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FEDERAL SCIENCE POLICY

RESEARCH PROGRAMME FOR EARTH OBSERVATION STEREO IV

(SUPPORT TO EXPLOITATION AND RESEARCH IN EARTH OBSERVATION)

CALL FOR PROPOSALS 2025

INFORMATION PACKAGE

DECEMBER 2024

CLOSING DATES:

Expressions of interest (mandatory): 30 January 2025 before 4 p.m.

Research proposals: 7 April 2025 before 4 p.m.

1 CONTENT

SUMMARY

Important notice: *To implement this call for proposals with new contracts starting in 2025, it is crucial to publish it before the end of 2024. At the time of the release of this information file, BELSPO's 2025 budget has not yet been approved by Parliament. Additionally, the federal government is currently operating in a caretaker capacity until a new government is formed. Please note that this call for proposals may therefore be paused or scaled down following the expression of interest phase, depending on future decisions.*

- This document features the information for teams wishing to take part in the 2025 call for research proposals in the "STEREO IV programme". This call only concerns thematic network projects.

- **Thematic network projects**
  - Multi-annual **multidisciplinary and inter-disciplinary projects** with a duration of 4 years
  - Aimed at fundamental and/or application-oriented innovative research
  - Must address global societal challenges listed in the thematic priorities
  - Innovation either targets the use of new types of remote sensing data, development of new methods for exploiting remote sensing data, innovative use of remote sensing in a research domain in which it is already being used, introduction of remote sensing in a new research domain or a combination of thereof.
  - Partnership composed of 2-4 Belgian research teams and 1 or 2 foreign team(s)
  - Belgian and foreign teams qualifying for funding under the programme:
    - Universities
    - Public research institutions
    - Non-profit research institutions
  - Coordinating team must have some experience in Earth Observation
  - Cooperation with a foreign scientific partner is mandatory. Per project a maximum of 20% of the STEREO budget may be earmarked for foreign teams. The foreign partners will co-finance their contribution to the project by matching the STEREO IV under a parallel funding arrangement. The foreign partner(s) should complement the Belgian teams and make a substantial scientific contribution to the project
  - Inclusion of teams from both the Flemish and the French community is strongly recommended
  - Inclusion in the network of teams new to STEREO or to remote sensing is encouraged
  - Each project shall serve as a frame for PhD (and potentially post-doc) research. **Only 1 researcher can be financed under a scholarship, the other researchers must be hired under an employment contract.**
  - There should be a genuine synergy between all project partners as evidenced by joint papers, stays and training of staff at partner institutes and joint PhD theses

- The **budget** for this call is **tentatively** set at about **7.4 MEURO**, but this may change (see notice above).

- 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.

- Expressions of interest and proposals should be presented in English.

- **Expressions of interest (mandatory) must reach the Belgian Federal Science Policy Office no later than 30 January 2025 at 4 PM.**
- **Proposals must reach the Belgian Federal Science Policy Office no later than 7 April 2025 at 4 PM.**

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

STEREO TEAM

SCIENTIFIC SUPPORT

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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 fourth call 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.

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 Belgian Climate Centre is greatly encouraged.

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.

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

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_2 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) 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. Available datasets can be consulted in the STEREO data archive (https://eo.belspo.be/en/stereo-data-archive) and, for VHR Pléiades data, in the Pléiades4Belgium platform (https://pleiades4belgium.be).
For acquisition of commercial EO data, it is recommended to consult the portfolio offered by ESA in the frame of the Third-party missions programme (https://earth.esa.int/eogateway/missions/third-party-missions).Finally, it should be noted that the Belgian regional administrations dispose of airborne data which may be available for scientific use.

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**), newsletter, twitter account (**@belgianeo**), LinkedIn account (**Belgian Earth Observation**), 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

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 thematic network 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.

THEMATIC NETWORK PROJECTS

- Large multi- and interdisciplinary projects lasting 4 years;
- Fundamental and/or application-oriented innovative research;
- Research should be socially relevant and focused on the global societal challenges listed in the thematic priorities;

- Research is carried out by partnerships in which 2-4 research teams (from Belgium) are compulsorily complemented by 1 or 2 international teams:
  - The inclusion of Belgian teams not previously involved in STEREO is a plus.
  - The inclusion of teams from both French and Flemish Belgian community is strongly recommended.
  - The international team(s) should be an indispensable part of the partnership and bring expertise not available in Belgium.
  - The team coordinating the project should have some experience in Earth observation.
- A senior scientist should be responsible for coordinating the project.
- These projects are a framework for doctoral theses.
- There should be a real synergy between all project partners. This should be reflected through joint papers, residencies and training of staff in partner institutes and joint supervision of PhDs.

2.11 PROGRAMME PLANNING

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

PROJECT TYPE:	2025	2026	2027	2028	2029
PROJECT FUNDING VIA FIXED CALLS:					
Thematic network projects					
Exploration projects					
PROJECT FUNDING VIA OPEN CALLS:					
Early career scientist grants					
Application projects					
Shared cost projects					
Dissemination and support projects					

2.12 IMPLEMENTATION OF THE PROJECTS

- The 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 at the Programme Management section of the programme website (https://eo.belspo.be/en/stereo-project-management).

2.13 PROGRAMME COMMITTEE

A **cooperation agreement** has been concluded with the Regions and Communities about the implementation of the programme.

The Belgian Federal Science Policy Office is responsible for managing the programme.

The Belgian Federal Science Policy Office is assisted in this task by a **Programme Committee** comprising of representatives of the relevant public administrations of the federal, regional and community authorities.

This Programme Committee 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 results

3 2023 CALL

3.1 OBJECT AND BUDGET OF THIS CALL

This call applies to **thematic network projects** only. These are large multidisciplinary projects lasting 4 years and carried out by 2 to 4 Belgian teams. An international partner is mandatory. A second international partner is optional.

The **budget** for this call is **tentatively** set at about **7.4 MEURO** *but may be subject to adjustments*!

3.2 TIMETABLE

- Submission of expressions of interest 30 January 2025
- Feedback on expressions of interest 14 February 2025
- Submission of proposals 7 April 2025
- Oral defence of proposals early July 2025
- Selection of proposals by the Steering Committee of the STEREO programme September 2025
- Start of contracts December 2025

4 PROFILE OF THE PROPOSALS

4.1 TARGET GROUPS

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

  International partners can participate according to the modalities explained in § 4.2.5. International partners must be an integral part of the partnership, provide real added value and preferably possess expertise not available in Belgian research organisations.

A partnership must be supported though sharing of staff, equipment and joint papers and joint PhD theses.
The promotor of a project must be involved in the running of the project on a regular basis.

Participation of research groups new to remote sensing and to the STEREO programme is encouraged. However, the majority of teams participating in a project (and the coordinator) must have EO expertise.

4.2 BUDGET BREAKDOWN

4.2.1 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.

Scholarship students and post-doctorate scholarship students who enjoy exemption from tax liability and are covered by the social security system in accordance with the Royal Decrees of 5 July 1996 and 26 March 2003 concerning employees social security may be appointed only exceptionally subsequent to permission being granted by the President of the Belgian Science Policy Office. **In any case within a STEREO project, only 1 researcher can be financed under a scholarship while the other researchers must be hired under an employment contract.**

- 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.

- *Sharing of staff between project partners and joint PhD promotorships are encouraged.*

4.2.2 (SPECIFIC) OPERATIONS

- This includes all 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. ...All expenses must be justified.

4.2.3 GENERAL EXPENSES (“OVERHEADS”)

- General expenses ("overheads") accounts for 15% of the total allowable staff and operation expenses.

4.2.4 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

4.2.5 SUBCONTRACTING

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

4.2.6 INTERNATIONAL COLLABORATION

- The following is considered as international cooperation: cooperation between a Belgian scientific institution and a scientific institution from a foreign State, and this with a view to reinforcing international scientific cooperation and Belgian expertise.
- A Belgian Institution is the financial intermediary between the international partner and BELSPO. Scientifically speaking the international partner is a partner of the project with some specific tasks defined in the technical annex of the contract. The international partner must contribute to the reports and his work is also evaluated during the Steering Committees.
- Collaboration with the international partner is realised on the basis of co-financing. A

maximum of 50% of the budget envisaged for these tasks is borne by the programme and this total may not exceed 20% of the overall STEREO budget for the project. The remaining balance is borne by the international partner. The share borne by the programme covers exclusively the personnel and functioning costs of the international partner. Neither overheads, or equipment or subcontracting are considered as expenses.

4.2.7 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 programme 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.

5 PROCEDURES

5.1 SUBMISSION

Submission is a two-stage process: first the submission of an expression of interest and then the submission of a research proposal.
Solely those who submit an expression of interest are entitled to submit a proposal later on.

5.1.1 EXPRESSIONS OF INTEREST

- Expressions of interest should be submitted solely via the online form intended for this purpose, which can be accessed via the BELSPO and STEREO websites:

  https://www.belspo.be/belspo/organisation/call/SRIV_2025_en.stm

  https://eo.belspo.be/en/stereo-call-proposals

- The expression of interest has to reach the Belgian Federal Science Policy Office no later than:

  30 January 2025 at 4 PM

- The Belgian Federal Science Policy Office will disregard any expression of interest that is submitted after the closing date.

5.1.2 PROPOSALS

- Proposals should be submitted solely via the online form intended for this purpose, which can be accessed via the BELSPO and STEREO websites:

  https://www.belspo.be/belspo/organisation/call/SRIV_2025_en.stm

  https://eo.belspo.be/en/stereo-call-proposals

- Applicants are required to meet the conditions set forth in this document.

- Proposals should be submitted in English.

- The proposal has to reach the Belgian Federal Science Policy Office no later than:

7 April 2025 at 4 PM

- The Belgian Federal Science Policy Office may disregard any proposals that are submitted after the deadline.

5.2 ASSESSMENT AND SELECTION

5.2.1 EXPRESSIONS OF INTEREST

After reception of the expressions of interest, the programme managers will give a **non-binding feedback (recommendations and/or remarks)** about the compliance of the expression of interest with the guidelines of this call.

5.2.2 PROPOSAL

Note that proposals will not be considered for evaluation if they do not meet the requirements of the call.

The evaluation of the proposals is divided into two steps. The **first step** is a written evaluation by 4 international experts. The criteria used for this first part of the evaluation are:

- Compliance with the guidelines of this call and the programme aims

- Scientific quality of the project proposal:

  - **scientific originality of the proposed research**
  - **definition of clear objectives and tasks**
  - clarity of the aims and the tasks
  - relevance of the methodological approach
  - validation of the results

- Calibre of the applicant(s)

    - relevant expertise and publications of the applicant's laboratory

- Quality of the proposed partnership

    - complementary relationship of the partners
    - distribution of tasks
    - balanced distribution of the resources among the partners
    - cooperation methods (joint activities, exchanges of researchers, joint publications, …)

- Feasibility of the proposal

    - realistic preparation of the work plan (including SWOT analysis)
    - realistic assessment of the resources required (duration, budget, staff)

- Exploitation

    - plan for disseminating project results, visibility given to the project

The **second step** of the evaluation consists of an oral defence in front of a panel of experts. This second step is only carried out for the proposals that successfully passed the first part of the evaluation.

The criteria used for this second part of the evaluation are:

- Presentation
- Knowledge of domain
- Innovative character of proposal
- Motivation
- Clarity and relevance of answers

5.2.3 SELECTION

At the end of the day the proposals are selected and recommended for funding by the STEREO Programme Committee (see § 2.13) on the basis of:

- The ranking of the proposals established by the panel of experts (based on the written evaluation and on the oral defence)
- The budget available

The final decision is taken by the State Secretary for Science Policy upon advice by the Inspector of Finances.