



Enforce
Empowering Citizens for Environmental Action



Integrating Earth Observation into the ENFORCE Plaza: A Multi-Persona Platform for Environmental Compliance Evidence

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Outline

From observations to environmental compliance decisions

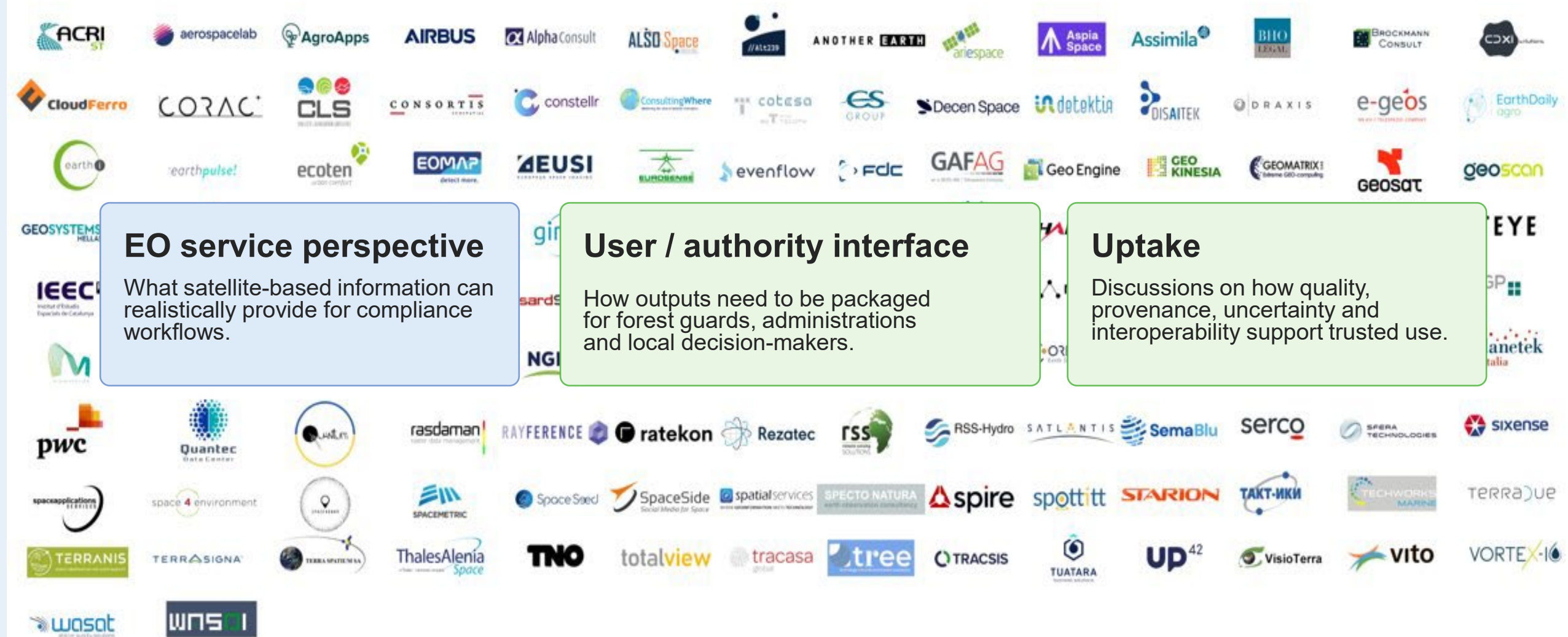
- 1 The gap** Authorities cannot monitor everywhere, ... EO and citizens observation.
- 2 ENFORCE bridge** Connect: Citizen science, EO, sensors and AI are structured to meet authority needs.
- 3 Braşov case** Illegal logging signals are cross-checked with forest plans, permits and traceability data.
- 4 From signal to case** Only validated, documented and confirmed information can support escalation.
- 5 What changes** ENFORCE helps prioritise inspections and make data more auditable, without replacing authorities.

EO supporting citizen and authority workflows more targeted, traceable and scalable

EARSC's role in ENFORCE

EARSC represents Europe's EO services industry and supports the translation of satellite data into operational geo-information services

Connecting operational Earth observation capability with public authority needs



what it adds, where it is limited, and how it becomes useful when combined with citizen and official data

ENFORCE views Official compliance systems are stretched; citizen observations are timely but often unusable harnesses **citizen science and innovative technology** to bridge the gap between locally collected environmental data and the standards required by public authorities for **environmental compliance monitoring and enforcement**.

Public authorities

- Large territories and many risks: forests, water, air, waste
- Periodic inspections cannot be continuous everywhere
- Lack of dedicated staff
- Agency data can arrive after the situation has changed



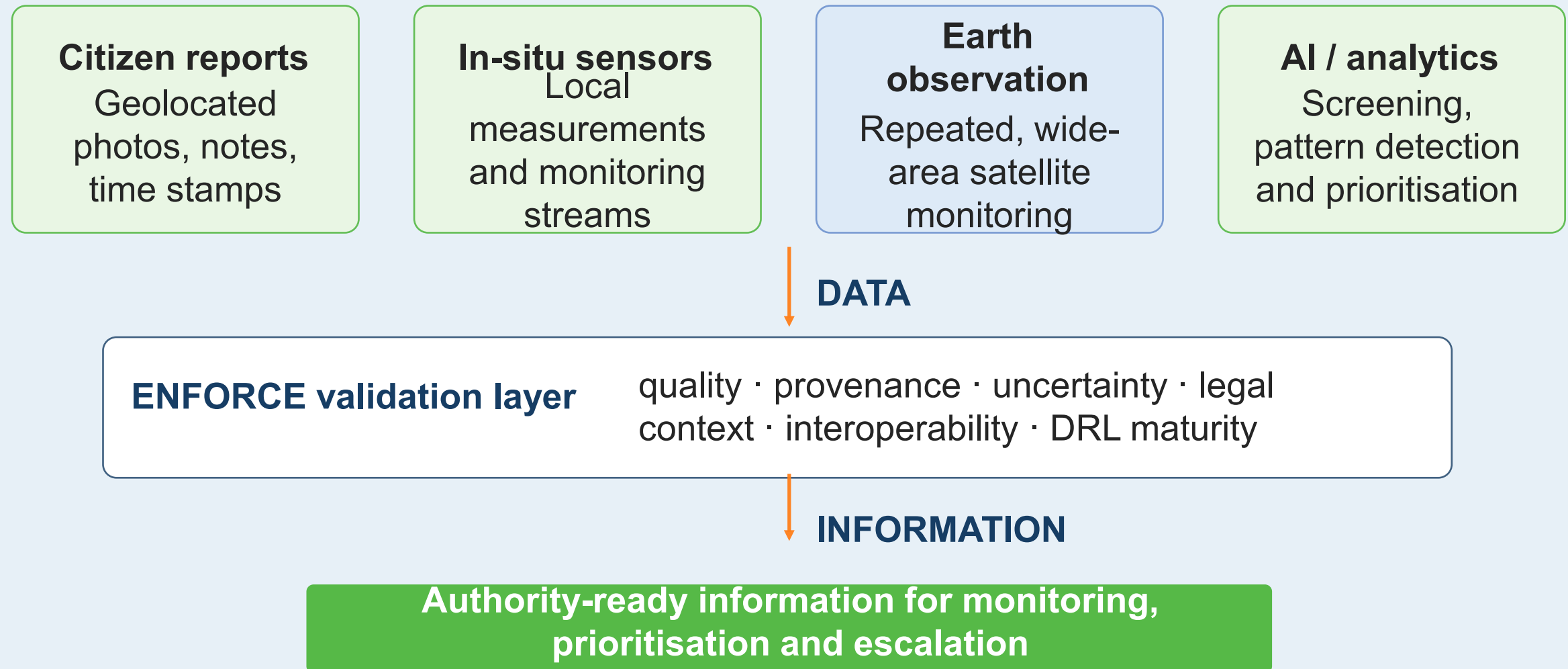
Citizens and communities

- Observe local problems in real time
- Provide photos, location, timing and local context
- Reports are scattered, uneven and not always validated

real-time observations are transformed into structured, documented and validated information that authorities can use

ENFORCE approach: make local observations fit for compliance use

Validation, documentation and interoperability are as important as data collection



Data Readiness Level: making data fit for purpose

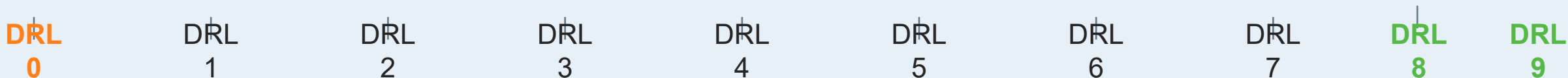
The same dataset may be good for awareness, but not yet ready for enforcement

DRL assesses data maturity across multiple criteria at the same time, producing a profile rather than a simple pass/fail.

Criteria dimensions:

Task-readiness fitness for monitoring or enforcement	Scientific validity sound and reproducible protocols	Legal admissibility regulatory and judicial requirements	Interoperability exchange and use across systems
Availability & access permissions, formats and constraints	Provenance & traceability origin, chain of custody and processing	Data quality & faithfulness accuracy, completeness, timeliness	Citizen contribution participation and empowerment

DRL scale (draft, based on TRL maturity model):



DRL0-1 → Data collected → DRL2-3 Data stored → ... → DRL8-9 Appropriate juridical/spatial/temporal granularity for intended use

Case study focus: Braşov, Central Romania

Enhancing sustainable forest management in Brasov, Romania



Environmental compliance objective

Sustainable Forest mgt
Suspected illegal logging

unauthorised timber
harvesting

possible falsified
transport documentation

need for faster, better
targeted responses

Main users and decisions supported

Local Public Forestry Administrations of
Kronstadt and Săcele

continuous monitoring beyond patrols alone

National Institute for Research and
Development in Forestry

trend analysis and forest health assessment

Braşov Forest Guard and Braşov City Council

structured alerts for enforcement coordination

Complementary evidence for data streams

EO + citizens + official context

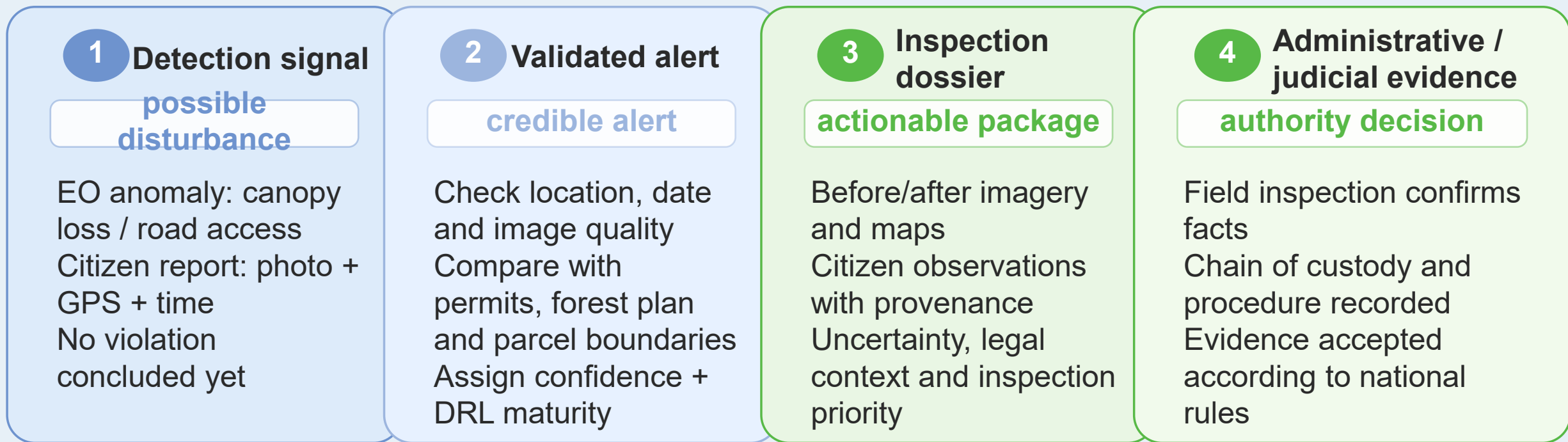


“Triangulated alert”
stronger prioritisation, fewer false
positives, clearer next action

combined data improves confidence and prioritisation; it does not
automatically create legal proof

From detection signal to enforcement-ready case

EO and citizen observations complement each other, but they only become usable for compliance after validation, documentation and authority confirmation.



Quality gates: traceability, uncertainty, validation against official records, and confirmation by competent authorities.

ENFORCE does not replace inspections; it turns scattered EO and citizen inputs into prioritised, auditable information for forest authorities.

ENFORCE Plaza Toolkit: from citizen data to compliance evidence

Turns citizen-generated environmental data into **evidence authorities can act on**

Modular architecture



Six layers (Acquisition, Governance, Analytics, Visualization, plus cross-cutting API and Infrastructure) connected through **open APIs**

Trusted data

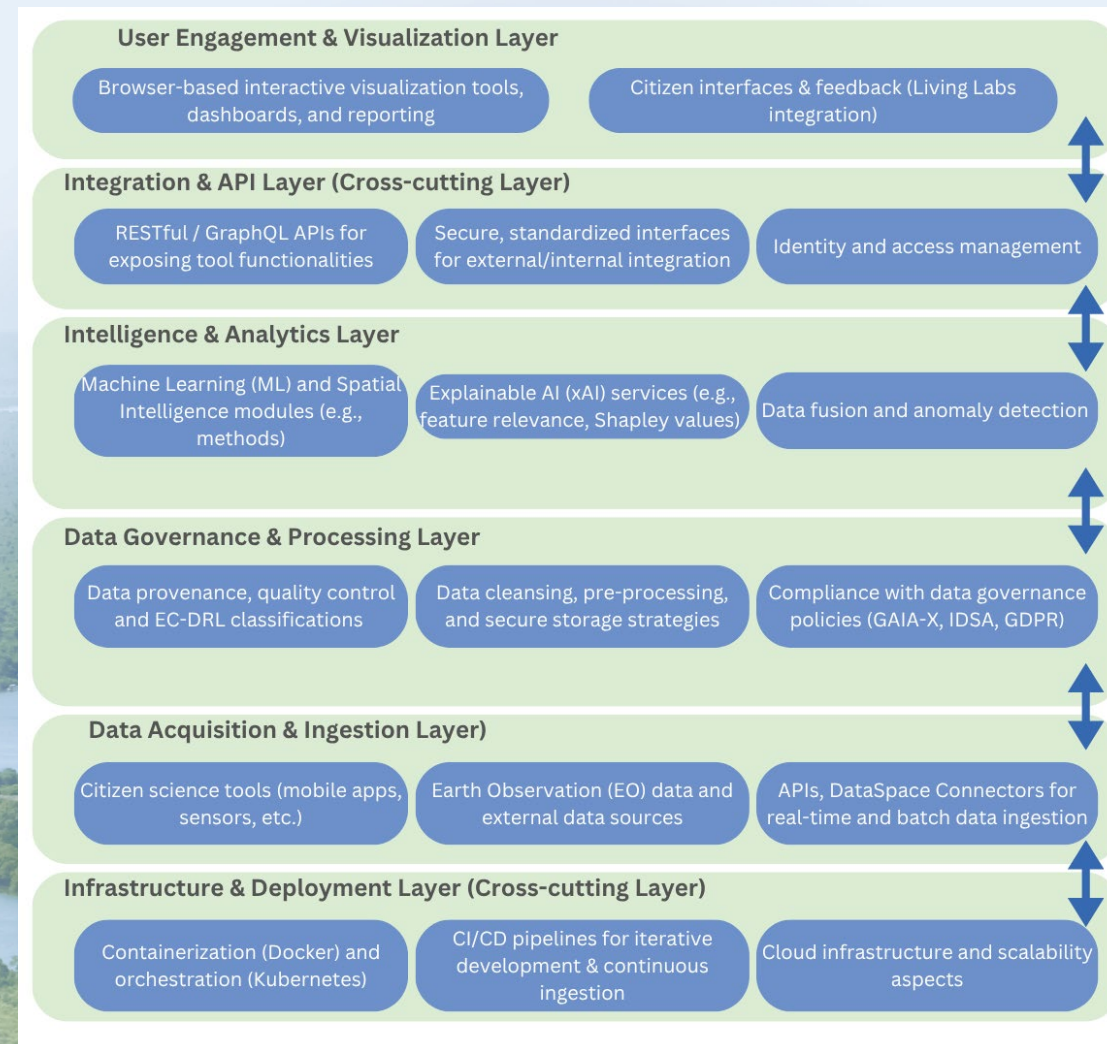


Follows **FAIR** principles and **GAIA-X / IDSA** Data Space standards

User-centric



Dashboards, maps and **explainable AI (xAI)** for citizens, researchers and inspectors



Who uses the ENFORCE Plaza Toolkit and how

Five user groups, from reporting data to acting on it



Citizens and citizen scientists

Report and collect data: photos, measurements, processed satellite images. See feedback and follow what happens next



Public authorities and inspectors

Get alerts on pollution hotspots and possible violations, check reports, **take enforcement action** and send feedback to citizens



Researchers and scientists

Check data quality, run analytics and AI models, and make citizen data scientifically sound



Platform and case study administrators

Manage data intake, metadata, access rights and data quality



Local stakeholders

NGOs, environmental organisations, land and forest managers **use maps and risk outputs** to plan, protect and restore the environment

What EO can and cannot do in the Braşov case

A strong contribution to screening and prioritisation — not automatic legal proof

EO adds

- ✓ Wide-area and repeated monitoring of forest disturbance
- ✓ Sentinel-1 radar adds resilience under cloud cover
- ✓ Sentinel-2 supports 10 m optical land-cover change detection
- ✓ Commercial VHR imagery can add parcel-level detail when available

EO still needs

- ! Canopy loss does not automatically reveal the cause
- ! Road proximity is a prioritisation factor, not proof
- ! Optical imagery can be limited by cloud and acquisition timing
- ! Admissibility depends on national rules and proceeding type

Expected impact in Braşov: faster, clearer, more auditable decisions

Value is created when evidence is packaged around authority workflows

Earlier screening

disturbances flagged before the next routine patrol

Better prioritisation

inspectors focus on higher-confidence discrepancies

Fewer false alarms

citizen and EO signals checked against legal context

Auditability

maps, time stamps, provenance and uncertainty recorded

ENFORCE does not replace competent authorities or field confirmation. It helps them decide where to look first and how to document what they find.

Key takeaways

From monitoring innovation to compliance-ready environmental governance

1

Complementarity is the core innovation

EO provides scale; citizens provide local detail; official records provide legal context.

2

Validation is where data becomes useful

Signals become alerts only after location, time, quality, uncertainty and records are checked.

3

DRL makes readiness explicit

Different uses require different standards: awareness, monitoring, inspection, enforcement.

4

The result is better prioritisation

Authorities receive clearer, more auditable information without losing their decision-making role.

THANK YOU

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