ARTES Sustainable Development in Applications

Creating Value, Along the Value Chain

HYLAS 1 Applications Workshop in conjunction

with the HYLAS 1 Applications Call

October 19th. 2011, Harwell

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European Space Agency

Table of content

- ARTES Applications & IAP
- Applications Activities Illustration
- Conclusion

ARTES= Advanced Research on TElecommunication Satellite Systems
IAP= Integrated Applications Promotion programme

→ **TELECOMMUNICATIONS**

& INTEGRATED APPLICATIONS

European Space Agency

The ARTES Programme Elements

A balanced combination of generic and specific

Mission/ System/Application/Service orientated Programme **Elements:**

- ❑ ARTES 1: **Preparatory**
- ❑ ARTES 3-4: **Telecom Applications & Products HYLAS/Avanti**
- ❑ ARTES 5: **Technology**

- ❑ ARTES 7: **European Data Relay Satellite (EDRS/Astrium Services)**

- ❑ ARTES 8: **Alphasat (Inmarsat)**

- ❑ ARTES 11: **Small GEO (Hispasat)**
- ❑ ARTES 10: **IRIS**
- ❑ ARTES 20: **Integrated Applications Promotion (IAP/Partners)**
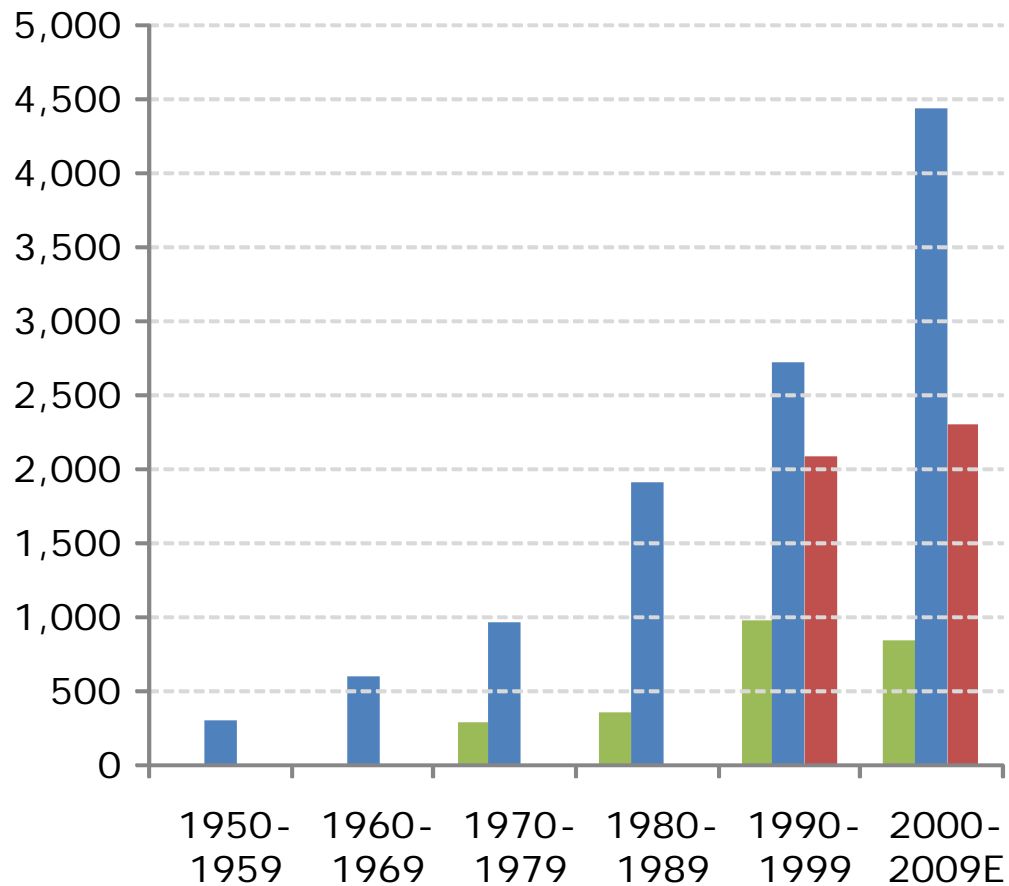- ❑ ARTES 21: **SAT-AIS (EMSA / Industry)**

Disaster prevention & recovery
Sector overview & primary stakes

An increasing impact of disasters per decade

➡ **Fast growing number of disasters reported in the different world regions**

➡ **Over 2 billion people impacted**

➡ **Economic damage over $500 billion**

Source: ISDR, Euroconsult estimates

© AFP/Getty Images

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

Benefit mapping function

1) Flexible terminals for Disaster communications
2) Quickly deployable IP network
3) Transmitters for urban / indoor positioning
4) Rapid mapping service
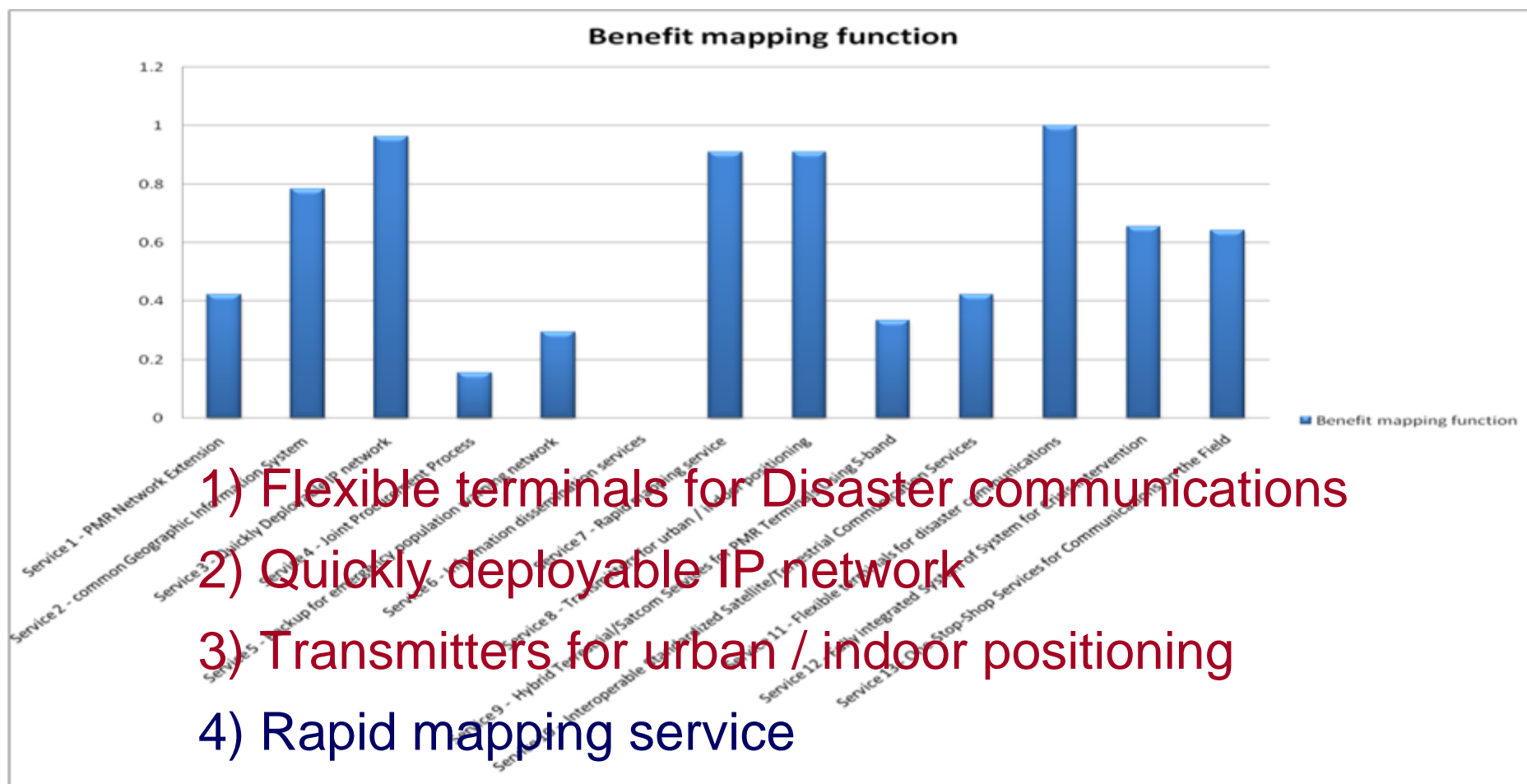
The Three Value Chains in Commercial Satellite Applications Global Space Market Revenue in US$Bn

COMMUNICATIONS

NAVIGATION

EARTH OBSERVATION

3.8	Upstream Sector
2	
0.6	
2.7	Launch services
0.2	
11	Sale of satellite capacity
0.6	
20	User terminals & ground equipment
18	
0.8	
76	Value-Adding services
21	
2	

Potential of Integrated Applications
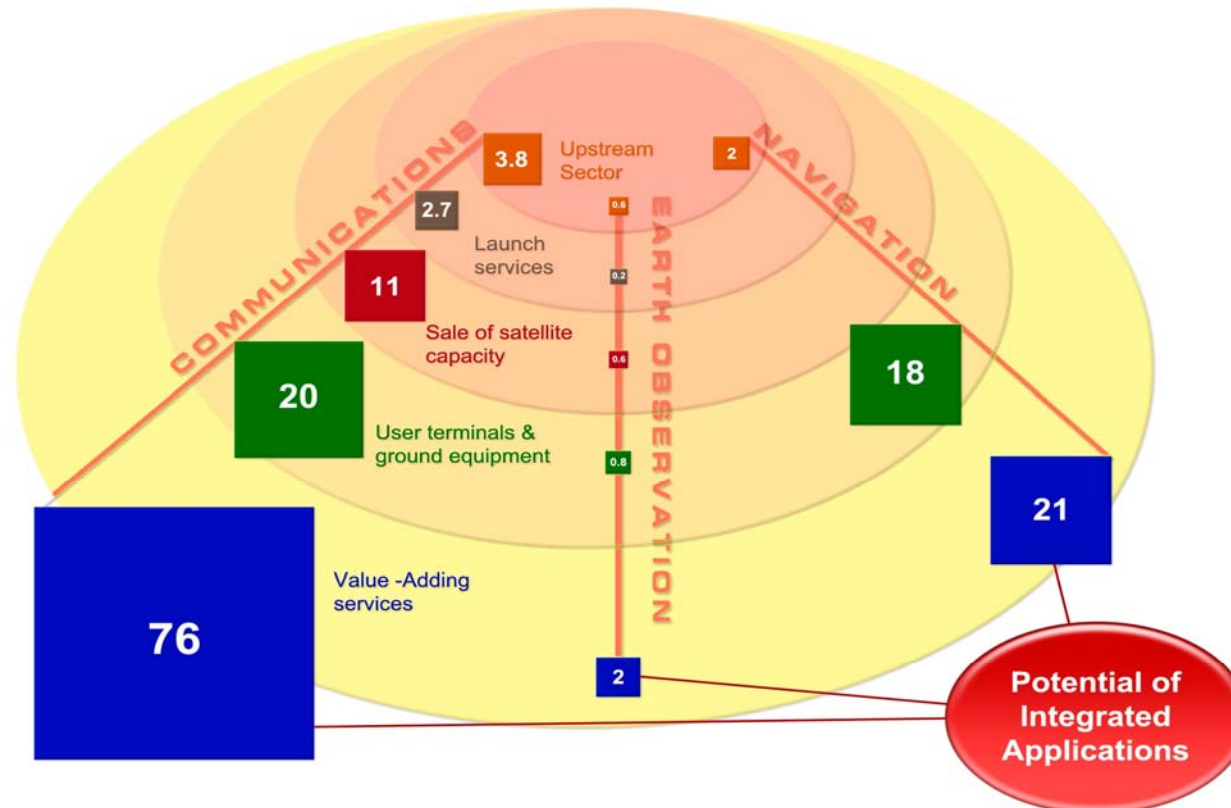
Satcoms are dominant with >75% of the downstream services revenue.

Source: Euroconsult & GSA, 2009/10

Thematic Areas addressed by ARTES Satcom Applications

153 projects, 250M€ total value, 108M€ ESA part

Telemedicine/ Medical Education

29 Projects
22.7 MEUR (ESA part)

Satcom Networks Systems & Services

37 Projects
31.2 MEUR (ESA part)
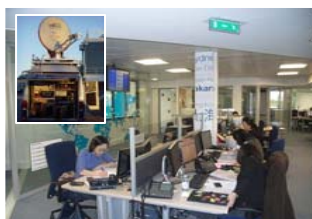
B2B / B2C

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)
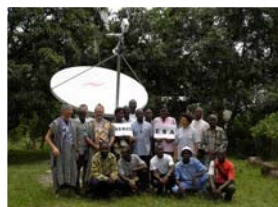
Distance Learning

9 Projects
4.2 MEUR (ESA part)

eGovernment

2 Projects
1.9 MEUR (ESA part)
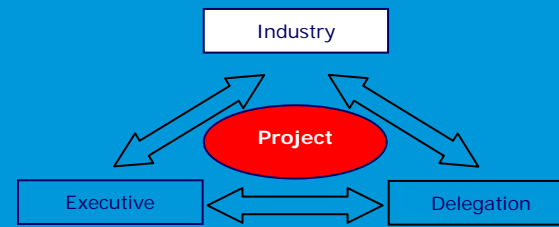
Did the product or service resulting from your project get into the market (i.e. with paying customers)?

yes, with total sales above the internal project fund

no

yes, with total sales not yet recovering project internal funds

27%

29%

26%

18%

yes, offered on the market but no sales yet
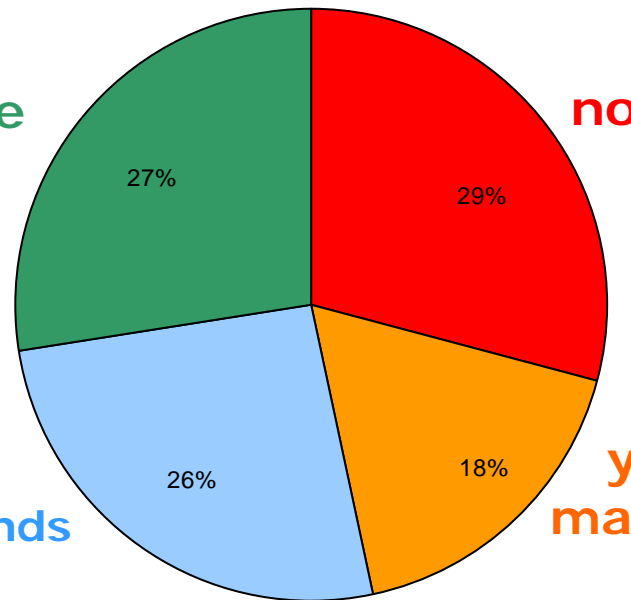
TO BE NOTED:

62 Respondents

69 Projects (quoted by respondents)

39 Projects (assessed) (*)

30 Projects not addressed

(out of total 151 projects)

Space Application – ARTES 3-4 and 20
User Driven Missions – ARTES 21

The following activities/funds emanating from:

- IAP Preparation Phase, WorkPlans, Demo projects
- ARTES 3- 4 Open Call,
- 3rd Party Funding EC/EIB etc

Cover wide thematic fields range, in partnership

Space 4:

- *Baltic, Alpine, Africa, Arctic*
- *Civil Protection/Crisis Management*
- *Development, Knowledge*
- *Maritime, Fisheries,*
- *Health*
- Safety, Security
- *Transport, Energy*
- *Agriculture, Water management*
- *…..*
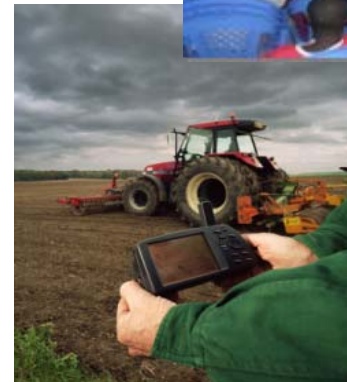
Climate ➔ Energy, Health …

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Space-based Applications methodology
Space for Energy
holistic approach
and examples

Stakeholder / User Community and Needs

- Stakeholder / User community:
  - Far from the traditional space business.
  - Wide community with different needs, including:
    - Planning and setting-up
    - Energy generation and management.
    - Distribution and storage.
    - Infrastructure maintenance.
  - Main players show interest in the added-value of space, but they have limited expertise / experience.

- Awareness is necessary to federate the community:
  - To identify relevant issues that can show the added-value of space.
  - To establish partnership with stakeholders / users to demonstrate the demand pull approach.
  - To reach a critical mass of users to guarantee sustainability.
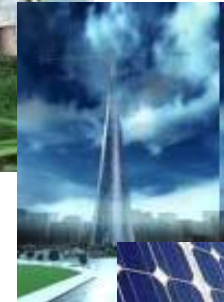
Space for Energy
Examples of on going relevant projects with partners

esa

Space & Power Grid Management

Intelligent / Smart Grid Management

Carbon Capture and Storage - Integrated Spaceborne Site Monitoring

Electricity generation from hydrological resources

Pipeline Integrity Monitoring

Low Carbon Energy
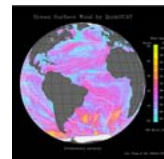
Space Weather Impact on Energy Sector
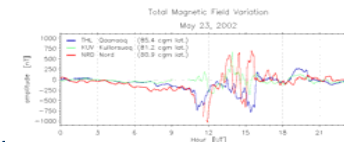
GNSS and Remote Sensing Integration for Applied Meteorology (Wind Energy Production Assessment)

Integration of Concentrating Solar Power (CSP) in the Electricity Grid

Space for Health, Knowledge Management

Typical IAP activities in Health

- Field data collection
- Vector and disease risk mapping
- Early warning & emergency response
- Telemedicine (diagnostic/surgery etc)
- Integration/centralized data & analysis/experts collocations'

Projects Examples

	Earth Observation	Navigation	SatCom	Human Space Flight techn.
HEWS			■	
SAFE		■	■	
Water quality monitoring in Egypt	■		■	
PREDICT – Senegal	■	■	■	
Portable Telemedicine Workstation		■	■	
eHealth in Subsaharan Africa			■	■
VECMAP	■	■		

Space for Transport

- **Typical IAP activities in Transport**
    - **Communication**
    - **Asset/dangerous goods Tracking**
    - **Fleet management**
    - **Monitoring**
    - **Land subsidence monitoring**

Projects Examples

	Earth Observation	Navigation	SatCom	Human Space Flight techn.
iTRAQ	✓	✓		
SSMART	✓	✓	✓	
IRISS		✓	✓	
DG-TRAC		✓	✓	
ECO2FLEET	✓	✓	✓	
Landslides	✓	✓	✓	
Intermodal Freight through Ports	✓	✓	✓	

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Space for Agriculture

- **Typical IAP activities in Agriculture**
    - **Precision farming**
    - **Crop growth monitoring**
    - **Optimal distribution of irrigation water**
    - **Pesticides minimization**

Projects Examples

	Earth Observation	Navigation	SatCom	Human Space Flight techn.
Talking Fields	■	■	■	
Bioscope	■	■		
GrapeLook	■	■	■	

Space for Safety

esa

- **Typical IAP activities in Safety**
    - **Communication networks**
    - **Integration/centralized data & analysis**
    - **Civil Protection…**

Projects Examples	Earth Observation	Navigation	SatCom	Human Space Flight techn.
Land Border Control	■	■	■	
Space Assets for Demining Assistance	■	■	■	
Bird Strikes in Civil Aviation	■	■		
TWIM	■		■	
UK Civil Resilience	■	■	■	

France
(speciality: Tele-Assisted Echography)

CNES
(Applications and Valorisation Group)

Germany
(speciality: Tele-Assisted Neurosurgery)

DLR
(Space Medicine Institute)

Italy
(speciality: Multi-modal Medical Imaging for Emergency)

ASI
(Applications Segment)

Spain
(speciality: Tele-Assisted Traumasurgery and Tele-Echography)

CDTI
(JCB Delegation)
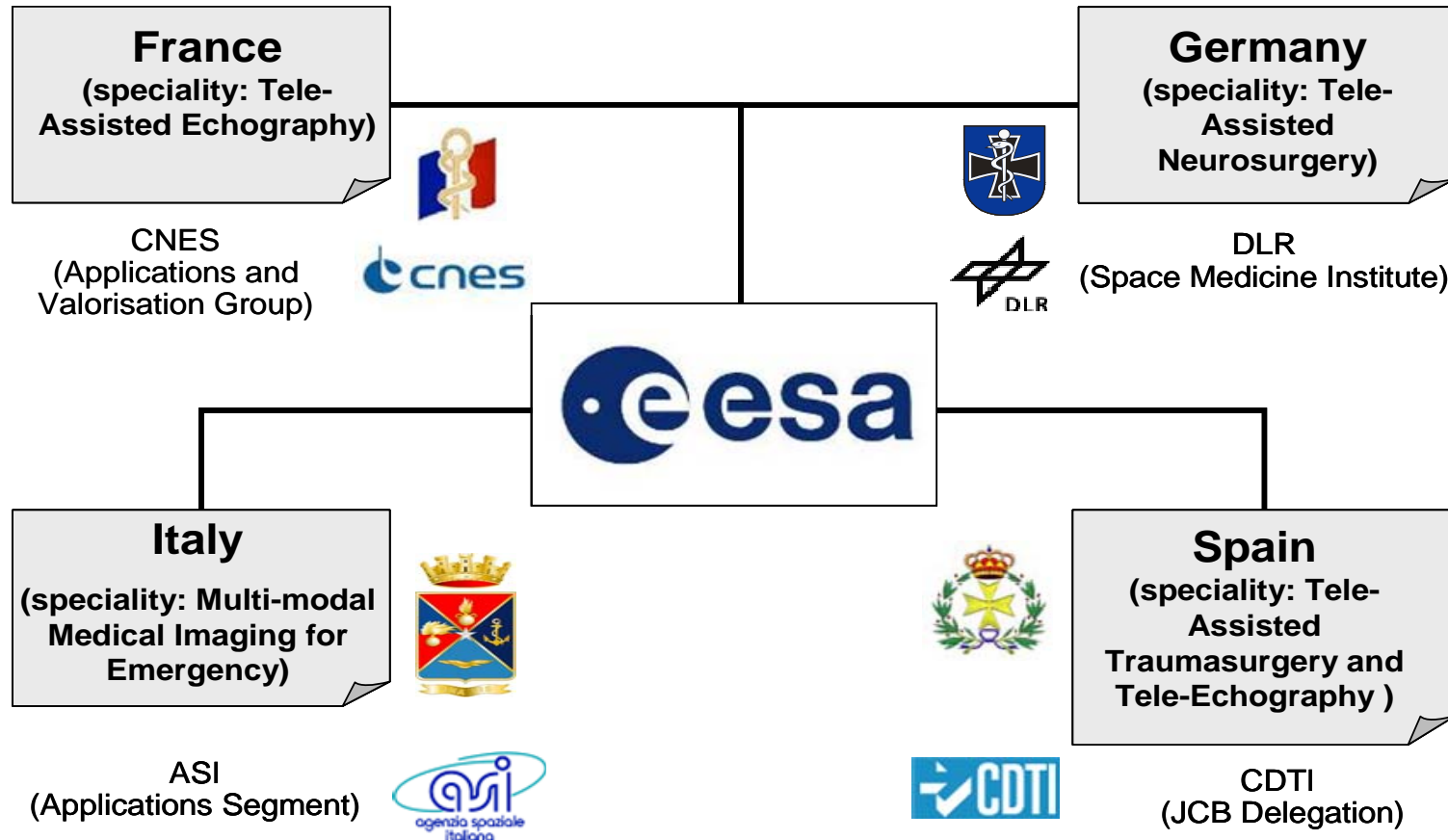
Dept. of Neurosurgery, Federal Armed Forces Hospital, Ulm

Crisis Prevention and Peace Operations 2010

Western Balkans

Croatia
OSCE — Office in Zagreb — 1/2008
| 0 | 0 | 4 |

Bosnia and Herzegovina
OHR/EUSR BiH — Office of the High Representative and EU Special Representative in BiH — 3/2002
| 0 | 0 | 24 |

EUFOR ALTHEA — EU Military Operation in Bosnia and Herzegovina — 12/2004
| 1,926 | 0 | 0 |

EUPM/BiH — EU Police Mission in Bosnia and Herzegovina — 1/2003
| 0 | 86 | 32 |

OSCE — Mission to Bosnia and Herzegovina — 12/1995
| 0 | 0 | 70 |

Serbia
OSCE — Mission to Serbia — 1/2001
| 0 | 0 | 36 |

Montenegro
OSCE — Mission to Montenegro — 6/2006
| 0 | 0 | 14 |

Albania
PAMECA III — Police Assistance Mission of the European Community to Albania — 2/2008
| 0 | 4 | 7 |

OSCE — Presence in Albania — 3/1997
| 0 | 0 | 23 |

Kosovo
UNMIK — UN Interim Administration Mission in Kosovo — 6/1999
| 8 | 8 | 172 |

KFOR — Kosovo Force — 6/1999
| 9,923 | 0 | 0 |

ICO/EUSR — International Civilian Office / EU Special Representative in Kosovo — 2/2008
| 0 | 0 | 200 |

EULEX Kosovo — EU Rule of Law Mission in Kosovo — 2/2008
| 0 | 1,164 | 501 |

OSCE — Mission in Kosovo — 6/1999
| 0 | 0 | 164 |

FYROM (Macedonia)
OSCE — Spillover Monitor Mission to Skopje — 12/1992
| 0 | 0 | 55 |

Other regions

Moldova
OSCE — Mission to Moldova — 2/1993
| 0 | 0 | 13 |

JPF — Joint Peacekeeping Force — 7/1992
| 1,375 | 0 | 0 |

Cyprus
UNFICYP — UN Peacekeeping Force in Cyprus — 3/1964
| 858 | 68 | 40 |

Lebanon
UNIFIL — UN Interim Force in Lebanon — 3/1978
| 12,067 | 0 | 319 |

Israel/Syria
UNDOF — UN Disengagement Observer Force — 6/1974
| 1,041 | 0 | 39 |

Israel/Palestinian Territories
UNTSO — UN Truce Supervision Organization — 5/1948
| 154 | 0 | 88 |

EUBAM Rafah — EU Border Assistance Mission at Rafah Crossing Point — 11/2005
| 0 | 6 | 7 |

EUPOL COPPS — EU Police Co-ordinating Office for Palestinian Police Support — 1/2006
| 0 | 22 | 31 |

TIPH — Temporary International Presence in the City of Hebron — 1/1997
| 0 | 0 | 68 |

Egypt/Israel
MFO — Multinational Force and Observers — 4/1982
| 1,652 | 0 | 119 |

Haiti
MINUSTAH — Mission des Nations Unies pour la Stabilisation en Haïti — 6/2004
| 8,454 | 2,462 | 676 |

Western Sahara
MINURSO — Misión de las NU para el Referéndum del Sáhara Occidental — 4/1991
| 233 | 6 | 113 |

Colombia
MAPP-OAS — Misión de Apoyo al Proceso de Paz en Colombia — 2/2004
| 0 | 0 | 35 |

Guinea-Bissau
UNIOGBIS — UN Integrated Peacebuilding Office in Guinea-Bissau — 1/2010
| 1 | 0 | 18 |

Sierra Leone
UNIPSIL — UN Integrated Peacebuilding Office in Sierra Leone — 10/2008
| 0 | 0 | 28 |

Central African Republic
MICOPAX — Mission de Consolidation de la Paix en République centrafricaine — 7/2008
| 558 | 146 | 21 |

BINUCA — Bureau Intégré des Nations Unies pour la consolidation de la paix en République centrafricaine — 4/2009
| 5 | 6 | 28 |

Liberia
UNMIL — UN Mission in Liberia — 9/2003
| 8,110 | 1,319 | 655 |

Democratic Republic of the Congo
MONUSCO — Mission de l'ONU pour la Stabilisation en RD Congo — 7/2010
| 19,590 | 1,206 | 1,629 |

EUPOL RD CONGO — EU Police Mission in the DRC — 7/2007
| 0 | 21 | 16 |

EUSEC RD CONGO — EU Mission to Provide Advice and Assistance for Security Sector Reform in the DRC — 6/2005
| 0 | 0 | 11 |

Côte d'Ivoire
UNOCI — UN Operation in Côte d'Ivoire — 4/2004
| 7,384 | 1,147 | 693 |

Opération Licorne — 2/2003
| 900 | 0 | 0 |

Burundi
BINUB — Bureau Intégré des Nations Unies au Burundi — 1/2007
| 5 | 8 | 163 |

Chad-CAR
MINURCAT — Mission des Nations Unies en RCA et au Tchad — 1/2008
| 2,941 | 208 | 578 |

Eastern Europe / Caucasus / Central Asia

Armenia
OSCE — Office in Yerevan — 2/2000
| 0 | 0 | 6 |

Nagorno-Karabakh
Personal Representative of the Chairman-in-Office on the Conflict Dealt with by the OSCE Minsk Conference — 8/1995
| 0 | 0 | 6 |

Azerbaijan
OSCE — Office in Baku — 7/2000
| 0 | 0 | 15 |

Kazakhstan
OSCE — Centre in Astana — 7/1998
| 0 | 0 | 6 |

Turkmenistan
OSCE — Centre in Ashgabat — 7/1999
| 0 | 0 | 6 |

Uzbekistan
OSCE — Project Co-ordinator in Uzbekistan — 12/2000
| 0 | 0 | 3 |

Kyrgyzstan
OSCE — Centre in Bishkek — 7/1998
| 0 | 0 | 21 |

OSCE — Police Advisory Group — 7/2010
| 0 | 52 | 0 |

Tajikistan
OSCE — Office in Tajikistan — 6/2008
| 0 | 0 | 28 |

North Korea/South Korea
NNSC — Neutral Nations Supervisory Commission — 6/1953
| 10 | 0 | 0 |

Belarus
OSCE — Office in Minsk — 1/2003
| 0 | 0 | 5 |

Moldova/Ukraine
EUBAM Moldova and Ukraine — EU Border Assistance Mission to Moldova and Ukraine — 12/2005
| 0 | 90 | 14 |

Ukraine
OSCE — Project Co-ordinator in Ukraine — 6/1999
| 0 | 0 | 4 |

Georgia
EUMM — European Monitoring Mission in Georgia — 9/2008
| 76 | 120 | 127 |

Kashmir
UNMOGIP — UN Military Observer Group in India and Pakistan — 1/1949
| 44 | 0 | 23 |

Middle East / Asia

Iraq
USF-I — United States Forces – Iraq — 1/2010
| 85,000 | 0 | 0 |

NTM-I — NATO Training Mission – Iraq — 8/2004
| 170 | 55 | 25 |

UNAMI — UN Assistance Mission for Iraq — 8/2003
| 234 | 0 | 322 |

EUJUST LEX — EU Integrated Rule of Law Mission for Iraq — 7/2005
| 0 | 0 | 40 |

Afghanistan
ISAF — International Security Assistance Force — 1/2002
| 119,500 | 0 | 0 |

UNAMA — UN Assistance Mission in Afghanistan — 3/2002
| 15 | 0 | 379 |

EUPOL Afghanistan — EU Police Mission in Afghanistan — 6/2007
| 0 | 165 | 84 |

Nepal
UNMIN — UN Mission in Nepal — 1/2007
| 68 | 0 | 59 |

Somalia/Gulf of Aden
EU NAVFOR Somalia – Operation ATALANTA — EU Naval Operation Against Piracy — 12/2008
| 1,800 | 0 | 0 |

Somalia
UNPOS — UN Political Office for Somalia — 4/1995
| 0 | 0 | 37 |

AMISOM — African Union Mission in Somalia — 2/2007
| 6,150 | 47 | 0 |

Somalia/Uganda
EUTM Somalia — EU Military Mission to Contribute to the Training of Somali Security Forces — 4/2010

Sudan
UNMIS — UN Mission in Sudan — 3/2005
| 9,914 | 697 | 1,257 |

UNAMID — United Nations Hybrid Operation in Darfur — 12/2007
| 17,298 | 4,789 | 1,563 |

Timor-Leste
UNMIT — UN Integrated Mission in Timor-Leste — 8/2006
| 33 | 1,497 | 534 |

ISF — International Stabilization Force — 5/2006
| 550 | 0 | 0 |

Philippines
EPJUST — EU-Philippines Justice Support Programme — 10/2009
| 1 | 14 | 18 |

IMT — International Monitoring Team — 10/2004
| 58 | 0 | 2 |

Solomon Islands
RAMSI — Regional Assistance Mission to Solomon Islands — 7/2003
| 150 | 300 | 150 |

Caption
Name of country/area
Acronym of mission
Full name of mission
Flag of institution

UNMIL — UN Mission in Liberia — 9/2003
| 8,110 | 1,319 | 655 |

Beginning of operation
international civilians
international police
international military

zif — Center for International Peace Operations

www.zif-berlin.org

Traditional lesson (Greytown - South Africa)

**Vocational Training, including Internet Browsing
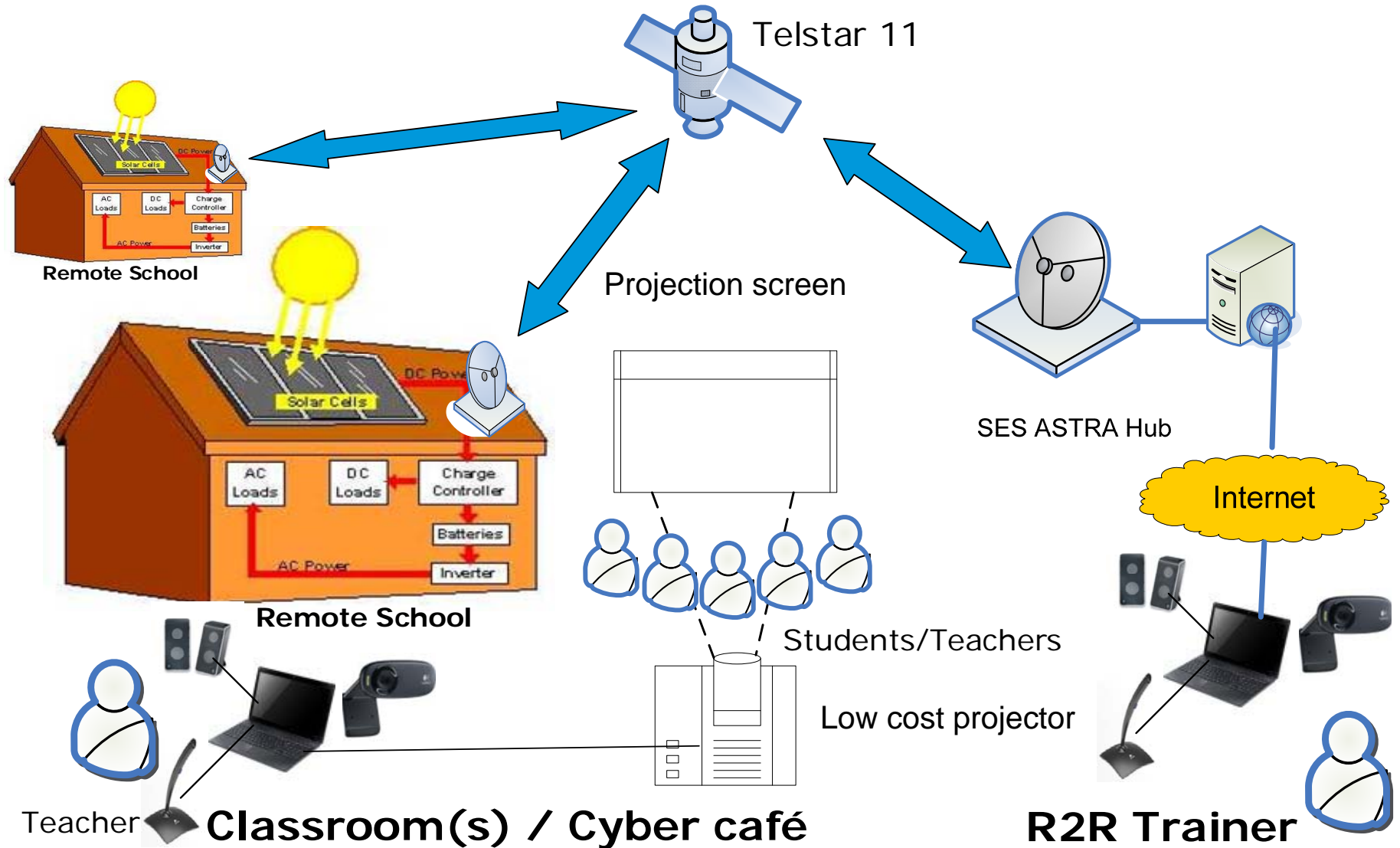(Kinshasa - DRC)**

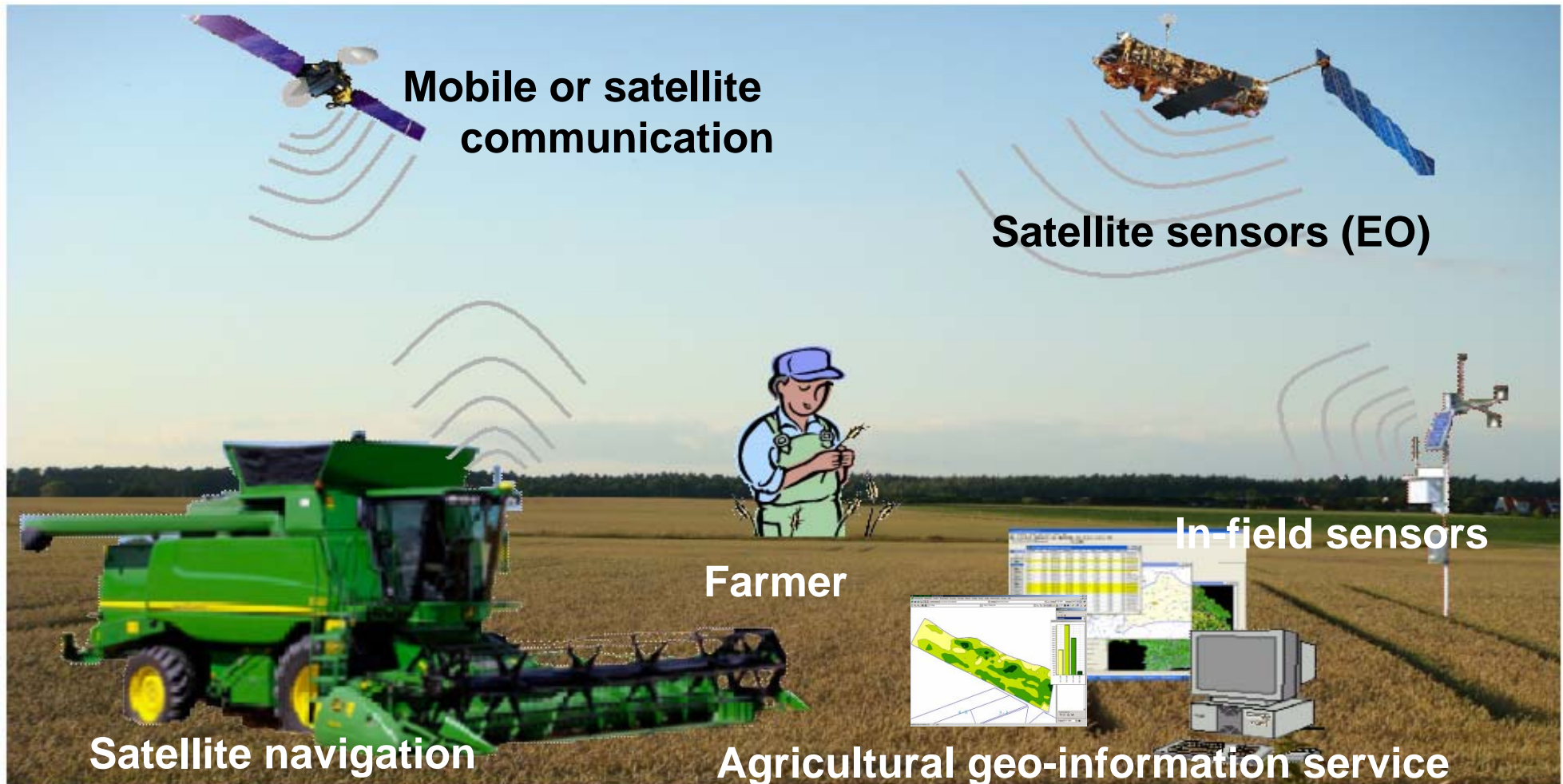**Lesson about local History (Burundi)**

Entertainment for pupils (Kinshasa - DRC)

"Space4Education"
"Rally to Read" add on architecture initiative

Talkingfields main functional elements

Mobile or satellite communication

Satellite sensors (EO)

Farmer

In-field sensors

Satellite navigation

Agricultural geo-information service

Current Status of Processing and Orders

Nuclear Safeguard and Verification

- IAEA needs:
    - Connect all Nuclear Power Plants to IAEA Headquarters
    - Monitor critical assets
    - Secure Data acquisition & processing in near real and real-time (confidentiality is a must)
    - Support on-site Inspections
- Pre operational Demo activity in key sites of 3 countries (Hungary, Armenia, Ukraine) Next 8 sites follows.
- IAEA wish an operational solution to integrate up to 400 sites.
- Letter received by ESA DG with request to enlarge cooperation
- Space assets involved:
    - Satcom for secure and reliable communications (fixed and mobile).
    - GIS, to acquire information on the areas of interest and prepare specific plants

Conclusions
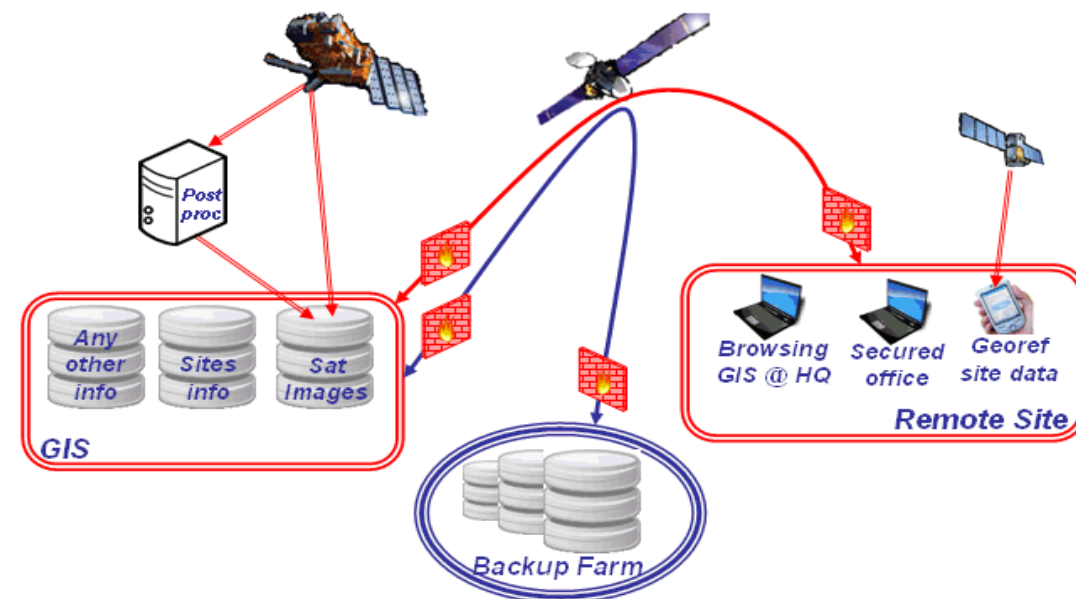
- Main **growth** in the value chain: **Downstream sector** / User Driven **Applications**

- **ARTES Applications**: an **opportunity** to promote the **added-value of Space** at large

- The today **dialogue** should lead to mutually useful activities **in partnership,** targeting sustainable services

- This Satcom Applications WS in view of the **HYLAS 1 Applications Call**, can be considered as 1ˢᵗ step in a series of dedicated **Actions & Projects** to follow ☺

Thank You!

Open Call, IAP web portal:
http://iap.esa.int

European Space Agency