

Orfeo ToolBox

Un logiciel libre pour le traitement d'images de télédétection
CEREMA - Journée Sat et Aménagement

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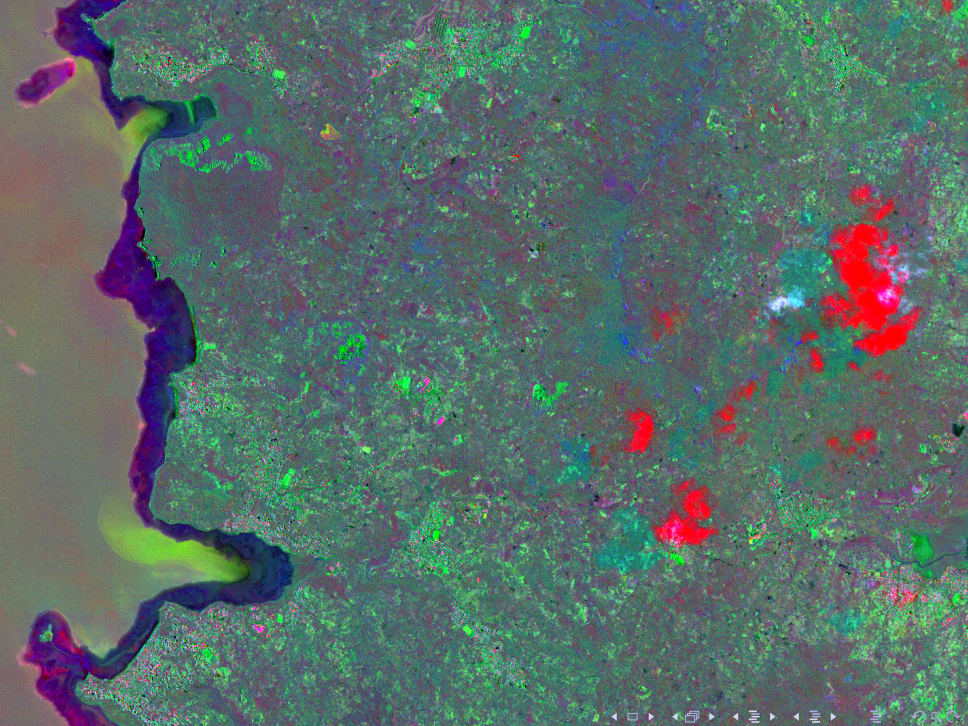


Si vous ne reprenez qu'une planche...

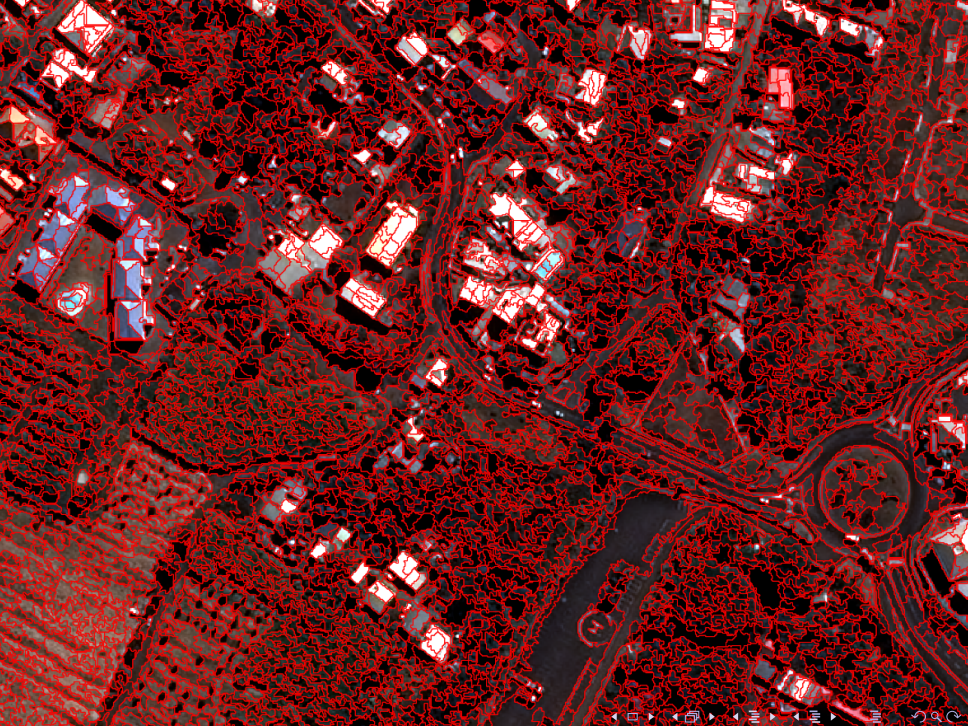
L'Orfeo ToolBox est :

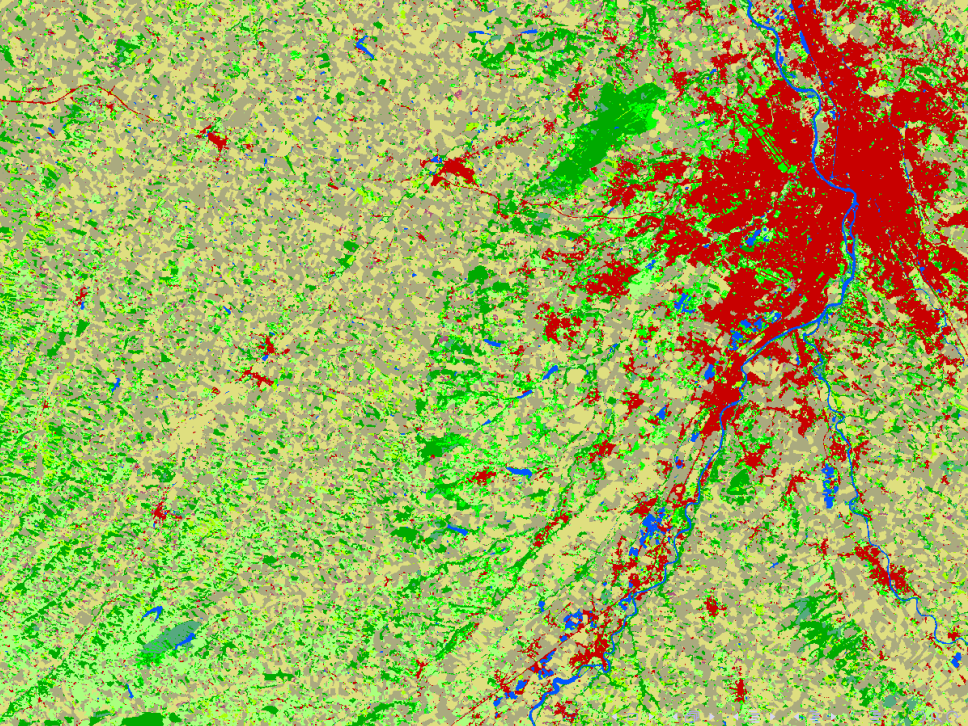
- ▶ Un outil de traitement d'images pour la télédétection
- ▶ Un logiciel libre (Apache v2.0)
- ▶ Financé et développé par le CNES (principalement)
- ▶ Linux, Windows, Mac
- ▶ Interfaces : bash, graphique, Python, QGIS
- ▶ Big data

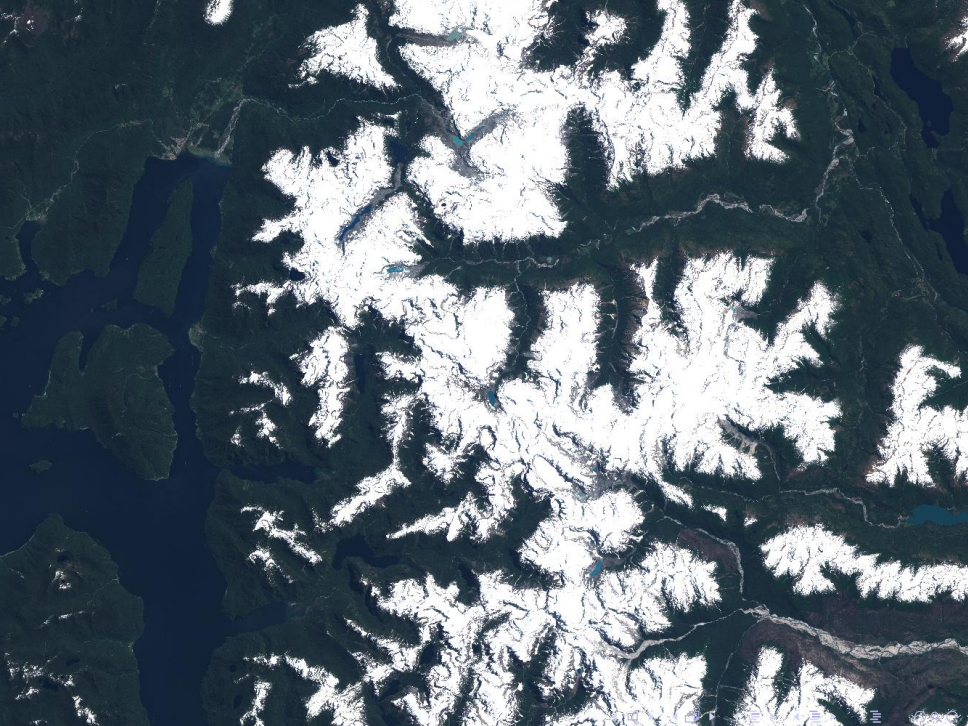
<https://www.orfeo-toolbox.org>





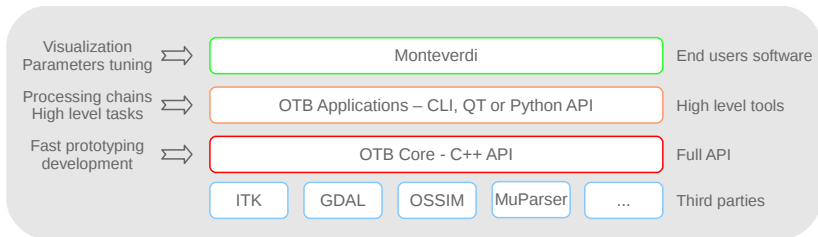








Comment utiliser l'OTB ?



Écrire son propre code

Flexible, accès à l'API complète, demande une connaissance en C++

Utiliser les applications

Fonctions de haut niveau (par ex. segmentation), appel en ligne de commande, via une interface graphique, ou depuis Python. Peut être étendue (création d'applications)

Utiliser Monteverdi

Visualisation, gestion persistante des données, **Accès à l'ensemble des applications**

Applications : appel depuis la ligne de commande

```
$ otbcli_OrthoRectification
```

```
ERROR: Waiting for at least one parameter...
```

```
This is the OrthoRectification application, version 5.2.1
```

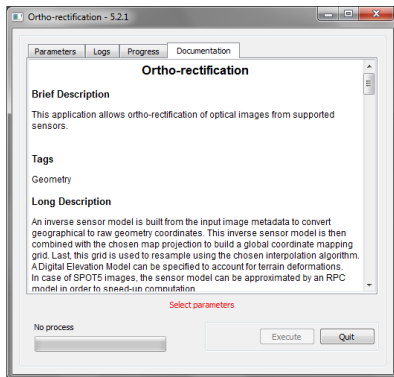
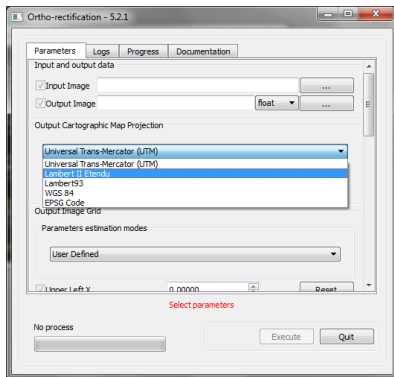
```
This application allows to ortho-rectify optical images from supported sensors.
```

```
Complete documentation: http://www.orfeo-toolbox.org/Applications/OrthoRectification.html
```

```
Parameters:
```

	-progress	<boolean>	Report progress
MISSING	-io.in	<string>	Input Image (mandatory)
MISSING	-io.out	<string> [pixel]	Output Image [pixel=uint8/uint16/int16/uint32/int32/float/double] (default v
	-map	<string>	Output Cartographic Map Projection [utm/lambert2/lambert93/wgs/epsg] (mandat
	-map.utm.zone	<int32>	Zone number (mandatory, default value is 31)
	-map.utm.northhem	<boolean>	Northern Hemisphere (optional, off by default)
	-map.epsg.code	<int32>	EPSG Code (mandatory, default value is 4326)
	-outputs.mode	<string>	Parameters estimation modes [auto/autosize/autospacing/outputroi/orthofit] (
MISSING	-outputs.ulx	<float>	Upper Left X (mandatory)
MISSING	-outputs.uly	<float>	Upper Left Y (mandatory)
MISSING	-outputs.sizeX	<int32>	Size X (mandatory)
MISSING	-outputs.sizeY	<int32>	Size Y (mandatory)
MISSING	-outputs.spacingX	<float>	Pixel Size X (mandatory)
MISSING	-outputs.spacingY	<float>	Pixel Size Y (mandatory)
	-outputs.lrx	<float>	Lower right X (optional, off by default)
	-outputs.lry	<float>	Lower right Y (optional, off by default)
	-outputs.ortho	<string>	Model ortho-image (optional, off by default)
	-outputs.isotropic	<boolean>	Force isotropic spacing by default (optional, on by default)
	-outputs.default	<float>	Default pixel value (optional, on by default, default value is 0)
	-elev.dem	<string>	DEM directory (optional, off by default)
	-elev.geoid	<string>	Geoid File (optional, off by default)
	-elev.default	<float>	Default elevation (mandatory, default value is 0)
	-interpolator	<string>	Interpolation [bco/nn/linear] (mandatory, default value is bco)

Applications OTB : Interface graphique



Applications : appel depuis l'interface Python

```
#!/usr/bin/python

# Import the otb applications package
import otbApplication

# The following line creates an instance of the OrthoRectification application
OrthoRectification = otb.Registry.CreateApplication("OrthoRectification")

# The following lines set all the application parameters:
OrthoRectification.IO.IN = "QB_TOULOUSE_MUL_Extract_500_500.tif"
OrthoRectification.IO.OUT = "QB_Toulouse_ortho.tif"

app.MAP = 'epsg'
app.MAP.EPSG.CODE = 32768

# The following line execute the application
OrthoRectification.ExecuteAndWriteOutput()
```

Monteverdi (accès aux applications OTB)

The screenshot displays the Monteverdi software interface. The main window shows an aerial photograph with a circular region of interest (ROI) highlighted in white. On the left, a 'Navigateur d'OTB-Applications' window lists various processing tools. On the right, a 'Histogramme' window shows a color histogram with red, green, and blue channels. Below the histogram, there are 'Réglage de la dynamique' options for gamma and dynamic range. At the bottom, a 'Pile de couche' table lists the loaded layers and their properties.

Navigateur d'OTB-Applications

- Applications OTB
 - Calibration
 - Optical calibration
 - SAR Radiometric calibration
 - Concatenation
 - Images Concatenation
 - Conversion
 - Image Conversion
 - No Data management
 - Multi Resolution Pyramid
 - Image resampling with a rigid trans...
 - Coordinates
 - Cartographic to geographic coordi...
 - Obtain UTM Zone From Geo Point
 - Pixel Value
 - Vector Data reprojection
 - Dimensionality Reduction
 - Dimensionality reduction
 - Vertex Component Analysis
 - Edge
 - Edge Feature Extraction
 - Feature Extraction
 - Binary Morphological Operation
 - Generate Distance Feature From...

Histogramme

RVB

Y-axis: 0, 2000, 4000, 6000, 8000
X-axis: 150, 200, 250, 300, 350, 400

Réglage de la dynamique

No data: 0 [Appliquer]

Gamma: [Slider]

Bas Haut [Apply]

R: 141.286503203495; 415.988634132241 [min,Max]
Q: 2.00% [Slider] 2.00% [Slider] 2%

Bas Haut [Apply]

G: 205.245677822226; 402.221126079555 [min,Max]
Q: 2.00% [Slider] 2.00% [Slider] 2%

Bas Haut [Apply]

B: 284.191308711325; 429.242747320766 [min,Max]
Q: 2.00% [Slider] 2.00% [Slider] 2%

Pile de couche

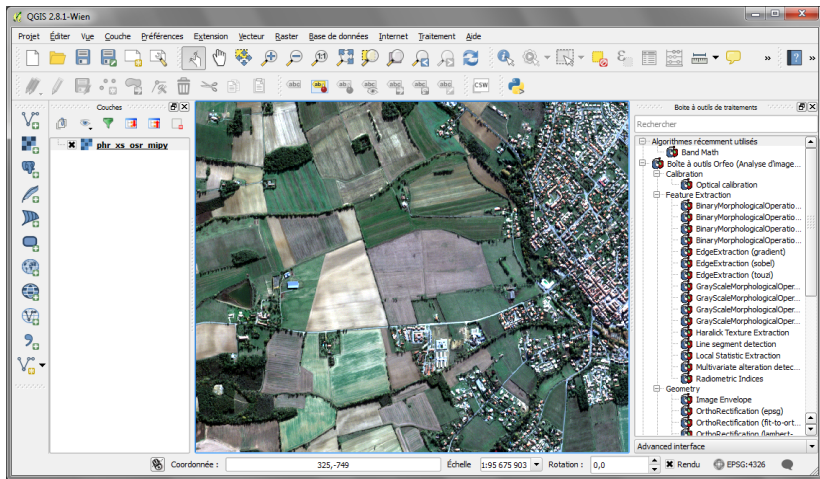
Proj	Rés	Nom	Effet	I	J	Rouge	Vert	Bleu	X	Y
Captueur	1	phr_xs_osr_...	Angle spectral	1522	500	224	268	332	6422.55	4301.33

Position: 1522, 500 [N 43.5224; E 1.17695; 0] [R: 224; V: 268; B: 332]

Niveau de zoom: 1:2.65252



QGIS (accès aux applications OTB)



Accès OTB dans QGIS : A powerful wedding

- ▶ Facilite l'accès à l'OTB (QGIS is mainstream)
- ▶ Profite de l'interface et des fonctionnalités de QGIS (OTB GUI...)
- ▶ Intégration dans le module "processing" de QGIS (batch, Python...)
- ▶ Collaboration très positive avec la communauté QGIS
- ▶ Support des développeurs QGIS
- ▶ OSGeo *power*
- ▶ Démo : <https://www.youtube.com/watch?v=ufSQ2SgSIV4>

Mais aussi des problèmes...

- ▶ “Comment on installe la dernière version de l’OTB dans QGIS ?”
- ▶ “Quelles versions de l’OTB fonctionnent avec quelles versions de QGIS ?”
- ▶ “Pourquoi l’application de segmentation OTB n’apparaît pas dans le menu QGIS ?”
- ▶ “Pourquoi les applications OTB n’ont pas le même nom dans QGIS ?”
- ▶ “J’abandonne OTB dans QGIS, rien ne fonctionne...”
- ▶ **STOP !**
- ▶ 2018 : on va améliorer tout ça

Interface de l'application *Smoothing*

Parameters Log

Input Image
QB_Toulouse_Ortho_XS [EPSG:32631] ...

Smoothing Type
anidif

Time Step [optional]
0.125000

Nb Iterations [optional]
10

Conductance [optional]
1.000000

▼ Advanced parameters

Output pixel type [optional]
float

Available RAM (Mb) [optional]
128

Output Image
[Save to temporary file] ...

Open output file after running algorithm

0%

Cancel

Run as Batch Process... Run in Background Close Help

Interface de l'application *TrainImagesClassifier*

Parameters Log

3 elements selected

Input Vector Data List

3 elements selected

Validation Vector Data List [optional]

0 elements selected

Input XML image statistics file [optional]

Temporary files cleaning [optional]

Maximum training sample size per class [optional]

1000

Maximum validation sample size per class [optional]

1000

Bound sample number by minimum [optional]

1

Training and validation sample ratio [optional]

0.500000

Field Name

Class

Processing algorithm...

98%

Cancel

Run as Batch Process... Run in Background Close Help

Support/Aide/Contribution

Ressources

Site web orfeo-toolbox.org

Blog blog.orfeo-toolbox.org

Documentation et aide

Doxygen [doxygen](http://doxygen.orfeo-toolbox.org)

Documentation Software Guide et CookBook (remote sensing recipes)

forum <https://forum.orfeo-toolbox.org>

Code gitlab.orfeo-toolbox.org