

# Vahine Web Service and framework : some tools for the analysis and the visualization of hyperspectral images

<http://mistis.inrialpes.fr/vahine/dokuwiki-2008-05-05>

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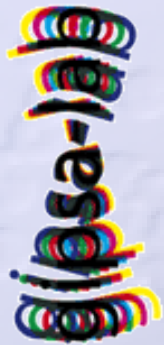
Porteur du projet Vahiné

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# Vahine partnership and funding



**gipsa-lab**

INPG



INRIA Rhône-Alpes

This project would not be possible without the financial support of :



MDCO program (“Masse de Données et Connaissances”).  
ANR-07-MDCO-013.



through its “R&T Systèmes Orbitaux” program.

- Astrophysical investigations with visible and near infrared imaging spectroscopy.
- New data : “hypercubes” (big size  $\sim 500\text{Mo}$  and 4D)
- Developing models, algorithms, and software able to deal with large hyperspectral dataset
- Project is divided into five work-packages :
  - Statistical image processing
  - Mathematical and physical models
  - Inversion algorithms
  - a framework for the visualization and analysis
  - Vahine Web Service (VWS)

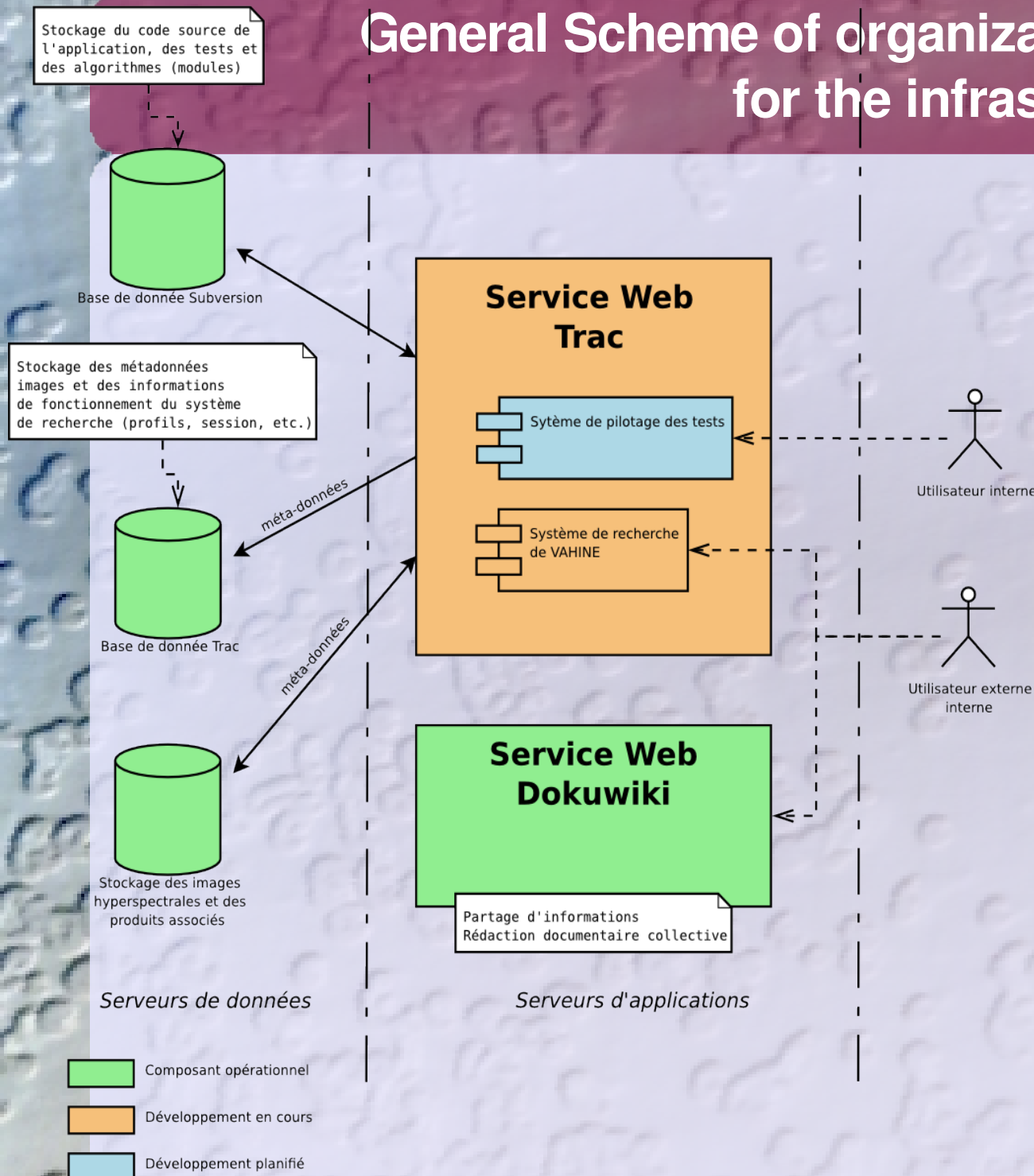
- Access to data and information within the group
- Data manipulation, visualization and analyses
- Using algorithms with custom workflow
- At this moment we have :
  - Several tera-bytes of data
  - One xls file for searching data
  - Format data is Planetary Data System
  - Several Matlab algorithms
  - We use Envi for visualization
- =>New software application required



# Vahiné Web Service

- a tool for collective writing of documents and for sharing information (Wiki)
- a database of meta-data easing the management of our collections of :
  - hyperspectral observations
  - synthetic hyperspectral images or spectral libraries
  - products generated by the analysis
- a system for :
  - the interrogation of the database (multi-criteria)
  - the retrieval of the data
    - by downloading
    - by direct file access from a piece of software
- a tool for the collective development of algorithms and software

# General Scheme of organization and functioning for the infrastructure of the VWS



# VWS : data access

# VAHINE

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[Vahiné](#) [Timeline](#) [Roadmap](#) [Browse Source](#) [View Tickets](#) [New Ticket](#) [Search](#) [Admin](#) [Data Search](#)

## Data Search

### Recherche sur OMEGA

Vous pouvez ajouter ou supprimer (🗑️) un champ de recherche et pour chaque champ ajouter (🔍) ou supprimer (❌) un filtre

LS

LS (float)

Filtre 1

min lat (float)

Filtre 1

max lat (float)

Filtre 1

Le nombre de résultat est volontairement limité à 1

#### Recherche

OMEGA

#### Historique

Mon panier

#### Préférences

Modèles

Champs

Associations

Données

Injection

#### Statistiques

Consulter

## Data Search

#### Recherche

OMEGA

#### Historique

Mon panier

#### Préférences

Modèles

Champs

Associations

Données

Injection

#### Statistiques

Consulter

## Listes des champs associé aux modèles

Modèles :

Nom	Parent	Description	Accès
OMEGA		data OMEGA	VAHINE_EXTERNAL

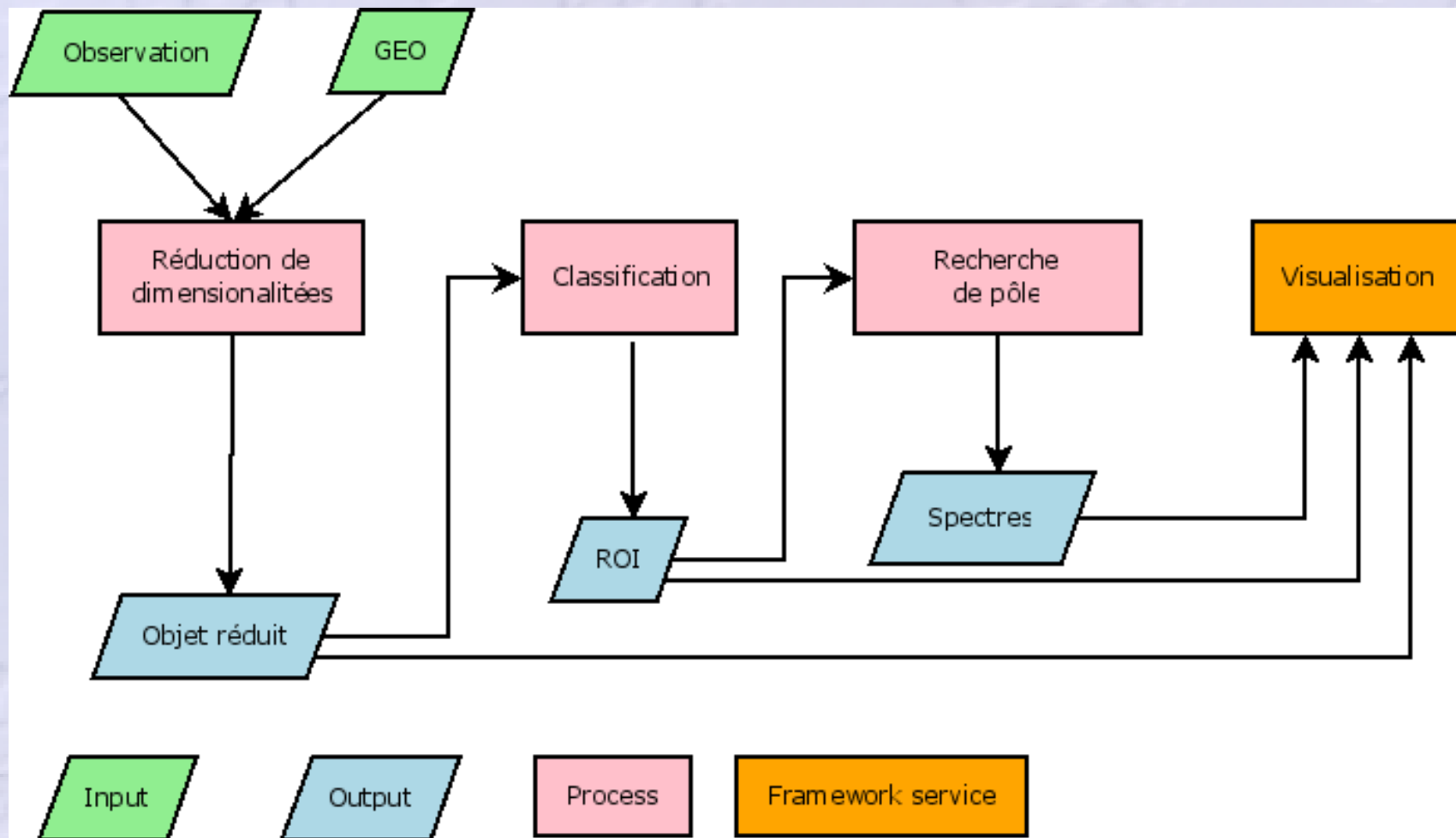
Champs associé au modèle de donnée OMEGA :

	Inclus	Nom	Description	Type	PDS	Majeur	Accès
🔍	<input checked="" type="checkbox"/>	LS	<a href="#">solar longitude</a>	<a href="#">FLOAT</a>		<input checked="" type="checkbox"/>	<a href="#">VAHINE_EXTERNAL</a> 📄
🔍	<input checked="" type="checkbox"/>	min lat	<a href="#">minimum latitude</a>	<a href="#">FLOAT</a>		<input checked="" type="checkbox"/>	<a href="#">VAHINE_EXTERNAL</a> 📄
🔍	<input checked="" type="checkbox"/>	max lat	<a href="#">maximum latitude</a>	<a href="#">FLOAT</a>		<input checked="" type="checkbox"/>	<a href="#">VAHINE_EXTERNAL</a> 📄
🔍	<input checked="" type="checkbox"/>	day start	<a href="#">start day of measure</a>	<a href="#">DATE</a>		<input type="checkbox"/>	<a href="#">VAHINE_EXTERNAL</a> 📄
🔍	<input checked="" type="checkbox"/>	start time	<a href="#">start measure time</a>	<a href="#">DATETIME</a>		<input type="checkbox"/>	<a href="#">VAHINE_EXTERNAL</a> 📄
🔍	<input checked="" type="checkbox"/>	stop time	<a href="#">stop measure time</a>	<a href="#">DATETIME</a>		<input type="checkbox"/>	<a href="#">VAHINE_EXTERNAL</a> 📄
🔍	<input checked="" type="checkbox"/>	east long	<a href="#">east longitude</a>	<a href="#">FLOAT</a>		<input type="checkbox"/>	<a href="#">VAHINE_EXTERNAL</a> 📄
🔍	<input checked="" type="checkbox"/>	west long	<a href="#">west longitude</a>	<a href="#">FLOAT</a>		<input type="checkbox"/>	<a href="#">VAHINE_EXTERNAL</a> 📄
🔍	<input checked="" type="checkbox"/>	nb cols	<a href="#">number of columns</a>	<a href="#">INTEGER</a>		<input type="checkbox"/>	<a href="#">VAHINE_EXTERNAL</a> 📄
🔍	<input checked="" type="checkbox"/>	nb line	<a href="#">number of lines</a>	<a href="#">INTEGER</a>		<input type="checkbox"/>	<a href="#">VAHINE_EXTERNAL</a> 📄
🔍	<input checked="" type="checkbox"/>	%Prop CO2		<a href="#">FLOAT</a>		<input type="checkbox"/>	<a href="#">VAHINE_CORE</a> 📄
🔍	<input checked="" type="checkbox"/>	%Prop CO2_rb		<a href="#">FLOAT</a>		<input type="checkbox"/>	<a href="#">VAHINE_CORE</a> 📄
🔍	<input checked="" type="checkbox"/>	%Prop H2O		<a href="#">FLOAT</a>		<input type="checkbox"/>	<a href="#">VAHINE_CORE</a> 📄
🔍	<input checked="" type="checkbox"/>	%Prop H2O_rb		<a href="#">FLOAT</a>		<input type="checkbox"/>	<a href="#">VAHINE_CORE</a> 📄
🔍	<input checked="" type="checkbox"/>	%Prop Unknow		<a href="#">FLOAT</a>		<input type="checkbox"/>	<a href="#">VAHINE_CORE</a> 📄
🔍	<input checked="" type="checkbox"/>	%Prop Unknow_rb		<a href="#">FLOAT</a>		<input type="checkbox"/>	<a href="#">VAHINE_CORE</a> 📄



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By Edgewall Software.

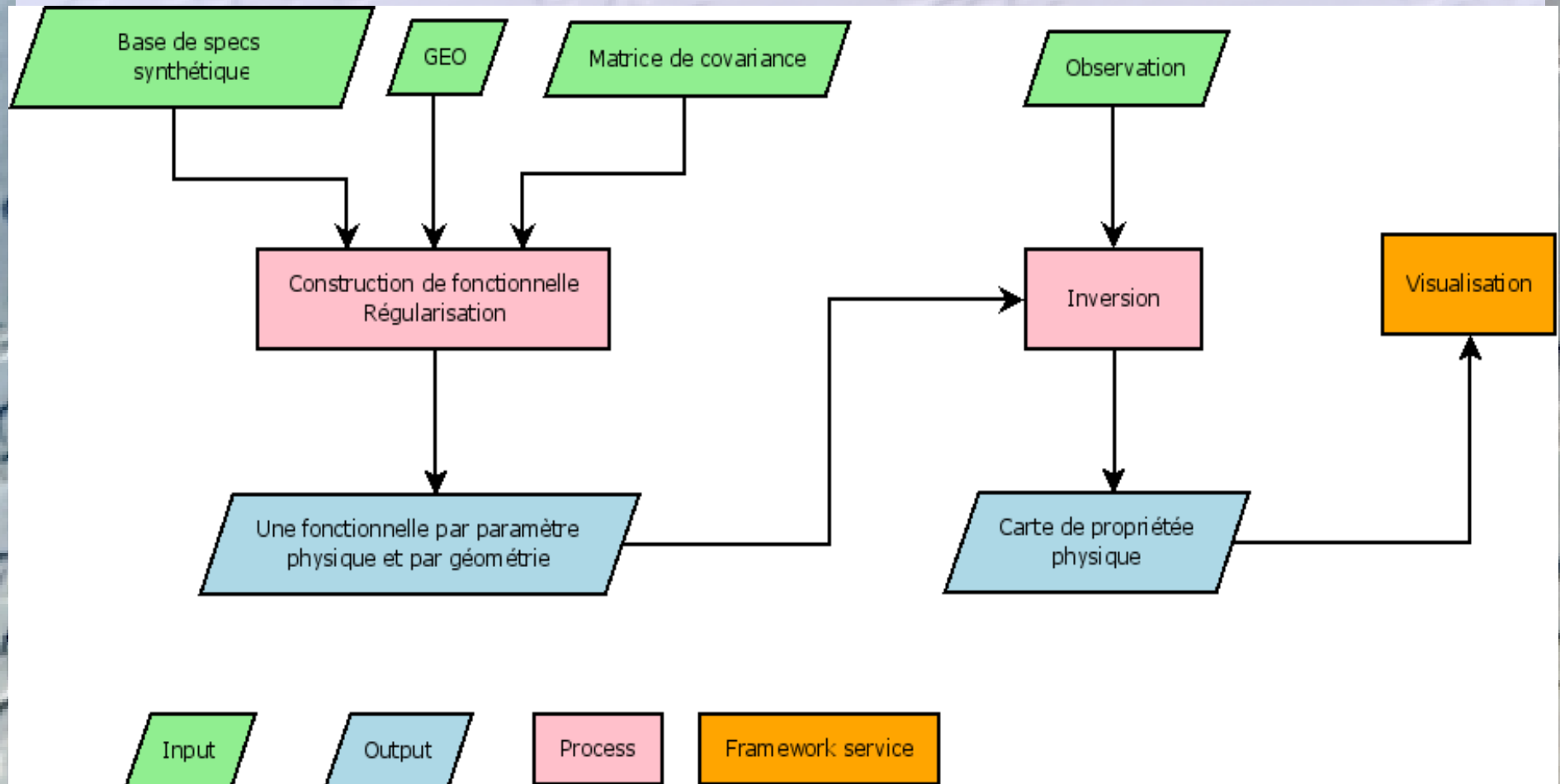
# Vahine : typical classification workflow



Each process :  
requires input parameters and tuning  
generates technical as well as scientific logs



# Vahine : typical Inversion workflow



# Vahine Framework Requirements

- Current project requirements for software :
    - Human machine interface for controlling processes and data manipulations
    - Informative visualization of data (efficient, fast)
    - Add or remove algorithms for each run
    - Intermediate results between each algorithm
    - Possible grid calculation
    - Easily create custom workflow
    - “Use or do not used” VO normalization ?
    - Scientific tests :
      - sensitivity studies to internal parameters
      - comparison between methods
- of algorithms in a systematic manner

# Vahine and the community

- organizing a campaign to gather expectations and other inputs from the community
- valorization :
  - publications in international conferences and journals
  - a software toolbox (publicly available and distributed through the project Web pages)
- one European (possibly international) workshop at the end of the project (early 2011)
- a web site

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