DEIMOS-1: Announcement of Opportunity (AO)

1. Description of the Opportunity

Deimos-Imaging (DMI) and the Remote Sensing Laboratory of the University of Valladolid (LATUV), announce an opportunity to carry out a scientific research or a comprehensive study for the utilizations of Deimos-1, the first earth observation satellite of Spain. It will provide the services and applications of Deimos-1 in multispectral images. Deimos-1 has been launched successfully on 29th July 2009 at Baikonur, Kazajstan, by a Dnepr rocket.

This Announcement of Opportunity (AO) is open to global scientific community for carrying out research proposals towards the utilizations of Deimos-1 data in the following broad categories:

- Advanced applications for agriculture, land use/land cover
- Advanced applications for forestry
- Advanced applications for hydrology, coastal study, marine issues
- Advanced applications natural resources and disaster management including climate change & global warming
- Specific techniques development for innovative methodologies, techniques, metric and operational use of the data on a regional/global basis

It should be noted that this AO does not fund the 'projects', but only ensures that the selected Principal Investigators (PIs) are provided with relevant, limited data sets.

2. Overview of Deimos-1 Mission

DMI has decided, in 2006, to develop its own remote sensing system: Deimos-1. This satellite was manufactured by Surrey Satellite Technologies (SSTL) under advisory of DMI and LATUV. Deimos-1 was successfully launched on 29 July, 2009, from Baikonur cosmodrome on board of a Dnepr launcher, in a sun-synchronous orbit of 680 km altitude.

Deimos-1 is a worldwide system, fully owned and operated by DMI. The satellite has a design life of five years on its operational orbit, with a probable extension of several more years. It provides imagery in the visible and near infrared region of the electromagnetic spectrum in Multispectral mode. The image data from the instruments are transmitted to the Deimos-1 Image Ground Segment via a station which accommodates the reception and processing of Deimos-1 image data. (refer to Annex V). The Deimos-1 Control Ground Segment (CGS) provides programming mission facilities in preparing and tasking the daily satellite activities as well as monitoring and control facilities allowing the verification and maintenance of the optimal operational conditions of the satellite in orbit.

© DEIMOS Imaging S.L.

3. Data Availability

Deimos-1 data will be made available to the Principal Investigators (PIs) after the commissioning phase, which is expected to be around January 2010. The data sets required for executing the AO projects would be provided to the selected PIs at no cost after evaluation. The term 'data' refers to the data products produced at the CGS. All the Deimos-1 products will be distributed by DMI.

Data will be gathered in a best-effort basis when the regular programme of the satellite and the Ground Station allows for it.

4. Evaluation of Proposals

This Announcement of Opportunity (AO) for potential Principal Investigators is aimed towards stimulating researchers in applications development; identifying necessary support for calibration and validation; and for encouraging development of specific techniques for operational use of the data on a regional/global basis.

Towards this, the proposals received in response to this AO will be evaluated considering primarily the scientific/technical merits. The overall, scientific or technical merit of the proposal, uniqueness and innovative methods, approaches or concepts by making synergistic use of multispectral and panchromatic data planned to be demonstrated.

DMI reserves the right to select the proposals that best meet the programme's objectives and requirements.

5. Specific Areas of Interest

The proposals are invited in the following Areas of Interest (AOI) for utilization of Deimos-1 data:

- Agriculture
- Climate change and its impact
- Land use / land cover
- Coastal zone monitoring
- Forestry
- Urban study
- Hydrology
- Geology/Geomorphology
- Oceanography
- Disaster
- Water resources management
- Cartography and mapping
- Natural resources and Environment
- Others

© DEIMOS Imaging S.L.

Projects that combine potential for applications and, at the same time, make use of the very unique capabilities of the system (specifically the very large size of the image leading to very short revisit periods, sustainable over large areas) will be given special attention.

6. Guidelines for Proposal Preparation

The potential PIs should submit the proposals in a format described in the following sections. The format for the cover page is given in Annex II. The format for the detailed proposal is given in Annex III.

The format of proposal includes an Agreement to be signed by the Principal Investigator and Head of the Institution (Annex IV)

6.1 Instructions for Submission of Proposal

Proposal should be limited to around 10 pages in length on a standard A4 size paper, typed in English and in the prescribed format. The prospective PIs shall fulfil details in the forms given in Annex II and Annex III and submit two copies by mail or e-mail to:

Prof. José Luis Casanova
Director of LATUV
Edificio I+D
Paseo de Belén, 1
47011-Valladolid
SPAIN
Email: jois@latuv.uva.es

6.2 Description of the Proposal

The main part of the proposal should contain a summary (brief objectives, methodology, deliverables of the project and the time schedule), then followed by a detailed description of the objectives and the scientific rationale. The data requirement and the analysis methods should also be highlighted and followed by the methodology or approach. The expected results of the project must be presented. Targeted schedule for various stages of the project must be indicated including the completion date. Criteria for assessing the success of the project should be projected.

Concerning Project Duration, it is expected that the project will be completed within 2 years. Project proposal will be evaluated and the results will be announced.

Concerning Data Requirements, the proposal should identify Deimos-1 data requirements for the study in the form provided by DMI. DMI will make these requirements available to the approved PIs.

Only limited data set not exceeding 8 standard scenes (80x80 km2) will be supplied. The approved PIs should clearly indicate the type of data product (refer to Annex V for available data products), geographical area (latitude/longitude) and the period of coverage. Additional delivery of imagery from the currently available archive may be considered. All approved PIs are encouraged to download the data product

© DEIMOS Imaging S.L.

samples which are currently hosted on the DMI website to have an idea of the kind of product that the system will deliver once calibration is finished.

The project may involve joint efforts among individuals from the associated institution(s). However, only one PI will be recognized. Other participants could be designated as "Co-investigators". PI-Coinvestigators shall provide Curriculum Vitae referring to educational qualifications, the work carried out in the related areas and list of recent publications. The PIs are responsible for ensuring timely completion of the project. The assurance of necessary administrative and financial support to PIs and Co-investigators from Head of the Institution(s) is a must.

Please include a description of available computer facilities, image analysis and other equipment in the home institution or affiliation concerned which can be accessible for the project.

Concerning Presentation of Project Results, a workshop will be conducted within 6 months after the project kick off for the purpose of reviewing the progress of the AO projects and the final conference will be organized after the completion of the AO program. These dates are tentative and may vary with a view to the scope of the selected projects.

7. Terms and Conditions

- ✓ DMI reserves the right to revoke in part or in whole its support for a project at any time without assigning any reason.
- ✓ The data sets provided must be used only for the purpose specified in the proposal. DMI will provide the data associated with a corresponding licence, restricted to the uses described in the project description. The project personnel do not have the right to copy, lease or loan satellite data without the prior permission from DMI. Ownership and copyright of the data lies with DMI. This data is supplied at no cost purely for scientific research in a specific project and it should not be used for any other project, or for commercial or operational applications. Commercial use is defined as anything that involves the sale or resale of data, as well as the derived data for more than the cost of reproduction. Operational use is defined as routine real time or near real time use of the data as well as the derived data.
- ✓ The user will make available to the scientific community the prominent results of the AO projects through publication in appropriate journals or other established channels. Acknowledgement of DMI support must be made in all reports and publications arising out of the AO projects. Copies of all publications resulting from these research projects must be submitted to DMI and LATUV to the address mentioned under paragraph 6.1. DMI reserves the right to use the published results in its reports and publications with due reference to the publication. If the reports or publications are copyrighted, DMI will have a royalty-free right under the copyright to reproduce, distribute, and use the copyrighted works for their purposes.
- ✓ All print of the data/products supplied by DMI should carry the mark "©DMI" mark in legible letters.

© DEIMOS Imaging S.L.

- ✓ The PI is required to submit six-monthly progress reports during the duration of the project. A detailed report is to be submitted during the mid-term and final review in softcopy form.

The PI must maintain an inventory of data products received under the AO project(s) and the data products must be deposited with the home institution after the end of the project. The agreement contained in the proposal format must be signed by the PI and Head of the Institution (Annex ***). Otherwise, the proposal will not be considered valid and is liable to be rejected.

8. Proposal Submission

LATUV requests the provision of both hardcopy and softcopy versions of the proposals. Hardcopy proposals shall be submitted to LATUV in accordance with Annex III as well as the Agreement, Annex IV. All parts shall be bound together. The proposals must be received at LATUV not later than 31 December 2009. The proposer shall notify (bye-mail) the addressee listed in section 6.1. For the hardcopy version, LATUV will confirm in writing that the proposal has been received. The addressee should contact LATUV if the confirmation is not received within two weeks after submission. The softcopy version shall be' in both Microsoft Word and PDF formats. Copies (including all parts of the proposal) should be sent to LATUV designated contact in section 6.1.

9. Schedule

Announcement	September 2009
Deadline for Proposal Submission	December, 31, 2009
Notification of Accepted Proposal	January, 31, 2010
Conclusion of Agreement	February, 28, 2010
Progress Report	6 months after the projects kick off
Mid-term Workshop	September, 2010
Final Report Submission	Two years after kick off
Final Conference	TBD

© DEIMOS Imaging S.L.

List of Acronyms:

AO	Announcement of Opportunity
AOI	Areas of Interest
CGS	Control Ground Segment
DMI	Deimos-Imaging
LATUV	Remote Sensing Laboratory of University of Vallalolid
TBD	To Be Defined

© DEIMOS Imaging S.L.

Deimos-1 satellite description

Deimos-1 is the first private remote sensing satellite of Europe. Total weight of spacecraft is near 90 kg, and its main characteristics are:

- 6 cameras in the Red, Green and Near Infrared bands, spectrally equivalent to Landsat 2,3 and 4 spectral bands:
  Green: 520- 600 nm
  Red: 630-690 nm
  NIR: 770-900 nm
- High spatial resolution of 20-22 m
- Wide swath of 600 km

The processing system and backup have a capability of 4 GBytes with a high performance. This reception system is available to work in real time by means of a conection of 20 MBps between the spacecraft and the ground segment. The solar panels, with high effciency, provide a electric power for any geometry sun-satellite. The possibility to modify the orbit, is available too.

© DEIMOS Imaging S.L.