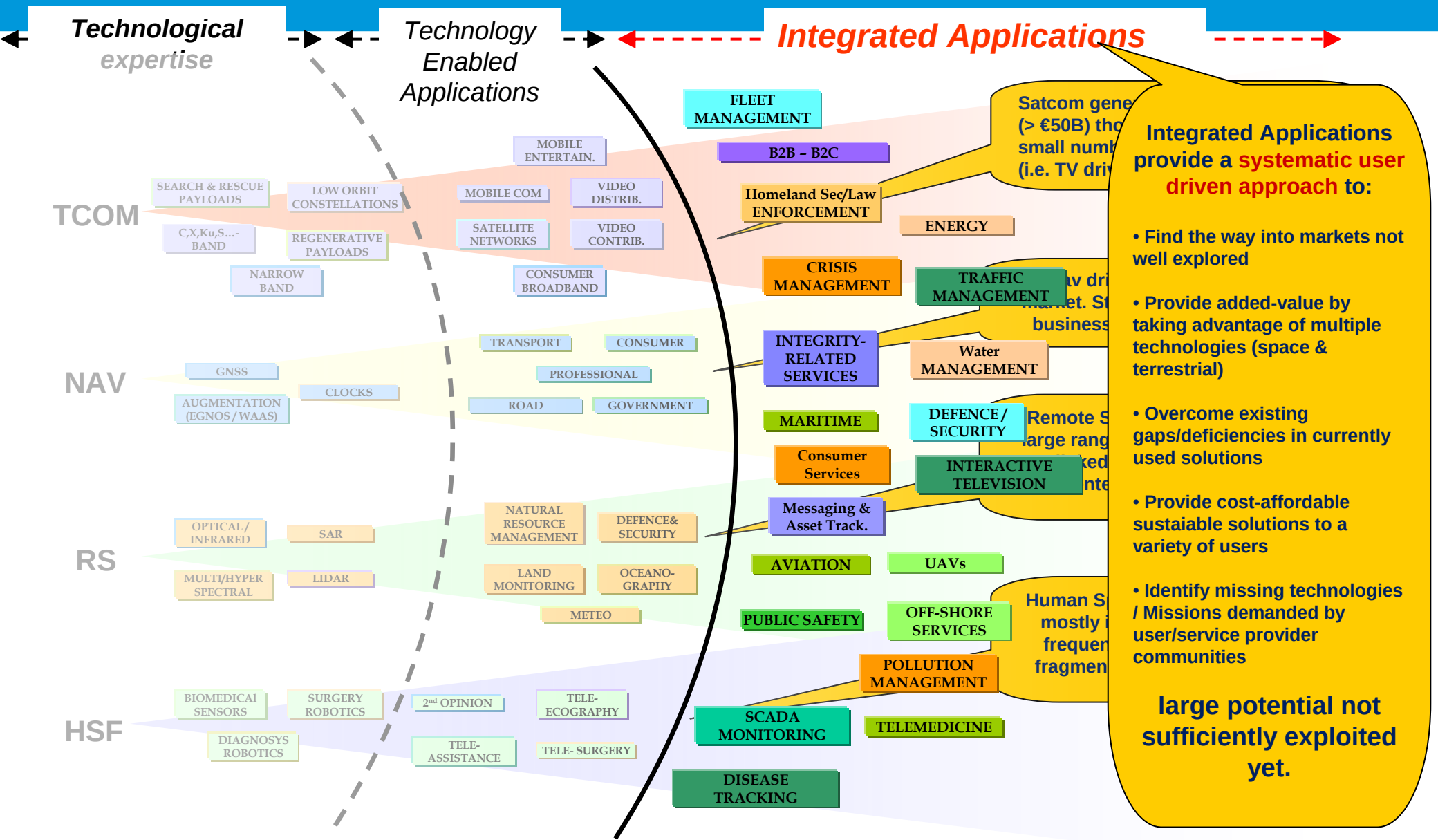
ESA's Integrated Applications Promotion Programme (ARTES 20 / IAP)

The goal :

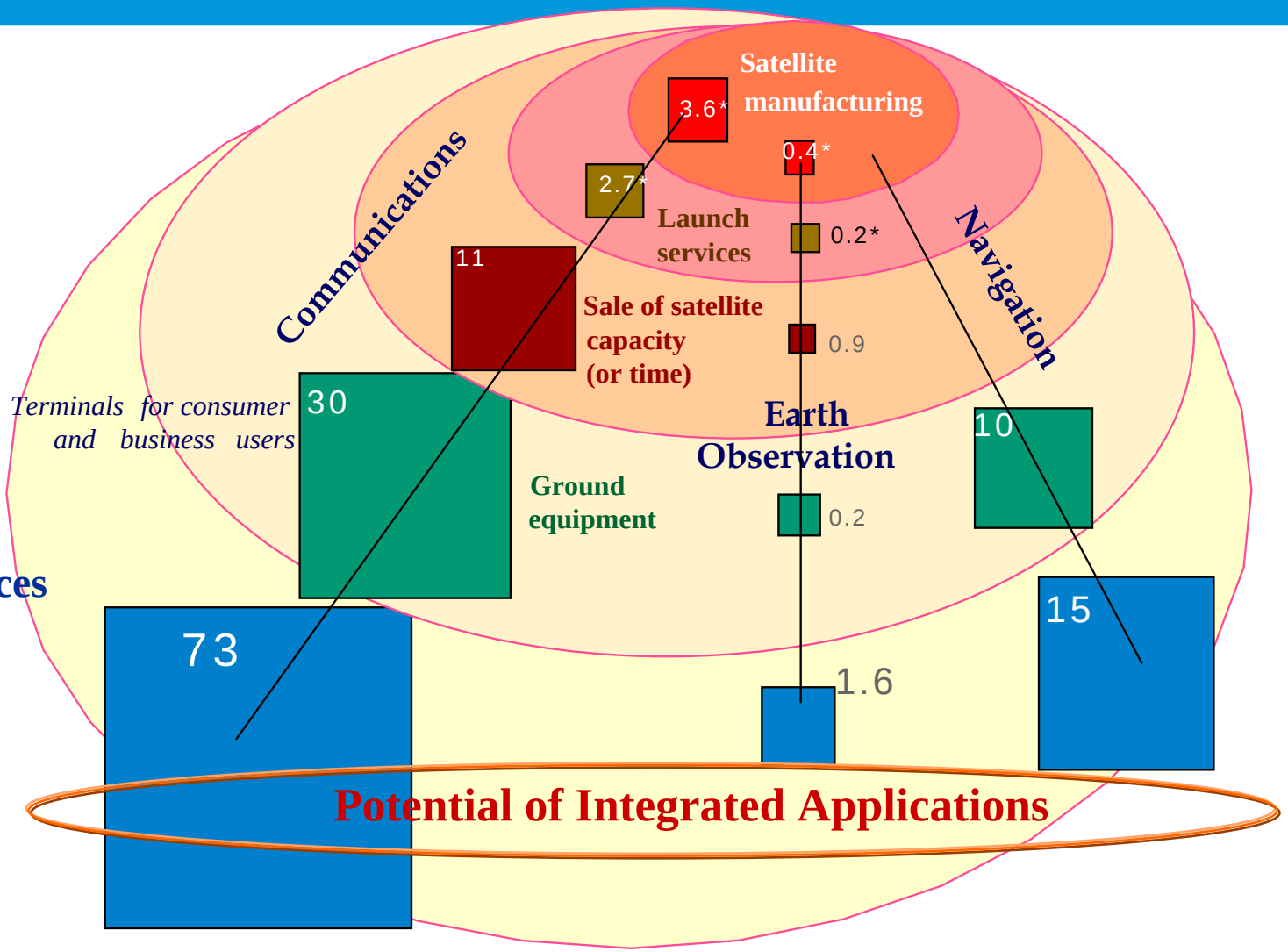
Foster new utilization of existing space capacity and capability, in close partnership with end-users, through the development of integrated (different space and non space technologies) applications projects which demonstrate a potential for sustainable services.

Incubator of Services

Integrated Applications



The Three Value Chains in Commercial Satellite Applications

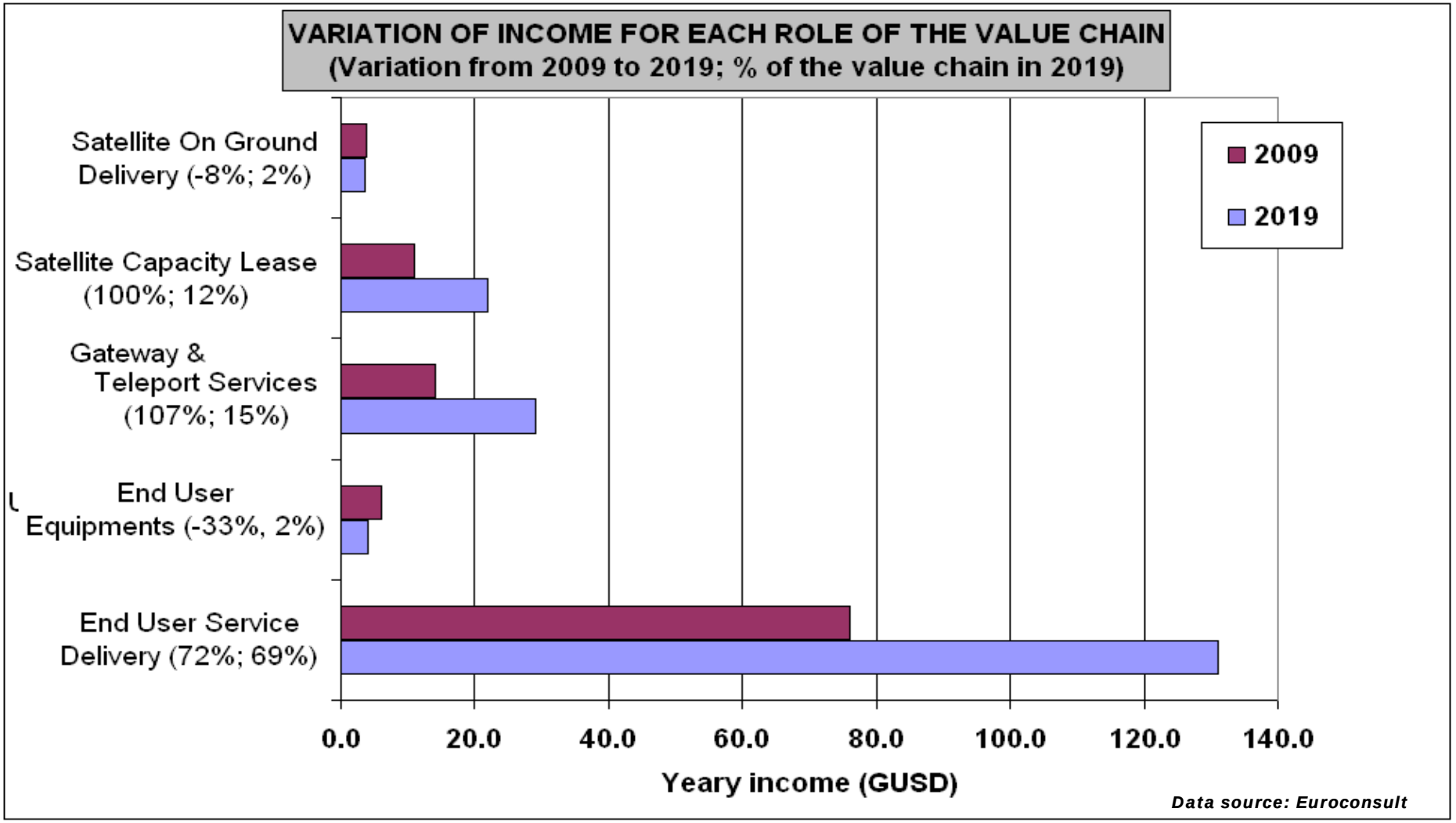


Values for the year 2009 in billions of € (Satcom)

European Space Agency

COURTESY OF Euroconsult

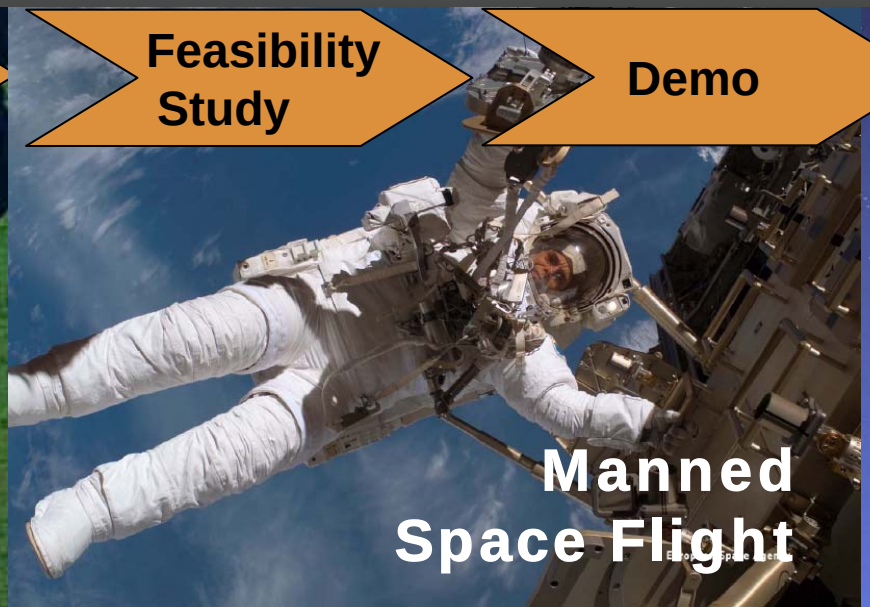
2009-2019: Revenues shifting downstream in the value chain



ESA's Integrated Applications Promotion Programme (IAP / ARTES 20)

➔ Developing new services for new user communities

User Demand → Feasibility Study → Demo → Operational Service



The following activities emanating from:

- IAP Preparation Phase
- IAP WorkPlans: 2009, 10, 11: 39
- IAP Demo projects: 12
- ARTES 3- 4 Open Call: 15
- ARTES 21 SAT-AIS: 4
- 3rd Party Funding: 2

Cover wide thematic fields range: ***Space 4:***

- ***Africa, Agriculture, Arctic***
- ***Civil Protection/Crisis Management***
- ***Development, Fisheries, Maritime, Knowledge***
- ***Health***
- ***Capacity building***
- ***Consumer***
- **Safety, Security & *Transport***
- ***Energy***

Climate → Energy, Health …

Awareness ARTES 20 and 3-4
3rd Party funding

- **IAP Awareness Activities in development**
  - IAP Advisory Committee (IAPAC) 4th meeting in March 2011
  - Web portal gateway in operation (http://iap.esa.int)
  - Ambassador platforms (AP) in Austria, UK, Norway, Spain, France, Fin. and Italy
  - IAP events across Europe (workshops, symposia, roundtable discussions)
  - ARTES Application Workshop/Lessons Learned, 5.-6.4.2011 at ESTEC
  - Theme: „Space for Africa & Africa in Space“
  - Preparation of a dedicated IAP approach documents for:
    Baltic, Alpine region, Ireland, Arctic.

- **3rd party funding**
  - Satellite–Enhanced e-Health & telemedicine for sub-Saharan Africa Initiative, 4.16M€ by EIB/LUX Development and on same subject 0,5M€ from DG-DEV
  - Innovation Fund: 1st fund launched by MT Innovation Fund in cooperation with DLR/Bavaria/ESA http://www.mt-innovation-fund.de/

Integrated Application Promotion Ambassador Platforms (AP)

Geographic and or Thematic AP representation

NO: *AP for E-Health in inaccessible regions (by NST)*

UK: *AP for Enhanced mobility*

AT: *AP for Integrated Application in Central & Eastern European Countries (by ESPI)*

FR: *AP for Environmental Risks & Hazards in the Mediterranean Region (by Pôle Risques)*

FI: *AP for the Baltic Sea Region (in prep. Q2 2011)*

CH: AP for alpine environment (in prep. Q3 2011)

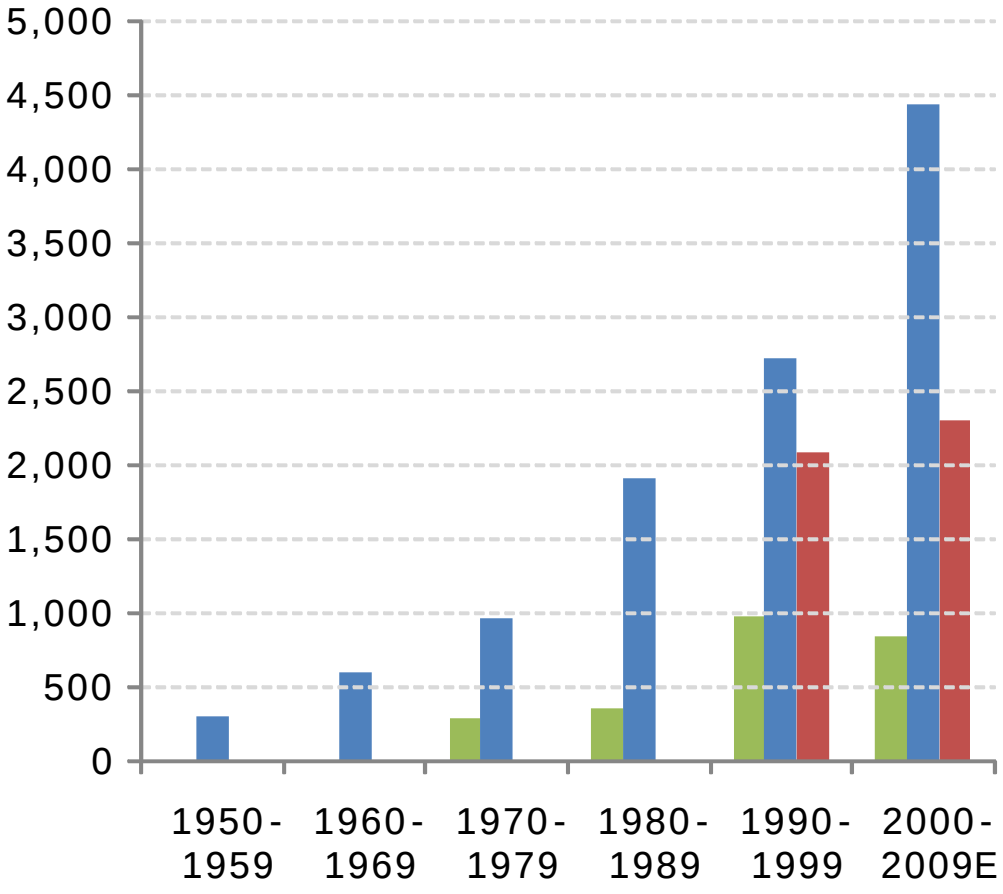
IT: AP for maritime Security (in prep. Q3 2011)

GER: AP topic not yet fixed (in prep. Q4 2011)

ES: ***AP for EU adoption of renewable energies (CENER)***

Disaster prevention & recovery
Sector overview & primary stakes

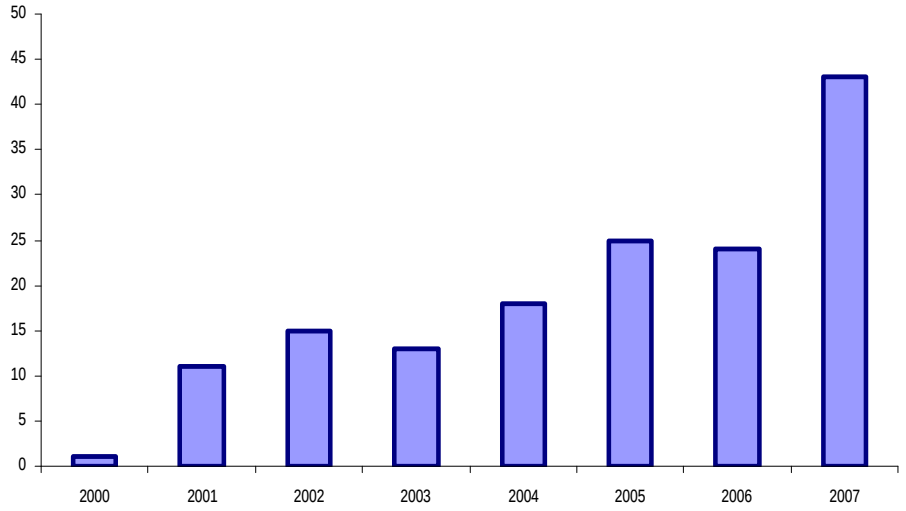
An increasing impact of disasters per decade



Source: ISDR, Euroconsult estimates

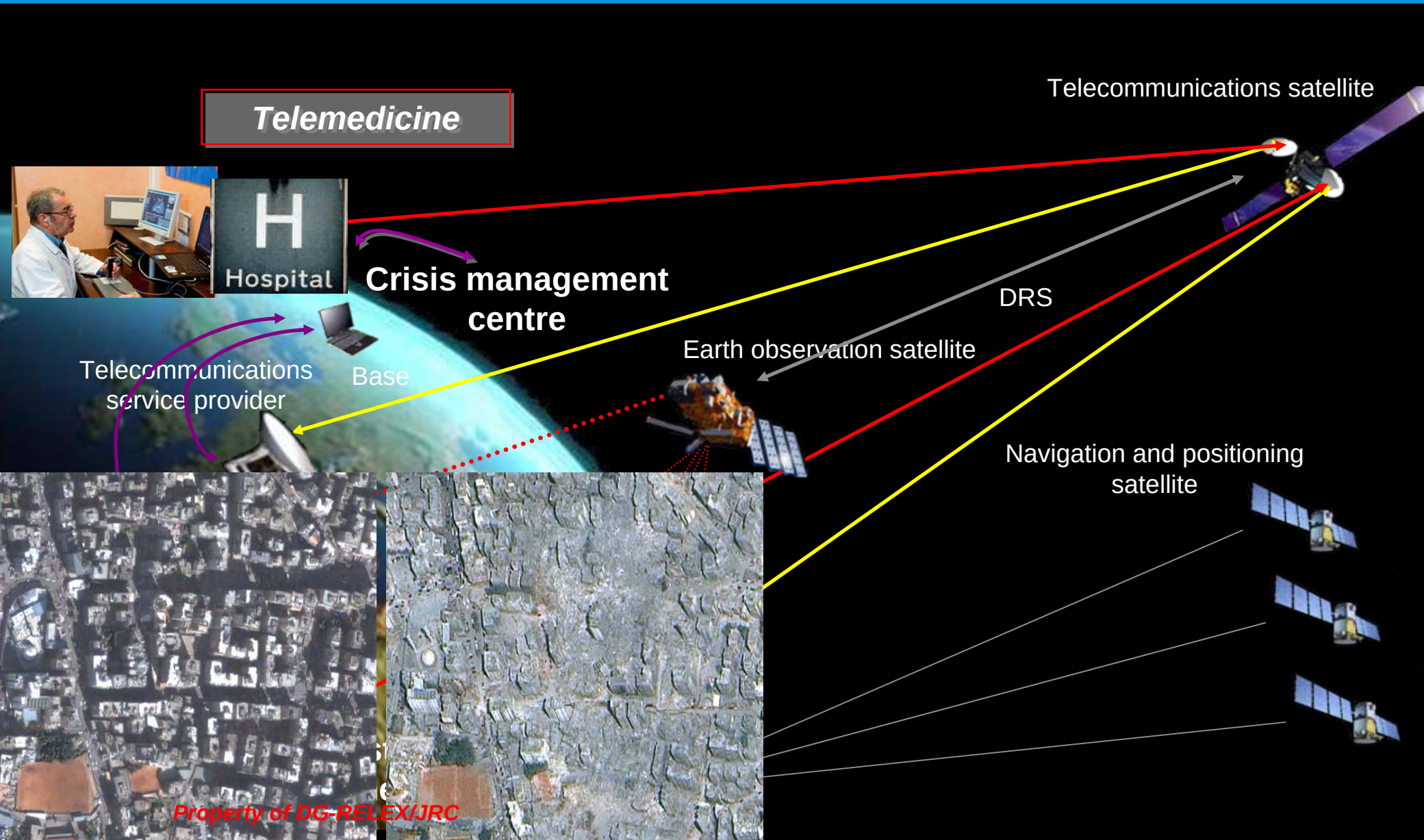
- Fast growing number of disasters reported in the different world regions
- Over 2 billion people impacted
- Economic damage over $500 billion

International Charter Activations by Year



Source: International Charter

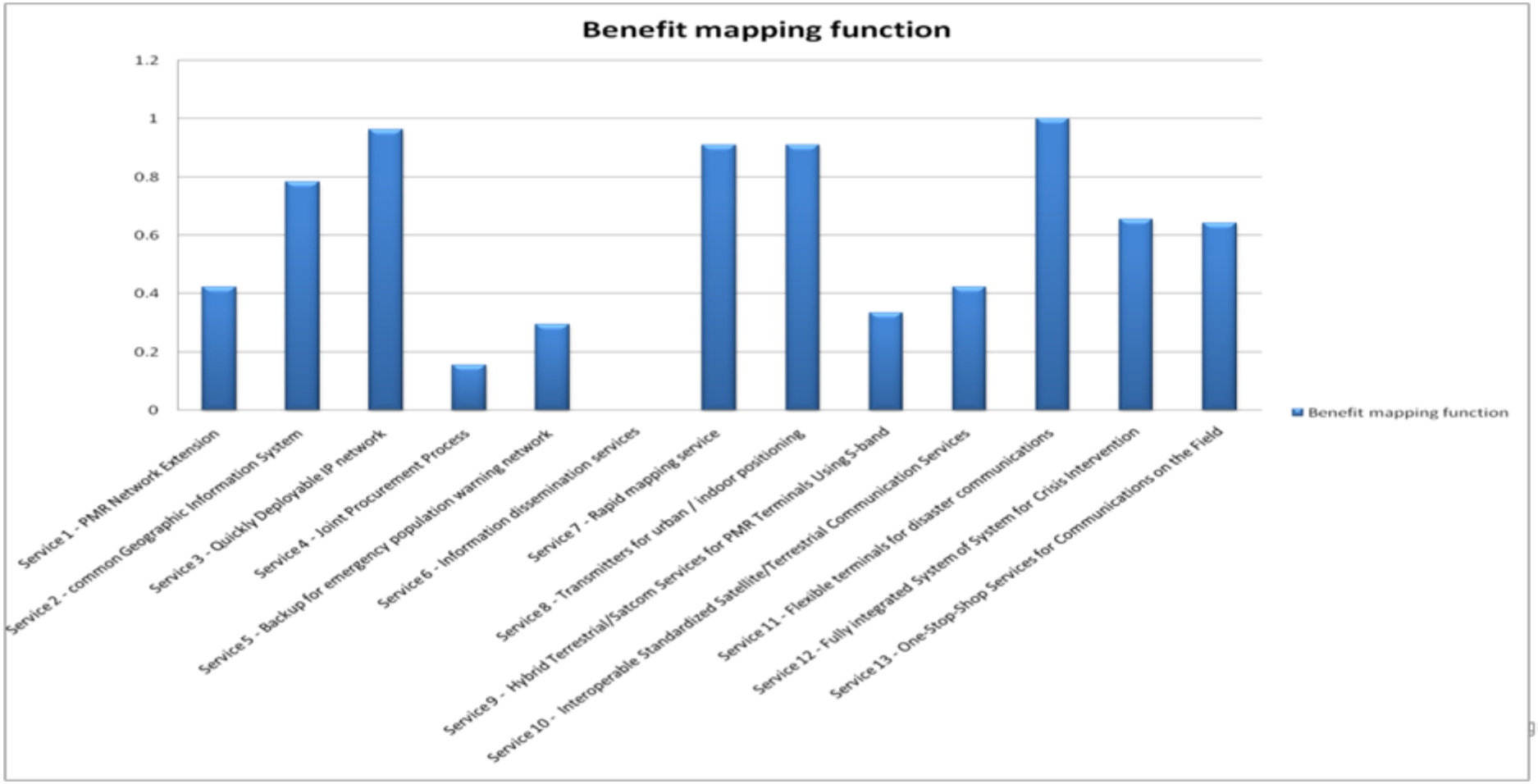
Integrated Applications
Example: ”Service-Buy” Model



Space 4 CP

Future Sat-based Services for European CPs

19 national CPs involved in 2 surveys, **a list of 13 services was proposed to the CPs.** On the basis of the answers collected, **a single Benefit Metrics was defined to elaborate an effective ranking and select the most successful Services:**.



ARTES 20 Demonstration Projects
User Driven & in partnerships

On-Going Projects with a total commitment of 17.2 M€ (>=50% co-funding):

- SpaceGrid: Power grid management; 1.05 M€; Users: TERNA (I)
- T4MOD: Telemedicine for Medical Operations in Distant Areas, 2.05 M€, Users: MoDs from F, D, I, E (Djibouti, Herat, Masar-e-Sharif)
- Talking Fields: Integrative Use of Satellite Techniques to Optimise Agricultural Production, 1 M€, Users are PC-Agrar GmbH and Land-data Eurosoft, representing 30.000 farmers in Europe.
- AMAZON: Real Time Satellite-based Telemedicine Service for Professional Clinical Users in Remote Locations, 700 k€, Users: International SOS
- S2BAS: Space Service Benefits in Aviation Systems; 1.3 M€; Stakeholder: Techno Sky (I), representing Air Traffic Control users for local airports.
- WaterWatch: Space Based Services for Water Irrigation Management of Vineyards in South Africa; Users: Dept. of Agriculture of South Africa; 0,31M€
- SAT-AIS Data Center: Data Processing centre for Sat-AIS Services; 4M€; EMSA
- Blue Belt: Cargo ships transport between European harbours: Custom, Ship owners, *idea >approval within 3 weeks*

Under preparation:

- UAS: UAS Demonstration Mission 1st Phase; 1,2M€; User: EDA

Operational Service:

- FlySafe bird strike risk reduction in aviation be operated by KNMI (Royal Netherlands Meteorological Institute). http://public.flysafe.sara.nl/bambas/index.php
- IAEA: Nuclear site monitoring (Hungary, Armenia, Ukraine); Users: IAEA; Successfully operating. Additional 8 nuclear sites are in preparation.

Examples of Established Services

- FlySafe, Bird Strike Avoidance
- Safeguard Services for IAEA

Birds and Flight Safety

GAF (1997-2004): 360 collisions strikes/year
FAF (1998-2005): 320 collisions strikes/year
RAF(<2004): 110 documented serious accidents

Estimated conservative cost due to damage and delays of commercial aircraft worldwide
1.2 billion USD per year

ARMÉE DE L'AIR

FLYSAFE Web Service

The FlySafe Bird Avoidance Model - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites

Address http://public.flysafe.sara.nl/bambas/migration/index.php?radar=glons&subwindow=nw

Web Search Bookmarks Settings Get IE8 now! Translate Page Mail My Yahoo! Answers Games Anti-Spy

esa **The FlySafe** Bird Avoidance Model

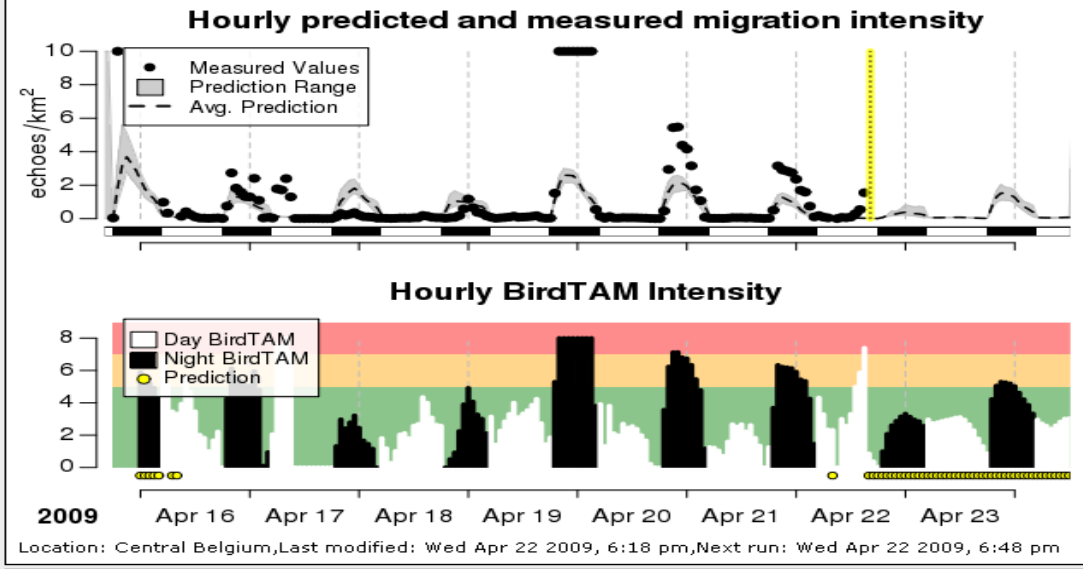
European Space Agency

ESA | Home | Migration | Spatial Models | More information | Legal Disclaimer

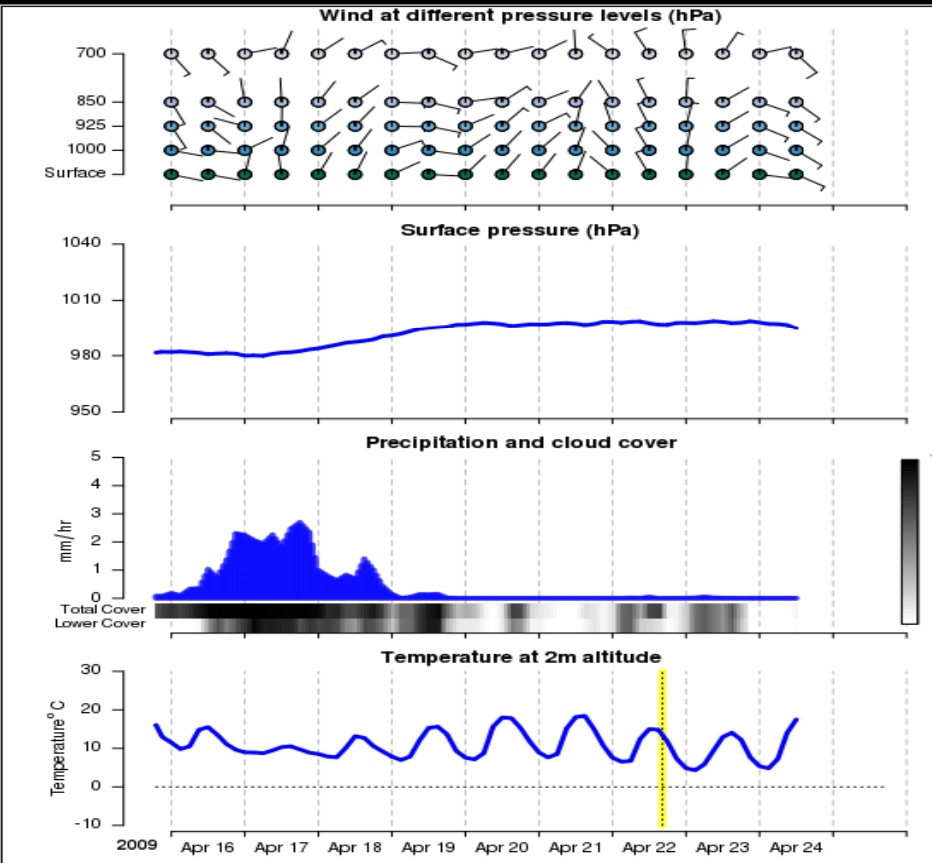
Welcome to the FlySafe bird migration prediction module

This page provides a 72-hour forecast of bird migration intensity for the **Central Belgium** location. The predictions are provided in two formats. The **Hourly predicted and measured migration intensity** plot shows the measured bird density values in bird echoes/km^2 (black dots) as well as the mean predicted bird density (dashed line) and prediction range (gray). The prediction range is produced by an ensemble forecast of ~50 models. The **Hourly BirdTAM Intensity** plot shows the bird densities converted to BirdTAM warning levels for pilots from seven days in the past and three days into the future. If the measured value is available, the BirdTAM intensity reflects that measured value. If no measurement is available, the mean bird migration density prediction is used (indicated by small yellow circle).

These predictions are made using the European Centre for Medium Range Weather Forecast Deterministic Model. The most important weather variables in the predictions are visualized in the plots on the right. Wind speed and direction at multiple pressure heights in the top plot. The tails point in the direction FROM which the wind is coming, and the barbs indicate the speed of the wind. Following plots are surface pressure (hPa), hourly precipitation (mm) as well as the percentage of cloud cover. Cloud cover is given in both a **lower** and **total** component. The final plot provides temperature (deg).



Location: Central Belgium,Last modified: Wed Apr 22 2009, 6:18 pm,Next run: Wed Apr 22 2009, 6:48 pm



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Koninklijke Luchtmacht sara

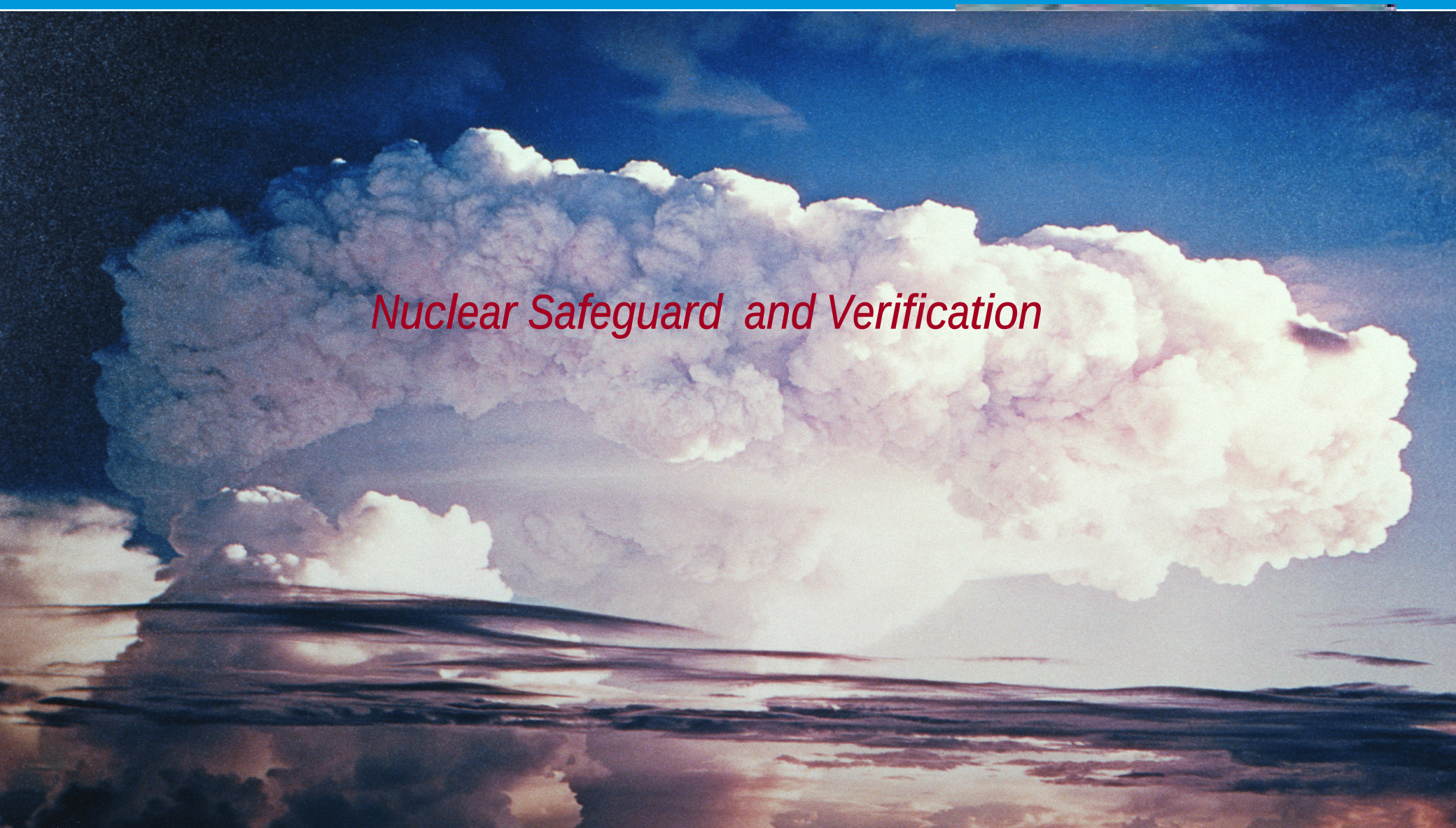
Improvements Needed for the Local Situation Anticipation of Birds Crossing the Airport

Hudson river (New York – 15/01/09)

Hudson River

Hudson river (New York – 15/01/09) (simulation)

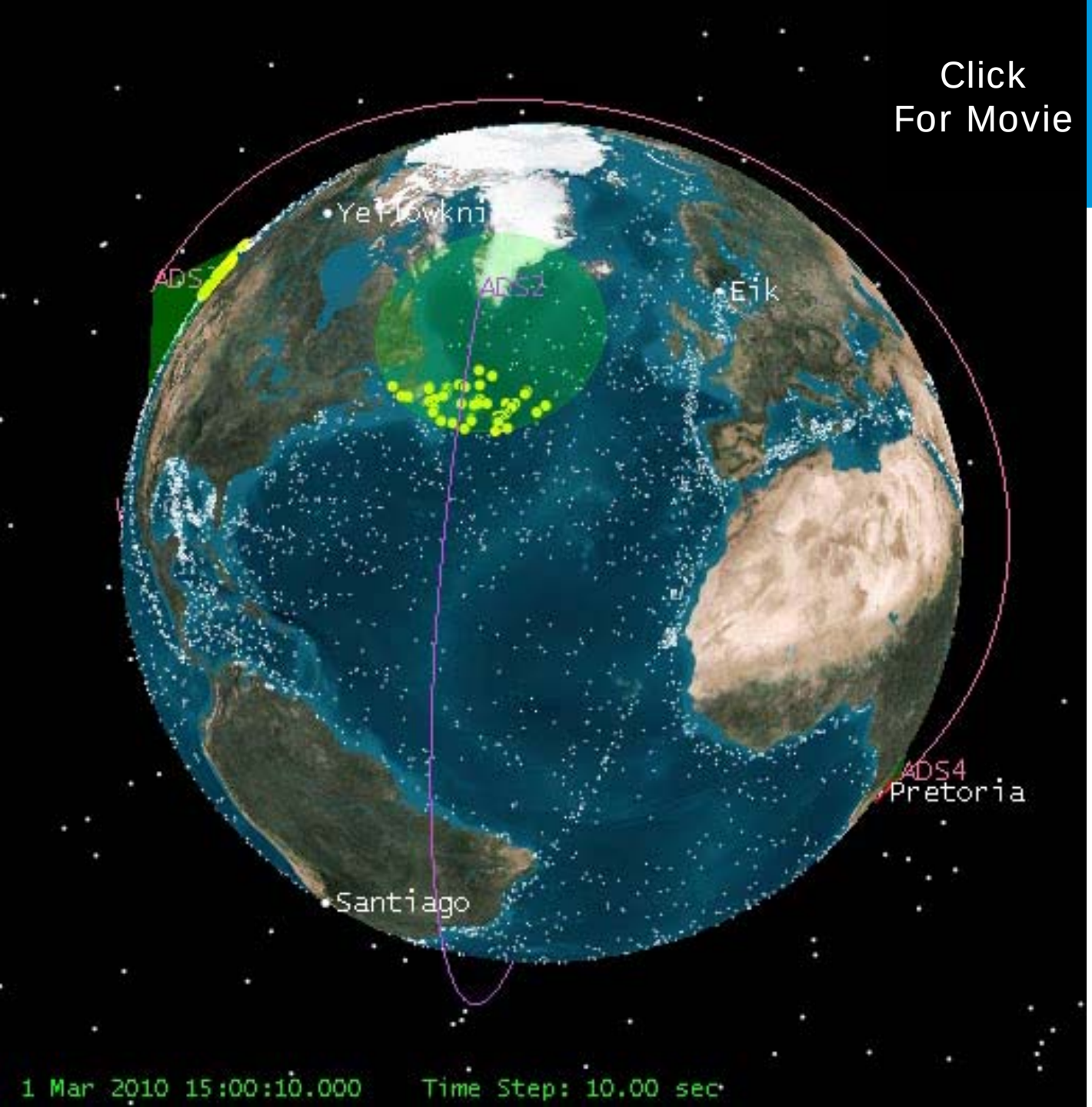
Integrated Satellite-Based IAEA Safeguard Services



IAP- Multi-Satellite Network

Users Driven
European Satellite AIS Mission

Source: International Salvage Union, 2003



esa

SAT-AIS Programme

DG-MARE / ESA
Joint

Action Team

&

European

Steering group:

EC DGs (Mare, ENV, TREN, JLS, INFSO, TAXUD, ENTR, JRC) FRONTEX, EDA,

&

EMSA / ESA

Partnership

European Space Agency

Event Overview

22nd January 2010 EMSA/ESA Information Meeting in Lisbon

17th February 2010 JCB Meeting (Info. Note ESA/JCB(2010)18

31st March 2010 SAT-AIS Information Meeting

26/27th April 2010 SAT-AIS 1st Industry Information Workshop

19 &20th May 2010 JCB, SAT-AIS documents discussed & finalised

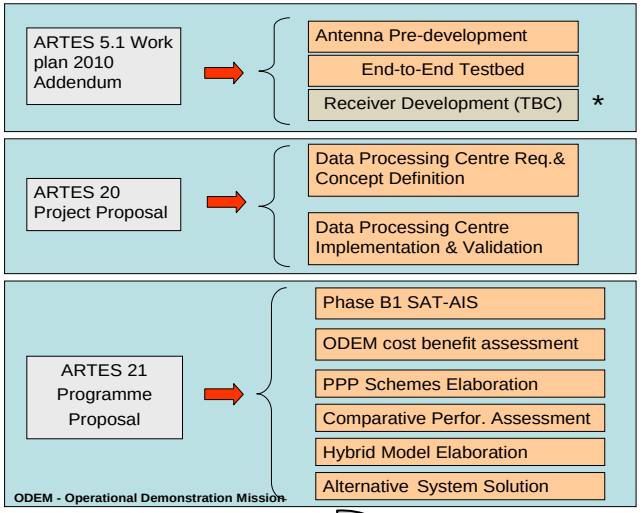
The ESA and EMSA Directors put ink to paper at the European Space Agency's Paris headquarters on 2 July.

2 July 2010 EMSA / ESA Agreement Signed by DG and EMSA Director

13 July 2010 JCB approved ARTES 21 with achieved subscription level

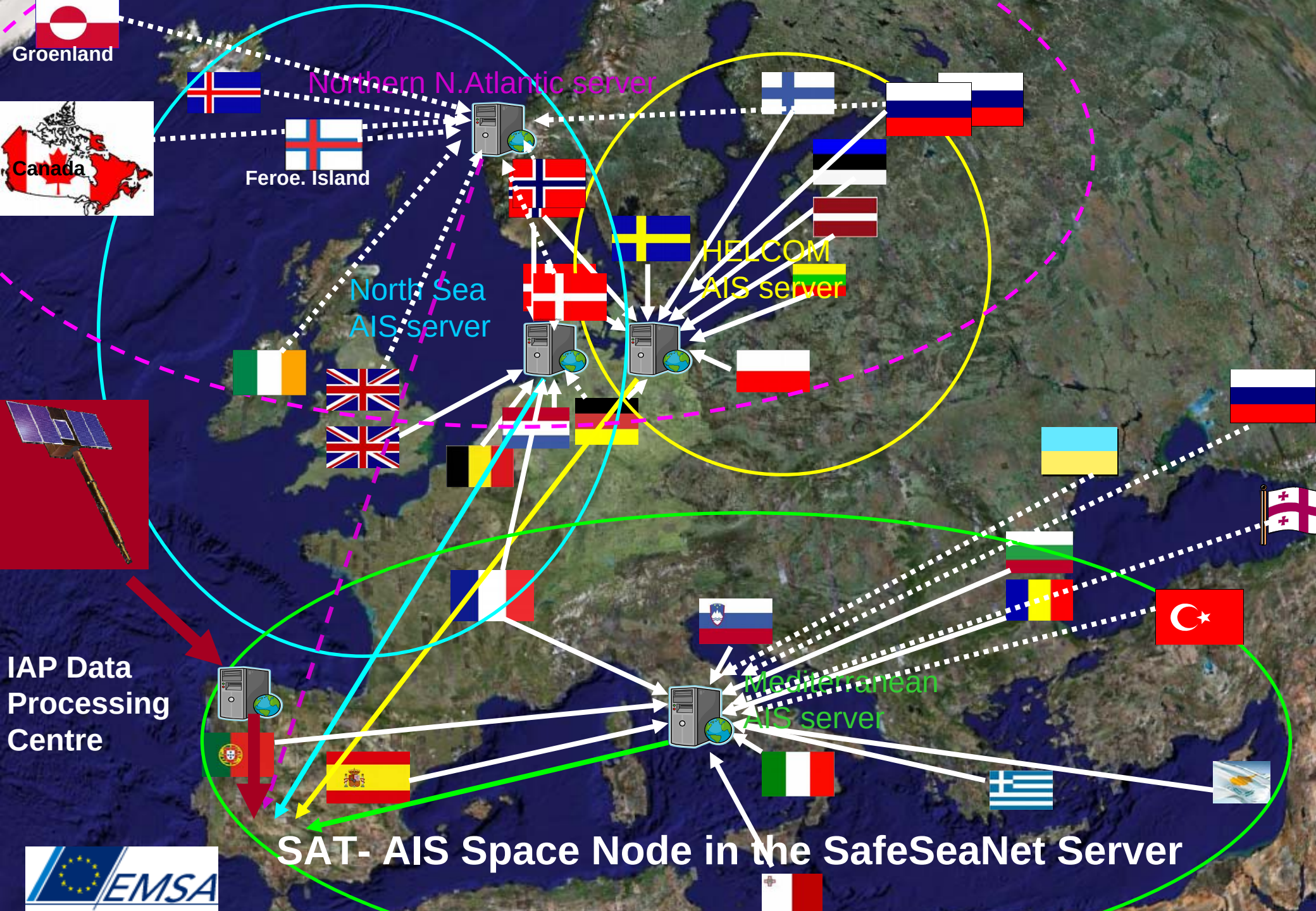
2nd September 2010 SAT-AIS 2nd Industry Information Workshop

- 2nd EMSA/ESA Information Meeting at ESA, Jan 26th 2011
- User consultation Jan 27th 2011

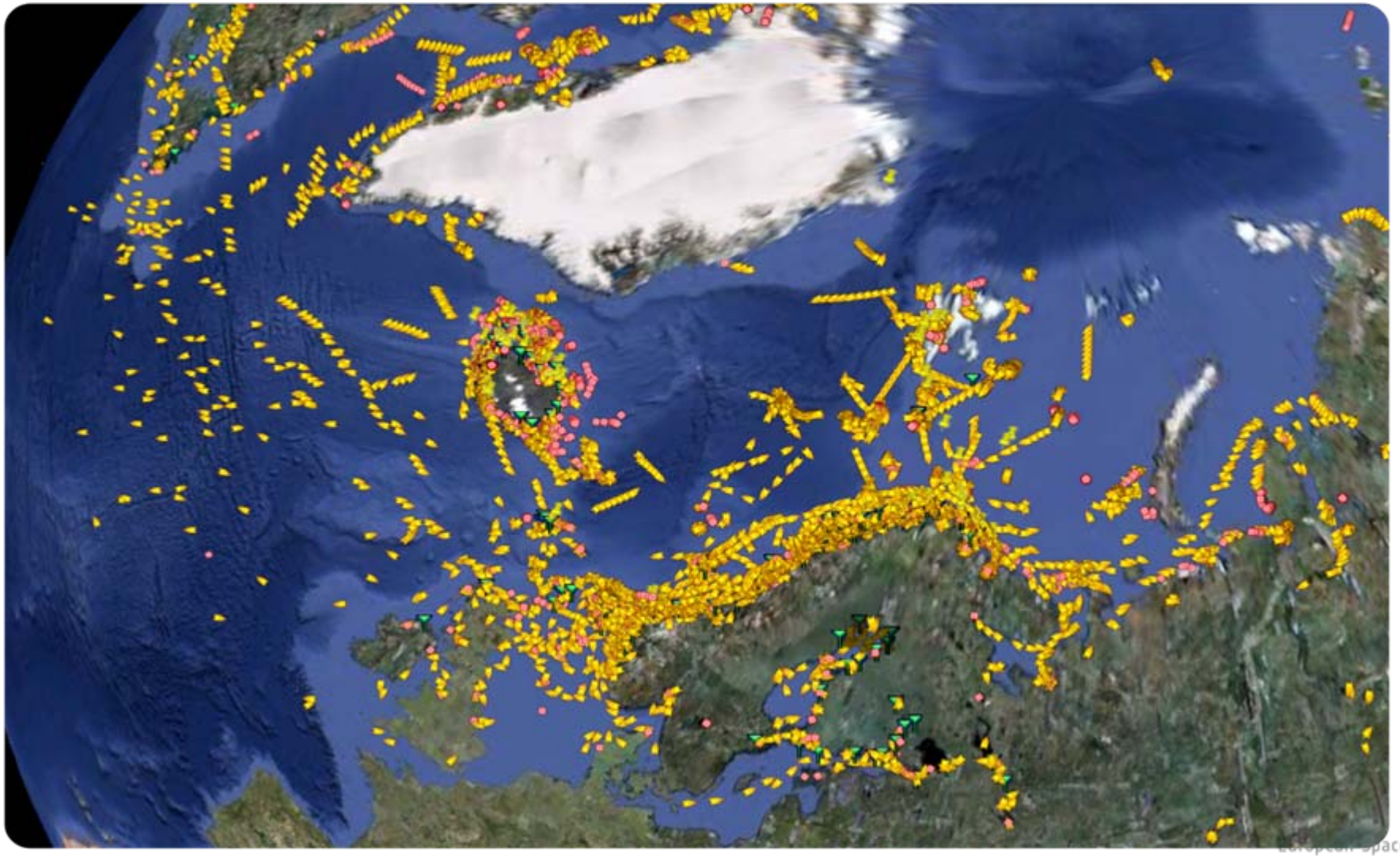


European Space Agency

SAT-AIS
EMSA/ ESA Meeting


Groenland
Canada
Feroe. Island
Northern N.Atlantic server
North Sea
AIS server
HELCOM
AIS server
Mediterranean
AIS server
IAP Data
Processing
Centre
SAT- AIS Space Node in the SafeSeaNet Server
EMSA

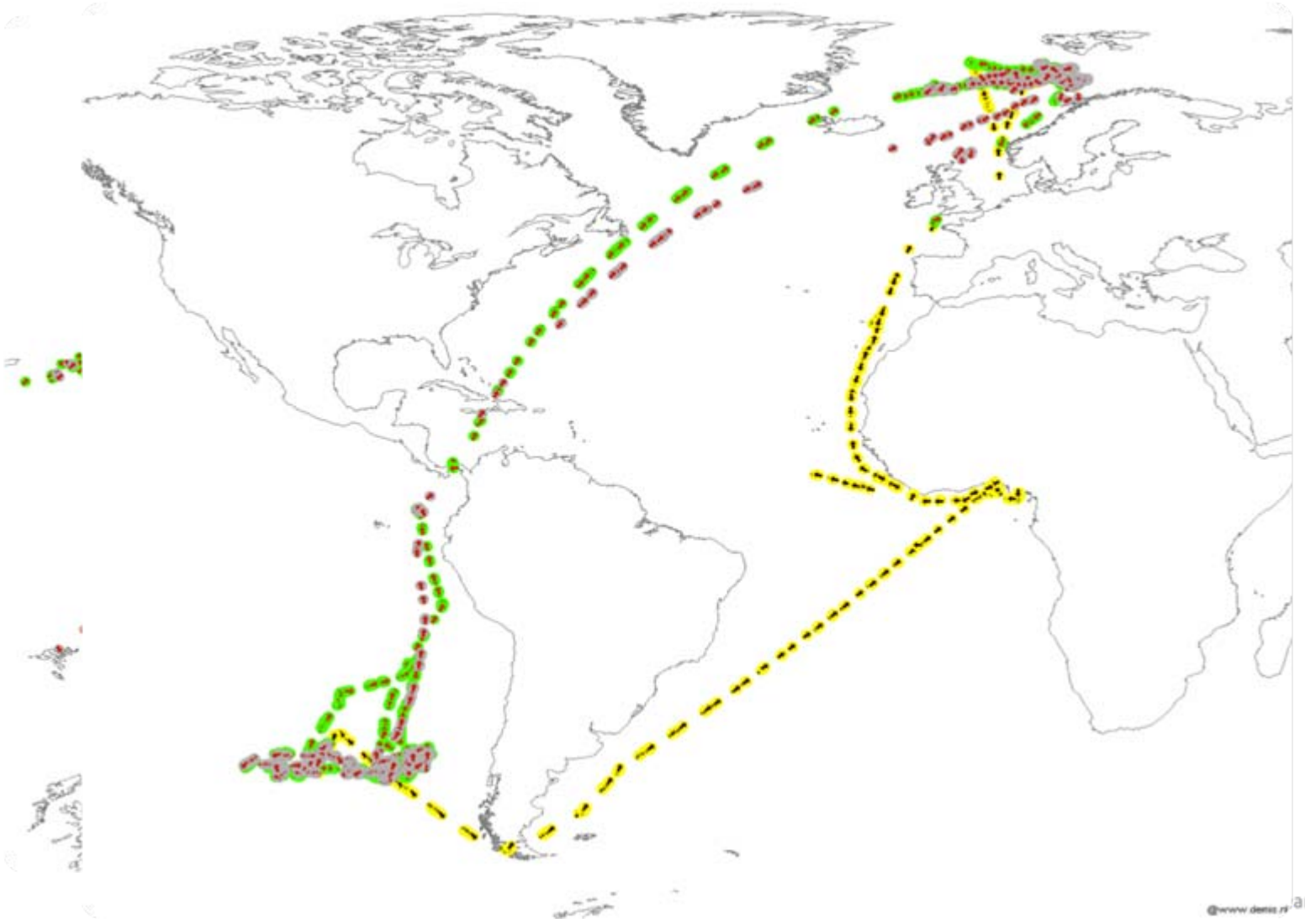
AISSat-1 Data from 10 Consecutive Passes



European Space Agency

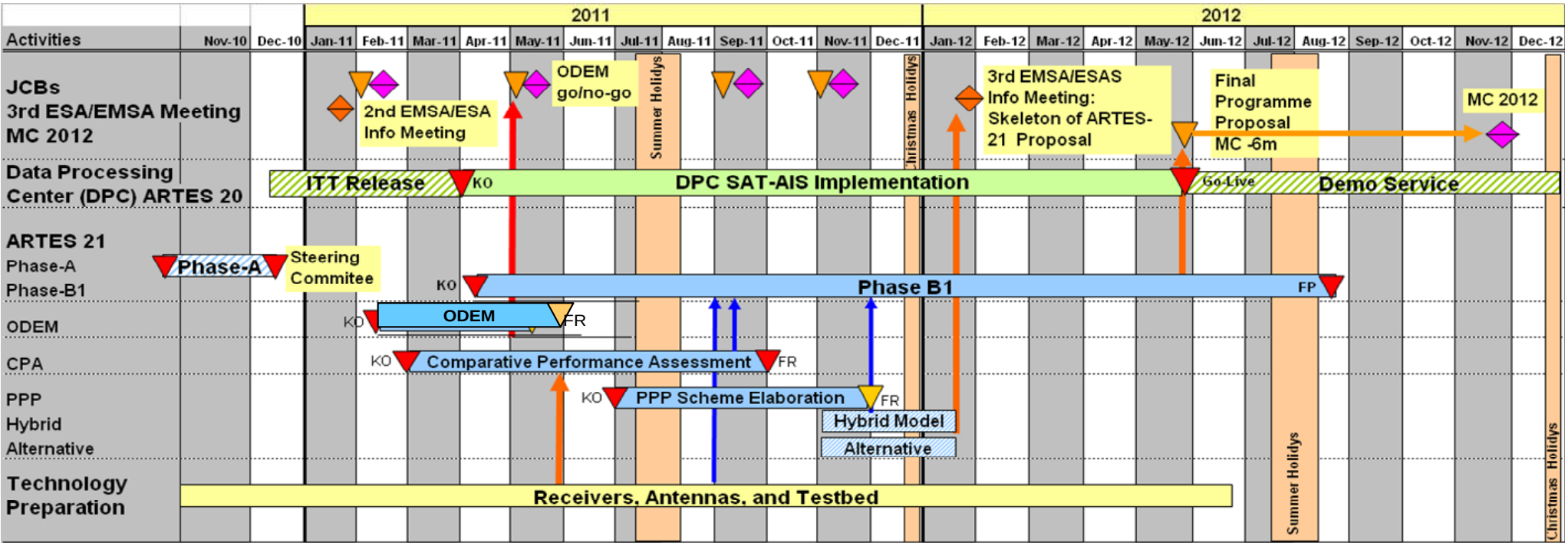
COURTESY OF Norwegian Space Centre

Ship tracking world wide



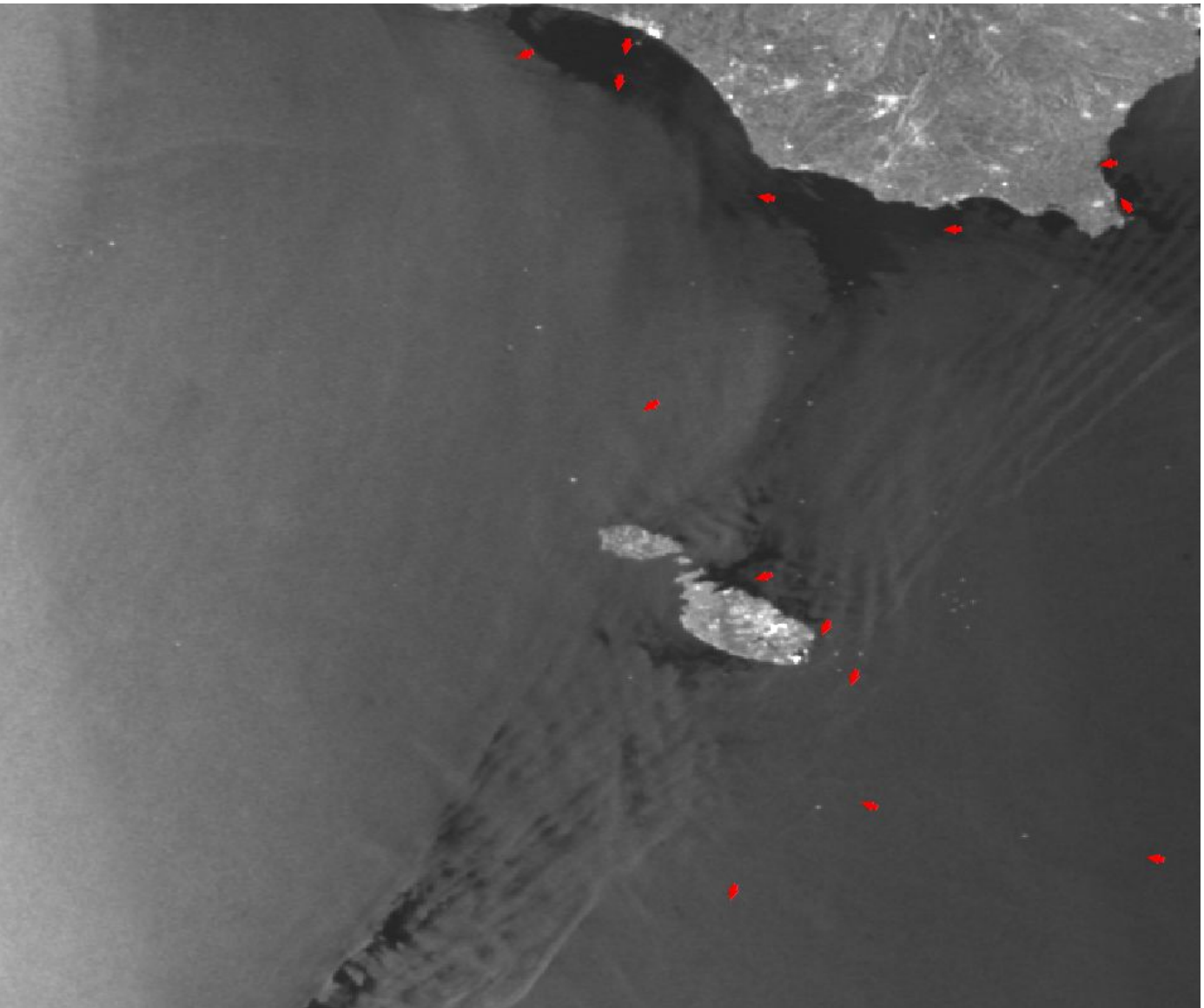
COURTESY OF Norwegian Space Centre

SAT-AIS
Schedule



Integrated Application

Satcom, Nav, EO & UAS



AIS tracks from ships

SAR detected ships

Correlation SAR & AIS

Remaining uncorrelated ships & UAS for identification

➔ Mission Video

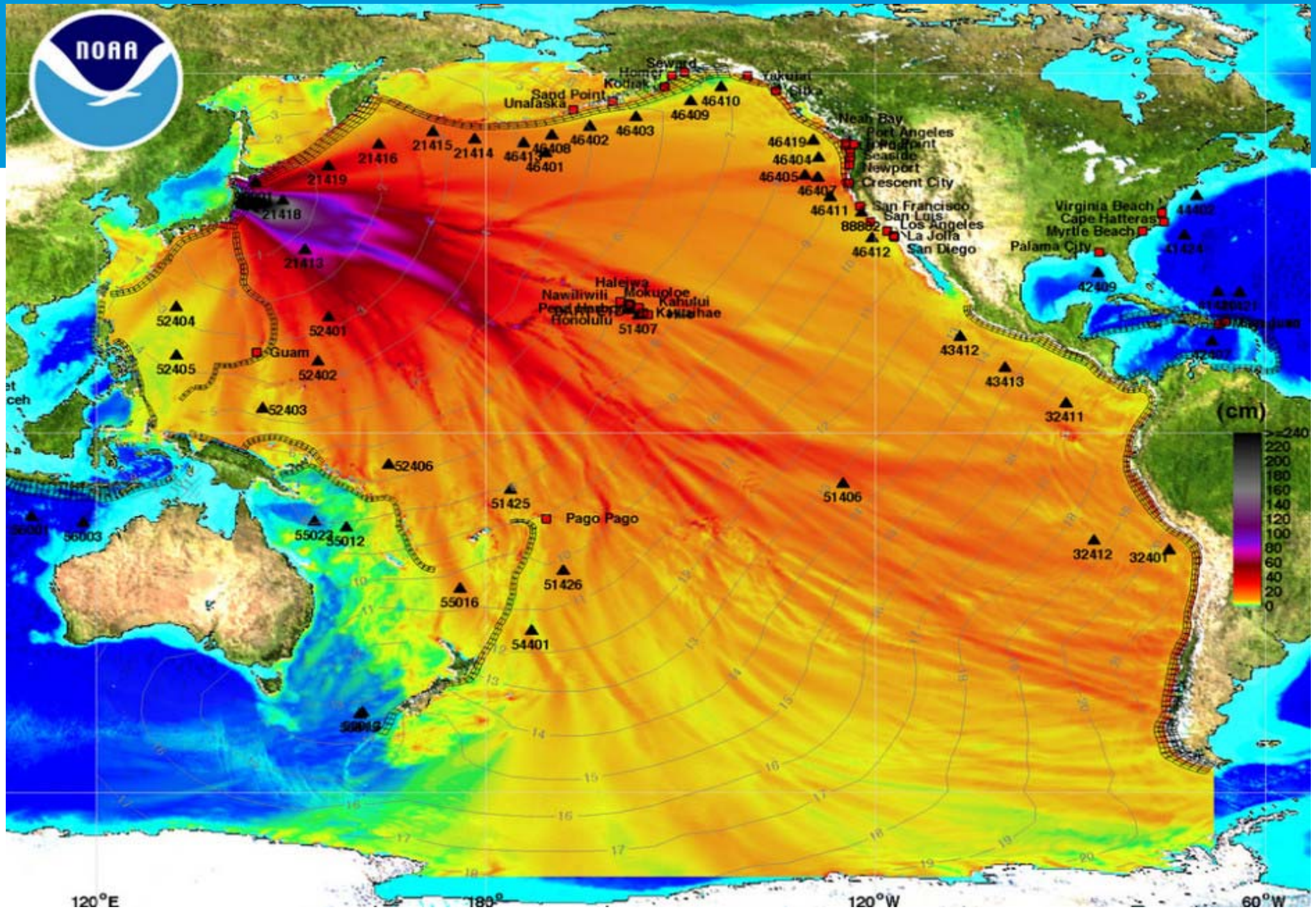
UAS supported by integrated space systems (Safety)

- Background:
  - UAS (Unmanned Aerial Systems) steadily become more important for e.g. surveillance tasks
  - Until now, UAS have only been deployed routinely in segregated airspace because of safety reasons
  - The safe and secure integration into “non-segregated airspace” is still a challenge
    - Technology is not proven
    - Regulation is missing
    - Little practice and experience

IAI Heron UAV in flight

- Objective of the Feasibility Study:
  - Investigate the technical and economical feasibility of UAS services in non-segregated airspace supported by space systems for:
    - **Command & Control, Sense & Avoid, Air Traffic Control**
    - **Operational service provision (UAV Payload data transmission, e.g. camera, radar, etc.)**
  - Simulations and demo project preparation specifically in the civil domain: pipeline monitoring

Volcanic ash cloud monitoring


NOAA
Seward
Homer
Kodiak
Sand Point
Unalaska
Yakutat
Cordova
46410
46409
46403
46402
46408
46401
21415
21414
21416
21419
21418
21413
46419
46404
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Port Angeles
Seaside
Newport
Crescent City
San Francisco
San Luis
Los Angeles
La Jolla
San Diego
88882
Virginia Beach
Cape Hatteras
Myrtle Beach
Palama City
44409
41424
42409
Halejwa
Nawiliwili
Mokuoloe
Kahului
Honolulu
51407
52404
52401
52405
Guam
52402
52403
52406
51425
Pago Pago
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56003
55016
51426
54401
43412
43413
32411
51406
32412
32401
(cm)
>=240
220
200
180
160
140
120
100
80
60
40
20
0
120°E
180°
120°W
60°W

SPACE FOR ENTREPRENEURSHIP
Space & Innovation

Opportunities to create an Partnership for Space Innovation Fund

ESA / IAP

=<50%€

= 0 €

Space / Non Space company

- Funds (€)
- In kind

PROJECT

50-100% €

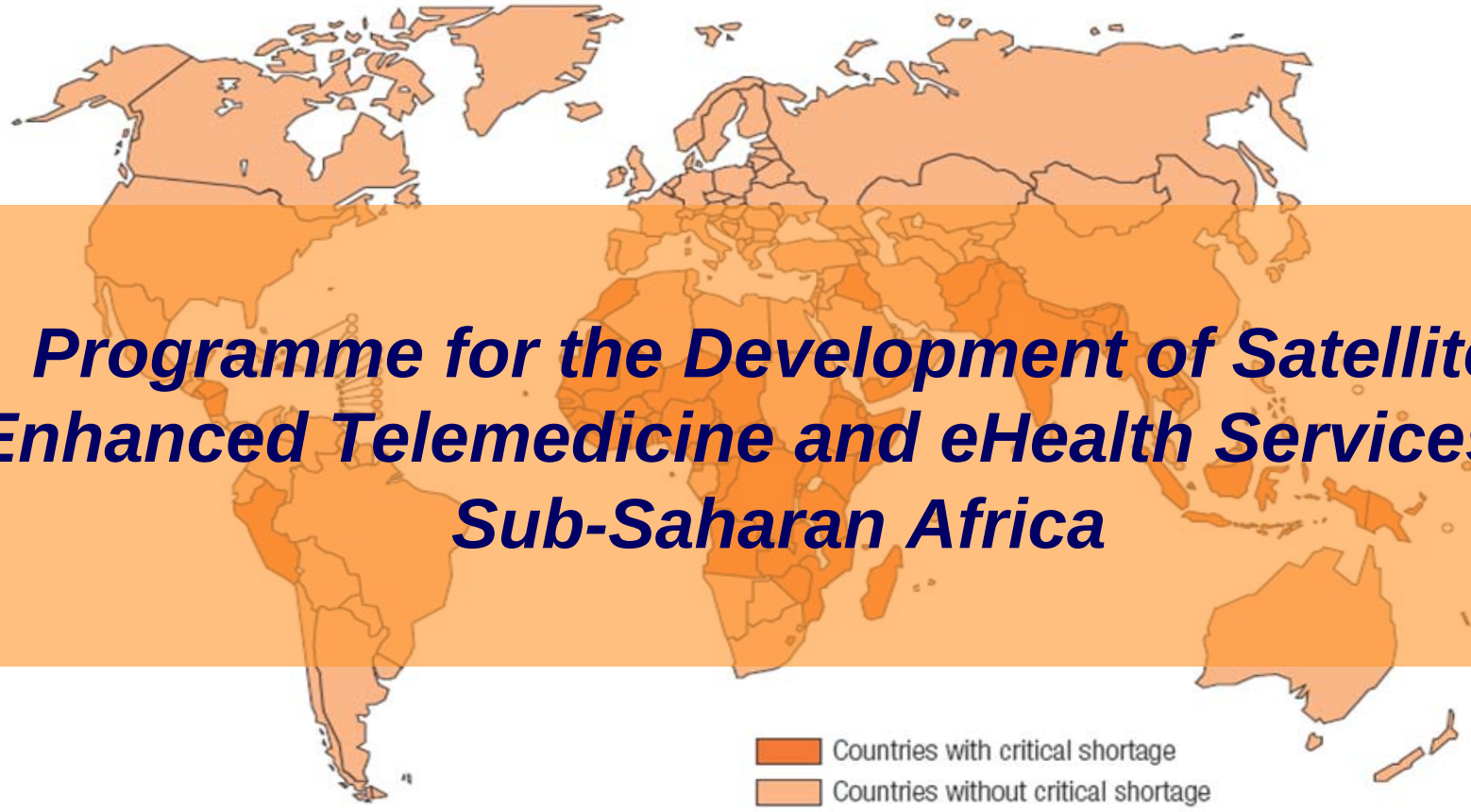
TC/EIB

Equity partner / Government

- Funds (€)

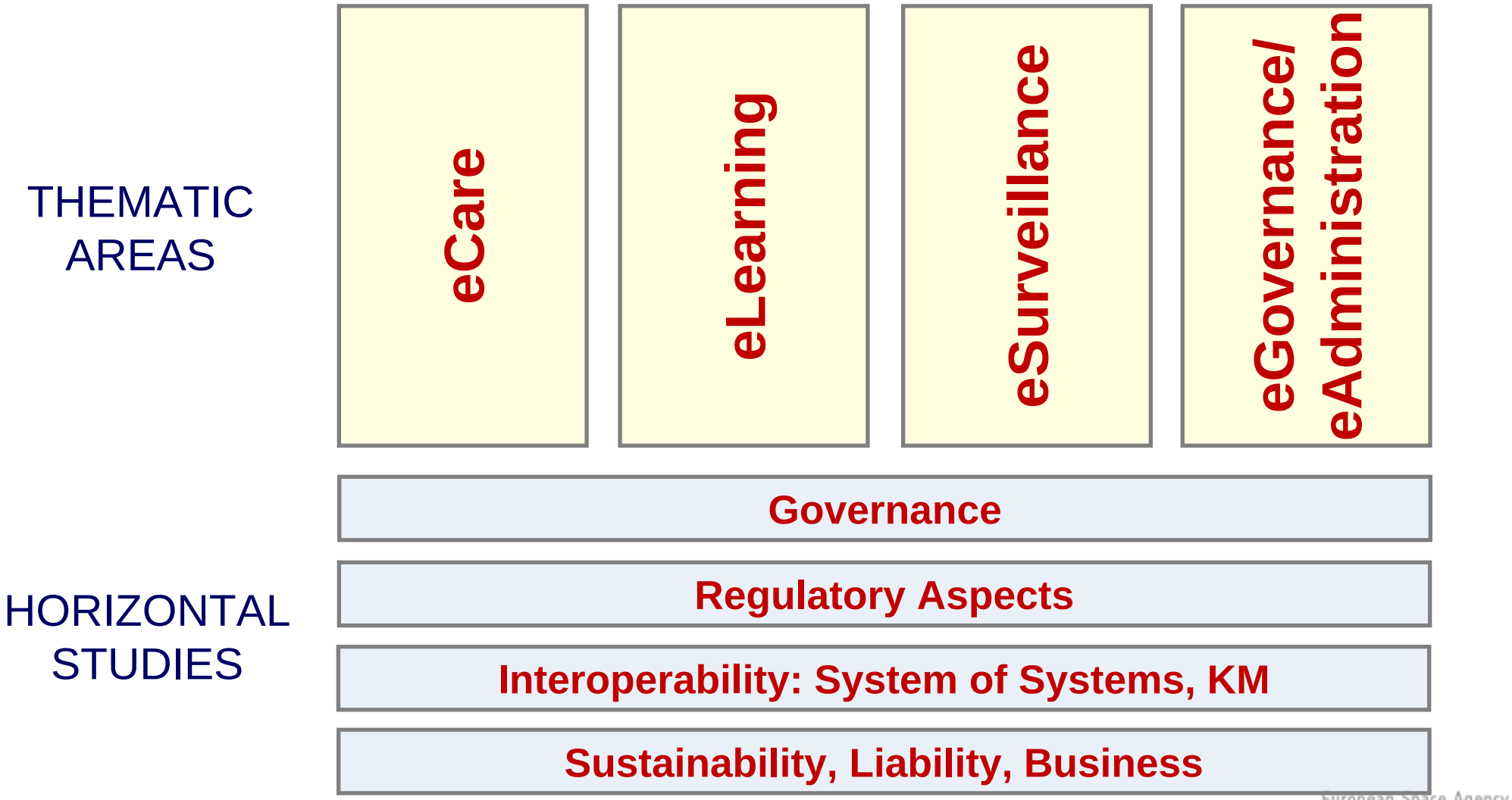
Space 4 Africa

Programme for the Development of Satellite-Enhanced Telemedicine and eHealth Services in Sub-Saharan Africa



(World Health Report 2006)

Space 4 Africa



MT Innovation Fund

MT Innovation Fund - der F...

www.mt-innovation-fund.de

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MT INNOVATION FUND

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MT INNOVATION FUND

Der MT Innovation Fund, eine Initiative der Augsburger MT Aerospace AG, unterstützt die wirtschaftliche Entwicklung vielversprechender Innovationen aus der Luft- und Raumfahrt, aber auch aus den Bereichen Verkehr, Sicherheit und Energie. Er bietet Start-up-Unternehmen Know-how, Strategieentwicklung und finanziellen Invest sowie Zugang zu einem breiten Netzwerk aus Industrie, Forschung und Politik.

Zusammen mit unseren Partnern, dem Deutschen Zentrum für Luft- und Raumfahrt DLR und der Europäischen Raumfahrtbehörde ESA, fungiert der MT Innovation Fund als Bindeglied zwischen wissenschaftlich-technischer Forschung und dem Markt – und stärkt damit den Vorsprung neuer Unternehmen im weltweiten Wettbewerb.

News

- Mit Technologien aus Luft- und Raumfahrt, Energie und Verkehr neue Geschäftsfelder erschließen: das...

Design und Programmierung www.creationell.de

MT Innovation Fund

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www.mt-innovation-fund.de/news/news/article/mt_aerospace_initiiert_deutschlands_ersten_luft_und_raumfahrt_fonds.html

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News

MT INNOVATION FUND > News

MT Aerospace initiiert Deutschlands ersten Luft- und Raumfahrt-Fonds

Mittwoch, 09. Februar 2011

Mit Technologien aus Luft- und Raumfahrt, Energie und Verkehr neue Geschäftsfelder erschließen: das ist das Ziel des MT Innovation Fund. Er ist Deutschlands erster Beteiligungsfonds, der gezielt die breite wirtschaftliche Nutzung neuer Technologien aus Luft- und Raumfahrt sowie aus Verkehr, Sicherheit und Energie vorantreiben will. Start-up-Unternehmen und innovative Geschäftsideen werden durch Kapitalbeteiligung, Know-how und den Zugang zu einem breiten Netzwerk aus Forschungseinrichtungen und Fördergebern unterstützt.

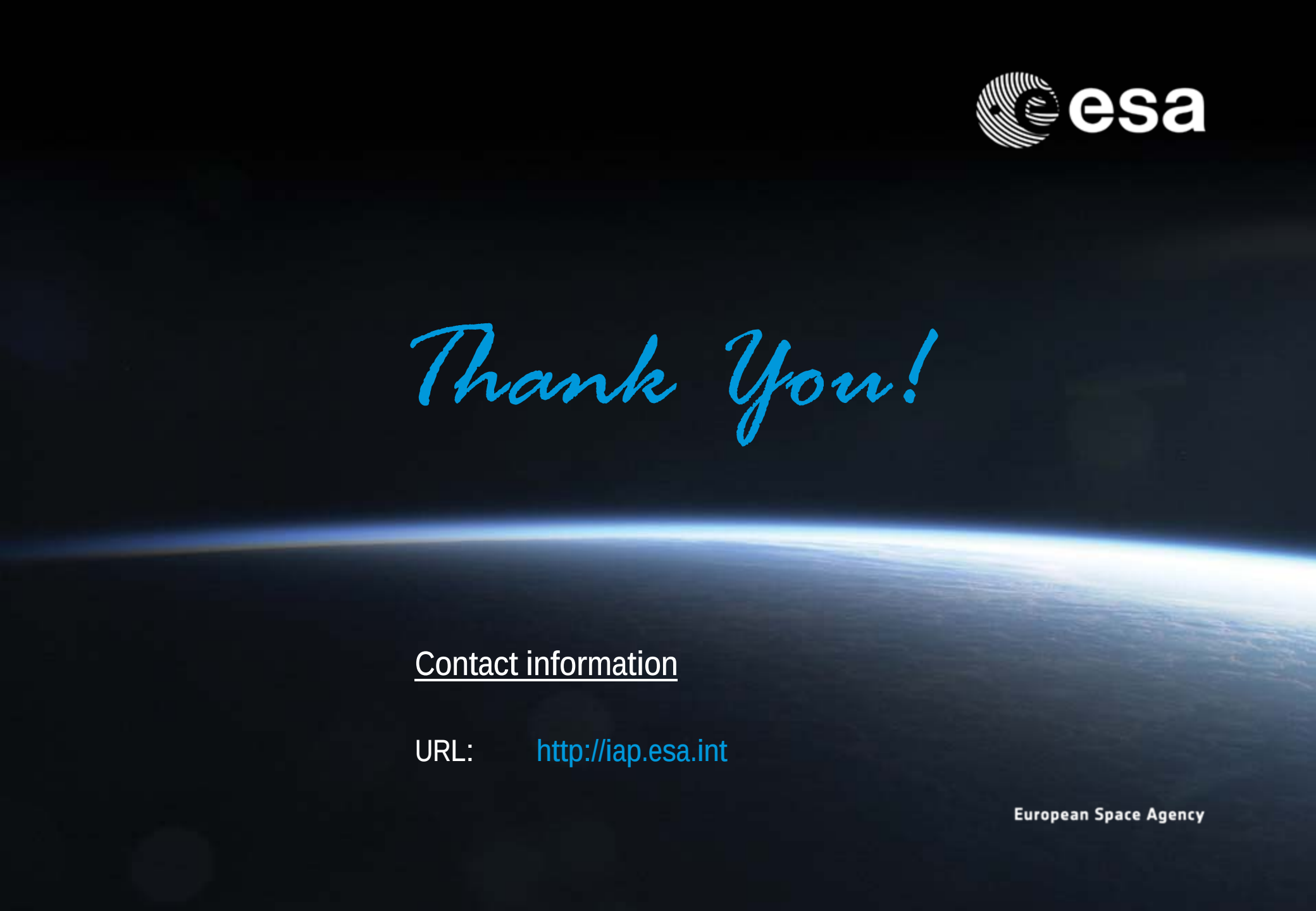
Partner des MT Innovation Fund sind das Deutsche Zentrum für Luft- und Raumfahrt e.V. (DLR), das seine Technologien und deren Transfer zu Marktanwendungen im Rahmen von Kooperationsprojekten mit Unternehmen zu neuen Produkten und Dienstleistungen weiterentwickelt und im Rahmen des Technologie-Transfers-Nutzungsrechte an Technologien an Unternehmen lizenziert, und die Europäische Weltraumorganisation ESA, die im Rahmen des Programms für Integrierte Raumfahrtanwendungen (IAP) neue Projekte in den Bereichen der Telekommunikation und der integrierten Raumfahrtanwendungen fördert. MT Aerospace fungiert als Kapitalgeber und Bindeglied zwischen wissenschaftlich-technischer Forschung, Raumfahrtanwendungen und der industriellen Vermarktung.

« Zurück (News)

Design und Programmierung www.creationell.de

Conclusions

- Main Business value and growth in the value chain : Ground Systems and **Applications**
- Evolution of needs:
  - Increase automation and **distant** management
  - Support the development and optimization of **infrastructure, logistics & resources**
  - Optimize reactivity in case of **emergency**
- ARTES **Applications** in general and **IAP** in particular offer unique **opportunity** platform to **enable growth**, in support of innovative **solutions,** for future challenges
- Use this workshop to **learn** about the current activities, encourage the attendees to **network** and stimulate new project **ideas**


Thank You!
Contact information
URL: http://iap.esa.int
European Space Agency