Access to GHGSat as ESA's Third Party mission
Terms of Applicability

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1 General

Within the Third Party Mission scheme, ESA provides to Earth Observation users data from non-ESA missions, so-called Third Party Missions, to complement the data from ESA EO missions and to support and build up the scientific user community for those data in Europe.

A Third Party Mission (TPM) is a mission

- that is operated by any legal body, governmental or non-governmental entity other than ESA or
- 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 cost or
- for which ESA assumes a data distribution responsibility, usually towards European Users, but sometimes towards a worldwide user community for a subset of the geographic coverage of this mission.

The implementation of a new Third Party Mission follows a Selection Procedure approved by the Program Board on Earth Observation in 2004. This procedure evaluates a yearly list of Third Party Candidate Missions according to a set of criteria (e.g. European User benefits and excellence, accessibility etc.). In order to gain access to the TPM data, ESA establishes co-operation schemes with the owners/operators of the Third Party Missions. In these co-operation schemes, one option foresees to provide ground segment support to the TPM owner/operator in exchange for access to the TPM data (e.g. share acquisition or archiving facilities or support respective operations).

GHGSat Constellation, owned, developed and operated by GHGSat Inc., focused on the observation of greenhouse gas (GHG) global emissions.
This mission is considered a 'Third Party Mission under assessment'. The evaluation will tackle cal/val activities and assess the products specifications. This analysis will be performed in the framework of the Earthnet Data Assessment Pilot (EDAP). The evaluation will also allow any interested user to investigate the suitability of the data for scientific and R&D activities.

Within the ESA CAT-1 TPM Scheme, GHGSat Inc. offers the ESA CAT-1 community:

- On-demand access over worldwide areas of GHGSat products for category-1 use, both 'Catalogue' (archive imagery collected more than 12 months ago) and 'New collect' (new tasking imagery and imagery collected in the preceding 12 months) data to Category-1 Users located in the territory of ESA Member States (including Canada), in the European Commission Member States and in China as part of the Dragon cooperation programme
- Access to online Datamaster catalogue for data browsing and download
- Ordering via GHGSat website
- Standard delivery for both 'catalogue' and 'New collect' data

ESA tries to support as many high-quality and innovative projects as possible within the quota limit available, therefore only a limited amount of products can be made available to each project.

2 Data Accessibility Conditions

The GHGSat data produce measures of vertical column densities of greenhouse gas emissions (typically CH_4); products are provided on a pre-defined area (12 km x 12 km scene) basis only, for the full sensor field- of-view. The target site will be within the scene and GHGSat will make its best effort to best measure any emission plume.
The observations are subject to the seasonal variations in solar elevation angle: sensing at higher latitude targets may not produce satisfactory results during northern hemisphere winter and the 3.7° cone about the geographic north and south poles can never be observed.

Products (and Level):

- **Abundance dataset (Level 2):** Set of per-pixel abundances (ppb or mol/m2) for a single species, and per-pixel measurement error expressed as a standard deviation for a single site on a single satellite pass. Data format is GeoTIFF (16-bit) or optionally GeoTIFF (32-bit or 64-bit floating point)
- **Concentration Maps (Level 2):** High readability pseudocolour map combining surface reflectance, and column density expressed in ppb or mol/m2 for a single species in PNG (optional PDF) format. The relevant abundance dataset is provided as well.
- **Emission Rates (Level 4):** Instantaneous emission rate from targeted source estimated using abundance datasets from rom a single satellite pass and applying dispersion modelling techniques in PDF format. The delivered product includes the emission rate estimate with uncertainty and key dispersion parameters (in CSV format) as well as the abundance dataset used for the emission estimate.

Class:

- **Instantaneous:** based on a single observation of the scene.
- **Full year:** average annual emission rate based on as many observations as can be successfully collected on a best effort basis over a calendar year from the date of the order

Category:

- **Catalogue order:** imagery collected more than 12 months ago.
- **New collect:** programmed imagery and imagery collected in the preceding 12 months

Types of site (distinction made at GHGSat sole discretion):

- **Point source:** it is a single physical feature (e.g. an industrial chimney/stack, or group of stacks within a few hundred metres of each other) emitting greenhouse gases at an industrial facility.
- **Complex Source:** can be an area source (e.g. tailings ponds, mine faces, hydroelectric reservoirs), line source (e.g. pipelines), or other unique source (e.g. airport departure and approach corridors, shipping lanes, etc.).

Ordering and Delivery

- Order for new acquisition (programmed imagery as part of New collect category) has to be finalized and sent to GHGSat well in advance, taking into account that the observation shall be scheduled from 1 to 3 weeks after the successfully evaluation of the feasibility analysis
- Standard delivery of products is completed in 3 working days from the date of order submission for archive orders, in 1 working day from the date of data acquisition for tasking orders
- Data are delivered via GHGSat online Datamaster system

3 Data users

- Access to data is restricted to ESA and/or ESA approved science and application development users (PIs, and Co-PIs if any) located in the territory of ESA Member States (including Canada), in the European Commission Member States and in China as part of the Dragon cooperation programme.
- Additional restriction is applicable to users located in countries that are under Government of Canada sanction as listed at https://www.international.gc.ca/world-monde/international_relations-relations_internationales/sanctions/current-actuelles.aspx?lang=eng
- No geographic restrictions on Area of Interests (AOI) unless ESA defines otherwise
- Access to GHGSat data is subject to further GHGSat Inc. control and orders may be rejected for security reasons.

4 Assignment and usage of quota

Project Proposal submission and evaluation

A user requesting access to GHGSat products in the frame of the TPM shall submit a project proposal to ESA. During the project submission, the user shall specify his need as

- Product:
  - Abundance Dataset – Instantaneous
  - Abundance Dataset – Full year
  - Concentration Maps – Instantaneous
  - Concentration Maps – Full year
  - Emission Rates – Instantaneous
  - Emission Rates – Full year
- Amount of data in terms of number of scenes split in:
  - Catalogue
  - New Collect
- Type of Site:
  - Point source
  - Complex Source
- Site location(s) of interest (Latitude and Longitude) or region(s)/Area(s) of interest (bounding box)
- Time of interest

To identify the availability of the data over the site of Interest, the user is invited to check the GHGSat online Datamaster catalogue: a request needs to be submitted to GHGSat Inc. by using the form at https://www.ghgsat.com/sales-inquiries/ asking for the creation of a temporary user account for data discovery.

During the evaluation process, the scientific content of the submitted project proposal and the data request are subject to the assessment by ESA and GHGSat.

Order submission and data delivery

Upon acceptance of the project proposal by ESA, a quota is assigned to the project: the PI (and Co-PIs if any) is allowed to order the products (number of scenes) corresponding to such quota.

The ordering is done directly through GHGSat by following the procedure received by EOHelp@esa.int after the final acceptance of the project. The PI can order the products by compiling the form at https://www.ghgsat.com/sales-inquiries/: it is important to fill the Message box with the approved ESA project proposal ID number and with the data request (type of data, site location, Time of interest, amount of scenes). GHGSat shall activate an account for the Datamaster catalogue and the PI shall be contacted and provided with the credentials of the account entitled to download the ordered data.

The PI is not strictly constrained to order exactly the products requested into the proposal. The ordered data can change in product type, type of site, AOI or TOI with respect to the original proposal provided that the new request is within the original assigned credits and taking into consideration that the products are not cost equivalent between them (e.g. if a Project has a quota per specific data type, other data types can be ordered if the original total quota is not exceeded). The PI willing to order something different (but within the ESA TPM offer) is invited to contact GHGSat Inc. prior to submit the order fir the evaluation of the impact on the quota.

The quota shall be consumed within a year from assignment. After the validity period of 1 year, ESA reserves the right to remove the credits or to extend the end date. This validity period can be extended if requested by the user for particular reasons.

Products are made available on the Datamaster online catalogue for download. As soon as the requested data are ready, the PI is notified by email about the data availability on its account into the GHGSat Datamaster catalogue.

There is no retention time for data download, the products will remain always available in user account personal area on Datamaster catalogue.