

## WP23\_25: Space and Security

1214,258

### Basic Information

#### Full title of the Initiative

Space and Security

#### Short Title or Acronym

SPACE-SECURITY

#### Current category in the 2020-2022 GWP

Community Activity

#### Proposed category in the 2023-2025 GWP

Pilot Initiative

### Points of Contact

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### Purpose

#### Objective

To find synergies and develop solutions to improve the safety and security of citizens and societies by exploiting EO data, collateral data and associated technologies.

#### Please provide a short description of the Initiative

The Space and Security pilot initiative gathers partners involved in security-related activities that benefit or are willing to benefit from the exploitation of space assets, with particular focus on EO and collateral data.

The initiative provides a forum for discussion that establishes and fosters cooperation among key entities and stakeholders. At the same time, SPACE-SECURITY participants interact with their respective users to collect needs and identify initiatives to be put in place, looking at enhancing:

- The resilience of the society against natural and man-made disasters, with a focus on civil security;
- The capabilities to assess and mitigate potential risks for the security of citizens in cross-domain scenarios, such as climate security, food security or energy security;
- The protection of critical infrastructures;
- The efficiency in tasks related to border and maritime surveillance, civil protection and/or humanitarian aid;
- The capacity of relevant stakeholders to achieve the Sustainable Development Goals (SDGs) relevant for Security;

Furthermore, the Pilot Initiative works towards raising awareness and adoption of open data, citizen science, in-

situ data and advanced technologies in the space and/or security domains.

SPACE-SECURITY partners are involved in different activities in the space and/or security domains and work towards:

- Identifying observational and capability gaps to be filled by space assets;
- Exploring how to take maximum benefit from very large quantities of heterogeneous data;
- Identifying, developing and assessing innovative applications, services and platforms along the whole data lifecycle to fill the gaps identified.

In addition, SPACE-SECURITY contributes to the implementation of relevant projects in the framework of R&I initiatives and builds synergies with relevant GEO and any other significant activities.

### **Why is this Initiative needed?**

The entire world is facing challenges that are more diverse and less predictable than before. Areas like urbanization, social movements, political instability and even climate change are challenging the current international state of play in the Security domain. This highly dynamic geopolitical situation raises Security issues all around the world, forcing decision makers to take suitable actions to respond in due time to complex situations. International initiatives - including the United Nations (UN) 2030 Sustainable Development Agenda, the Paris Agreement and the Sendai Framework - are working towards a more sustainable future, with clear targets defined including peace and wellbeing of the population. To support the achievement of these targets from a security perspective, EO is a recognized key asset that provide relevant and trustable information for decision-making processes. In particular, space-based EO is an outstanding mean to support these initiatives at global level.

Within GEO there are different initiatives dealing in some way with security-related topics as, for instance, climate change impact, food security, disasters or health security, but the different results are spread and it is difficult to fully exploit them to address the complex security scenarios that humanity needs to face today. This fact justifies the existence and need of SPACE-SECURITY, which aims at being an entry point to access civil security-related applications and a collaboration forum to address scenarios in which events in different domains are interconnected.

### **What evidence is there to support this need?**

SPACE-SECURITY organized two sessions in the GEO Symposium and GEO Week respectively, which served to bring to light the need of a security forum within GEO. Specifically, the outcomes of the sessions highlighted that: • As security scenarios are increasingly complex, it is needed to understand the link between different domains to properly address current situations and be prepared for future challenges (e.g. food security, water security, climate security); • SPACE-SECURITY is the only GEO activity directly addressing security, then it is key to cooperate with other relevant GEO initiatives; • The security footprint within GEO needs to be extended, and synergies exploited to identify relevant tools and enhance capability development. Particular evidence is given by the impact of Climate Change in human patterns, which can lead to safety and security issues for populations, what is known as Climate Security. For instance, the increase of draughts in some vulnerable regions might lead to migratory events or conflicts due to restriction in the access to fresh water. This type of scenarios is becoming more frequent in the last years and countries need to be prepared to face them.

### **Is this Initiative open to participation by representatives of any GEO Member, Participating Organization, and GEO Associate?**

Yes

### **Are you aware of other projects or initiatives at a global or regional scale (both in GEO and externally) that provide similar products or services?**

No

**Please identify the most important actual and/or intended outputs (products, services, etc.) produced by the Initiative, along with their intended and/or actual users. This list does not need to be comprehensive but should identify the outputs which are most used and are expected to have the greatest potential impact.**

<b>Output</b>	<b>Status</b>	<b>Users</b>	<b>Additional info</b>
A research and innovation platform (GEO-DAMP) provided by SatCen to foster joint cooperation in the exploitation of EO data and collateral sources for security	Regularly updated	SPACE-SECURITY partners. SatCen and its stakeholders. Potentially available to other users for collaborating purposes.	
EO products to address landslides related to underground water extraction in vulnerable regions, resulting from the pilot application under development in the SPACE-SECURITY 2020-2022 Implementation Plan.	In development	World Food Programme and its field offices. Plan to extend users to entities working in water and food security that are affected by underground water extractions.	Expected outputs of the Implementation Plan 2020-2022
Water extraction risk assessment maps in vulnerable regions, extending the coverage of the products, planned in the 2023-2025 Implementation Plan.	Planned	Users working in water and food security that are affected by underground water extractions.	Planned outputs of the Implementation Plan 2023-2025

**If needed, please provide additional comments or explanation to accompany the outputs table**

Support the elaboration of relevant security policies (e.g. civil security) as well as international cooperation initiatives (e.g. UN or EU programmes).

**What kinds of decisions are the outputs of this Initiative primarily intended to support?**

The results offered by SPACE-SECURITY aims at enhancing safety and security of population. Linked to this main impact, collateral impacts on socio-economical decisions, reduction of loss of life or agricultural policies are expected.

**How will these decisions benefit from the outputs of this Initiative?**

Enhancing the available information to make a decision related to the policies, as EO data is not part of many decision chains in many policies related to security, while it is demonstrated that it is really valuable in many scenarios.

**What kinds of impacts (for example, reduced loss of life, monetary savings, conservation of biodiversity, etc.) are anticipated as a result of the use of the outputs of this Initiative?**

Reduce risks of loss of life, preparedness for unforeseen circumstances.

**Has this Initiative been asked to provide specific information (for example, reports, data, services) on an ongoing basis to an international convention, organization, or other multilateral body?**

No

## Technical Synopsis

**Please provide a brief description of the methods used by the Initiative to produce its (actual or planned) outputs.**

Engagement and coordination methodology:

- Maintain continuous interaction with SPACE-SECURITY participants;
- Organization of side events in relevant GEO events, to foster synergies with other GEO initiatives and to engage new partners;
- Participation in relevant international events, either with specific contributions (e.g. articles, posters) or participating in the organization of the event (e.g. participation in Technical and Organization committees, organizing dedicated sessions related to the use of EO for security);

Development of EO solutions (e.g. products, services):

- Internal pilot initiative meetings;
- Surveys to gather user needs and identify synergies and gaps;
- Liaison with initiative participants' stakeholders to work on real scenarios;
- Co-design of EO applications with SPACE-SECURITY participants, building on available capabilities and validating results with final users.

**If you would like to provide further details on the technical methods, you may upload one or more documents here.**

- no supporting documents provided -

**Are there any significant scientific or technical challenges that need to be resolved by the Initiative during the 2023-2025 period?**

Yes

**Please describe these challenges and the steps being taken to solve them.**

The main challenge is to understand complex security scenarios in which several domains interconnect (e.g. climate security, food security, health security, environmental hazards), supported by the use of EO data and other relevant data sets. This challenge is different in each specific scenario, but a step-by-step methodology is applicable to all of them: • Identification of users and stakeholders involved in the scenario (e.g. policy-makers, decision-makers, first respondent / teams operating in the field) as well as relevant available GEO resources; • Identification of relevant data sources to be used to address the scenario and respond to stakeholders' needs (users); • Study of the potential interconnection between events and available data sources; • Definition and implementation of algorithms to be applied to the data in order to extract information; • Testing and validation of algorithms with users; • Considerations for future evolutions and follow-up activities. Starting from the outputs of the 2020-2022 Implementation Plan, and focusing on Climate Security scenarios, this methodology will be carefully tailored for each specific scenario identified in the 2023-2025 implementation plan, building on current H2020 project results (e.g. GEM, AI4Copernicus, e-shape) as well as involving relevant partners and GEO initiatives to avoid duplication of work and maximize impact of results.

**Does the Initiative expect to complete any key new outputs, improvements to existing outputs, or improvements to the methods of producing outputs, in the 2023-2025 period?**

Yes

**Please describe these new outputs or improvements.**

Water extraction risk assessment maps in vulnerable regions, extending the coverage of the products. Assessment of new Climate Security scenarios, based on the inputs collected from SPACE-SECURITY partners (1st version already available from 2020-2022) and resources at individual level, and definition and implementation of a new relevant pilot application.

**Please identify the key tasks that must be implemented to ensure delivery of these changes, with target dates for completion.**

<b>Task</b>	<b>Task description</b>	<b>Expected completion (month/year)</b>
Analysis of results and impact	Updated analysis of the results obtained in the 2020-2022 IP, and the associated impacts, including the inputs from the individual partners and the identification of new synergies for SPACE-SECURITY, also exploring dissemination of results through the GEO Knowledge-Hub.	06/2023
Identification of new Aol	Prioritization of SPACE-SECURITY scenarios related to Climate Security, based on pilot outcomes from the previous period and the partners new needs and available resources (e.g. new results and tools, potential in-kind contribution, etc.).	12/2023
Definition and development of new EO pilot application	Design and development of processing algorithms and tools.	03/2025
Validation of results and way-forward	Validation of results with final users and dissemination of new results.	12/2025
Alignment with GEO actions and activities	Continuous dissemination and communication actions to foster SPACE-SECURITY activities with the objective of engaging new partners and liaising with relevant GEO initiatives, including interaction with the GEO Knowledge-Hub and ensuring alignment with GEO Data management principles.	01/2023 to 12/2025

## **Resources**

**Have all resources required to implement the Initiative's planned work in the 2023-2025 period been secured?**

- Gap in financial resources

**What is the estimated funding gap for the 2023-2025 period?**

100000 / EURO

**What actions is the Initiative taking to obtain the required resources?**

Preparation of proposals for Horizon Europe calls relevant for GEO.

**Please list all financial and non-financial contributions to the Initiative (other than in-kind, voluntary participation by individual contributors) having a value of more than USD 50,000.**

<b>Contributing Organization</b>	<b>GEO Status</b>	<b>Type of Resource</b>	<b>Value</b>	<b>Currency</b>
EU SatCen GEO-DAMP platform	EU SatCen - European Union Satellite Centre	Equipment	120000	EURO

## **Lessons from the 2020-2022 Period**

**Were all planned activities for the 2020-2022 period implemented as expected?**

Yes

**Were there any key challenges faced by the Initiative in the 2020-2022 period?**

Yes

**Please describe.**

The engagement of stakeholders working in operational activities in the Aol was a tough task, as they have many other priorities and providing data for the pilot application (in-kind) is not within the priorities.

**Were there any impacts or changes to operations due to COVID-19?**

Yes

**Please describe.**

Engagement activities were affected by the COVID pandemic, avoiding a wider spread of the SPACE-SECURITY pilot motivation and goals and making impossible physical gathering to define and work on the pilot project development. Thus, the understanding of user requirements, the design of the pilot application and the involvement of a wider community have been either slowed down or paralyzed given the situation.

**Please describe the key changes proposed for the 2023-2025 period, for example, new projects, new areas of focus, or adjustments to the activity governance.**

SPACE-SECURITY plans to continue in a similar collaborative approach as done up to now. Building on previous results, during this period it is planned to scale-up the pilot application developed with some SPACE-SECURITY partners to other Areas of Interest (Aol) relevant for partners or other GEO participants. In addition, the results and lessons learned from current R&I projects where the partners are involved will be shared within the community to extend the work on Climate Security, with the aim of identifying new pilot applications relevant for the participants.

**Does the Initiative have outputs (products, services, etc.) available to users now, even if only on a pilot or testing basis?**

No

**Do you have evidence of any impacts that have occurred in part as a result of using the outputs of the Initiative (for example, policy decisions taken, behaviour changes by users, risks mitigated)?**

No

**Have there been any internal or external reviews or evaluations of the Initiative since 2019?**

No

**Please indicate any GEO Work Programme activities with which you have ongoing collaboration.**

- EUROGEO - European Group on Earth Observations
- NEXT-EOS - Next Generation Earth Observation Services

**Please indicate any additional GEO Work Programme activities with which you would like to establish new collaborations.**

- CLIMATE-OBS - Climate Observation, Simulation and Impacts
- EO4DRM - Earth Observations for Disaster Risk Management
- EO4SDG - Earth Observations for the Sustainable Development Goals
- HUMAN-PLANET - GEO Human Planet
- GFRM - Global Flood Risk Monitoring

## **Stakeholder Engagement and Capacity Building**

**Are there specific countries or organizations that your Initiative would like to engage?**

Yes

**Please list these countries, regions or organizations.**

EC, NASA, UN Environment, ECMWF, EURISY and IDMC (to be assessed)

**What are your plans to engage them?**

EC and NASA have been involved in the SPACE-SECURITY organized sessions in the GEO Symposium 2021 and GEO Week 2021. The goal is to continue interaction with them to formally engage them as participants to the pilot initiative.

With UN Environment and ECMWF, initial contact has been established and it is planned to continue interaction through phone calls or joint participation in events.

In addition, potential collaboration with EURISY and the Internal Displacement Monitoring Centre (IDMC) will be studied.

**Does your Initiative engage users in the work of the Initiative (for example, consultation, testing, co-design)?**

Yes

**Please briefly describe the Initiative's approach to engaging users.**

Each SPACE-SECURITY participant has its own network of users and interact with them to disseminate activities and results of the pilot initiative, also through consultation in ad-hoc meetings. Users that might be interested in the results or activities are engaged in co-design processes, to understand their needs and design the solutions in line with them.

**Does the Initiative have a user engagement strategy or similar kind of document?**

No

**Are there categories of users that are not represented at this time, but you would like to engage?**

No

**Does the Initiative have a documented capacity development strategy?**

No

**Please describe the approach to capacity development that is being implemented by the Initiative?**

The Pilot Initiative built on previous projects and activities to develop capacity of participants that can benefit from those. When a participant identifies a result or solution of its interest, it is shared within SPACE-SECURITY and actions are put in place to generate results tailored to each participant's needs.

**Are there any commercial sector organizations participating in this Initiative?**

No

**Are there opportunities for commercial sector uptake of the outputs of the Initiative?**

Yes

**Please describe these opportunities.**

SPACE-SECURITY works in the development of pilot applications to demonstrate the potential benefits for Space and Security stakeholders. The commercial sector can make use of the pilot results and scale them up to develop operational solutions.

**Is there already commercial uptake occurring?**

No

**Are there opportunities for further commercial sector participation in the Initiative?**

No

**Does the Initiative have a plan for commercial sector engagement?**

No

**Governance**

**Please describe the roles of each of the key leadership positions, as well as any team structures involved in day-to-day management.**

The Space and Security pilot initiative governance trusts on partners' spontaneous participation and engagement, building on the collaboration framework that SPACE-SECURITY provides. SatCen leads the pilot initiative and fosters this intra-collaboration between partners.

Stakeholders follow their respective operational activities and, when a need or an opportunity is identified, it is shared with the pilot initiative partners to look for solutions.

SatCen commits to coordinate contributions and to foster engagement of current and new members. Promotion in social networks, conferences and relevant events is done by all members linked to their specific needs.

Participants contribute to SPACE-SECURITY on an in-kind contribution basis, taking advantage of relevant results from common and individual projects that might be relevant to the involved partners.

**Is there a steering committee or other governance bodies that advise the Initiative but are not involved in day-to-day management?**

No

**What methods does the Initiative use to communicate with its participants?**

- Email / e-newsletters
- Regular conference calls

- Other

**Please describe.**

1. Side sessions organized in key GEO events.
2. Presentations in relevant EO conferences and workshops.
3. Ad-hoc conference calls.

**Please describe the key risks that could delay or obstruct the completion of the planned activities and outputs of the Initiative, along with any actions taken to mitigate these risks.**

Description of the hazard	Description of the possible impacts	Scale of impact	Likelihood of occurrence	Mitigation measures
Work overload at stakeholders' side,	Delay of the activities associated to the pilot initiative, as contributions are in-kind and might be treated as low priority by participating entities.	Limited	Possible	Direct communication between partners of the initiative, allowing for a steering of the schedule and activities to accommodate any potential delay with minimum impact on schedule.

**What methods are used by the Initiative to monitor its effectiveness?**

- Informal discussions with users / beneficiaries
- User or beneficiary surveys
- Consultations or events

**Would the Initiative be interested in assistance from the GEO Secretariat for developing an impact plan?**

Yes

**How are the results of the monitoring and evaluation activities shared with participants and the wider GEO community?**

Not applicable.

**Are any monitoring or evaluation activities required by funders/contributors?**

No

**Participants**

**Please list the active individual participants in the Initiative**

First name	Last name	Email address	Member	Org
Jerome	Bequignon	jerome.bequignon@esa.int	ESA - European Space Agency	ESA - European Space Agency
Gerardo	Herrera	g.herrera@igme.es	EuroGeoSurveys - The Association of the Geological Surveys of the European Union	EuroGeoSurveys - The Association of the Geological Surveys of the European Union
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Sergio	Albani	sergio.albani@satcen.europa.eu	EU SatCen - European Union Satellite Centre	EU SatCen - European Union Satellite Centre
Hennig	Aberle	henning.aberle@bkg.bund.de	Germany	- German Federal Agency for Cartography and Geodesy

## Other information

**Please provide any other comments or information that was not included in the previous sections, but you would like to appear in the Implementation Plan.**

- no answer given -

- no supporting documents provided -

## Co-Editor Management

### List of co-editors for this initiative

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