



Monitoring of large scale soil displacement

Using of satellite data to support risk-based
and data-driven soil inspection



200.000.000

tonnes of sand and soil
moved annually in NL

Soil Displacements



- Clear and Prepare construction sites
- Agricultural Activity
- Infrastructural Projects

Illegal displacements



- Bypass Dutch “soil passport” system
- Hiding heavily polluted “industrial” soil
- Exploit organized crime networks for cheap disposal



200.000.000

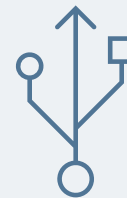
tonnes of sand and soil
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Inspection agencies under pressure



- Increasing workload
- Personnel shortages
- Administrative burden

Data driven ambitions



- Moving towards a digital strategy
- A lot of manual inspection
- No insights on activities

How can inspection agencies more effectively and efficiently monitor
environmental risk locations?

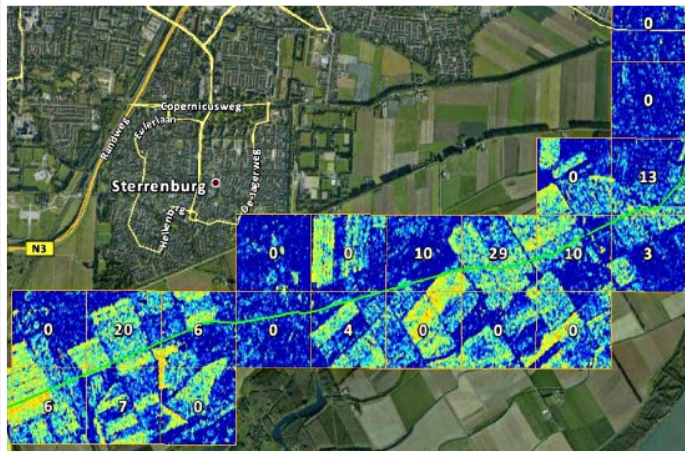


On the use of satellite data

TerraVisie combines several sources of satellite data to map (unreported) large ground movements.

Radar (SAR) data

- Radio waves converted into images
- Low resolution: pixels ~10m
- Not sensitive to clouds
- Freely available
- Difficult to interpret



Change detection

+

High resolution optical images

- 'Ordinary' photos in RGB
- High resolution: pixels <50cm
- Sensitive to clouds
- Limited availability
- Easy to interpret



Depot recognition

How it works

With TerraVisie you can monitor your area of interest in two simple steps:

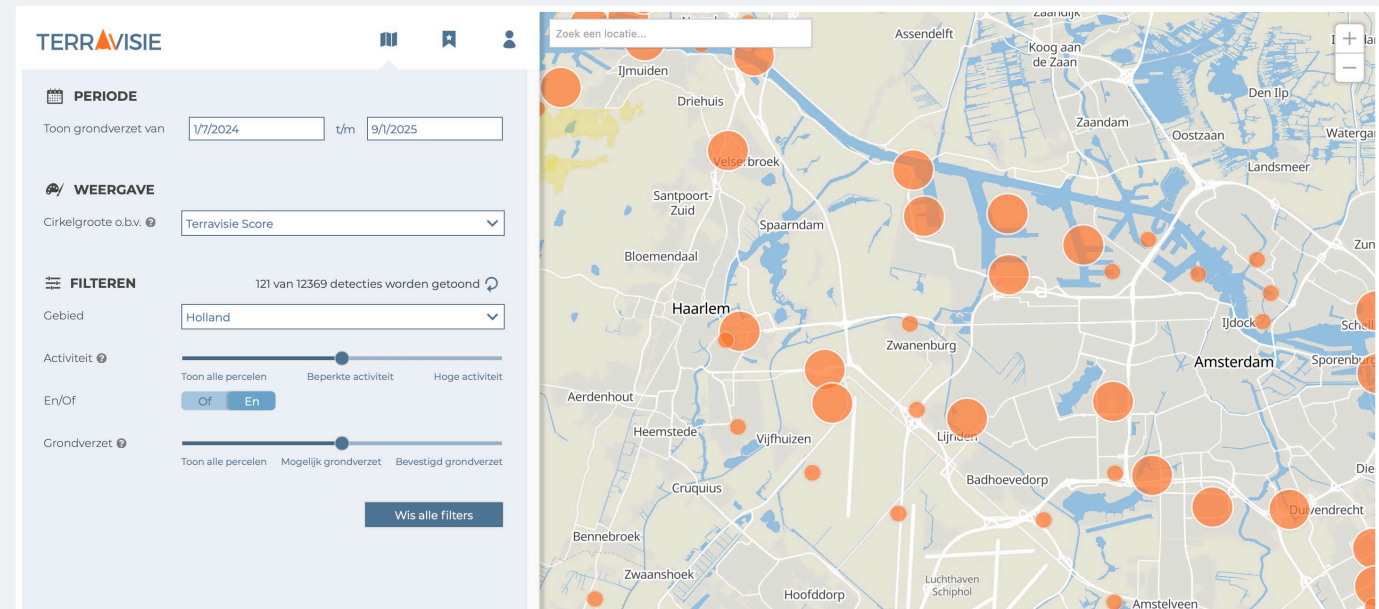
Change detection

Deposit recognition

Change detection

Radar waves are used to detect changes that may indicate large ground movement. In this process, 95% of the locations are filtered so that only potentially relevant locations are shown. This data arrives every ~5 days and is automatically loaded into the system.

The degree of change present is reflected in the size of the icons on the map. Filters can be used on both the extent and certainty of ground movement.



In this example the portal is in Dutch, but a translation to English / Norwegian is easily implemented.

How it works

With TerraVisie you can monitor your area of interest in two simple steps:

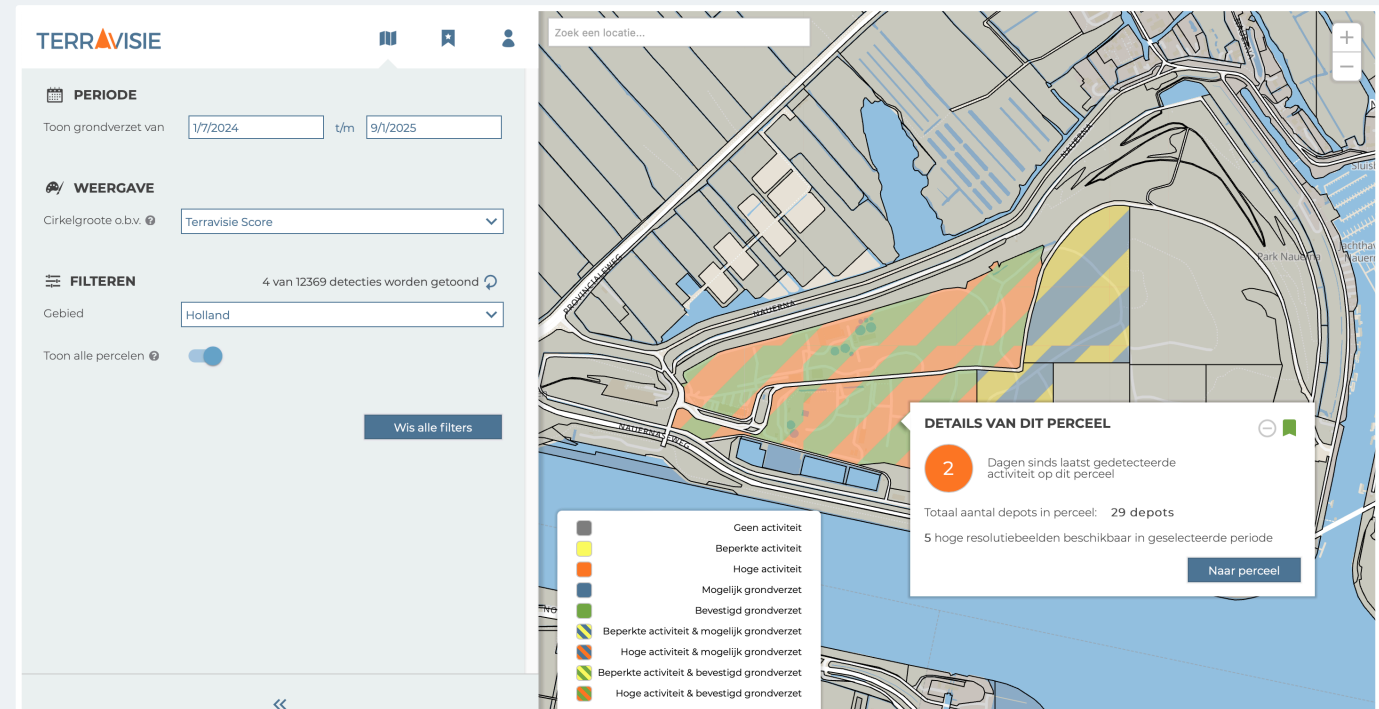
Change detection

Deposit recognition

Change detection

Each plot shows how long ago the last detected activity can be seen.

The colour score indicates the degree of activity detected. When a user has manually confirmed a new change, this is included in the view.



How it works

With TerraVisie you can monitor your area of interest in two simple steps:

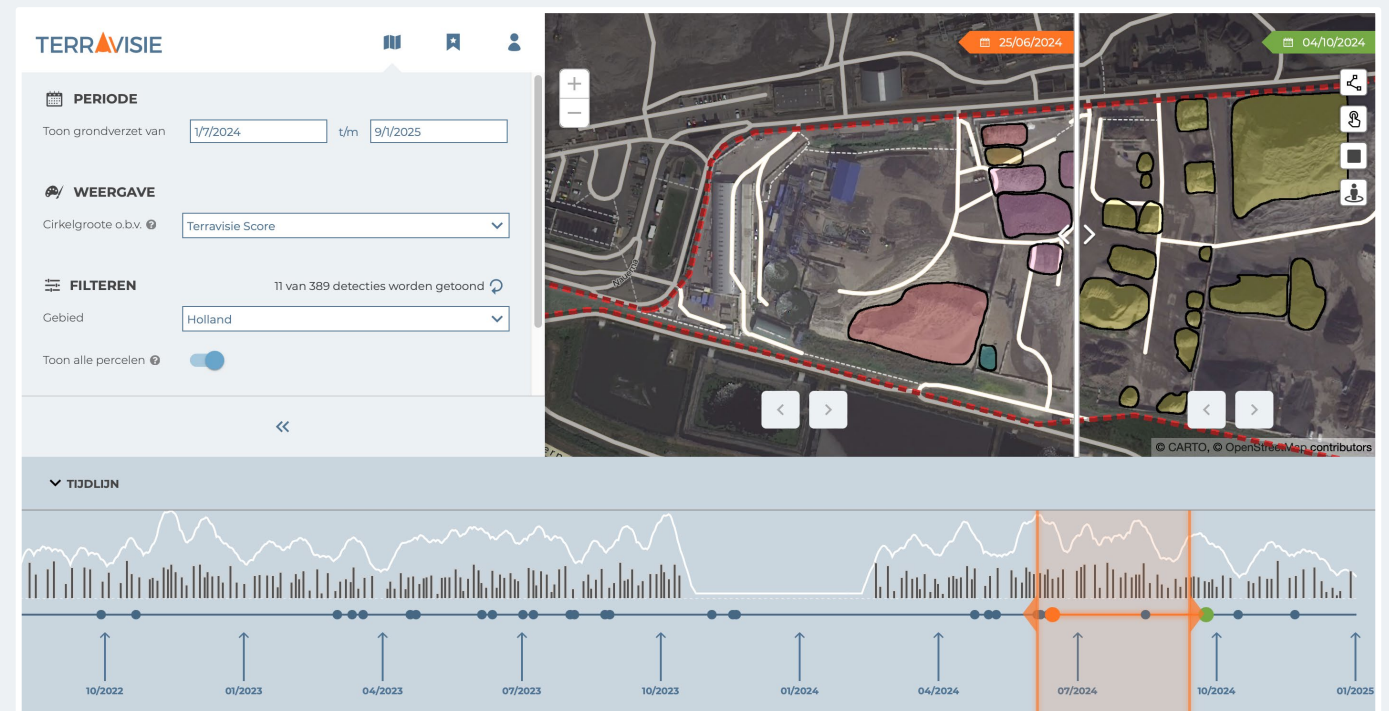
Change detection

Deposit recognition

Deposit recognition

High-resolution optical images from different days are compared for each plot. As a user, you can click on different dates to compare with each other, with the database going back several years.

TerraVisie's machine learning algorithms automatically detect depots, provide an outline and make a height and volume estimate of the soil batches. The user can also draw in depots manually and provide (confirmed) height and volume.



A risk-based and data-driven approach

TerraVisie is an information service that uses satellite data to support monitoring and enforcement of large-scale earthmoving operations. Designed specifically for inspectors dealing with soil (remediation), construction materials or excavations, TerraVisie provides more effective free field inspection and validation of remote reports.



Directed free field inspection

- ▶ Monitoring large areas
- ▶ New data every week
- ▶ Remote indication of ground movement
- ▶ Fully automatic system

Monitoring high-risk sites

- ▶ Signalling ground movement by AI
- ▶ Saving locations of interest
- ▶ Detection and volume estimation of deposits
- ▶ Improved effectiveness of monitoring



Contact

Want to know more? Be sure to contact our Environment & Sustainability team. We would be happy to take the time to tell you more about the applications of satellite data for inspection and enforcement.



About S[&]T

TerraVisie was developed by S[&]T, a European software company headquartered in Delft, The Netherlands, and active in the space sector for 25 years. We are experts in getting the most valuable insights from all kinds of data sources.

We focus on measuring deforestation, soil health and air quality, but also do risk analyses related to changes in the natural environment. In this we try to use Space for a Safer Life.



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TERRAVISIE

