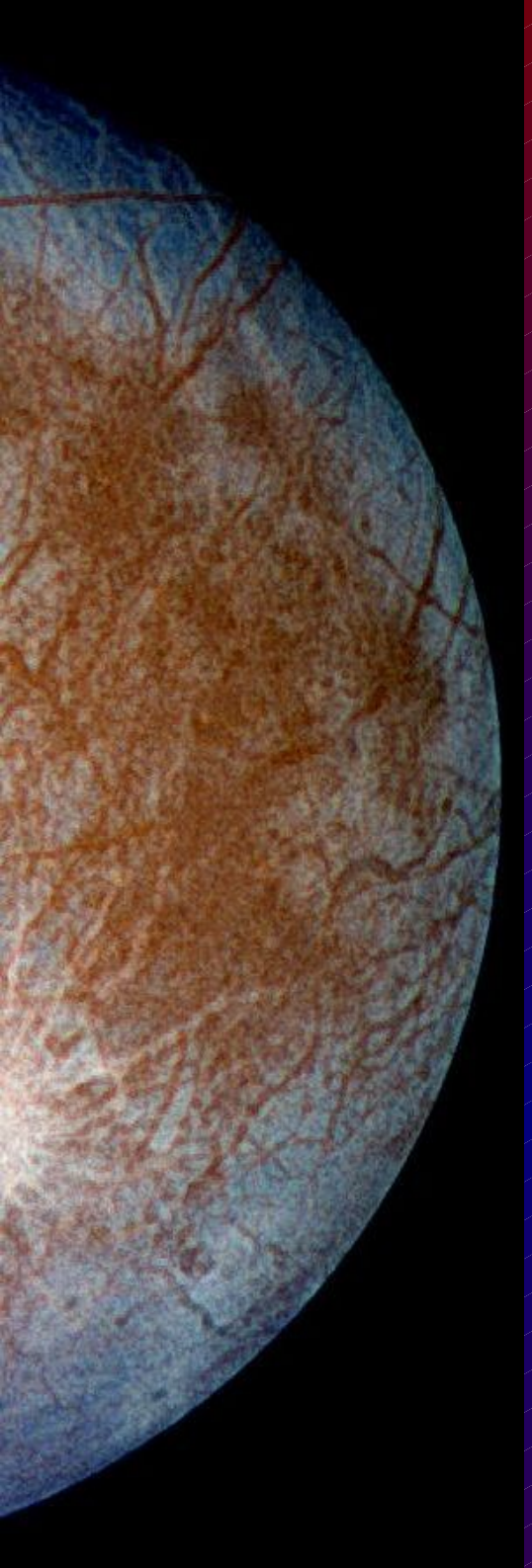
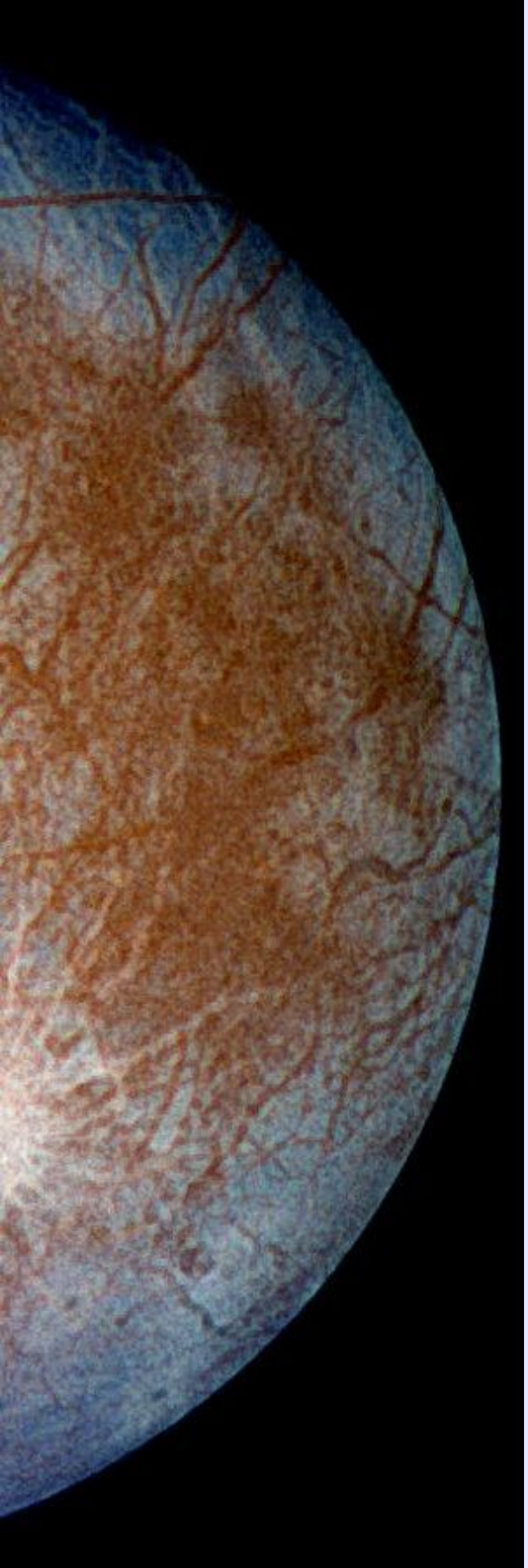


VAHINE
Visualization and analysis of multi-dimensional hyperspectral images

Ludovic Léau-Mercier
Computer engineer
Laboratoire de Planétologie de Grenoble

OV France - Workflow - 14 novembre 2008

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



Vahine partnership

Laboratoire de Planétologie Grenoble

gipsa-lab

Mistis

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

AGENCE NATIONALE DE LA RECHERCHE

ANR

through its MDCO program (“Masse de Données et COnnaissances”). The Vahiné project was selected in 2007 under the reference ANR-07-MDCO-013.

cnes

CENTRE NATIONAL D'ÉTUDES SPATIALES

through its “R&T Systèmes Orbitaux” program.

VAHINE context

- Astrophysical investigations with visible and near infrared imaging spectroscopy.
- New data “hypercubes” (big size ~500Mo and 4D)
- New algorithms for statistical and physical analysis
- Developing physical and mathematical models, algorithms, and software able to deal with the hyperspectral dataset

- Project divide in four workpackages :
  - Statistical image processing
  - Mathematical and physical models
  - Inversion algorithms
  - Visualization system

Problems

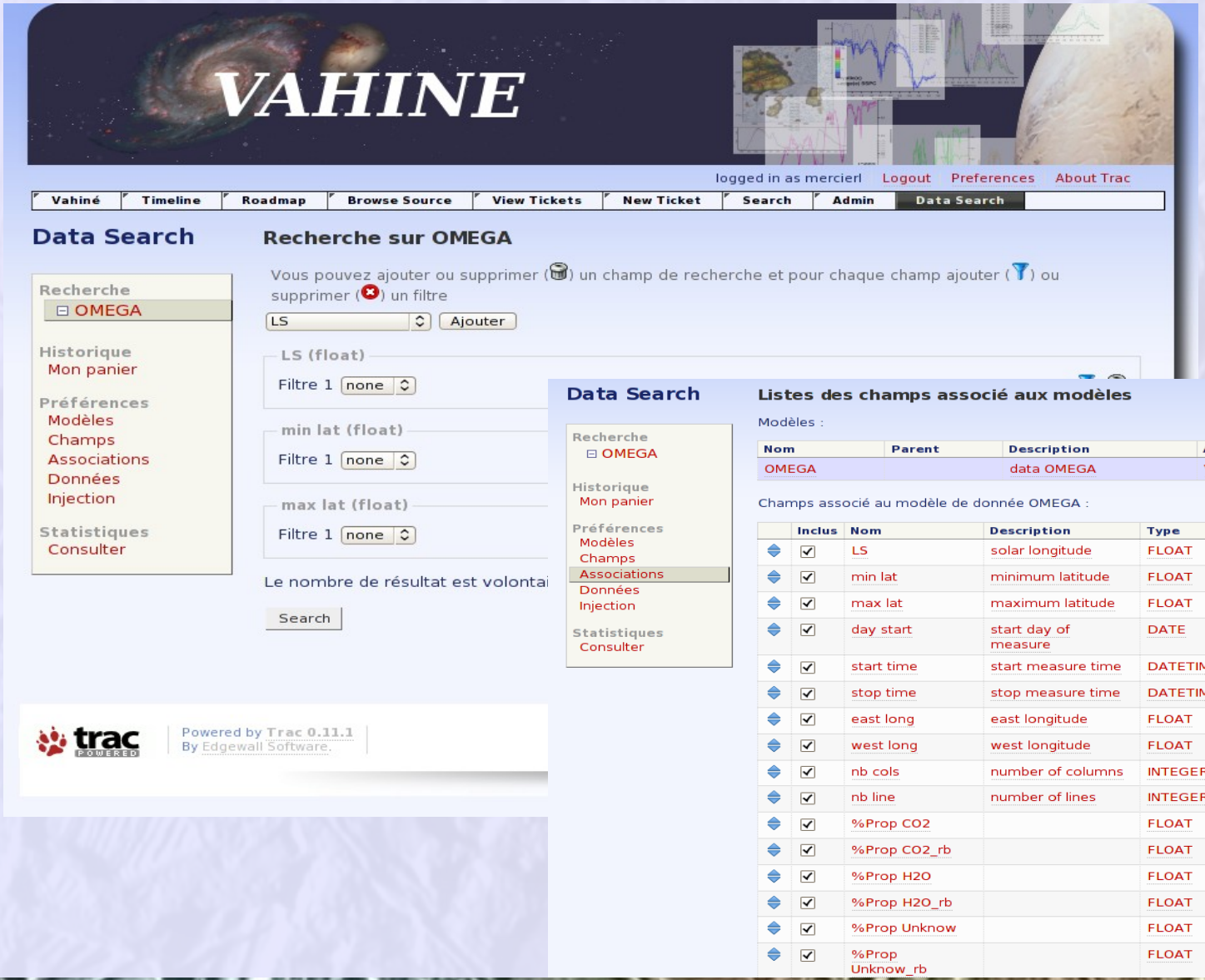
- Data access (Internet access)
- Data manipulation, visualization and analyses
- Using algorithms with custom workflow

- 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

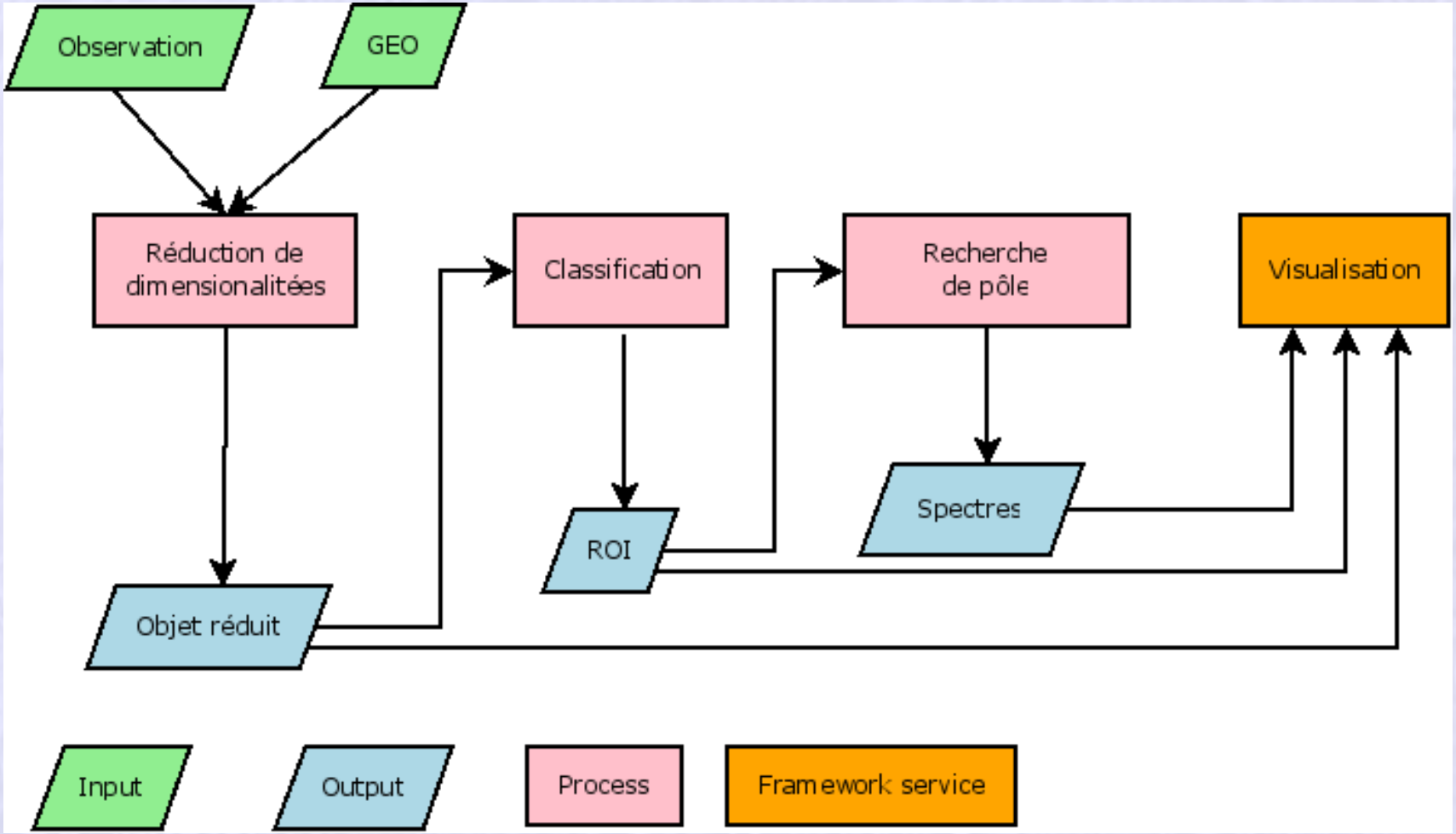
- =>New software application required

Solutions

- Vahine Web Service for the data access



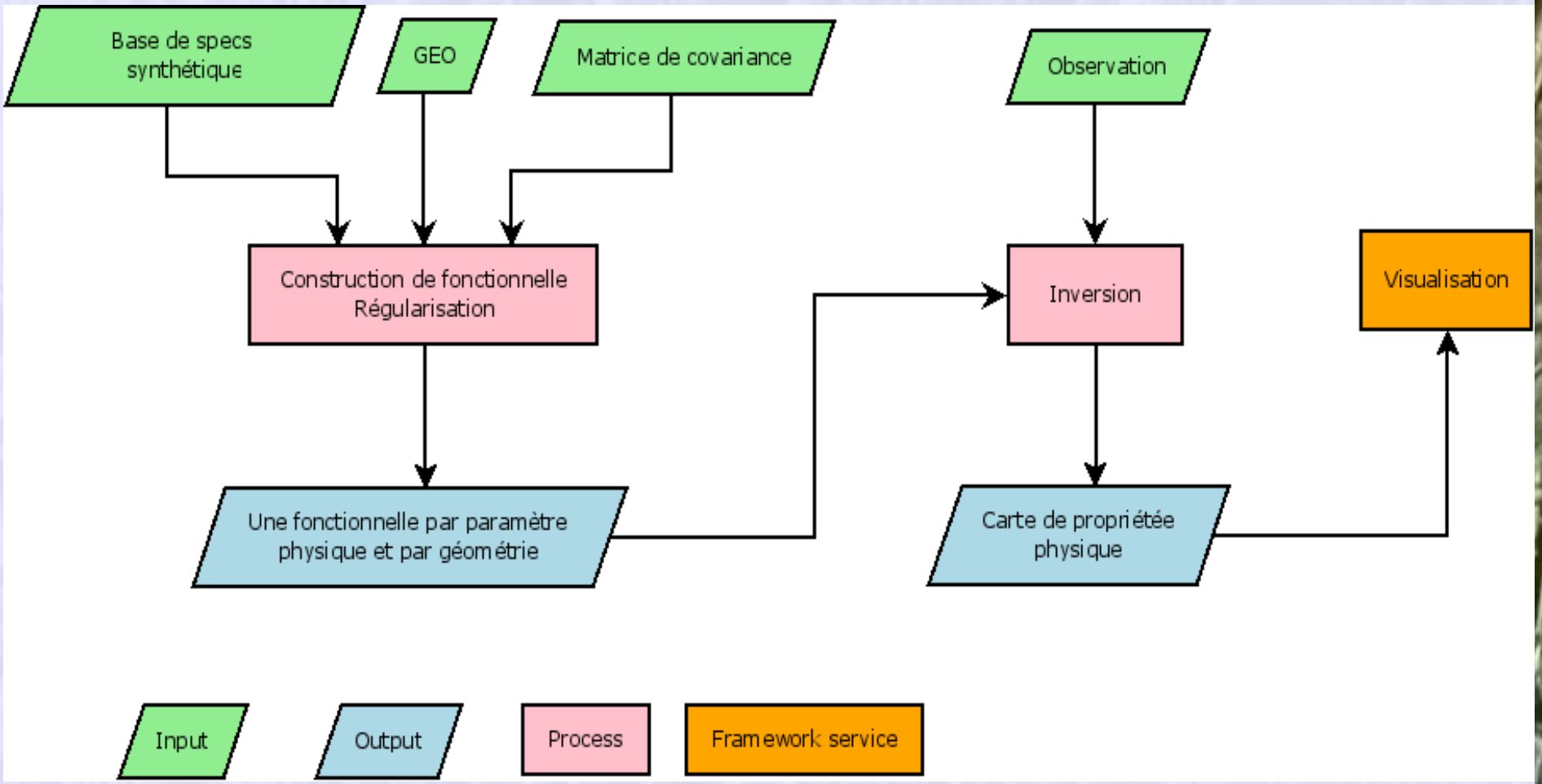
Vahine : typical classification workflow



Each process :

- requires input parameters and tuning
- generates technical as well as scientific logs

Vahine : typical Inversion workflow



Vahine Framework Requirements

- Currently 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 of algorithms in a systematic manner

Software and Algorithms testing & development

"Write the right code" "write the code right"

- For software code (Industrial method of development)
  - Unit tests (check one function) "code right"
  - Acceptance tests (check one functionality) "right code"
- For algorithms ?
  - Manual test is not satisfying !
  - Create acceptance tests for scientific algorithms ?
  - Which measures for automated test with severals ten data set ?
- Scientific framework : what is the best one for us ?