

COSMO-SkyMed Constellation

Open Call for Science

Italian Space Agency



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Acronyms:

ASI:	Italian Space Agency
AO:	Announcement of opportunity
COSMO-SkyMed:	COnstellation of Satellites for Mediterranean basin Observation
Co-PIs:	Secondary Investigators
CSK:	COSMO-SkyMed
CSG:	COSMO-SkyMed Second Generation
I-CUGS:	Italian Civil User Ground Segment
DEM:	Digital Elevation Model
EO:	Earth Observation
GEO:	Group on Earth Observation
GEOSS:	Global Earth Observation System of Systems
GMES:	Global Monitoring for Environment and Security, currently COPERNICUS
MoD	Ministry of Defense
R&D:	Research and Development
SAR:	Synthetic Aperture Radar
PI:	Principal Investigator

Introduction

The Italian Space Agency (ASI) intends to promote the scientific utilization of COSMO-SkyMed mission providing data acquired by the Italian SAR constellation to Principal Investigators for basic and applied R&D on new algorithms, products and applications.

The call is focusing on the exploitation of COSMO-SkyMed data only for civil applications and is open to the National and International Scientific Community.

ASI wishes to receive original scientific proposals taking advantage both of the unique characteristics of the COSMO-SkyMed Constellation and of the innovative ideas for the synergistic utilization with the ESA and International EO Missions.

To submit a project, proposer must read carefully the present guideline document that states limitation and highlights for an acceptable proposal.

References

[RD.1] COSMO-SkyMed Mission and Products Description, see www.asi.it, section CALLS and OPPORTUNITIES → CALLS → Open Call for Science.

[RD.2] COSMO-SkyMed License to Use, see www.asi.it, section CALLS and OPPORTUNITIES → CALLS → Open Call for Science.

1. General Guidelines of the COSMO-SkyMed Open Call

The main objectives of this call are to promote the improvement of existing applications or the development of new technologies and algorithms based on Earth Observation information using products in X band from the COSMO-SkyMed Constellation.

COSMO-SkyMed is an Earth Observation satellite system funded by the Italian Ministry of Research and Ministry of Defense and developed by the Italian Space Agency (ASI), intended for both military and civil use.

The space segment of the system includes four identical medium-sized satellites equipped with Synthetic Aperture Radar (SAR) sensors allowing the global coverage of the planet. See more details in [RD 1].

This call is exclusively related to basic and applied R&D in view of scientific and toward operational utilization of the products developed.

Commercial or operational activities are not supported.

This call is open to national and international scientific investigators and proposals can be submitted anytime only via secure online submission as indicated on the web site www.asi.it, section CALLS and OPPORTUNITIES → CALLS → Open Call for Science.

Any request for clarifications related to the Call can be asked to: csk.science@asi.it

Users are encouraged to report any difficulties or failures encountered in compiling proposal by sending comments to the email addressed to the dedicated web site (www.asi.it, section CALLS and OPPORTUNITIES → CALLS → Open Call for Science).

A product/programming quota will be assigned by ASI to selected proposals and data will be provided free of charge through established online delivery via ftp.

1.1. Timeline

The opportunity to submit a proposal for this call will be always open.

The result from evaluation will be provided within two months from the proposal's submission.

Selected projects will be supported for a maximum of two years.

1.2. Image Allowance

ASI is interested in supporting as many high-quality proposals as possible within a given product budget allowance. As authorised projects within this AO are related to basic and applied R&D, they should therefore require a limited number of scenes to demonstrate capabilities. For this reason, all proposals must include an estimate of the number of images required; data needs shall be aligned with the objectives of the proposal to be achieved.

A maximum provision of 100 COSMO-SkyMed scenes may be requested.

1.3. Promotion of Project Results

In accordance with the objectives of this AO, ASI intends to use the project results to promote COSMO-SkyMed applications.

Proposers must agree and commit to report the results of their projects in scientific or technical publications and acknowledge ASI COSMO-SkyMed program appropriately, using the following notice: *Project carried out using CSK® Products © ASI (Italian Space Agency), delivered under an ASI licence to use in the framework of COSMO-SkyMed Open Call for Science.* Proposers must also agree to attend at least one workshop or national/international symposium to present results and related publications of their projects and to provide ASI with material for promotional purposes.

It is mandatory for the proposers to provide ASI (to the following e-mail address csk.science@asi.it) with all technical publications related to the accepted proposal and based on the exploitation of COSMO-SkyMed data.

2. Objectives of the COSMO-SkyMed Open Call

The Principal Investigator must include details clearly demonstrating that the proposal will address one or multiple of the following objectives and scope.

2.1. COSMO-SkyMed Constellation Innovative Exploitation

Under this topic, Principal Investigators must take advantage of the unique capabilities offered by the COSMO-SkyMed Constellation for basic and applied R&D on new algorithms, products and innovative applications.

Evaluation Criteria

The proposals should demonstrate the following:

- the target application(s) for the new product or innovative application;
- demonstrated interest in the project by a potential user in the product or innovative application to be developed;
- the improvements or technological advantages offered by COSMO-SkyMed Constellation to the product or innovative application;
- a valid work plan for developing product or innovative application will be tested;
- sufficient finances and resources available to complete the project during the period covered by the COSMO-SkyMed initiative;
- willingness to publish project results.

2.2. COSMO-SkyMed and Synergies with other EO Missions

Under this topic, proposers must aim at exploring capabilities offered by the synergistic utilization of COSMO-SkyMed Constellation and Sentinels, Earth Explorers and other SAR or optical/multi/hyper spectral missions to develop new products or innovative applications in many domains of Earth Science, such as land cover and vegetation, water resources and hydrology, ocean and marine applications, polar research, risk management and security.

Evaluation Criteria

The proposals should demonstrate the following:

- the target application(s) for the new product or innovative application;
- demonstrated interest by a potential user in the product or innovative application to be developed;
- the improvements or technological advantages that the synergistic utilization of COSMO-SkyMed Constellation and other missions can add to the product or innovative application;

- a valid work plan for developing the product or innovative application, indicating how the product or service will be tested;
- sufficient finances and resources available to complete the project during the period covered by the COSMO-SkyMed initiative;
- willingness to publish project results.

2.3. COSMO-SkyMed Methods and Algorithms

Under this topic proposers must exploit the capabilities offered by COSMO-SkyMed, also in synergy with other missions, to advance the development of algorithms, methodologies or information products for existing or potential applications in many domains of Earth Science.

The synergic use of COSMO-SkyMed data with other EO missions is welcome.

Evaluation Criteria

The proposals should demonstrate the following:

- an understanding of SAR and the potential offered by COSMO-SkyMed Mission to deliver a technological advantage to the product or application;
- the potential benefits of the project to support future operational activities;
- a work plan indicating how the potential use of the information will be tested;
- sufficient finances and resources available to complete the R&D project;
- willingness to publish project results.

2.4. New ideas for System Exploitation

Under this topic, applicants shall address the development of innovative technologies for the exploitation of the future mission “COSMO-SkyMed Second Generation” standalone as well as in coordination with the current operational system. Results from these activities should provide recommendations and improvements for the design of COSMO-SkyMed Second Generation or for the future generations of COSMO-SkyMed mission.

The key goals of the proposal covering this topic are:

- to elaborate acquisition mode or design concepts which can improve scientific insights and foster innovation by making use of COSMO-SkyMed data and system capabilities;
- to study innovative SAR techniques and technologies (algorithms, software, data simulator) in support of the preparation, characterization and exploitation of future generations of COSMO-SkyMed mission.

The main study areas are related but not limited to:

- study of combined exploitation of legacy acquisition modes common to both COSMO-SkyMed (CSK) and COSMO-SkyMed Second Generation (CSG) missions.
- identification of image performance parameters relevant to the quad-pol acquisition mode available in CSG;
- identification and characterization of innovative SAR acquisition mode;
- identification and implementation of automatic product quality check algorithms.

Evaluation Criteria

The proposals shall demonstrate the following:

- an understanding of SAR and the potential offered by COSMO-SkyMed Mission (CSK, CSG or both) or its possible evolutions to deliver a technological advantage to the product, application, technique or design concept;
- the potential benefits of the project to support future operational activities;
- a work plan indicating how the potential use of the information will be tested;
- sufficient finances and resources available to complete the R&D project;
- willingness to publish project results.

3. Specific Instructions Applicable to the COSMO-SkyMed Open Call

3.1. Procedure

The Proposer shall:

- submit a proposal for a R&D project;
- agree to have his/her proposal evaluated by Earth Observation experts appointed by ASI;
- sign the “COSMO-SkyMed License to Use”;
- coordinate the project execution;
- submit to ASI reports as planned on project’s results and findings (see file TEMPLATE FOR PROJECT REPORTING on the web site);
- publish the results of the research project and appropriately acknowledge the COSMO-SkyMed initiative. Provide ASI with advance copies of their publications and communications;
- provide ASI, on request, with information for promotional purposes;
- attend organized workshops or symposium to present results;
- delete ASI Products following completion of the project.

3.2. Web site Submission Guideline

This Call is limited to Principal Investigators (PI) from Institutional Entities.

The proposal should be submitted via the secure website (as indicated on the web site www.asi.it, section CALLS and OPPORTUNITIES → CALLS → Open Call for Science). Mailed proposals will not be accepted. English language is requested.

To submit a proposal Principal Investigator shall register on the website.

All communications will be addressed to the PI e-mail provided in this section.

The website supports the proposal submission in several steps. It can be modified until the submission confirmation button is pressed. This step releases the proposal for the evaluation process and marks the formal submission of the proposal.

The proposal should clearly describe the intended research, the scientific benefit, the required data and acquisition plan. In particular the following information should be provided:

- Team Composition, PI, Co-Is, Experience of the Team
- Innovation of the proposed project
- Detailed description of the intended work
- Work plan of the investigation
- Source of funding

- Data Requirements and justification for the amount and type of the requested data.

The title, the PI and the Executive Summary of the accepted proposal will be made available to the public on dedicated web pages.

3.2.1. Cover Page

This section should provide the title of the project, the main objective of the proposal, the primary application domain and the Executive Summary.

Title of the project should not exceed 256 characters.

Main objectives are the following:

- COSMO-SkyMed Constellation Innovative Exploitation
- COSMO-SkyMed & other missions synergies
- COSMO-SkyMed Methods and Algorithms
- New ideas for System Exploitation

Primary application domains can be selected as follows:

- Land Cover & Vegetation
- Water Resources & Hydrology
- Ocean & Marine Applications
- Polar Research
- Risk Management & Security
- SAR Methods & Research
- Other

Executive Summary (*should not exceed 3000 characters*) must resume scientific and technical objectives of the project, proposal methods and expected results.

PI and CO-PI resume the contact information and affiliation for the project.

3.2.2. Proposal description and innovation

This section should provide:

- a description (should not exceed 12000 characters) of the **proposal's objectives**, the technical and scientific approach and methods proposed, a list of the tasks to be completed and the expected results.
- a description (should not exceed 2000 characters) of the **innovative character** of the project and to what extent the utilization of COSMO-SkyMed data (alone or in synergy with other missions) data could provide a competitive advantage to the proposed research or application.

This section should also provide information on region(s) of interest of the study area.

Study area can be selected as follows:

- Global
- Asia
- Europe
- Africa

- Australia
- South America
- Artic/Antarctic/Greenland
- Pacific Ocean
- Atlantic Ocean
- Indian Ocean
- North/Central America

Projects referring to the complete Earth globe can be classified as 'Global'. Projects with test areas in different parts of the Earth can be classified as “Global” as well.

3.2.3. Team Composition and Experience

The **Team** Composition section should provide a presentation (*should not exceed 2000 characters*) of the project team and the organization of the work described in the technical proposal.

The **Experience** section should provide a description (*should not exceed 2000 characters*) of their expertise and their roles in the achievements of the project's objectives.

3.2.4. Schedule and Funding

The **schedule** must show the project phases (preparation, data acquisition, analysis) as well as the plan for reporting preliminary and final results. A Work Plan of the investigation, including a description of the key milestones, the planned use of data, models and facilities shall be provided (*should not exceed 2000 characters*).

Availability of **funding** to run the project must be specified in this section. Facultative description of cost breakdown may follow. Full contact details about the funding agency must be provided (*should not exceed 2000 characters*)

3.2.5. Product Requirements

This section should specify the COSMO-SkyMed Products required for the project.

A maximum budget of 100 scenes may be requested. The majority (at least 80%) of the products must be ordered from COSMO-SkyMed archive, linked through the page *Open Call for Science* (www.asi.it, section CALLS and OPPORTUNITIES → CALLS → Open Call for Science).

If the proposal requests a greater number of scenes (greater than 100), justification must be provided in the project description.

A limited number of new acquisitions can be requested (maximum 20% of the total number of the products) for every selected project. New acquisitions can be requested only on 2 test-sites.

For new acquisitions, during routine mission operations, operational and commercial data requests will have priority over COSMO-SkyMed Projects. Although not guaranteed, every effort will be made to provide COSMO-SkyMed data over the requested period.

No COSMO-SkyMed real time acquisition will be possible in any case.

For data request over ITALY, the investigators must basically rely on archive data acquired for example within the MAP ITALY project (Stripmap acquisition mode over all Italian territory every 16 days). New acquisitions over Italy can be considered only on exceptional cases.

PI has to indicate the following information: the acquisition mode (Spotlight, Stripmap, Scansar-wide, Scansar-huge), the country where the images are requested, the number of images, the acquisition type (archive or new acquisition). In case of new acquisitions the preferred period of the acquisition should be specified.

3.2.6. Other data used

If the PI wishes to use **other data** than COSMO-SkyMed (e.g. other Space Agency, ground/airborne campaigns) he/she should provide information about the procurement approach and the data description used in the “Comments” field.

3.2.7. Documentation attached

A brief CV of the PI and CO-I shall be submitted.

The PI can provide more information (e.g. letter of interest by user as foreseen in section 2.1 and 2.2, tables, list of publications, references, etc.) uploading a file in this section. A short description of the file shall be provided in the relevant comment field. Please note: only one file can be uploaded in this area. Should you have more files, please zip them together.

For what concern COSMO-SkyMed product requirements, an excel file must be downloaded, compiled and uploaded with all the requested information.

Before uploading the file, rename it with the PI last name.

3.3. How to modify and submit a proposal

Project proposal submission can be quit at any moment, after it has been initiated. The PI will be able to re-access at a later stage of submission. Final submission of the project proposal can be done only after all the fields have been duly completed. After the formal submission no more changes can be performed on the proposal's contents and an automatic submission acknowledgement will be sent to the e-mail of the PI.

3.4. Evaluation

Each proposal will go through a scientific and technical evaluation. This will be the task of the evaluators team appointed by ASI and composed by Earth Observation experts.

The purpose of the reviewers is to evaluate the scientific and technical merits of the proposed projects in relation to the COSMO-SkyMed Open Call objectives, as well as their technical feasibility.

As a result of the evaluation process proposals might be split or merged or ASI might decide to select only a portion of the proposed project. In any case investigators will be given the opportunity to accept or decline such partial acceptance.

The result of the evaluation will be provided within two months from the submission.

The proposal should demonstrate the following:

- a) the potential offered by COSMO-SkyMed mission to deliver innovative products/applications;
- b) potential benefits of the projects to advance knowledge in Earth Science or positive outcomes or to support future operational activities;
- c) technical and programmatic feasibility of the project within a period of two years;
- d) competence and relevant experience of the PI and collaborators, as an indication of their ability to complete the project successfully;
- e) sufficient finances and resources available to complete the project.

3.5. Data Access

Prior to ASI provision of COSMO-SkyMed products, the selected PI has to return a signed “COSMO-SkyMed License to use”.

The provision of COSMO-SkyMed products is governed by COSMO-SkyMed data policy.

ASI will verify that product requests are compliant with the security regulations. This means that some product requests may be rejected even for accepted proposals.

The products will be ordered after the approval of the project using a CSK Request Form provided by ASI.

Products delivery will be available via ftp.

3.6. Project implementation, Reporting and Intellectual Property

Selected proposals will be monitored by ASI. All selected PI will be expected to submit a progress report, at the end of the first year, describing the status of their project and to prepare a final report at the end of project period (see file TEMPLATE FOR PROJECT REPORTING_SCIENCE on the web site). The templates for the progress report and final report will be provided after proposal acceptance.

PIs will be invited to present their results and related publications of their projects to workshops or conferences..

PIs must commit to report the results of their projects in scientific publications and acknowledge ASI with the following notice: *Project carried out using CSK® Products © ASI (Italian Space Agency), delivered under an ASI licence to use in the framework of COSMO-SkyMed Open Call for Science.*

ASI intends to use project's results to promote COSMO-SkyMed applications and proposers must agree to provide material for promotional purpose.

3.7. Questions

Any request of clarifications related to the Call can be asked to: csk.science@asi.it

A FAQ section will be available on the web site almost every 15 days.

Users are encouraged to report any difficulties or failures encountered in compiling proposal, by sending comments to the email addressed on the dedicated web site (www.asi.it, section CALLS and OPPORTUNITIES → CALLS → Open Call for Science).