TELESPAZIO
a LEONARDO and THALES company

Earth Observation Veracity Proof of Concept Verification

Public Webinar

EO Veracity
PROOF OF CONCEPT VERIFICATION

Virtual, 17th of December 2025

Ref: EOVerPoCVerif.PRE.007

Please avoid printing this colourful slide. Let's save the planet together.

Agenda

EO Veracity

PROOF OF CONCEPT VERIFICATION

- Project Introduction
- Why this is important for you
- What we have done
- What we will do now
- What we will produce
- Questions and Feedback

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Project Introduction

EO Veracity

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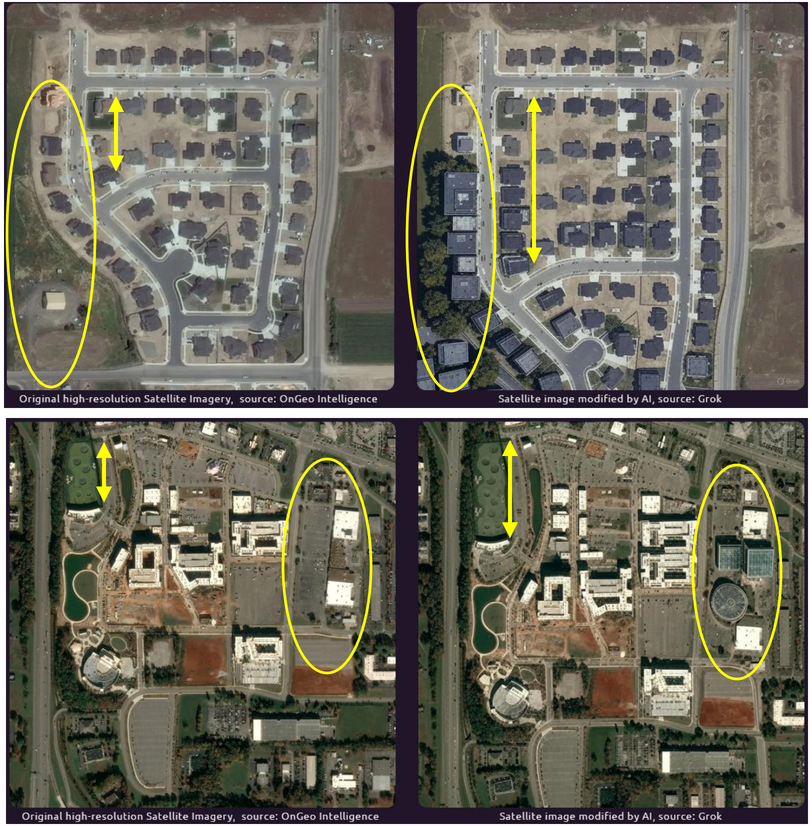
Why verify EO products?

Earth Observation scenes are open to **manipulation** and **misinformation.**

Such as:

- Geopolitical misinformation
  - Influence **strategic decisions**
  - Affect **international opinions**
- Environmental manipulation
  - Exaggerate / reduce **natural phenomena**
  - Directly affect **policies and markets**

Examples of Deepfake Geography (simulations)



Original high-resolution Satellite Imagery, source: OnGeo Intelligence

Satellite image modified by AI, source: Grok

Original high-resolution Satellite Imagery, source: OnGeo Intelligence

Satellite image modified by AI, source: Grok

https://ongeo-intelligence.com/blog/when-satellite-images-lie-the-rise-of-deepfake-geography

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The Project

ESA funded project

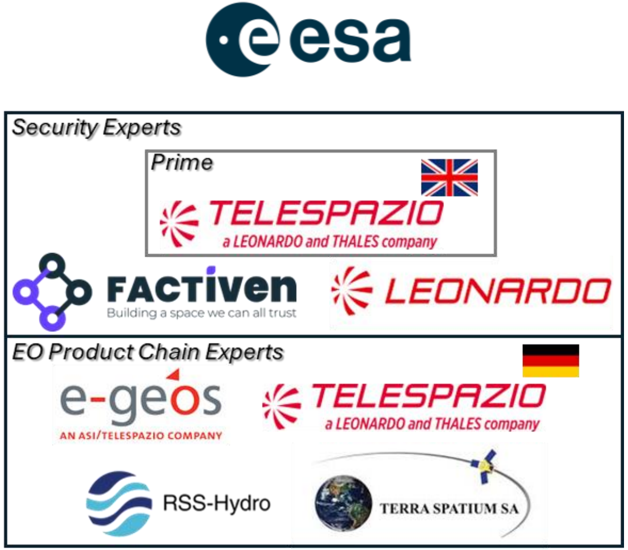
Kicked off in September 2025

Running until February 2027

Investigating:

- How EO data could be **interfered with**
- How to **counter this interference**, and
- How to **guarantee the veracity** of the information provided

Project Team


esa
Security Experts
Prime
TELESPAZIO
a LEONARDO and THALES company
FACTiven
Building a space we can all trust
LEONARDO
EO Product Chain Experts
e-geos
AN ASI/TELESPAZIO COMPANY
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RSS-Hydro
TERRA SPATIUM SA

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What does veracity mean?

Veracity refers to the **truthfulness** or **accuracy** of information

High veracity = truthful and reliable, factually correct & reflects reality

Low veracity = presence of falsehoods, inaccuracies or misleading content

Veracity is linked to **Provenance** and **Authenticity**

Provenance = **origin and history** of the information; the process its undergone; its context and traceability

Authenticity = **genuineness** of the information; true to its source, not altered, falsified or manipulated; from a legitimate source

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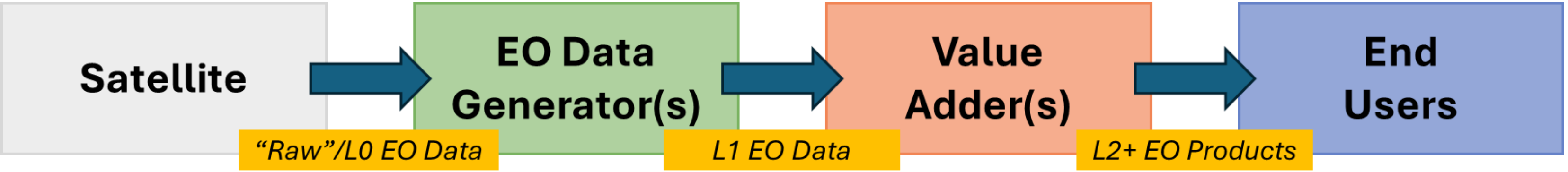
EO Information Chains

- Activities focus on example EO chains.
- Four chains identified:
  - **Sentinel-2:** data acquisition & processing (L0 → L2A) to dissemination
  - **SEonSE:** near real-time maritime situational awareness
  - **FloodSENS:** AI-powered flood mapping
  - **EUGENIUS:** Border Permeability Mapping



Satellite

EO Data Generator(s)

Value Adder(s)

End Users

“Raw”/L0 EO Data

L1 EO Data

L2+ EO Products

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Objectives

Objective 1

Elaborate the EO end-to-end information generation chain that could be open to interference

Objective 2

Characterise types of potential interference and the expected consequences

Objective 3

Specify methods to detect potential interferences

Objective 4

Specify methods to counter interference and formulate a methodology integrating these methods

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Why this is important for you

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The Situation

- Satellite imagery once considered a highly reliable source
- Recent rise in fake information questions this
- Ability for information to spread rapidly increases threat

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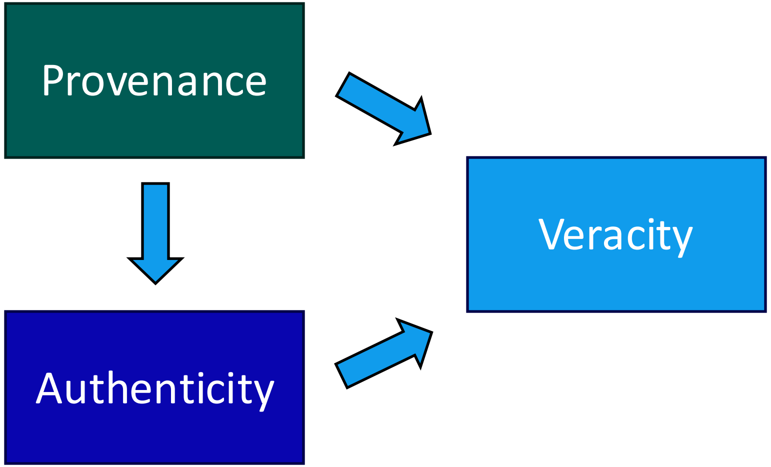
The Problem

Are you certain of the **veracity** of the data you are providing or using?

- Do you know the **provenance** of your input data?
- How can you prove the **authenticity** of your EO products?



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The Solution

- **Understanding where** your EO chain could be open to interference
- Knowing what to do to **counter such interference**
- Putting in place methodologies that **safeguard your EO chain**
- Being able to **ensure your customers** of your EO data veracity

We can help!

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What we have done

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Investigated EO chain elements

Consider these elements in all parts of the EO data product chain.
Each can be relevant at multiple stages

Information Generation	• Data collection • Content creation • Authorship
Verification & Validation	• Fact checking • Quality control • Including external auxiliary data
Packaging & Structure	• Formatting • Metadata creation
Distribution	• Publishing • Platforms • Network transmission
Archiving & Preservation	• Storage • Retrieval
Ethical & Legal Considerations	• Copyright & IP • Privacy & security • Bias & objectivity

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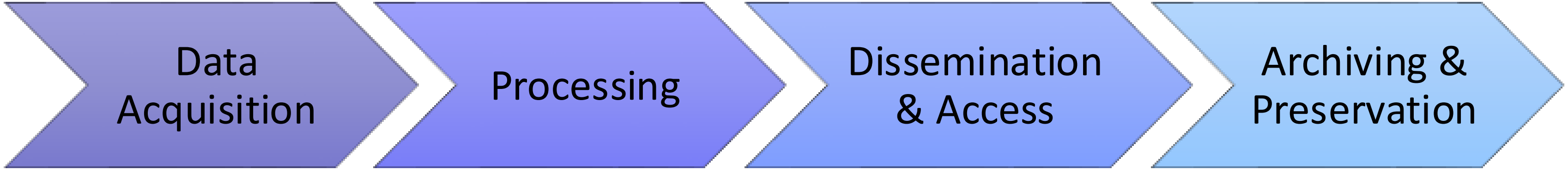
Investigated EO chain lifecycle

We must consider each of the topics from the previous table at each of these points in the chain:



Raw data is acquired and downlinked to the GS

L0 data is taken from the GS and processed to generate data products. This can occur at one or more providers depending on chain complexity.

Output data products are provider to users. These users could have their own follow-on processing chains (e.g. L1→ L2+) or they may already be the final user.

Data and products are archived and stored for variable amounts of time. Whilst in storage they need to remain retrievable in a trustworthy way.

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Trends Identified – EO chains

- Good awareness of **access & network segregation control**
- Limited awareness/implementation of **specific data integrity controls**
- Limited/no ability to demonstrate proof of the **chain of trust** for data
- Limited **logging and archiving processes**
- **Limited mechanisms** to verify authenticity of upstream data providers
- Verification often a manual, but **vulnerable to imitation/attacks**
- Often unclear what/when secondary/tertiary data is added and its source
- <u>Wide risk of well-crafted spoofed data going undetected</u>

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Trends Identified – Challenges

- **Lack** of cryptographic provenance attestation
  - This makes it **difficult to confirm data source/originator**
- **Challenge** in uptake in the different levels of need
- **Need for education** across different consumers

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Trends Identified – Way Forward

- Opportunity to **improve** data integrity tagging at every stage
- Opportunity to **standardise** means to provide trust in data chain
- Opportunity to **standardise** detection technologies
- Opportunity to **define** consistent mechanism to document each data source, its precise version/timestamp, and its **trust level**

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What we will do now

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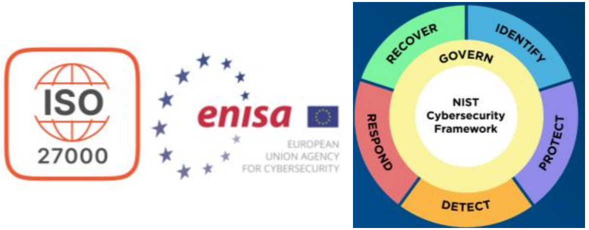
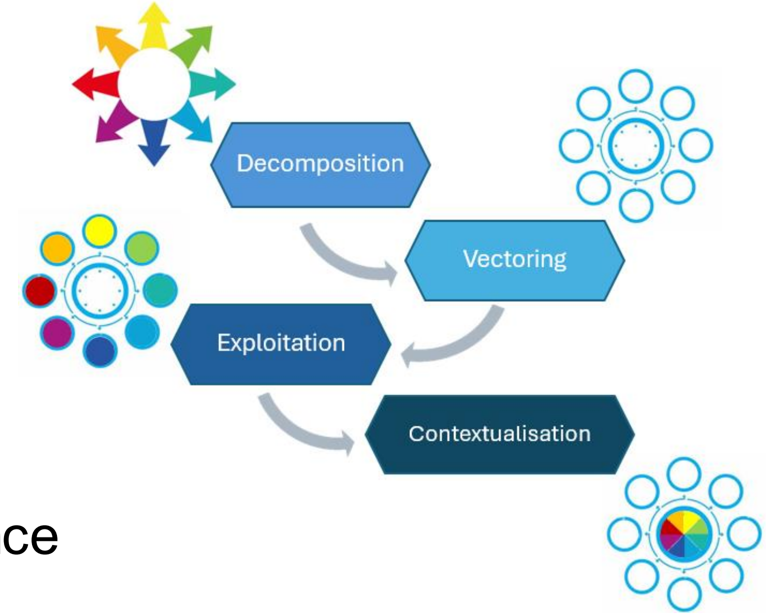
Characterise potential interference


ISO
27000
enisa
EUROPEAN UNION AGENCY FOR CYBERSECURITY
RECOVER
IDENTIFY
GOVERN
NIST Cybersecurity Framework
RESPOND
PROTECT
DETECT

- **Focus** on range of threats:
  - Identified from inputs studied
  - Industry trusted taxonomies
  - Wider studies of data integrity threats

- **Identify** the nature of potential interference using a 4-stage process



- **Understand** consequences of interference

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Detect and counter interference

- **Focus** on potential interference identified in previous task
- **Identify** countermeasures to these potential interferences
- **Evaluate** countermeasures, which take the form of:
  - Technical solutions
  - Human-centred approaches
  - Procedural methods

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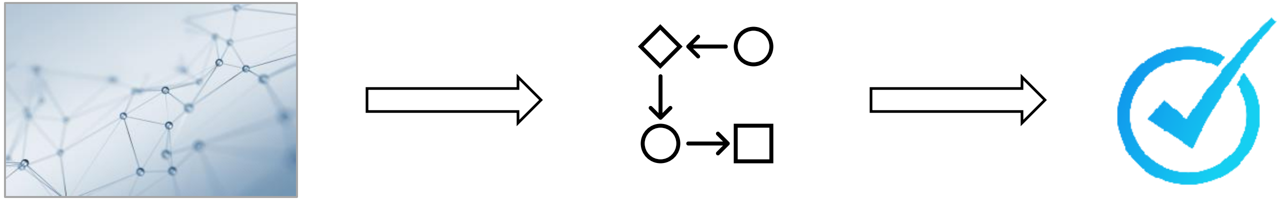
Develop EO veracity methodology

- A process ensuring EO data veracity across the whole EO chain
- Approach follows three phases:
  - Development of **EO Veracity data model**
  - Development of **Standardised Assessment Methodology**
  - **Formalisation and Standardisation** of proposed Methodology



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What we will produce

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Project Deliverables

Report detailing assessment of elements of the end-to-end EO chain

Report characterising the nature of potential interferences

Report describing methods to detect and counter interference

Report outlining end-to-end veracity methodologies

Roadmap for EO companies interested in protecting the veracity of their EO information chains

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Public Outputs/Activities

- Conference attendance:
  - Geospatial World Forum 2026
  - VH-RODA 2026
- Project update webinars
- Communication materials highlighting project activities and findings
- Regular updates to the project website: https://eoveracity.ssl.telespazio.com/

Why we need you!

We don’t want to work in isolation

We want to **meet the needs** of EO industry

We want to **engage** with EO organisations

We need your feedback!

Together we can produce a roadmap that is thorough and practical to implement

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Questions and Feedback

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Questions and Feedback

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Thank you!

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Contact us via the website or at amanda.hall@telespazio.com

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