CGI's Waterway Monitoring Service

Government water boards are responsible for managing water quality and levels, as well as waterway maintenance. For example, every year water boards manually inspect thousands of kilometers of waterways in the Netherlands to ensure proper maintenance. Otherwise, overgrown vegetation and other issues resulting from poor maintenance can increase the risks of operational, health and safety problems such as flooding.

CGI's Waterway Monitoring Service digitizes the inspection of waterways. It uses satellite data to map out large areas of waterways, and then a machine-learning model to assess their status automatically. As a result, physical inspections can be limited to problem areas, saving time and money.

During their yearly inspections, water boards need a significant number of people to inspect waterways in person. These inspections also require a significant amount of time and labor for planning, logistics and registration system preparation.

Because water boards have limited resources, there is much to gain from digitizing the inspection process. CGI's Waterway Monitoring Service is ideal for this. While a physical inspection can take at least two weeks to complete, using satellites to inspect takes only a few hours as soon as a clear day allows for high-quality satellite photos. CGI's solution makes the end-to-end inspection process more efficient and minimizes the need for physical inspections.

DIGITAL INSPECTIONS FROM SPACE

CGI's Waterway Monitoring Service—a component of the CGI EnvironmentMonitor360 intellectual property solution—uses satellite data with high precision. Satellites map the characteristics of the landscape, with an accuracy rate of up to 50 centimeters. Using this data, the service determines the relationship between water and vegetation and assesses whether current maintenance is sufficient.

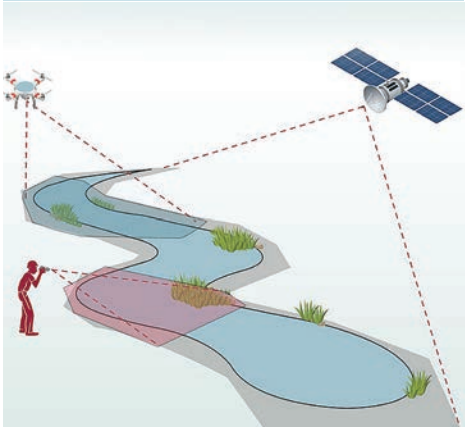
CGI developed the service with the Drents Overijsselse Delta Water Board in the Netherlands. Based on satellite data, drone images and input from surveyors, CGI and the water board developed a model to assess digitally the maintenance status of waterways. Because monitoring works faster using this solution, it can take place more often. Moreover, the resulting assessment is more objective.

The pilot outcomes were so successful that the water board has been completing the first phase of its waterway inspection process digitally since 2019. Employees only enter the field physically during the second phase and onwards.

USERS OF CGI'S WATERWAY MONITORING SERVICE

Our service is for any organization involved in the inspection of waterways, including:

- **Water boards:** Obliged to inspect waterways at set times throughout the year; they check whether maintenance is sufficient to guarantee a good flow.
- **Municipalities and provinces:** Obliged to maintain waterway parts that are not under the management of water boards; for example, they assess the provision of purchased maintenance for water districts.



HOW DOES IT WORK?

CGI's Waterway Monitoring Service uses commercially available earth observation satellites, which generate optical satellite images. CGI's machine-learning model analyzes the collected data with special algorithms to determine the status of waterways. This model features a recurrent improvement mechanism, which enables the continuous addition of new learning data, making the model increasingly smarter. It also supports future expansion of the model; for example, to determine not only that a ditch is polluted, but also the type of pollution.

Satellite images can help water boards in many ways. In addition to identifying pollution areas, they can identify landscape changes, such as the relocation of a ditch due to construction. They also can help with the enforcement of regulatory mandates by, for example, revealing the unlawful irrigation of a plot of land. It also is possible to map out greening initiatives, such as the pruning or mowing of land areas. We also are investigating whether the satellite data can help detect illegal practices, such as the discharge of manure or drug waste, which are becoming increasingly common.

CGI has tested the use of earth observation data with several clients to determine its value for their businesses. Because of the positive results, we now offer this Waterway Monitoring Service for the entire water management sector. In doing so, we help water boards drive efficiencies, optimize waterway use and protect against risks like flooding.

CASE STUDY

The Drents Overijsselse Delta Water Board (WDODelta) is one of 21 water boards in the Netherlands and is highly engaged in innovation. Together with CGI, the water board decided to investigate through a proof-of-concept whether it would be possible to make the inspection of waterways more efficient using satellite data. For waterways that are clearly clean on the images, a physical inspection is no longer necessary. Only rejected waterways require further inspection. This pilot was so successful that the water board digitized the entire first phase of its inspection process in 2019.

"Thanks to the Waterway Monitoring Service, we can deploy our enforcers more efficiently on other inspections. That's good, because the pressure of work is high and deployment is limited."

Team Lead Inspection and Enforcement,
WDODelta

ABOUT CGI

Founded in 1976, CGI is among the largest IT and business consulting services firms in the world. Operating in hundreds of locations across the globe, CGI delivers end-to-end services and solutions, including strategic IT and business consulting, systems integration, intellectual property, and managed IT and business process services.

In the space sector, CGI delivers secure, complex, mission critical space software systems across Asia-Pacific, Europe and North America, supporting programs from satellite navigation, ommunications and operations, to space-enabled applications.

CGI works with clients through a local relationship model complemented by a global delivery network to help clients achieve their goals, including becoming customer-centric digital enterprises.