**Service Contract 3436/R0-Copernicus/EEA.59142**

**CLC+ components conceptual work**

**Interim Report**

**Version 1.0**

**30.03.2023**

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Title:

Interim report: CLC+ components

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# Scope and objectives

The objective of this negotiated procedure was to continue the support to EEA with respect to the further development of the EAGLE concept and its application in the context of the CLC+ product suite.

Task 1 addresses the update of the relevant EAGLE documentation and making them available to service providers as well as users to support the implementation of CLC+ Core, respectively the ingestion of data into the database.

Task 2 concerns the update of the EAGLE web presentation and the integration of the web pages into the new Copernicus web portal.

Task 3 reviews and updates the bar-coding concept in light of the lessons learned during the ingestions of data into CLC+ Core. On the other hand, the task shall help to simplify and streamline the bar-coding of CLMS products and other frequently used feature classes by providing a proposal for a standard bar-coding of these data.

Task 4 finally addresses the development of an EAGLE concept for the characterisation and handling of change data in the CLC+ Core database as well as a critical review on the extraction of change data from the database.

Task 5 is about providing support to the organisation of Copernicus related meetings.

Task 6 addresses the scope of using AI and ML technologies (and other commercial EO-based analytics) for the gap filling in CLC+ instances.

Task 7 is about providing and “EAGLE view” and support to the ISO standardisation group.

This interim report summarises the task achievement until the end of March 2023. Project end and final results are end of October 2023.

# Task 1 – documentation update

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| Task lead  | Stephan Arnold  |
| Task partners  | Lechner, s4e, Specto Natura, M. Bock, UMA, Spatial Focus, Cloudflight, CNIG  |

## Objective

The aim of task 1 is to update the documentation of the EAGLE concept to make them available for access by interested stakeholders. The task has three sub-tasks:

1. update of the EAGLE matrix and the related documentation;
2. update of the EAGLE UML model;
3. commenting and updating of the CLC+ Core user guidelines

## Results

### Update of the EAGLE matrix and the related documentation

Within this task, the EAGLE matrix version 3.1.2 has been reviewed and revised. The result is a new matrix version 3.2. The changes between old and new version are new elements, renamed elements, and elements foreseen to be deleted.

For easier navigation through the new matrix version in detail, please refer to the first table sheet “READ ME” in the excel file deliverable of the matrix. Most changes have been done in the Land Characteristics Block (LCH), only few on LCC and LUA.

The following segments have been added, respectively revised:

* LCC Poaceae and LCC Cyperaceae [new]

The LCC “Grasses, Sedges, Rushes, Cereals” (LCC level 4) appeared to be not distinctive enough for the VLCC grassland Layers (CLMS product). Therefore it has been subdivided (on level 5) into LCC “Poaceae, Grasses, Cereals” and LCC “Cyperaceae, Sedges, Rushes”.

* LUA Land Areas Not In Other Economic Use & LUA Water Areas Not In Other Economic Use [deleted]

“LUA Land Areas Not In Other Economic Use” and “LUA Water Areas Not In Other Economic Use” are foreseen to be deleted, and only “LUA Areas Not In Other Economic Use” shall be kept, because from strict LUA perspective it does not matter if on land or water, which is expressed by LCCs anyway.

* LCH Crop Types [modified, extended] and Cultivation Purpose [extended]

Under the segment “Agricultural Land Management”, the main focus in the new matrix version lays on the crop type list. The reason for its revision was the inconsistent mixture of subdividing criteria, like crop form, cultivation purpose or climate zone. Some crops where listed multiple times, depending on how or for which purpose they are harvested. The new order of crop type tries to focus on the form of the crop and part of the plant which is of harvesting interest, in the best case also considering botanical aspects. The previous partly existing cultivation purpose has been eliminated from the crop type list and was moved and completed instead in its own matrix segment, independently from (and now able to combine with) the crop type list.

Crop Type “Harvested field” has been moved to the segment "Growth Stage". Crop Type “Meadow, Pasture” has been renamed to “Meadow grasses and herbs”, because the old name reflected more a management form than a crop type.

To some extent, a pragmatic view still remains in a way that some crops are not listed under strict botanical aspects but under common sense of crop categories.

On the extraction site of CLC+ Core it will be possible to e.g. query all kinds of energy crops (after they have been ingested as such), without the need to browse through the (old) crop type list and manually hand pick all crops that can be consider as energy crops. This segment also opens up the applicability for other thematic domains like e.g. climate mitigation and biodiversity preservation with the element "functional crops".

* LCH Grazing [moved, extended], Lifestock Species Type

Under the segment “Agricultural Land Management” the element “grazing” has been extended with a more thorough listing of different grazing cycles and routines. It was done so, because such information is relevant for the assessment of grassland biodiversity and the appearance of herbaceous species depending on the grazing activities. In the old version, grazing was rooted under “cultivation measures”, but has now been removed there and received its own segment, because it has a different character compared to all other only human-based activities like fertilization, irrigation etc.

The new list of most common Lifestock Species Types carries information, which kind of animals are grazing the land. As they have different ways to feed, and have different output of animal manure excrements, lifestock has also an effect on biodiversity of grassland types.

* LCH Crop Season [new]

In reaction to the new CLMS product HRL VLCC, crop season (winter, summer, year-round) became important, which now has its own short segment within the matrix.

* LCH Forest Tree Species [new]

New list of the most common forest tree species, under the existing segment of “Forest Land Management”.

* LCH Ground Water [new]

New entry for groundwater information under the matrix segment “Water Characteristics”.

* LCH Climate Zones [new]

New entries under the segment “Geographic Characteristics” with the main four global climate zones.

* LCH Terrain Characteristics [new]

A new segment for terrain parameters has been opened under “Geographic Characteristics”. When implemented, it is now possible to ingest data on elevation, slope and aspect into the Core system. It will be useful to assess probabilities of different habitat types depending on terrain information, or also extract habitat information based parametric terrain data in combination with wetness information and vegetation types.

Terrain Curvature is another descriptive element for inclined terrain worth to consider. However, it has not yet been included in this new version 3.2 of matrix, and can be addressed in a later matrix version if necessary.

* LCH General Parameters

So far, the content names of the parameters have only 1 line to be bar coded. In the case that another matrix field is needed to enter a parameter VALUE, I have added for each general parameter (geometric, temporal) in the lower section of the matrix a line pair "From" & "To". With these fields it is possible to enter or query a range (min / max) of values. If a value is not a range but a fixed figure, the identical value is entered in the "From" and the "To" field.

Together will the colleagues from Cloudflight it will be discussed to what extend it is feasible and necessary to also include the “from..” and “to..” fields in the platform.

* General issues

The EAGLE matrix elements have three identifiers: the URI (Uniform Resource Identifier), the Label Code and the Label Name. When starting to build the CLC+ Core platform based on the EAGLE ontology, it was decided that the URI should be the stable identifier which shall not change. Label codes and label names, however, can be changed when useful or necessary, without jeopardizing the ontology of the running system (regarding ingestions and extractions in use). The user of the platform normally only sees the label code and label name, while the URI is used as unique identifier by the software system behind the CLC+ Core platform.

During the matrix revision process it became evident, that we need a technical approach for changing or disappearing URIs in the system. It is therefore recommended to decide on a procedure, how to conceptually and technically also handle changes in the URIs and to establish semantic mapping mechanisms between old and new URIs.

* Element Label Names [changed]

Label names of matrix elements have been shortened or clarified. This modification has no impact on the running CLC+ Core system, only names will appear differently in the user interface.

* Element Label Codes [changed]

The adding of new elements comes along with the need to also adapt the label codes of existing (essentially unchanged elements), whenever these new elements make it necessary to create more numeric space between existing label codes for the new ones.

The adding, moving or deleting of matrix elements goes together with the need to also adapt the label codes of existing (essentially unchanged elements), whenever these new elements make it necessary to create more numeric space between existing label codes for the new ones.

* Deleted matrix elements

When a matrix element has been deleted, it is necessary to elaborate a way how do handle such changes inside the CLC+ Core platform. In all cases, where a matrix element has been deleted, other remaining matrix elements should take over the bar code from the previous (and now disappeared) elements. This is either a 1:1 or a 1:n transition. This may come along with a bar code on a higher hierarchical (parent) level as an easier solution, or in a different segment of the matrix, distributed to a number of other elements.

The ChangeLog Matrix Table (part of deliverables) shows more details.

* LC / LC / Gen assignment of matrix elements

According and in preparation to the ideas formulated further down in the chapter of EAGLE UML model, to distribute all LCH elements to either the theme land cover, land use, or general aspects, each matrix element was flagged respectively. In the matrix column “thematic relevance” each matrix element is marked as “LC”, “LU” or “Gen”. Based on this flagging, LCH elements can later be assigned to the corresponding LCC and LUA model classes in the EAGLE UML data model.

### Update of the EAGLE UML model

During the project meeting in November 2022, a number of required (and nice-to-have) modifications to the UML data model have been discussed. Some of which require a considerable amount of effort. The project team has agreed to tackle the following points immediately, whereas others will be kept back for discussion and implementation at a later stage. These are the steps that have been performed already, and the intermediate results are available:

* Update information on the required UML model changes, based on the EAGLE Matrix 3.1.2 (predecessor of the currently developed 3.2). The Excel spreadsheet ([link](https://spatialfocus-my.sharepoint.com/%3Ax%3A/g/personal/christoph_perger_spatial-focus_net/EULXEmuC8hZCg0pToPaZjaUBPtRoR0FKjYt2pGZLwaT7wA?e=NCqKiB)) contains all the required information to update the Enterprise Architect UML data model, however the implementation has not started yet since the Matrix update 3.2 was not finalized, as well as other architectural considerations have not reached an agreement yet.
	+ ***Conclusion****: the implementation of this point (based on version 3.2 of the matrix) is foreseen in the context of the current contract, but can only be started when the version 3.2 is available.*
* Proposed the use of codelists (e.g. from the EIONET [EAGLE data dictionary](https://dd.eionet.europa.eu/vocabulary/landcover/eagle/view)) for all look-up attribute values instead of using custom enumerations and codelists; drop enumerations (closed list) in favour of codelists (open and extensible).
	+ ***Conclusion****: this point will be implemented together with the bullet point above after the decision how to handle codelists and data dictionaries.*
* Proposed harmonization steps between the UML model and the matrix have been proposed but not decided on. In short these would be the required structural renaming / regrouping steps:
	+ Land Cover Components -> LC classes in the UML model
	+ Land Use Attributes / Components -> LU classes in the UML model
	+ Land Characteristics -> Attributes of the model, that cannot be assigned to either LU or LC
	+ Land (Cover) Characteristics -> Attributes of the LC classes
	+ Land Use Characteristics -> Attributes of the LU classes (TBD)

Two explaining notes regarding this harmonization between matrix and model:

* + - In general, all Land Characteristics (LCHs) from the EAGLE matrix (where they are listed side by side with LCCs and LUAs) need to be attached as UML attributes to concrete UML classes in the model at a specific hierarchical level. Placed at that certain position in the UML model, the LCH inherit the carried information downwards to all subordinated subsequent levels of UML classes. Once a new branched UML class structure for Land Use is opened in the model (as proposed above), it needs to be decided where to place and how to distribute the LCH among the LCC branches and the LUA branches. Therefore, the LCH elements in the matrix are pre-tagged as a) being related to the theme Land Cover or b) to Land Use or c) being general Characteristics that are assigned to the Land Unit class in the UML model (above the point where LCC and LUA branch out).
		- Renaming, re-arrangements and introduction of new matrix elements also need to be adapted in the UML model. Besides, they are content-wise modifications and are different from the above addressed structural modifications in the UML model.
	+ ***Conclusion****: this issue was put on hold during the Vienna meeting.*
* Draft implementation (prototypical) of a potential UML model extension to integration the land use aspect into the data model. LUAs would be modelled as classes (similar to LC components) and related characteristics as attributes.

At the November 2022 project meeting another improvement for the UML model was discussed, which could be seen as the “missing link” between the matrix and the model. Originally the matrix was designed as a tool to describe nomenclature classes, whereas the model was planned (and used in practical test cases) to describe concrete datasets and its features (incl. object geometries). In the weeks after the project meeting a high-level draft was created ([link](https://spatialfocus-my.sharepoint.com/%3Ap%3A/g/personal/christoph_perger_spatial-focus_net/Eamng-Rrb6BGoLE2XcnMA7YB4RMBJxVhKVuu1GzQzO8r4A?e=phpC89)), on how nomenclatures could be integrated into the UML data model. The PowerPoint slides explain the necessary modifications in order to describe nomenclature classes by setting up relationships between land cover components (LCCs), followed by two concrete examples.

* + ***Conclusion****: this point cannot be achieved / implemented with the available resources as it would require more conceptual changes to the EAGLE approach. Nonetheless, a draft / prototype development could be envisaged as preparation for implementation at a later stage.*

### Commenting and updating of the CLC+ Core user guidelines

During the Eionet training sessions on the use of the CLC+ Core database (i.e. ingestion and extraction of data sets) is clear that the CLC+ Core user guidelines need to be improved in their clarity and by providing better examples.

In the task 22 of the ETC Copernicus service contract 59032 the ETC partners tested the data ingestion process in CLC+ Core. The exercise included the following steps:

* Bar-coding of land use layers form 5 countries;
* Ingestion of those layers into CLC+ Core;
* Testing the extraction of the same layers from the database again;
* Development of a LULUCF instance (not part of the update of the CLC+ Core guidelines).

Based on the experiences from the first three steps above two types of lessons learned were obtained:

* Using the bar-coding approach to characterise land use databases from 5 different countries and the issues from having to consider national specificities or slight differences in the national definitions of similar classes;
* Practical experience from different partners try to ingest the land use data sets into CLC+ Core, using the existing guidelines to support the process.

The experiences from the second group of lessons learned was used to propose concrete text edits (mainly related to practical examples and improved descriptions of individual steps) as well as making suggestions to the general processing / handling of the data (to be handled by the consortium responsible for implementing the database).

## Deliverables

* D1-1: Updated EAGLE matrix (ready for upload in EIONET Data Dictionary) - <https://projects.eionet.europa.eu/eagle/library/service-contract-no-3506-r0-copernca-eea.59142/task-1-documentation-update/d1-1-updated-eagle-matrix-and-change-log>
* D1-2: Updated EAGLE UML model (EA and PDF-Format) – on hold
* D1-3: Updated Content Explanatory Documentation of the EAGLE Concept (HTML and PDF format, including the definitions of the matrix / model elements) - <https://projects.eionet.europa.eu/eagle/library/service-contract-no-3506-r0-copernca-eea.59142/task-1-documentation-update/d1-3-updated-content-explanatory-documentation>
* D1-4: Mapping table between old and updated EAGLE matrix versions - <https://projects.eionet.europa.eu/eagle/library/service-contract-no-3506-r0-copernca-eea.59142/task-1-documentation-update/d1-4-mapping-table-between-old-and-updated-eagle-matrix-versions>
* D1-5: Update of the CLC+ Core User Guidelines – <https://projects.eionet.europa.eu/eagle/library/service-contract-no-3506-r0-copernca-eea.59142/task-1-documentation-update>

# Task 2 – Support the maintenance of the EAGLE website

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| Task lead  | Emanuele Mancosu (UMA)  |
| Task partners  | Stephan Arnold, s4e, Specto Natura  |

## Objective

Task 2 aims to update the EAGLE material published on the CLMS site, providing easier access to up-to-date information concerning the upcoming CLMS new interface. It will highlight the increasing interest focused on the CLC+ related material, and specifically design promotional material to improve the communication towards external users. The EAGLE Group will support the EEA by providing the most relevant and updated material needed to be published on the website.

## Results

The EAGLE group prepares, in agree with EEA, detailed documentation (D2-1) based on the previous EAGLE web page selecting the most relevant information to introduce the EAGLE concept, to explain the main tools e.g. the matrix and the data model, and practical application, e.g. main uses cases. The documentation reflects the same section structures as ideally will be hosted in the new CLMS web page. The set of graphs and pictures presented in the document are also made available with a separated document (D2-2). Both document text and graphs can be modified in agree with EEA, as needed/possible e.g. to overcome limits of the web page design.

## Deliverables

* D2-1: Updated website material: <https://projects.eionet.europa.eu/eagle/library/service-contract-no-3506-r0-copernca-eea.59142/task-2-support-maintenance-eagle-website/d2-1-updated-website-material/t2_eagleweb_relevant_material_finaldraft-clean_v2/download/en/2/T2_EAGLEweb_relevant_material_FinalDraft-clean_v3.docx>
* D2-2: Promotional material:
<https://projects.eionet.europa.eu/eagle/library/service-contract-no-3506-r0-copernca-eea.59142/task-2-support-maintenance-eagle-website/d2-2-promotional-material/d2-2-promotionalmaterials/download/en/1/D2-2%20PromotionalMaterials.pptx>

# Task 3 – EAGLE bar coding review

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| Task lead  | Stephan Arnold  |
| Task partners  | WENR, Lechner, s4e, Specto Natura, UMA, DGT |

## Objective

During the CLC+ Core training it became obvious that the EAGLE bar-coding approach needs to be reviewed to ensure that the EAGLE characterisation of data sets is done with a certain degree of harmonisation.

Firstly, this task shall develop best practice guidelines for the characterisation of frequently used classes or of specifically complex situations. Moreover, the task shall investigate the feasibility of installing a “system” which will review the characterisation done by a user and give feedback on the “quality” of the characterisation; this will help to ensure the compatibility of the ingested data sets and the subsequent creation of instances.

Secondly, this task will provide standard bar-coding for the most frequently used CLMS products to avoid that different users have to do it again and again. Thus results are streamlined and guidance is provided for similar data sets at national level.

## Results

### Feedback Loop for Bar Coding

The procedure of bar coding review can be done based on the ingestions that have been provided by users on the CLC+ Core platform. Through the download function, a copy of the bar coding result can be generated in form of an excel table. In that excel table, comments can be made, and alternative bar coding value can be suggested. After an internal feedback loop within EAGLE group (contact persons and involved contributors still tbd) the commented bar coding excel sheet can be returned to the original “ingestor” for a consolidation round. After agreement, the new / confirmed bar coding result can be – if necessary – uploaded again to the CLC+ Core platform to replace the old bar coding ingestion.

So far, the reviewing of already existing ingestions still needs to be agreed upon, which ingestions to choose and to review.

### Reviews done

* Bar Coding Exercise on HRL VLCC

A bar coding exercise has been done on all components of the High Resolution Layer (HRL) on Vegetated Land Cover Characteristics (VLCC). In a collaboration between EAGLE and Geoville Austria all VLCC Layers have been bar coded. During this procedure, some missing matrix elements or ideas to improve its content have been identified and already implemented within the new matrix version 3.2. For the final bar coding output, the new matrix version is used.

Based on the bar coding exercise of VLCC, conclusions can also be drawn for other CLMS products, how to apply the bar code values according to their meaning and the role they express for the matrix element they have been assigned to.

* Bar coding of LUA / interclass layers

During the preparation of the LULUCF instances (task 22 of the Copernicus contract 59032) a bar coding approach for the LUA / interclass layers provided by the countries has been developed.

The key question to solve at the start of the bar coding (as preparation for the ingestion of the data into the CLC+ CORE database) was to decide at which level to characterise the input data sets: a) at the most detailed level or b) at a “parent” level? For example bar coding all different types of irrigation or just bar coding the presence of irrigation, independent of the type.

It was agreed to bar code the data at the higher “parent” level. A standard bar coding (based on the European level understanding of the LULUCF categories) has been proposed.

The question of how to handle the bar coding of “parent” levels is also an issue that need to be addressed during the extraction of data from CORE. The possibility of “extracting” the data at a higher level could facilitate the extraction process. This should be discussed also with the CLC+ CORE contractors.

* Improvement of CLC+ Core ingestion / extraction procedure

During the bar coding exercise on HRL VLCC, both perspectives on ingestion and extraction have been taken into account. In conclusion, the CLC+ Core system should be able to make logic transfers between child and parent bar codings, and between related bar code values. It is still under discussion, if and what kind of machine readable conclusions from manually ingested bar coding result can be drawn.

For example when a certain element has been bar coded with value “3” (cumulative mandatory: must have all 3-coded elements) during ingestion, the system should return those elements when an extraction rule uses that particular element by setting a bar code value “2” (selective mandatory: either – or).

As a first part of deliverable D3-1, the bar coding result of HRL VLCC and its various Layers can be considered as preliminary input, but still needs to be consolidated among EAGLE group. A standardized bar coding for CLMS products is still pending.

## Deliverables

* D3-1: Report of Task 3 - Standardised bar coding for CLMS products – pending
* D3-2: Report of Task 3 - Concept for a bar coding review and acceptance process

# Task 4 – Develop a change mapping/detection concept for CLC+

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| Task lead  | Geoff Smith, Specto Natura |
| Task partners  | Gerard Hazeu (WENR), Barbara Kosztra (Lechner), Gergely Maucha (Lechner), Mirko Gregor (s4e), Stefan Kleeschulte (s4e), Stepahn Arnold, Gebhard Banko (UBA-v), Emanuele Mancuso (UMA), Mario Caetano (DGT), Christop Perger (Spatial Focus), Julian Delgado (CNIG) |

## Objective

Task 4 will address the need to store and produce meaningful change data with CLC+ Core. It will develop the concepts for storage of change data and ensure the derivation of time series consistency within and through the CLC+ products (Backbone, Core, LUA layers, Instances). It will also examine the implications of the different change scenarios on the future development of time series within the CLC+ product suite and how to ensure the best possible consistency and sustainability. The task will provide a road map for the implementation of best practice examples and recommendations.

## Results

Task 4 does not start in earnest until April 2023 due to the availability of key members of the team. However, we have had an initial meeting of the members of the EAGLE Group involved in this task and are developing a working document to guide the activity as we move forward.

The working document focuses on the background to change mapping, the inputs to the task, in terms of datasets and documentation, and outlines in more detail the three sub tasks. A shared space has been set up in DropBox to hold the working document along with a document library for useful reports and papers etc. So far documents have been collected from the CLMS Technical Library and other are being requested from the MS to understand the performance of existing products and any potential lessons learnt.

The working document will be supplied to the EEA towards the end of March 2023. The task leader will then reach out to the team at the EEA and service providers to arrange some bilateral meetings to discuss the way forward and request any additional information that may be required.

## Deliverables

* Working document for discussion (due 31.03.2023) – pending
* D4-1: Report of Task 4 - Develop a change mapping concept for CLC+ (due 30.11.2023)

# Task 5 – Preparation and participation in meetings

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| Task lead  | Stefan Kleeschulte (s4e)  |
| Task partners  | All EAGLE partners and EAGLE experts |

## Objective

The task shall ensure the participation of EAGLE experts in relevant meetings with EEA, Eionet or service providers as well as internal meetings of the EAGLE experts.

## Results

The following meetings have been attended by EAGLE experts.

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| **Date & Location**  | **Topic**  | **Attendance**  |
| 24. Oct. 2022 – online  | Kick off meeting with EEA  | All  |
| 15-16 Nov. 2023 Vienna  | 1st EAGLE workshop – task brainstorming  | All  |
|  |  |  |

## Deliverables

* D5-1: Collection of PowerPoint presentations
* D5-2: Report of Task 5 – Summary of tasks undertaken

# Task 6 – Use of AI/ML EO-based analytics products for filling gaps in CLC+ instances (CLC Legacy and/or LULUCF)

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| --- | --- |
| Task lead  | WENR (Marian Vittek) |
| Task partners  | Lechner, Specto Natura, M. Bock, UBA, UMA, DGT |

## Objective

This task shall assess the use of modern technologies (like artificial intelligence / machine learning) and / or recent EO-based products that are being provided by the service industry to support the closing of current data and information gaps.

* Expected output:
	+ Data gap typology overview
	+ Methodology overview for filling the data gaps
	+ Proposal for common practice of filling data gaps – from identification through typology to solution
	+ Guideline for selection of data gaps filling method

## Results

* Task starts at 1-April-2023
* Task kick-off meeting with partners will be scheduled in April 2023

## Deliverables

* D6-1: Report of Task 6 - Use of AI/ML and other (commercial) EO-based analytics for filling gaps in CLC+ instances

# Task 7 – Support to the exchange with ISO standardisation group

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| Task lead  | Julián Delgado (CNIG)  |
| Task partners  | Specto Natura, Stephan Arnold |

## Objective

This task relates to the ongoing work on the international standardization of land cover and land use in the frame of the ISO 19144 documentation series. The participation of EAGLE members at the working group guarantee that the knowledge and EAGLE concepts are recognized and considered for integration into the new and revised standards and identify potential gaps between new developments in ISO about land cover and land use, and Copernicus Land Monitoring Services products. This task only supports the participation of EAGLE members who are not part of the ETC DI.

## Results

During last period of 2022 and first months of 2023, EAGLE members have participated in several ISO working group meetings and collaborate in the modification and preparation of ISO 19144-3 standard on Land Use Metalanguage (LUML). It is remembered that EAGLE members are part of ISO/TC 211 Working Group 7 and Advisory Group 13 on Land Cover and Land Use.

This EAGLE participation means by contribution of modification proposals, documentation commenting on draft technical information and active participation and reasoning of technical concepts during meetings . EAGLE members as the rest of technical members of the project are not able to edit directly documentation and models. They are edited by the Editor team.

During last months it has been prepared first draft report D7-1 in order to collect a general panorama of ISO standards ongoing work of the ISO groups. This report has been considered as living document always updatable according ISO calendar and publication standards.

As summary, next list inform on the ISO meeting happened in last months with EAGLE members participation and foreseen calendar of ISO standards on land cover and land use.

ISO/TC 211 Working Group 7

* 23th November 2022. Project team meeting ISO 19144-3 LUML
* Internal commenting collection for draft version of ISO 19144-3 LUML
* 17th January 2023. Project team meeting ISO 19144-3 LUML
* 14th February 2023. Project team meeting ISO 19144-3 LUML
* 23rd February 2023. Project team meeting ISO 19144-3 LUML
* 2nd March 2023. Project team meeting ISO 19144-3 LUML
* 14th March 2023. Project team meeting ISO 19144-3 LUML

Advisory Group 13 on Land Cover and Land Use

* 6th December 2021. Group meeting

ISO calendar

* Project 19144-3 LUML was restarted by TC211 CIB Resolution 2022-04 to produce a Technical Specification, instead an International Standard
* ISO 19144-2 LCML. From 8th December 2022 to 1st March 2023. Draft International Standard (DIS) balloting.
* Project team ISO 19144-2 LCML resolution of comments and elaboration the Final Draft International Standard (FDIS) by 22nd June 2023.
* ISO 19144-2 LCML International Standard publication by 6th November 2023
* ISO 19144-3 LUML. Draft a Technical Specification by 30th November 2023
* ISO 19144-3 LUML Technical Specification publication by 30th April 2024

## Deliverables

* D7-1: Report of Task 7 - Support to the exchange with ISO standardisation group

# Task 8 – Coordination and management of the contract

The implementation of tasks 1 to 3 is strongly delayed.

* D1-1 – the final draft version of the update of the EAGLE matrix was provided on 30.03.2023, this had an impact on several depending tasks.
* D1-2 – the update of the UML model was agreed among the task partners to be delayed until the finalisation of the EAGLE matrix and the answering of some open questions. The delay had no impact on any other tasks.
* D1-3 – the update of the Content Explanatory Documentation was provided on 30.03.2023.
* D1-4 – the mapping table between the old and updated EAGLE matrix versions was submitted together with D1-1.
* D1-5 – the update of the CLC+ Core Guidelines was submitted on 15.03.2023. The submission included a revised guideline document with track changes and comments, as well as a second document with overall observations and suggestions for the improvement of the readability of the guidelines.
* D2-1 – the EAGLE web site has been reviewed and updated in line with the EEA / Copernicus guidelines. A continuous update with updated contract outputs is foreseen.
* D2-2 – illustrative material used for the web update has been provided.
* D3-1 – the development of a standard barcoding approach for CLMS products is pending.
* D3-2 – the concept for a bar coding review and acceptance process is pending

The tasks 4 to 7 will mainly only start after the interim report. Some initial discussions have been done.

Table ‑: Deliverable list

|  |  |  |  |
| --- | --- | --- | --- |
| **No.**  | **Description**  | **Planned date**  | **Actual date**  |
| D1-1 | Updated EAGLE matrix | 31.12.2022 | 17.03.2023  |
| D1-2 | Updated EAGLE UML model | 31.01.2023 | On hold  |
| D1-3 | Updated Content Explanatory Documentation of the EAGLE Concept | 31.12.2022 | 30.03.2023  |
| D1-4 | Mapping table between old and updated EAGLE matrix versions | 31.12.2022 | 17.03.2023  |
| D1-5 | Update of the CLC+ Core User Guidelines | 30.09.2022 | 15.03.2023 |
| D2-1 | Updated website material. | 31.12.2022 | 27.03.2023  |
| D2-2 | Promotional material | 31.12.2022 | 27.03.2023  |
| D3-1 | Report of Task 3 - Standardised bar coding for CLMS products | 31.01.2023 | Pending  |
| D3-2 | Report of Task 3 - Concept for a bar coding review and acceptance process | 30.06.2023 | Pending  |
| D4-1 | Report of Task 4: Develop a change mapping concept for CLC+ | 30.11.2023 |  |
| D5-1 | Collection of PowerPoint presentations | 30.11.2023 |  |
| D5-2 | Report of Task 5 – Summary of tasks undertaken | 30.11.2023 |  |
| D6-1 | Report of Task 6 - Use of AI/ML and other (commercial) EO-based analytics for filling gaps in CLC+ instances | 30.11.2023 |  |
| D7-1 | Report of Task 7: Support to the exchange with ISO | 30.09.2023 |  |
| IR | Interim report | 31.03.2023 | 30.03.2023  |
| FR | Final report | 31.10.2023 |  |