



CENTRE NATIONAL D'ÉTUDES SPATIALES

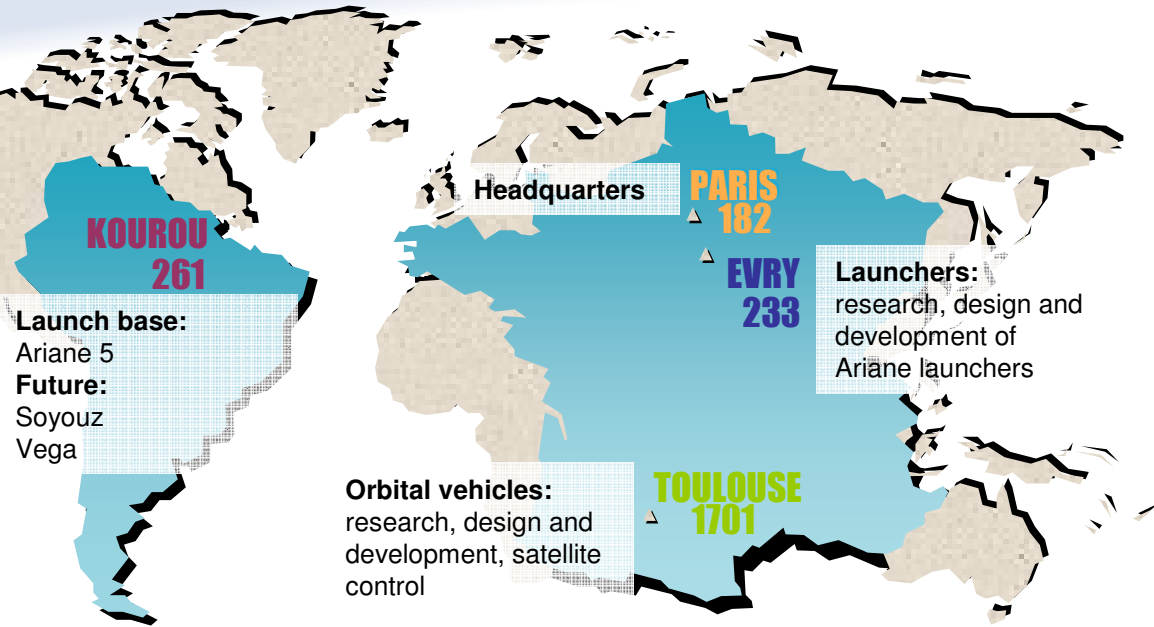
**Third United Nations International
UN-SPIDER Bonn Workshop:
“Disaster Management and Space Technology-
From Concepts to Application”**

21-23 October 2009

**Space-based applications for development, disaster
management, emergency response, humanitarian action**

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- § CNES, a government agency
- § Our concept: innovating space applications
- § Our strategy: space applications for societal benefits
- § Our role: in the value chain of space applications
- § Our tool: a call for projects to develop space applications
- § Examples of space applications:
 - Fleet management: HumaNav
 - Observation Charter, Telecom Charter
 - Search and Rescue: Cospas-Sarsat
 - Emergency response: Emergesat, Recover (Tango), Mobidick, ABCs@t
 - Development: Burkina Faso (NetAdded), UNFM
 - Tele-Health: Telemedecine, Tele-epidemiology
- § Conclusions



Founded in 1961

4 centres of excellence

2418 staffs with 1800 engineers and executives (35% of women)

Budget of 1740 M€ (2008)

5 strategic domains:

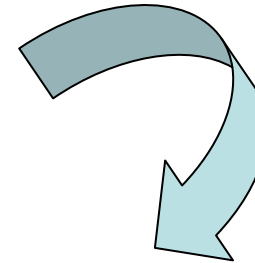
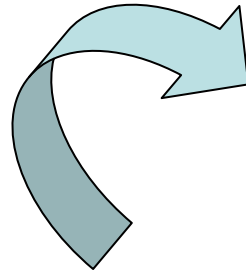
- access to space
- civil applications of space
- environment
- science and technology research
- security and defence

Earth observation
satellites

Telecommunication
satellites

Navigation
satellites

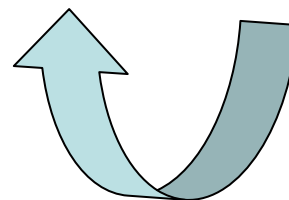
Technological or
methodological
innovation



Organisational
innovation

*Innovating
space
applications*

Economical
innovation



1. To promote space-based applications for the society and to democratize the access to space applications for all
2. To develop privileged and permanent relationships with end-users (*demand pull approach / technological innovation responding to precise user needs*)
3. To federate innovating public-private multi-actors partnerships (*organisational innovation for the creation of value added in common*)
4. To support the development of sustainable services (*economical innovation*)

The objectives of public-private partnerships, as a lever of common development, are:

1. To involve key actors of the value chain in the development of new applications and services, within a balanced governance
2. To improve the reciprocal knowledge between partners, the creation of synergies, achieving significant savings together
3. To share information on mutual experiences and existing initiatives
4. To stimulate innovation and high potential of growth through an ecosystem of actors
5. To ensure sustainability along the value chain

1. A role of leverage effect: to impulse the start of feasibility studies and pilot projects and/or demonstrations of new services
2. A role of interface or coordination between the industry, laboratories and end-users
3. To bring a technical expertise in the conception phase (if needed)
4. To bring a legal expertise (if needed)
5. To promote the development of space applications useful for the society
6. Cnes should not have any operational role in the future services

A new tool to implement our strategy...

- § First call of this type for innovating space applications projects
- § Themes: environment, transports, tele-health, ICT, development, disaster management, emergency response and humanitarian action
- § Launched in Paris and Toulouse (Cité de l'Espece) in June, 2009
- § Deadline 30 September 2009
- § **45 proposals are being evaluated now!**

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- § **Conclusions**

§ Context:

50 000 humanitarian vehicles deployed in the world in a difficult context (armed conflict, natural disasters)

§ Needs:

To reinforce security and safety of relief teams and to improve efficiency of fleet management

§ Objectives:

- To develop an operational service
- To combine different space technologies within the same service (Earth observation, telecommunication and navigation by satellite)
- To federate a multi-actors partnership

Multi-actors partnerships :
UNHCR, ICRC,
NOVACOM,
UNOSAT, CNES



Pilot project in 2009-2010: Deployment of 100 vehicles



HumaNav



Chad, Sudan, Uganda
Nepal, Zimbabwe, Côte d'Ivoire



HumaNav

Fleet management benefits

Security

- Real time tracking
- Route monitoring
- Geo-fencing
- Security alerts

Safety

- Over speeding control
- Driver hours monitoring
- Driver performance

Environment

- Reduced fuel consumption
- Reduced CO₂ emissions

Efficiency

- Reduced kilometres driven
- Reduction in fleet size
- Direct messaging to/from vehicle

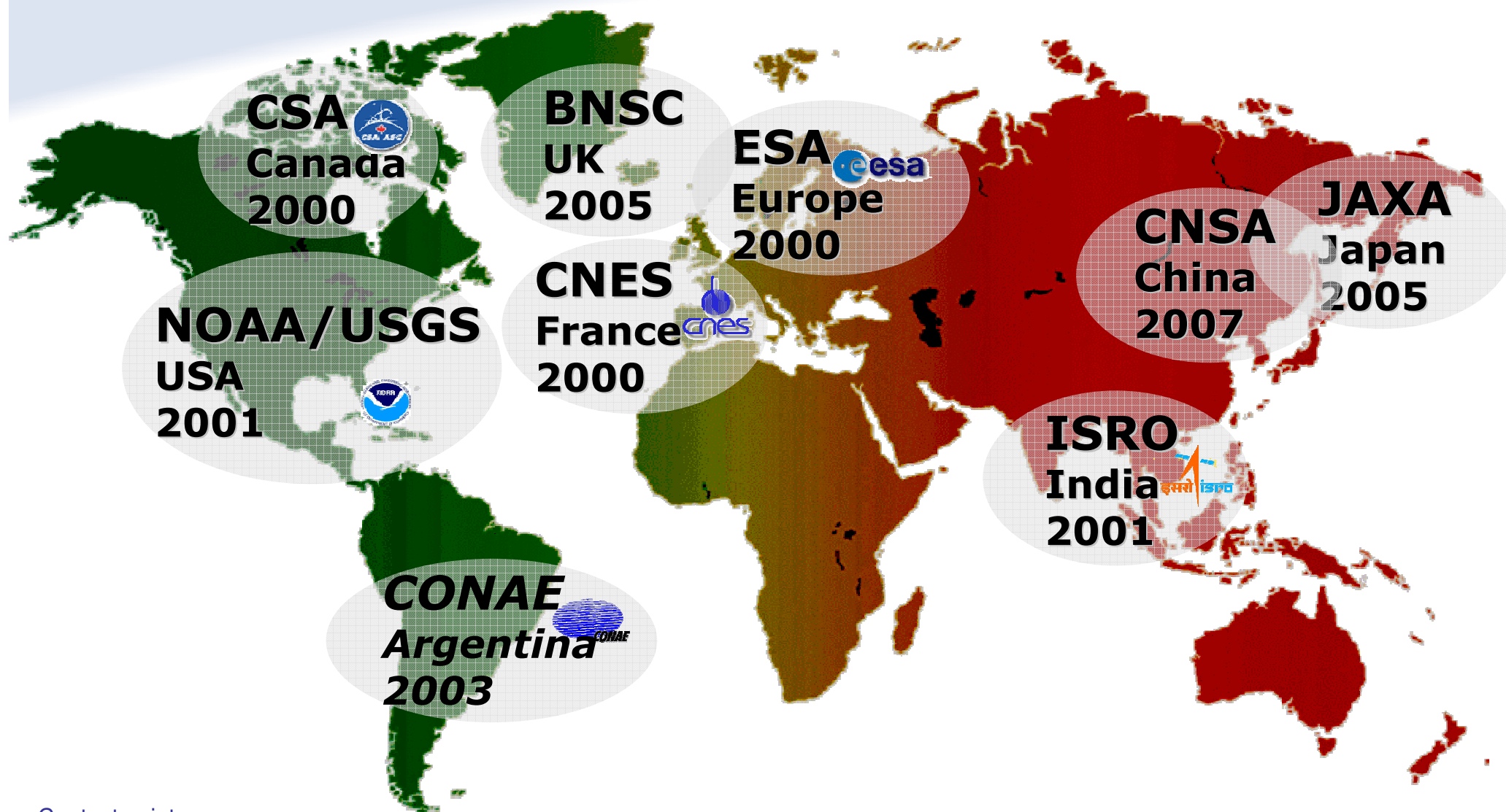


Earth observation charter

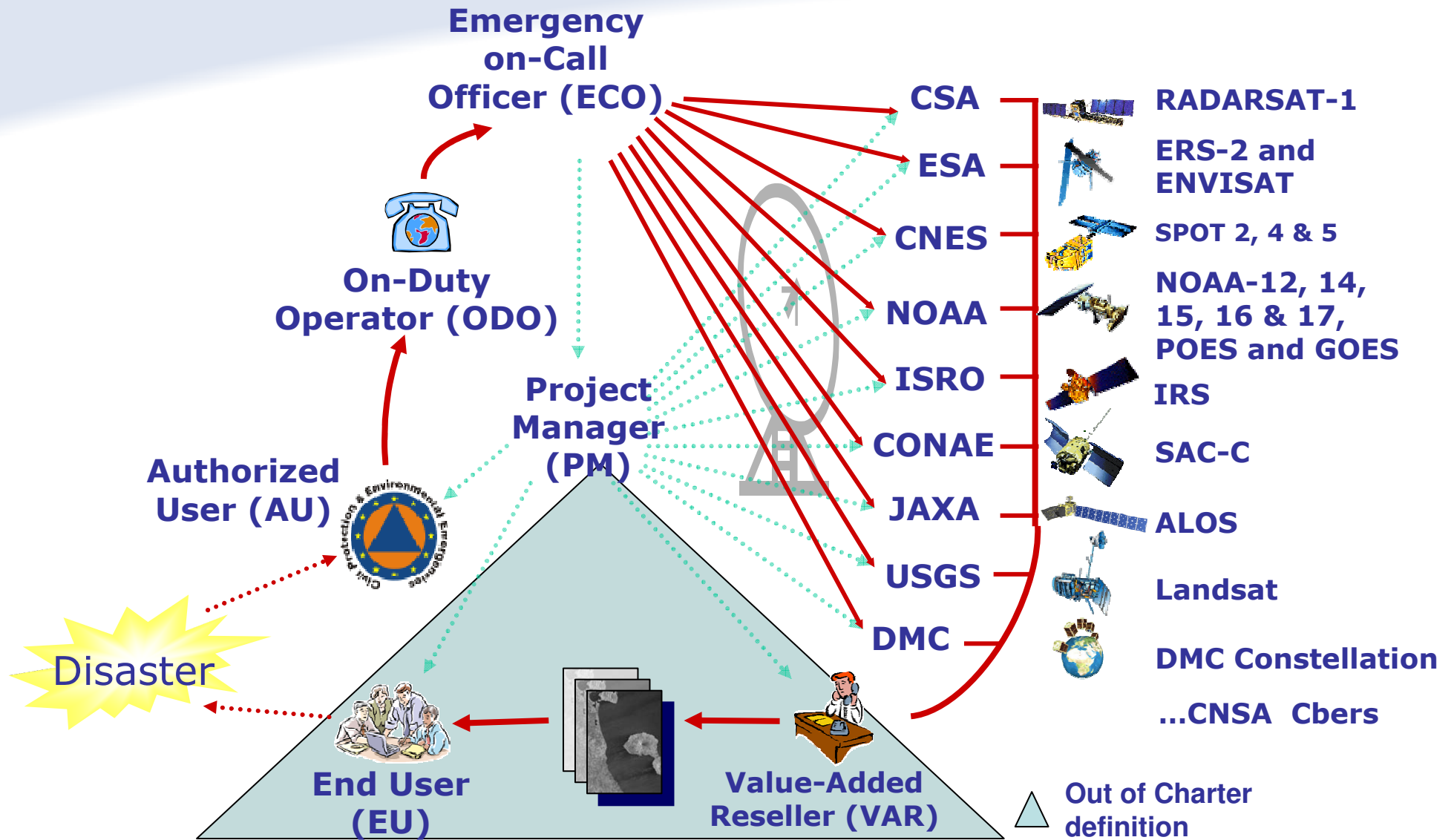
The Charter was initiated by CNES/ESA at the occasion of the UNISPACE III Conference in Vienna (July 1999)

- § the Charter is an international cooperation between space agencies, making their resources available to emergency operations
- § the Charter is a global mechanism:
 - to task satellites in emergency response situations, and
 - to provide rush access to EO data, free of charge, in case of natural or man made disaster





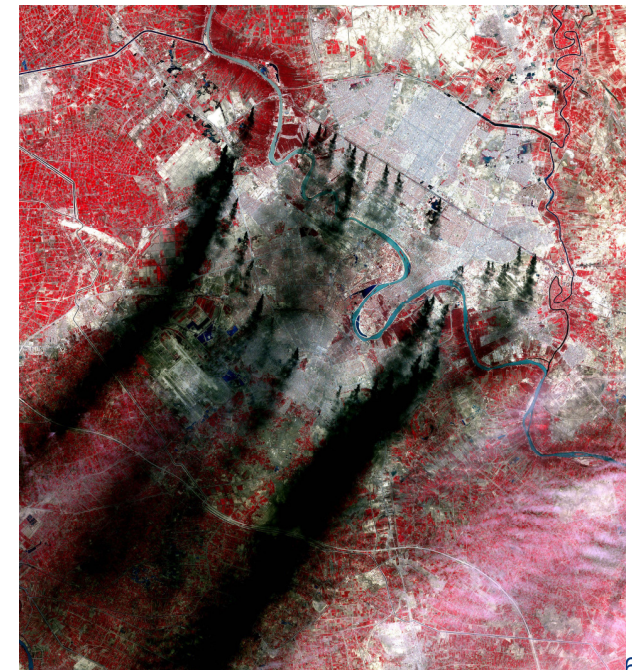
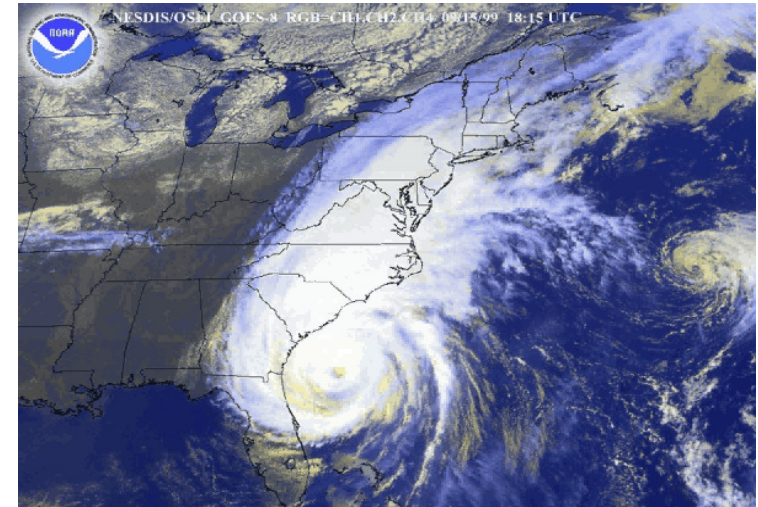
Earth observation Charter operational loop



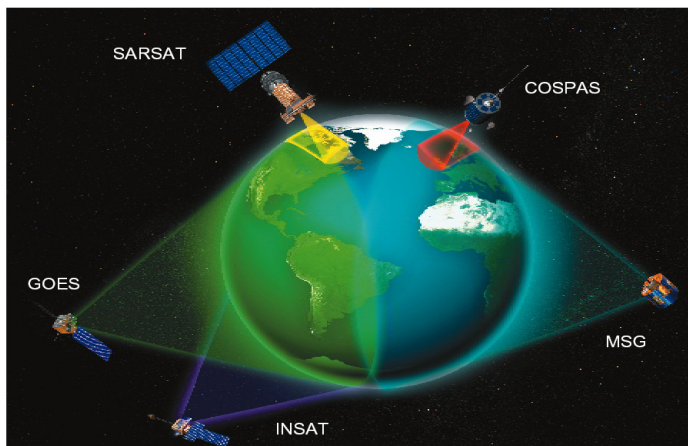
Contact point:
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Satellite telecom charter

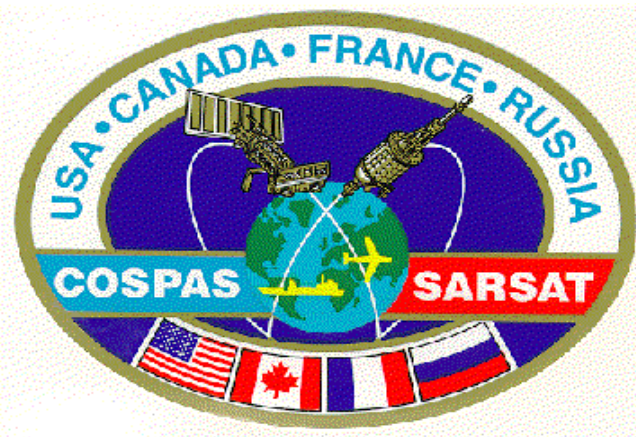
- § New project initiated by CNES using his first successful experience of the “Earth observation Charter”
- § Work done under the general framework of the UN Tampere Convention adopted by France in 2008
- § Scope of the telecom Charter: to provide guaranteed and free satellite bandwidth to humanitarian organizations during the emergency response phase ; this Charter also aims at servicing worldwide
- § 2008: work done as part of the WGET led by OCHA with humanitarian organizations such as UNHCR, ICRC, IFRC to define user needs
- § 2009: CNES has launched a feasibility study on satellite telecommunication operators
- § 2010: draft charter to be submitted to next WGET for discussion



- § The International Cospas-Sarsat Programme provides accurate, timely, and reliable distress alert and location data to help search and rescue authorities assist persons in distress
- § 4 founder countries: France, Canada, United States, Russia and 34 other member states
- § 26 700 persons saved in the world since 1984
- § 1 satellite regional centre located in Toulouse (CNES)



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<http://www.cospas-sarsat.org>



Satellite Transmissions:

- § Ku band VSAT antenna auto-pointing
- § Return link up to 4Mbps
- § Forward link up to 35Mbps
- § Based on ETSI DVB-RCS standard

WIFI :

- § Based on 802.11a,b,g standards
- § Transportable and autonomous base (rucksack), tested 25 km
- § Automatic network configuration
- § QoS management allowing application priority: videoconference, telephony



Partners: Thales
Alenia Space,
FCR, UNHCR,
MEDES, CNES

GSM:

- § Thales GSM backhauling Solution
- § Compliant with GPRS/EDGE

VHF / TETRA:

- § VHF relay or TETRA base station inside
- § Validated & configured VHF or TETRA terminals
- § Long-range antenna
- § VoIP interface

§ French Civil Protection (Ministry of Home Affairs)

Urban area real operation made by Firemen in Paris - August 2006

Rural and mountain area real operation (humidity, low temp° and snow) - Ariège March 07. Transported by firemen vehicle, interconnected with on-site Command&Control Vehicle, VoIP communications with European coordination centre (Brussels) & Firemen Brigade HQ.

French Firemen real operation on flood thematic - March 2008

§ Humanitarian organization

Operations with UN-HCR during rain conditions – Switzerland, July 2007

Operational deployment in Chad by UN-HCR in Abeche's refugees Camp : telecom & medical usages – from Nov. 2007 to Jan. 2008

§ French Emergency Medical Services (PSMA)

Emergesat delivery to French Guyana's SAMU: customized with medical equipments & applications for Medical Rescue and Surveillance operations in case of human or natural disasters, medical assistance of large events and epidemiology follow up – March 08. Demonstration done in French Guyana - November 2008.

§ French Ministry of Foreign Affairs

Emergesat delivery for international rescue operations – July 08

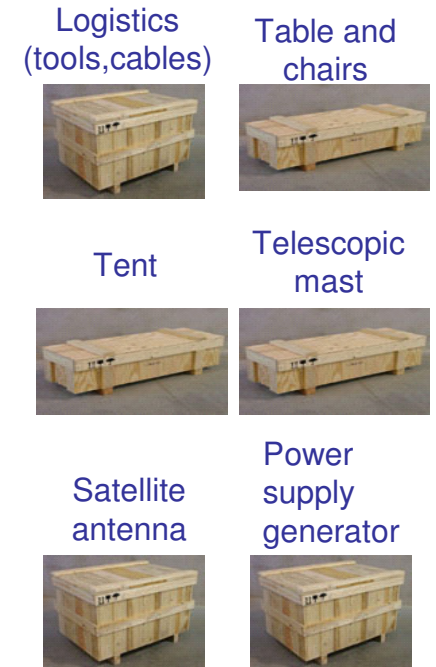
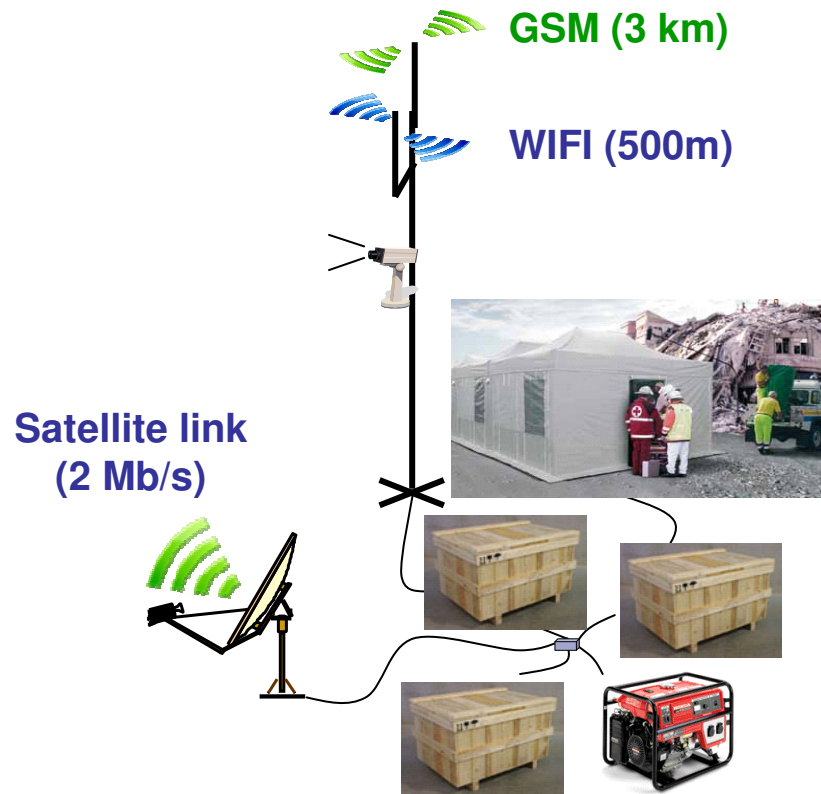


RECOVER: Risk and Emergency Container for Valuable and Essential telecom Recovery

- § Developed as part of the TANGO project from the European Commission FP6 Integrated Project to serve the needs of GMES
- § Consortium of 24 partners coordinated by EADS Astrium
- § A modular, light and transportable solution based on small containers (< 60 kg)



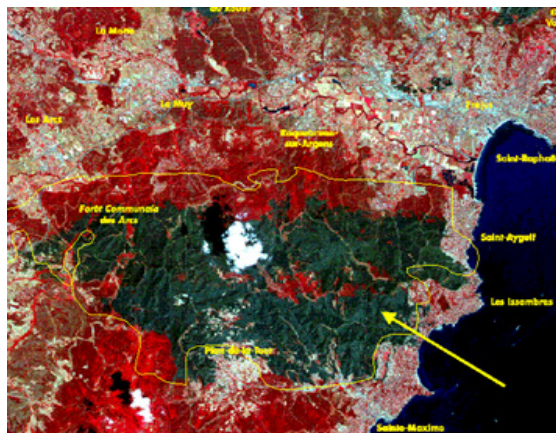
Transportation by helicopter, truck, boat, etc.



All containers can be packed in only one standard civil aviation container

Demonstration done on 11 December 2008 Cahors, France

Demonstrator of embedded operational tools for French authorities, using satellite means for observation, positioning and communication

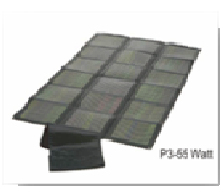


Several Demonstrations done

Mobile kit (10 kg) useful for:

- § Emergency response
- § Scientific exploration missions in isolated areas

Foldable Solar Charger
IP-54 Providing up to 55 W



Internet Connection
Inmarsat BGAN Explorer
500 satellite terminal (IP-54).
Up to 464 kbps



End-user terminal
Rugged tablet PC



WiFi Router

Telephone
BGAN Bluetooth
telephone (IP54)



Alimentation System
High capacity batteries,
charged by a solar
cover, external sector or
other sources

Suitcase
Resistant to shocks
and vibration,
waterproof and
dustproof IP-54

LA BOUDEUSE: a French state scientific exploration mission around the world for sustainable development 2010-2011



BURKINA FASO NET-ADDED: New Technologies to Avoid Digital Division in e-Divided areas



- § Development of e-learning applications for alphabetization programmes
- § Opportunities in capacity building for disaster management

Hiperlan2
Access Units



SATELLITE MODEM

SWITCH

ROUTER

TRAFFIC SHAPER

MONITORING &
APPLICATION
SERVERS



VSAT
Antenna
System

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BURKINA FASO NET-ADDED: A need to federate multi-actors partnerships

Mutualisation of satellite bandwidth is possible with several users:

PARAKOU UNIVERSITY



TOWN HALL



PROVINCIAL
DIRECTORATE



MEDICAL DISPENSARY



NGO



Existing NGOs:

- French NGO GREF
- Local NGO FIIMBA, Bogande
- Local NGO DSF, Ouahigouya

Programme of tele-education in partnerships with local universities in developing countries:

3 operational centres:

- § **Ouagadougou**, Burkina Faso
- § **Bamako**, Mali
- § **Brazzaville**, Congo

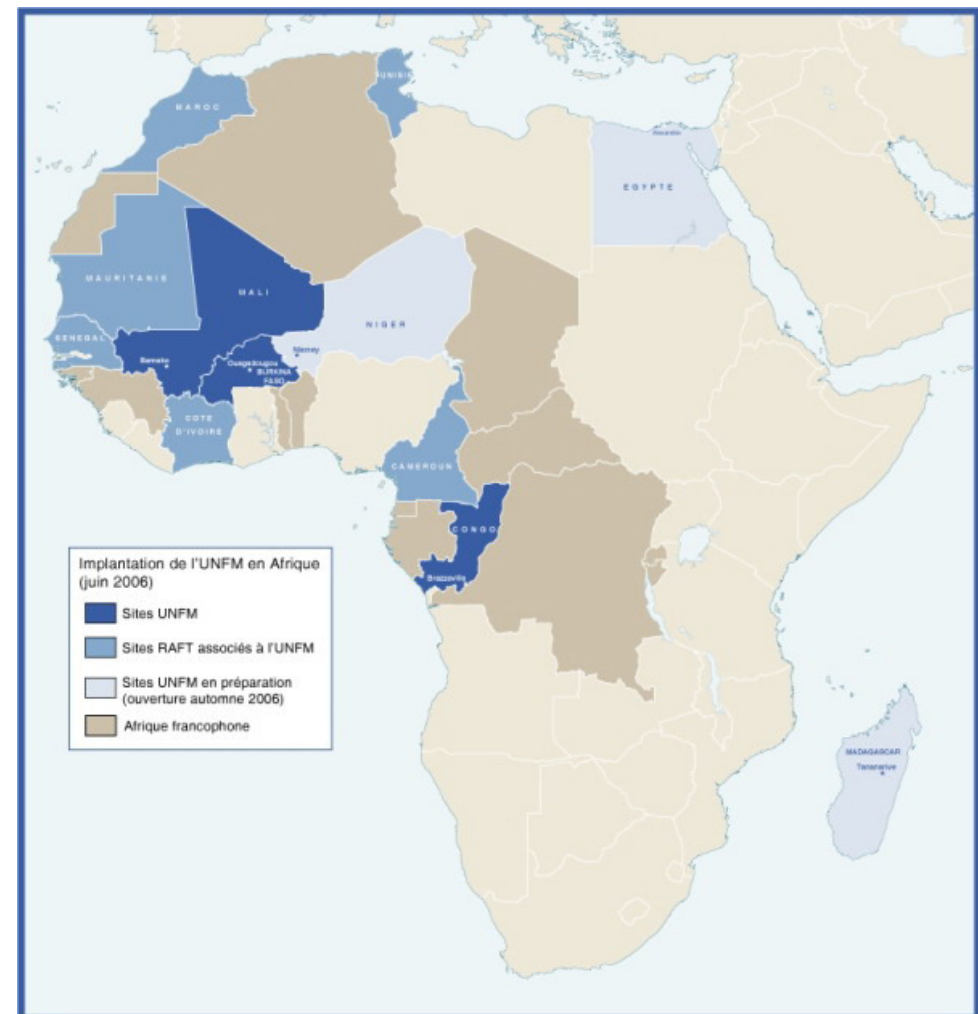
Future:

- § **Niamey**, Niger
- § **Ndjamena**, Chad
- § **Yaoundé**, Cameroun
- § **Dakar**, Sénégal
- § **Antananarivo**, Madagascar

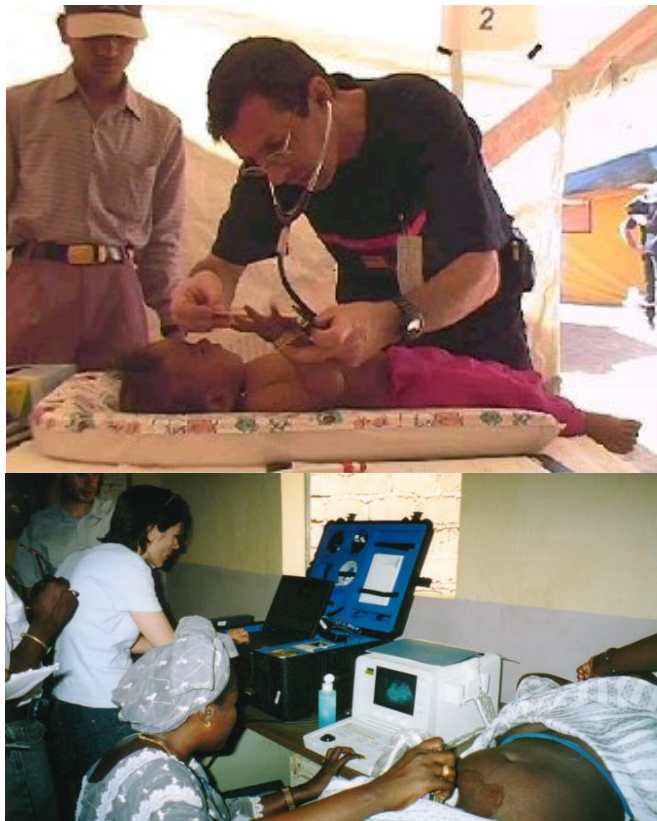


<http://www.unfm.org>

The UNFM University in Africa



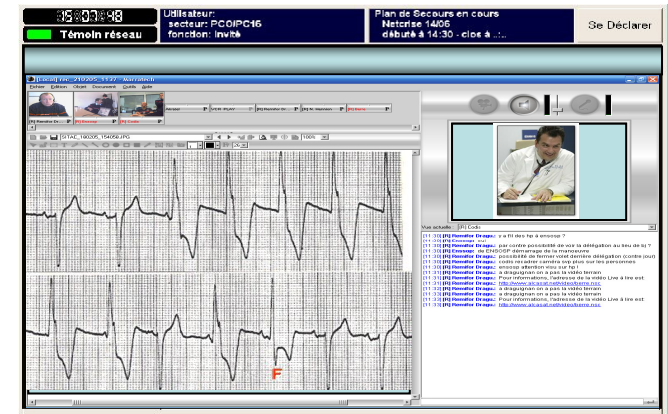
Medical tele-diagnostic



Mobile telemedicine case



Tele-transmission of ECG data



Partners:
MEDES,
MEDESSAT,
CNES and
others

- ☐ To collect epidemiology and environmental data
- ☐ To predict and evaluate risks of epidemics

FUNCTIONS

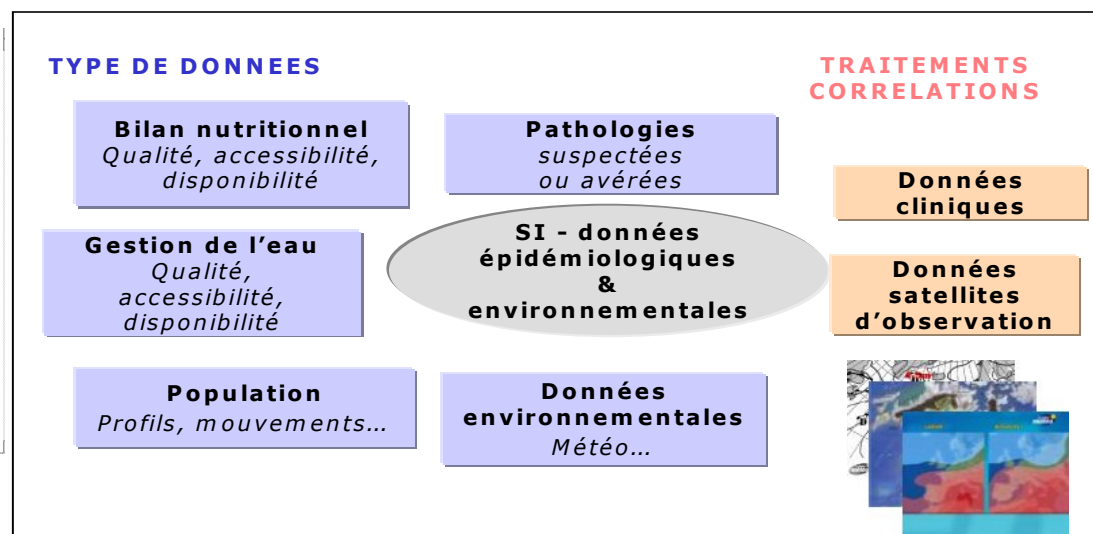
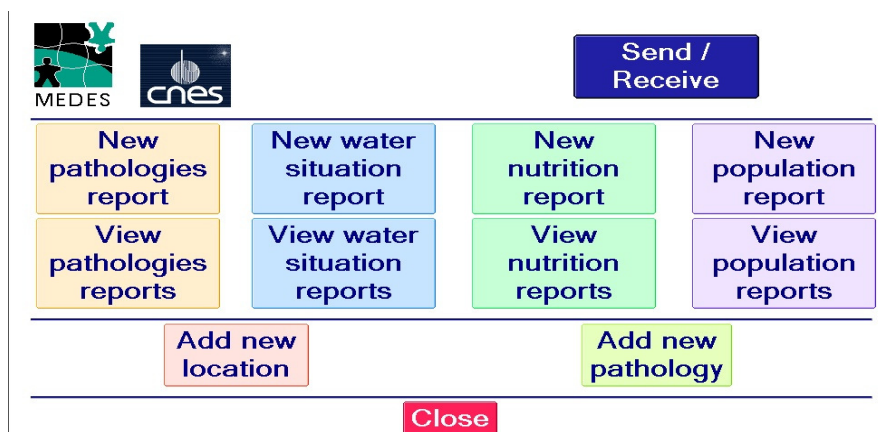
To collect, geolocalize and send epidemiology and environmental data from laptop or PDA

To access data on a secure web site

To export data using standard formats (XML, CSV)



Partners:
MEDES, CNES
and others



§ In summary, from concepts to applications:

In the past, many concepts, many pilot projects for disaster response were successful in terms of technological innovation

today, we try to stimulate the development of “innovating space applications” taking into account economical and organisational issues

§ UN-SPIDER is a perfect platform:

to collect Disaster Management actors’s requirements

to build multi-actors partnerships between public and private sectors

to stimulate the development of new space applications for disaster management and emergency response

THANK YOU

Dr. Pascal Faucher

Development, Exploration, Humanitarian action, Disaster
Management

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