



**belspo**

FEDERAL SCIENCE POLICY

# RESEARCH PROGRAMME FOR EARTH OBSERVATION STEREO IV

(SUPPORT TO EXPLOITATION AND RESEARCH IN EARTH  
OBSERVATION)

## ***OPEN CALL FOR PROPOSALS***

DEVELOPMENT OF APPLICATIONS

SHARED COST

DISSEMINATION AND SUPPORT

INFORMATION PACKAGE

*SEPTEMBER 2023*

### SUBMISSION DEADLINES

DEVELOPMENT OF APPLICATIONS:

*BEFORE THE END OF 2026*

SHARED COST:

*BEFORE THE END OF 2025*

DISSEMINATION AND SUPPORT

*BEFORE 30 JUNE 2029*

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## SUMMARY

This document features the information for teams wishing to take part in the open call for research proposals in the "STEREO IV programme". This call concerns application, shared cost and dissemination and support projects. **The call for *Early career scientist grants* will be added at a later stage.**

- Proposals can be submitted any time
- Belgian teams qualifying for funding under the programme:
  - Universities
  - Public research institutions
  - Non-profit research institutions
- Applicants are required to observe the rules laid down in this information package, otherwise their proposals cannot be taken into account by the Belgian Federal Science Policy Office.
- Applicants must make sure that there is no overlap with grants from other regional/national/European programs.
- Proposals should be presented in English.

**For further details about the programme and this call please get in touch with:**

**STEREO TEAM**

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## 2 PRESENTATION OF THE PROGRAMME

### 2.1 INTRODUCTION

On 22 November 2019 the Council of Ministers approved the funding of the multi-annual research programme for earth observation, STEREO IV, as part of the Belgian space strategy. This programme will cover the period of 2022-2029 and has been allocated a budget of 28,15 M€.

**This document concerns the open calls for proposals of the STEREO IV programme.**

### 2.2 PROGRAMME GOAL

STEREO IV's **goal** is in line with the previous programme and aims at maintaining a top-notch, dynamic and visible remote sensing community in support of the Belgian space strategy.

This translates into following subobjectives:

- *Facilitate quality research*
- *Increase the visibility of Belgian RS research*
- *Support building a dynamic RS community*

### 2.3 THEMATIC PRIORITIES

The thematic research priorities are as follows:

1. Impact of climate change on terrestrial and marine environments
2. Advanced Monitoring and Assessment of Hazards (including pandemics)
3. Monitoring environment for improved environmental health and biodiversity
4. Geo-information for Sustainable and Green Cities

Certain topics are covered by several programme themes, or even by all of the themes. A variety of disciplines sometimes has to be brought into play to study these issues from several thematic viewpoints. In this case, cooperation between one or more scientific teams with no remote sensing expertise is strongly recommended.

Projects can also focus on the development of new methodologies, but this should always be done with a future thematic application in mind.

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### 2.3.1 IMPACT OF CLIMATE CHANGE ON TERRESTRIAL AND MARINE ENVIRONMENTS

Climate change is one of the most challenging problems facing society today. Intense weather events such as floods, droughts and heatwaves are becoming more frequent, widespread and catastrophic.

Remote sensing can play a role in understanding climate change by quantifying processes at various spatio-temporal scales, assess and predict its impact on the environment and humanity, establish long-term trends and predict and monitor and evaluate mitigation strategies.

This requires innovative and fast analysis of multiple data sources, both EO and other, to improve observational monitoring and gain new insights to upgrade models.

**Interaction with the recently launched Belgian Climate Centre is greatly encouraged.**

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### 2.3.2 ADVANCED MONITORING AND ASSESSMENT OF HAZARDS (INCLUDING PANDEMICS)

The combination of climate change and increasing human encroachment into the natural environment results in increased hazards of all kinds. These are not limited to natural risks, such as flooding, wildfires, earthquakes and volcanic eruptions, but also include man-made risks and the emergence and spread of pathogens.

Remote sensing comes into play at different levels: understanding the risks, identifying vulnerable areas and producing accurate hazard maps, developing early warning and forecasting systems, assisting with emergency responses, and inventory disaster impacts and post disaster damages.

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### 2.3.3 MONITORING THE ENVIRONMENT FOR IMPROVED ENVIRONMENTAL HEALTH AND BIODIVERSITY

Biodiversity is under serious threat. The global population of wild species has fallen by 60% over the last 40 years and one million species are at risk of extinction, largely because of unsustainable human activities. Yet biodiversity is essential for us humans. Nature provides us with food, health and medicines, materials, recreation and well-being. A healthy ecosystem filters our air and water, helps keep the climate in balance, converts waste back into resources, pollinates crops, keeps soil fertile and much more. It is becoming clear that the health of the planet and human health are closely linked.

The extensive use of Earth observation data is not yet fully realized in biodiversity assessment, monitoring and conservation and new techniques for quantifying biodiversity at the community to species level need to be developed. However, with the loss of plant and animal species accelerating, remote sensing should gain prominence to monitor biodiversity and help policymakers prioritize the most critical areas and monitor restoration efforts.

The focus of the programme is placed on the following types of environment:

- Water (both sea and inland)
- Coastal zones
- Wetlands, heaths and peatlands
- Agriculture and soil
- Forest, savanna and grassland
- Snow and ice
- Deserts

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### 2.3.4 GEO-INFORMATION FOR SUSTAINABLE AND GREEN CITIES

Over 50% of the world population lives in cities. Yet, cities consume over 65% of the world's energy and account for more than 70% of global CO<sub>2</sub> emissions. Cities are also the cause of locally amplified climate change. As cities grow, their temperatures become higher than the surrounding areas because of changes in land cover and so-called urban heat islands (UHI) come into being. The impacts of UHI's are increased energy consumption, increased air pollution and deterioration of human health.

Green and sustainable cities are designed to address climate change, be environmentally friendly and provide a healthy environment for their population. This requires greening the infrastructure, planting (preferably) native, drought tolerant trees and other vegetation and greening rooftops.

High precision remote sensing can inventory the city vegetation up to species level, identify green corridors and biodiversity hubs, characterize man-made surfaces and determine where hot spots of land surface temperature are located in urban areas.

This information should help explaining why certain areas are experiencing increased temperature, identify which populations are most vulnerable, and lead to ways to mitigate the effects through adaptive land use planning.

## 2.4 GEOGRAPHIC PRIORITIES

- There is a preference for study areas where previous (STEREO or BELSPO) research took place.
- Site sharing between STEREO projects is encouraged.
- It is advisable to upscale to a larger scale and/or to compare the results of the study area with other sites. Results must be replicable in other study areas and be part of an unfolding process as much as possible.

## 2.5 METHODOLOGICAL PRIORITIES

Following methodological research topics merit particular attention. They either dovetail with Belgian expertise, respond to the recommendations of the STEREO III evaluation or are worldwide at the forefront of remote sensing research:

- Artificial intelligence and deep learning, including interpretable artificial intelligence
- Synergic use and fusion of machine learning and physics-based approaches
- Big data exploitation
- Use of multi-mission, multi-modal, multi-sensor and multi-scale data: from space over airborne to close sensing
- Novel frameworks to deal with the scarcity and/or the low quality of data
- Automation of data processing
- Standardisation
- Advanced physics-based inversion methods
- Use of crowd sourcing
- ....

In addition, improved estimation of uncertainty of the results remains of utmost importance. The results and products derived from the research will be backed up with comparative tests, quality

and reliability tests. The methods, models and services developed will have been calibrated and validated with representative field data and subjected to sensitivity analyses and error propagation.

New methodologies should be replicable by other researchers, applicable in variety of settings rather than be specific to a particular location and address the question of *why* a given result is produced.

## 2.6 REMOTE SENSING DATA

The *image requirements* (including the need to organise airborne campaigns) have to be clearly determined and motivated.

The use of free and open Copernicus Sentinel data is strongly encouraged as well as the use of BELSPO's collaborative ground segment (TERRASCOPE) and its functionalities. However, the programme also supports the use of a wide additional range of remote sensing imagery, such as optical, hyperspectral, thermal, radar and lidar, in combination with in-situ data.

The remote sensing data can be from satellite or airborne and include UAV data.

*Whenever possible data previously acquired by BELSPO should be used.*

## 2.7 CARBON FOOTPRINT

The applicants are strongly encouraged to minimize the carbon footprint of the project. This could be achieved through reduction of travelling or through compensation mechanisms and should be addressed in the project reports.

## 2.8 VALORISATION AND DISSEMINATION

Valorisation and dissemination are key to the durability of Belgian's remote sensing community. Alongside traditional ways of dissemination via scientific papers and presentations at conferences, additional efforts should be focused on dissemination avenues such as social media, newsletters, webstories and the publication of data sets and algorithms.

The project teams are strongly encouraged to publish their papers and data in open access journals or depositories.

Not only the scientific community should be targeted but potential beneficiaries of the results as well as the public at large should be informed about the outcome of the research.

## 2.9 SOCIETAL IMPACT

Besides the direct scientific output of research projects, STEREO is also concerned about the longer-term societal impacts: impacts on human capital, on wider public, as well as on economy and innovation.

Therefore, projects should be designed and managed in view of:

- Career development of involved researchers, and in particular PhD students and post-doc researchers, via training and maximal recognition in the scientific community;
- Maximal involvement of stakeholders of the research;
- Transfer of knowledge to the wider scientific community and potential end-users.

## 2.10 PROGRAMME STRUCTURE

The two-part programme comprises:

- Support to scientific research: various types of projects are funded on the basis of calls for proposals.
- Valorisation and support to the remote sensing community using following tools: website ([eo.belspo.be](http://eo.belspo.be)), newsletter, twitter account (@belgianeo) and (co)-organisation of events, in addition to
  - Image acquisition and distribution
  - Call evaluation and project supervision
  - Programme evaluation
  - Training for researchers
  - Cal/val activities
  - Toolbox support
  - Communication support
  - Publication support
  - ...

## SCIENTIFIC RESEARCH

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The scientific research covers 6 types of projects:

- Thematic network projects
- Exploration projects
- Early career scientist grants
- Shared cost projects
- Dissemination and support projects
- Application projects

More information on the various project types can be found on the STEREO website (<https://eo.belspo.be/en/stereo-iv-programme>).

Thematic network projects and Exploration projects are selected only as part of a fixed call for proposals and after evaluation by international peers.

Early career scientist grants, Shared cost, Dissemination and support projects (DISSUP) and Application projects can be submitted via an open call and are selected by the STEREO Programme Committee depending on the scientific quality and relevance, the fit with the programme, the duration and the available budget.

**This call only concerns following open call projects.**

For information on the open calls for Applications, Shared cost and DISSUP projects, please visit our website (<https://eo.belspo.be/en/stereo-iv-programme>).

**Information on Early career scientist grants will be made available at a later stage.**

## APPLICATION PROJECTS

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- The goal of these projects is a transfer of technology and knowledge from scientific institutions to companies or Belgian public administrations or both. The proposal must result from a critical need of the organisation or its customers and end users.
- These applications can be products, services, software codes or procedures. Potential gains in resources, efficiency or turnover must be clearly demonstrated.
- In terms of content, the proposals must have a bearing on the four priority research themes.
- A maximum of three scientific teams, solely from Belgium, are responsible for the implementation of the project for a period of 1 to 3 years.
- The programme pays solely for the scientific partner(s). The proposal must be submitted by the non-research partner who should also coordinate the project.

- Residency and training of scientists at the corporate partner is recommended.

## SHARED COST PROJECTS

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This type of project provides co-financing for a Belgian partner that was selected for an international, bilateral, regional or national project, but did not receive 100% funding.

- Only peer-reviewed projects are eligible;
- The co-financing covers only the part of the project dealing with remote sensing;
- Co-financing of a Belgian participation in transnational programmes such as ERA-NETs is also possible.

## DISSEMINATION AND SUPPORT PROJECTS

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These are small short-term projects with a maximum duration of 6 months and a budget not exceeding 30.000 €. They concern:

- Writing up of papers of STEREO research output not initially foreseen or not yet mature by the end of the project;
- Rendering software written for a specific project accessible for the remote sensing community, e.g. in the framework of the STEREO toolbox;
- Linking of two STEREO projects through comparison of approaches, testing of methodology in study area of other project, joint paper, .....
- Small dedicated research needed for BELSPO or to support the use of Earth observation in a specific research area where Earth observation is not or hardly used a specific remote sensing field;
- Training grant for scientists in other research laboratory or company;
- ...

## 2.11 PROGRAMME PLANNING

The **indicative calendar** of the calls is as follows:

PROJECT TYPE:	2022	2023	2024	2025	2026	2027	2028	2029
<b>PROJECT FUNDING VIA FIXED CALLS:</b>								
Thematic network projects								
Exploration projects								
<b>PROJECT FUNDING VIA OPEN CALLS:</b>								
Early career scientist grants								
Application projects								
Shared cost projects								
Dissemination and support projects								

## 2.12 IMPLEMENTATION OF THE PROJECTS

- Selected projects are covered by a **contract** between the Belgian Federal Science Policy Office, the relevant scientific institutions and, where appropriate, the private or public partner.
- The practical requirements for the project implementation process are described in the **technical annex** of the contract. The contract describes in particular the part played by all the parties, the funding, the project follow-up procedures, the ownership rights concerning the project the data and project results, the input of all the parties and the legal provisions in the event of disputes.
- The results developed in the context of the project shall be the property of the partner responsible for these results. The State shall nonetheless reserve the right to use these results for its own needs without any charge and on a non-exclusive and irrevocable basis.
- Each project selected (with the exception of Dissemination and support projects) must be supervised by a **Steering Committee**.

The Committee should include at least:

- 3 international scientific experts
- Representatives of the Belgian Federal Science Policy Office
- Potential users can be involved (mandatory for application-oriented projects) as well as representatives from other relevant STEREO projects.

The choice of the Steering Committee members must be approved by the Programme Management.

The Steering Committee is tasked with:

- Assessing the progress of the project
- Adjusting the objectives and activities of the project via a binding opinion in the light of the scientific, technical and methodological demands of the project and the intermediate achievements
- Assessing the impact of the partnership/project and the synergy between the various tasks and partners
- Assessing and guiding exploitation activities and help disseminating the results nationally and internationally
- Drawing attention to serious problems within the partnership/project which could result in the termination of the agreement
- For thematic network projects a mid-term extended Steering Committee meeting must be organized. During this half-time evaluation the Steering Committee must take a decision about the continuation of the PROJECT

The Committee meets at least once a year. All partners must participate. The **costs** for organising the meeting (renting of meeting room, meals, travel costs of Steering Committee experts...) are **disbursed via the project** and reimbursed via the programme (outside the budget of the project) up to a maximum sum of €4,500 per Committee session organized in Belgium (if the committee is organized in a foreign country, this amount can be adapted). Detailed guidelines can be found at the Programme Management section of the programme website (<https://eo.belspo.be/en/stereo-project-management>).

## 2.13 PROGRAMME SUPERVISION

A cooperation agreement is being concluded with the Regions and Communities about the implementation of the programme. During the transition phase between STEREO III and STEREO IV, the STEREO III Cooperation Agreement remains valid until the end of 2023.

The agreement includes the establishment of a Programme Board, composed of representatives of the relevant public administrations of the federal, regional and community authorities.

This Programme Board is responsible for:

- overseeing the consistency of all the activities being carried out;
- delivering advisory opinions about the activities undertaken;
- overseeing the effective transfer of the research result.

## 3 PROFILE OF THE PROPOSALS

### 3.1 TARGET GROUPS

- Only following Belgian partners qualify for funding under the programme:
  - Universities
  - Public research institutions
  - Non-profit research institutions

**A partnership must be supported through sharing of staff, equipment and joint papers.**

The promotor of a project must be involved in the running of the project on a regular basis.

### 3.2 BUDGET BREAKDOWN

The following only applies to Application and Shared Cost projects. Dissemination and support projects are granted a lump sum.

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#### 3.2.1 STAFF

- The staff costs cover: index-linked gross salaries, employer's social security contributions and statutory insurance charges, plus any other legally due compensation or payments as amounts added to the salary.
- Preferably, at least 60% of the total proposal's budget should be devoted to staff and the budgets of the different partners should be in balance.

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### 3.2.2 OPERATIONS

The operations costs are divided in two sections depending on the type of expense:

- **OPERATIONS:** This includes all current expenditure linked to the project like ordinary laboratory, workshop and office supplies and products, documentation, travel and trips in Belgium or abroad, use of computing equipment, software, and more generally, consumables, ... The overall total of these operations expenses is fixed as a flat rate, on the basis of a percentage of the staff cost. The percentage is limited to 15% for the coordinator and 10% for the other partners.
- **SPECIFIC OPERATIONS:** This includes all specific operations costs linked to the execution of the project like costs for analysis, organisation of workshops, maintenance and repair of equipment acquired by the project, surveys, acquisition and processing of UAV data, etc. ...

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### 3.2.3 EQUIPMENT

- It is recommended to buy equipment to be used jointly by network partners.
- Budget available for purchasing and installing of scientific and technical appliances and instruments, including computer and office automation equipment.
- The equipment must be ideally bought during the first half of the project

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### 3.2.4 SUBCONTRACTING

- Subcontracting operations for each partner may not exceed 25% of the partner's STEREO budget.

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### 3.2.5 GENERAL EXPENSES ("OVERHEADS")

- General expenses ("overheads") account for a maximum of 5% of the total allowable staff

and operating expenses <sup>1</sup>.

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### 3.2.6 EARTH OBSERVATION DATA

***Satellite earth observation data is not chargeable to the project but to the programme after approval by the programme managers. The data requested should be fully justified and indispensable to the project.***

- The STEREO team can provide researchers with satellite images from its image archive, in accordance with the agreements with the data providers and distributors. New imagery may be bought if necessary for the implementation of the project and provided STEREO's planned image budget so permits.
- All data acquired can be used for a project but remain property of BELSPO.
- As regards airborne data, in as much as possible data acquired during previous campaigns or by the regional administrations should be re-used.
- The budget requested should be proportionate to the project budget.

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<sup>1</sup> The overhead rate for this call is 5% until the end of 2023 but this could be adapted thereafter