

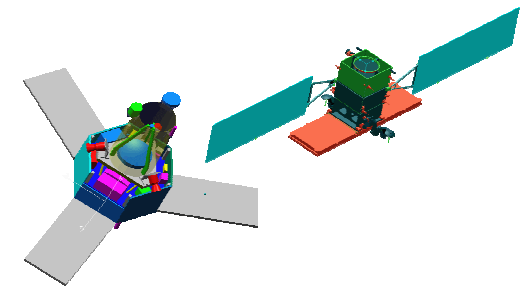


CENTRE NATIONAL D'ÉTUDES SPATIALES

ORFEO

ORFEO Preparatory Programme

CNES Preparatory Program
B Boissin



Orfeo User Preparatory Program

Objectives :

- to define evaluate and prepare adequate future services
- to prepare user to develop their own routine processes

“in very close cooperation with the final users”

“at ORFEO level to give the best answer”

Two complementary approaches

–**Methodology** : 50 researchers from 25 institutes

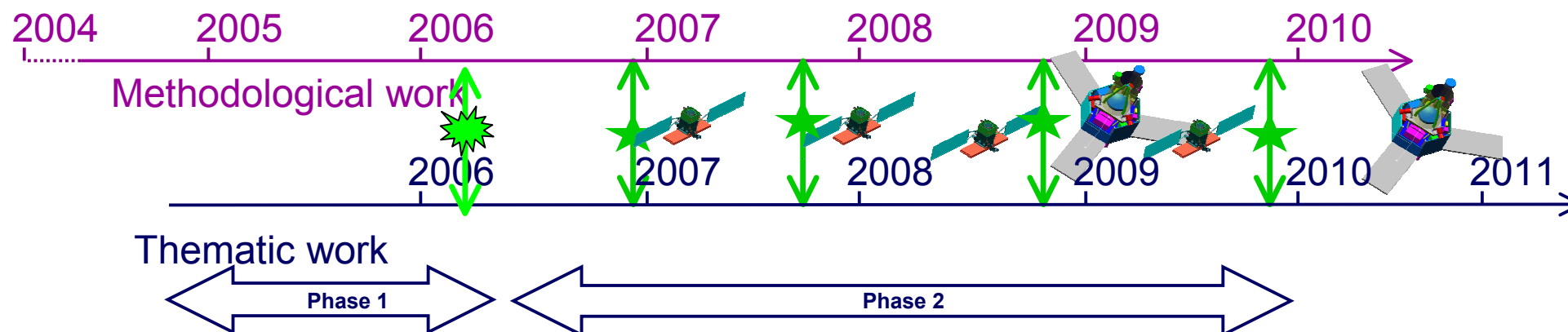
- Definition and development of tools for the operational exploitation of the images
 - High volume of data's : Automatic processing mandatory
 - Processing techniques to be adapted to the new kind of visible objects

–**Thematic** : 55 users (mainly from institutions)

- Better understanding of the users needs in terms of services
- Better understanding by the users of the performances and system limitations

Two phases :

- Phase 1 : Identification of needs in terms of :
 - services including operational constraints
 - products
 - tools
- Phase 2 : Services and tools development and validation



■ Program responsible :

- ◆ **Earth observation delegation of CNES Strategy and Programmes Direction :**
 - Benoit BOISSIN

■ Monitoring and technical chairing : CNES Toulouse Center (DCT/SI/AP service)

- ◆ **team coordination** : Frédéric ADRAGNA
- ◆ **methodological part** : Jordi INGLADA
- ◆ **links between the methodological part / thematic part** : Jean Claude FAVARD
- ◆ **thematic part** : Hélène de BOISSEZON
- ◆ **"ORFEO Accompaniment Program" server and simulated data** : Selma CHERCHALI

- **in coordination with the PLEIADES Project** : Eric BOUSSARIE

Resources

■ Specific budgets

- ◆ Airborne campaigns
- ◆ Space images purchase
- ◆ Generic tools development

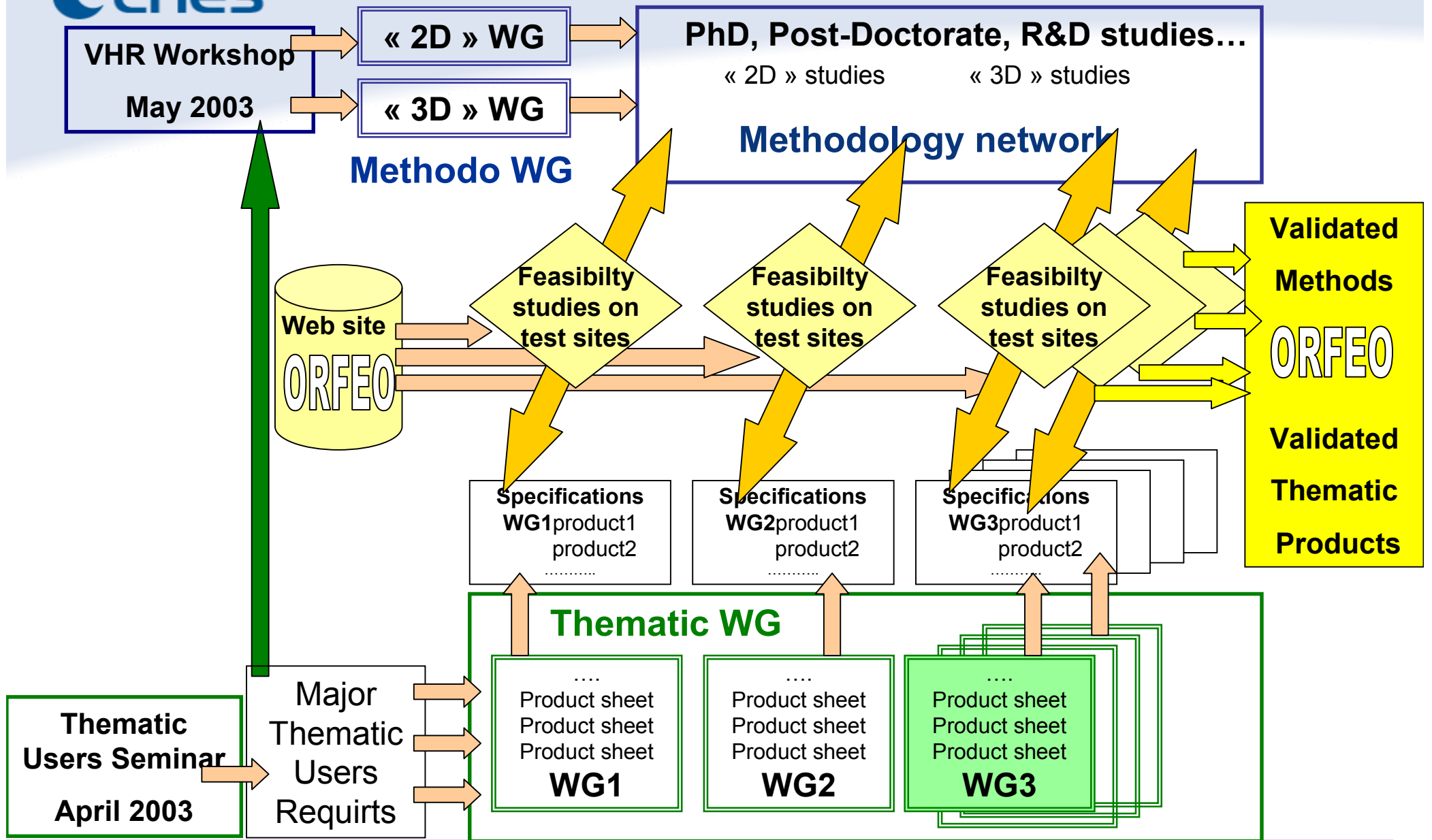
■ Research actions

- ◆ in coordination with the R&T Cnes program
- ◆ in coordination with French Research Ministry actions

■ PhD and Post doc



ORFEO Preparatory Program – Methodological part



ORFEO Preparatory Program – Thematic part



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ORFEO

Orfeo preparatory program Methodological part

- Main axes
- ORFEO Tool Box

Start in April 2003 : « ORFEO Users Workshop »

Objective : preliminary *users needs identification*, definition of 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 »)

June 2005 : Methodological Meeting

Objective : *Improve* the coordination *Re orient* the activities *Prepare* the work plan

- Development of the ORFEO Tool Box

- ◆ **Pre-processing**
 - Registration
- ◆ **Land-cover / land-use**
 - Surface approaches
 - Multiresolution fusion/synthesis
 - Object detection and recognition
 - DTM, DEM
 - Multitemporal analysis

ORFEO TOOL BOX

“To capitalize the methodological results by developing generic tools”

– To give user adequate re presentation

Ortho rectification

Image/map or geographical database superposition

Various scale images superposition

Optical/Radar data fusion

3D navigation...

– To help user to extract adequate information

Object detection/recognition and measurements

Land cover classification

Change detection

Orfeo preparatory program Thematic part

- Service/product data sheets
- Functionalities to develop
- Thematic feasibility studies
- Operational feasibility studies

- **Covering most of the foreseen applications**

- **7 civil thematic workshops : Risks and Humanitarian Aid, Sea and Coastlines, Cartography and Town and Country Planning, Geology, Hydrology, Forestry, Agriculture.**

- **First phase**

- **Identification for various applications of services and products:**

- **including operational constraints and order book**

- **Identification of needed functionalities and tools**

- **Definition of feasibility studies**

- **Second phase :**

- **validation using simulated Data Including the demonstrations and validations of the new services**

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

Belgian experts are present in 5 WG :

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

General description, objectives

Technical specification

Precision, surface, ancillary data

Needed information

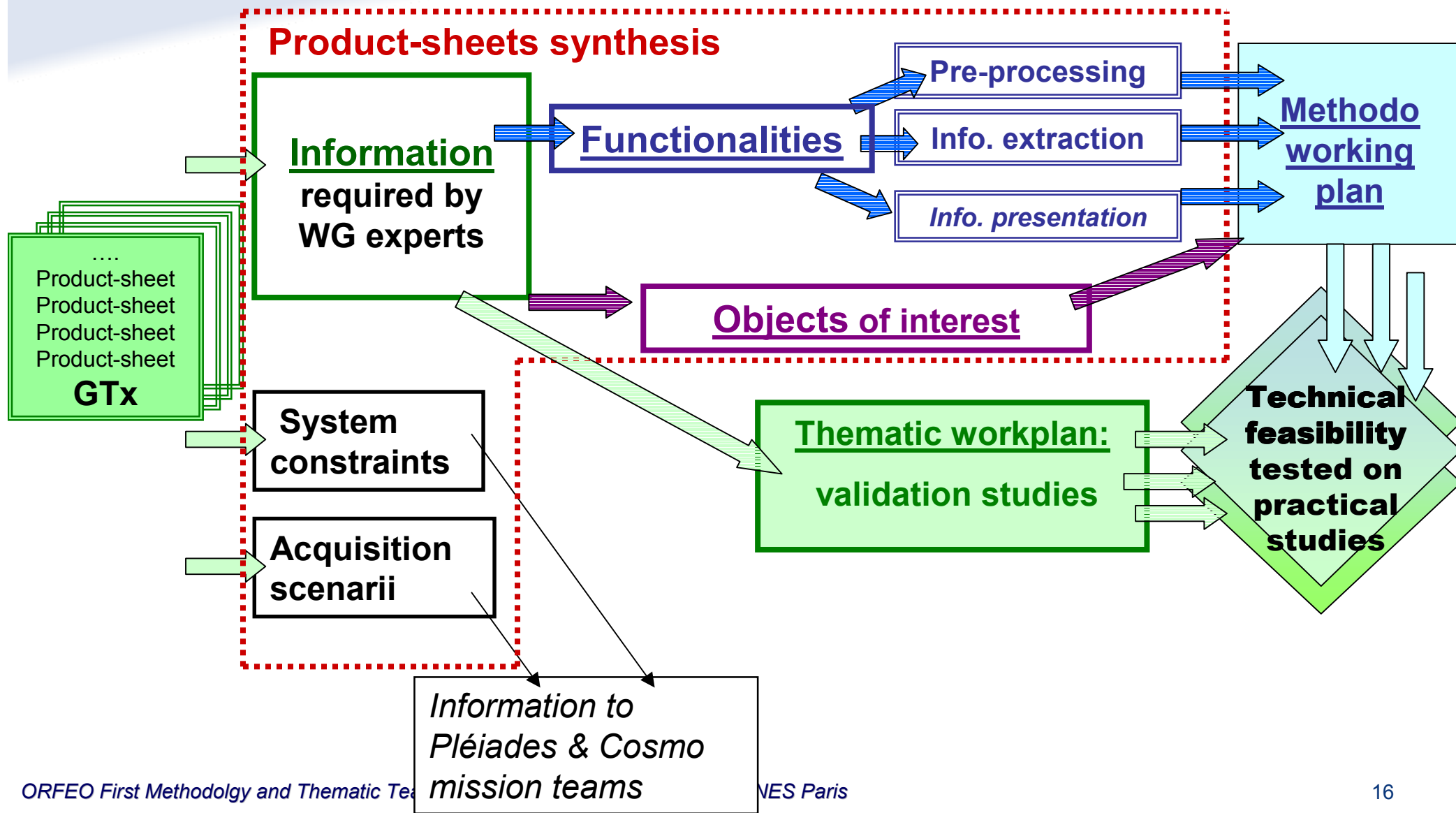
Format

Operational constraints

Temporal constraints, delay between request and data reception, ...

Yearly needs evaluation

From “product-sheet” to required functionalities



■ 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 , $t+\Delta t$)

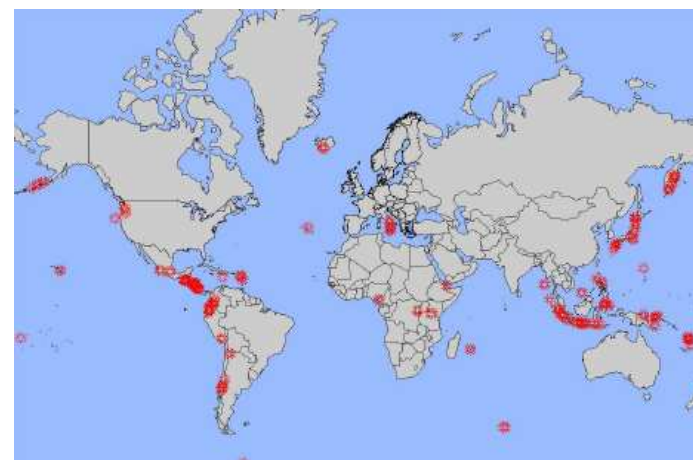
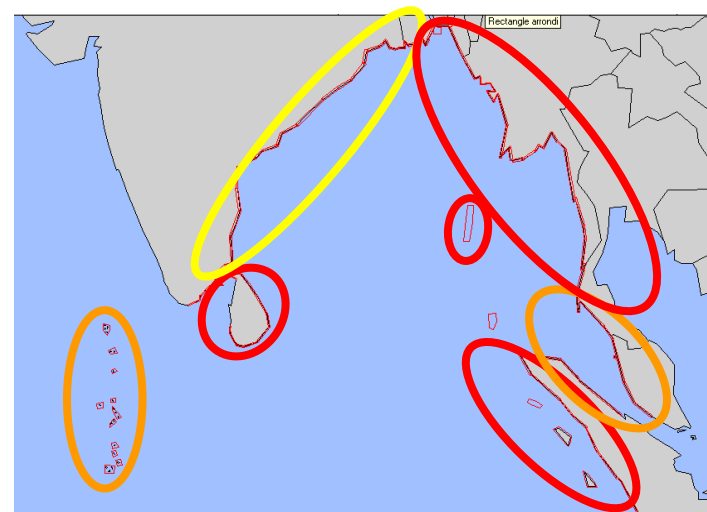
■ Information extraction

- ◆ Objects recognition (specific list to be built)
- ◆ Specific land cover classification (burnt areas; flooded areas..)
- ◆ Change detection between 2 or more images, optical/SAR : damaged areas identification
- ◆ Change detection for some identified and recognized objects
- ◆ Identification of some specific land cover classes (specific list to be built)
- ◆ Calculation: water height, flood duration, ...
snow height, ...
- ◆ Vectorization of areas

- **Objective of the study**
- **Area of interest**
- **Members**
- **Existing and requested images**
- **Planning**

“Operational feasibility studies”

- **The operational needs permit us :**
 - ◆ To make Pléiades simulations
 - ◆ To evaluate if the needs can be satisfied
 - ◆ To identify the real capability end limitations
- **Up to now three cases studied**
 - ◆ Volcanoes monitoring
 - ◆ Pléiades capability in the case of the last december Tsunami
 - ◆ Cartography : Pléiades capability to satisfy IGN needs
- **To be pursued during phase 2**





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ORFEO

Orfeo preparatory program Web Server

<http://smc.cnes.fr/PLEIADES>

Orfeo preparatory program Web Server

■ Informations on the program

- ◆ Planning , minutes , présentations, documents...

■ Access to simulated images

- ◆ Simulated Pléiades Images from PELICAN aerial acquisitions
 - Very small images (1kmx1km) mainly for methodology studies
- ◆ QuickBird et Ikonos Images
 - commitment to be signed
- ◆ X band radar metric images from Ramses aerial acquisitions

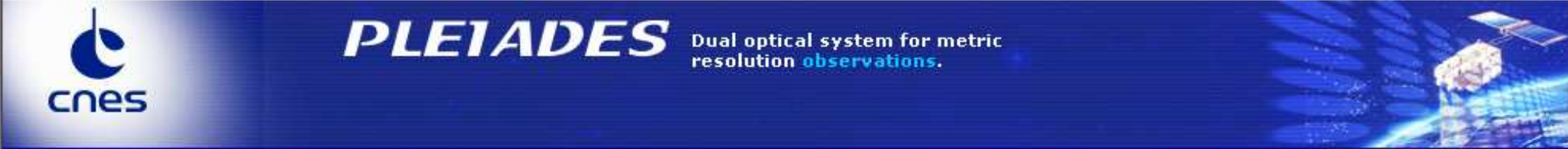
ORFEO Accompaniment Program - Microsoft Internet Explorer fourni par IE6 SP1 - Aut v3.1 - NT/W2k/WXP

Fichier Edition Affichage Favoris Outils ?

Précédente Recherche Favoris Média

Adresse http://smc.cnes.fr/PLEIADES/A_prog_accomp.htm

Google Recherche Orthographe Options



HOME VERSION FRANCAISE PRACTICAL INFORMATION RIGHTS WEBMASTER HELP OTHER LINKS Missions

WELCOME NEWS MISSION APPLICATIONS SATELLITE GROUND SEGMENT ORGANIZATION GALLERY CONTACTS OTHER SITES

ACCOMPANIMENT PROGRAM SIMULATION DATA

ORFEO Accompaniment Program

Beside the Pleiades (PHR) 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** mid-2003 and will last until 2009.
It consists in two parts, between which it is necessary to keep a strong interaction :

- ▶ A **Methodological** part,
- ▶ A **Thematic** part.

▶ **NEWS** NEW

23-24 March 2006
ORFEO meeting in Paris

▶ **METHODOLOGICAL PART**

- ✓ Meetings
- ✗ Research Reports 
- ✗ Work plan NEW
- ✗ ORFEO Tool Box NEW

▶ **THEMATIC GROUPS**

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

points de rencontre ←→ Cosmo Pléiades

2004 2005 2006 2007 2008 2009


ORFEO Accompaniment Program - Microsoft Internet Explorer fourni par IE6 SP1 - Aut v3.1 - NT/W2k/WXP

Fichier Edition Affichage Favoris Outils ?


Précédente Recherche Favoris Média

Adresse http://smc.cnes.fr/PLEIADES/A_prog_accomp.htm

Google Recherche Orthographe Options



PLEIADES Dual optical system for metric resolution observations.



ORFEO Tool Box - Microsoft Internet Explorer fourni par IE6 SP1 - Aut v3.1 - NT/W2k/WXP

Précédente Recherche Favoris Média Imprimer

ORFEO Tool Box

Dans le cadre du Volet méthodologique du Programme d'accompagnement ORFEO, le CNES a décidé de développer l' "ORFEO Toolbox" (OTB), un ensemble de briques algorithmiques qui permettront de capitaliser le savoir méthodologique et de se placer dans une démarche de développement incrémental visant à rentabiliser au maximum les résultats obtenus dans les études méthodologiques.


La consultation industrielle pour la réalisation de la première phase de l'OTB a eu lieu en juillet 2005. La spécification technique du besoin est [disponible ici](#).

L'OTB sera constituée d'un ensemble de briques de base (API de classes C++) et d'utilitaires (programmes indépendants réalisés à l'aide de l'API développée).

Le développement a démarré début décembre 2005 et la version 1.0 de l'OTB sera disponible en juin 2006.

Missions

OTHER SITES

- ▶ **NEWS** NEW
 - 23-24 March 2006
ORFEO meeting in Paris
- ▶ **METHODOLOGICAL PART**
 - ✔ Meetings
 - ✖ Research Reports 
 - ✖ Work plan NEW
 - ✔ ORFEO Tool Box NEW
- ▶ **THEMATIC GROUPS**
 - Sea and Coastlines
 - Risks and Humanitarian Aid
 - Cartography, Town and Country Planning
 - Geology and Geophysics
 - Hydrology
 - Forestry

▶ A **Thematic** part.

points de rencontre ←→ Cosmo Pléiades

2004 2005 2006 2007 2008 2009

GT2 : Risques et Aide Humanitaire

Dernière mise à jour le 23/01/2006

N'oubliez pas de changer régulièrement votre [mot de passe](#) !

[COMPOSITION DU GROUPE DE TRAVAIL](#)

[FICHES PRODUITS](#) ORFEO émises par le GT2 (accès réservé)

[ETUDES THEMATIQUES DE VALIDATION](#) émises par le GT2 (accès réservé)

Il ne vous reste qu'un mois pour faire vos dernières propositions d'études thématiques afin que l'on puisse planifier la future commande d'images Quickbird pour 2006 !!!

[RAPPORTS DE SYNTHESE](#) émis par le GT2 (accès réservé)

REUNIONS DE TRAVAIL (accès réservé)

Date	Ordre du jour	Présentations	Compte-Rendu	Télécharger
15/07/2004	Agenda	Présentations	Compte-rendu	
02/02/2005	Agenda	Présentations	Compte-rendu	
03/06/2005	Agenda	Présentations	Compte-rendu	

PLANNING DES PROCHAINES REUNIONS

ANNONCE D'EVENEMENTS LIES AU GT2

Fiches du GT2

Dernière mise à jour le 15/09/2005

- ▶ [Fiche DDSC n°1 Grands Evénements](#)
- ▶ [Fiche DDSC n°2 Tremblement de Terre](#)
- ▶ [Fiche DDSC n°3 Secours à personnes](#)
- ▶ [Fiche DDSC n°4 Inondations](#)
- ▶ [Fiche DDSC n°5 Feux forêts](#)
- ▶ [Fiche DDSC n°6 Risque technologique](#)
- ▶ [Fiche EMA Inondations 1](#)
- ▶ [Fiche EMA Inondations 2](#)
- ▶ [Fiche EMA Inondations 3](#)
- ▶ [Fiche ERM carte crise](#)
- ▶ [Fiche ERM carto base](#)
- ▶ [Fiche ERM planification deminage](#)
- ▶ [Fiche ERM refugies](#)
- ▶ [Fiche ERM risque deminage](#)
- ▶ [Fiche MNR n°1 Zones inondées](#)
- ▶ [Fiche MNR n°2 Hauteur d'eau](#)
- ▶ [Fiche MNR n°3 Durée d'immersion](#)
- ▶ [Fiche MNR n°4 Zones tempêtes](#)
- ▶ [Fiche MNR n°5 Dégâts urbains tempête](#)
- ▶ [Fiche MNR n°6 Dégâts forêts tempêtes](#)
- ▶ [Fiche SDIS 83 FF Avant](#)
- ▶ [Fiche SDIS 83 FF Pendant](#)
- ▶ [Fiche SDIS 83 FF Apres](#)
- ▶ [Fiche SDIS 83 MAREE BLANCHE](#)
- ▶ [Fiche SDIS 83 MAREE NOIRE AVANT](#)
- ▶ [Fiche SDIS 83 MAREE NOIRE PENDANT](#)
- ▶ [Fiche SDIS 83 MNT MNE](#)
- ▶ [Fiche SDIS 83 MNT MNE CRISE](#)
- ▶ [Fiche SDIS 83 MVT TERRAIN SEISME](#)
- ▶ [Fiche Sertit geo coule de boue](#)
- ▶ [Fiche Sertit geo glissement terrain](#)
- ▶ [Fiche Sertit geo tremblement terre](#)
- ▶ [Fiche Sertit geo volcan](#)
- ▶ [Fiche Sertit hyd met inondations 1 extension](#)
- ▶ [Fiche Sertit hyd met inondations 2 dynamique](#)
- ▶ [Fiche Sertit hyd met inondations 3 impact](#)
- ▶ [Fiche Sertit hyd met tempete cyclone](#)
- ▶ [Fiche Sertit nat anthro feux foret](#)
- ▶ [Fiche Sertit nat anthro indus](#)


Simulation de donnees - Microsoft Internet Explorer fourni par IE6 SP1 - Aut v3.1 - NT/W2k/WXP


Fichier Edition Affichage Favoris Outils ?

Précédente Recherche Favoris Média

Adresse http://smc.cnes.fr/PLEIADES/Fr/Protect/A_simulation.htm

Google Recherche Orthographe Options

 **PLEIADES** Système dual d'observation optique de résolution métrique.

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

BIENVENUE ACTUALITES MISSION APPLICATIONS SATELLITE COMPOSANTE SOL ORGANISATION GALERIE CONTACTS AUTRES SITES

PROGRAMME D'ACCOMPAGNEMENT **DONNEES DE SIMULATION**

Simulation de données pour le programme d'accompagnement d'ORFEO

N'oubliez pas de changer régulièrement votre [mot de passe](#) !

Vous trouverez sur les pages suivantes trois types de données :

- ▶ **Simulations PLEIADES** : PELICAN, PUSHBROOM, Caméra DCS 460-R126.
Dernière mise à jour le 28/10/2005 : Mise à jour des planches contact des sites de septembre 2004 pour les simulations PELICAN
- ▶ **Simulations COSMO** : ESAR, RAMSES.
Dernière mise à jour le 14/02/2006 : Ajout des données des simulations Ramses 8 sites disponibles.
- ▶ **Données satellite** : QUICKBIRD, IKONOS.
Dernière mise à jour le 06/10/2005 : Mise à jour du site d'Arles (donnée IKONOS)

Dernière mise à jour le 17/02/2006

Terminé Intranet local

Available optical data

“ Pléiades simulations from PELICAN aerial acquisitions ”

SITE	DATE D'ACQUISITION	THEMATIQUE
Port de Bouc Camargue	06 Mars 2005 07 Mars 2005	Port, zone industrielle Zone humide, littoral
Toulouse Toulouse 3D Toulouse Roujan Clapier Salon de Provence Digne	17 Septembre 2004 17 Septembre 2004 18 Septembre 2004 17 Septembre 2004 18 Septembre 2004 20 Septembre 2004 20 Septembre 2004	Urbain, péri-urbain Urbain, péri-urbain, 3D Urbain, péri-urbain Péri-urbain, vignes Péri-urbain, agriculture, forêt Aéroport, mire, péri-urbain Montagne
Salon de Provence Marseille Port de Bouc	29 Février 2004 29 Février 2004 29 Février 2004	Péri-urbain, aéroport Port, urbain dense Port, zone industrielle



➔ **More than 30
available
simulated
Pléiades data set
(1kmx1km)**

Available optical data “using Quickbird and Ikonos images”

■ ORFEO Preparatory Program specific data : QuickBird images already acquired

- ◆ 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
- ◆ Cannes (coastline, urban)
- ◆ Arles & Alger/Boumerdes (risks – after crisis status)
- ◆ Geneve & Salon (carto and urban management)
- ◆ Villamblain & Boigneville (agriculture)
- ◆

Programmed QuickBird images

- ◆ Marseille (coastline, urban)
- ◆ Cevennes & Durance (hydrology)
- ◆ Wallonie & St Gilles (agriculture)
- ◆ Fuyun/China (geophysics)
- ◆

■ Images previously acquired, available for ORFEO PP

- ◆ Ikonos images : > 20 images (e.g. Arles – floods dec 2003)
- ◆ QuickBird images : > 40 images (mainly urban areas)



More than 70 available images



SAR data in X band

Lack of SAR data in X band for thematic validation

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

Cosmo emulations have been generated by CNES/ONERA from RAMSES aerial data.

SITE / Thematic area	ACQUISITION DATE	RADAR MODE
Hyeres : urban, agriculture	03/04/2002	High resolution
Baux de Provence : agriculture (hilly)	07/02/2003	Interférometry
Avignon : peri-urban, agric, forest	20/03/2002	Polarimetry
Toulouse : urban	22/07/2004	High résolution
Avignonnet : agriculture (hilly)	22/07/2004	High résolution
Mont de Marsan : forest	15/05/2002	High resolution
St Mandrier : sea, coast, urban, ships (hilly)	30/11/1999	Interférometry
Toulon : harbor, ships, urban	30/11/1999	High resolution

