
Tool Augmentation by user enhancements and Orchestration

End User Licence Agreement for TAO Services

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and Orchestration**

End User Licence Agreement

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1. Introduction

1.1. Purpose and scope

This agreement is made between the "The Service Provider" – CS GROUP – ROMANIA S.R.L. - and "The User" - to cover the provision and support of the service(s) as described hereafter.

The intent of this End-User License Agreement (EULA) is to ensure the proper understanding and commitments are in place for effective provision of the TAO services.

1.2. Document Structure

This section describes the structure of the document.

- Section 1 is this introduction
- Section 2 describes the service components
- Section 3 define the services terms and conditions of usage

1.3. Applicable and Reference Documents

This section contains the applicable and reference documents.

23.RHES.006_ EO Network of Resources 2023-2028_SOW – NoR ITT SoW



2. Service Description

This EULA applies to the following services (that will be collectively indicated as "The Service" in the following) provided by the TAO Platform.

General TAO Introduction

The TAO platform, developed in the frame of an ESA contract, is a lightweight, consistent, and easy to use orchestration framework, easily scalable to hundreds or thousands processing nodes. It allows the reuse of commonly used processing toolboxes such as (but not limited to) Orfeo Toolbox and SNAP/Sentinel Toolboxes and their enhancement with capabilities for processing composition and distribution in such a way that end-users can define by themselves workflows, without in-depth IT or programming knowledge, and easily integrating custom processing modules (either third party processing modules or written by users using popular scripting languages).

TAO framework allows for processing composition and distribution in such a way that end users could define by themselves processing workflows and easily integrate additional processing modules (by processing module it is understood either a standalone executable or a script).

In terms of use, the TAO platform provides a mean for orchestration of heterogeneous processing components and libraries to process scientific data. This is achieved in following steps:

- Preparation of resources (including processing components) and data input
- Definition of a workflow as a processing chain
- Execution of workflows
- Retrieval / visualization of the results

A processing component represents a standalone application defined by the following parameters:

- Input description: type of data that the component accepts as input source (e.g. image, raster maps, vector maps, sensors, etc.)
- Processing operation with execution parameters: the operation that the component executes with the list of accepted parameters.
- Output description: type of data provided as processing operation result. Can consist in one or more files.

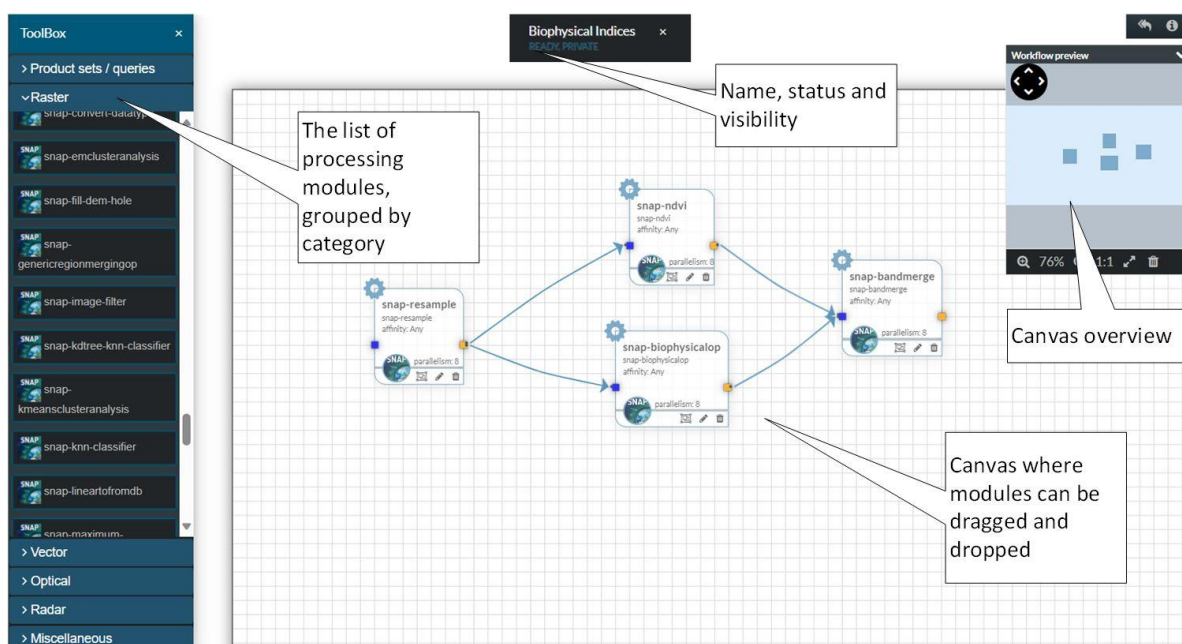
A component is viewed as a generic execution resource and should permit, through its parameters list, the possibility to define *input location* (the place where it expects to retrieve input data for consuming) and *output location* (the place where the processing results are persisted).

The processing modules are heterogeneous regarding their implementation language or operating system. TAO aims to be as OS-independent as possible and to allow the integration of modules written in different programming languages (such as C/C++, Java or Python).

TAO allows for workflows creation by combining individual components, named processing components. They are heterogeneous regarding their implementation language or operating

system and can be written in different programming languages (such as C/C++, Java or Python). Along with out-of-the-box components from well-known EO toolboxes (OTB, SNAP, GDAL), custom code components can be added by users. These components can be edited in a Jupyter Notebook, hence several programming languages are supported, given the variety of language kernels for Jupyter. Currently, the platform supports writing components in Python, R, Ruby and Javascript.

By workflow it is understood a directed acyclic graph consisting of processing operations performed on a given input (EO data and/or ancillary data), having at least one output. A workflow is described by a formal flow diagramming technique, with directed flows between components.



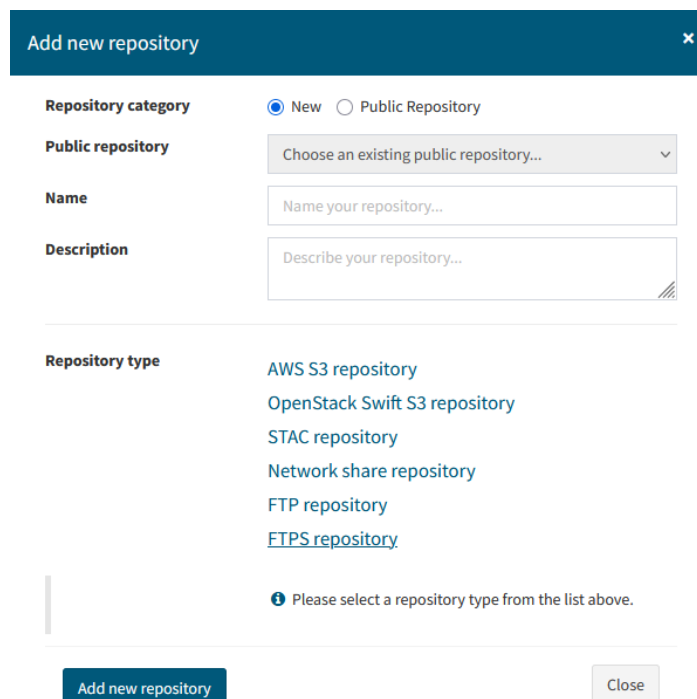
The modules are grouped into categories that represent packaged applications.

A workflow can be created from scratch, can be edited, and deleted. It can also be created (or cloned) from an existing workflow. Users can find workflows based on some tags or filter existing ones.

As it is OGC Application Packaging compatible, TAO also provides to the user the possibility to import workflows and components from existing CWL workflows. The system will automatically create all the necessary Docker images descriptors, the Processing Components descriptors and the internal TAO workflow corresponding to the imported CWL workflow. Vice-versa, once the user has built its algorithms as TAO workflows, he can export them into CWL, Argo, Bash and Javascript workflows that can be executed or imported on other platforms.

In terms of functionality, it is possible to query and select the products on which the algorithm is applied as well as to specify some of the algorithm parameters. To support this kind of services TAO offers a set of data sources that can be used for querying and fetching EO

products (download or directly use the products when available locally, ex. in /eodata). Users can create sites defined by their AOI and temporal extent that can be used for simpler later queries to the different data sources available. From the already downloaded EO products user can create, by having the possibility of filtering the products, the so-called product datasets that can be used as inputs to different processing services available in TAO. Alternatively, the data sources can be directly connected to the inputs of the different processing services in which case, the products are downloaded automatically according to the querying parameters, and the services workflows are fed with all the products returned by the query. The user has also the possibility to upload additional user data like LPIS or similar structured data or other files that can be used as inputs in the algorithms. Results are stored online in a user private space and can be downloaded on the user's machine. It is possible to share the processing results with other people on the platform or publicly on the internet. In his/her account, the user can also mount different external repositories and in this moment several types are supported:



It is worth noting that TAO already includes several public repositories.

Into his repositories administration page, the user can copy easily data from the remote repositories to the local repository or vice versa (if allowed).

- STAC repositories
- S3 repositories
- FTP and network repositories.

In terms of execution of the defined user workflows, TAO implements several Resource Managers that implement DRMAA interface (Distributed Resource Management Application API) allowing local execution, SSH executions, Kubernetes execution and dynamic allocation and deallocation of virtual machines in cloud environments where OpenStack is available.



Using dynamic allocation of virtual machines and deallocation them when no longer used help in optimizing the resources cloud costs while also ensuring a vertical and horizontal scalability of the executions by both parallelizing the executions but also choosing the right flavour for the tools executing.

TAO implements a dual-mode subscription mechanism to manage user access to computational resources, built on top of OpenStack, under two main models: fixed resources and pay-per-use.

- **Pay-Per-Use:** users are charged based on actual resource consumption, particularly the number and type of virtual machines (VMs) instantiated. Resource usage is tracked via a monitoring system, ensuring billing reflects real-time usage, although the precision of this tracking may vary.
- **Fixed Resources:** users operate under a predefined subscription flavour, which specifies the number and type of VMs allocated. When a user attempts to create or terminate a VM, the system checks this operation against their subscription flavour. The request is only authorized if sufficient resources are available under the user's plan, ensuring compliance with the allocated quota.

Data Processing Services

This service offers access to a set of algorithms (i.e. processing services) which can be applied to one or more EO products to obtain a specific information.

The Platform is equipped with a large set of EO processing services including:

- Sentinel-1 pre-processing into Amplitude and Coherence products starting from the Sentinel-1 SLC products
- Biophysical and Spectral indicators calculation (LAI, FAPAR, FCover, NDVI, NDWI, Brightness etc.) starting from the Sentinel-2 and Landsat-8 L2A products
- Grassland mowing detection containing information about grassland mowing events over the parcels declared by the farmers as permanent grassland in a given region or country. It is based on the processing of S1 and S2 derived products, which are respectively coherences, calibrated amplitude backscatter and three BIs which are the NDVI, the FAPAR and the LAI.
- L3 Basic Markers aiming to produce products that contain the S1 and S2 signals which are aggregated over each declared parcel (assumed to be homogeneous land management unit), moving from pixel to object analysis. For each parcel, signal statistics and markers are then computed and stored in a collection which is therefore growing over time
- Agricultural Practices monitoring that aims at the identification of the agricultural practice of crop harvesting/clearance and the comparison of the temporal behaviour of vegetation of fallow lands, catch-crops or nitrogen-fixing crops with the pre-defined (country specific) EFA (Ecological Focused Area) practices rules
- Crop Type Mapping detection generates a parcel-level crop type map based on a dense time series of Sentinel-2 and Sentinel-1 acquisitions and on an in-situ dataset,



nominally the subsidy applications. It trains a Random Forest model from a subset of the in-situ dataset, which is then applied on the entire set of parcels. The predicted crop type can then be compared to the expected one, to check the conformity of the declarations.

- Bare soil detection that aims providing products containing bare soil and non-bare soil markers, based on the optical Sentinel-2 (S2) surface reflectance and Synthetic Aperture Radar (SAR) Sentinel-1 (S1) time series at the parcel level.
- Parcel Heterogeneity detection for detection the homogeneity of the parcels in terms of the crop uniformity.
- Change of agricultural category detection that allows detection from one year to another of a change in the agricultural category of a certain parcel
- Tillage monitoring performs the tillage detection for a certain parcel
- Winter Cover Crops that aim to provide products related to the future Winter Cover Crop (WCC) processor related to the WCC detection, WCC season length estimation and WCC aboveground biomass estimation
- Burned area monitoring performs the detection of burned areas.

The Data Processing Services operated on TAO are split in two subcategories according to the complexity of the underlying algorithm as specified in Annex 1 of this EULA document:

- Simple services
- Advanced services

User Algorithm Hosting

This service also based on TAO is meant for developer users to plug onto the Platform already existing scientific applications written in a variety of languages (e.g. Java, C++, Python, R), and then deploy, automate, manage and scale them in a very modular way.

It offers access to a development environment in the Platform Cloud infrastructure and an online resource exposing a REST API that allows the developer user to upload his algorithm (also developed offline) onto the platform and deploy it as a Platform-operated data processing service.

The User Algorithm Hosting Service enables the use of such algorithms with the EO data and user private data and takes care about the access to and use of processing resources. It makes possible the sharing of the algorithm with other users of the platform.



3. Service Terms and Conditions

3.1. Terms of Service

This Platform, sen4x.tao.c-s.ro (the "platform"), is governed and operated by CS GROUP - ROMANIA S.R.L. ("we" or "us"). By using the platform tier service, the services hosted on the platform, or the data content we make available to Users ("you") through the services (collectively, "Services"), you agree to be bound by the following Terms of Service and any future modifications (collectively, the "Terms"). You also acknowledge that you accept the practices and policies outlined in the Privacy Policy on this page. Please read them carefully. If you don't agree to these Terms, you may not use the Services.

3.2. Signing up

To use most Services, you must register for a TAO account. When you use our application program interfaces (APIs), each request to an API must include one of your account's unique API keys.

Please carefully guard the security of your account and monitor use of your API keys. You are responsible for all use of the Services under your account, whether authorized, including any use of your API keys. At our discretion, we may make limited exceptions to this policy for unauthorized use of your account if you notify us of the problem promptly.

If you are entering into this agreement on behalf of your company or another legal entity, you represent and warrant that you have the authority to bind that entity to these Terms, in which case "you" will mean the entity you represent.

3.3. Platform-based services

We will make the TAO and the Services hosted on TAO available to you in accordance with these Terms. We grant you a non-exclusive, revocable license and right to:

- Use the Services from or within 3rd party applications; and
- Use the Services to develop new online services and online, desktop, or mobile applications.
- Access and integrate processing components, including system components (e.g., Orfeo Toolbox 6.4 and SNAP 12.0.0), user-uploaded components (in Python or R), and contributor components, subject to the Software's multi-user features and quota management.
- Query and access data from local and remote sources (e.g., Scientific Data Hub, Amazon Web Services, PEPS, USGS, FedEO, Alaska Satellite Facility, CreoDIAS, Mundi DIAS) for workflow execution, provided You comply with any third-party terms applicable to such data sources.
- Create, edit, and execute workflows using the graphical interface for dragging, dropping, and connecting processing components.
- Utilize computing resources, including Docker containers for isolated execution, and cluster resource managers (e.g., SLURM, Torque, Kubernetes, SSH) via DRMAA-compliant interfaces.
- Access user workspaces for viewing local data products, uploading additional files, and selecting inputs for workflows.



- Interoperate with external systems via OGC WPS-compliant components for invoking external processors or exposing public workflows.
- Monitor system status, workflow execution, task status, and quota usage through the provided dashboard.
- Create printed and online media or videos.
- Within the trial period and within non-commercial plans you may only use the Services for non-commercial purposes and for research. When using Commercial subscription plans, you may use the Services for both commercial and non-commercial purposes unless otherwise explicitly specified for the specific platform service being used.

This license is limited to the number of users, CPUs, storage space, and RAM as defined by Your quota or subscription level.

3.4. Data

3.4.1. Dataset Specific Terms and Conditions

Within TAO there are 3rd party datasets used and distributed through the Services. User of the Services must comply with terms and conditions of the datasets used.

Sentinel Data

EU law grants free access to Copernicus Sentinel Data and Service Information for the purpose of the following use in so far as it is lawful:

- a) reproduction.
- b) distribution.
- c) communication to the public.
- d) adaptation, modification and combination with other data and information.
- e) any combination of points a) to d).

See here more details on the use of Copernicus Sentinel data and service information.

Acknowledgement or credit of the Copernicus Sentinel data used through the TAO services should be provided by including a line of text citation such as the example shown below.

Contains modified Copernicus Sentinel data [Year] processed by the TAO

Landsat Data

A statement of the data source when citing, copying, or reprinting USGS Landsat data or images is requested. Details can be found on the EROS Data Citation page.

Acknowledgement or credit of the USGS as data used through the TAO services should be provided by including a line of text citation such as the example shown below.

[dataset_name image] courtesy of the U.S. Geological Survey processed by the TAO

For Commercial datasets made available through the platform, the related terms and conditions will be presented to You (for agreement / signature) prior to granting access to the data.



3.5. Illegal and Other Unauthorized Uses

You may not use the Services for any illegal purpose. Your use of the Services must comply with all local rules regarding online conduct and acceptable content.

You may not use the Services in any manner that could damage or overburden the Services or interfere with any other party's use of the Services.

You may not engage in other unacceptable use of the Services, which includes:

- Disseminating material that is abusive, obscene, pornographic, defamatory, harassing, grossly offensive, vulgar, threatening, or malicious.
- Aiding or implementing practices violating basic human rights or civil liberties.
- Disseminating or storing material that infringes the copyright, trademark, patent, trade secret, or other intellectual property right of any person.
- Creating a false identity or otherwise attempting to mislead others as to the identity or origin of any communication.
- Exporting, re-exporting, or permitting downloading of any content in violation of any export or import law, regulation, or restriction of the European Union and its agencies or authorities, or without all required approvals, licenses, or exemptions.
- Interfering with or attempting to gain unauthorized access to any computer network.
- Upload or integrate processing components that infringe third-party intellectual property rights or contain malicious code.
- Exceed allocated quotas for CPUs, storage space, RAM, or other resources, as managed by the Services authorization module.
- Transmitting viruses, Trojan horses, running mining programs or any other malicious code or program; or
- Engaging in any other activity deemed by CS GROUP – ROMANIA S.R.L. to conflict with the spirit or intent of these Terms.

You may not, nor may you permit any third party to, modify, create derivative works from, reverse engineer, or attempt to derive any source code from the Platform software, except as expressly permitted by a written license from us.

3.6. Your Content

Your content (data and algorithms) is your content. You retain ownership of all content that you contribute to or generate with the Services. You remain the owner of the Intellectual Property rights applicable to the algorithms integrated while using the Service.

Limited to the purpose of hosting your content so that we can provide the Services to you, you hereby grant CS GROUP - ROMANIA S.R.L. a non-exclusive, worldwide, royalty-free, transferable right and license (with the right to sublicense), to use, copy, cache, publish, display, distribute, modify, create derivative works, and store such content on the platform and to allow others to do so on the platform. This right and license enable CS GROUP - ROMANIA S.R.L. to host and mirror your content on the platform. You warrant, represent, and agree that you have the right to grant CS GROUP - ROMANIA S.R.L. these rights.



On termination of your account, CS GROUP - ROMANIA S.R.L. will make all reasonable efforts to promptly remove from the platform and cease use of your content; however, you recognize and agree that caching of or references to the content may not be immediately removed.

3.7. Our Content and Third-Party Content

Other than your content and other user contents, all content displayed on the platform or accessible through the Services, including text, graphics, maps, logos, images, illustrations, software or source code, audio and video, and animations, are the property of CS GROUP - ROMANIA S.R.L. and/or third parties and are protected by Romanian and international copyright laws. You may be held liable for any unauthorized copying or disclosure of this content.

All logos and product names appearing on or in connection with the Services are proprietary to CS GROUP - ROMANIA S.R.L. and/or suppliers. You may not remove any proprietary notices or product identification labels from the Services' software, maps, or other content.

3.8. User management and quotas

The Software includes user management features, including quota enforcement for resource usage. Provider reserves the right to monitor activity, collect data on processing and storage consumption, and restrict access if quotas are exceeded. You agree to fair usage and acknowledge that excessive use may result in suspension.

3.9. Publicity

We're proud to have you as a user. During the term of this agreement, you hereby grant us a worldwide, non-exclusive, royalty-free, non-transferable license to use your trademarks, service marks, and logos for the purpose of identifying you as a Platform user to promote and market the Platform services. Of course, if you prefer we would not use your logo or name in a particular way, just let us know, and we will respect that.

3.10. Ownership

The Services and all intellectual property rights therein, including copyrights, patents, trademarks, and trade secrets, are owned by Provider or its Providers. This Agreement does not transfer any ownership rights to You. You retain ownership of any user-uploaded components or data products You create, subject to Provider's rights to manage and store them within the Software's framework.

The Services integrates third-party toolboxes (e.g., SNAP, Orfeo Toolbox) under their respective open-source licenses. You are responsible for complying with those licenses when using such components.

3.11. Charges and Payment

Most of the Services require payment or vouchers to obtain Platform Credits.

For the case of Vouchers you need to apply for grants from the sponsor institution.

For the consumption of these credits:



- We may charge credit consumption on an ongoing basis in advance of providing Services or as needed for prepayments for your subscription fee, and any other charges you may incur in connection with your use of TAO Services. The subscription fee is billed in full on the first day of each billing period, unless and until you cancel your subscription.
- If your credit usage exceeds the services usage quota allowed by your plan, we may charge you overage fees at the end of your billing period. Overage rates vary by plan. We will notify you, when your account reaches 90% of the allowed quota within a billing period. If we fail to do so, we will not charge an overage fee for a specific billing period.
- All credits are non-refundable unless expressly stated otherwise or provided by applicable law.

For the case of payments:

- We are not responsible for any bank fees, interest charges, finance charges, overdraft charges, or other fees resulting from charges billed by CS GROUP - ROMANIA S.R.L. Currency exchange settlements will be based on agreements between you and the provider of your credit card.

3.12. Account Cancellation or Suspension

You may cancel at any time. However, we do not give pro-rated refunds for unused time if you cancel during the middle of a billing cycle.

The limited license granted by this agreement terminates automatically, without notice to you, if you breach any of these Terms.

In addition, CS GROUP - ROMANIA S.R.L. may cancel or suspend your account for any reason by providing you thirty days advance notice. Upon cancellation or suspension, your right to use the Services will stop immediately. You may not have access to data that you stored on the platform after we cancel or suspend your account. You are responsible for backing up data that you use with the Services. If we cancel your account in its entirety without cause, we will refund to you on a pro-rata basis the amount of your payment corresponding to the portion of your service remaining right before we cancelled your account.

3.13. Changes to Services or Terms

We reserve the right to modify these Terms at any time by posting the changed terms on the Platform web site. All changes shall be effective immediately upon posting. We will notify upon changes but please check these Terms periodically for changes. Your continued use of the Services after we post about changes constitutes your binding acceptance of the new terms.

We may change the features and functions of the Services, including APIs, as well as the terms of the EULA. It is your responsibility to ensure that calls or requests you make to the Services are compatible with the current Platform APIs. We will endeavour to avoid changes to our APIs that are not backwards compatible, if any such changes become necessary, we will use reasonable efforts to notify you prior to implementation.

In addition, we may retire Services for any reasons by providing you thirty days advance notice. If it is not possible to find within the platform a suitable replacement of the retired Service, we



will refund you on a pro-rata basis the amount of your payment corresponding to the portion of your Service remaining right before we retire the Service.

3.14. Indemnification

You agree to indemnify and hold harmless CS GROUP - ROMANIA S.R.L. and its employees, officers, agents, subsidiaries, affiliates, partners, and suppliers from any claim or demand, including reasonable attorneys' fees arising out of:

- Your violation of these Terms.
- Your use of the Services.
- Your end users' use of the Services in or through an application or service you provide.
- Content you or your end users submit, post to, extracts from, or transmit through the Services.

3.15. Disclaimers

You expressly agree that the use of the Platform is at your sole risk. The Platform and its software, services, maps, and other content, including any third-party software, services, media, or other content made available in conjunction with or through the Platform, are provided on an "AS IS", "AS AVAILABLE", "WITH ALL FAULTS" basis and without warranties or representations of any kind, either express or implied.

NO WARRANTIES. To the fullest extent permissible pursuant to applicable law, CS GROUP - ROMANIA S.R.L. disclaims all warranties, statutory, express or implied, including implied warranties of merchantability, fitness for a particular purpose, title, and non-infringement of proprietary rights. no advice or information, whether oral or written, obtained by you from CS GROUP - ROMANIA S.R.L. or through the site, will create any warranty not expressly stated herein.

3.16. Limitation of Liability

Under no circumstances, and under no legal theory, including negligence, shall CS GROUP - ROMANIA S.R.L. or its affiliates, contractors, employees, agents, or third party partners or suppliers, be liable for any special, indirect, incidental, consequential, or exemplary damages (including loss of profits, data, or use or cost of cover) arising out of or relating to these terms or that result from your use or the inability to use the Platform, including software, services, maps, content, user submissions, or any third party services referred to on or by the Platform, even if CS GROUP - ROMANIA S.R.L. or a CS GROUP - ROMANIA S.R.L. authorized representative has been advised of the possibility of such damages.



3.17. Miscellaneous

Entire Agreement: This Agreement constitutes the entire understanding between the parties and supersedes all prior agreements.

Amendments: Provider may amend this Agreement by providing notice; continued use constitutes acceptance.

Severability: If any provision is invalid, the remainder remains in effect.

Export Controls: You agree to comply with all export laws regarding the Software.

Contact: For questions, contact Provider at cs.ro.office@soprasteria.com.

By using the Services, You acknowledge that You have read, understood, and agree to this Agreement.



4. Annex 1: TAO Processing Services

4.1. Simple EO data processing services

Maintainer	Service
CS GROUP - ROMANIA	Sen4CAP S1 Pre-processing
CS GROUP - ROMANIA	Sen4CAP Spectral indices
CS GROUP - ROMANIA	Sen4CAP Biophysical indicators
CS GROUP - ROMANIA	L3 Basic Markers

4.2. Advanced EO data processing services

Maintainer	Service
CS GROUP - ROMANIA	Sen4CAP Crop Type Mapping
CS GROUP - ROMANIA	Sen4CAP Agricultural Practices
CS GROUP - ROMANIA	Sen4CAP Grassland Mowing Detection
CS GROUP - ROMANIA	Sen4CAP Bare soil Detection
CS GROUP - ROMANIA	Sen4CAP Parcel Heterogeneity Detection
CS GROUP - ROMANIA	Sen4CAP Tillage Detection
CS GROUP - ROMANIA	Sen4CAP Winter Cover Crops Detection
CS GROUP - ROMANIA	Burned Area Detection