

OCTOBER 12, 2020

Downstream processing of open source satellites images



Enhancing efficiency by making geospatial intelligence actionable and affordable



Benoît Deper – Founder & CEO

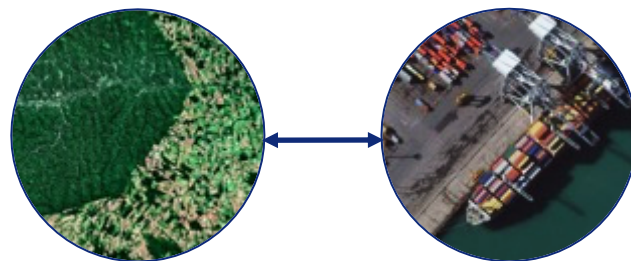
Why Geospatial Intelligence?

Observing the full picture



Large scale

Small scale *



Long time-scale

Short time-scale **

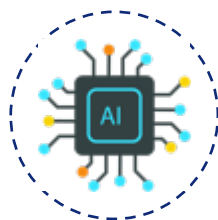
A World of Applications



Forestry, Agriculture, Defense, Security, Maritime, Insurance, Finance...

* Depending on resolution
** Depending on revisit frequency

Our fullstack solution



Actionable Intelligence

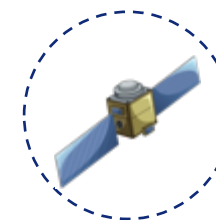
We provide **actionable Intelligence (Strategic, Economic & Environmental)**, using Artificial Intelligence and Machine learning on our proprietary satellite datasets.



Empowered by Data

Earth Observation imagery, acquired through our satellites, with a focus on:

- **Very high resolution**
- **Revisit frequency**
- **Rapid tasking and delivery**



Enabled by Satellites

Data is gathered through our proprietary constellation of **small satellites** (75 to 150 kg).

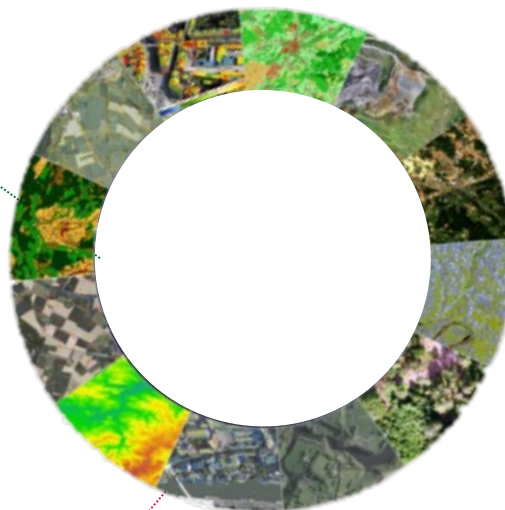
Satellites platforms are also made **commercially available** for external customers.

Bringing Geospatial solutions to your expertise

Supporting Governments, Agencies and NGOs in:

Environmental Intelligence

- Monitoring climate change impact
- Fighting illegal deforestation
- Securing food production and distribution
- Responding to natural disasters
- Detecting green house gas emissions
- Detecting oil spills



Supporting financial analysts, investors, traders and insurers:

Economic Intelligence

- Estimating commodities inventory levels
- Estimating manufactured products inventory levels
- Detecting unusual activities
- Monitoring infrastructures and plants of interest
- Optimizing supply chains and operations
- Making better-informed business decisions
- Making more sustainable investing strategies

Supporting Defence and Security analysts in:

Strategic Intelligence

- Monitoring critical infrastructures
- Detecting threats
- Conducting Situational and functional mapping
- Detecting impactful changes
- Forecasting possible outcomes

* Depending on resolution
** Depending on revisit frequency

Demo (wish me luck 😊)

How Aerospacelab used a **Change Detection** algorithm to unlock strategic insights from ESA's **Sentinel-2** multi-spectral images ?

Aerospacelab developed a model to **detect changes** on a **pair of images** based on a combination of two approaches using **AI** and **computer vision**.

With a GSD of 10m at best, images from Sentinel-2 allow us to detect only **major changes** but with a **high frequency** thanks to the high revisit frequency of those satellites.

Use Case 1

Detecting strategic sites
that have been damaged or
destroyed

SITUATION

We would like to monitor strategic assets such as nuclear facilities.

PROBLEM

Without automation this task quickly becomes tedious and error prone.

IMPLICATION

Resources are wasted since most of the time, nothing happens.

SOLUTION

We used the Change Detection algorithm to automate the task.

Use Case 1



Area of Interest: Natanz
Nuclear facility

BEFORE



AFTER



Use Case 1

CHANGE DETECTION RESULTS



Change Detection
Algorithm



Change mask

CONFIRMATION ON HIGH RESOLUTION IMAGE



Mystery swirls
around explosion
at Iran's Natanz
nuclear facility

"An explosion at the heart of Iran's nuclear programme in the dead of night. An obscure group called the Cheetahs of the Homeland takes credit for it. Then there are fires and gas leaks at key infrastructure around the country." Financial Times

Use Case 2

Detecting the location of
new strategic sites such as
air missile radars

SITUATION

We would like to locate an air missile radar that we know has been built recently in Iran.

PROBLEM

We don't know its location and the search area is too large: $\sim 9000 \text{ km}^2$

IMPLICATION

We spend hours to look for it manually or we don't act on the intel.

SOLUTION

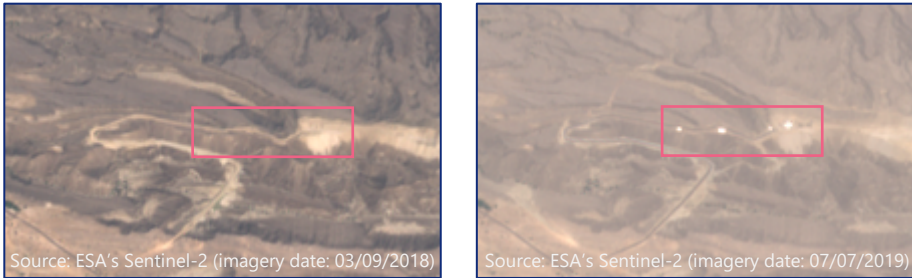
We used the Change Detection algorithm to narrow down the search area.

Use Case 2

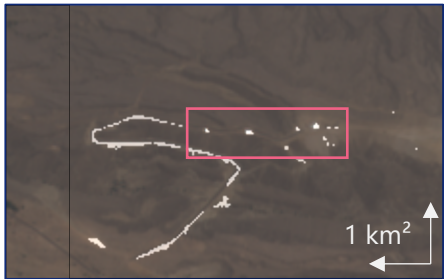


Use Case 2

CHANGE DETECTION RESULTS

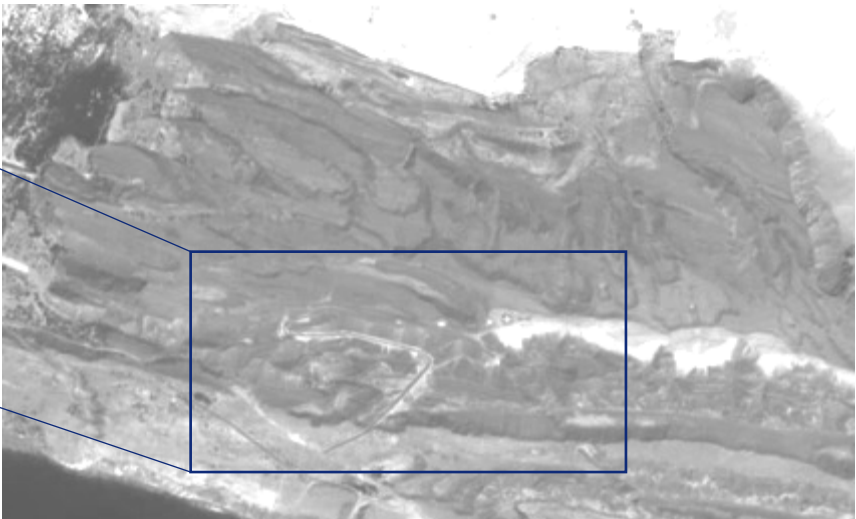


Change Detection
Algorithm



Change mask

CONFIRMATION ON HIGH RESOLUTION IMAGE





Jobs!

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