



CalVal LiDAR

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Speakers: Benoit Laignel & Nicolas Picot

Calval LiDAR

Project: SWOT COTEST

PI: B. Laignel

LiDAR Flight over the Seine river estuary - October 15, 2017

Objectives

- Evaluate precision of the LiDAR measure on water
 - comparison with tidal-gauges on the estuary (in progress)
 - comparing the results with GPS points on the estuary taken by the boat campaign
- Improve the Seine estuary modeling by providing the precise topography of complex areas (small islands)
- Estimate roughness parameters on the Seine estuary
- Compare the LIDAR measures and the SWOT data of the simulator & improve the SWOT simulation

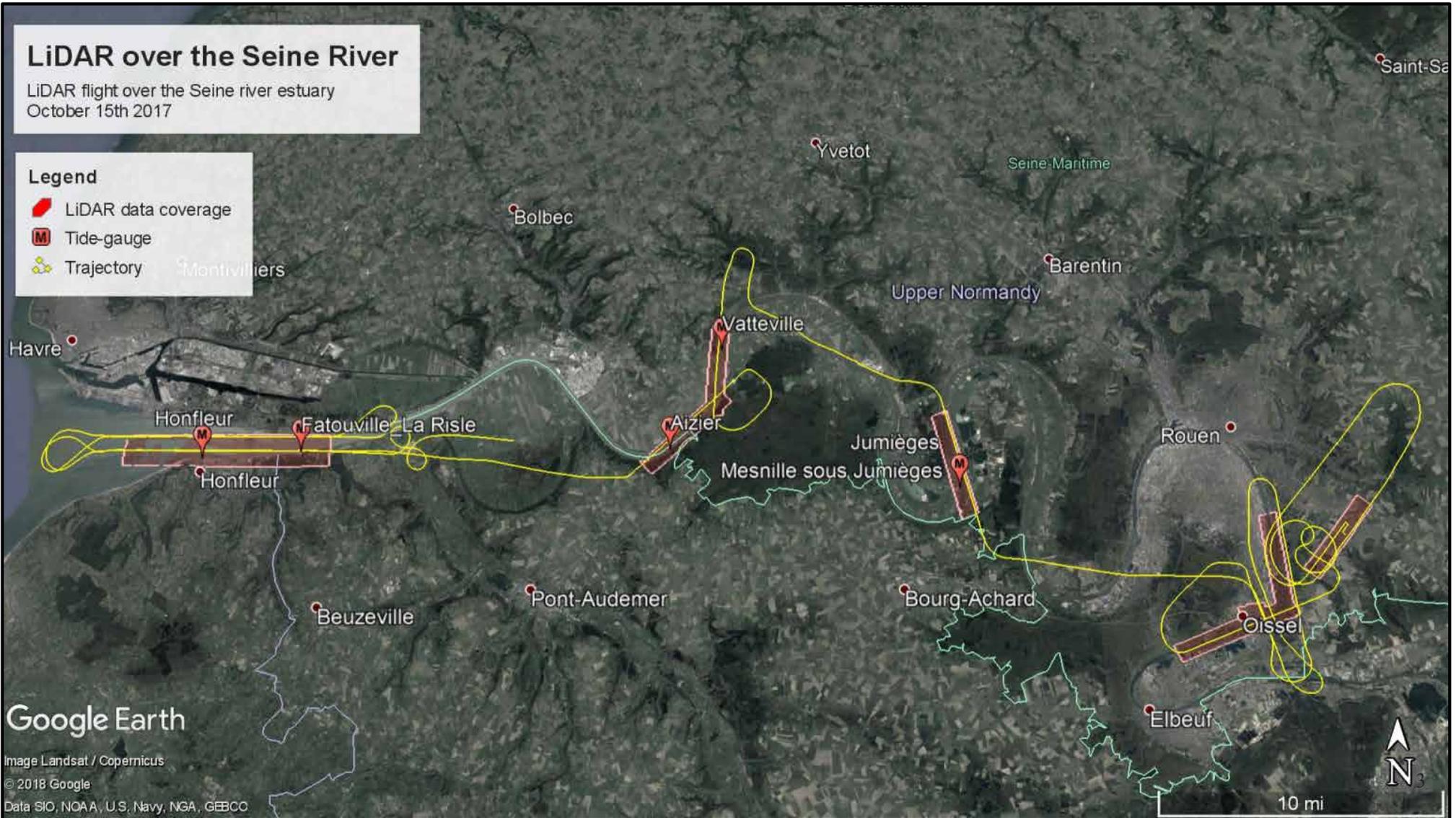


LiDAR over the Seine River

LiDAR flight over the Seine river estuary
October 15th 2017

Legend

-  LiDAR data coverage
-  Tide-gauge
-  Trajectory



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Flight

- Initially planned in June 2017 to acquire synchronous data with the GPS carpet boat campaign (INSU)
 - => postponed at the last minute due to change in weather conditions
- Flown in October 15, 2017 without the boat.
- Flight plan
 - Low altitude of 800 m to ensure accuracy of the sensor
 - Nadir centered on water to ensure maximum returns

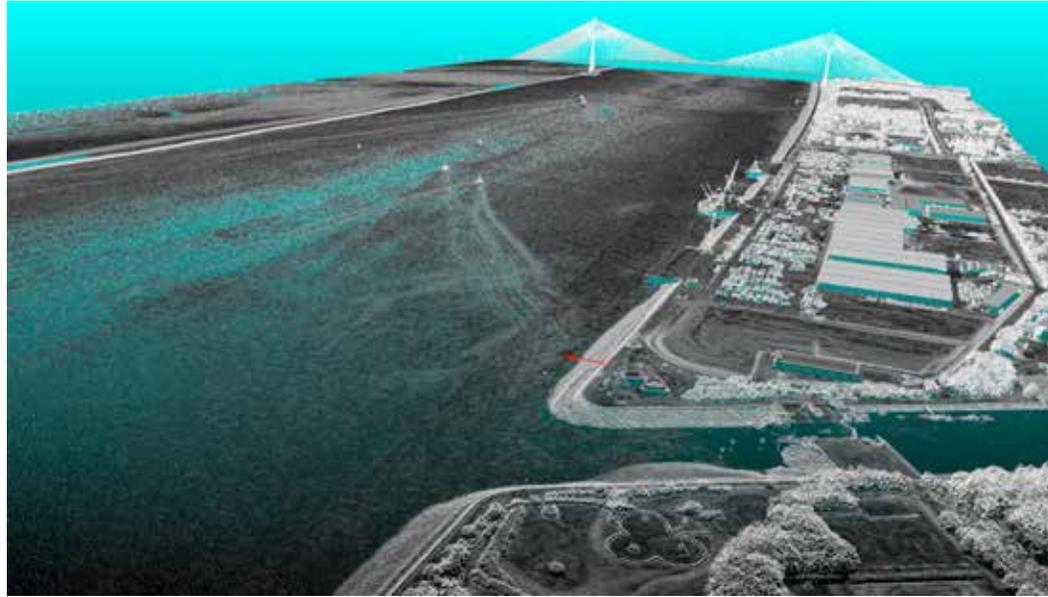
Processing

- 150 million measured points / 30 million on water
- Trajectory computed was based on DGPS receivers deployed on the field for the campaign
- DGPS points were taken on the ground at 4 different locations
- absolute georeferencing error of 5.3 cm in RMS



Top view of the tidal gauge pier in Honfleur (in red)

- The comparison with tidal gauges is in progress
- Future work will be to compare the LIDAR measurements and the SWOT data of the simulator

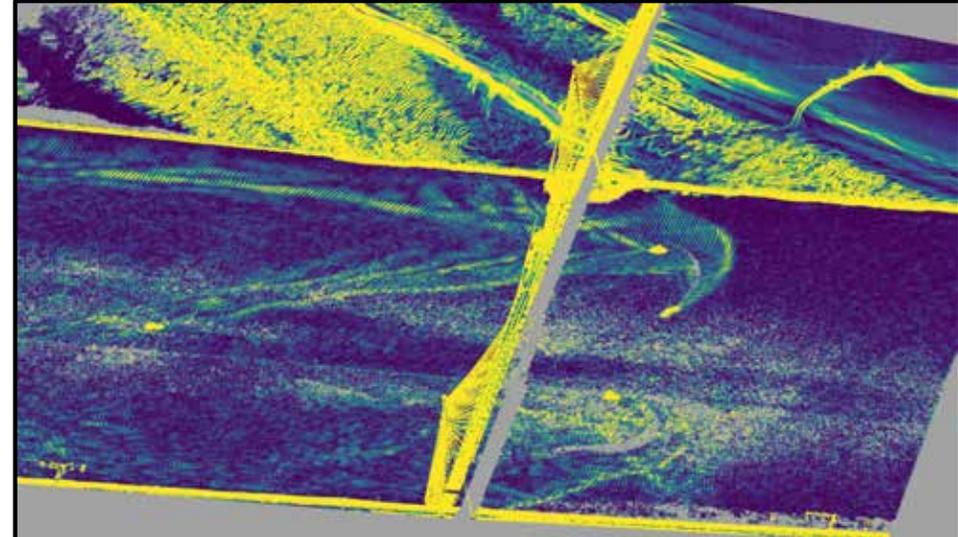
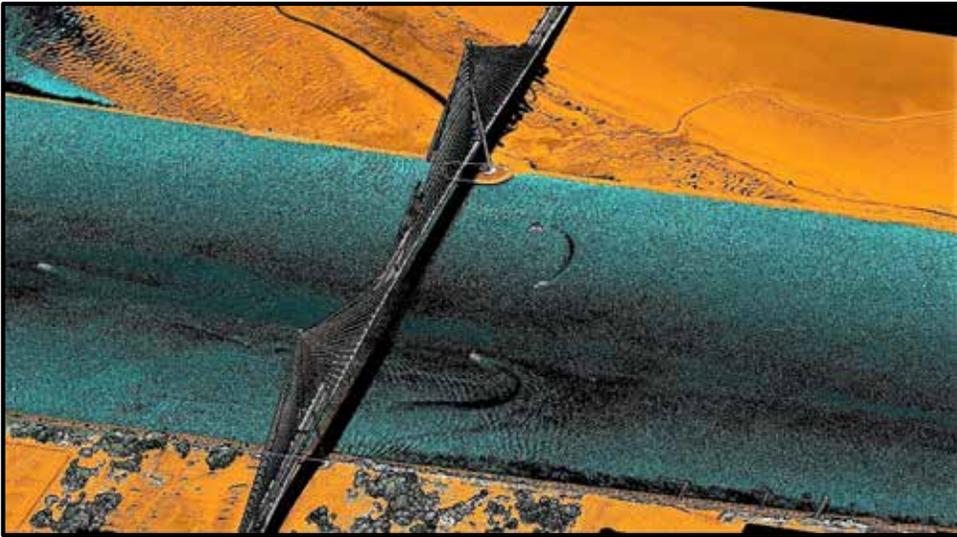


Calval LiDAR - Seine Estuary: Some results

Top: View on the tidal gauge pier in red (Honfleur city)

Left: view by class (water, ground, building, vegetation)

Right: 2 meter surface normal amplitude



Calval LiDAR

Project: BIOSWOT

PI: F. d'Ovidio

LiDAR / Hyperspectral flight over the Mediterranean

Objectives

- Evaluate the capacity of in-situ LiDAR data to measure SSH
- Improve 3D current modeling through in-situ sea surface topography
- Hyperspectral measure of the phytoplankton

Sensors

- LiDAR (Leica ALS60)
of the M2C laboratory of the universities of Caen & Rouen
coupled with a
- Hyperspectral camera (SPECIM AISA Eagle 1K / VNIR (400-970 nm))
of the IETR laboratory of the University of Rennes
(Hyperspectral team SHINE-TSI2M)



Top Left

Piper Navajo used for the LiDAR/Hyperspectral test flight on April 24, 2018

Top Right

LiDAR + Hyperspectral camera

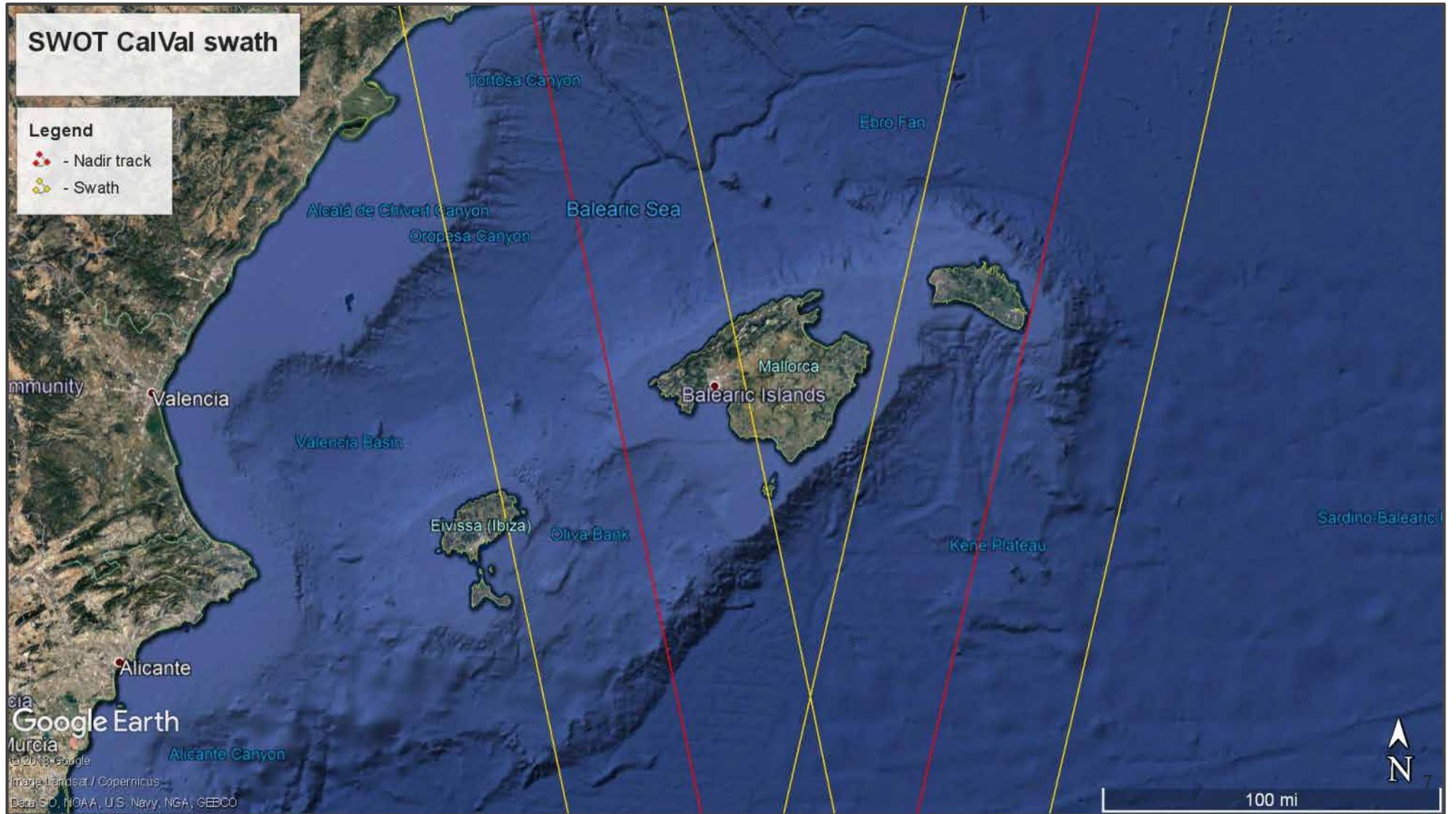
Bottom Right

Sensors installed on the plane

SWOT CalVal swath

Legend

- Nadir track
- Swath



Calval LiDAR

Project: BIOSWOT

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LiDAR / Hyperspectral flight over the Mediterranean

Involved team: 7 persons

1 professor, 3 engineers, 1 assistant engineers & 2 pilots

Josias Lefèvre (Research Engineer, IETR), Kacem Chedhi (Professor, IETR), Christophe Conessa (Engineer, CNRS), Laurent Benoit (Assistant Engineer, CNRS), Pixair Survey (2 pilots), Laurent Froideval (Research Engineer, CNRS)

Flights

- 2 flights
 - Scientific calval: hyperspectral measure coupled with LiDAR data over area of interest
 - Flight plan in a “comb” shape over the boat sampling area
 - Technical calval: flight over altimeter tracks
 - Sentinel 3A, Jason 3 or Cryosat 2
 - Flight plan
 - 150 km in straight line over altimeter tracks, flown 4 times (2 round trips)



Examples of groundtracks selection

In green: possible altimeter tracks for Cryosat 2 in the airport range (Port Mahon, Minorca)

Blue circle: Possible range for the local transit depending on the total flight time

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LiDAR / Hyperspectral flight over the Mediterranean

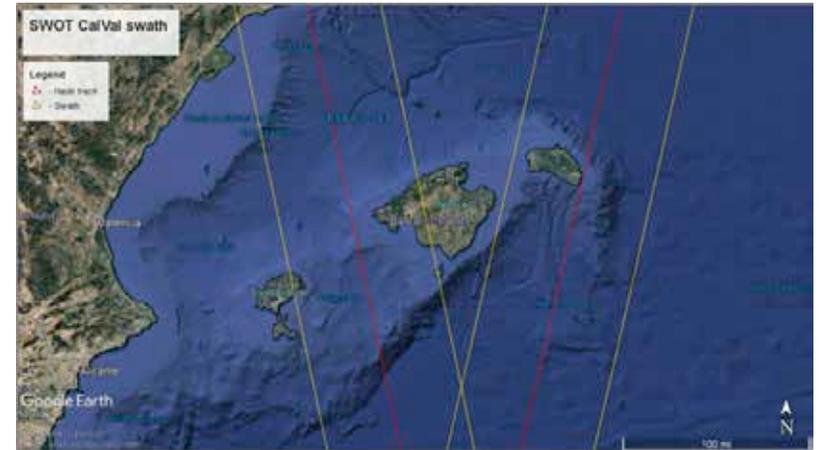
- Originally planned for beginning of May 2018, these flights were canceled due to weather forecast not compatible with LiDAR / Hyperspectral sensors
- First test flight of this coupled system in April 24, 2018, in Normandy in the Seine estuary & wetlands
 - flight was successful
 - fine processing of the coupled data is still in progress



FUTURE

New LIDAR/hyperspectral campaign to replace the Mediterranean campaign ?

In the same or other location

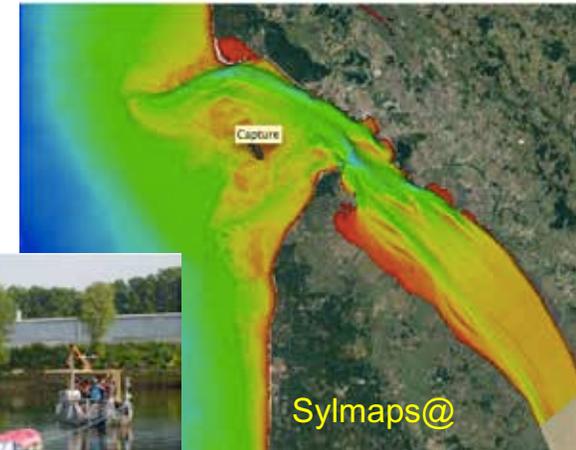
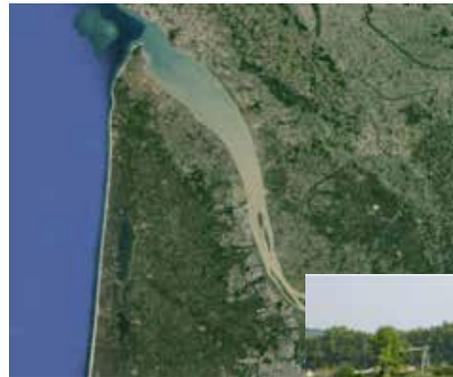


Other LIDAR campaign in estuary ?

Maybe in the same time of the GPS carpet
boat campaign in the Gironde estuary...

By LEGOS & INSU (COCTO project, N. Ayoub)

To plan



SWOT



Thanks

