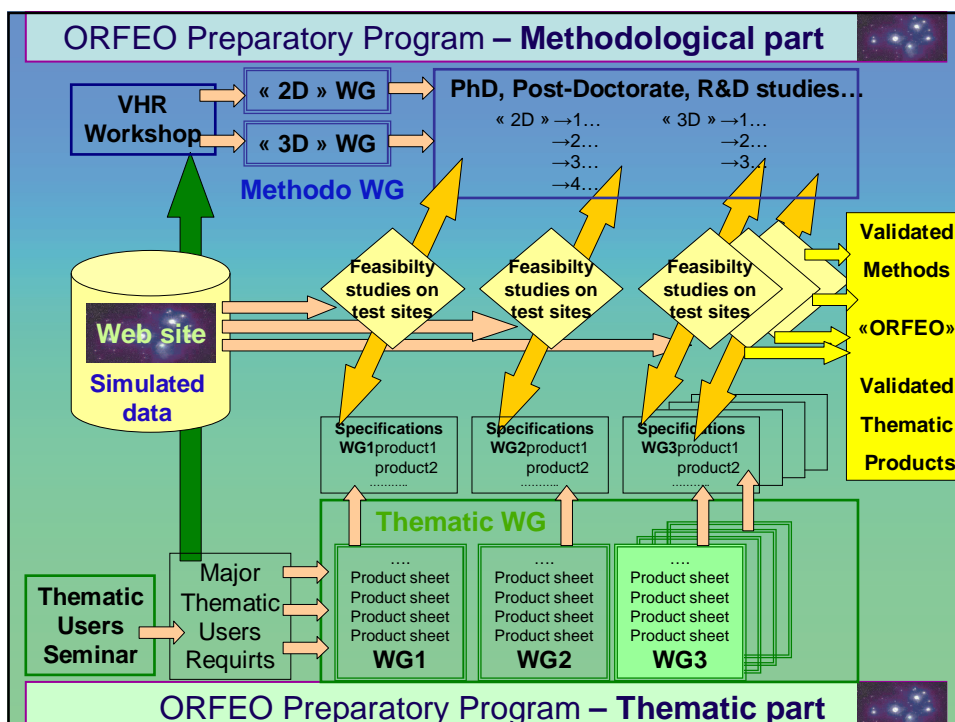


ORFEO Preparatory Program
Progress on 31st March 2005

31/03/2005 Paris COSMO-SkyMed Meeting ASI/CNES 1



ORFEO Preparatory Program progress



Methodological section progress

Start in April 2003 : « ORFEO Users Workshop »

Objective : preliminary *users needs identification*,
defining major *orientations for methodological studies*

Synthetic presentation of users requirements in 7 thematic domains:
Defence, Risks, Cartography, Hydrology, Agric. & Forest, Geophysics, Sea & Coastlines

Identification of major methodological domains required :
such as... 2D objects recognition, change detection, 3D reconstruction, optical/radar, ...

Pre-processing improvement required : clouds, shadows, calibration, ...

May 2003 : « Very High Spatial Resolution » Methodological Workshop

Objective : *State of the art* on methods (current, future); *Priorities* definition

Identification of 7 major methodological trends

Creation of 2 Methodological Working Groups (« 2D », « 3D »)

ORFEO Preparatory Program progress



Methodological section progress

Summer-Autumn 2003 : Methodological WG synthesis documents

« 2D » WG: 1. Multi-scale analysis, coupling to exogenous data
 2. HR band X SAR data analysis
 3. From pixel *to object* : models and image analysis
 4. From object to *scene* : models and image analysis

« 3D » WG: 1. Urban 3D models used in optical imagery
 2. Terrain distortions characterization
 3. 3D HR SAR information

Transversal studies : joint use of optical and SAR data

2004 : Starting of 7 «ORFEO» PhD and Post-doc

In coordination with:

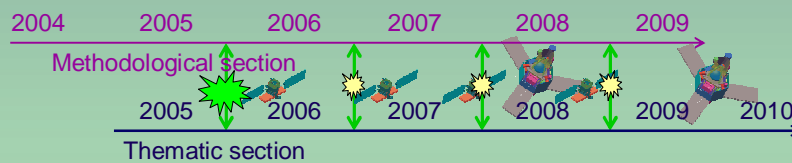
- CNES 2004, 2005 R&T programme (12 themes related to ORFEO)
- French Research Ministry actions

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Links Methodological / Thematic sections :

- First meeting** Thematic / Methodological experts : planned **end 2005**
- Presentation of Thematic WG conclusions to experts
- Precision on targeted objectives (concrete and useful !)
- Possible reorientation of methodological objectives
- Setting up of thematic feasibility studies, in relation with Methodological WG



Further annual meetings

- Feed-back of Thematic WG on Methodological results obtained
- Possible reorientation (or precision) of objectives
- Analysis of feasibility studies progress, of problems encountered....

ORFEO Preparatory Program progress



Composition of the Thematic WG:

CNES responsible person

- | | |
|--|--|
| 1- Sea & Coastlines : | A Sand / H de Boissezon |
| 2- Risks & Humanitarian aid : | JL Bessis / H de Boissezon |
| 3- Cartography, Town and country planning : | A Baudoin / JP Cantou |
| 4- Geology & Geophysics : | P Ulte-Guerard / E Cubero |
| 5- Hydrology : | H Jeanjean / E Cubero |
| 6- Forest : | H Jeanjean / JC Favard |
| 7- Agriculture : | A Husson / H de Boissezon |
| 8- Defence : | requirements expressed in CNES/DGA/ASI framework |

Belgian experts are present in 5 WG :

Sea & Coastlines, Risks, Cartography & Town Planning, Forest, Agriculture

ORFEO Preparatory Program progress



Example of intermediate results on WG2 Risks :

Until now, WG2 Risks has produced 47 product sheets

		Nb fiches
Risques hydrométéo	Inondations (crues éclair, lente)	12
	Marée blanche	2
	Tempêtes / Cyclones	4
	Tsunamis	0
Risques origine naturelle ou anthropique	Feux forêts	5
	Risque technologique	2
	Stress hydrique	0
Risques géol-géoph.	Tremblements terre	3
	Eruptions volcaniques	1
	Glissements terrain	2
	Coulées de boue	1
Crises Humanitaires	Camps de réfugiés	3
	Déménagement	2
Grands événements		1
Marées noires		2
Cartographie 2D		4
MNT MNE		3
Total fiches		47

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ORFEO Preparatory Program progress



Example of intermediate results on WG2 Risks :

Some WG2 Risks product sheets....

« Landslides » « Mudflows » product sheets

Extension and damages after a mudflow	SERTIT
Extension and damages after landslides	SERTIT
Damage estimation and landslide evolution modelling	UNOSAT

« Earthquakes » product sheets

Earthquake damages intensity and localisation	SERTIT
Earthquake damages precise cartography	DDSC
Identification areas affected by ground movement, DEM change detection	SDIS83

« White tide » product sheets

Extension of snow storm	SERTIT
“White tide” assessment and monitoring, snow height evaluation	SDIS83

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Example of intermediate results on WG2 Risks : A WG2 Risks product sheet...

FICHE PRODUIT ORFEO
GT « Risques, Interventions rapides en cas de crise, Aide Humanitaire »

Type de Risque : MOUVEMENT DE TERRAIN	Phase : PENDANT CRISE
Nom du produit : SUIVI Mouvement de Terrain, Séisme	
Objectif recherché (3 lignes): Mettre en évidence les zones touchées par le mouvement de terrain Définir les zones touchées occupées par l'activité humaine (habitat, agriculture) et le niveau d'atteinte Figurer éventuellement un dispositif opérationnel terrestre	
Spécifications techniques du produit	
Contenu en information et précision associée :	
Information recherchée, nomenclature...	
<ul style="list-style-type: none"> o Image o Zone du séisme mouvement de terrain o Définir les zones formant une étendue d'eau suite au sinistre (modification du MNT) o Déterminer les ressources de lutte : points d'eau naturels et artificiels (citernes) zones de poser hélicoptères, zones de repli de population o Définir les contraintes : habitat isolé, établissements de plein air, lieux de rassemblements de personnes, accès pour évacuation, et détermination de l'impact du feu : destruction, sinistré, comptage o Visualiser le dispositif de lutte : engins terrestres, zones d'épandages de retardant coloré 	
Précision 5 m en x,y	
Surface géographique à couvrir (ou plage de surfaces) Zone touchée	

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Example of intermediate results on WG2 Risks : Links / optimization between the different WG

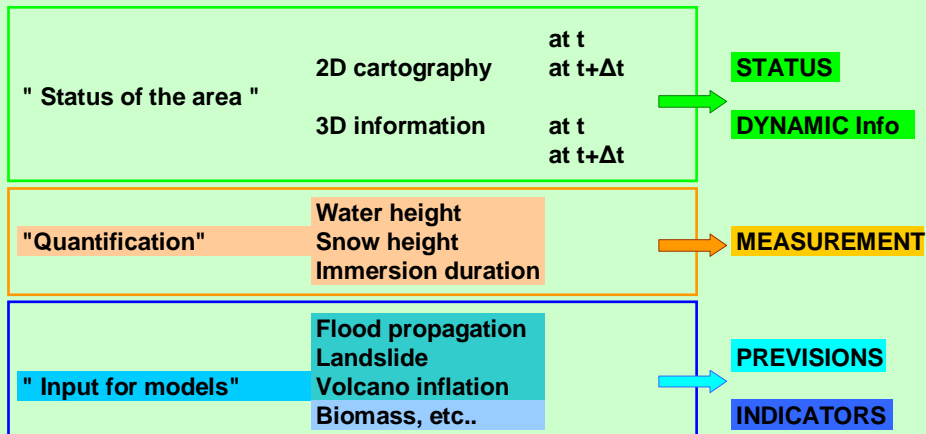
		Nb fiches
Risques hydrométéo	Inondations (crues éclair, lente) Marée blanche Tempêtes / Cyclones	12 2 4
	Is there specificities ? ← Tsunamis	0
Risques origine naturelle ou anthropique	Feux forêts Risque technologique	5 2
Forest WG ...but out of ORFEO scope ← Stress hydrique		0
Risques géol-géoph.	Tremblements terre Eruptions volcaniques Glissements terrain Coulées de boue	3 1 2 1
Crises Humanitaires	Camps de réfugiés Déménagement	3 2
Grands événements		1
Marées noires → Sea&Coasts WG		2
Cartographie 2D MNT MNE → Generic requirement for all risks		4 3
Total fiches		47

ORFEO Preparatory Program progress



Example of intermediate results on WG2 Risks :

Main categories of information required in WG2 product sheets



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Example of intermediate results on WG2 Risks :

Main functionalities required in WG2 product sheets

Main "Geometric" functionalities

- Images superposition
Optical / Optical, Optical / SAR, SAR / SAR
- Image / map and image / geographical database superposition
- Localisation, ortho-rectification, projection in the local geographical reference system
- Correlation map – Distortion calculation (3D)
- DTM & DEM
- 3D navigation (at t, t+ Δt)

ORFEO Preparatory Program progress

Simulated data or satellite data available

PLEIADES Earth observation satellites constellation and means covering all the European civilian and defense needs.

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WELCOME | NEWS | MISSION | **APPLICATIONS** | SATELLITE | GROUND SEGMENT | PRODUCTS | ORGANIZATION | CONTACTS

ACCOMPANIMENT PROGRAM | DATA SIMULATIONS

ORFEO Accompaniment Program

Beside the Pleiades (PBR) and Cosmo-SkyMed (CSK) systems developments forming ORFEO, the dual and bilateral system (France - Italy) for Earth Observation, the **ORFEO Accompaniment Program** was set up, to prepare, accompany and promote the use and the exploitation of the images derived from these sensors.

The creation of a preparatory program is needed because of :

- the new capabilities and performances of the ORFEO systems (optical and radar high resolution, access capability, data quality, possibility to acquire simultaneously in optic and radar),
- the implied need of new methodological developments : new processing methods, or adaptation of existing methods,
- the need to realise those new developments in very close cooperation with the final users, the integration of new products in their systems.

This program was initiated by CNES in 2003 and will last until 2009. It consists in two parts, between which it is necessary to keep a strong interaction :

- One **Methodological** part, which objective is the definition and the development of tools for the operational exploitation of the future submetric optic and radar images (tridimensional

NEWS

WORKING GROUPS

- Sea and Coastlines
- Risks and Humanitarian Aid
- Cartography, Town and Country Planning
- Geology and Geophysics
- Hydrology
- Forestry
- Agriculture

31/03/05 Intranet local

ORFEO Preparatory Program progress

Simulated data or satellite data available

PLEIADES Constellation de satellites et de moyens d'observation de la Terre couvrant l'ensemble des besoins Européens civils et de défense.

ACCUEIL | ENGLISH VERSION | INFOS PRATIQUES | TEXTES DE LOIS | WEBMASTER | AIDE | AUTRES LIENS | Missions

BIENVENUE | ACTUALITES | MISSION | APPLICATIONS | SATELLITE | COMPOSANTE SDL | PRODUITS | ORGANISATION | CONTACTS

PROGRAMME D'ACCOMPAGNEMENT | SIMULATIONS DE DONNEES

Simulations de données PLEIADES

N'oubliez pas de changer régulièrement votre mot de passe !

Vous trouverez sur les pages suivantes une partie des simulations au CNES ainsi qu'une description des images sources correspondantes. Vous pourrez alors télécharger (en cliquant sur les liens dans le paragraphe "produits simulés") les données que vous voulez utiliser pour votre étude.

SIMULATION DE DONNEES DANS LE CADRE DE LA DEFINITION TECHNIQUE DE LA MISSION PLEIADES

SITE	DATE D'ACQUISITION	MODE	THEMATIQUE
Luc en Diois	23 Septembre 1999	P	Végétation, 3D
Montpellier	14 Juillet 1999		Végétation, rural
Poitiers	?		Urban
Port de Bouc	23 Septembre 1999		Port
Salon de Provence	21 Septembre 1999		Péri-urbain
Toulouse	26 Octobre 1999	P (0.48 à 0.83 µm)	Urban
Toulouse	08 Juin 2000		
La Save	26 Octobre 1999	P	Agricole, 3D
Luc en Diois	23 Septembre 1999		Végétation, 3D
Marseille 2	16 Mai 2000		Urban, 3D
Marseille 3	16 Mai 2000		Urban, 3D
Montpellier	14 Juillet 1999		Végétation rural 3D

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ORFEO Preparatory Program progress



Available data assessment

ORFEO Preparatory Program specific data

Pléiades simulations from PELICAN aerial acquisitions (French sites):

- Instrument qualification in March 2004 : 2 sites
- 1st PELICAN campaign mid-September 2004 : 5 sites acquired for ORFEO Methodological WG and for Pléiades image quality purposes.
- 2nd PELICAN campaign in march 2005 (one site acquired for ORFEO Thematic WG)
- 3rd PELICAN campaign planned in September 2005, dedicated to ORFEO Preparatory Program.

ORFEO Preparatory Program progress



Available data assessment

ORFEO Preparatory Program specific data

Example of Pléiades simulation from PELICAN aerial image:



Series of small images of
1*1 km²
IRC and/or Natural Colors
70cm resolution

On an area of **3*10 km²**:
42 small images

Possibility of **mosaic**
covering the whole area,
but still to be done...

ORFEO Preparatory Program progress



Available data assessment

ORFEO Preparatory Program specific data (commitment to be signed)

- QuickBird images acquired for ORFEO:

La Réunion -Trois Bassins (coastline, sugarcane, urban)

La Réunion - Hellbourg (landslides, erosion) – 2 scenes

Camargue / Port de Bouc (industrial site et protected area)

Tahiti / Raïatera (landslides, erosion, 3D) – 4 scenes

Tunisie – Cap Bon (surface status, erosion)

Martinique – François (landslides, urban)

Images previously acquired, available for ORFEO PP (same conditions)

Ikonos images : Arles – floods december 2003

QuickBird images : (various towns)

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QuickBird image



Port Saint Louis
(Port de Bouc)
Camargue
28 01 2004

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Available data assessment

SAR data in X band

Aerial SAR data in X band have been acquired with **RAMSES instrument** on different sites (ONERA/ French Defence), during the last years.

The last campaign (july 2004) was performed on Toulouse, and partly funded by CNES.

In the framework of ORFEO Preparatory Program, the DGA/French Defence agreed to give access to a **representative subset of RAMSES images**. But data have not been delivered yet (announced delivery date : July 2004)

Experts from all **Thematic and Methodological WG** are "eager" to **see, test and use metric SAR data in X band !**

COSMO simulations available ? Access for French partners ?

ORFEO Preparatory Program progress



**Now, let's talk about practical questions related to COSMO data,
as asked by experts
during the Thematic WG meetings ...**