Announcement of Opportunity for Planet Skysat and PlanetScope data
1 INTRODUCTION

1.1 Purpose and Structure of the Document

The present document describes the Call to conduct Research and Development using Planet Skysat and PlanetScope data. The activities to be carried out shall assess the suitability and quality of data provided by the constellation which is currently an ESA Third Party Mission under evaluation.

Chapter 1 outlines the purpose of this document, explains its structure and provides lists of relevant documentation and abbreviations;
Chapter 2 provides the background and objectives of the Announcement;
Chapter 3 describes the data available;
Chapter 4 illustrates the evaluation procedures and criteria;
Chapter 5 and 6 outline the conditions for data provision and reporting requirements;
Chapter 7 provides an overview of the Schedule of the Announcement.

1.2 Applicable Documents

[AD1] Terms and conditions for ESA TPM data use
https://earth.esa.int/files/TPMterms

1.3 Reference Documents

[RD1] Guidelines for the submission of project proposals
https://earth.esa.int/files/guidelines
[RD2] Planet products distributed by ESA description and specifications
https://earth.esa.int/web/guest/-/planetscope-full-archive
https://earth.esa.int/web/guest/-/skysat-full-archive-and-new-tasking
[RD5] Planet Imagery Product Specifications
https://assets.planet.com/docs/Planet_Combined_Imagery_Product_Specs_letter_screen.pdf

1.4 Glossary and Definitions

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<td>DEM</td>
<td>Digital Elevation Model</td>
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<td>EDAP</td>
<td>ESA's Earthnet Data Assessment Pilot</td>
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2 BACKGROUND AND OBJECTIVES

2.1 Background

ESA’s Third Party Missions (TPM) scheme has operated for more than 40 years, providing EO data from non-ESA missions for the primary benefit of European research and developments entities.

A TPM is a mission that is operated by any legal body, governmental or non-governmental, other than ESA, for which:

- ESA assumes some formal responsibility towards the mission operator or to which ESA contributes financially, usually through sharing of Ground Segment facilities or operations;
- ESA assumes a data distribution responsibility to a European or worldwide user community; or,
- ESA otherwise procures the right to sub-license data to users under the TPM scheme.

ESA is launching an Announcement of Opportunity to the international R&D community to assess the suitability of the 15-satellite SkySat and over 120-satellite PlanetScope constellations, for science and EO-based applications.

While start-ups can also submit proposal, this call is not intended to support proposals for commercial products or operational services.

The submitted proposals will be reviewed and selected by ESA.

Proposals should be submitted online through the following dedicated Web site (https://earth.esa.int/aos/Planet), following the guidelines available in [RD1].

The submission deadline is end March 2020.

Progress and final reports will be submitted by the selected Principal Investigators, summarising the major findings of the project and its achievements versus its original objectives.

2.2 Objectives of the Call

This call offers an opportunity for scientists and researchers to access Planet data products (PlanetScope and SkySat) to support the assessment of the potential of such data as an ESA Third Party Mission.

In particular, the following contributions are expected:

- Assessment of data quality;
- Development of new science, applications, services and products using Planet data;
- Evaluation of the complementarity of Planet data with other ESA and ESA TPM Missions;
- Prepare for future missions.

2.2.1 Data quality assessment

Based on the principles defined in the Quality Assurance framework for Earth Observation (QA4EO) [RD3], and building on experience developed implementing quality assessment frameworks in other projects, the EDAP project has defined high-level principles and activities.
required in quality assessments for Earth Observation missions. For optical missions, these can be found in [RD4].

2.2.2 Science, Applications and Products

The very high resolution data provided by Planet, jointly with their high frequency of acquisitions and global coverage, may provide extremely valuable inputs for carrying out research and development projects or applications in need of local to global information.

In particular the data can be useful for applications such as:

- Agriculture (e.g. crop identification, health, productivity, etc.),
- Forestry (forestry conditions and productivity, monitor deforestation, support REDD+ measurement, reporting and verification),
- Conservation and protection (monitoring health of watersheds, water bodies and hydro systems, analyse conservation areas, wildlife habitats and land use patterns),
- Infrastructure development and monitoring (encroachment, following infrastructure and construction projects, change detection and urban expansion),
- Damage assessment, risk reduction and environmental impact, vulnerability,
- Maritime activities (vessels detection and monitoring, oil spillage and pollutants, harbour operations).

It is expected that proposals received in response to this Announcement will demonstrate, assess and qualify usefulness of the provided data for the development of new science and applications, services and products.

2.2.3 Complementarity with other ESA and ESA TPM data

Within this Announcement, proposals may also assess the usefulness of the Planet data to perform scientific research, applications development and pre-operational prototyping in combination and in complementarity with other ESA and ESA TPM data.

3 DATA AVAILABLE

3.1 PlanetScope

PlanetScope is a constellation composed by more than 120 optical satellites (also named Doves) operated by Planet.

Level 1B and Level 3 data are available for this Announcement as full archive given the daily global coverage of the constellation for monitoring purpose. The proposal shall specify the amount of data needed for the project.

The PlanetScope Basic Scene product is a Scaled Top of Atmosphere Radiance (at sensor) and sensor corrected product, without correction for any geometric distortions inherent in the imaging processes and is not mapped to a cartographic projection. The imagery data is accompanied by Rational Polynomial Coefficients (RPCs) to enable orthorectification by the user.
This kind of product is designed for users with advanced image processing and geometric correction capabilities.

The PlanetScope Ortho Scene product is radiometrically-, sensor- and geometrically-corrected and is projected to a cartographic map projection. The geometric correction uses fine Digital Elevation Models (DEM) with a post spacing of between 30 and 90 meters.

PlanetScope Visual Ortho Scene product is orthorectified and color-corrected (using a colour curve) 3-band RGB Imagery. This correction attempts to optimize colors as seen by the human eye providing images as they would look if viewed from the perspective of the satellite. PlanetScope Analytic Ortho Scene product is orthorectified, 4-band BGRN Imagery with geometric, radiometric and atmospheric correction. This data is optimal for value-added image processing such as land cover classifications.

Products Specifications can be found in [RD5]

3.2 SkySat

SkySat is a constellation composed by 15 optical satellites operated by Planet. The available SkySat product suite includes the SkySat Basic Scene Product (L2B), the SkySat Orthoscene Product (L3B) and the SkySat OrthoCollect Product (L3B) in different product types, all generated from both archive and new tasking imagery. Through this Announcement, users can get access to products from the archive or will be able to request new tasking over specific areas of interest. The proposal shall specify the amount of data needed for the project.

The SkySat Basic Scene product is uncalibrated and in a raw digital number format, not corrected for any geometric distortions inherent in the imaging process and not orthorectified. Rational Polynomial Coefficients (RPCs) are provided to enable orthorectification by the user.

The SkySat Basic Scene product is available as "analytic" (full 12-bit B,G,R,NIR data) and "panchromatic" (12-bit PAN data) product types.

The SkySat Ortho Scene product is sensor- and geometrically-corrected (by using DEMs with a post spacing of between 30 and 90 meters) and is projected to a cartographic map projection; the accuracy of the product will vary from region to region based on available GCPs. Different product types are available.

The SkySat Visual Ortho Scene product is orthorectified, pansharpened, and color-corrected (using a color curve) 3-band RGB Imagery in 8-bit format only.

The SkySat Analytic Ortho Scene DN product is orthorectified, multispectral BGRN, uncalibrated, digital number imagery product. The product has been processed to remove distortions caused by terrain, to eliminate the perspective effect on the ground (not on buildings), restoring the geometry of a vertical shot. Transformation to at-sensor radiance is not included.
The SkySat Analytic Ortho Scenes are calibrated multispectral imagery products with radiometric corrections applied to correct for any sensor artefacts and transformation to top-of-atmosphere radiance.
The SkySat Pansharpened Multispectral Scene product is orthorectified, pansharpened 4-band BGRN Imagery.

The SkySat Panchromatic DN Ortho Scene product is orthorectified, panchromatic, uncalibrated, digital number imagery product. It has a finer GSD than the Analytic Product. Transformation to at-sensor radiance is not included.

Products Specifications can be found in [RD5].

4 PROPOSAL EVALUATION

4.1 Review Process

The proposals will be reviewed and selected by ESA, whereas Planet will be in charge of a feasibility assessment. The purpose of the review is:

- To evaluate the scientific, application and technical merits of the proposed projects in relation to their technical feasibility.
- To assess whether the specific projects are in accordance with existing data policy and with the specific objectives of the Announcement.

ESA may decide to select only a portion of the proposer’s investigation, in which case the investigator will be given the opportunity to accept or decline such partial acceptance.

These final decisions will take into account the relevance to the objectives of this Announcement and project feasibility requirements in terms of spacecraft resources/data availability.

4.2 Evaluation Criteria

Each proposal will be evaluated against the following criteria:

- The scientific and experimental (e.g. non-commercial, non-operational) nature of the proposal
- Relevance of the proposed project for the specific objectives of the Announcement (Data quality assessment, Development of science and applications, Complementarity with other ESA and ESA TPM)
- The demonstrated degree of innovation of the proposal, its scientific merit and its technical quality
- The technical feasibility of completing the project and achieving positive results within a period of typically six months, with special emphasis on the adequacy and practicability of the schedule presented in the proposal
- The competence and relevant experience of the Principal Investigator and collaborators, as an indication of their ability to complete the project successfully.
With regards to the volume of data, ESA will try to accommodate all selected proposals. If the overall request is too high with respect to the available resources, ESA will coordinate with the investigator a review and reduction of the data quantity, in which case the investigator will be given the opportunity to accept or decline such partial acceptance.

5  DATA PROVISION

Following approval of the proposed project, access to satellite images necessary to execute the projects will be provided to the selected Principal Investigators within the limits of the quota assigned to the proposal. Prior to the actual provision, Principal Investigators will be requested to accept the ESA TPM Terms and Conditions.

6  REPORTING

All selected Principal Investigators will be required to submit a short progress report after three months, via the PI Community Website (https://earth.esa.int/web/guest/pi-community) describing the status of their project (confirming they are receiving the data from Planet and highlighting any issue to run the project).

At the end of the project period (about 6 months) a final report shall be submitted, summarising the major findings of the project and its achievements vs its original objectives. In particular the final report shall have the following structure:

- General assessment (ease to search, retrieve and access the data, accuracy and completeness of the metadata, quality of the support received from the Planet helpdesk, eventual assessments and remarks about accuracies). If your proposal focussed on data quality, this part should provide a comprehensive report about the specific quality parameter (e.g. geolocation accuracy) of the received data.
- Suitability and value-adding of the received data to conduct the specific R&D or application project, as proposed in the original proposal (not applicable if your proposal was only focussing on data quality)
- Assessment of the complementarity of the data with other ESA, ESA TPM and Copernicus data
- Recommendation to ESA to include Planet as part of the standard TPM offer.

The template for reporting will be made available on the Website dedicated to the Announcement (https://earth.esa.int/aos/Planet).

PIs may be invited to present their results or part of their results at symposia or specialised workshops to be organised by ESA.

Basic information about accepted projects could be published on the Web page dedicated to this Call: name and affiliation of the Principal Investigator and project abstract without any contact detail.
7 SCHEDULE

Abstracts submission deadline: End March 2020
Expected maximum duration of the projects is 6 months after the data access is granted.