

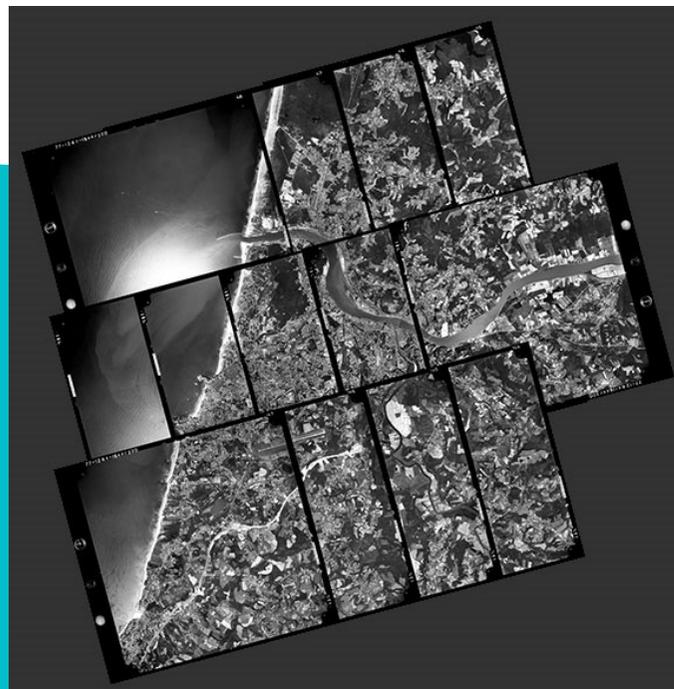


INSTITUT NATIONAL
DE L'INFORMATION
GÉOGRAPHIQUE
ET FORESTIÈRE

GEOPROCESSING, ARCHIVING & SHARING HISTORICAL AERIAL IMAGES

Philippe Truquin

Euro SDR Workshop, June 3, 2019



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PROCESS

Acquisition

Conservation (ANALOG)

Conversion (ANALOG)

OrthoRectification

E-archiving

Diffusion



ACQUISITION

EXISTING RESSOURCES

4 IGN Beechcraft planes regularly flying over the territory for mapping purposes.

IGN air base is in Beauvais, 80 km North of Paris.



ACQUISITION CHRONOLOGY

First war : first aerial photos.

50's : first national coverage.

... Coverage every 5/10 years (30K).

2003 : IGN's digital camera.

... Coverage every 3/4 years (25 cm/pix).



CONSERVATION OF ANALOG COVERS

“Photothèque nationale”,
the IGN’s national aerial
photo library

3 million aerial photos on
France

1 million on the former
French possessions

Villefranche-sur-Cher,
200 km South of Paris



CONVERSION ANALOG SPECIFICATIONS

2007-2017 : national
territory's coverage
converted

Glass plates and
films, various
formats and scales

B&W films 1200 dpi
Color films 900 dpi
Glass plates 750 dpi

Delivery JPEG 2000
uncompressed



CONVERSION ANALOG PROCESS

Preparation

Converting films &
glass plates
(outsourcing)

Repackaging
(outsourcing)

Digitizing flight plans
& metadata

Quality controls &
post-processing

CONVERSION ANALOG METADATA

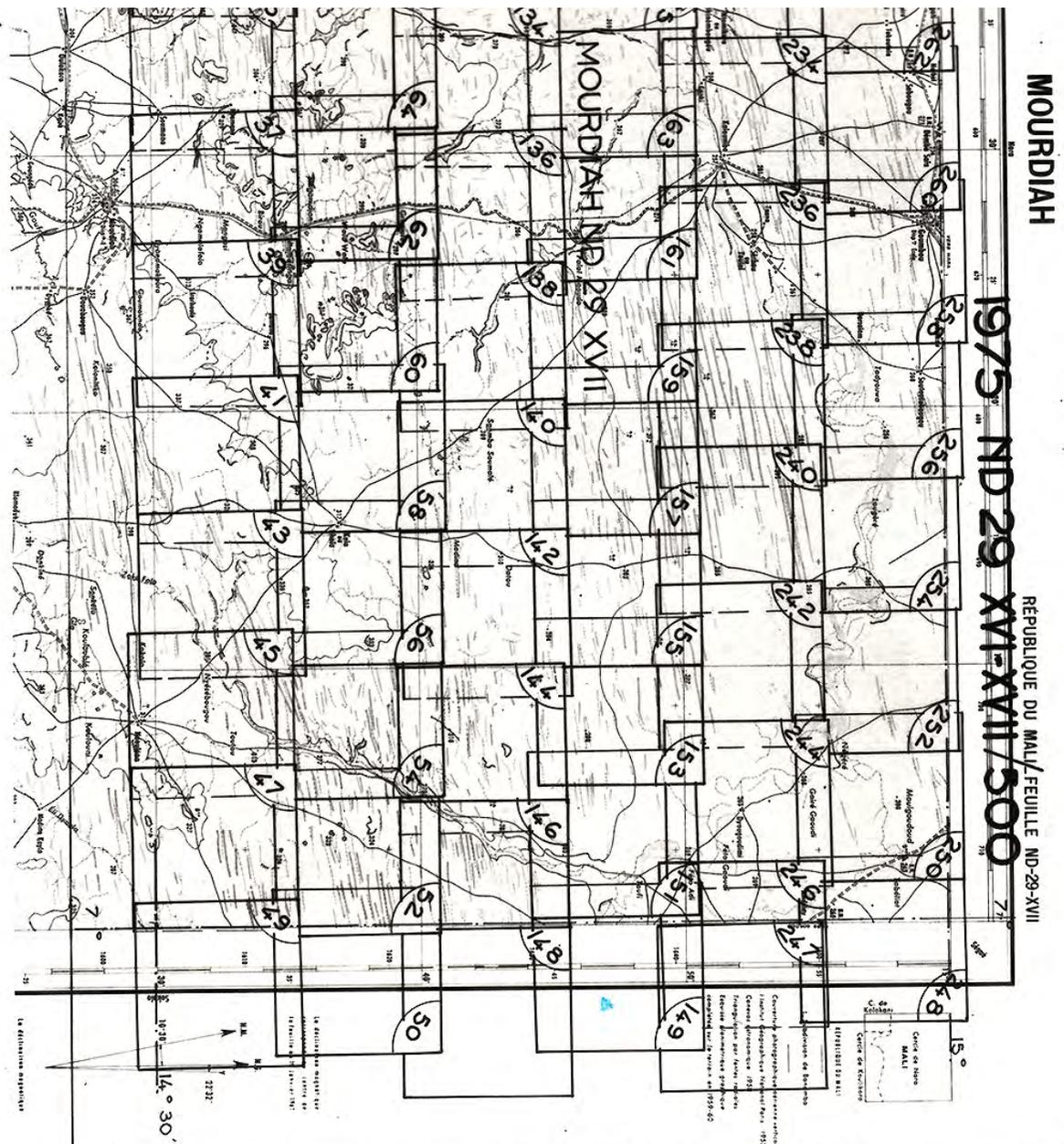
Flight plan

Acquisition campaign

Sensor format
Focal lens
Date...

Aerial photos

Image quality
Cloud cover
Reflections
Damages
Duplicata or prints available



DATE	HEURE	CHAMBRE Focale	ALTITUDE		ECHELLE		N° DES CLICHES	OBSERVATIONS
			SOL	MER	CALQUE	CLICHES		
15. 3. 75	9°15.11' 25"	151. 750	7600m	7950m	1/200000	1/50000	1 à 295	

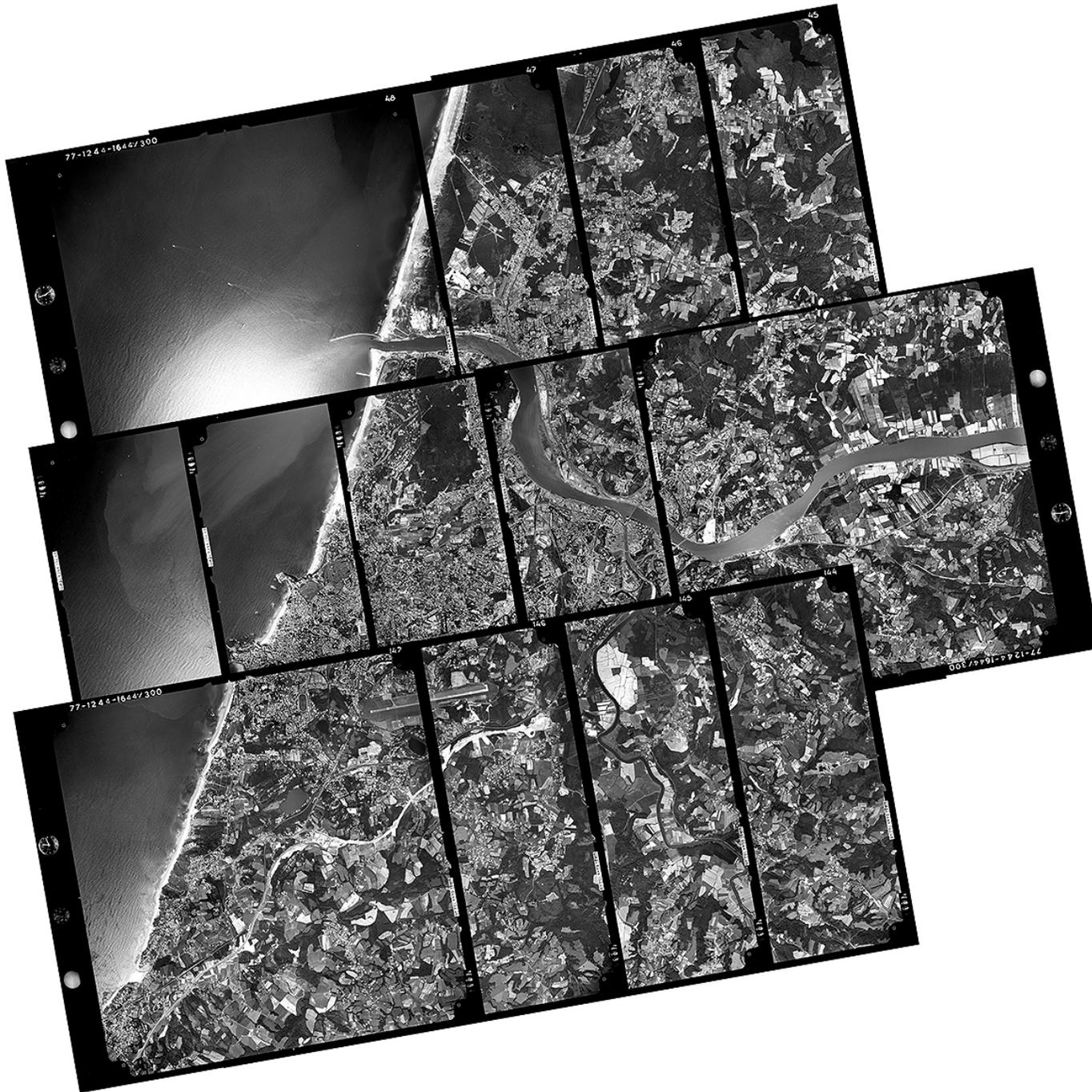
ORTHORECTIFICATION SPECIFICATIONS

Converted analog
1950-65 (1965-80)

JPEG 2000
Lambert 93
50 cm / pixel
Alti grid 25m

Native digital

JPEG 2000
Lambert 93
20 cm / pixel
Alti grid 10m





ORTHORECTIFICATION PROCESS 1/2 GEOMETRY

Orientation

Theoretical beam modeled from the camera calibration certificate. Before 1970, possible errors of several pixels.

Aerotriangulation

Support points measured on orthophoto of IGN's large scale database (RGE, 5m/pix). Common points automatically calculated.

Calculation

Image correction with internal orientation and aerotriangulation models. IGN's DTM used for global computing (Pitch : 25m histo / 10m recent)

ORTHORECTIFICATION

PROCESS 2/2 MOSAICKING

Mosaicking

Difficulties due to imprecision of the models used upstream: geometry (orientation, relief) and radiometry (veil, vignetting, different dates).

Radiometry

Since 2003, the recording of the shooting conditions by the digital camera has made it possible to automate and improve this stage.

Prior to 1970, the use of short focal lengths generated vignetting, difficult to eliminate.





E-ARCHIVING

Double archiving

Magnetic tapes

Converted analog

JPEG 2000 uncompressed

250 To

Metadata ISO 19115/19139

Native digital

JPEG 2000 compressed x 5

70 To



DIFFUSION STORAGE

Oshimae, interministerial
hosting platform (object
storage)

Store « Geoportal »

ISO 19115 / 19139

Pictures for download

JPEG 2000 – 60 To

B&W compressed x 5

Color compressed x 10

Orthophoto for streaming

JPEG 2000 lossless compressed

250 To

WMTS displaying (JPEG)



DIFFUSION GEOPORTAIL

Historical Ortho 1950-1965 can be displayed and overlapped to other data on the Geoportail.

The screenshot displays the Géoportail web application interface. At the top left, there is a 'CARTES' menu icon and the 'géoportail' logo. A search bar contains the text 'Chercher un lieu, une adresse, une donnée'. The main map area shows an aerial view of Bayonne, France, with a red location pin over the city center. The map is surrounded by various navigation and tool icons, including a zoom in (+) and zoom out (-) button, a scale bar (0 to 500 m), and a scale indicator (Échelle 1 : 34 110). On the right side, there is a 'CARTE EN COURS' panel with a list of data layers: 'ROQUEFORT' (Dénominations géographiques), 'Corine Land Cover (2018)', 'DIJON' (Carte IGN), 'Parcelle express (PCI)', 'Photographies aériennes 1950-1965', and 'Photographies aériennes'. Below the list are buttons for '+ DE DONNÉES' and 'ENREGISTRER LA CARTE'. The bottom right corner shows a '2D' and '3D' toggle.

DIFFUSION GEOPORTAIL API

Programming library

Javascript, HTML, CSS

Usable with main GIS

QGIS, ArcGIS, GeoConcept, IGN Map, FME, OGR

Compatible with main cartographic web tools and libraries

Leaflet, Open Layers, iTowns, Google Maps API, 3D Cesium JS

REMONTER LE TEMPS SCREENSHOT « COMPARING »

The screenshot displays the 'Remonter le temps' website interface in 'COMPARER' mode. The browser address bar shows the URL: <https://remonterletemps.ign.fr/comparer/basic?x=2.436061&y=46.462577&z=6&layer1=ORTHOIMAGERY.ORTHOPHOTOS&layer2=GEOGRAPHICALGRIDSYSTEMS.MAPS.SCAN-EXPRESS.STANDARD&mode=double>. The navigation menu includes 'LE PORTAIL IGN', 'REMONTER LE TEMPS', 'COMPARER', 'TÉLÉCHARGER', 'COMMANDER UN POSTER', and 'AIDE ET CONTACT'. The 'COMPARER' dropdown menu is set to 'Photographies aériennes' and 'avec Carte IGN'. The main content area is split into two panels: the left panel shows aerial photography of the region, and the right panel shows a topographic map from IGN. The map covers France, Belgium, the Netherlands, and parts of Spain and Italy. Major cities like Paris, London, Brussels, and Amsterdam are labeled. A search bar at the top left of the map area contains the text 'Rechercher un lieu'. The IGN logo is visible in the bottom left corner. The Windows taskbar at the bottom shows the system time as 19:58 on 02/06/2019.

REMONTER LE TEMPS SCREENSHOT « COMPARING »

The screenshot displays the IGN 'Remonter le Temps' (Go Back in Time) web application interface. The browser address bar shows the URL: <https://remonterletemps.ign.fr/comparer/basic?x=2.616803&y=48.849574&z=17&layer1=ORTHOIMAGERY.ORTHOPHOTOS&layer2=ORTHOIMAGERY.ORTHOPHOTOS.1950-1965&mode=hSlider>. The navigation menu includes 'LE PORTAIL IGN', 'REMONTER LE TEMPS', 'COMPARER', 'TÉLÉCHARGER', 'COMMANDER UN POSTER', and 'AIDE ET CONTACT'. The 'COMPARER' section is active, showing a comparison between 'Photographies aériennes' (Aerial Photography) and 'Photographies aériennes historiques 1950-1965' (Historical Aerial Photography 1950-1965). The search bar contains '77420 Champs-sur-Marne'. The main view is split into two horizontal panels: the top panel shows a modern aerial photograph with a grid of small thumbnail images overlaid on a residential area, and the bottom panel shows a historical black and white aerial photograph of the same area, which appears mostly as open fields. A 50m scale bar is visible in the bottom left of the image area. The bottom of the screen shows a Windows taskbar with various application icons and a system tray displaying the date '23/04/2019' and time '18:33'.

REMONTER LE TEMPS SCREENSHOT « COMPARING »

The screenshot displays the 'Remonter le temps' (Go back in time) web application interface. The browser address bar shows the URL: <https://remonterletemps.ign.fr/comparer/basic?x=6.919293&y=45.929383&z=14&layer1=ORTHOIMAGERY.ORTHOPHOTOS&layer2=GEOGRAPHICALGRIDSYSTEMS.ETATMAJOR40&mode=doubleMap>. The navigation menu includes 'LE PORTAIL IGN', 'REMONTER LE TEMPS', 'COMPARER', 'TÉLÉCHARGER', 'COMMANDER UN POSTER', and 'AIDE ET CONTACT'. The 'COMPARER' section is active, showing 'Photographies aériennes' selected for comparison with 'Carte de l'état-major (1820-1866)'. The search bar contains '74400 Chamonix-Mont-Blanc'. The main view is split into two panels: the left panel shows a modern aerial photograph of a mountain valley with a large glacier, and the right panel shows a historical topographic map of the same area with contour lines and labels for various glaciers and locations. A 500m scale bar is visible in the bottom left of the aerial view. The Windows taskbar at the bottom shows the system tray with the date '23/04/2019' and time '18:25'.

REMONTER LE TEMPS SCREENSHOT « DOWNLOADING »

The screenshot displays the 'Remonter le temps' (Go back in time) interface on the IGN website. The browser tabs at the top include 'geohistorical data - Qwant Rech...', 'GeoHistoricalData', 'IGN Remonter le temps', and 'geohistorical data - Recherche C...'. The address bar shows the URL: [https://remonterletemps.ign.fr/telecharger?x=2.452116&y=48.825660&z=14&layer=GEOGRAPHICALGRIDSYSTEMS.MAPS.SCAN-EXPRESS.STANDARD&demat=DEMAT.PVA\\$GEOPORTAIL:DEMAT:PHOTOS&missionId=missions.496...](https://remonterletemps.ign.fr/telecharger?x=2.452116&y=48.825660&z=14&layer=GEOGRAPHICALGRIDSYSTEMS.MAPS.SCAN-EXPRESS.STANDARD&demat=DEMAT.PVA$GEOPORTAIL:DEMAT:PHOTOS&missionId=missions.496...)

The navigation bar features the following options: LE PORTAIL IGN, REMONTER LE TEMPS, COMPARER, TÉLÉCHARGER, COMMANDER UN POSTER, and AIDE ET CONTACT. Below this, a timeline shows years from 1919 to 1932, with 1925 selected. A search bar on the left contains the text 'Rechercher un lieu'. The main map area shows a historical map of the Vincennes and Charenton-le-Pont area in 1925, with a blue square highlighting a specific location. The map includes labels for various districts and landmarks such as ST-MANDÉ, NOGENT-SUR-MARNE, CHARENTON-LE-PONT, and ST-MAURICE. A scale bar at the bottom left indicates 500 meters. The Windows taskbar at the bottom shows the system tray with the date 23/04/2019 and time 18:38.

REMONTER LE TEMPS SCREENSHOT « DOWNLOADING »

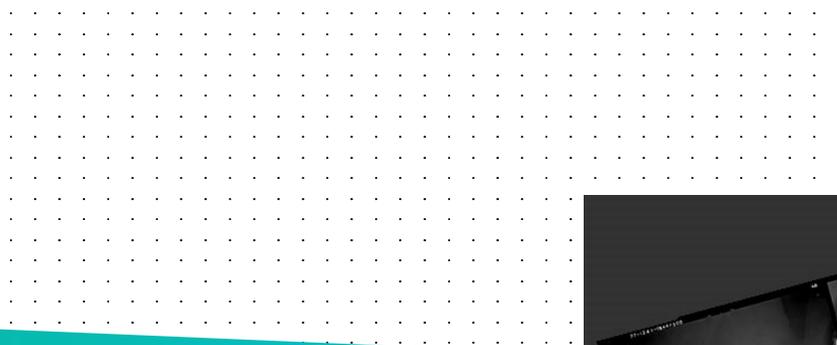
The screenshot displays the IGN 'Remonter le Temps' interface. The main area features a historical aerial photograph of a racetrack, tilted at an angle. The photo is labeled 'E 1 6-10-25 N° 2'. The interface includes a navigation bar with options: 'LE PORTAIL IGN', 'REMONTER LE TEMPS', 'COMPARER', 'TÉLÉCHARGER', 'COMMANDER UN POSTER', and 'AIDE ET CONTACT'. A sidebar on the right, titled 'APERÇU', provides the following details:

- TÉLÉCHARGER GRATUITEMENT**
- COMMANDER UN TIRAGE**
- IDENTIFIANT DE LA MISSION:** C2314-1221_1925_NP1_7002
- CLICHÉ n°:** 7002
- ÉCHELLE:** 1/5088
- TYPE DE CLICHÉ:** Argentique
- DATE DE PRISE DE VUE:** 06/10/1925

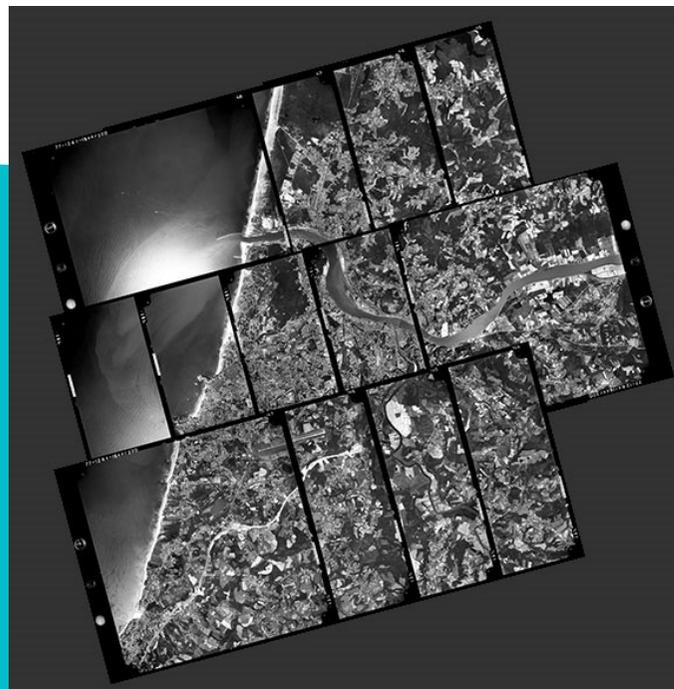
The bottom of the screen shows a Windows taskbar with various application icons and a system tray displaying the time '18:39' and date '23/04/2019'. The IGN logo is visible in the bottom left corner.



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THANK YOU FOR
YOUR ATTENTION



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