guardtime

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Disruptive Technologies for EO Data Provenance Media Pack

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Contents

Document versioning

Date (MM.YYYY)	Version	Author	Changes
11.2025	0.1	Beata Kroszka (CloudFerro)	Initial draft
12.2025	1.0	Beata Kroszka (CloudFerro)	First release

1. Introduction

1.1. Purpose and scope

This Media Pack has been developed to support the communication and outreach activities of the Trace4EO project. It brings together all essential materials — descriptions, visuals, branding elements, use case summaries, timelines, partner information, as well as communication analytics and web blog stories — into one coherent package. Its main purpose is to ensure that all project partners communicate about Trace4EO in a consistent and effective manner, using shared messages and a unified visual identity.

The Media Pack also helps external audiences quickly understand what Trace4EO is, why it matters, and how its results can be used. It provides clear explanations of the project's objectives, the technologies explored, and the real-world use cases that demonstrate the added value of provenance for EO and AI. By including social media and website analytics alongside ready-to-use communication assets such as web blog stories, the Media Pack supports outreach efforts across events, publications, and online channels, amplifying the visibility and impact of the project.

1.2. Structure of the document

The document consists of the following chapters:

1. Introduction – purpose and scope
2. Trace4EO – Media Kit (short version) – concise public-facing project description
3. Trace4EO – Media Kit (extended version) – detailed project overview, value proposition, and use cases
4. Web blog stories – communication articles prepared for dissemination
5. Data Analytics – social media analytics and website metrics
6. Summary – synthesis of all communication materials produced

1.3. Annexes

Name	File	
Project Logo (Trace4EO)	Trace4EO_logo.png	
ESA Logo	esa-brand-manual_logo.pdf	
ESA Φ-lab Logo	ESA Philab_logo.jpg	
Consortium Logos (Guardtime)	guardtime logo – vector.pdf	
Consortium Logos (CloudFerro)	CloudFerro_logo.png	
Consortium Logos (Alt239)	Alt239_logo.png	
Trace4EO webpage image	Trace4EO_photo_AdobeStock_1218421571.jpg	
Trace4EO mediapack	Trace4EO_mediapack.zip	
Trace4EO webpage report	Trace4EO_webpage_report_11.2025.pdf	

2. Trace4EO – Media Kit (short version)

Disruptive Technologies for Provenance of Earth Observation (EO) Data

Project Overview

Trace4EO is an ESA-funded project developing an open-source prototype showing how disruptive provenance technologies improve trust, transparency, and reproducibility in EO workflows.

Short Description

Trace4EO is an ESA-funded innovation project developing an open-source prototype for traceability and provenance of Earth Observation (EO) data. By leveraging disruptive technologies, the project strengthens transparency, reliability, and reproducibility in EO workflows, ensuring data integrity for scientific, operational, and AI-driven applications.

The project runs from 16 June 2025 to 16 June 2026 and is delivered by Guardtime, CloudFerro, and Alt239.

Mission

To build a trustworthy and transparent ecosystem for Earth Observation by developing a prototype that demonstrates how disruptive provenance technologies can improve reproducibility, integrity, and usability of EO data and AI models.

Objectives

- Identify disruptive technologies for provenance.
- Build an open-source EO provenance prototype.
- Demonstrate added value through real-life use cases.
- Engage end-users and build community.

Use Cases

1. Forecasting Cereal Yields Using Traceability combined with Sentinel and Meteorological Data.

2. Traceability for AI Modelling.

Key Milestones

- Launch: 16.06.2025
- Requirements Review: 15.09.2025
- Interim Review: 15.03.2026
- Final Review: 16.06.2026

Events & Engagement

- ESA–ECMWF Workshop, Bologna: 13–17.04.2026
- EGU26, Vienna: 03–08.05.2026
- Workshop in ESA Φ-lab (TBC)
- Stakeholders: JRC, POLSA, ESA teams.

Contacts

Project Coordinator (ESA): Mounia El Baz

Project Manager (Guardtime): Tuuli Lõhmus

Website: https://trace4eo.guardtime.com/

3.Trace4EO – Media Kit (extended version)

Disruptive Technologies for Provenance of Earth Observation (EO) Data

Project Overview

Trace4EO is an ESA-funded project developing an open-source prototype showing how disruptive provenance technologies improve trust, transparency, and reproducibility in EO workflows.

Extended Description (≈150 words)

Trace4EO – *Disruptive Technologies for Provenance of Earth Observation Data* – is an innovative initiative funded by the European Space Agency (ESA) Φ-lab. The project addresses the growing challenge of ensuring trust, transparency, and traceability in the rapidly expanding EO data ecosystem. As the volume of EO data increases, its effective and reliable use in downstream applications requires robust methods for tracking lineage, verifying processing steps, and ensuring reproducibility.

Trace4EO develops an open-source software prototype that implements provenance mechanisms and demonstrates their value through real-life use cases, including EO product verification and traceability in AI modelling workflows. The project is led by a consortium of European experts — Guardtime, CloudFerro, and Alt239 — and places strong emphasis on community engagement to ensure that the developed solutions meet operational needs and are adopted by potential end-users.

The project runs from **16 June 2025 to 16 June 2026**.

Mission

To build a trustworthy and transparent ecosystem for Earth Observation by developing a prototype that demonstrates how disruptive provenance technologies can improve reproducibility, integrity, and usability of EO data and AI models.

Objectives

- Identify disruptive technologies that address key provenance challenges in the EO domain.

- Develop an **open-source software prototype** implementing EO data provenance mechanisms.
- Validate the prototype through real-life use cases and demonstrate added value.
- Engage with the scientific community and stakeholders to promote adoption.
- Build a user community that supports the sustainability of the work beyond the project's duration.

Consortium

- **Guardtime (Estonia):** A global leader in data integrity and provenance technologies.
- **CloudFerro (Poland):** A provider of cloud computing infrastructure and services for Earth Observation platforms.
- **Alt239 (France):** Experts in Earth Observation and metadata management.

Use Case 1 — Forecasting Cereal Yields Using Traceability with Sentinel and Meteorological Data

This use case demonstrates how traceability enhances the accuracy, reliability, and credibility of crop yield forecasts derived from satellite and meteorological data. Using inputs from ESA's Sentinel-3 missions (optical and thermal indicators) together with ERA-5 Land meteorological variables, machine learning models are trained to predict cereal yields at the NUTS-2 regional level.

Traceability ensures that every step of the forecasting workflow—from data acquisition to model training and validation—is fully documented and verifiable. This allows users to understand exactly which datasets, parameters, and model configurations contributed to a given prediction. Such transparency is essential for agricultural policymakers, public agencies, and farmers who rely on yield estimates for decisions related to food security, subsidies, and resource planning.

The approach is scalable, transferable to other crops or regions, and supports critical needs such as auditing, reproducibility, and long-term monitoring of agricultural conditions.

Use Case 2 — Traceability for AI Modelling

This use case focuses on how traceability strengthens trust and regulatory compliance in AI systems trained on Earth Observation data. As AI models become widely used in operational and commercial settings, users increasingly require transparency about the origin, quality, and processing history of the data used to train them.

Traceability enables AI providers and users to record and verify which satellite images, tiles, or pre-existing models contributed to a training dataset, as well as all transformations applied along the way. This supports compliance with emerging regulations, including the EU AI Act, which mandates documentation of training data, logging of model lifecycle activities, and auditability.

By ensuring that AI models can be linked back to authenticated, well-described input data, the use case enhances trust, fairness, and quality assessment. It also enables independent third-party verification—an important requirement for high-risk AI systems—and provides significant added value to organizations building or using AI for EO applications.

Key Milestones

- Launch: 16.06.2025
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Events & Engagement

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4. Web blog stories

The web blog stories included in this Media Pack are based on communication content that has previously been published in shorter form (e.g. bullet-point news items and brief announcements) on partner channels. For the purpose of this deliverable, these materials have been expanded and consolidated into narrative web stories suitable for publication on the Trace4EO webpage and for further dissemination.

The stories cover the official launch of the Trace4EO project, the cereal yield forecasting use case, and the AI modelling traceability use case. Together, they provide accessible, public-facing articles that explain the project's objectives, methods, and added value for the EO and AI communities, and can be reused across web, social media, and event communication.

These web stories are derived strictly from the content of the project's official deliverables and previously published communication materials, without introducing new technical claims.

Trace4EO Project Officially Launched to Advance Trust and Transparency in Earth Observation

The Trace4EO project, funded by the European Space Agency (ESA) Φ-lab, was officially launched on **16 June 2025**. The initiative brings together three leading European organisations — **Guardtime** (prime contractor), **CloudFerro**, and **Alt239** — to develop an open-source prototype that demonstrates how disruptive provenance technologies can improve trust, transparency, and reproducibility in Earth Observation (EO) data workflows.

As EO data volumes continue to grow, ensuring the reliability and verifiability of the information derived from satellite observations has become increasingly important. Trace4EO addresses this challenge by applying traceability methods that track input data, metadata, processing chains, and machine learning model configurations through the entire workflow. This helps operational users, researchers, and policy makers validate results, understand data lineage, and meet emerging regulatory requirements, such as those associated with trustworthy AI.

Over the course of its one-year duration, the project will demonstrate provenance-enabled workflows through two real-world use cases: **forecasting cereal yields using Sentinel and meteorological data**, and **traceability for AI modelling**. These cases highlight how transparent data pipelines benefit both domain-specific applications and general AI/ML workflows.

The project will also focus on building awareness and engaging the EO community. Outreach activities include conference participation, workshops, webinars, and public communication through social media and the Trace4EO website. Public deliverables and the open-source prototype will be made available throughout the project, ensuring broad accessibility and supporting adoption beyond the project's lifetime.

With its launch, Trace4EO begins a collaborative effort to strengthen the integrity and usefulness of EO data across scientific, commercial, and policy-making domains. The project sets the foundation for more reliable and verifiable EO-based services, paving the way for future innovations in data governance, AI transparency, and operational decision-making.

Using Traceability to Improve Cereal Yield Forecasting Across Europe

Accurate and timely crop yield forecasts are essential for supporting food security, agricultural planning, and policy decision-making across Europe. As part of the Trace4EO project, the consortium is developing a provenance-enabled workflow that combines Earth Observation data from ESA's Sentinel missions with meteorological information to produce reliable cereal yield forecasts at regional scale.

The use case focuses on integrating **Sentinel-3 optical and thermal indicators** with **ERA-5 Land meteorological variables**, such as air temperature, precipitation, soil moisture, and solar radiation. These datasets form the basis of machine learning models that predict yields for selected crops at the NUTS-2 administrative level. What sets this approach apart is the addition of **traceability**, which records every step of the workflow, from data acquisition to model configuration and validation, ensuring that forecasts are transparent, auditable, and reproducible.

Traceability helps address several practical challenges identified during stakeholder consultations with institutions such as the Joint Research Centre (JRC) and the Polish Space Agency (POLSA). These organisations emphasised the importance of verifying input data quality, tracking metadata changes, and ensuring consistent comparisons when forecasting models are revisited after reprocessing cycles or algorithm updates. By documenting data lineage and processing details, the Trace4EO workflow enables users to understand precisely how results were obtained and to validate the integrity of the predictions.

The cereal yield forecasting use case demonstrates the value of provenance not only for agricultural monitoring but also for broader EO-based applications. The methodology is scalable, allowing it to be adapted to other crops, regions, and modelling frameworks. It also supports operational needs such as auditing, subsidy management, insurance assessments, and long-term agricultural planning.

Through this work, Trace4EO highlights how combining EO data, machine learning, and structured traceability can strengthen confidence in environmental information systems and provide actionable insights for policy makers, analysts, and the agricultural sector.

Strengthening Trust in AI Models Through Traceability in Earth Observation Workflows

As artificial intelligence becomes increasingly integrated into Earth Observation (EO) applications, the ability to verify how AI models are trained and what data they use has become essential. The Trace4EO project addresses this challenge by introducing a traceability framework that documents the entire lifecycle of AI models trained on EO data—improving transparency, accountability, and regulatory compliance.

The use case demonstrates how traceability captures detailed information about the datasets and model components used during AI development. This includes identifying satellite images or image tiles, recording their origins and metadata, and documenting all transformations applied before training.

This capability has become particularly important with the introduction of the **EU AI Act**, which requires providers of high-risk AI systems to maintain documentation on data provenance, training processes, and model behaviour. By

integrating provenance tracking into EO-based AI workflows, Trace4EO helps organisations meet these requirements and supports the development of trustworthy and explainable AI systems.

Consultations conducted with stakeholders and AI practitioners highlighted a growing need for independent verification of AI model quality. As AI models become widely used in public services, commercial operations, and scientific research, users increasingly expect assurances about the originality, authenticity, and reliability of the underlying training data. Traceability provides a mechanism to assess these aspects objectively and consistently, reducing risks and improving confidence in AI-driven decisions.

This use case also showcases how provenance enables interoperability and scalability. By using standardised, vendor-neutral approaches, Trace4EO allows organisations to integrate traceability into diverse AI pipelines, from cloud-based model training to federated learning environments, without disruption.

By demonstrating traceability for AI modelling, Trace4EO highlights the importance of building transparent and resilient AI ecosystems that can adapt to evolving regulatory and operational needs, ultimately strengthening trust in EO-powered machine learning solutions.

5. Data Analytics

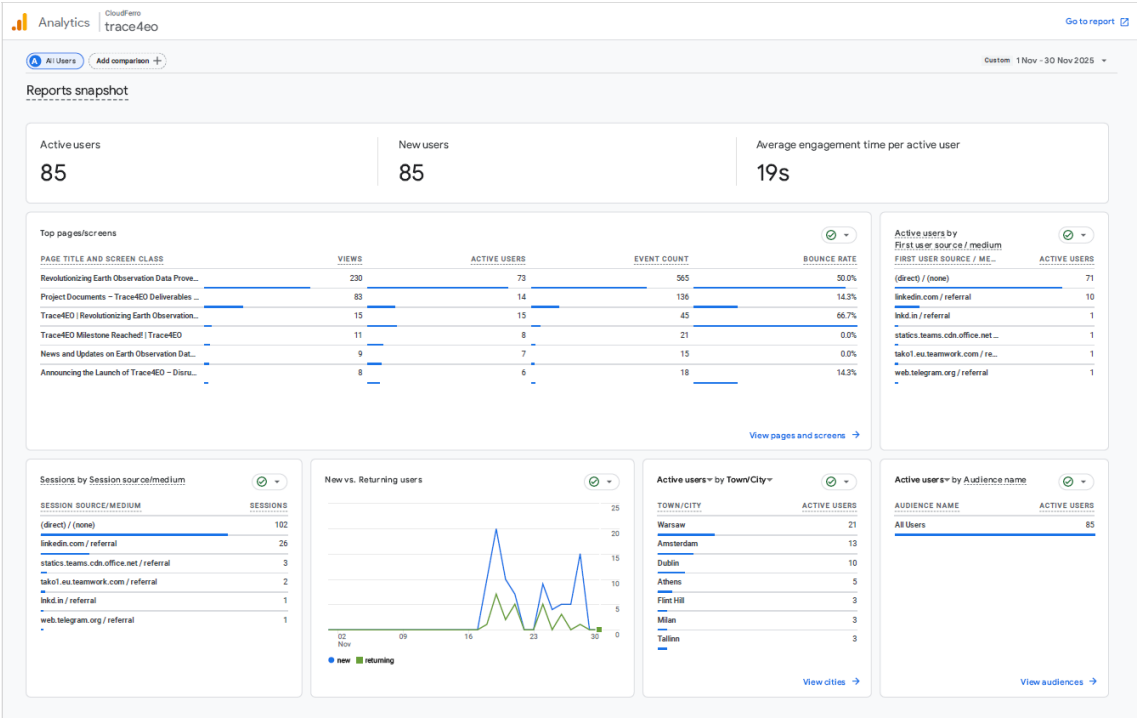
This section presents quantitative indicators describing the communication performance of the Trace4EO project. It summarises data related to webpage visibility and social media outreach, based on measurements collected from the project website and partner communication channels.

The analytics include information such as the number of visits and page views on the Trace4EO website, user behaviour on key pages, as well as reach and engagement statistics for social media posts (e.g. impressions, reactions, comments and shares). Together, these metrics provide an overview of the effectiveness of the project's dissemination activities and support the assessment of how Trace4EO content is accessed and used by the target community.

5.1. Webpage visibility

Since the launch of the project website, usage statistics have been collected using Google Analytics. In November, the site recorded 85 active users. The top three countries of origin were Poland, the Netherlands and Ireland. The most frequently visited sections were "Project Overview" and "Project documents". The average engagement time per active user was 19 seconds.

A detailed Google Analytics report is shown below; for better readability, the full report is also attached as a PDF annex to this deliverable.



5.2. Social media outreach

Since the start of the project, in line with the external communication plan, two posts have been published on LinkedIn via the ESA Φ-lab community as well as the Guardtime and CloudFerro accounts. The first post announced the launch of the Trace4EO project, while the second reported the achievement of the first milestone and the completion of two major deliverables.

The corresponding reach and engagement figures for these posts are presented below.

Post	Subject	Channel (LinkedIn)	Reactions	Reposts	Impressions	Members reached
1	Trace4EO project launch	The ESA Philab community	10	1	1046	607
1	Trace4EO project launch	Guardtime	24	2	(*)	n/a
1	Trace4EO project launch	CloudFerro	58	2	2063	n/a
2	First Milestone Reached!	The ESA Philab community	15	2	1335	849
2	First Milestone Reached!	Guardtime	7	2	(*)	n/a

2	First Milestone Reached!	CloudFerro	26	0	890	n/a
Total			**140**	**9**	**5334**	**1456**

(*) – it will be included in the next version of Deliverable

6. Summary

The Media Pack consolidates the project overview, objectives, key facts, and value proposition, and includes summaries of the two use cases that demonstrate the relevance of provenance in Earth Observation and AI modelling workflows. It also provides branding elements that can be used across reports, presentations, events, and online channels. By providing these resources in a single structured package, the Media Pack supports greater visibility, recognisability, and transparency of the Trace4EO initiative.