

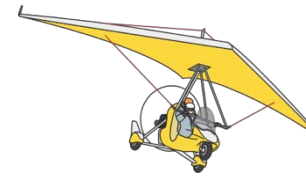


SWITCH platform Leman Baikal Project

M. Cubero-Castan, D. Constantin, Y. Akhtman

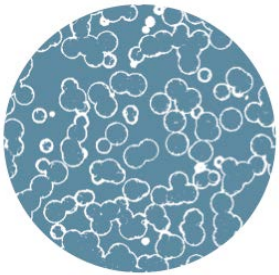
EPFL/TOPO

Scientific motives



Why compare Lake Geneva and Lake Baikal?

- large lakes of great regional importance
- complex hydrological, biological and chemical dynamics
- high anthropogenic pressure



What are we trying to learn?

- water circulation dynamics
- interactions on land-water and air-water interfaces
- transport of pollutants
- pollution impact on ecosystems

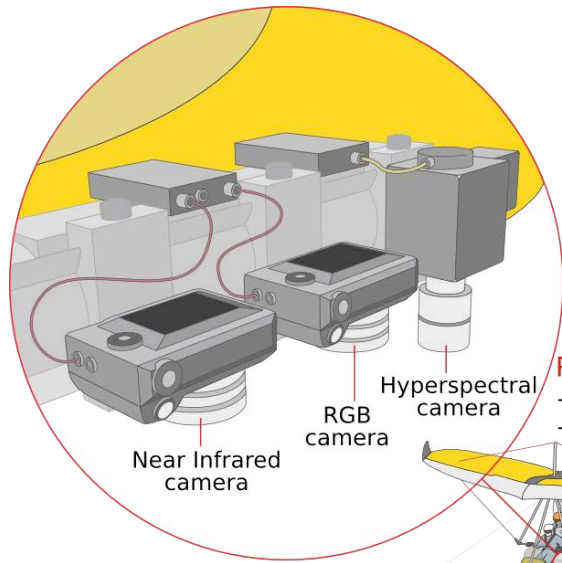


Why use ultralight aircraft?

- versatility, robustness and ease of exploitation
- accessibility for the mounting of scientific payloads
- low exploitation cost

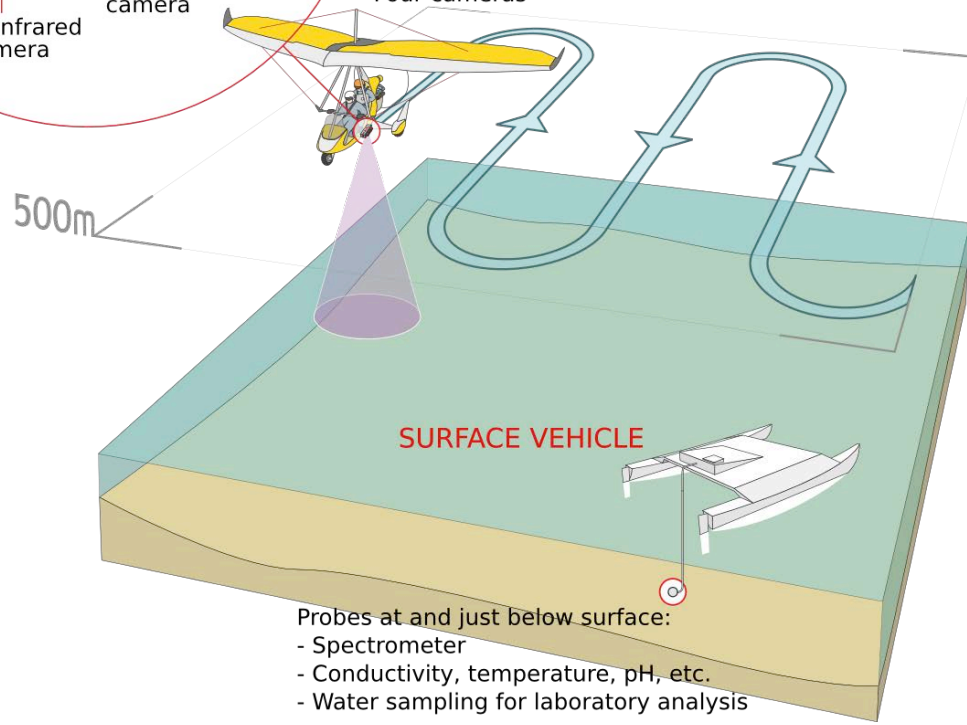


Data acquisition methodology



REMOTE SENSING ULTRALIGHT

- GNSS/INS georeference platform
- Four cameras

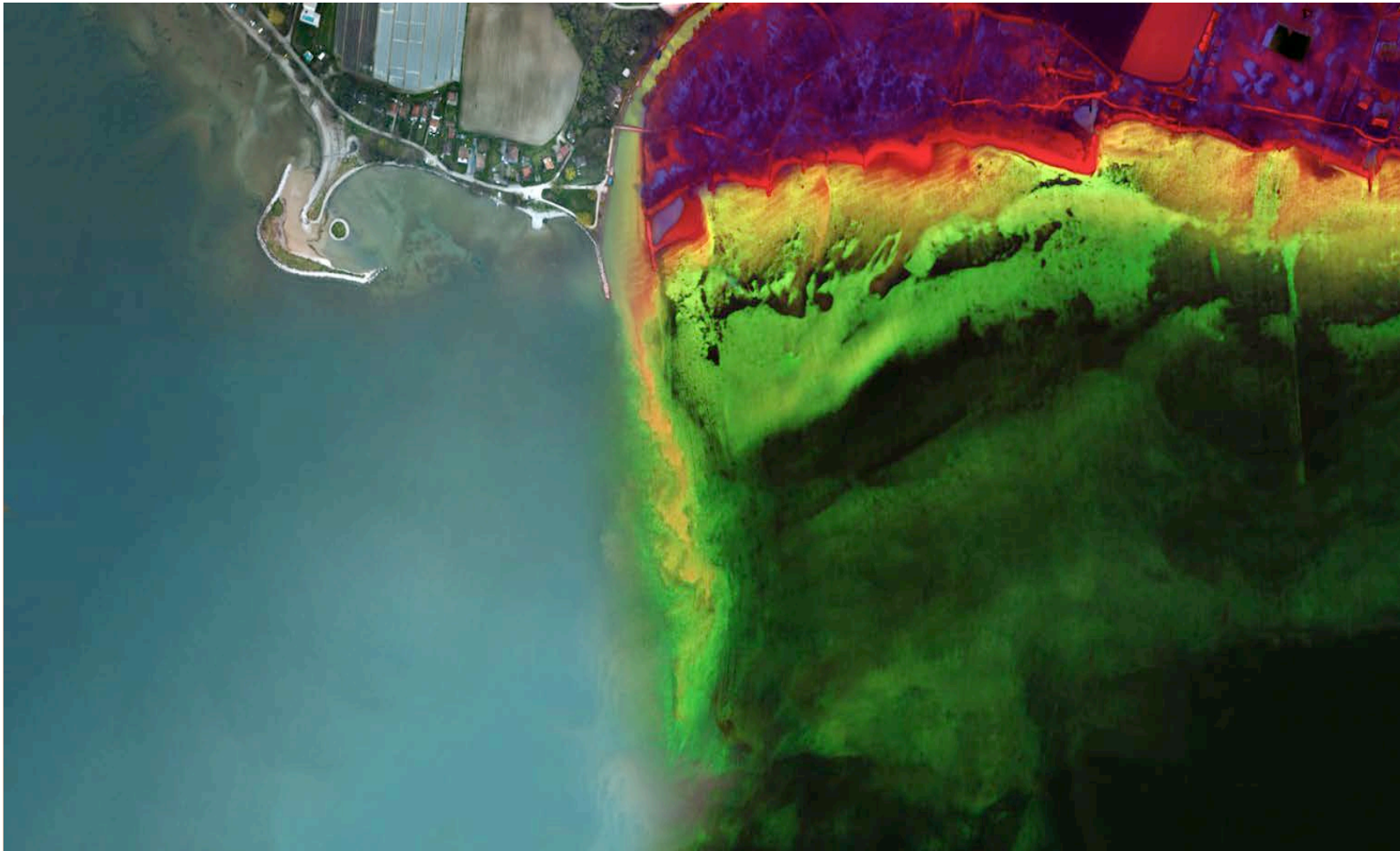
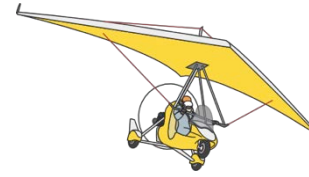


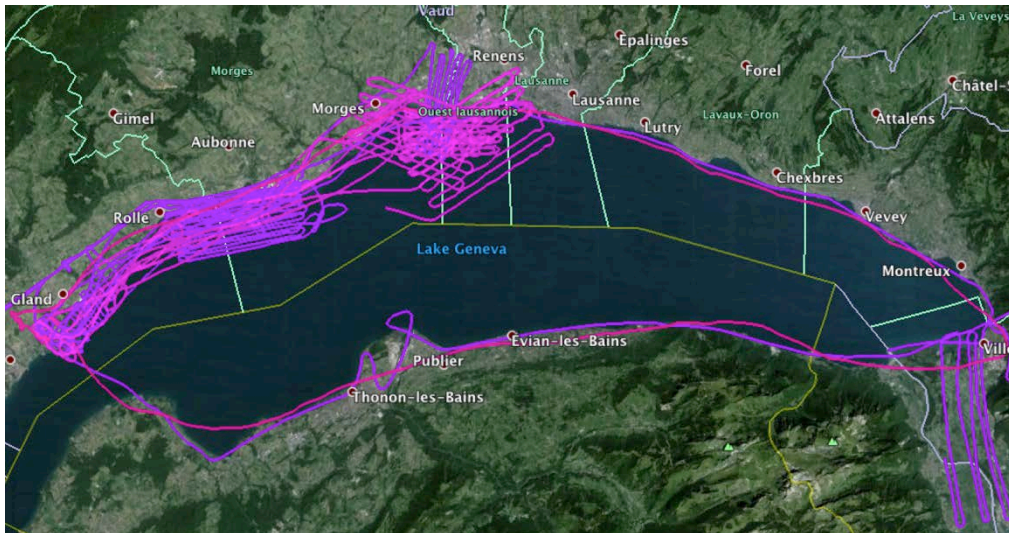
SURFACE VEHICLE

Probes at and just below surface:

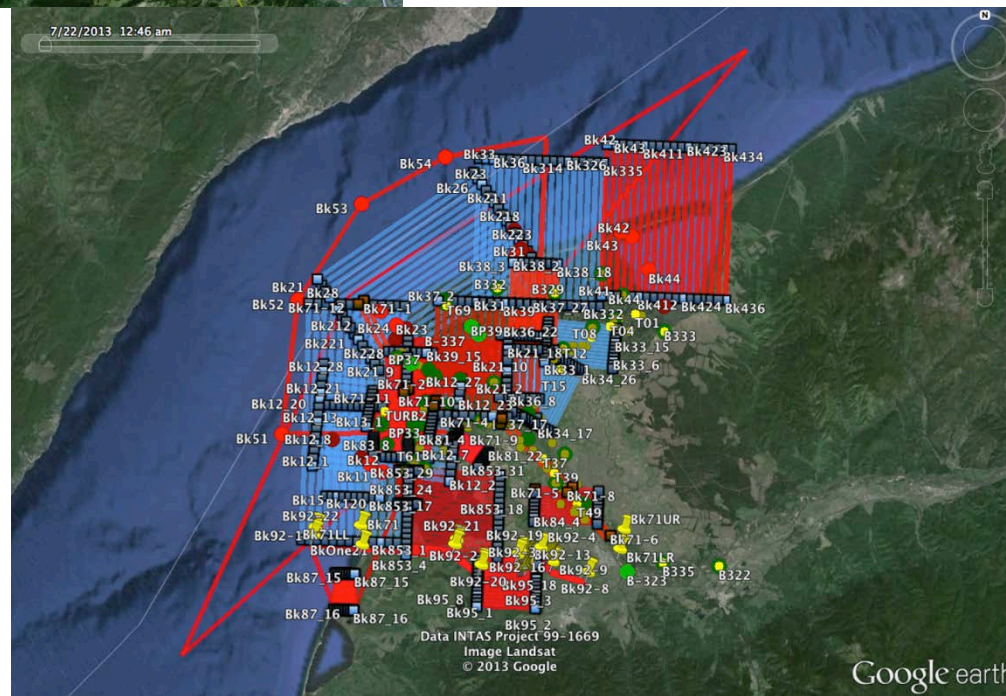
- Spectrometer
- Conductivity, temperature, pH, etc.
- Water sampling for laboratory analysis

Hyperspectral imaging



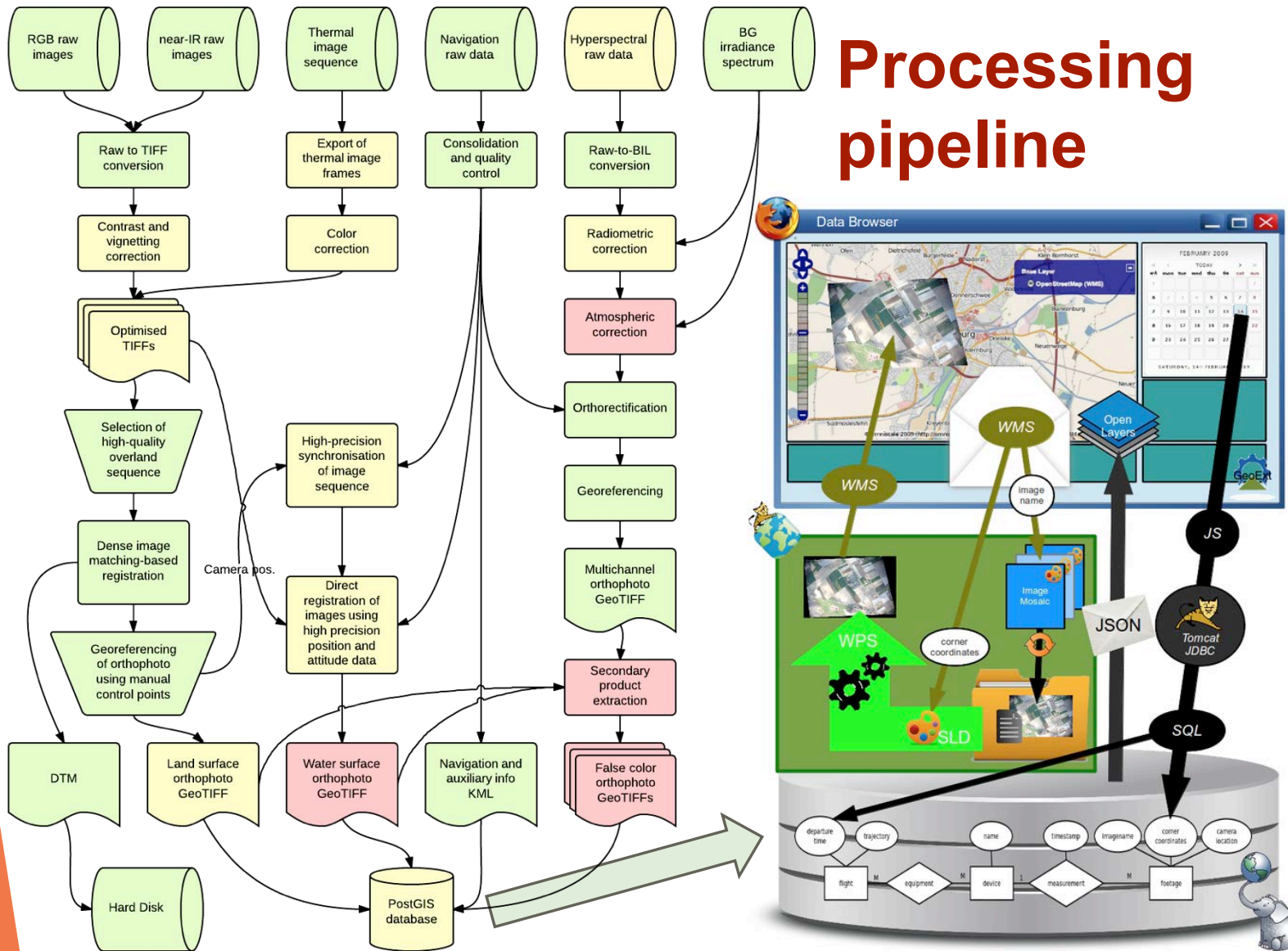


- 11 flights on Lake Geneva
- 10 flights between Geneva and Pskov
- 32 flights on Lake Baikal
- 7,700 km of data
- 2,000 km²
- 83 hours of air time
- 120 ground sampling sites
- 580,000 images
- 15,000,000 hyperspectral lines
- **total of 7 TB of raw data**

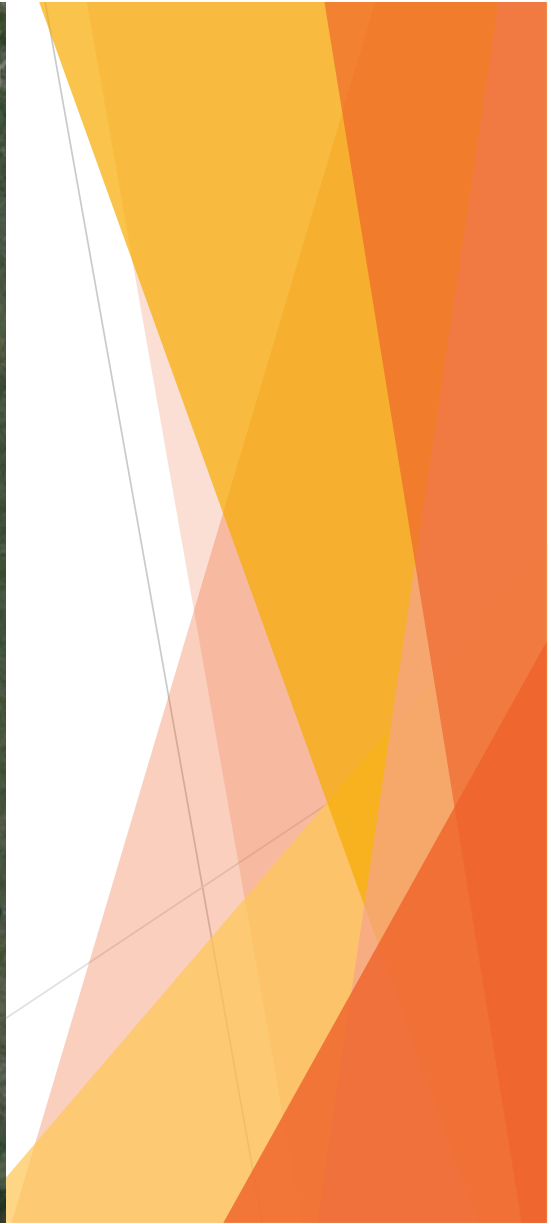
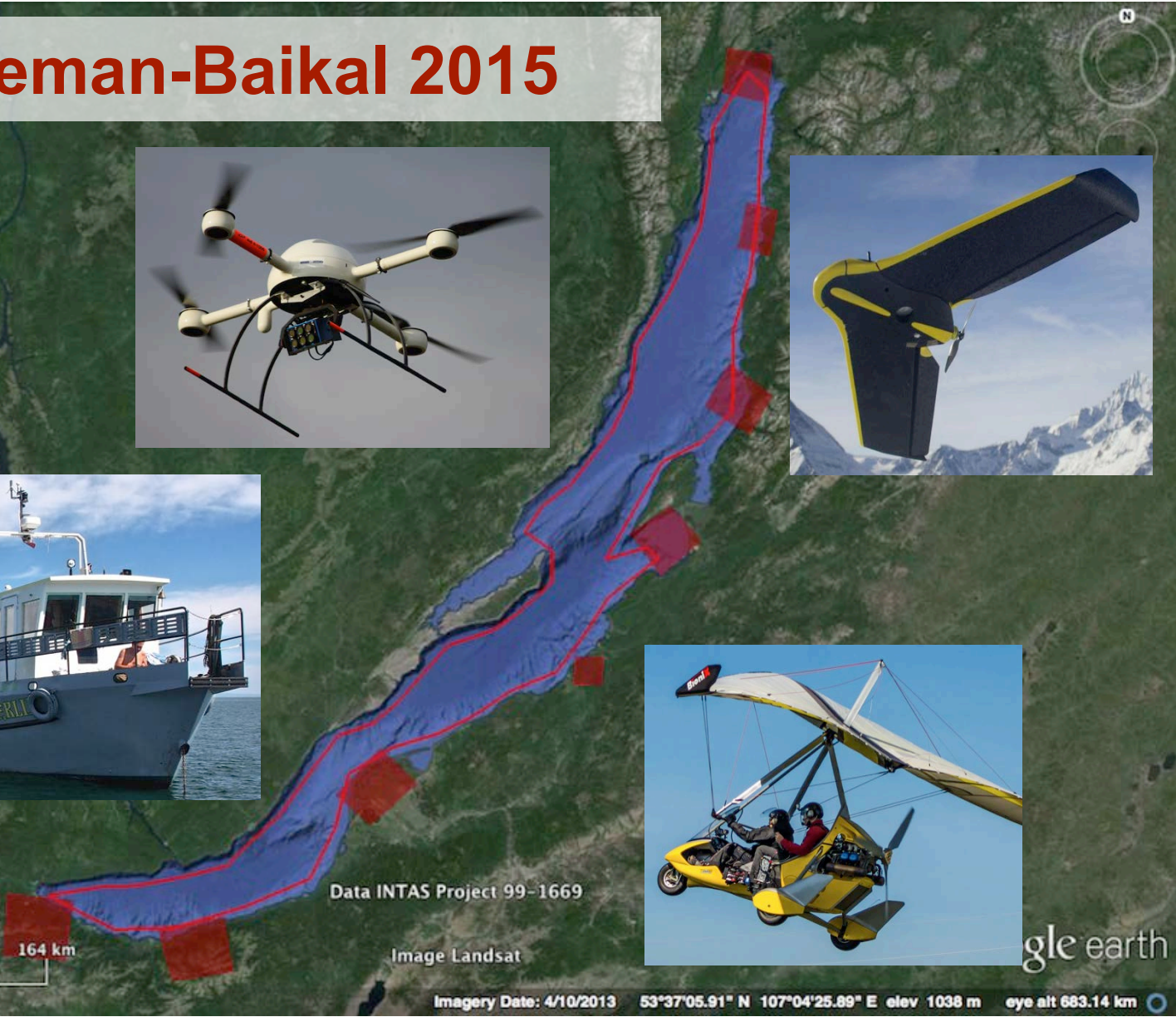


Google earth

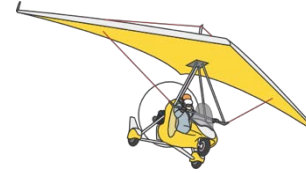
Processing pipeline



Leman-Baikal 2015



Processing power needs



- Data size
 - 7 TB of raw data – 1 flight = ~ 50-100 GB
- Processing steps
 - Preprocessing - MATLAB
 - Orthoprojection – Agisoft Photoscan, WorldWind (custom software)
- Current processing power (per machine, 3 machines)
 - GPU: GeForce / Quadro for OpenCL processing
 - CPU: 12 cores – Intel i7 / Xenon
 - 64 Gb RAM
- Desired processing power
 - 32+ cores
 - 32-64+ Gb RAM
 - Licences? (Matlab in particular)

