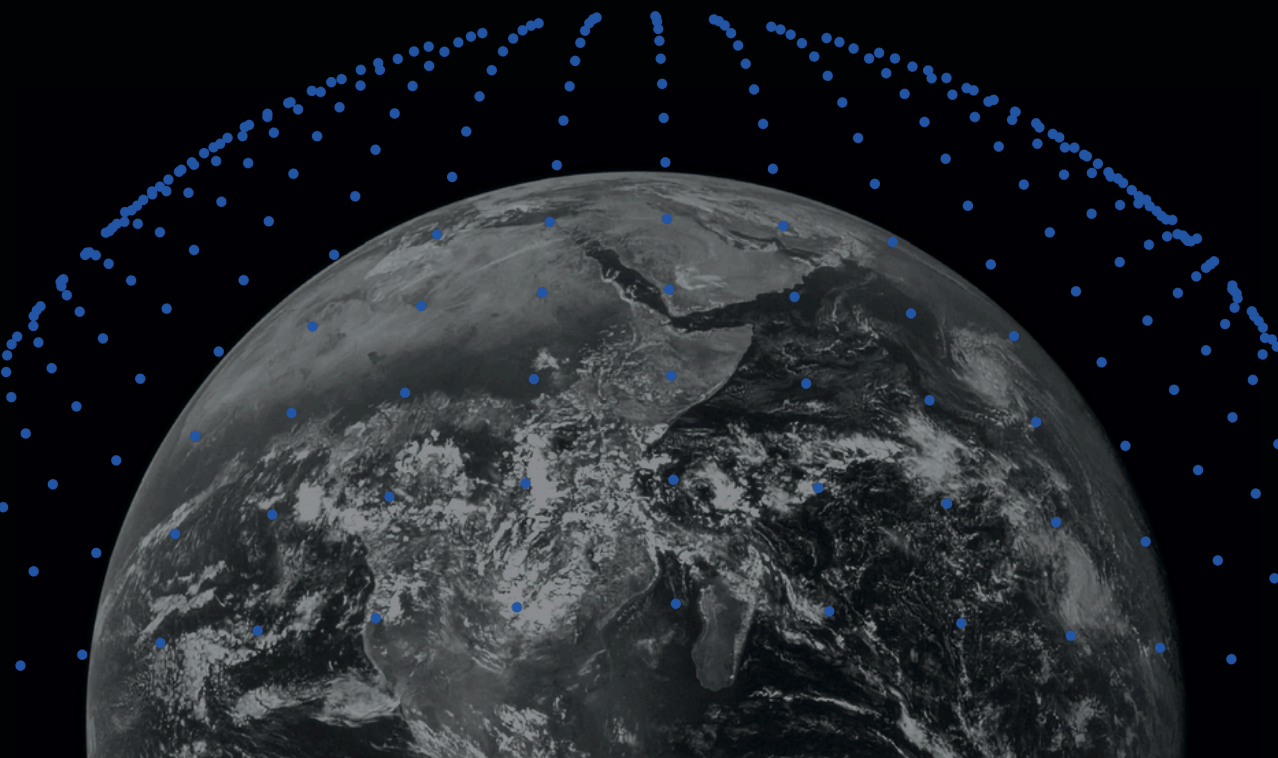
COMPANY PROFILE

TITAN4

Actionable insights for safer infrastructure

Turning complex satellite data into smart decisions.



THE COMPANY

Founded in 2017 and born within the ESA BIC programme of the European Space Agency, Titan4 is an Italian company specializing in **Earth Observation** and the **advanced monitoring** of **critical infrastructure**.
The company develops proprietary technologies that integrate satellite radar, optical and multispectral imagery, climate models, and artificial intelligence algorithms. These solutions enable public and private operators to monitor strategic networks and assets with continuity, precision, and enhanced predictive capability.

At the core of Titan4's technological offering is a SaaS Earth Observation platform designed for the automated and scalable processing of optical, multispectral, and radar satellite data through InSAR techniques.
The platform provides continuous monitoring of infrastructure and territorial health, allowing early detection of deformation, instability, and degradation. Its cloud-native architecture ensures continuity, consistent data quality, and direct integration with client systems via API.

The robustness of internal processes and the quality of development activities are validated by the ISO 9001 certification issued by RINA, covering the design of downstream platforms and the provision of satellite data processing services.

Thanks to an interdisciplinary team of telecommunications engineers, data scientists, and software architects, Titan4 collaborates with major public and private clients who rely on the company for its robustness, reliability, and capacity for innovation.

This reputation is reinforced by Titan4's strengths in:

- Proprietary multisensor technologies based on SAR, optical, and multispectral data
- Historical, diagnostic, and predictive analyses supported by AI models tailored to infrastructure
- Scalable SaaS solutions designed to meet the standards of national infrastructure operators
- End-to-end automated workflows, from data acquisition to alerting
- Reliability, precision, and uniformity of results, even across large territorial areas

PROPRIETARY TECHNOLOGY

The Titan4 platform is composed of a series of proprietary modules that operate in an integrated manner, providing a comprehensive, multi-layered view of infrastructure and territory. Each module contributes to a different aspect of the analysis, enabling the combination of satellite observations, environmental data and predictive models within a single, coherent technological environment.

Radar Module (SAR Analytics)

The radar module leverages information from all major SAR frequency bands — X, C and L — to analyse ground deformation and terrain dynamics with high precision.
Through interferometric processing, the platform reconstructs millimetric time series that describe the evolution of phenomena over time, allowing users to identify patterns, accelerations and early-warning indicators of potential instability.
The operational pipelines are fully automated, ensuring consistent results and continuous monitoring even over very large areas.

Optical and Multispectral Module (Optical Intelligence)

The optical module processes data from high and very high-resolution sensors, along with multispectral and hyperspectral datasets.
Thanks to proprietary super-resolution technologies and adaptive oversampling techniques, the platform enhances spatial detail and reduces noise, enabling more accurate analysis of surfaces, materials and environmental conditions.
Multitemporal change-detection functions and automatic radiometric corrections ensure comparable observations over time, supporting the identification of subtle territorial or asset changes that may not be detectable with radar alone.

Data Fusion Module (Data Fusion Hub)

To achieve a complete representation of infrastructure conditions, Titan4 integrates satellite data with information from ground-based sensors, LiDAR surveys, digital terrain models and geological or geotechnical knowledge.
The data-fusion module connects phenomena observed from different perspectives, creating a robust and multidimensional interpretative framework.
This integration strengthens analytical quality, enhances diagnostic capabilities and improves the reliability of risk assessments.

Climate Module

The climate module connects Earth Observation–derived information with medium- and long-term climate projections.
This makes it possible to understand how extreme events, hydrological variations, thermal stress, or changes in environmental regimes may influence infrastructure stability over time.
The system supports the assessment of asset vulnerability and resilience, enabling operators to integrate climate considerations into maintenance planning and long-term strategic decision-making.

AI & Early Warning Module

Artificial intelligence plays a central role within the Titan4 platform.
Through predictive models and pattern-recognition algorithms, the AI module automatically identifies anomalies, accelerations, and early indicators of degradation.
These insights are then translated into risk indicators and operational alerts, supporting preventive maintenance and enabling interventions before significant issues emerge.

INNOVATIVE PROJECTS AND STRATEGIC COLLABORATIONS

Titan4 consistently invests in applied research and innovation.

The company supports PhD programmes, collaborative projects and initiatives with Italian and European universities, focusing on activities such as:

- advanced InSAR techniques and multisensor integration,
- AI-based predictive algorithms,
- climate-impact analysis on infrastructure,
- new paradigms for satellite-based early warning.

Participation in national and international programmes ensures continuous technological evolution and promotes the transfer of advanced methodologies into the infrastructure-management sector.

1. Climate impacts on infrastructure and predictive modelling

Titan4 collaborates with a national climate competence centre and with public administrations responsible for hydrogeological risk management.
The project integrates climate models, satellite data and territorial information to analyse how extreme events, hydrological changes and thermal stress can affect the stability of transport infrastructures, water networks and earthworks, supporting the planning of long-term resilience strategies.

2. Earth Observation for energy and environmental assets

In collaboration with energy operators and environmental agencies, Titan4 develops multisensor methodologies to detect instability phenomena, surface disturbances and geotechnical risks that may affect plants and distributed networks.
The integration of radar data, optical imagery and ground-based sensors enables the creation of predictive models and updated risk maps, supporting operational continuity and preventive maintenance.

3. Satellite monitoring of water networks and urban environments

Titan4 collaborates with water utilities and municipal administrations to analyse ground movements, subsidence and potential causes of leakage within aqueduct networks.
These analyses generate predictive indicators that support technical–operational planning and the prioritisation of interventions, contributing to loss reduction and improving the efficiency of urban water infrastructure.

4. Data fusion for linear infrastructure and engineering structures

In collaboration with transport operators and technical universities, Titan4 develops data-fusion models that integrate satellite radar, optical components, LiDAR surveys and sensors installed on bridges and viaducts.
The goal is to provide continuous insight into the condition of both linear and point infrastructures, detecting anomalies and degradation trends in advance through a comprehensive, multilayer analytical framework.

5. Advanced space technologies and experimental applications

Titan4 also participates in initiatives dedicated to new EO applications in collaboration with technological clusters and national incubators.
Activities include super-resolution, oversampling, innovative pre-processing techniques and new software architectures for distributed processing of large satellite datasets, with the aim of improving quality, resolution and timeliness of analyse

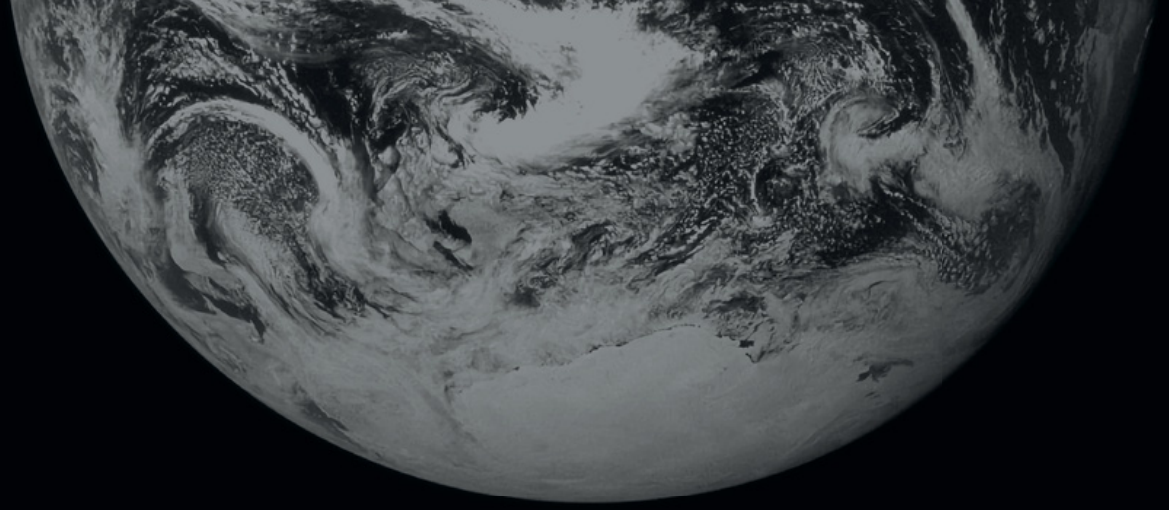
ACHIEVEMENTS & AWARDS

Finalist at the International Astronautical Congress – ESA BIC Start-up Pitch Competition

Best Innovative Start-up at the New Space Economy

Recognized as the Best Company at the Impact Now LiTA Awards

SOCOTEC Italia Award at the TIM Smart Infrastructure Challenge 2025,
in recognition of the value of Titan4's platform for predictive maintenance based on the integration of satellite data, IoT sensors and AI algorithms.



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