Copernicus Space Component

Technical Operating Arrangement

European Space Agency – Philippine Space Agency

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Copernicus Space Component Technical Operating Arrangement

between the **European Space Agency** on one side,

and

the **Philippine Space Agency** on the other side,

executing the Copernicus Administrative Arrangement concluded between the European Commission and the Philippine Space Agency on their cooperation in the area of data access and use of Copernicus Sentinel data of the Union Space Programme.

1 INTRODUCTION

1.1 Background

'Copernicus' is a European programme, providing Earth Observation information for environmental monitoring and civil security. The dedicated Copernicus Sentinel missions are being developed to meet the operational needs of the programme.

Copernicus now forms part of the European Union's Space Programme, which was established under Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 establishing the Union Space Programme and the European Union Agency for the Space Programme ('the EU Space Programme Regulation'). Within the frame of the European Union Space Programme Regulation, the European Commission has concluded agreements with the European Space Agency ('ESA') and the European Organization for the Exploitation of Meteorological Satellites ('EUMETSAT') for continuing the implementation of the space component of Copernicus.

These agreements foresee that ESA and EUMETSAT will provide support to the European Union ('EU') for matters concerning the international technical cooperation of Copernicus. In particular, ESA and EUMETSAT will assess the impact of international technical cooperation requests and will implement and be responsible for technical actions with international partners subject to the prior approval of the European Commission and prerequisite funding provided by the European Union.

On this basis, the European Commission requests ESA and EUMETSAT to establish relevant technical operating arrangements with international partners, primarily focusing on the Copernicus Sentinels operated by ESA and EUMETSAT and addressing issues such as technical data interface specifications.

ESA and EUMETSAT will be responsible for the implementation of the technical actions, in coordination and subject to prior consultation with the European Commission.

The implementation of the technical operating arrangements will be facilitated by a joint 'Copernicus Cooperation group', involving the European Commission, ESA, EUMETSAT, the European Environment Agency ('EEA') and the international partners. The members of the Copernicus Coordination group will meet whenever necessary, to oversee and stimulate cooperative activities as mentioned in the relevant Administrative Arrangement.

1.2 Purpose and objectives

The EU, represented by the European Commission, and the Republic of the Philippines, represented by the Philippine Space Agency ('PhilSA'), signed an Administrative Arrangement

on 30 June 2023 on cooperation in the area of data access and use of Sentinel data of Copernicus of the Union Space Programme ('the Copernicus Administrative Arrangement'). The Copernicus Administrative Arrangement reflects both sides' recognition of the current and potential value of Earth Observation ('EO') data, and identifies areas where PhilSA and the European Commission see potential for cooperation to help realise this value.

In the Copernicus Administrative Arrangement, both signatories recognise that the European Union and the Republic of the Philippines are pursuing EO activities in a number of areas of common interest and that sharing each other's data based on reciprocity should provide mutual benefits. Both sides are committed to the principle of full, free and open exchange of EO data and information, subject to applicable security restrictions.

The European Commission wishes to provide PhilSA with access to Copernicus Sentinel data using high bandwidth connections from data hub to data hub, with a view to fostering the exchange of EO data between Europe and the Republic of the Philippines.

Both sides acknowledge that access to EO satellite data and in-situ data provided by PhilSA will benefit Copernicus.

Recognising that Copernicus emphasises the importance of in-situ observations and the complementarity with space-based observations, PhilSA wishes to support this objective and intends to facilitate access to data from local monitoring stations throughout the Philippines, including geophysical and meteorological networks, to support the enhancement of the Copernicus data architecture and the development of global products.

This Technical Operating Arrangement ('TOA') is established in order to give technical effect to relevant aspects of the Copernicus Administrative Arrangement. ESA and PhilSA will collaborate to undertake the necessary technical activities. These activities are described in the present TOA.

The TOA defines the respective roles and tasks of ESA and PhilSA, as well as the terms and conditions under which they will cooperate to implement the exchange of data foreseen in the Copernicus Administrative Arrangement.

The TOA will be implemented based on voluntary, non-legally-binding cooperation, without exchange of funds. In the event that either ESA or PhilSA is unable to continue one or several of the activities described in this TOA, each signatory may discontinue participation in such activities. In such a case, the signatories will endeavour to consult each other and provide each other with reasonable notice of their intentions.

The signatories agree that any future evolution of the technologies in the infrastructure and operational domain which has the potential to become relevant for the implementation of the present TOA but which goes beyond the current capabilities of the signatories will be duly considered by them, without creating an obligation for the signatories to adopt/ acquire

these new technologies. The signatories will consult each other should this case materialise, endeavouring to ensure continuity of the TOA's implementation.

The TOA will take effect on the date on which the second of the two signatories signs the TOA.

1.3 Scope

This TOA, which does not create any rights or obligations, describes the technical operating arrangements between PhilSA and ESA which are necessary to give effect to relevant aspects of the Copernicus Administrative Arrangement. The technical operating arrangements include a description of the initiatives over which the signatories will cooperate, the necessary operational interfaces, and the support required from each signatory.

1.3.1 **The main activities which PhilSA intends to carry out are:**

a. Creating a local Copernicus data centre with a user-friendly data access platform for supporting the creation of value-added information and the development of new data products and downstream services in the Philippines from the Copernicus Sentinel satellites, and for facilitating the European Commission's National Copernicus Capacity Support Action Programme for the Philippines ('CopPhil'). The data centre will make available Copernicus Sentinel data which covers the geographical area of interest identified in Annex A, including the land and marine territories of the countries within that area. This activity is described in further detail at Section 4.1 below.

b. Facilitating the uptake of Copernicus Sentinel data from the data centre by PhilSA's partner institutions in the Philippines and, where possible, in other countries of the Association of Southeast Asian Nations ('ASEAN').

c. Providing the in-situ data described at Section 3 below for the benefit of Copernicus. PhilSA will also attempt, where possible, to facilitate access for Copernicus to in-situ data available from regional (ASEAN) data sources in addition to national data sources.

d. Upon subsequent agreement by exchange of letters, PhilSA may also provide ESA with satellite data from its Earth observation missions, for the benefit of Copernicus.

1.3.2 **The main activities which ESA intends to carry out are:**

a. ESA will provide to PhilSA the access reserved for the EU's Copernicus international partners to the Copernicus Data Space Ecosystem, which is managed by ESA, or to any equivalent privileged data access service for Copernicus Sentinel data operated on behalf of ESA for the EU's Copernicus international partners which is put in

operation to replace the access to the Copernicus Data Ecosystem after the date of signature of this TOA. The logistics of this data access are described in more detail at Section 4.2 below.

b. ESA will provide the related technical support required to ensure the correct functioning of this access to Copernicus Sentinel data.

c. ESA aims to make use of the in-situ and EO satellite data made available by PhilSA and to work collaboratively with PhilSA on developing products using the data together with Copernicus Sentinel data.

1.3.3 Additional areas of technical cooperation may be included in the future, if relevant and endorsed in advance by the European Commission.

1.3.4 The Annexes to this TOA form an integral part of the TOA, but they can be revised and updated through explicit joint agreement in writing and such a revision or update shall not require a formal signed amendment of the TOA.

1.4 References

An overview of the Copernicus Sentinel missions is available on the Sentinel Online portal at sentinels.copernicus.eu. In particular, the portal contains up to date information on:

- Each of the Copernicus Sentinel missions which is operated by ESA, describing both the space and ground segment aspects, and providing news from the operations;
- Available user-level data from the Copernicus Sentinels, including the contents and format specifications;
- Detailed user handbooks; and
- How to link to the Copernicus Data Space Ecosystem, including registration process, user manuals, and operational news.

The Copernicus Data Space Ecosystem is an open ecosystem which is operated on behalf of ESA to provide free instant access to a wide range of data and services from the Copernicus Sentinel missions and more on our planet's land, oceans and atmosphere. The Copernicus Data Space Ecosystem is a core part of the Copernicus Space Component which is managed by ESA as part of its entrusted tasks within the European Union Space Programme. The Copernicus Data Space Ecosystem is publicly accessible online at the internet address: https://dataspace.copernicus.eu/.

The following documents are referenced in this TOA and provide further supporting information for the cooperation:

- *CSC Operations - ESA Framework - Operations Concept*, [latest version at the date of signature: issue 1.1, ESA- EOPG-EOPGC-TN-19, dated 27 September 2022]. A copy of this document is appended to this TOA at Annex C.
- The European Commission's legal notice setting out the conditions of the licence under which Copernicus Sentinel data and information may be used: "Legal notice on the use of Copernicus Sentinel Data and Service Information", accessible online via

  https://sentinels.copernicus.eu/documents/247904/690755/Sentinel_Data_Legal_Notice

  A copy of this document is appended to this TOA at Annex D.

2 TECHNICAL INTERFACES

PhilSA will act as the technical interface to ESA for carrying out the activities described in this TOA.

Where other entities (e.g. institutes, ministries, commercial enterprises, etc.) are involved in the implementation of the TOA on behalf of PhilSA, PhilSA will act as the sole interface to ESA and the contact point for any such entities.

Where ESA identifies a desire to access EO satellite data or data to support calibration and validation, or wishes to discuss complementary calibration/validation activities, PhilSA will act as a coordinating point to facilitate such discussions.

Occasional technical meetings are intended to be held between PhilSA and ESA, for instance within the Copernicus Cooperation Group which will be led by the European Commission. The European Commission will be invited to all meetings between PhilSA and ESA, and all meeting documentation will be forwarded to the European Commission for information.

3 EUROPEAN ACCESS TO EO SATELLITE DATA AND CALIBRATION AND IN SITU DATA FROM THE PHILIPPINES

PhilSA will, on a best-efforts basis, facilitate access for ESA to networks of climatological, meteorological and other in-situ and EO data in the Philippines that can support the calibration and validation of satellite Earth observations and images derived from those Earth observations, as well as provide input to the Copernicus Services.

Data from these networks, and other data and information of value to calibration/validation activities and the Copernicus Services will be made available for the benefit of Copernicus in accordance with national, state/territory and organisation-level policies.

As mentioned at paragraph 1.3.1(d) above, upon subsequent agreement by exchange of letters, PhilSA may also provide ESA with satellite data from its Earth observation missions, for the benefit of Copernicus.

It is understood that the data made available by PhilSA and/or its partners in the course of the implementation of this TOA will be made available for onwards use on the Copernicus Data Space Ecosystem, or equivalent publicly accessible Copernicus data access service. Consequently, the transmission of these data will allow for such a distribution, without restriction. ESA will serve as facilitator for data transmission to the Copernicus Data Space Ecosystem, or equivalent Copernicus data access service.

4 INTERNATIONAL ARCHIVING AND DISSEMINATION CENTRES – DATA MIRROR SITE

4.1 Data Mirror Site

PhilSA intends to establish a regional Copernicus data access/analysis mirror site ("Data Mirror Site"), to improve access to, and the exploitation of Copernicus Sentinel data in the Philippines and subsequently, if desired, in the broader ASEAN region.

In the context of the present TOA, this Data Mirror Site is intended to retrieve data from ESA-operated Copernicus Sentinel missions from ESA-operated data systems, and then to store and make available such data to government, industry, research and general public users for download and/or online analysis. The Data Mirror Site is intended to access all data products produced by all ESA-operated Copernicus Sentinel missions for a geographical area of interest that includes the land and marine territories of countries identified in the map in Annex A.

The specific data products to be retrieved, and the scope of the geographic region for which data will be retrieved/stored/re-distributed, may change from time to time. PhilSA will discuss such changes with ESA prior to implementing them in the Data Mirror Site. For the purpose of technical efficiency, simpler geographical boundaries may be employed that encompass an area larger than the specific geographical area of interest.

The Data Mirror Site is intended to be a distributed system, designed according to the characteristics agreed by the parties and based on ESA's previous experience.

PhilSA intends to utilise high bandwidth networks capable of peering to GEANT on the European side (e.g. academic research networks or other), as the backhaul connection from ESA-operated systems to the Data Mirror Site. Such networks are scaled for data of the size of Copernicus Sentinel data products, and are a cost-effective way of moving large amounts of scientific data. PhilSA understands that ESA intends to directly connect ESA-operated data systems with the European GEANT network using high-bandwidth connections.

The types and levels of service provided by the Data Mirror Site (such as web service access, direct file download, etc.) will be determined from time to time by PhilSA in consultation with its partners and ESA.

Access to data will always be provided in a manner consistent with the overarching terms documented in the Copernicus Administrative Arrangement.

PhilSA will implement a simple and un-bureaucratic user registration process for the Data Mirror Site, in order to support the onwards distribution of Copernicus Sentinel data in the region and to share aggregated information with ESA and the European Commission. As part of the user registration process, users will be asked to state, by choosing from a drop-down menu, the country in which they operate, the category of user into which they fall, and their intended field of use for the data, to enable PhilSA to provide ESA with the annual statistics described at Section 4.4 below.

4.2 ESA Support

4.2.1 Access to the Copernicus Data Space Ecosystem

ESA shall provide PhilSA with an account reserved for ESA's international Copernicus partners on the Copernicus Data Space Ecosystem, which is operated on behalf of ESA. The Copernicus Data Space Ecosystem provides bulk dissemination capabilities for Copernicus Sentinel data products, as well as a range of hosted local processing services.

PhilSA or a Delegated Partner will directly connect to the Copernicus Data Space Ecosystem, or equivalent Copernicus Sentinel data access point. Other partners may be engaged as required, following prior consultation with ESA and the European Commission.

'Delegated Partner' shall mean any entity authorised by PhilSA in writing to act on its behalf in the implementation of the activities foreseen in this TOA following prior consultation with ESA and the European Commission.

The Copernicus Data Space Ecosystem will continuously store Copernicus Sentinel data acquired during the previous month(s) at the processing levels agreed as part of the Copernicus Sentinel data portfolio and the associated timeliness as defined in the document 'CSC Operations - ESA Framework - Operations Concept', (latest version: Issue 1.1, ESA-EOPG-EOPGC-TN-19, dated 27 September 2022), a copy of which is appended to this TOA at Annex C. The Copernicus Data Space Ecosystem enables searching, browsing, previewing and downloading all Copernicus Sentinel data, as well as range of hosted local processing services.

Access to the Copernicus Data Space Ecosystem is allowed via a web authentication module. ESA will provide PhilSA with a username and password to access the Copernicus Data Space Ecosystem. This username and password may be used only by PhilSA (including its

representatives, employees and contractors involved in the initiative) for the purpose of the initiative and will not be shared with other natural or legal persons.

PhilSA will use the Copernicus Data Space Ecosystem access, or equivalent Copernicus Sentinel data access service only for the purpose of its activity in the Data Mirror Site initiative described above. Through registration at the Copernicus Data Space Ecosystem, or to the equivalent Copernicus Sentinel data access service, accessing and\or downloading available content, PhilSA will not misuse or interfere with the service of the Copernicus Data Space Ecosystem portal or that of the equivalent Copernicus Sentinel data access service. In particular, PhilSA aims at building a mirror archive of Copernicus Sentinel data over its geographical area of interest and hence will not repeat the download of identical datasets from the Copernicus Data Space Ecosystem, or from the equivalent Copernicus Sentinel data access service, but will store downloaded Copernicus Sentinel data for re-use and re-dissemination.

All functionalities and contents offered by the Copernicus Data Space Ecosystem, or by the equivalent Copernicus Sentinel data access service, are provided by ESA on a best efforts-basis. The transmission of content from the Copernicus Data Space Ecosystem, or from the equivalent Copernicus Sentinel data access service, may be interrupted or delayed by ESA, e.g. in the event of technical constraints, such as the internet bandwidth. In such case, the download requested by PhilSA will be enabled later taking into account other users' requests.

4.2.2 Data Transfer

ESA will provide appropriate interfaces to transfer Copernicus Sentinel data to PhilSA and its Delegated Partner. If required, ESA can support network performance analysis to help fully utilise available bandwidth.

4.3 Time Schedule

ESA will provide Copernicus Sentinel data as they become available in accordance with ESA's data provision plan (e.g. after launch, commensurate with the commissioning and ramp-up plan for data provision).

4.4 Reporting

PhilSA will keep ESA and the European Commission informed about the course and success of the Data Mirror Site.

PhilSA will submit to ESA annual reports regarding the Data Mirror Site. The annual reports will, as a minimum, contain information regarding:

- The use which PhilSA has made of Copernicus Sentinel data during the year, and any applications it has developed;

- Onward use or dissemination of Copernicus Sentinel data, including in particular statistics regarding user activity on the Data Mirror Site;
- Any changes to the pre-agreed set up of activities that may have an impact on ESA's support to the Delegated Partner's activities;
- PhilSA will provide feedback to ESA on the Copernicus data access mechanism.

More specifically, as concerns Data Mirror Site usage statistics, PhilSA will provide an annual set of statistics covering as a minimum:

a) Statistics on the Copernicus Sentinel data offer on the Data Mirror Site:
   - Volume of Sentinel data acquired for the Data Mirror Site from a data access interface operated on behalf of ESA;
   - Number and volume of Sentinel user-level data products published on the Data Mirror Site, by mission and user-level data type.

b) Statistics on the level of user-uptake from the Data Mirror Site:
   - Number of registered users on the Data Mirror Site, number of new users, and number of active users during the reporting period, including users' geographic origin, affiliation, thematic activity, and sector of activity;
   - Number and volume of Sentinel user-level data products downloaded by the users via the Data Mirror Site, by mission, by product type, including users' geographic origin, affiliation, thematic activity, and sector of activity;
   - Complementary Sentinel data and information developed by PhilSA or its partners;
   - Support provided to Copernicus calibration and validation activities by PhilSA or its partners.

The template for providing this information to ESA is attached at Annex E below.

The collection of these statistics will require PhilSA to structure the user registration process so that when users register, they provide the following information to be associated anonymously with their user account:

a) User geographic origin

Users will be asked during the registration process to state the country from which they will primarily download the data.

b) User's organisation

Users will be asked during the registration process to state the type of organisation for which they work, using the following list of categories:

- International public organisation;
- National/regional/local public authority;
- Research and education organisation;
- Business/commercial/professional – Small and medium-sized enterprise ('SME');
- Business/commercial/professional – non-SME;
- Charity or NGO;
- Private individual – personal interest;
- Other.

c) User thematic activity

Users will be asked to select their main intended area of application for the data from the following list of application areas:

- Land;
- Marine environment, maritime affairs and fisheries;
- Arctic policy and polar areas;
- Transport;
- Energy;
- Environmental compliance;
- Raw materials;
- Air quality and atmospheric composition;
- Health;
- Tourism;
- Climate Change;
- Civil protection and humanitarian aid operations;
- International development and cooperation;
- Migration and home affairs;
- Security;
- Research and innovation;
- Other.

d) User sector of activity

Users will be asked to state their main target sector, using the following categories:

- Public sector (including policy support);

- Business sector;
- Research;
- Education;
- Media and public relations;
- Charities and NGOs;
- Private individuals for non-commercial purposes;
- Other.

PhilSA intends to implement an automated means for the Data Mirror Site to collect the required statistical information on Copernicus Sentinel data re-distribution and analysis, and intends to cooperate with ESA on the technical means for ensuring such data is formatted/structured to ensure it is of maximum value.

It is highlighted that ESA may pass the information provided in the annual report to a third-party contractor for processing and analysis. The information and an analysis of the statistics will be sent to the European Commission and subsequently made publicly available.

PhilSA will design the user registration process so that the statistical information can be collected while preserving the anonymity of the user and in compliance with national and/or regional legislation for protecting the users' personal data. PhilSA will not disclose any personal data (i.e. information from which a natural person can be identified) of its Data Mirror Site users to ESA.

4.5 Sentinel Data Governance

Copernicus Sentinel data made available via the Copernicus Data Space Ecosystem, or equivalent Copernicus Sentinel data access service, are governed by the "Legal notice on the use of Copernicus Sentinel Data and Service Information", a copy of which is appended to this TOA at Annex D.

In the event that the EU, in the future, designates Copernicus Sentinel data as "sensitive"[1], the access to such Copernicus Sentinel data through the Copernicus Data Space Ecosystem or equivalent Copernicus Sentinel data access service, and its use and distribution may be subject to different licensing conditions.

This also applies for Copernicus Sentinel data already received by PhilSA, its Delegated Partner or any other partner through the Copernicus Data Space Ecosystem or equivalent

[1] As defined in Art. 13 of the COMMISSION DELEGATED REGULATION (EU) no 1159/2013 of 12 July 2013 supplementing Regulation (EU) No 911/2010 of the European Parliament and of the Council of the European Earth monitoring programme (GMES) by establishing registration and licensing conditions for GMES users and defining criteria for restricting access to GMES dedicated data and GMES service information.

Copernicus Sentinel data access service, in the event the Copernicus Sentinel data are assessed to be "sensitive" after the time of data download.

Where Copernicus Sentinel data are identified as "sensitive", PhilSA will endeavour to remove such data from the Data Mirror Site. It is understood that PhilSA will be unable to retract data which has already been re-distributed.

5 INTERNATIONAL COMPLEMENTARY EXTERNAL VALIDATION SUPPORT

5.1 PhilSA Activity

PhilSA intends to facilitate complementary Copernicus Sentinel data calibration and/ or validation activities in collaboration with ESA, with the aim of improving the quality of both core Copernicus Sentinel core user-level data and of derived higher-level user-level data.

Copernicus Sentinel data required for those projects may be supplied directly from the Copernicus Data Space Ecosystem to the project, or from the Data Mirror Site. In the latter case, reporting and data governance are handled as per Sections 4.4 and 4.5 above.

PhilSA may conduct these calibration/validation projects together with partner entities. In such a case, PhilSA will act as the interface and contact point between ESA and the other entity.

Details of on-going and planned calibration/validation projects are described in separate documents, describing the involved entities, the scope of the calibration/validation project, applied methodology, expected results and related use/licence conditions, geographical area of interest, mechanism for supply of Copernicus Sentinel data, time schedule and reporting.

Annex B contains a list of the currently on-going and planned projects. Annex B will be updated as and when necessary.

5.2 ESA technical support to complementary validation activity

ESA will provide relevant data sets from the Sentinel -1, -2, -3 and -5p core user-level data (i.e. L1 and L2. In special cases also L0) as they become available, to support joint validation and calibration activities.

5.3 Reporting

Reporting regarding the complementary external validation activities will be defined in the related separate technical documentation.

5.4 Copernicus Sentinel Data Governance

Copernicus Sentinel data used by the complementary validation activity are governed by the "Legal notice on the use of Copernicus Sentinel Data and Service Information.", a copy of which is attached to this TOA at Annex D.

6 DISCLAIMER

6.1 Access to data from the Copernicus Sentinel missions is on an "as is" basis. ESA disclaims all conditions, representations and warranties of any kind, whether express, implied statutory or otherwise, including but not limited to what concerns the functionalities of the Copernicus Data Space Ecosystem or equivalent Copernicus Sentinel data access service, and the data transferred. This disclaimer includes the warranties regarding availability, continuity, accuracy, integrity, reliability, fitness for or compatibility with a particular purpose or meeting the users' requirements, satisfactory results or non-infringement of third-party rights.

6.2 ESA will not be held liable for any damage that may result from the support activities provided under this TOA, including in particular the functionalities of the Copernicus Data Space Ecosystem or equivalent Copernicus Sentinel data access service, the data transfer, and advice and communication by ESA personnel.

6.3 ESA may at any time review, modify, suspend or terminate the support activities under this TOA, including but not limited to on the occurrence of the following events:

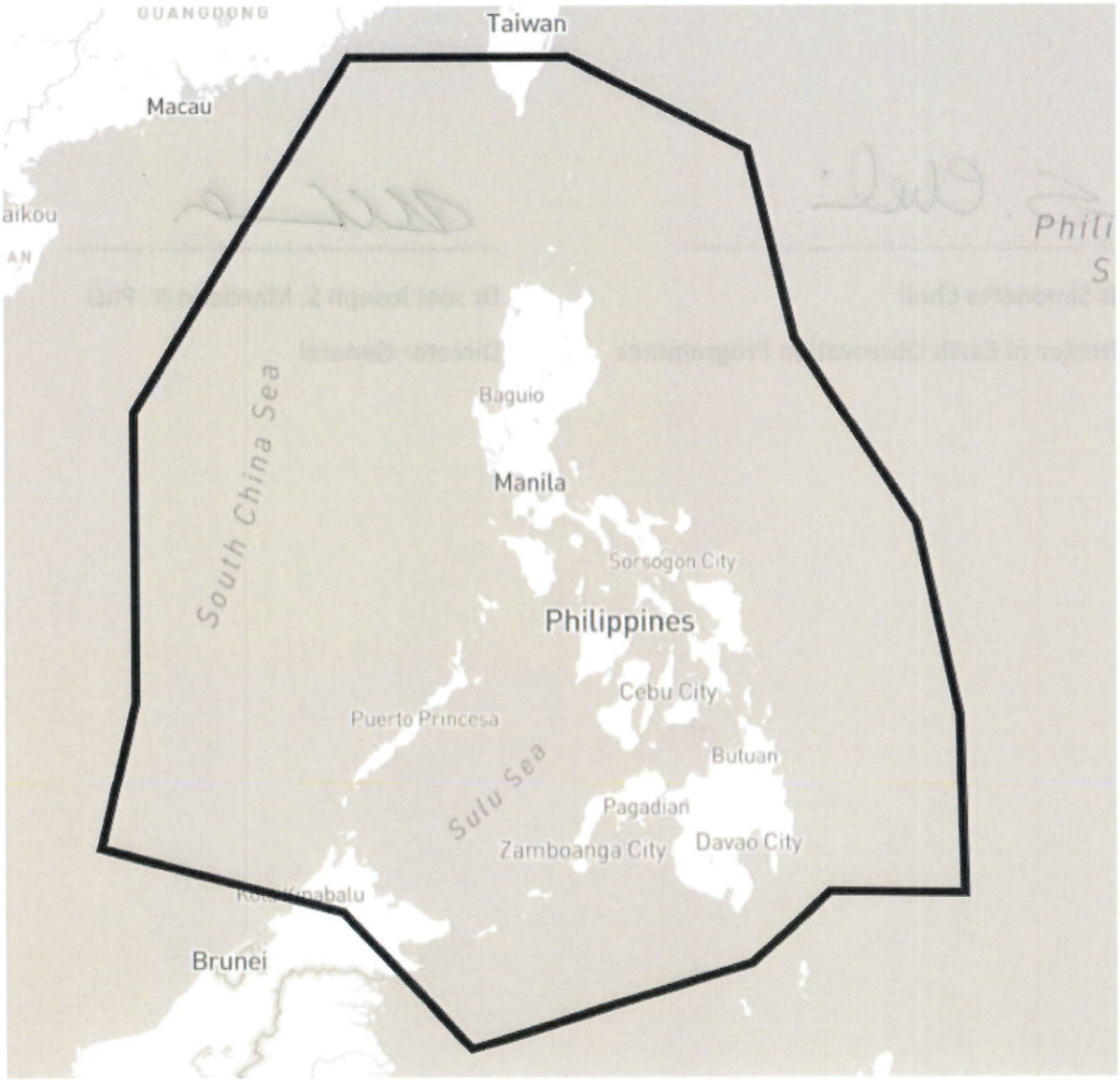
(i) lack of sufficient funding for sustaining the Copernicus Sentinel missions, and associated facilities and activities;
(ii) satellite or ground system failure; or
(iii) suspension or cancellation of planned activities of related Copernicus Sentinel systems and facilities, in order for ESA or the EU to carry out activities considered of a higher priority.

6.4 ESA may modify the Copernicus Sentinels' operations plans at any time, according to operational priorities or if it considers corrective action is necessary for ensuring the safety and success of the missions.

Annex A. Map of geographical area of interest

The map below represents the geographical area of interest for PhilSA at the date of signing the TOA. The scope of the geographical region for which data will be retrieved/stored/re-distributed may be changed when required, with a notification sent to ESA.

It is assumed that PhilSA will scale up the infrastructure on a step-by-step basis to be able to host and process coverage of this full area.



Annex B. Complementary External Validation Support Projects

Below is a list of the currently on-going and planned projects aimed at complementary Copernicus Sentinel data calibration and/ or validation activities in collaboration between PhilSA and ESA with the aim of improving the quality of both core Copernicus Sentinel core user-level data and of derived higher-level user-level data. This list may be updated at any time by written agreement of the signatories.

No activity planned at the date of signing the TOA.