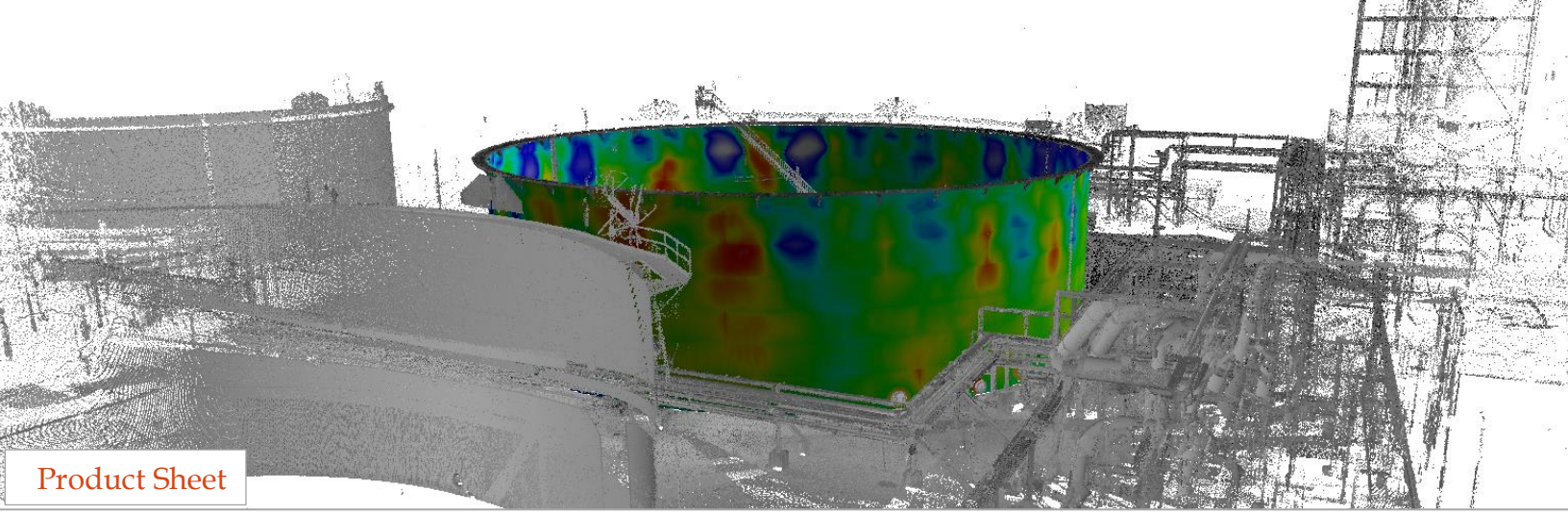


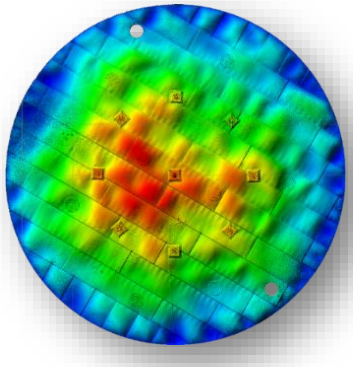
Product Sheet

Tank Reporting Service

Novlum's **T**ank **R**eporting **S**ervice (TRS) uses high-resolution LiDAR scans to assess American Petroleum Institute (API) standards compliance of above ground storage tanks. This service enables inspectors to conduct rapid data interpretation with next day feedback. At its core is Novlum's proprietary software system "Tanker". This technology has been used in many projects to assess tanks across North America, the Caribbean, and Europe over the last several years, and has proven to be robust, reliable, and highly accurate.

Disruptive Technology

Novlum's TRS Service uses laser scanning technology (LiDAR) to support traditional API storage tank inspections. This new technology helps safeguard the environment and improves health and safety practices in the Oil and Gas industry. It helps avoid costly incidents such as a storage tank failures and consequential repairs, unscheduled downtime and negative environmental impacts. LiDAR can capture the entire tank structure in great detail within the span of a few hours, minimizing scheduled downtime. The unprecedented measurement coverage provides unparalleled information to the user and can be captured without interference with onsite activities. External scans can be used to assess the tank while it is still in service. Internal scans can be used to evaluate as-built condition by reconstructing the tank shell, roof, floor, internal structure, and all attachments in 3D.



Floor profile showing plate welds, column pads, and sump locations

Cutting-edge LiDAR Analysis

Novlum's approach to LiDAR data analysis does not rely on using targets in field. Rather, it uses state-of-the-art technology that uses structural features to register scan data, significantly reducing in field preparation and risk of project failure. Novlum has been able to generate analysis results from scan data every time without fail.

Novlum's in-depth structural tank analysis includes:

- Floor Settlement – Identifies local deformations, indicators of corrosion, subsidence, water beneath the surface, or improperly distributed column loads
- Shell Deflection – Identifies deviations from a perfect cylinder, indicators of shell settlement, shell stresses, physical damage, or improper repairs
- Shell Peaking and Banding – Identifies deviations from smooth surfaces, indicators of compromised welds
- Shell Verticality – Identifies deviations from vertical, indicators of planar settlement or column deformations
- Column Verticality – Identifies deviation from vertical, indicators of column deformations, improperly distributed column loads, floor settlement, or tank twisting
- Girders and Rafters Deflection – Identifies deviation from design dimensions, indicators of column deformations
- Roof Settlement – Identifies local deformations, indicators of corrosion or girder, rafter, or column deformation

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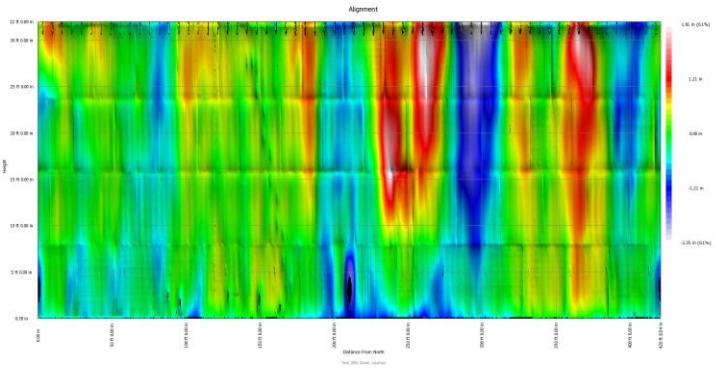
- Floating Roof Gap – Identifies gap between the shell and floating roof, indicators of where roof may get hung up or where the seal may fail.



Shell alignment showing plate welds, manways, and repads

Benefits at a Glance

Laser scanning has many advantages over the traditional storage tank measurement methods.

- Measurements are performed safely from the ground, reducing onsite injury risks.
- Laser scanning is fast, reducing exposure of personnel to potentially toxic environments.
- Data can be collected within hours, reducing the total turnaround time of reporting, and ultimately downtime of assets.
- Data can be collected externally so assets can be assessed while in service.
- Unprecedented measurement coverage provides the ability for further analysis without the need to return to the site.

Novlum's unique and innovative analysis and reporting technology eliminates the common pitfalls of using LiDAR.

- TRS is a systematic, repeatable service that assures a comprehensive coverage and delivers high quality reports.
- Data acquisition can be performed without targets in field, significantly reducing risk of project failure and in field data acquisition time
- Guaranteed report delivery within five business days, with available next business day rush service

Novlum's TRS is the fastest and most cost-effective solution on the market and makes LiDAR a viable technology in the field today.

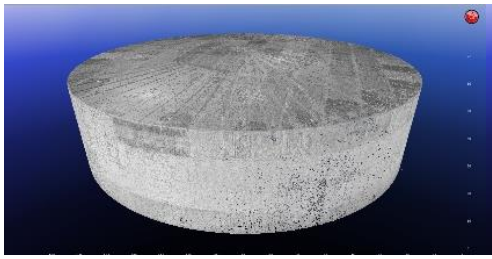
Service Offering

Novlum provides the following analysis and reporting services:

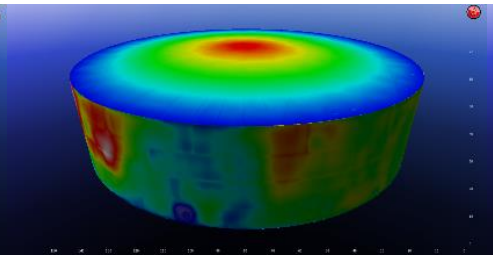
- Tank Analysis Report (API 650/653 compliance)
- Tank Calibration (API MPMS 2.2a)
- Dike Containment

The reports are delivered as pdf documents. Digital data files can be provided on request. Guaranteed report delivery is within five business days after data receipt. Next business day rush service is available on request.

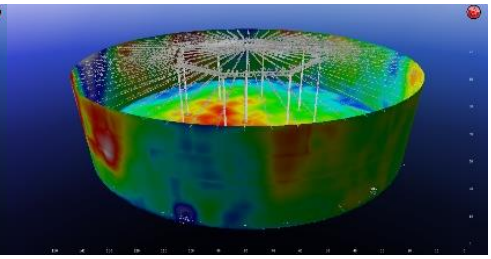
Novlum provides analysis and reporting services and can work with your current service providers to acquire data and interpret results. Novlum can also support and recommend a list of certified API inspectors.



Tank LiDAR Image



Tank Deflection Analysis



Tank Inside Structure & Deflection

About Novlum

Novlum is a boutique software company that develops geospatial software products with a focus on real-time visualization and efficient analysis of 3D geographic data. Novlum's goal is to develop software products that are powerful yet easy to use, enabling non-GIS experts to leverage the power of GIS.

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