



TOWARDS A GEOSPATIAL INTELLIGENCE FRAMEWORK IN ENVIRONMENTAL CRIMES ENFORCEMENT: THE IMPEL GIECA PROJECT

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The IMPEL GIECA Project



Why?

Enhance the geospatial intelligence in the fight against environmental offences



How?

Establishing **technical** and **judicial** requirements to obtain court-proof evidence from geospatial data



Project team



European Union Network for the Implementation and Enforcement of Environmental Law

Mission: ensuring effective implementation and enforcement of European environmental law by promoting professional collaboration, information and best-practice exchange between environmental regulators



Albania



Belgium



Croatia



Czech Republic



Greece



Hungary



Ireland



Italy



Kosovo



Latvia



Malta



Portugal



Romania



Spain



The Netherlands



Turkey



Ukraine



United Kingdom

42 team members & 23 supporting contributors

Evolution of the project

PHASE 1: 2022 - 2024

GIEDA Project

Geospatial Intelligence for **Environmental Damage** Assessment

Analysis of real-world cases involving the use of geospatial technologies for environmental damage ascertainment and assessment to understand methods and strengths/limitations

PHASE 2: 2025 - 2027

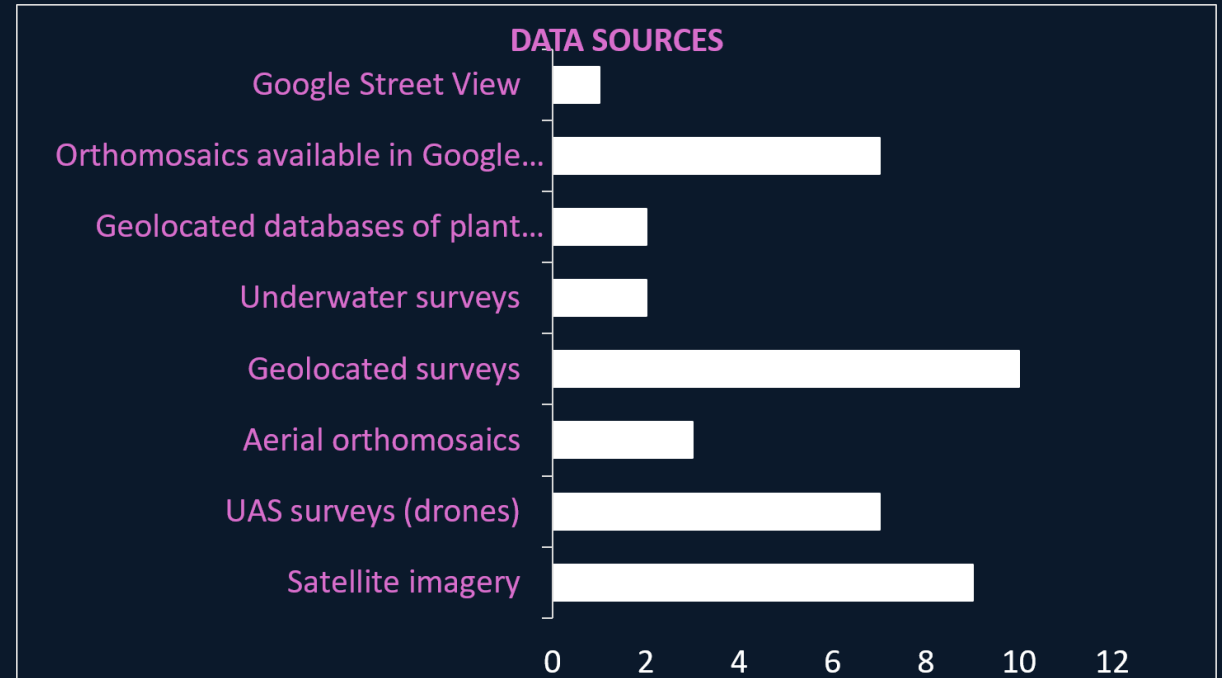
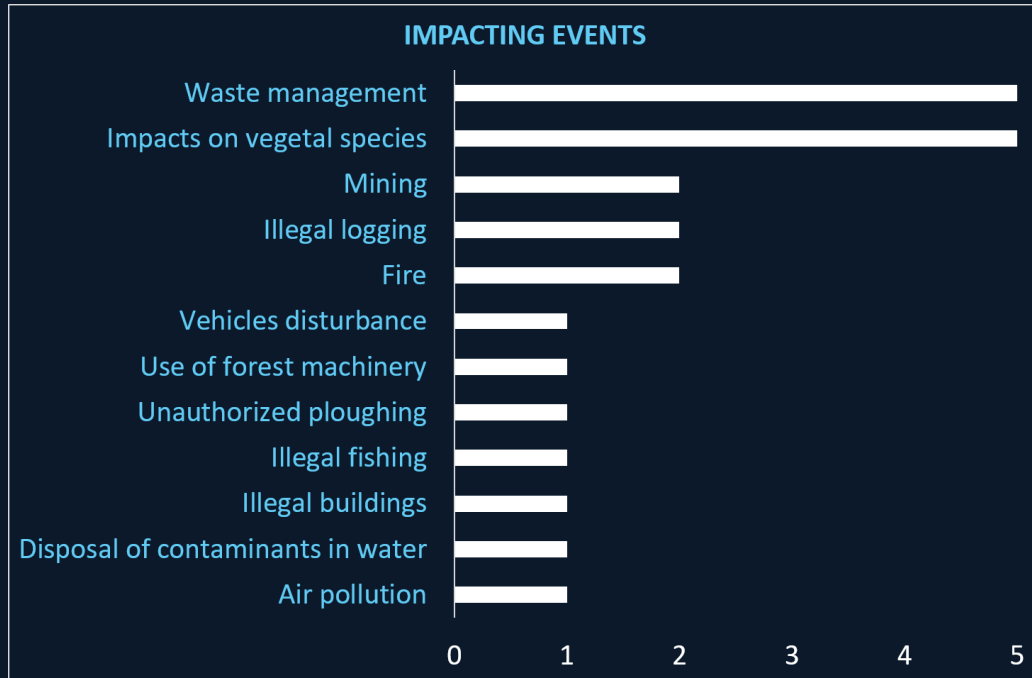
GIECA Project

Geospatial Intelligence for **Environmental Compliance** Assurance

Promotion of multidisciplinary dialogue among experts from different networks, to promote strategies to improve the operational use of geospatial intelligence

First phase GIEDA: main outcomes

<https://www.impel.eu/contents/libraryfile/2022-24viiiwg10-gieda-report.pdf>



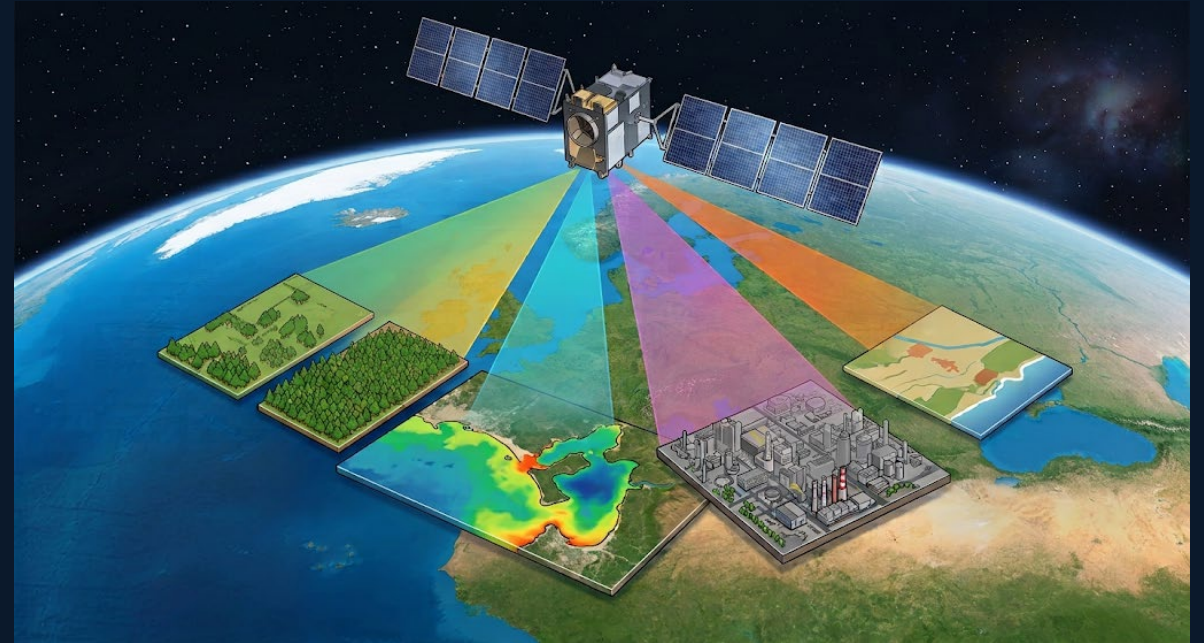
- Difficulty in sourcing technical-judicial data on the analyzed cases
- Lack of specific laws/guidelines and standardized procedures

The core problem

Geospatial Intelligence (GEOINT) is useful for assessing multiple categories of infractions using heterogeneous data types and methods

BUT

In the absence of specific laws and guidelines or accessible databases of real cases to establish a foundation for data admissibility and strong evidentiary value



GIECA project: bridging Tech & Law to support the compliant use of GEOINT



Identify solutions to mitigate the impact of limited resources within environmental agencies



Provide approaches to bridge the gap in forensic geospatial expertise

Promote standardized procedures to ensure the admissibility and effectiveness of geospatial data

Geospatial intelligence round-table



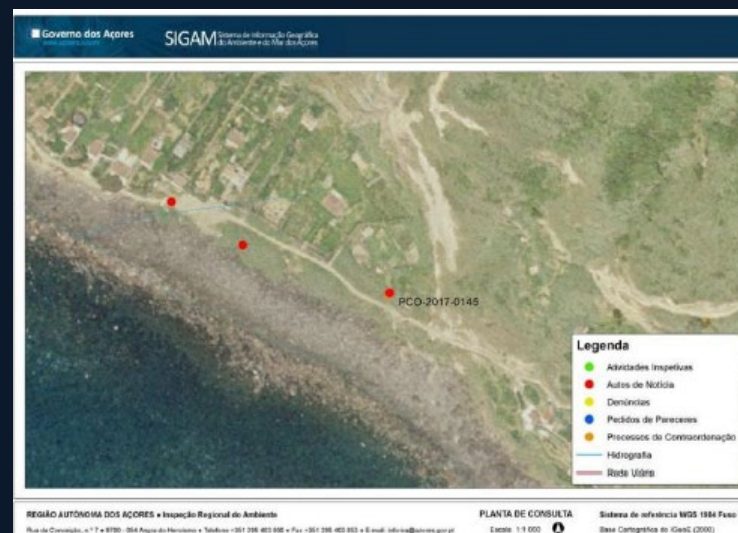
Faculty of Law - Comenius University
Bratislava (Slovakia) - 20 May 2025

<https://www.impel.eu/contents/library/file/2022-24viiiwg10-gieda-report.pdf>

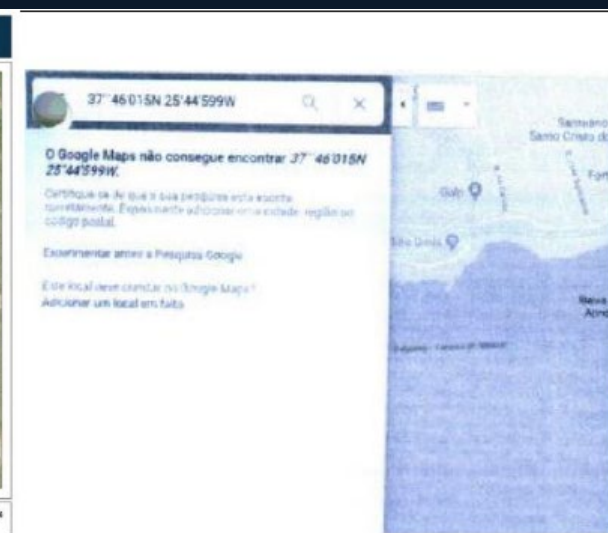
- **Conditions governing the use of different types of geospatial data**
 - Airborne and satellite remote sensing, Drones
 - Authorizations, Trans-national use of geospatial data
- **Information can be derived from geospatial data and its characteristics**
 - Quantitative information & qualitative evidence
 - Error estimate and margin
 - Reproducibility & Standardization
- **Issues for investigation and evaluation activities**
- **Remarks for reports to support inquiries**

Technical and judicial analysis of real cases

CASE NO. 13		IRA Inspeção Regional do Ambiente
Event		
Type of event	Potential infraction. Constructions in Ecological Reserve and violation of special land use plan provisions.	
Reference date	17/03/2017	
Location	Rocha da Relva (São Miguel island, Azores), Portugal	
Natural resources interested	Ecological Reserve	
Geospatial data		
Starting of the activity	Administrative offense proceedings	
Source	Own data – localization of the constructions; Public data – <u>orthophotomap</u> .	
Methodological approach	ArcGIS software was used for locating the constructions and subsequent analysis.	
Produced information	Construction location map. No specific standards used.	
Authorizations	N/A	
Data providers	Image produced in ArcGIS, by IRA	
Analysis providers	Analysis performed by IRA GIS technician.	
Key elements of geospatial intelligence	A posteriori analysis was essential to identify the area and the settings of the construction.	
Legal issues		
Infraction	Constructions in Ecological Reserve and violation of special land use plan provisions.	
Decision	Fine suspended, conditioned to the demolition of the structure.	
Judicial challenges	The defendant claimed, among other arguments, that there was no geographic location with those coordinates on Google Maps.	
Sentence	The police report was deemed invalid due to a lack of correct <u>geographic coordinates</u> .	
Feedback about the use of GI in the court proceeding	Although the investigation report included a detailed description of the facts and aerial photos and context of the location, the sentence in question revoked the administrative decision, with the main argument being the lack of specificity of the location	
Images		



Location map of the construction over orthophotomap - GIS project produced by IRA.



Evidence of the defense showing that it was were unable to locate the place using the coordinates on Google Maps.

Let's bring structure to the context!



Standard operating procedure SOP



Preliminary concepts

- Geospatial data types and sources
- Legal powers and duties



Requirements to use geospatial data

- Data eligibility
- Data evidentiary weight and effectiveness

SOP – Preliminary concepts



Preliminary concepts

- Geospatial data types and sources
- Legal powers and duties

- ✓ Geodata formats and source types vs. environmental offenses
- ✓ Framework of powers and obligations of authorities involved in investigating and managing environmental offenses

REMOTE SENSING AND INVESTIGATIVE POWERS UNDER ITALIAN LAW

- **Private, restricted, corporate, or residential premises:** prior authorization from the judicial authority **REQUIRED**
- **Public or publicly accessible areas:** prior authorization **NOT REQUIRED**

SOP – Requirements: data eligibility



Requirements to use geospatial data

- Data eligibility
- Data evidentiary weight and effectiveness

Compliance with relevant sector-specific European and national regulations (distinguishing between satellite, drone, and aerial data, if relevant)

- Privacy and personal data protection (e.g. EU R. 2016/679)
- Operational rules for equipment (e.e. EU R. 2019/947)
- Authorization and registration requirements of devices and softwares/algorithms

PRINCIPLE OF LEGALITY

SOP – requirements: data evidentiary weight



Requirements to use geospatial data

- Data eligibility
- Data evidentiary weight and effectiveness

Robust and well-explained analysis, providing «ready-to-use» information for the different authorities dealing with environmental infractions, considering that geospatial data can contribute to :

- ☐ Evidence in criminal proceedings
- ☐ Legal basis in administrative acts
- ☐ Support for planning and monitoring activities

SOP scheme

STEP 0 - PRELIMINARY CONCEPTS

- Identification of geo-data types and sources to use
- Framework of powers and obligations of authorities



STEP 1 - DATA ELIGIBILITY IS ENSURED?

- Law sectors
- Data protection and privacy
- Usage/authorization of the sources and algorithms

YES

NO

Geospatial data are not admissible in criminal proceedings or administrative acts

STEP 2 - WHAT IS DATA EVIDENTIARY WEIGHT?

Weight of GEOINT data as:

- Evidence in criminal proceedings
- Legal basis of administrative acts
- Support for predictive and monitoring activities

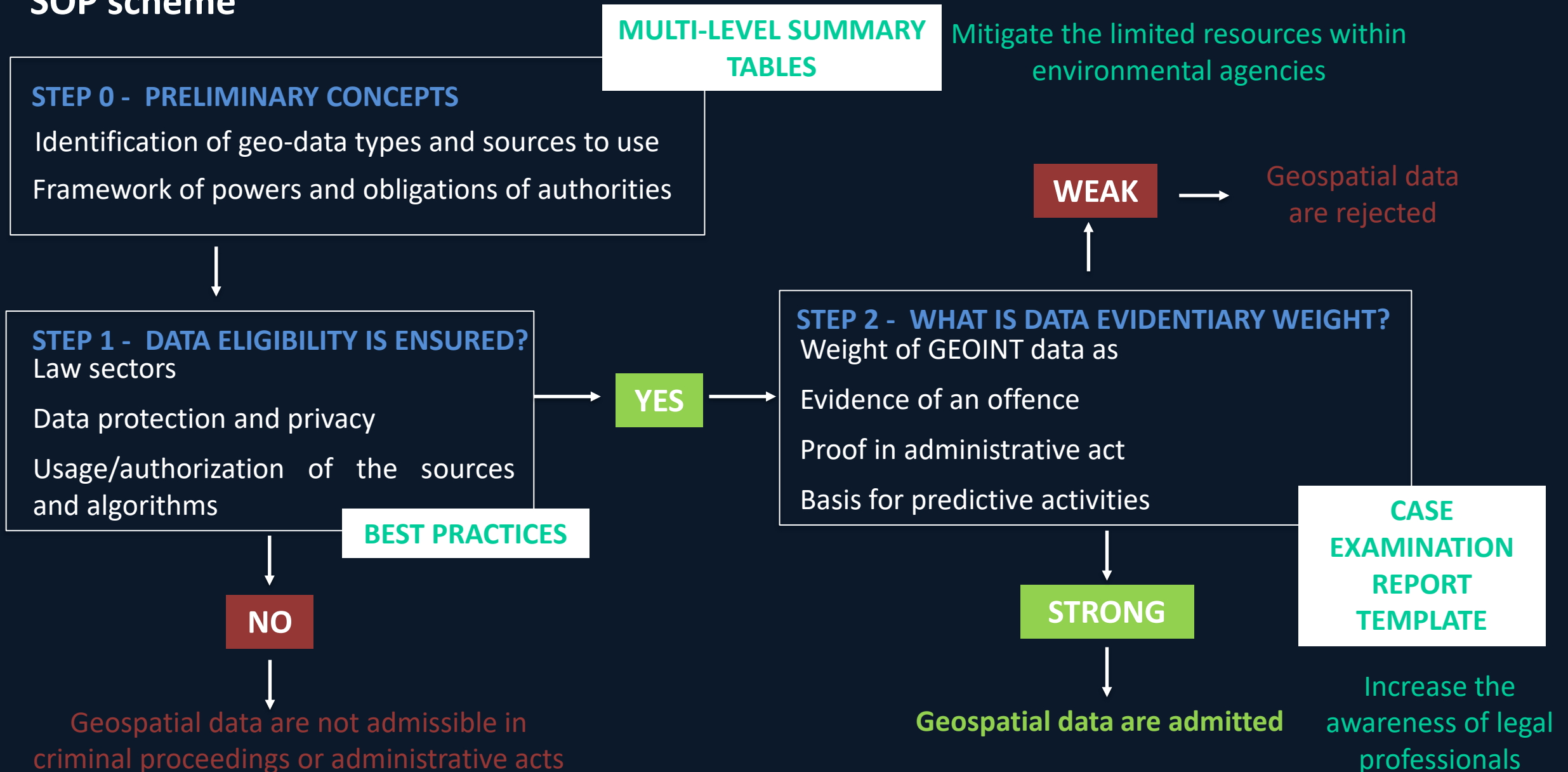
STRONG

Geospatial data are admitted

WEAK

Geospatial data are rejected

SOP scheme



SOP – operative tools

MULTI-LEVEL SUMMARY TABLES

 ENVIRONMENTAL OFFENCE	 EXPECTED IMPACTS	 TARGETS	 GEOSPATIAL DATA / METHOD TO USE
 Illegal waste dumping			
 Industrial emissions			
 Quarrying / extraction			
 Water pollution (e.g. wastewater discharges)			
 Deforestation / land degradation			
 Uncontrolled urban development			

CASE EXAMINATION REPORT TEMPLATE

- ☒ Executive summary
- ☒ Detailed findings
- ☒ Technical methodology
- ☒ Metadata annex
- ☒ Chain of custody log
- ☒ Expert declaration

WORK IN PROGRESS!!!

Geospatial Intelligence for Environmental Compliance Assurance (GIECA)



Year

2023

Status

Ongoing

Lead country and contact

Italy | [Federico Filipponi](#) & [Laura Calcagni](#)

Tags

AI

ECD

ELD

Geointelligence

Methodology

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<https://www.impel.eu/en/topic/cross-cutting-tools-and-approaches/environmental-damage-and-liability/projects/geospatial-intelligence-for-environmental-compliance-assurance-gieca>