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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

INFORMATION PACKAGE

APRIL 2022

CLOSING DATES:

Expressions of interest (mandatory): 29 April 2022 before 4 p.m.

Research proposals: 15 June 2022 before 4 p.m.

1 CONTENT

FOREWORD

- This document features the information required for teams wishing to take part in the 2022 call for research proposals in the context of the "STEREO IV programme". This call only concerns exploration projects.

- **Exploration projects**
  - Small scale remote sensing projects either:
    - exploring innovative research avenues or
    - answering scientific questions that arose in a previous BELSPO project.
  - The call is addressed to Belgian universities, public scientific institutions and non-profit research institutions.
  - Cooperation with foreign scientific partners is optional but recommended. A maximum of 20% of the STEREO budget may be earmarked for foreign teams per project. 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.

- 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 this grant 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 29 April 2022 at 4 PM.**

- **Proposals must reach the Belgian Federal Science Policy Office no later than 15 June 2022 at 4 PM.**

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 2022-2027 and has been allocated a budget of 28,15 M€.
The particulars of the new programme are being elaborated taking into consideration the results of the evaluation of the preceding STEREO III programme and the current and planned European initiatives in the domain of earth observation.
In the meanwhile, however, for continuity's sake, a first call for exploration projects has been prepared based largely on the terms of the STEREO III programme.

This document concerns the first call for proposals of the STEREO IV programme.

2.2 MAIN ORIENTATIONS OF THE STEREO IV PROGRAMME

The evaluation established that STEREO III is a successful and varied (in terms of types of funding, support, themes covered and application domains) scientific programme that plays a central role in Belgian EO research and supports in general high-quality and innovative earth observation research
Positive aspects singled out include:

- The international visibility of the research teams;
- The built-in links to international researchers and groups;
- Role as facilitator tot attract external funding;
- Proposal evaluation and project supervision procedures;
- The training of young scientists;
- The communication and dissemination activities.

The main area of concerns is the limited uptake of EO applications in policy and industry.

Even though the details of the new programme are still being worked out, in collaboration with the Programme Board, the above findings together with the European context already allowed to outline the main orientations of STEREO IV.

2.3 PROGRAMME GOAL

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

2.4 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 these 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 de done with a future thematic application in mind.

2.4.1 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.

2.4.2 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 and volcanic eruptions, but also include man-made risks and the emergence and spread of pathogens.

Remote sensing comes into play at different levels: understand the risks, identify vulnerable areas and produce accurate hazard maps, develop early warning and forecasting systems, assist with emergency responses, and inventory disaster impacts and post disaster damages.

2.4.3 MONITORING 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 is essential for us. Nature provides us with food, health and medicines, materials, recreation and wellbeing. 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 in and help policymakers prioritize the most critical areas and monitor restoration efforts.

The focus is placed on the following types of environment:

- Water (both sea and inland)
- Coastal zones
- Wetlands, heaths and peatlands

- Agriculture and soil
- Forest and grassland
- Snow and ice
- Deserts

2.4.4 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, being environmentally friendly and providing 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 can explain areas are experiencing increased temperature, identify which populations are most vulnerable, and lead to ways to mitigate the effects through adaptive land use planning.

2.5 GEOGRAPHIC PRIORITIES

- There is a preference for study areas where previous (STEREO) research took place or for BELAIR sites (for more information got to https://belair.vito.be.)

- 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.

2.6 METHODOLOGICAL PRIORITIES

Following methodological research 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.

2.7 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 very high resolution optical, hyperspectral, radar and lidar, in combination with in-situ data.
The remote sensing data can be 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).
Belgian researchers can also access to Pléiades images at cost
Finally, it should be noted that the Belgian regional administrations dispose of airborne data which may be available for scientific use.

2.8 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.

2.9 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 in open access journals.
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.

2.10 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;
- Involve stakeholders of the research in as much as possible;
- Transfer of knowledge to the wider scientific community and potential end-users.

2.11 PROGRAMME STRUCTURE

The three-part programme comprises:

- Support to scientific research: various types of project are funded on the basis of calls for proposals.

- Support to the research community: this concerns a range of initiatives which are beneficial to the entire Belgian remote sensing community as well as the acquisition of remote sensing imagery for the BELSPO's research projects.

- Valorisation and support to the remote sensing community as a whole using following tools: website, newsletters, twitter account and (co)-organisation of events.

SCIENTIFIC RESEARCH

The scientific research covers 5 types of projects:

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

EXPLORATION PROJECTS

These are small-scale projects lasting ***2 to 3 years*** for ***1 to 3 teams*** whether or not rounded out by an international team.
The projects are directed at:

1. investigating new concepts, technologies and sensors (INNOVATION PROJECT); OR
2. Exploring a new research track resulting from previous BELSPO remote sensing projects (SPIN-OFF PROJECT).

2.12 PROGRAMME PLANNING

The calendar of the calls will be communicated at a later stage.

2.13 IMPLEMENTATION OF THE PROJECTS

- The selected project proposals are covered by a **contract** between the Belgian Federal Science Policy Office, the relevant scientific institutions and, where appropriate, the private or public partner or NGO.

- 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 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.

  It 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 disseminating the results nationally and internationally
  - Drawing attention to problems within the partnership/project resulting in the termination of the agreement

  The Committee meets at least once a year. All partners must participate. The **costs** for organising the meeting and paying the costs for foreign experts are **disbursed via the project** and reimbursed via the programme (outside the budget of the project) up to a maximum sum of €4,000 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-iv-programme).

2.14 PROGRAMME COMMITTEE

A **cooperation agreement** is being 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 representatives of the relevant public administrations of the federal, regional authorities

The 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 2022 CALL

3.1 OBJECT AND BUDGET OF THIS CALL

This call applies to **exploration projects** only. These are small scale projects lasting 2-3 years and carried out by 1 to 3 Belgian teams. An international partner is recommended but not obligatory.

The **budget** for this call is **tentatively** set at about **2.000.000 EURO** but may be subject to adjustments!

3.2 TIMETABLE

- Submission of expressions of interest — 29 April 2022
- Feedback on expressions of interest — 9 May 2022
- Submission of proposals — 15 June 2022
- Oral defence of proposals — mid-September 2022
- Selection of proposals by Steering Committee of STEREO programme — End of September 2022
- Start of contracts — December 2022

4 PROFILE OF THE PROPOSALS

4.1 TARGET GROUPS

- The following Belgian partners may 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.
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 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.

- 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 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. ...

4.2.3 EQUIPMENT

- It is recommended to buy equipment to be used jointly by network partners.

- Budget available for purchasing and installing 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

4.2.4 SUBCONTRACTING

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

4.2.5 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 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.

4.2.6 GENERAL EXPENSES

- General expenses ("overheads") account for a maximum 5% of the total staff and operating costs for the total budget of the project.

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 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 the APEX or BELAIR 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_2022_en.stm

  https://eo.belspo.be/en/stereo-iv-programme

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

  29 April 2022 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_2022_en.stm

  https://eo.belspo.be/en/stereo-iv-programme

- 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:

15 June 2022 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 3 or 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

- <u>Calibre of the applicant(s)</u>

  - relevant expertise and publications of the laboratory

- <u>Quality of the proposed partnership</u>

  - 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, …)

- <u>Feasibility of the proposal</u>

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

- <u>Exploitation</u>

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

The **second step** of the evaluation consists in 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 for funding by the STEREO programme committee on the basis of:

- The ranking of the proposals 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.

6 PROGRAMME BACKGROUND

6.1 THE NATIONAL CONTEXT

The Belgian long-term strategy in the field of earth observation is based on two pillars:

- The development of technology, via ESA and bilateral collaborations (for example: SPOT, Pléiades, VEGETATION, CTIV, PROBA, APEX, TERRASCOPE, ALTIUS);
- and, since 1984, the development of applications, the establishment of an expertise in earth observation and the support of the scientific use of types of earth observation data (focussing on the use of "Belgian" satellites and remote sensing instruments), financed by a succession of federal research programmes. Throughout the years, these programmes progressively put emphasis on:
    1. International visibility of the results of the Belgian research
    2. Transfer of knowledge from the universities to the industry and the administrations
    3. Interaction with users and enlargement of the user community
    4. Training and education

6.2 THE STEREO III PROGRAMME

The previous phase of the STEREO programme, STEREO III, ends in 2022. For more information visit https://eo.belspo.be/en/stereo-iii-programme.

In 2021-2022, an external evaluation of the programme was carried out in order to assess the performance of the STEREO II programme and its parts, and to provide recommendations on the elaboration of STEREO IIV.

The summary of this evaluation can be found on the following website:
https://eo.belspo.be/en/stereo-iii-programme.

6.2.1 ESA ACTIVITIES

There is an obvious synergy between national programmes and ESA activities: programmes like STEREO enable the training of highly qualified researchers and the development of expertise thus allowing an adequate ESA return to Belgium. A continuous financing of the research also makes it possible to have national champions.

Currently, the main ESA programmes for EO research and applications are the FutureEO-1 Block "EO Science for Society", the Global Development Assistance (GDA), and the Climate Change Initiative Opportunities (CCI+) programmes.

New ESA programmes will be decided upon at the ESA Ministerial Council which will take place in November 2022.

For more information about relevant ESA activities, please contact:
BELSPO's ESA delegate for Earth Observation: Steven Bogaerts (boga@belspo.be).

Or visit:
https://eo4society.esa.int/
https://climate.esa.int
https://www.esa.int/ESA_Multimedia/Images/2021/11/Global_Development_Assistance_Programme

6.2.2 HORIZON EUROPE

Horizon Europe, the successor to Horizon 2020, is the European Union' key funding programme for research and innovation for the period 2021-2027 with a budget of €95.5 billion €.
The programme aims to tackle climate change, help to achieve the UN's Sustainable Development Goals, reinforce Europe's scientific and technological excellence and boost the EU's competitiveness and growth.
The actions carried out within the programme are to support following 5 missions identified by the European Commission:

- Adaptation to Climate Change

- Cancer
- Restore our Oceans and Waters
- Climate-Neutral and Smart Cities
- A Soil Deal for Europe

The structure of the programme consists of 3 pillars:

1. Excellent science
2. Global challenges and European industrial competitiveness and
3. Innovative Europe.

Pillar 2 consists of 6 clusters:

- Health
- Culture, Creativity and Inclusive Society
- Civil Security for Society
- Digital, Industry and Space
- Climate, Energy and Mobility
- Food, Bioeconomy, Natural Resources, Agriculture and Environment

Horizon Europe supports research and innovation especially through Work Programmes, which set out funding opportunities for research and innovation activities. The first work programme covers the period 2021-2022.

EARTH OBSERVATION WITHIN HORIZON EUROPE

Funding opportunities 2021-2022 for Earth and Environmental Observation can be found via https://op.europa.eu/en/publication-detail/-/publication/aa9f1843-f013-11eb-a71c-01aa75ed71a1. Topics with strong links to environmental and/or Earth observations are mostly found in clusters 4 and 6.

6.2.3 COPERNICUS

Copernicus is the European Union's Earth observation programme coordinated and managed by the European Commission in partnership with the European Space Agency (ESA).
It aims to provide timely and easily accessible information drawn from satellite earth observation and in-situ data to improve the management of the environment, understand and mitigate the effects of climate change, and ensure civil security. The information services provided are free and openly accessible to users.

ESA coordinates the delivery of data from upwards of 30 satellites. The European Commission is responsible for the overall initiative, setting requirements and managing the services.

EARTH OBSERVATION SATELLITES

The Earth observation satellites which provide the data for the Copernicus services are split into two groups of missions:

- The Sentinels, which are developed for the specific needs of the Copernicus programme.
- The Contributing Missions, which are operated by National, European or International organisations and already provide a wealth of data for Copernicus services.

The Sentinel missions currently in orbit are:

- Sentinel-1, radar imaging mission for land and ocean services;
- Sentinel-2 multispectral high-resolution imaging mission for monitoring land, inland waters and coastal areas;
- Sentinel-3 is a multi-instrument mission for land and ocean monitoring;
- Sentinel-5 Precursor focussing on gases and aerosols;
- Sentinel-4 for atmospheric monitoring and to be embarked on a Meteosat satellite;
- Sentinel-5 to monitor the atmosphere from polar orbit aboard a MetOp satellite;
- Sentinel-6 carries a radar altimeter to measure global sea-surface height.

In addition to data provided by the Sentinel satellites, missions contributing to Copernicus deliver complementary data to ensure that a whole range of observational requirements is satisfied. Contributing Missions include missions from ESA and third party mission operators that make some of their data available for Copernicus.
For more information on third party missions: https://spacedata.copernicus.eu/data-access/access-to-esa-third-party-mission-data.

COPERNICUS SERVICES

To monitor the state of the Earth System Environment, 6 thematic services have been defined: Land monitoring, Climate change, Marine monitoring, Emergency management, Atmosphere monitoring and Security.

More information can be found at:
https://www.copernicus.eu/en/about-copernicus
or contact Steven Bogaerts (boga@belspo.be)