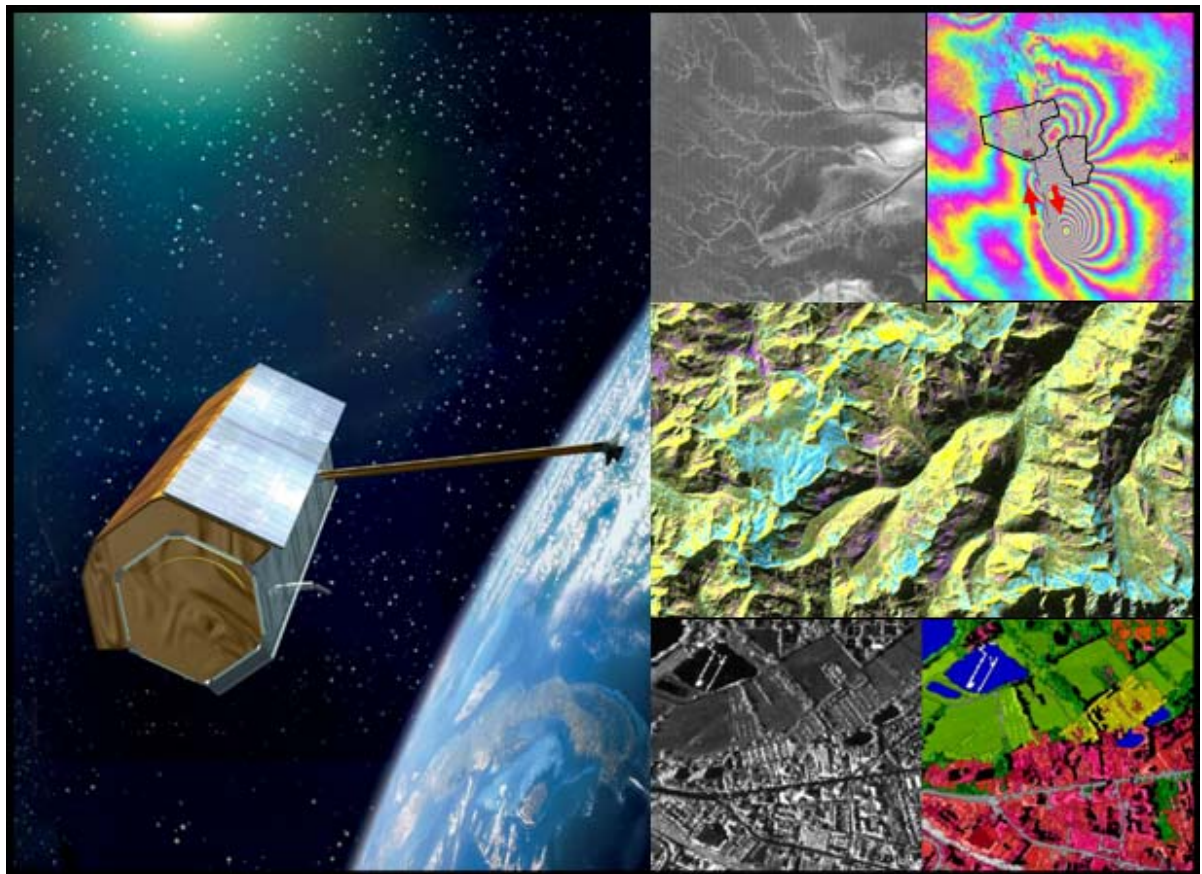


# TerraSAR-X

## Announcement of Opportunity: Utilization of the TerraSAR-X Archive



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## 1 INTRODUCTION

### 1.1 PURPOSE AND STRUCTURE OF THE DOCUMENT

This document describes the Call and procedure to conduct scientific research and education, as well as to develop, evaluate and demonstrate new applications of the TerraSAR-X mission.

Chapter 2 describes the objectives of the Announcement of Opportunity related to the utilization of the TerraSAR-X data archive. Chapter 4 provides information on the AO procedure, including submission guidelines, proposal evaluation, how the proposal shall be implemented as a project, data costs and schedule. The data rights are provided as Annex in the user license agreement.

This document describes the specific conditions and procedures applicable to proposals related to the Archived Data Announcement of Opportunity (AO).

### 1.2 APPLICABLE DOCUMENTS

- [A1] TerraSAR-X Science Plan, TX-PGS-PL-4001, Issue 1.0, 25.11.2004
- [A2] Gesetz zum Schutz vor Gefährdungen der Sicherheit der Bundesrepublik Deutschland durch das Verbreiten von hochwertigen Erdfernerkundungsdaten (Satellitendatensicherheitsgesetz, SatDSiG); 23.11.2007

### 1.3 REFERENCE DOCUMENTS

- [R1] TX-GS-DD-3302 – Basic Product Specification Document, Issue 1.9, 9.10.2013
- [R2] TX-GS-DD-3303 – Experimental Product Description, Issue 1.3, 6.10.2006
- [R3] TX-PGS-PL-4403 - User License for the Utilization of TerraSAR-X / TanDEM-X Data and Products for Scientific Use, Issue 2.2, 27.9.2011
- [R4] TX-PGS-PL-4111 – Announcement of Opportunity: Experimental Products of the Dual Receive Antenna Campaign 2010, Issue 1.0, 01.06.2010

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## 2 MISSION OVERVIEW

TerraSAR-X is an operational, advanced SAR-satellite system for scientific and commercial applications that was launched on June 15<sup>th</sup>, 2007. It carries a high frequency X-band Synthetic Aperture Radar (SAR) sensor that can be operated in different modes and polarisations. The Spotlight-, StripMap- and ScanSAR-modes provide high resolution SAR images for detailed analysis as well as wide swath data whenever a larger coverage is required. Imaging is possible in single, dual and quad-polarisation, the latter by employing a redundant receiver.

Earth observation is a well suited tool to monitor a world that is changing. The corresponding geo-information products support the investigation and understanding of the processes causing and resulting from the change. They also help to explore, manage and preserve the Earth's resources. TerraSAR-X data help to extend the range of parameters observed and therewith to increase the knowledge of the factors determining the behavior of the environment. Furthermore the data can be used to support the monitoring and management of the Earth's resources.

The objective of all calls for proposals is to foster the scientific use of TerraSAR-X data. Usually the calls – **including the current one** - address the provision of products according to the **“TerraSAR-X Basic Products” as described in [R1]**. This includes single and dual polarised data in StripMap and Spotlight modes provided as single look complex but also detected images in ground range or map projection. ScanSAR data are available as detected as well as complex images. All these products support mapping and monitoring as well as applying SAR interferometry (InSAR) to observe and measure ground movements. The high resolution and short revisit times of TerraSAR-X provide new perspectives for these purposes. In order to support interferometric applications repeat orbits are maintained such that they are within a  $\pm 250\text{m}$  tube relative to the reference orbit.

New modes were introduced, namely the Staring Spotlight and the Six beam ScanSAR modes. The last mentioned is also referred to as Wide ScanSAR mode. The archived data acquired in these modes are subject to the current call, too.

The provision of TerraSAR-X experimental mode products is subject to a separate call. The corresponding products are described in **“TerraSAR-X Experimental Products”** Fehler! Verweisquelle konnte nicht gefunden werden. and will be provided for scientific purposes only.

## **3 DESCRIPTION OF THE CALL**

### **3.1 GENERAL SCIENTIFIC OBJECTIVES OF TERRASAR-X**

Earth observation is a well suited tool to monitor a world that is changing. The corresponding geo-information products support the investigation and understanding of the processes causing and resulting from the change. Based on these findings reliable services can be provided to support environmental and climate protection, regional planning, development aid and security-related issues.

In particular the use of TSX data shall help to extend the range of parameters observed and therewith to increase the knowledge of the factors determining the behavior of the environment. Furthermore the system shall support the management and monitoring of the Earth's resources and to better understand the solid Earth processes.

New and innovative technological features of the SAR instrument enable the improvement of existing and the development of new technologies and applications. Both application and technological development shall aim at a further improvement of the Earth observation services.

Generally proposals shall address at least one of the following objectives:

- Scientific evaluation of TerraSAR-X data
- Stimulating the development of a commercial EO-market
- Support of the mission calibration and validation activities.

### **3.2 ANNOUNCEMENT OBJECTIVES**

#### **3.2.1 SCIENCE AND RESEARCH**

The main objective is to support scientific projects addressing global change issues. For this purpose "historic" TerraSAR-X data shall be made available from the TerraSAR-X archive to support the investigation of temporal changes of the sea as well as land surfaces, coastal waters and Polar Regions. It is expected that the proposals will address at least one out of the following application themes:

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

### 3.2.2 CALIBRATION AND VALIDATION

Proposals can address calibration and validation issues like the investigation of instrument long term stability and the product quality.

### 3.2.3 STIMULATION OF COMMERCIAL USE

The stimulation of the commercial EO-market might address

- the development of improved image processing and information retrieval techniques,
- the development and definition of new applications, geo-information products and services.

Accepted proposals will get TerraSAR-X data for the purpose of the described research.

### 3.2.4 GENERAL CONSTRAINTS

The call is **open to international participants**. A limited amount of TerraSAR-X products will be provided to accepted proposals **free of charge** and will be delivered electronically (see also chapter 4.7).

Investigators might form small research groups that jointly will work with the data. It is expected that these groups either consist of one remote sensing expert who collaborates with experts from other disciplines; or knowledge shall be transferred between institutions of significantly differing levels of expertise.

Like the general AO this call will **remain open** starting from December 2014.

The time span for the proposal's execution **should not exceed two years after the date of the proposal's acceptance**.

**"Historic"** data means that their acquisition date **must be older than 18 months at the time of ordering** from the archive. It is strongly recommended to check the **EOWEB catalogue** (<https://centaurus.caf.dlr.de:8443/>) for data availability before submitting a proposal.

Accepted proposals will get access to products according to the **"TerraSAR-X Basic Products" as described in [R1]**.

## 3.3 EXPERIMENTAL PRODUCTS

The provision of experimental products is not subject to this call.

## 4 AO PROCEDURE

TerraSAR-X data will be provided to projects targeting scientific use within the mission objectives. The status “Scientific Use” needs to be gained via a selection process. For this purpose current Announcement of Opportunity (AO) is released. Proposals need to be submitted via a web interface. Each submitted proposal will then go through a scientific and technical evaluation. One proposal should be related to one project. Principal Investigators (PI) may submit several proposals.

Investigators may form consortiums that will utilise the TerraSAR-X data jointly. For each proposal one PI has to be identified who will act as an interface to the TerraSAR-X project.

The PI will be informed about the evaluation results. The use of TerraSAR-X data is regulated via a license agreement [R2], which must be signed by the PI and all Co-Is. The corresponding account will be released when all required information and documents are on hand at DLR. It will enable downloading data from the DLR archive. New acquisitions are not supported.

### 4.1 SUBMISSION GUIDELINES

The proposal must be submitted electronically. The URL <http://sss.terrasar-x.dlr.de/> will guide to the corresponding proposal submission interface. Mailed proposals will not be accepted.

The proposal should clearly describe the intended research, the scientific benefit, the contribution to the mission objectives and the required data. In particular the following information should be provided:

- General information about the PI and the person authorised to sign the license agreement;
- the list of all Co-Is and the team organization;
- the innovation of the proposed activity and the contribution to the mission objectives;
- a detailed description of the intended work;
- the work plan and schedule;
- the data requirements; and
- information demonstrating the coverage of the “scientific use” criteria (see chapter 4.2 and [A1]).

The title, the PI and the executive summary of accepted proposals will be made available to the public on a dedicated web page.

The web page supports 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.

New investigators must register first. Registered investigators can directly create a new proposal.

The AO ID that the proposal shall be assigned to is

## **TSX-Archive-2014**

It is assumed that every person listed as Co-I or in the list of authorized people will get access to the TerraSAR-X products and that the list is complete. The PI is responsible for keeping both lists up to date during the lifetime of the project. An editing of the list of authorized people will be possible at any time. Changes of Co-Is (team members) need to be announced to DLR.

## **4.2 DEFINITION OF SCIENTIFIC USE**

Scientific, non-commercial use of TanDEM-X / TerraSAR-X data is defined as follows:

Every use of TanDEM-X / TerraSAR-X data and basic products for basic and application oriented research by national or international research institutions or through the German government sponsored projects is considered scientific, non-commercial use, including the development of future applications for scientific and/or operational use.

Every utilisation of TanDEM-X / TerraSAR-X data/products that is not targeting the commercial use with profit orientation is a scientific use.

This includes the use of TanDEM-X / TerraSAR-X data/products:

- by educational (schools, universities, etc.) and research institutions (DLR, ESA, NASA, etc.)
- for preparation and execution of government financed education-, research- and development-programmes
- for preparation and execution of data exchange with international partners of the FRG to support research- and educational programmes
- for demonstration of new applications for potential users

for use within the TanDEM-X / TerraSAR-X project (calibration, validation, quality assurance, public outreach, experimental instrument operations, etc.)

Scientific Users:

- will be generally provided with data/products via a selection process (e.g. an Announcement of Opportunity (AO) for the Scientific Exploitation of TanDEM-X / TerraSAR-X data).
- are required to follow the license agreement for use of TanDEM-X / TerraSAR-X data
- must not hand over the TanDEM-X / TerraSAR-X data/products or derived products (to the extent that the contribution of TanDEM-X / TerraSAR-X is substantial and recognisable) to third parties without authorisation by DLR



## 4.3 EVALUATION

Each proposal will go through a scientific and technical evaluation. This will be the task of an international team of evaluators consisting of DLR internal and external SAR experts. The reviewers will judge the scientific benefit and the data requirements while DLR will check additionally whether the scientific use criteria are met.

As a result of the evaluation process a user account will be created for each accepted proposal and the announced quota will be assigned.

The investigator shall be informed about the evaluation within 2 months after submission.

## 4.4 SECURITY REGULATIONS

The provision of TerraSAR-X data is governed by national security regulations. These regulations might affect the location of the test site, the acquisition time and the persons involved. DLR will be obliged to verify the sensitivity of data requests. The sensitivity check will be performed in two steps:

- The proposal evaluation includes the verification of the investigators and the team members.
- The main sensitivity check will be applied to each order and will comprise location, time and the persons involved.

In case of sensitivity of an order DLR needs to apply for authorisation of distribution by a state authority to be determined. This means that orders still can be rejected even for accepted proposals.

Please note that further regulations might be required after the release of the regulation law [A2].

## 4.5 PROJECT IMPLEMENTATION

Summarizing the procedure described so far AO projects are implemented in the following steps:

- Proposal submission (investigator);
- proposal evaluation (DLR);
- proposal acceptance (DLR);
- signature and provision of the license agreements (investigator);
- provision of user account details and release for ordering (DLR);
- execution of proposed work (investigator);
- provision of reports (investigator);
- participation in Science Team Meetings (investigator);

- provision of final report (investigator);
- removal of all TerraSAR-X data (investigator); and
- closing of user account for ordering (DLR).

#### **4.6 ROLE OF THE PRINCIPLE INVESTIGATOR**

The Principle Investigator (PI) shall act as an interface between the consortium and DLR. The PI will be responsible for

- ensuring the consideration of the security regulations,
- ensuring the validity of the "Scientific Use" criteria for all investigators (including the Co-Is),
- reporting of any changes that might effect the national security regulations or the status "Scientific Use" to DLR,
- distributing the TerraSAR-X data within the project
- publishing of the results in publications of international renown
- reporting to DLR; and
- documenting the progress and results concluding with the submission of a final report to DLR.

The PI's activities are considered to cover the total time period of the project approved by DLR.

#### **4.7 COST OF THE DATA**

Electronically delivered data will be provided free of charge. No other delivery media are supported..

### **5 REPORTING AND PUBLICATION**

The data policy issues as described in [A1] will be applied. A major goal of this AO is to stimulate the scientific utilization of TerraSAR-X data. Therefore it is expected that the investigators will make their results available to the public. This is mostly done by publications. The TerraSAR-X project will provide two platforms for this purpose:

- The project web site will provide a dedicated page where the reports are published. This page optionally can also be supplemented with further downloadable pdf-documents like other publications.
- The second platform is the Science Team Meeting. The information exchange and the transfer of

procedures and techniques into operational and commercial utilization shall be supported by these meetings. Proceedings of these meetings will be compiled and published.

The progress of the project shall be reported. The reports furthermore demonstrate the utilization of the TerraSAR-X data. As mentioned earlier it is a vital interest of the project that the TerraSAR-X data are used. Therefore DLR reserves the right to terminate the provision of data whenever the corresponding utilization is not demonstrated.

Further regulations are provided in the attached User License Agreement.

## **6 POINTS OF CONTACT**

Questions related the proposal submission, evaluation, scientific use etc. should be addressed to the TerraSAR-X Science Coordinator:

Achim Roth

Tel: 08153 / 28-2706

Fax: 08153 / 28-1458

Email: [tsx.science@dlr.de](mailto:tsx.science@dlr.de)

Questions related to ordering and order status as well as the provision of product descriptions etc. should be sent to the Orderdesk of DLR-DFD:

Tel: 08153 / 28-2889

Fax: 08153 / 28-1443

Email: [DFD-Orderdesk@dlr.de](mailto:DFD-Orderdesk@dlr.de)