# ENVIRONMENTAL CRIMES WORKSHOP 2024

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# IMPEL Geospatial Intelligence for Environmental Damage Assessment (GIEDA) project

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"GEOINT encompasses all aspects of imagery and geospatial information and services. It includes, but is not limited to the analysis of literal imagery; geospatial data; and information technically derived from the processing, exploitation, literal, and non-literal analysis of spectral, spatial, and temporal fused products. These types of data can be collected on stationary and moving targets by electro-optical, synthetic aperture radar, related sensor programs, and non-technical means (to include geospatial information acquired by personnel in the field)."

*Retired Air Force Lt. Gen. James R. Clapper, October 2005*

**In recent decades there has been a growing awareness that geospatial technology has the capability to monitor, inspect and assess the environment, producing the information needed by regulators to support investigations of eco-criminal acts and violations of environmental laws.**

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Environmental compliance assurance describes all the ways in which public authorities **promote**, **monitor** and **enforce** compliance with the relevant rules.

- **Environmental Liability Directive (2004/35/EC)**

Preventing and remedying damage to protected species, natural habitats, water and soil

- **Environmental Crime Directive (2024/1203/EC)**

Addressing serious environmental crimes through criminal law and supporting national enforcement capacities

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# FIELDS OF APPLICATIONS

Geospatial intelligence technology exists, its applicability and usefulness has been demonstrated to support surveillance, investigation, ascertainment of illegal acts to the environment.

## Surveillance

Surveillance/early-warning approach
Wide scale (typically from satellite data at least at municipal/regional level)

Methods:

Photo-interpetation

Anomalies detection

In case of environmental illegality early detection is crucial

## Investigation

Support to the analysis/investigation of a specific site of interest (arised from other different possible inputs)

Typical aspect of interests:

Extension / area involved

Timing

Type of materials

Volumes

## Ascertainment

Use in support to penal and judgement procedures, in some case direct use in courts.

Typical requirements:

Need of secure and certified information (precise dates of acquisition of EO data)

Accuracy metrics and uncertainty elements are needed/mandatory to complement quantitative estimates

Producing and gathering evidence is essential to successfully prosecute environmental crimes and environmental damage

How new techniques can be used to more efficiently prevent and detect environmental offenses?

- Raise the awareness of judges, prosecutors, administrative fining authorities about the use of geospatial intelligence

- Improve capability of practitioners to use geospatial intelligence technology

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# IMPEL NETWORK

The European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) is an international non-profit association of the environmental authorities of the European Union Member States, acceding and candidate countries of the EU, EEA and EFTA countries and potential candidates to join the European Community.

European Union Network for the Implementation and Enforcement of Environmental Law

## *Objectives of the network*

The Network objective is ensuring effective implementation and enforcement of European environmental legislation by promoting professional collaboration, information, and best-practice exchange between environmental regulators.

The core of IMPEL activities take place within a project structure and concern awareness raising, capacity building, peer review, exchange of information and experiences on implementation, international enforcement collaboration as well as promoting and supporting the practicability and enforceability of European environmental legislation.

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IMPEL Expert Teams

1. Industry and air

2. Waste and TFS

3. Water and land

4. Nature protection

5. Cross-cutting tools and approaches

European Union Network for the Implementation and Enforcement of Environmental Law

**"We need new techniques to prevent and detect environmental offences** ... need to actively seek opportunities to improve the use of new techniques such as big data analysis, geo-intelligence (satellites, drones) and artificial intelligence, that will enable authorities to detect and act earlier on potential breaches and respond quickly to any issues, with clearer priority areas and targets."
*Statement from the four Networks on environmental crime, 3 October 2023.*

ENPE

EUFJE

IMPEL

EnviCrimeNet

Actions that would significantly promote the use of geospatial intelligence to investigate and ascertain eco-criminal acts across EU are:

- identify effective methodological approaches
- raise the awareness of prosecutors and judges about appropriate and reliable product available from geospatial intelligence
- perform requirements analysis to identify necessary information for use in the courts that can be generated by geospatial intelligence
- improve capability of environmental agency and competent authorities to use such analysis techniques

**Final objective is increasing environmental agencies and regulators capability**

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# GIEDA PROJECT OVERVIEW
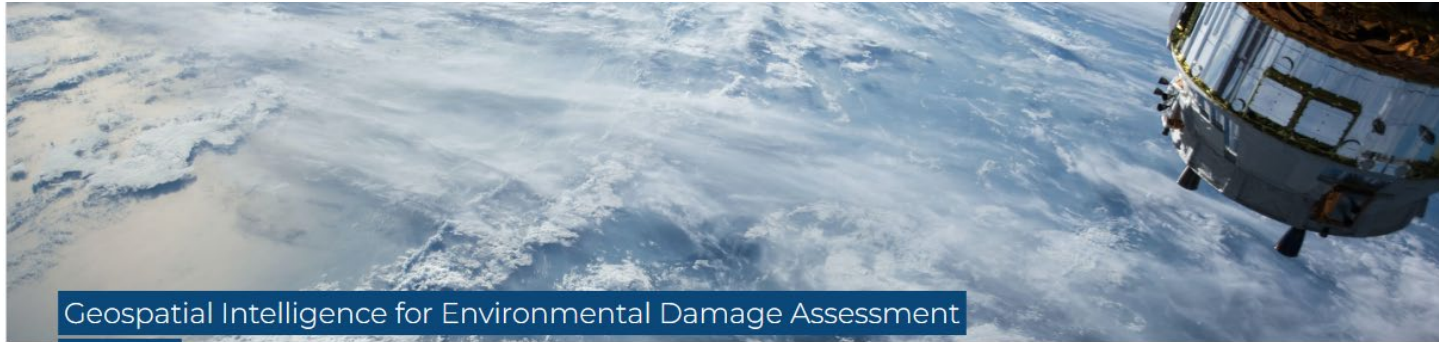


Geospatial Intelligence for Environmental Damage Assessment (GIEDA)

European Union Network for the Implementation and Enforcement of Environmental Law

IMPEL Geospatial Intelligence for Environmental Damage Assessment (GIEDA) project aims to contribute to information needs related to the detection, investigation and the ascertainment of the environmental damage due to illegal activities affecting environmental matrices by reporting effective methodological approaches using geospatial intelligence, based on the use of earth observation and geostatistical analysis.

- *First phase*

Focus on reporting effective methodological approaches for environmental damage assessment, by identifying real cases

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Geospatial Intelligence for Environmental Damage Assessment (GIEDA)

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Presented good practices for reported real cases contribute to share knowledge, with the aim of building technical and procedural capacity in producing a posteriori evidences of environmental damage caused by environmental incidents (e.g. responsible for water pollution), violations (e.g. unauthorized ploughing in protected sites), eco-criminal acts (e.g. illegal forest logging, illegal dumping), affecting various environmental matrices, like water, soil and biodiversity.

*Project duration: 18 months (July 2023 – December 2024)*

**33 active participants**
**17 organizations**
**13 countries**

**18 followers**
**12 organizations**
**9 countries**

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# GIEDA PROJECT WEBPAGE

Report on demonstration **real cases** using **geospatial intelligence** to produce **evidences** and support the assessment of environmental damage in courts, including:

- methodological approaches

- organizational technical aspects

- juridical aspects and requirements

- recommendations to support guidelines definition

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Real cases collection is performed through the following actions:

## Database query

- Setup short (multilanguage) survey to identify national Databases of legal environmental judgments
- Identify final set of keywords and regulations to be queried in Database
- Case selection from Databases query

## Survey

- Identify national competent authorities (target audience), regulations and illegal topics
- Setup and disseminate survey to identify real cases using of geospatial intelligence to generate evidences used in courts for environmental damage
- Analyze answers from target audience

## Other sources of information

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## Objectives

- Identify national regulations implementing Environmental Liability Directive

- Identify Databases to find cases for the reporting

- Identify cases to be reported

- Perform selection based on use of geospatial intelligence as evidence for environmental crimes proceedings

- Get information about the possible use of geospatial intelligence

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- 24 responses from 7 countries

- Identified national regulations implementing Environmental Liability Directive

- Lack of available databases

- No results from query on databases not reported by survey target audience

- Survey allowed to identify 6 real cases using geospatial intelligence (3 ELD case and 3 non-ELD cases, both in legal and administrative procedure)

- Activity that determined the environmental damage for the reported cases are mainly related to waste management and disposal of contaminants in soils

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**General assessment of the case (5 cases)**

- estimation of impacted areas (or volumes) and establishment of the period of violations

- photogrammetric surveys, drones, satellite data

**Individuation of the proofs of the environmental damage (2 cases)**

- waste volume assessment (orthoimages and satellite images)

**Assessment of the environmental damage remediation**

- no real cases have been identified

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# QUESTIONNAIRE: PRELIMINARY RESULTS

threat of such damage    DANNO AMBIENTALE    master program

CONSULENTE GIURICO    REGIONALE    AMBIENTALE    Associate    responsible

Associate Commissioner

## competent authority
National Institute of the Ministry

PROTEZIONE AMBIENTALE

Criminal Law Public prosecutor    **environmental damage**

Environmental Guard

PROTECTION AGENCY    AGENZIA REGIONALE    damage investigation

*Responders role*

Earth    report

geospatial datasets    satellatis images

city's surveyors    satellite imagery    file records

Google    drone imagery    aid of satellite    orthoimages

waste    programme

*Source of information*

Lessons learned

- Absence of official database of environmental damage cases, both at European level and national scale

- Some of the existing databases have restricted access

- Some reports are available, but it is difficult to obtain technical information

QUESTIONNAIRE: PRELIMINARY RESULTS

From your point of view, geospatial intelligence techniques can:

Left column items:
- Increase environmental surveillance by providing early-waning detection of eco-criminal acts
- Provide evidences for the imminent threat of damage cases
- Provide evidences for the confirmation of environmental damage
- Provide evidences for the confirmation of environmental crime
- Provide quantitative information that can support the assessment of environmental damage
- Provide quantitative information that can support the assessment of environmental crime
- Increasing the evaluation capacity of judges and prosecutors
- Support environmental damage ascertainment
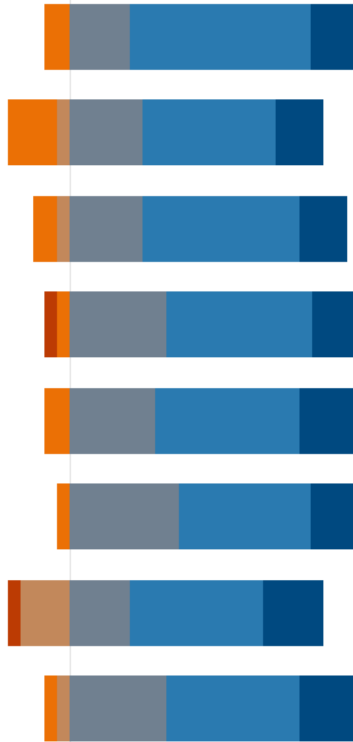
Right column items:
- Supporting the monitoring of remediation measures for environmental damage
- Satellite remote sensing can provide ex-post information to analyze the status of natural resource...
- Details on the algorithms used to generate qualitative and quantitative information must be provided
- The methodological approaches used to produce the evidence must be intelligible and reproducible
- Uncertainty measures should be provided along with the estimates
- There is a need to build capacity of environmental agencies to use geospatial intelligence
- Making use of expertise from private companies certified for performing Geospatial Intelligence...
- There is the need to better identify terms and requirements from prosecutors and judges for use...
- Improving efficiency in the ascertainment phase by preliminary analysis using geospatial intelligence

Legend:
- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree
- No opinion

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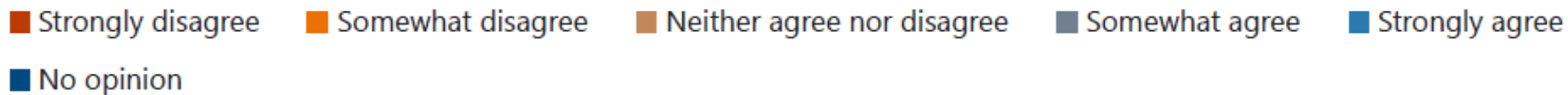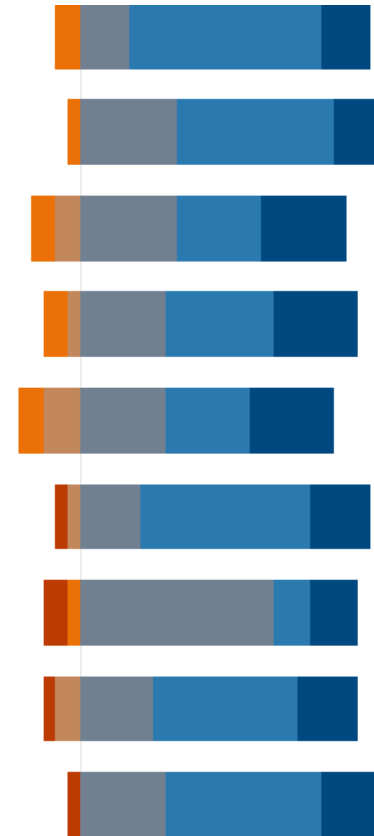
Description and analysis of the real cases where an environmental damage or an imminent threat of environmental damage is identified (period 2017-2023)

5 cases with the application of the geospatial intelligence:

- Preliminary assessment of the case

- Individuation of the proofs of environmental damage

- Assesment of the environmental damage remediation

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# SUMMARY
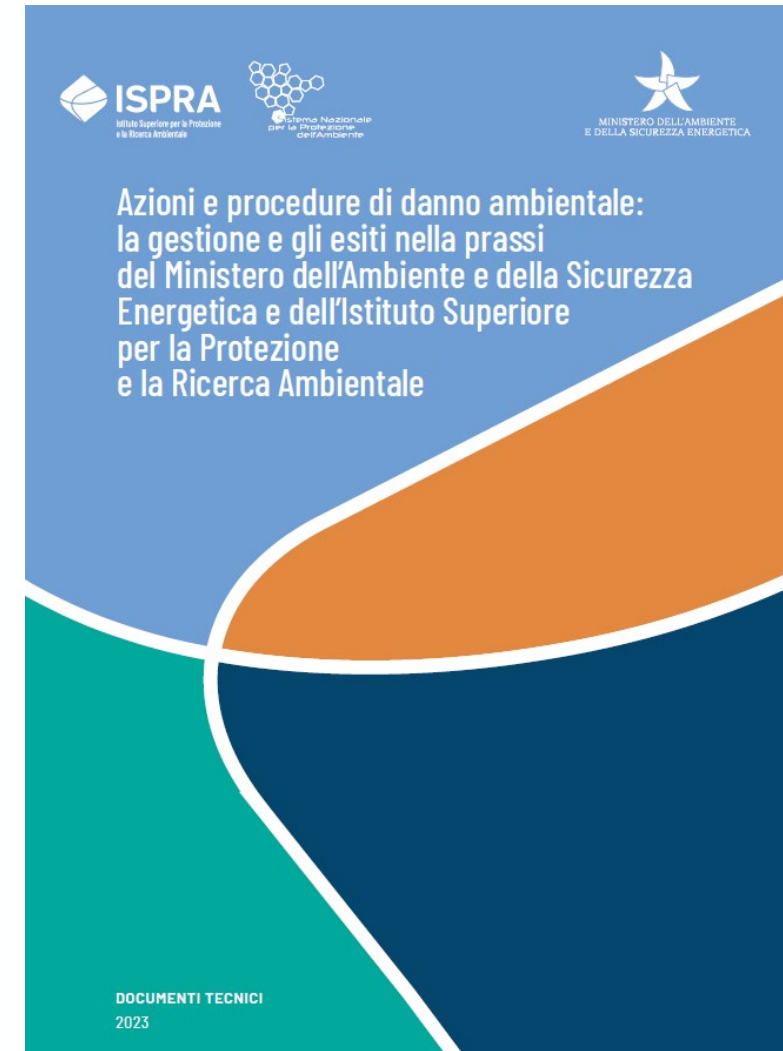
**Application context of geospatial intelligence**:
- Preliminary assesment of the case
- Individuation of the proofs of the environmental damage
- Assesment of the environmental damage remediation

**Different types of events**:
- Fire
- Damage on protected species or habitat
- Quarry management
- Landfill management

**Type of procedures**:
- legal
- administrative

**Data analysis performed by**:
- Technical specialists (legal procedure)
- Environmental agencies (administrative procedure)

# GIEDA PROJECT ACTIVITIES

**Need**

Increase GIEDA project members knowledge about geospatial intelligence

**Action**

Workshop given by *Geospatial Intelligence for Environment Protection against illegal activities* (GEOINT4ENV) Project supported by DG-ENV as part of the FPCUP WP 2021

**Topics**

- Illegal building / construction
- Manure spreading
- Illegal logging
- Air pollution
- Oil Spills
- Detection of floating marine litter
- Waste

More information on GEOINT4ENV will be given during presentation on 12 June 16:00
*Session S6 - Forest and agriculture related crime*

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Geospatial Intelligence for Environmental Compliance Assurance (GIECA)

- report real cases related to environmental crimes
- improve awareness of judges and prosecutors about the possible use of geospatial intelligence
- provide a baseline of needs to setup action aimed at improving agencies capacity

Project duration: 36 months (January 2025 – December 2027)

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## Objectives

- bring together EUFJE, ENPE and EnviCrimeNet networks in the discussion about requirements, with the aim of fostering institutional use and the legal application of technologies for environmental analysis and making regulations more efficient

- reporting on demonstration real cases, technical and juridical requirements for the use of evidences produced with geospatial intelligence in the courts

- interacting with EUFJE, ENPE and EnviCrimeNet networks in order to analyse requirements and provide a baseline of needs that could be used to setup action aimed at improving agencies capacity

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# CONCLUSIONS

*IMPEL Geospatial Intelligence for Environmental Compliance Assurance (GIECA) initiative*

**First phase (GIEDA)**

- Initiated the process of identification of the juridical aspects and requirements relevant to the use of information produced by geospatial intelligence

**Second phase (GIECA)**

- improve awareness of judges and prosecutors about the possible use of geospatial intelligence
- perform requirements analysis to identify necessary information for use in the courts that can be generated by geospatial intelligence
  - improve capacity of environmental agency and competent authorities to use such analysis techniques

**Third phase**

- improve capability of environmental agencies and competent authorities to use geospatial intelligence technology

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# CONCLUSIONS

*IMPEL Geospatial Intelligence for Environmental Compliance Assurance (GIECA) initiative*

**First phase (GIEDA)**

- Initiated the process of identification of the juridical aspects and requirements relevant to the use of information produced by geospatial intelligence

**Second phase (GIECA)**

- improve awareness of judges and prosecutors about the possible use of geospatial intelligence
- perform requirements analysis to identify necessary information for use in the courts that can be generated by geospatial intelligence
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**Third phase**

- improve capability of environmental agencies and competent authorities to use geospatial intelligence technology

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## IMPEL Geospatial Intelligence for Environmental Damage Assessment (GIEDA) project

## Thanks for your attention

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