

IMPEL Geospatial Intelligence for Environmental Compliance Assurance (GLECA) initiative

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COPERNICUS THEMATIC WORKSHOP: COMPLIANCE ASSURANCE

20 June 2024 - Online

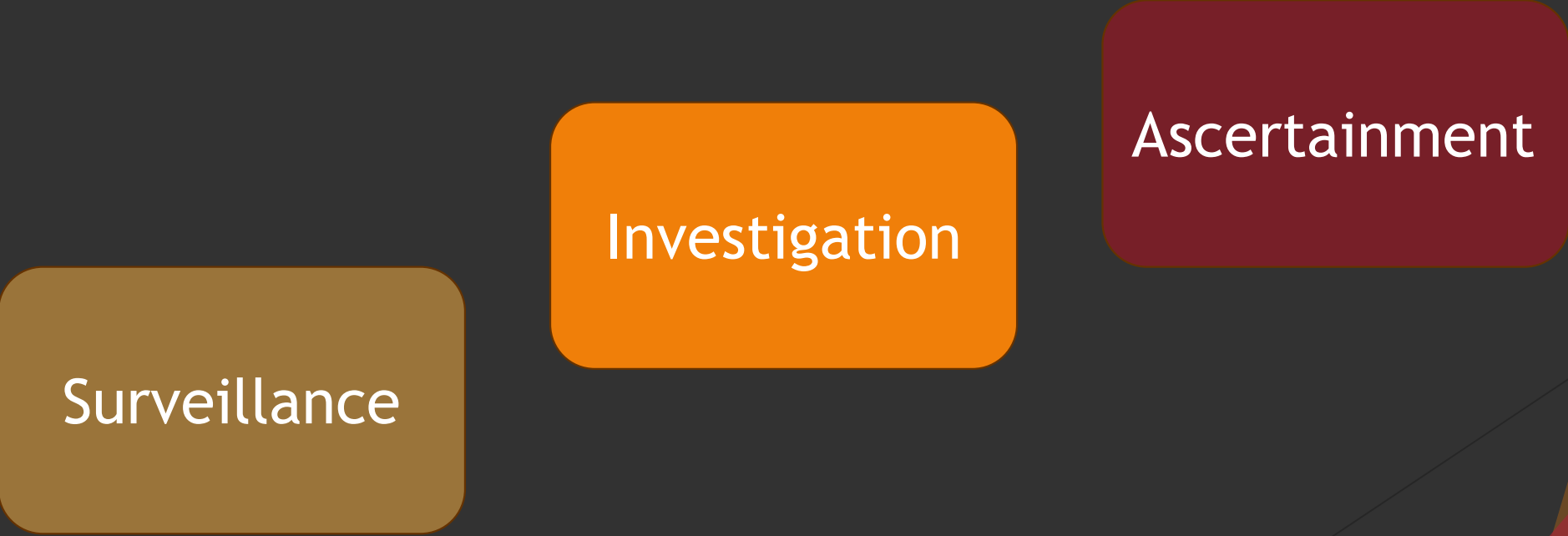
INTRODUCTION

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

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

The diagram consists of three rounded rectangular boxes arranged in a horizontal line. The first box on the left is olive green and contains the word 'Surveillance'. The middle box is orange and contains the word 'Investigation'. The third box on the right is maroon and contains the word 'Ascertainment'. The background is dark grey with abstract orange and maroon geometric shapes on the right side.

Investigation

Ascertainment

NEEDS

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

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.

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.

IMPEL NETWORK

“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

NEEDS

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
- perform requirements analysis
- improve capability of environmental agency to use geospatial intelligence techniques

GIEDA PROJECT OVERVIEW



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

GIEDA PROJECT OVERVIEW



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

GIEDA PROJECT WEBPAGE



European Union Network
for the Implementation
and Enforcement of Environmental Law

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Geospatial Intelligence for Environmental Damage Assessment (GIEDA)

2023 - 2024 Ongoing

Project description and aims

Rapid growing of geospatial techniques, like spatial statistics and earth observation remote sensing technology, as well as recent advances in artificial intelligence, increased the ability in monitoring environmental processes. In the last decades, there has been a growing awareness that geospatial technology has the ability to monitor, inspect and assess the environment, producing the information needed by regulatory practitioners, supporting the investigation of eco-criminal acts and environmental laws infringement. However, competent authorities across EU need to find out how information generated using geospatial intelligence best meets the requirements for the investigation of specific eco-criminal acts in the most efficient manner, in order to be used in court.

The Geospatial Intelligence for Environmental Damage Assessment (GIEDA) project aims to contribute on information needs related to illegal activities affecting the environmental matrices, demonstrating the capacity in producing a posteriori evidences of environmental damage caused by environmental incidents, violations, eco-criminal acts. Effective methodological approaches that use geospatial intelligence, based on the synergistic use of earth observation and geostatistical analysis, can provide valuable spatially explicit information, improving the ability to produce evidences: the characterization of the affected area in terms of nature, gravity, spatial extent, temporal occurrence and estimations of quantitative variations of specific biophysical parameters, can be a strong support to the assessment of environmental damage.

Select language EN

Searchterm

Topic
[Cross-cutting tools and approaches](#)

Lead country and contact
[Italy](#)
[Federico Filipponi](#)

References
[ToR \(VIII\)](#)

<https://www.impel.eu/en/projects/geospatial-intelligence-for-environmental-damage-assessment-gieda>

OBJECTIVES

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

METHODOLOGY

Real cases collection is performed through the following actions:

- Database query
- Survey
- Other sources of information



The screenshot shows a web-based survey form for the IMPEL GIEDA project. At the top right, there is a language selector set to 'English (United Kingdo...'. The header features the IMPEL logo, which consists of a blue circle with yellow stars and the word 'IMPEL' in the center. The title 'IMPEL GIEDA project - Survey' is displayed in bold white text on a teal background. Below the title, a paragraph explains the project's aim: 'The IMPEL Geospatial Intelligence for Environmental Damage Assessment (GIEDA) project aims to contribute to information needs related to illegal activities affecting environmental matrices by reporting effective methodological approaches using geospatial intelligence to investigate and ascertain environmental damage, based on the use of earth observation and geostatistical analysis.' Another paragraph describes the survey's purpose: 'This survey aims to identify real cases of environmental legal judgments in which geospatial intelligence approaches have been used to produce evidence and support the assessment and ascertainment of environmental damage. The geospatial intelligence knowledge questions aim to initiate the process of identifying the legal aspects and requirements relevant to the use of information produced by geospatial intelligence in the courts.' The form is divided into sections, with 'Section A' being the first. It contains a question '1. Country *' where the asterisk indicates it is a required field. Below the question is a text input field with the placeholder 'Enter your answer'.

English (United Kingdo... ▾



IMPEL GIEDA project - Survey

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

This survey aims to identify real cases of environmental legal judgments in which geospatial intelligence approaches have been used to produce evidence and support the assessment and ascertainment of environmental damage. The geospatial intelligence knowledge questions aim to initiate the process of identifying the legal aspects and requirements relevant to the use of information produced by geospatial intelligence in the courts.

* Required

Section A

1. Country *

SURVEY TO BOOST CASES COLLECTION

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

PRELIMINARY RESULTS

- 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

PRELIMINARY RESULTS

- ✓ **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

PRELIMINARY RESULTS

threat of such damage DANNO AMBIENTALE master program
CONSULENTE GIURICO REGIONALE AMBIENTALE Associate responsible
Associate Commissioner
PROTEZIONE AMBIENTALE **competent authority** National Institute of the Ministry
Criminal Law Public prosecutor **environmental damage**
Environmental Guard AGENZIA REGIONALE damage investigation
PROTECTION AGENCY

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

PRELIMINARY RESULTS

From your point of view, geospatial intelligence techniques can:

Increase environmental surveillance by providing early-warning detection of eco-criminal acts

Provide evidences for the imminent threat of damage cases

Provide evidences for the confirmation of environmental damage

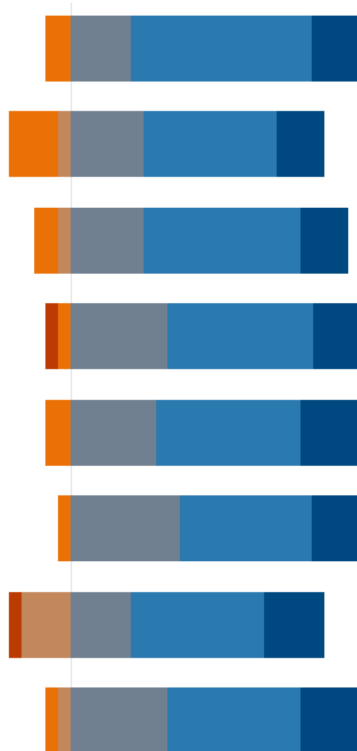
Provide evidences for the confirmation of environmental crime

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



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

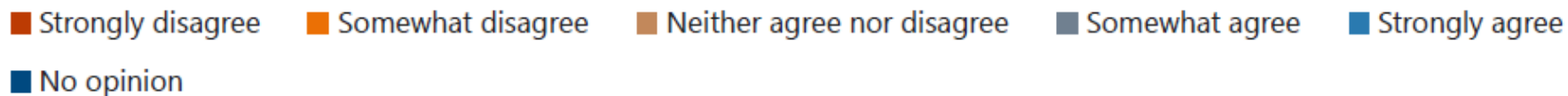
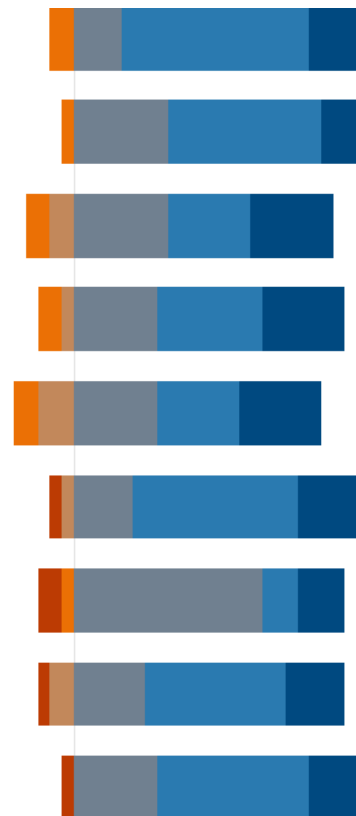
Uncertainty measures should be provided along with the estimates

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...

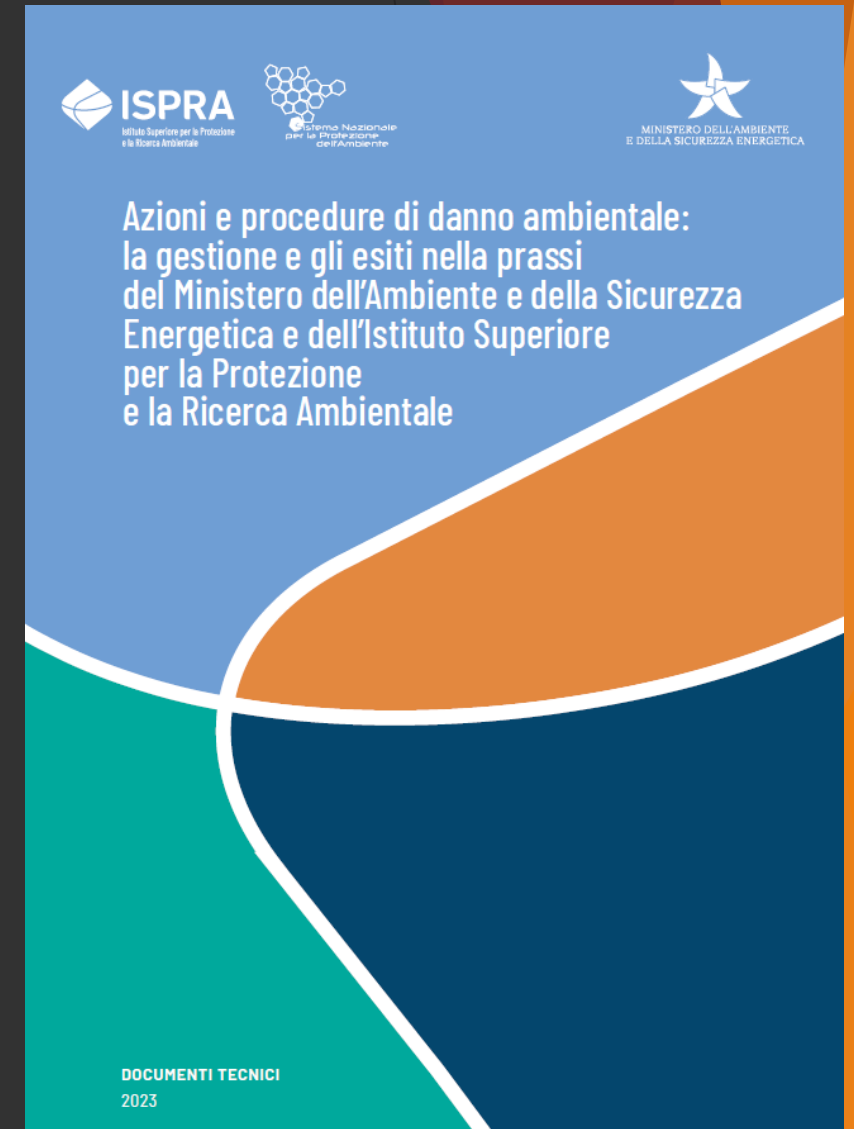
Improving efficiency in the ascertainment phase by preliminary analysis using geospatial intelligence



OTHER SOURCES: THE ITALIAN CASE

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



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

Type of procedures:

- legal
- administrative

Different types of events:

- Fire
- Damage on protected species or habitat
- Quarry management
- Landfill management

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



PROJECT SECOND PHASE

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)

PROJECT SECOND PHASE

Objectives

- reporting on demonstration real cases of environmental crimes
- bring together EUFJE, ENPE and EnviCrimeNet networks in the discussion
- interacting with networks in order to analyse requirements and provide a baseline of needs that could be used to setup action aimed at improving agencies capacity

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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THANKS FOR YOUR ATTENTION

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