Litto3D®

a 3D seamless representation of French coastal areas

LEADING ENGINEERING COMPANY
IN GEOGRAPHIC INFORMATION

IGN FRANCE INTERNATIONAL MAPS THE WORLD'S COMPLEXITY

SDI Days - 8th Cartography and Geoinformation Conference
Zagreb - 28 September 2012

PRESENTATION SUMMARY

- **1- Elements of context**
  - *Coastal areas at stake*

- **2- Needs for geo information**
  - *At national level*
  - *For local collectivities*
  - *French solution*

- **3- Litto3D®**
  - *Starting point*
  - *Mapping work – Scan littoral®*
  - *Updating work : prototype and production of Litto3D®*
  - *Applications of Litto3D®*

Elements of context

Coastal areas : location with strong economical stake...

... fragile and threatened

For instance by :

- Erosion

Elements of context

Coastal areas : location with strong economical stake...

... <u>fragile and threatened</u>
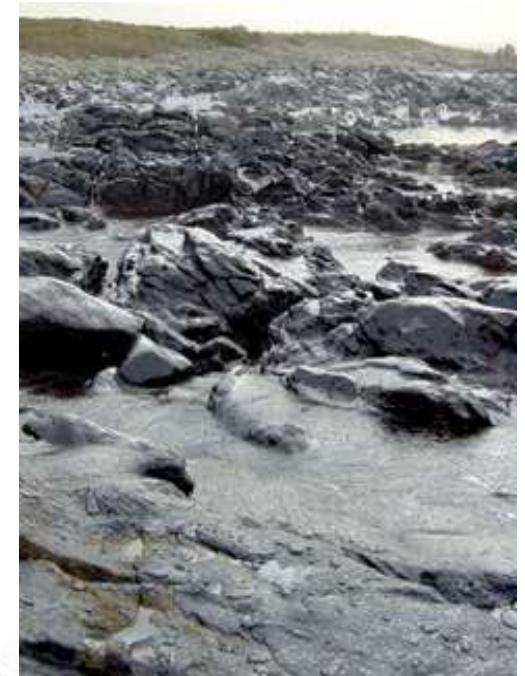
For instance by :

- Erosion

- Submersions, storms

Elements of context

Coastal areas : location with strong economical stake...

... <u>fragile and threatened</u>

For instance by :

- Erosion

- Submersions, storms

- Pollutions

    - Oil slicks

    - Nitrates conveyed by streams

    - Pollutants dumped at sea

Elements of context

Coastal areas : location with strong economical stake...

... fragile and threatened

For instance by :

- Erosion

- Submersions, storms

- Pollutions

- Urbanization

Elements of context

Following ERIKA and PRESTIGE disasters, Europe awared the importance of coastal areas and recommended since 2002 to proceed detailed inventory of coastal areas.
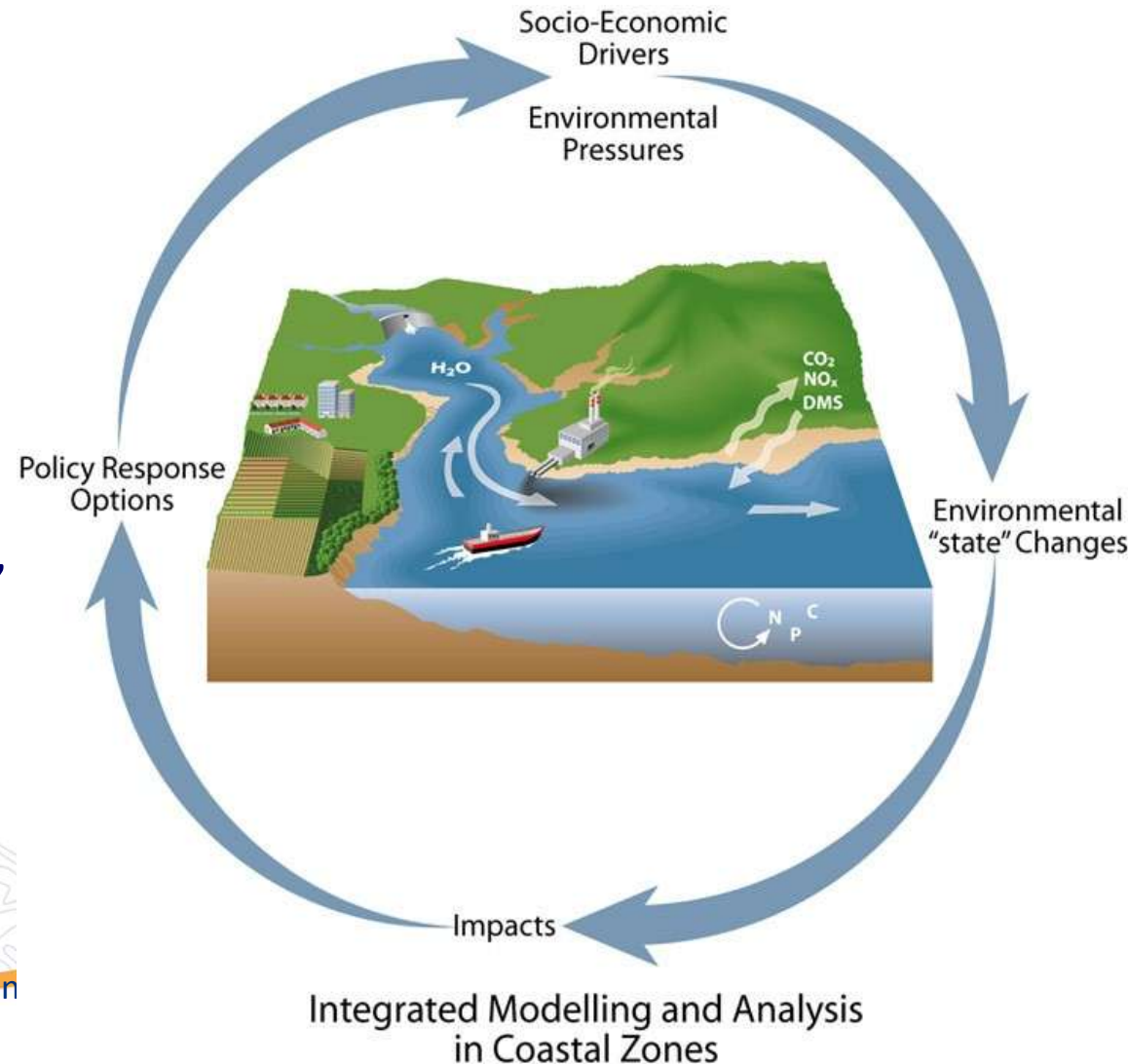
Also recommendations from EUROSION projet

Needs for geo-information

At national level:

- ecosystem protection,

- risks prevention,

- spatial planning,

- exploitation of resources,

- research and scientific studies,

- defence and national security,

- Integrated Coastal Zone
 Management (ICZM).

Socio-Economic Drivers

Environmental Pressures

Policy Response Options

H_2O

CO_2
NO_x
DMS

Environmental "state" Changes

Impacts

Integrated Modelling and Analysis in Coastal Zones

Needs for geo-information

For local collectivities:

- Coastal Act application within urbanism and spatial planning documents
- Protection against coastal erosion
- Harbours equipments construction
- Environmental protection for sensible areas
- Aquaculture, fisheries, seashore exploitation development
- Rescue plans (e.g. in case of submersion)
- Tourism attractiveness vs landscape conservation
- Recreation and leisure (beaches and nautical activities)

Needs for geo-information

French solution:
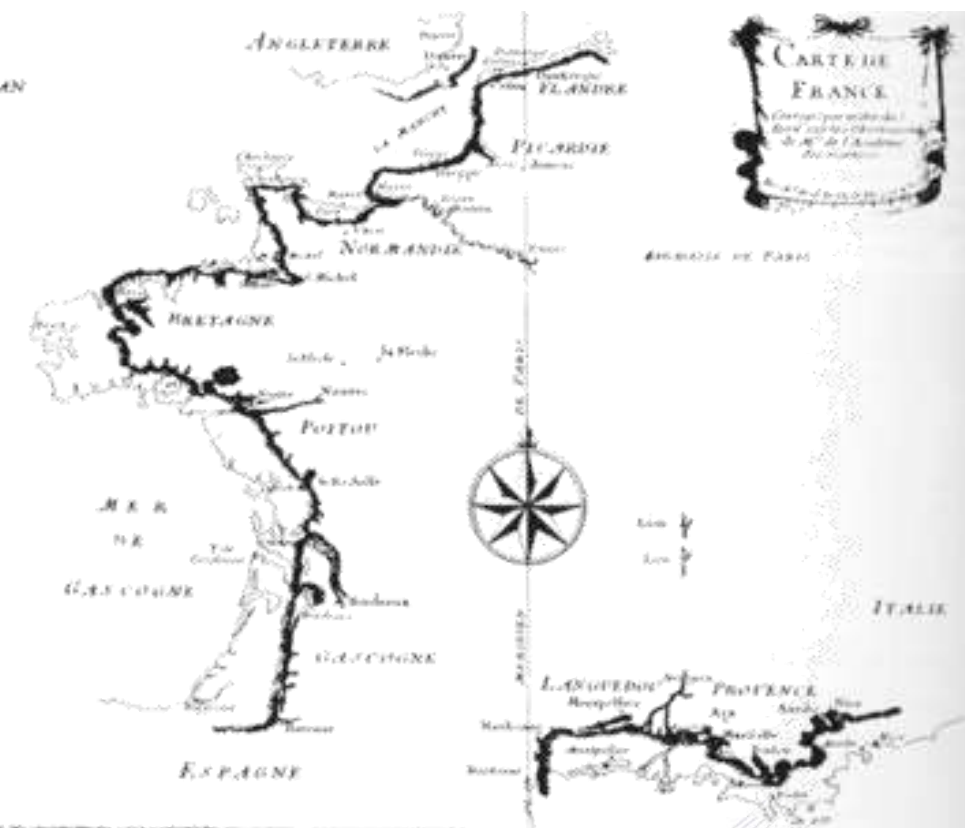
Decree of April 29th, 2003

IGN *and* **SHOM** *have* « to combine efforts for studying the best way to produce a Coastal Layer of Reference »

Référentiel Géographique Littoral (RGL)

Litto3D® – starting point

Nautical chart

Source SHOM

Topographic map

Source IGN
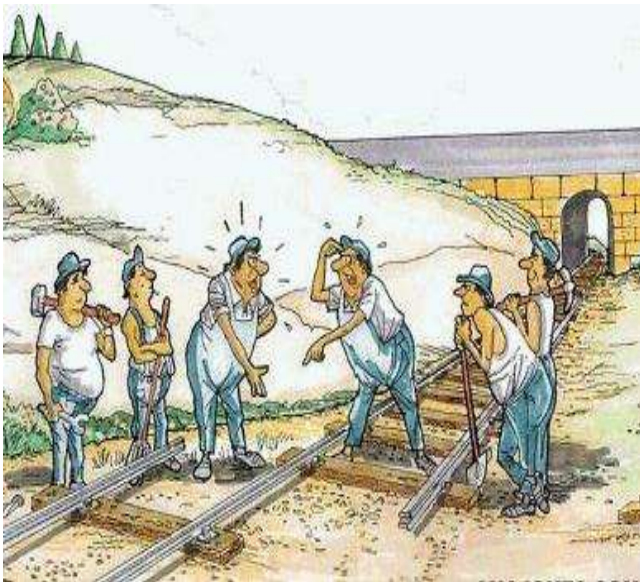
Litto3D® – mapping work

Merge to obtain product *SCAN Littoral®* without update
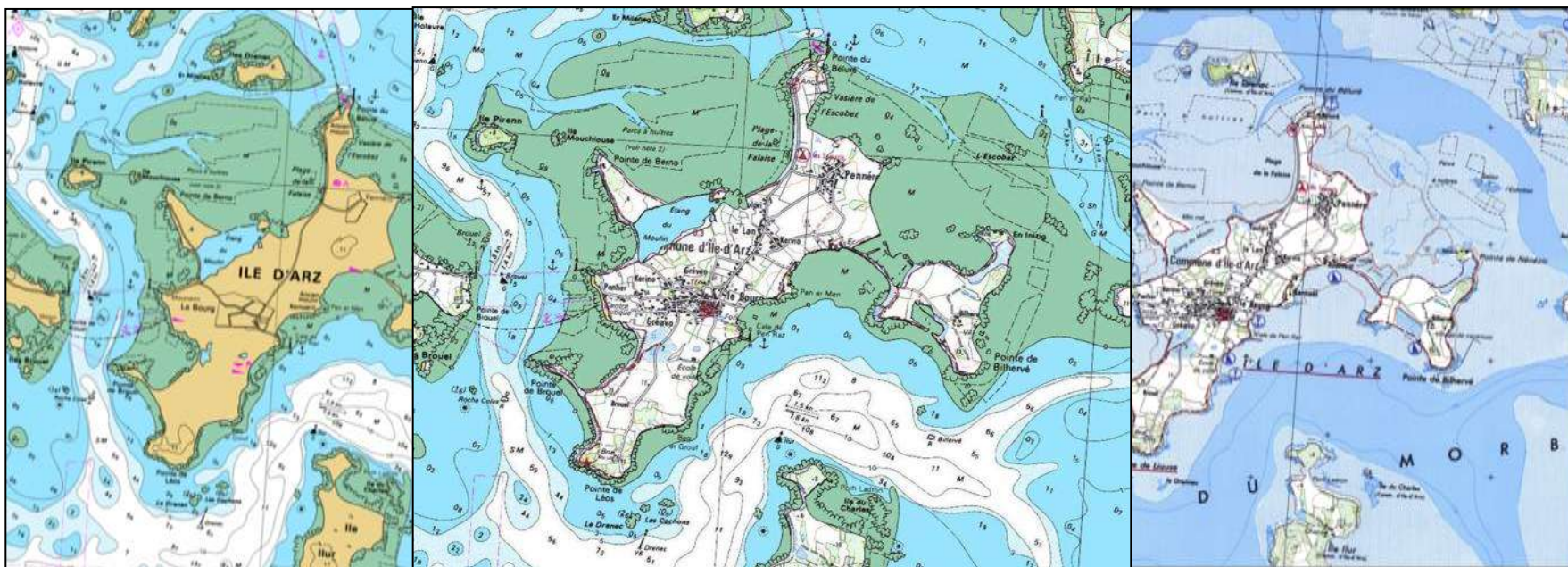
Litto3D® – updating work

SCAN Littoral®:

Automatized process <u>but</u> the combination of both maps of different sources led to alteration of accuracy of resulting map

A seamless product with homogeneous accuracy was required!
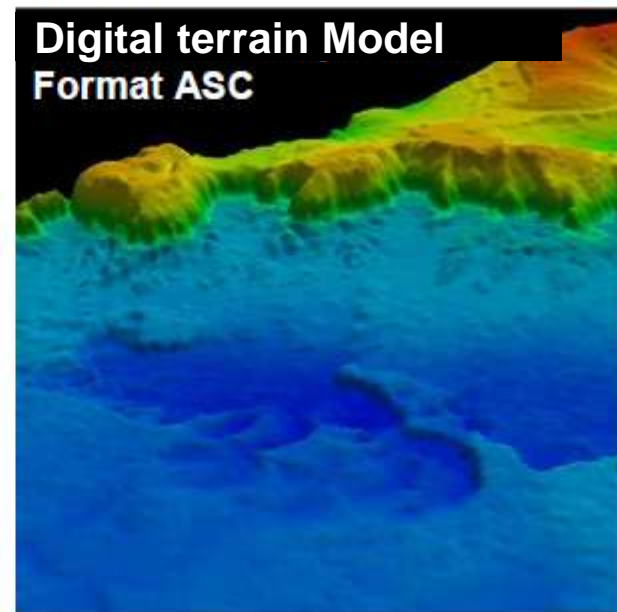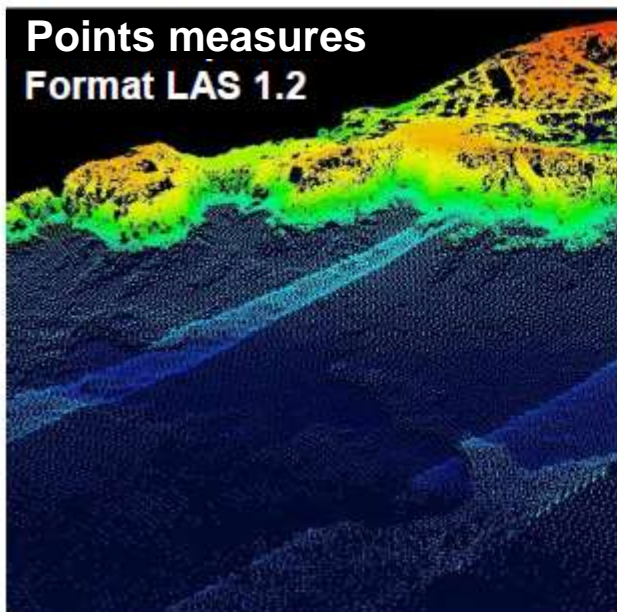
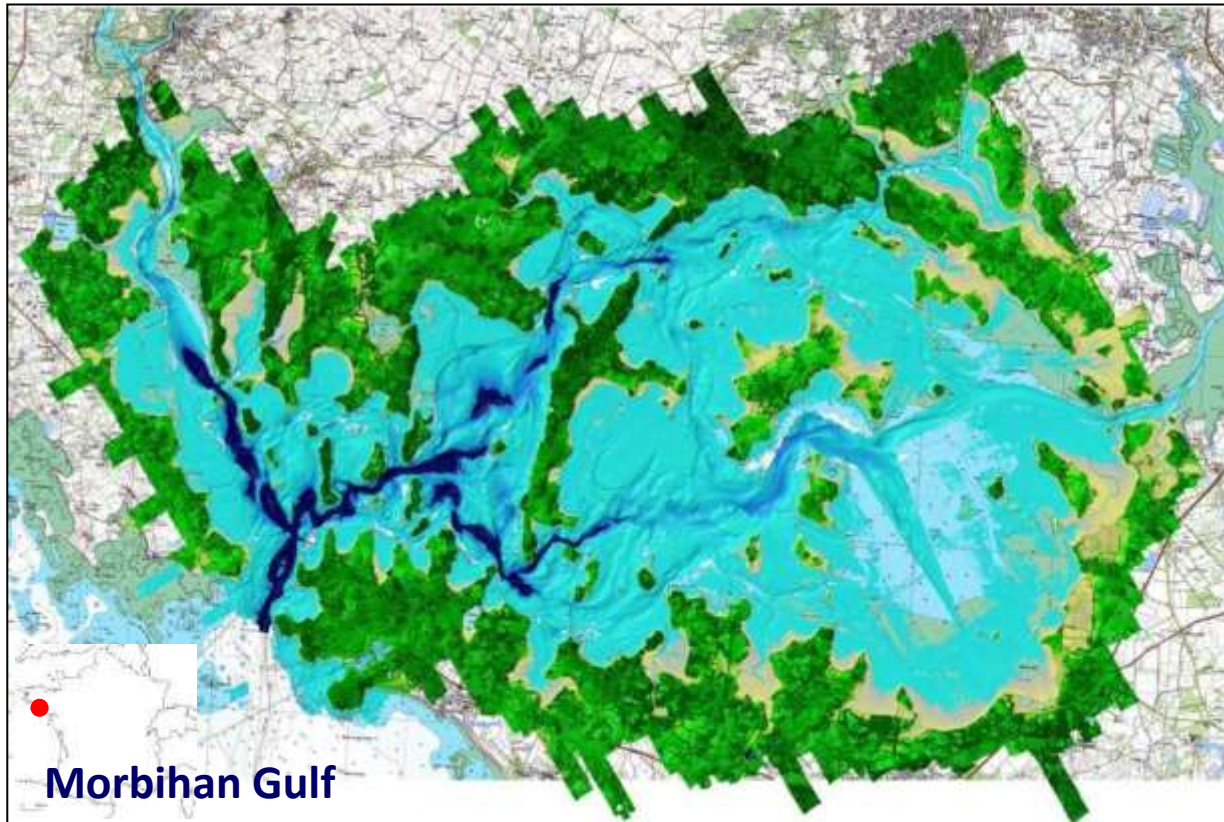New acquisition process was needed !

New acquisition process

Topography
Airborne topographique laser

Bathymetry

Multibeam sounder

Airborne bathymetric laser

Lowest astronomic sea level - coeff 120

Highest astronomic sea level - coeff 120

Sea area   **Intertidal zone**   **Land area**

Litto3D® – 3D data

Points measures
Format LAS 1.2

Digital terrain Model
Format ASC
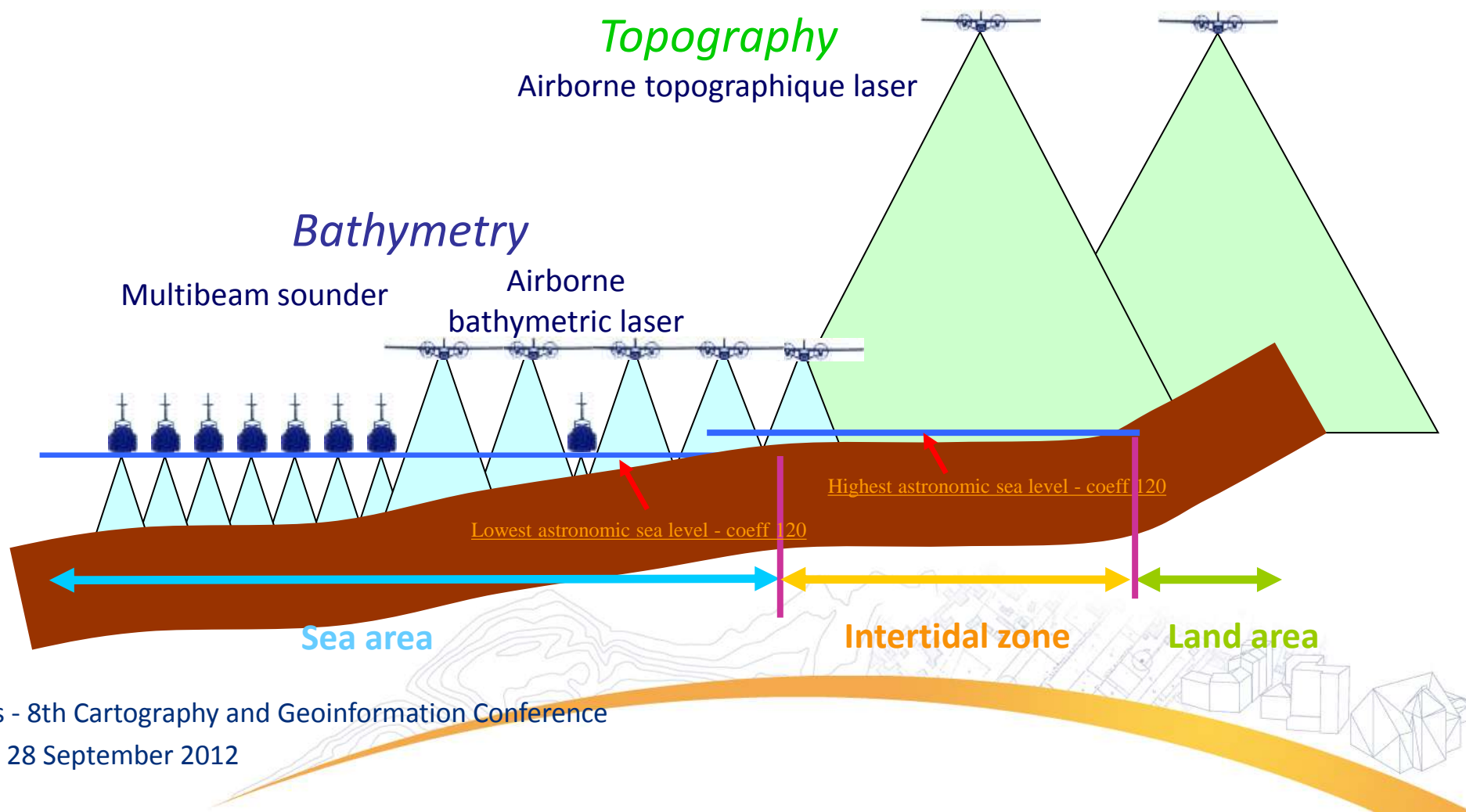
Litto3D® – Prototype results

Morbihan Gulf

Geographical extent Limited to:
- Landwards: 10m height, min 2 km
- Seawards: isobath 10m, min 2km

Reached accuracies:
landwards

> < 1 m   XY
> < 30 cm   Z

Delivered with metric resolution
Vegetation, building extraction

Seawards

> < 2 m   XY
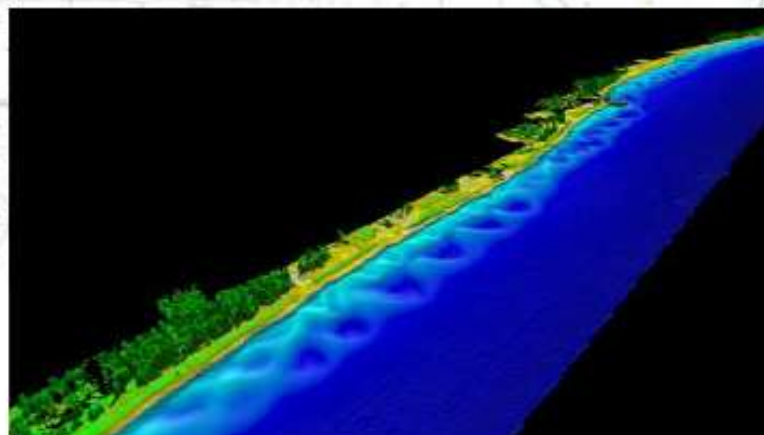> < 60 cm   Z

Delivered with 5 m resampled resolution

Litto3D® – Production

Languedoc-Roussillon
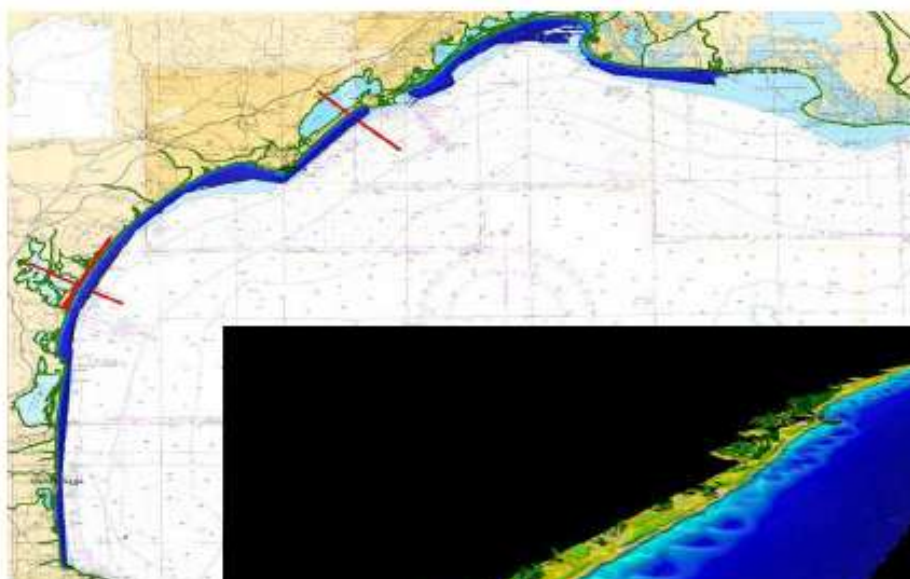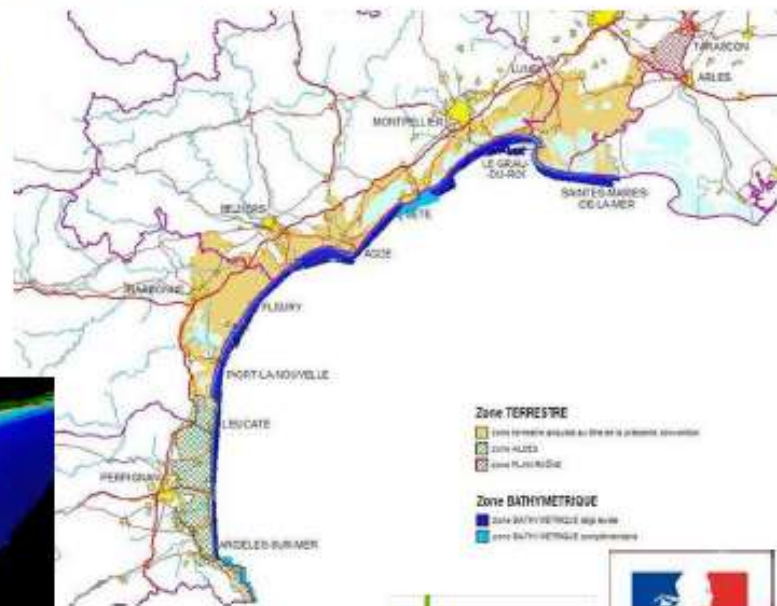
Litto3D® – Production

Var - ALDES

2010
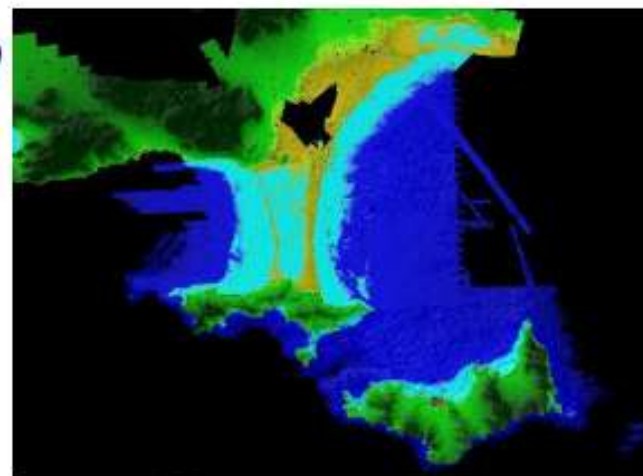
Litto3D® – ultra-peripheral departments

2010 - 2011

Guadeloupe

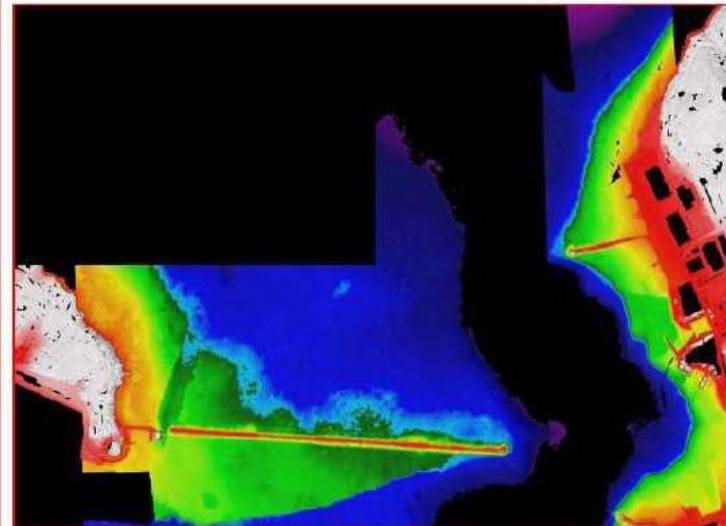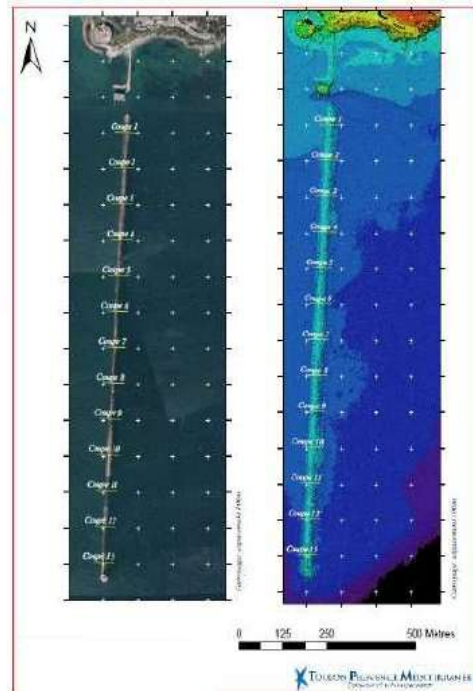**Martinique**

Réunion
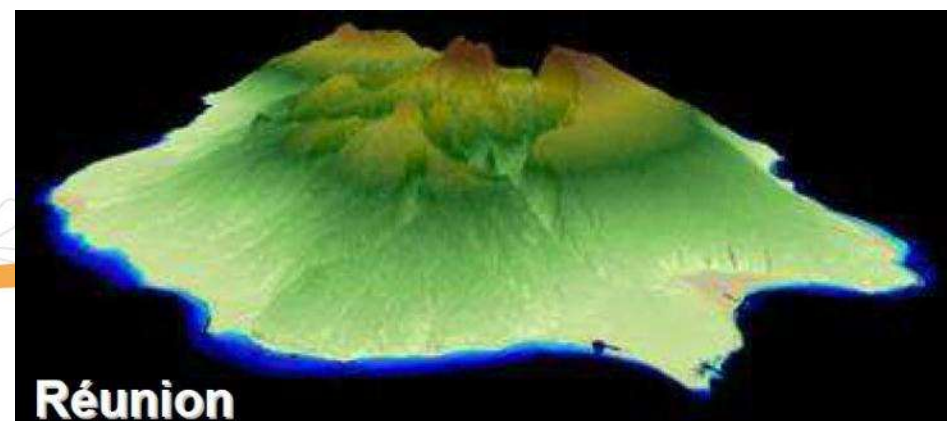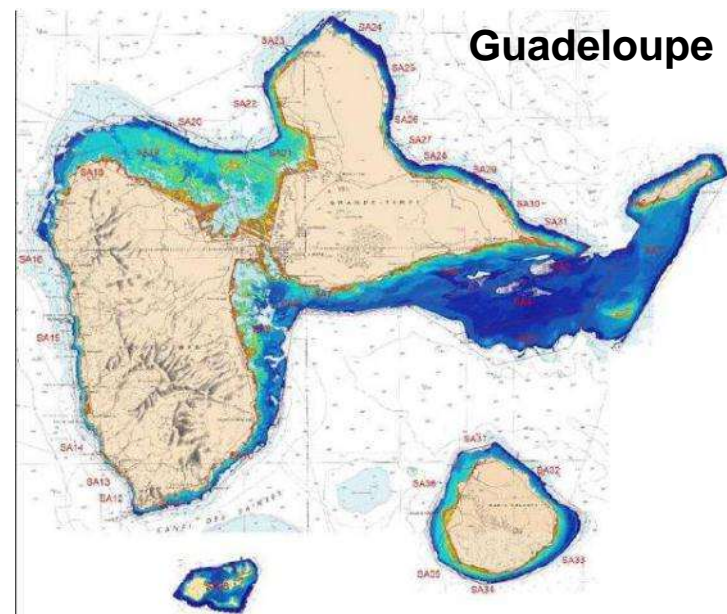
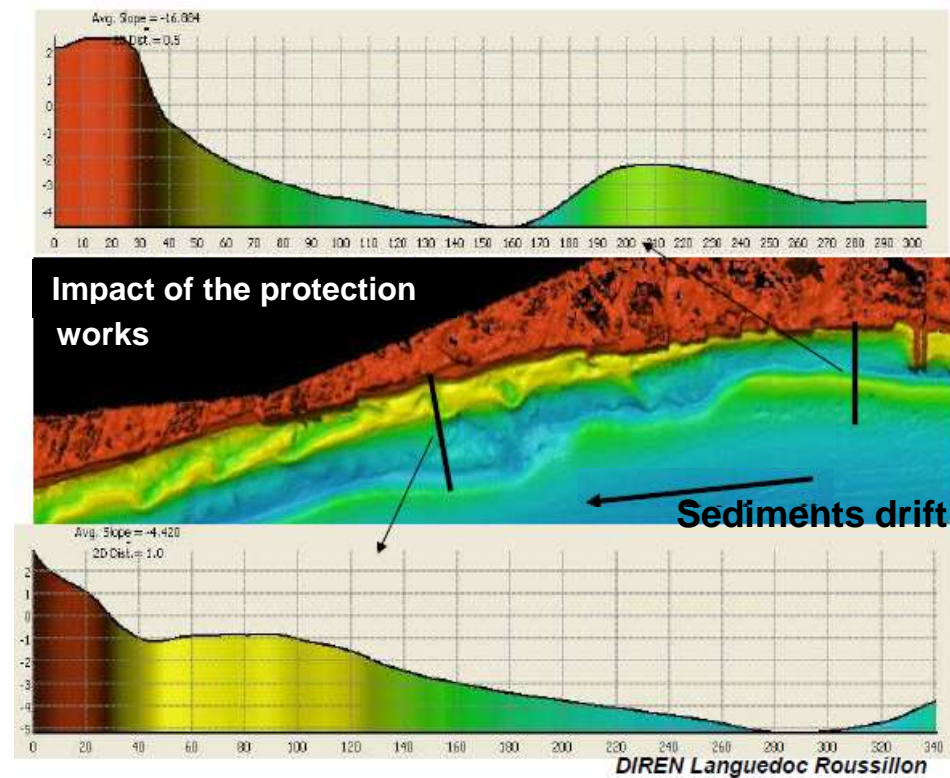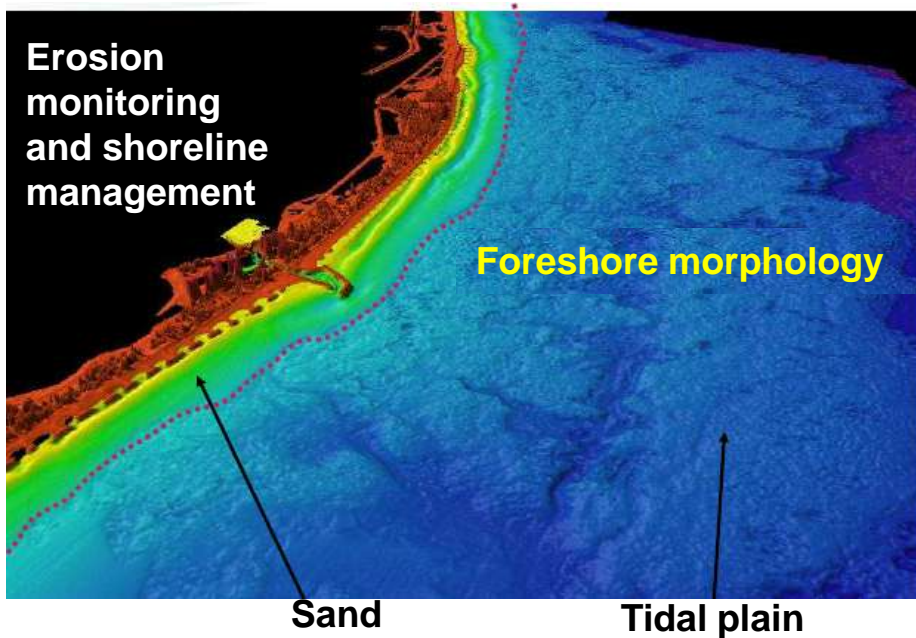# Litto3D® – other territories
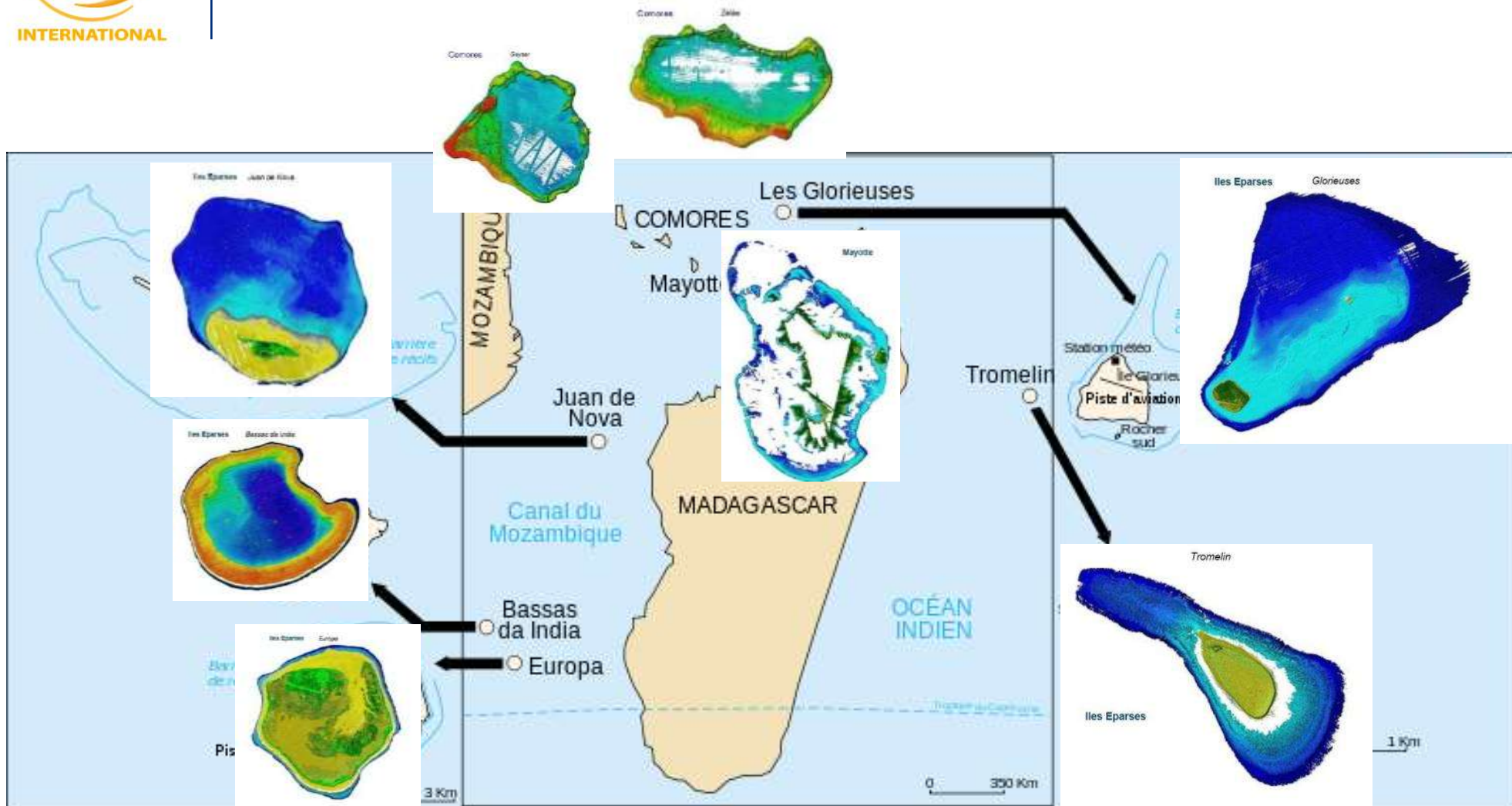
Litto3D® – exemple of application

Toulon: port infrastructures management

Reference data for the construction of Toulon' harbour great dyke.

Litto3D® – exemple of application

Erosion monitoring and shoreline management

Foreshore morphology

Sand

Tidal plain

Impact of the protection works

Sediments drift

DIREN Languedoc Roussillon
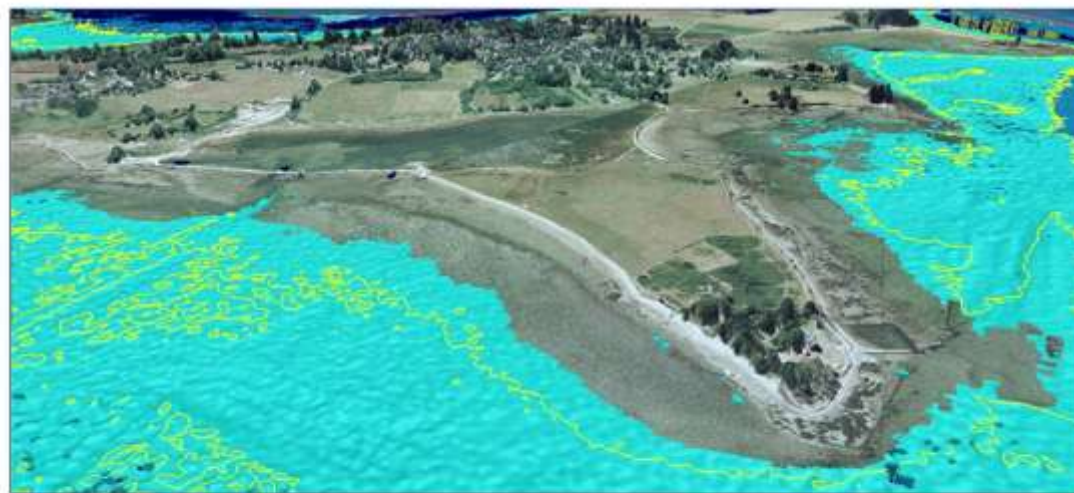
Litto3D® – exemple of application

Litto3D ®

Sea level rise simulation

Litto3D® – other applications

- **Public Maritime Domain perimeters delimitation**

- **Protection of environnement: maps of benthic habitats**

- **Pollutants sea dispersion**

- **Coastal risk prevention**

- **….**

Litto3D® Conclusion

- Funded by public money (EU funds, State, Regions, Departments, Local collectivities, IGN, SHOM)

- Provide geo information to address several EU directives (WFD, Flood, Maritime Milieu Strategy…)

- Obeying to INSPIRE principles
- Integrated as spatial layers of the French NSDI
- Display through www.geoportail.fr

- IGN – SHOM warrant of data acquisition, processing and quality
- IGN France International in charge of the promotion of this product worldwide

THANK You for your attention

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