CENTRE NATIONAL D'ÉTUDES SPATIALES

The ORFEO Toolbox and Monteverdi

In the frame of the ORFEO program

- Goal: make the development of new algorithms and their validation easier
- Challenge:
  - Amount of datas available
  - Targeted at high resolution images but with applications to other sensors
  - Synergy with other datas: vector databases, DEM...

From a library to user friendly applications

- Roadmap ORFEO methodological part
  - Collaboration with labs
  - State of the art of remote sensing image processing
- 2006: ORFEO Toolbox
  - Provide many algorithms (pre-processing, image analysis)
  - For methodological developers
- 2008: ORFEO Applications
  - Applications (with GUI) . Focus on specific process (for validation purpose or demonstrator)
  - Applications for non-programmers
- 2009: Monteverdi – Compose your process
  - Integrate software (with GUI)
  - Interactively build an image processing streaming pipeline
  - Targeted at operational end user

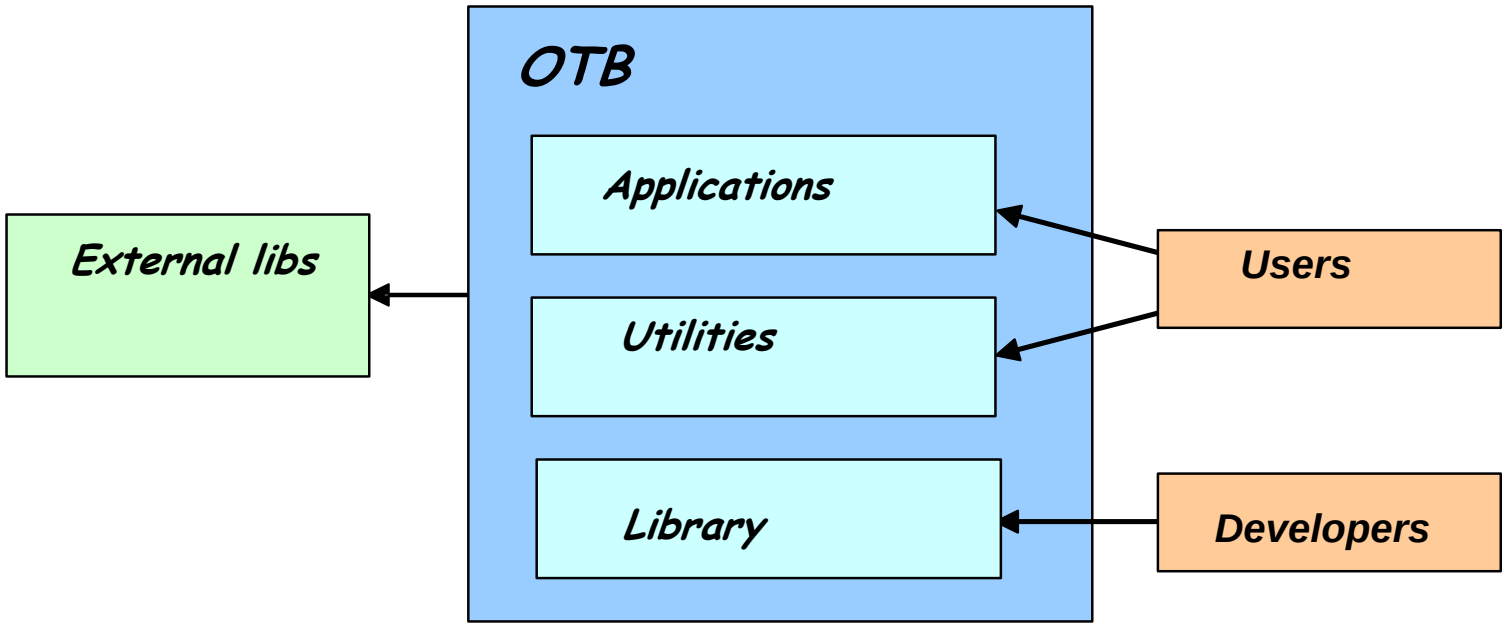
ORFEO Toolbox

- C++ library : provide many algorithms (geometric, radiometric, extraction, segmentation, classification...)

- Open Source : free to use, to modify, you can make your own software based on OTB and sell it.

- Multiplatform: Windows, Linux, Unix, Mac

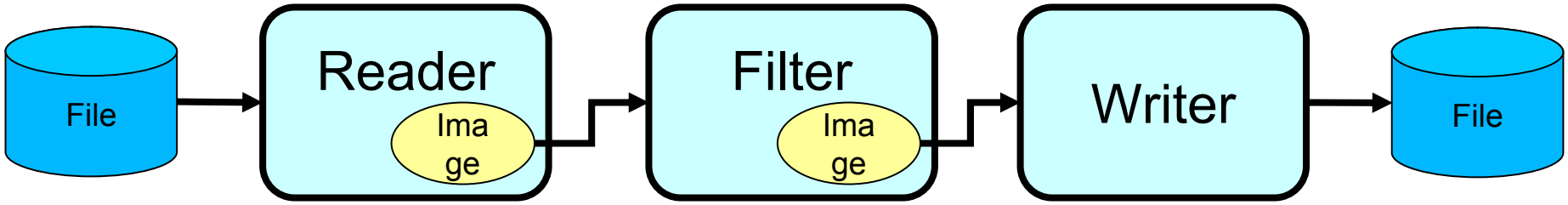
Orfeo Toolbox architecture



Components available

- Define by ORFEO end users
- Most satellite image formats
- Geometric corrections
- Radiometric corrections
- Change detection
- Feature extraction
- Classification

The Data Pipeline



OTB Goodies

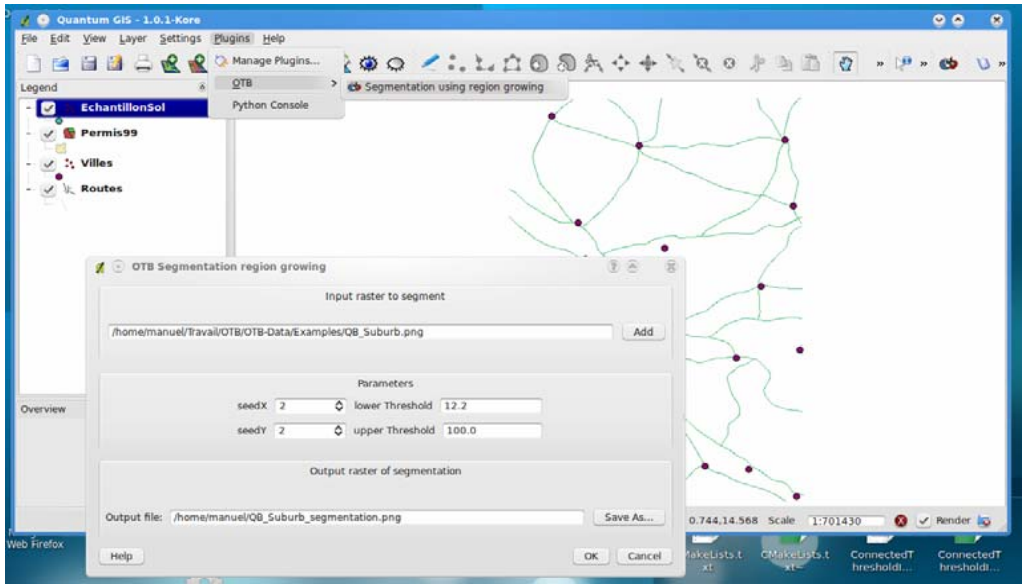
- Streaming / Threading
- Transparent Image Format Handling
- Iterators
- Composite Filters
- Frameworks
  - Registration
  - Change Detection
  - Classification

Use the best work of others

- Integration of Open Source library
  - ITK (segmentation, registration)
  - GDAL (IO)
  - OSSIM (sensor models)
  - 6S (radiometry/calibration)
  - Boost (graphs)
  - GALib, libSVM, OpenJPEG, libKML, Edison, libLAS, SIFTFast, ...
- In a common interface → OTB

Not everybody use C++!

- library (bindings)
  - Python, Java
- Via dynamic libraries
  - IDL/Envi
  - Matlab
- Plugins
  - Qgis (external contribution)

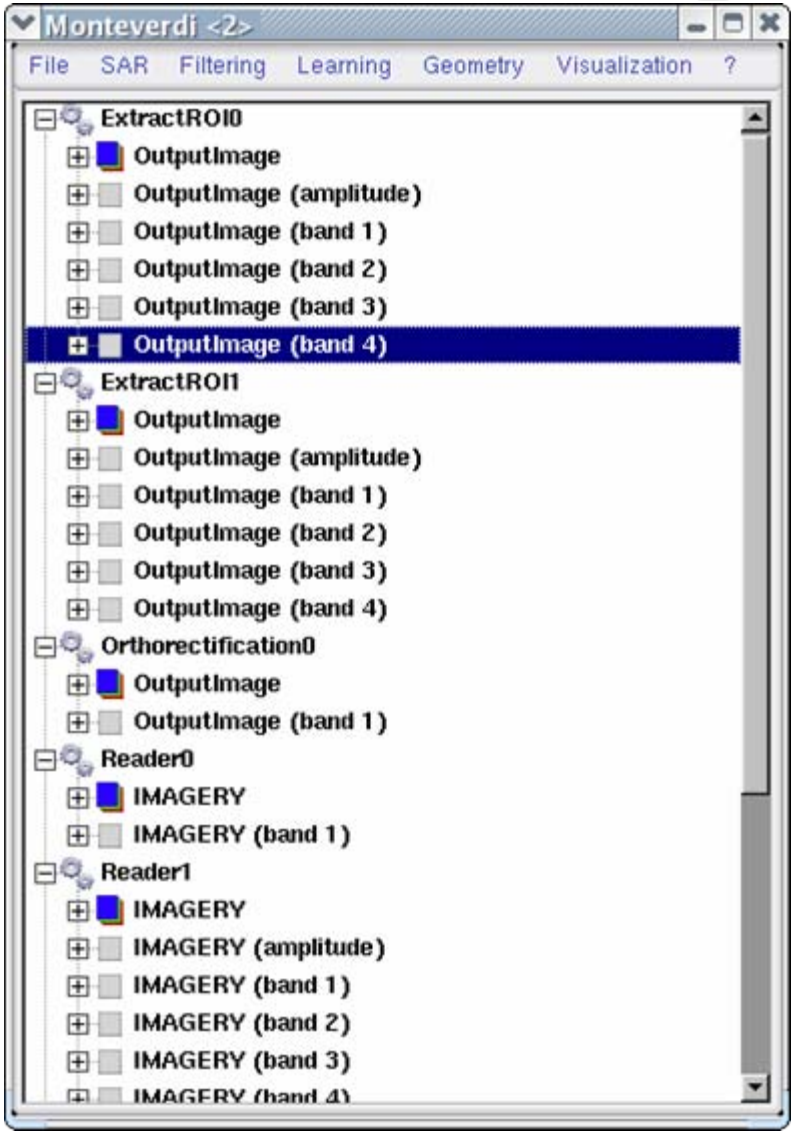


Monteverdi

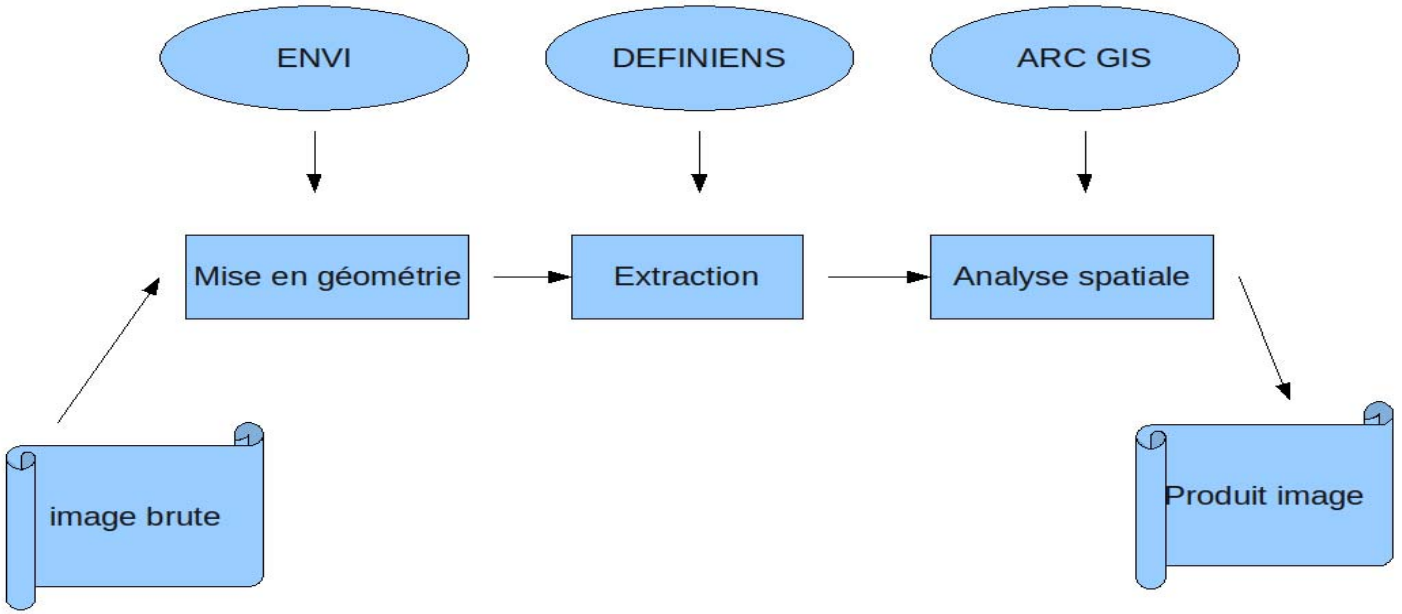
What is Monteverdi ?

- Framework to simply and interactively build an image processing streaming pipeline
- For end users
- Build interactively streamed and multi processes treatments

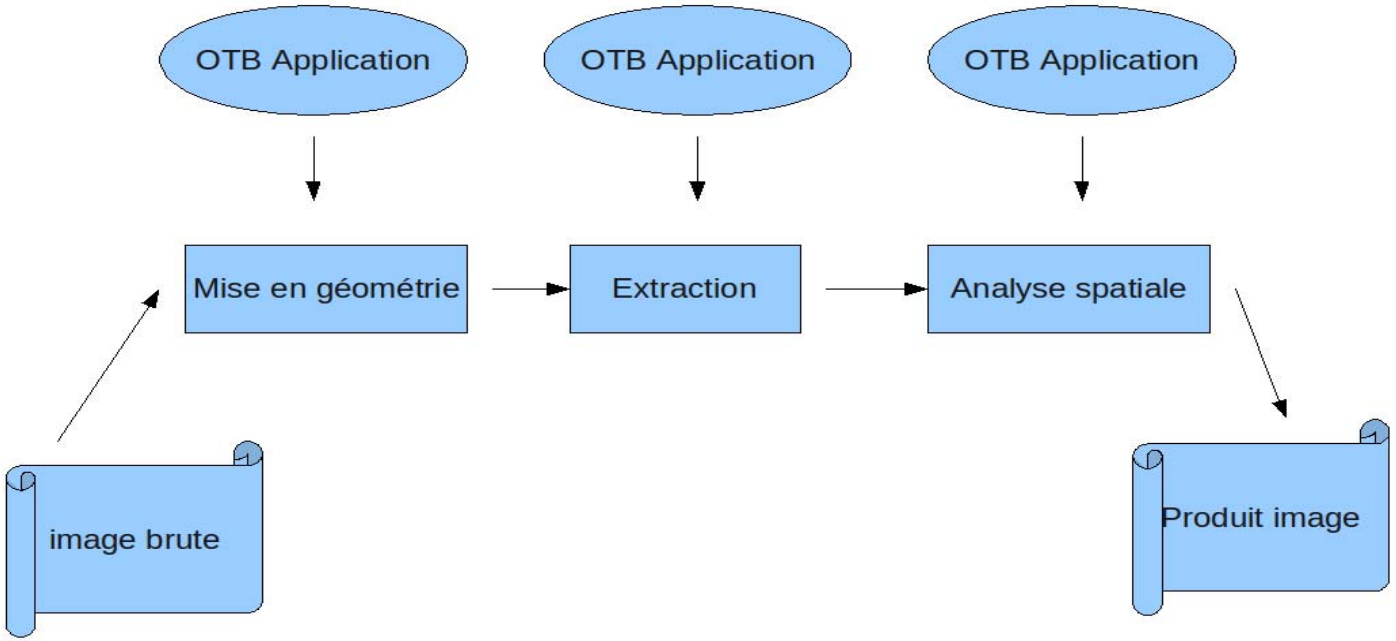
- Orfeo Toolbox components :
  - Functions and filters
  - Applications
  - Global framework
  - => Monteverdi



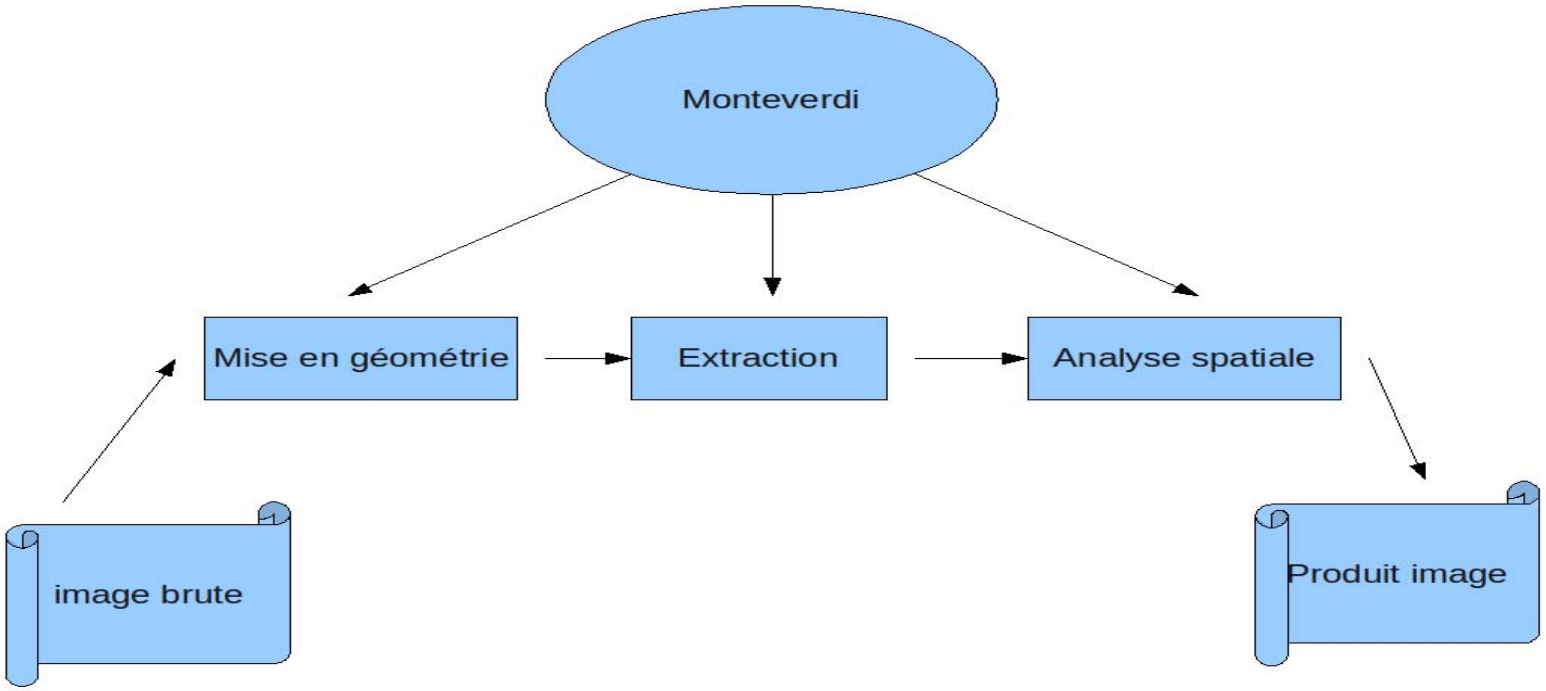
Goal : Commercial products process (Specific applications)

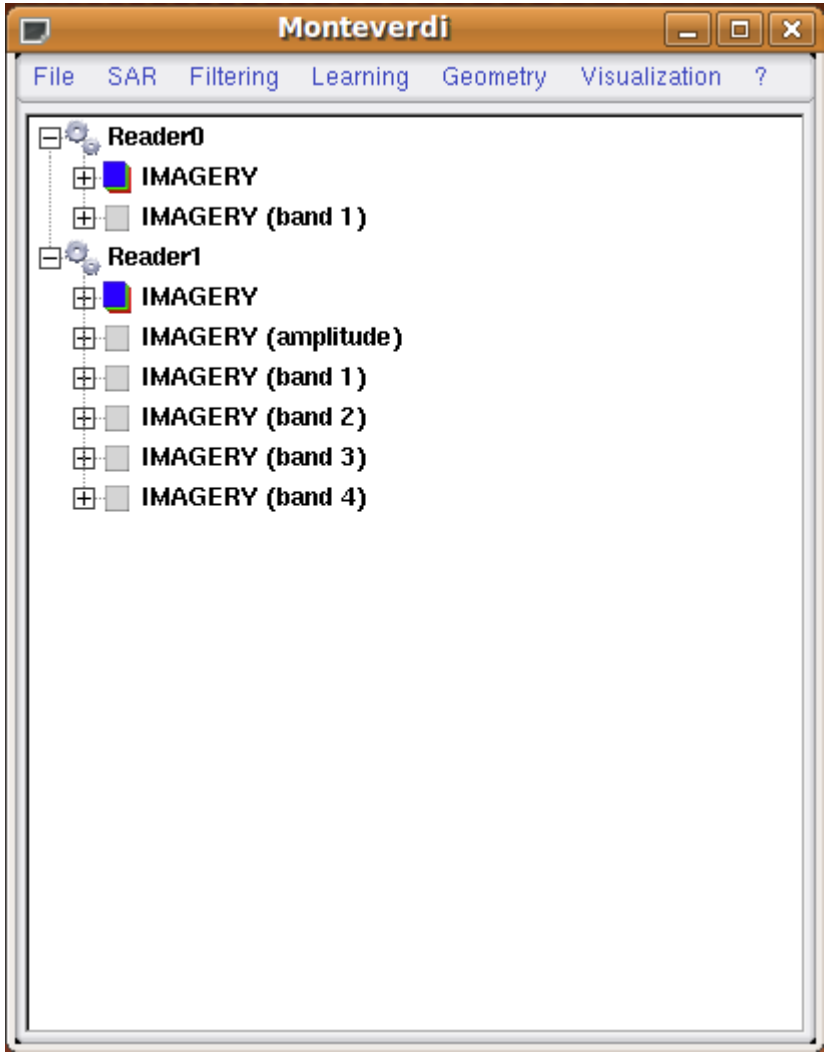


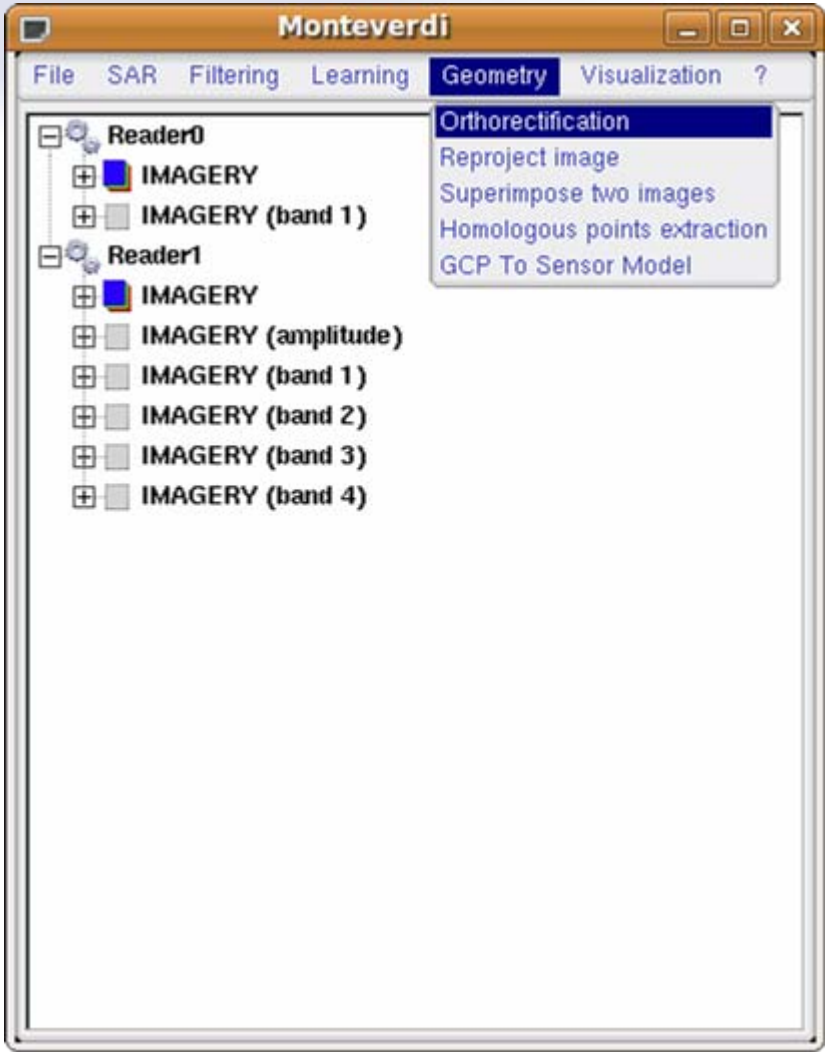
OTB applications process (Specific applications)



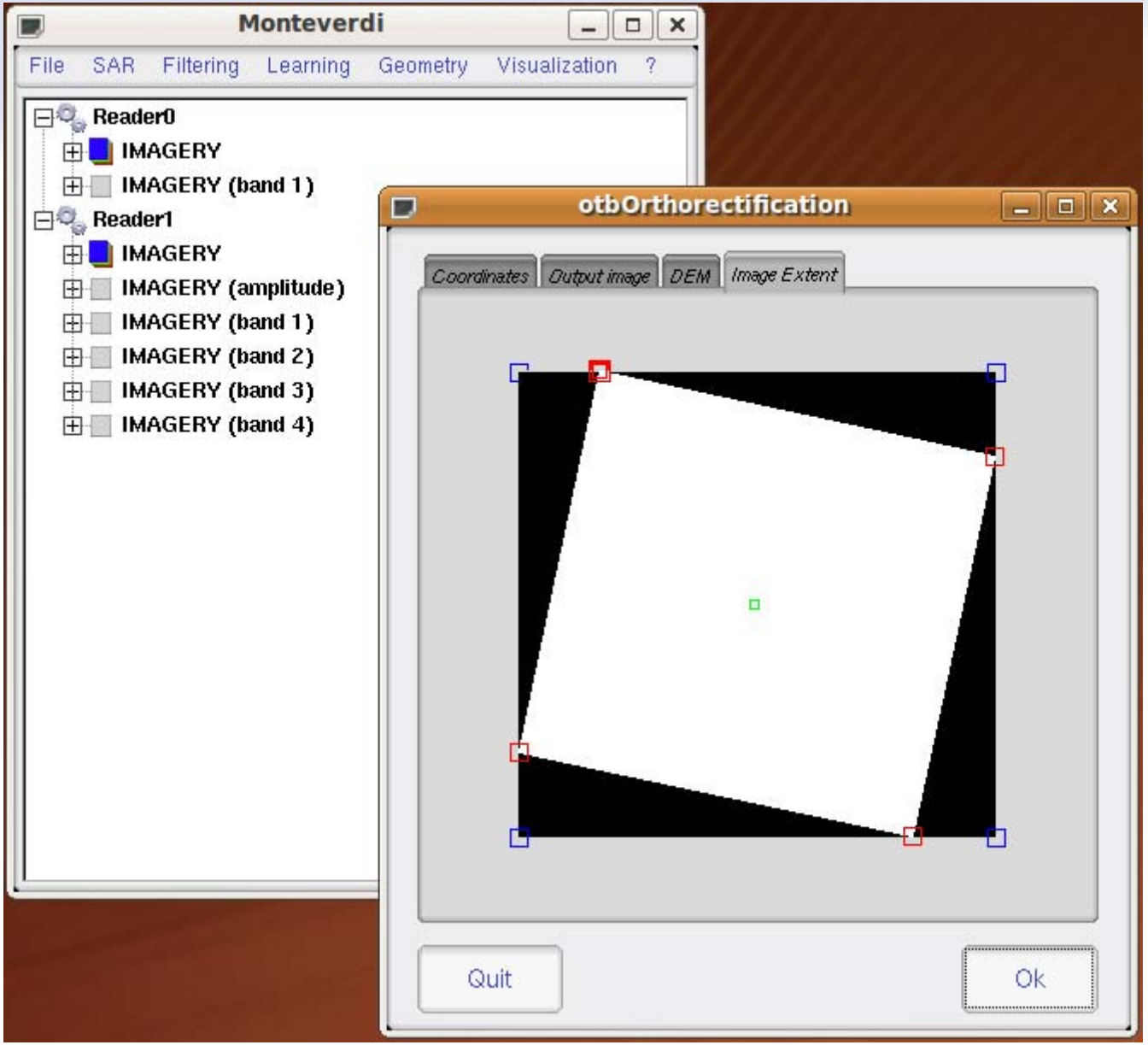
Monteverdi process (All in One)




Monteverdi
File
SAR
Filtering
Learning
Geometry
Visualization
?
Reader0
IMAGERY
IMAGERY (band 1)
Reader1
IMAGERY
IMAGERY (amplitude)
IMAGERY (band 1)
IMAGERY (band 2)
IMAGERY (band 3)
IMAGERY (band 4)



- Basic tools
- Sar
- Filtering
- Learning
- Geometry
- Visualization


Monteverdi
File
SAR
Filtering
Learning
Geometry
Visualization
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Reader0
IMAGERY
IMAGERY (band 1)
Reader1
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IMAGERY (amplitude)
IMAGERY (band 1)
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otbOrthorectification
Coordinates
Output image
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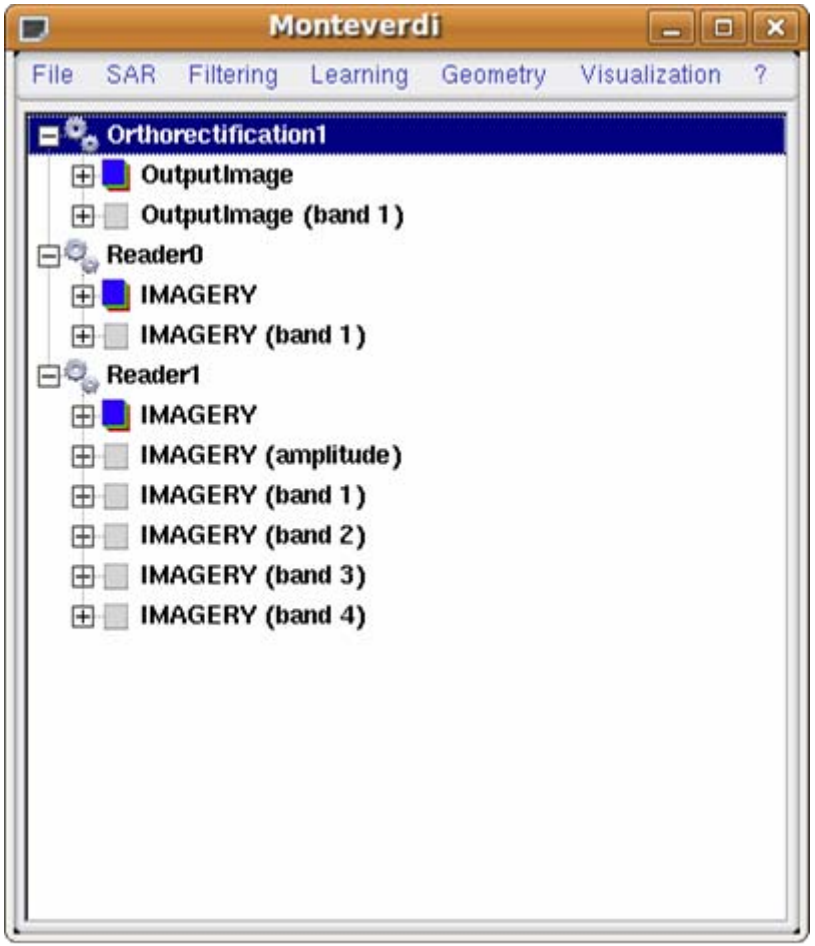
Quit
Ok


Monteverdi
File
SAR
Filtering
Learning
Geometry
Visualization
?
Orthorectification1
OutputImage
OutputImage (band 1)
Reader0
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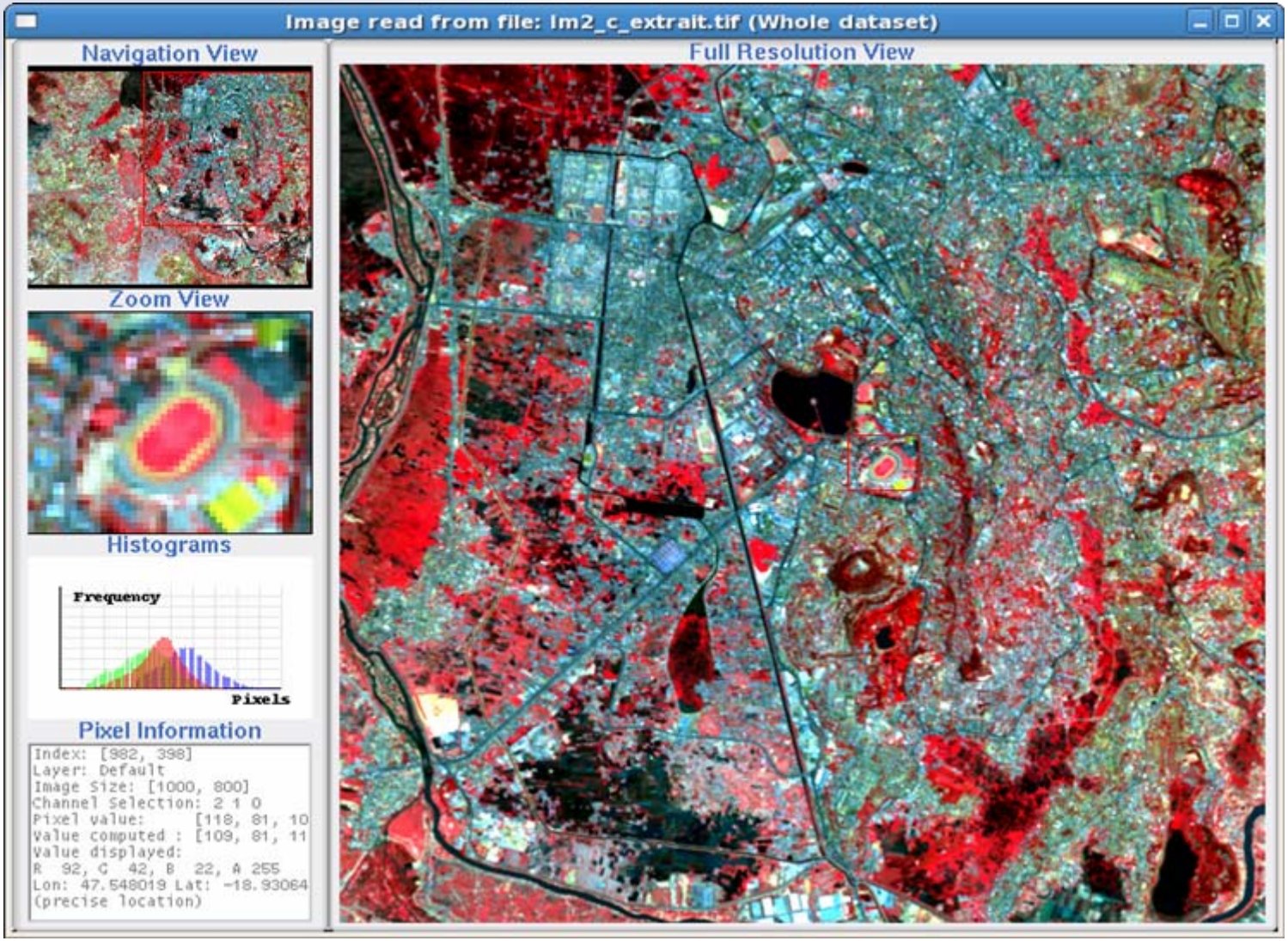
IMAGERY (band 1)
Reader1
IMAGERY
IMAGERY (amplitude)
IMAGERY (band 1)
IMAGERY (band 2)
IMAGERY (band 3)
IMAGERY (band 4)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Navigation View
Zoom View
Histograms
Frequency
Pixels
Pixel Information
Index: [982, 398]
Layer: Default
Image Size: [1000, 800]
Channel Selection: 2 1 0
Pixel value: [118, 81, 10
Value computed : [109, 81, 11
Value displayed:
R 92, G 42, B 22, A 255
Lon: 47.548019 Lat: -18.93064
(precise location)
Full Resolution View

http://www.orfeo-toolbox.org

- Blog : news
- Download : source code, Monteverdi standalone windows executable
- Wiki: collaborative website to share practical informations
- Bug Tracker
- Documentation: Huge documentation available ; Software Guide (pdf also the online version)
- Public forum : OTB user community growing steadily
- Live CD OTB available
- More to come...

Thank you!