



APPENDIX 1 TO ANNEX II TO CONTRACT

**Framework Service Contract supporting the Global land Component of the GIO
Land service – 2 Lots**

Contract Notice No. 2012/S 129-213277 of 7th July 2012

Product and Service Detailed Technical requirements

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1 List of acronyms and definitions

ACP: Africa, Caribbean and Pacific group of States: signatory parties to the Cotonou agreements

AMESD: African Monitoring of Environment for Sustainable Development (an EDF-funded programme)

AUC: African Union Commission

AVHRR: The Advanced Very High Resolution Radiometer (AVHRR) is a low resolution space-borne sensor embarked on NOAA satellites

BioPar: a component of the geoland 2 FP7 project

Calibration: The process of quantitatively defining the system responses to known, controlled signal inputs. (CEOS)

CCI : Climate Change Initiative of ESA

CEMAC: Communauté Économique et Monétaire de l'Afrique Centrale (Central African Economic and Monetary Community, a REC)

CEOS : Committee on Earth Observation Satellites

CDOP : Continuous Development and Operations Phase (EUMETSAT)

dekad: "10-day period" defined as 1st to 10th, 11th to 20th, or 21st to end of month

DMP : Dry Matter Productivity

ECOWAS: Economic Community Of West African States (a REC)

ECSS: European Cooperation for Space Standardization

ECV: Essential Climate Variables

EDF: European Development Fund

ESA: European Space Agency

EUMETCast: a Digital Video Broadcast – based data distribution system operated by EUMETSAT as part of GEONETCAST

EUMETSAT: European Organisation for the Exploitation of Meteorological Satellites

FAPAR: fraction of absorbed photosynthetically active radiation (a bio-geophysical parameter)

Fcover: fractional cover (a biogeophysical parameter)

FP6: 6th Framework Programme of the European Community for research, technological development and demonstration activities

FP7: 7th Framework Programme of the European Community for research, technological development and demonstration activities

GCOS: Global Climate Observing System

GEO: Group on Earth Observations

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Geoland2: a FP7 project to demonstrate in pre-operational mode the GMES land service

GEONETCAST: a Digital Video Broadcast – based data distribution system operated at global scale by various partners, including EUMETSAT, NOAA (US) and China, under the aegis of GEO.

GEOSS: Global Earth Observation System of Systems

GIO: GMES Initial Operations

GMES: Global Monitoring for Environment and Security

HW: hardware

IGAD: Inter-Governmental Authority on Development (a REC)

IOC: Indian Ocean Commission (a REC)

JRC: DG Joint Research Centre, European Commission

LAI: leaf area index (a biogeophysical parameter)

LRM: Land Resource Monitoring Unit, JRC

MARS-OP: the operational crop production monitoring programme of the European Commission

MESA: Monitoring Environment and Security in Africa (EDF programme)

METOP: EUMETSAT's polar-orbiting satellite dedicated to operational meteorology.

MODIS: the Moderate Resolution Imaging Spectroradiometer is a medium resolution Earth Observation instrument operated by NASA

MyOcean: a FP7 project to demonstrate in pre-operational mode the GMES ocean service

NASA: National Aeronautics and Space Administration (US)

NDVI: Normalized Difference Vegetation Index (a biogeophysical parameter)

NOAA: National Oceanic and Atmospheric Administration (US)

PROBA-V: an ESA contributing mission aimed at serving as gap-filler between the end of the VEGETATION mission and the joint operation of sentinel 3a and 3b by acquiring medium resolution Earth Observation data.

REC: Regional Economic Community (in Africa)

ROI: Region Of Interest

SADC: South African Development Community (a REC)

Sentinel 3: two future ESA satellites (3a and 3b) embarking two medium resolution Earth Observation instruments each

SW: software

TBC: To Be Confirmed

TBD: To Be Defined

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Validation: The process of assessing, by independent means, the quality of the data output data derived from the system outputs.(CEOS)

VEGETATION: a joint programme of France, Belgium, Sweden, Italy and to European Commission that operates a low resolution Earth Observation instrument onboard the satellites SPOT 4 and SPOT5

VCI: Vegetation Condition Index

VPI: Vegetation Productivity Indicator

2 Purpose of the document

This document provides additional details in complement to the tender document. These detailed requirements are based on internationally agreed standards, on state-of-the-art practices and on well identified user needs.. in the framework of the specific contracts the contractor is expected to provide the output data and services according to these requirements.

These detailed requirements will therefore be included in the definition of tasks that will be required for each specific contract.

The detailed requirements may be adapted at this occasion according to needs and circumstances.

Note: Meaning of verbal forms in the present document:

The verbal form “shall” is used whenever a provision is a requirement.

The verbal form “should” is used whenever a provision is a recommendation.

The verbal form “may” is used whenever a provision is a permission.

The verbal form “can” shall be used to indicate possibility or capability.

3 Lot 1: “Operation of the Global Land Component”

3.1 General requirements

In order to avoid duplication of specifications all specific requirements that may be common to several components of lot 1 are grouped in the section “general requirements”.

3.1.1 Definition of bio-geophysical parameters

The bio-geophysical parameters that shall be generated as “output data” of lot 1 activities belong to the following list with corresponding definition valid for the purpose of this service, and priority level (corresponding reference to GCOS ECV is made wherever applicable):

First priority bio-geophysical parameters:

Surface albedo (ECV T.5)

Refers to the hemispherically integrated reflectance of the Earth’s surface in the range 0.4-0.7 μm (or other specific short-wave ranges) (CEOS). Albedo is further defined spectrally (broadband) or for spectral bands of finite width, and according to its bi directional reflectance properties (black-sky or white-sky albedo) (GCOS 107 & 154).

Fractionally absorbed PAR (FAPAR) (ECV T. 7)

Fraction of PAR absorbed by vegetation for photosynthesis processes (generally around the “red”: PAR stands for Photosynthetically Active Radiation)

Leaf Area Index (LAI) (ECV T.8)

One half of the total projected green leaf fractional area in the plant canopy within a given area. Representative of total biomass and health of vegetation (CEOS)

Top of Canopy spectral reflectance

Refers to the portion of the incident energy reflected by the surface in a given spectral band and without atmospheric interferences.

Fractional cover (Fcover)

Fractional cover refers to the proportion of a ground surface that is covered by vegetation.

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Normalized Difference Vegetation Index (NDVI)

Difference between maximum (in NIR) and minimum (around the Red) vegetation reflectance, normalised to the summation. (CEOS).

Vegetation Condition Index (VCI)

Per-pixel NDVI value rescaled according to the min and max values observed over the whole time series (Kogan 1990: Remote sensing of weather impacts on vegetation in non-homogeneous areas. IJRS 11: 1405-1411)

Vegetation Productivity Indicator (VPI)

Per-pixel and per dekad percentile ranking of the NDVI value against its historical range of variability (Sannier & al 1998: "real-time vegetation monitoring with NOAA AVHRR in Southern Africa for wildlife management and food security assessment. IJRS 19:621-639)

Dry Matter Productivity (DMP) (relates to ECV T.9)

Amount (weight) of dry matter produced per surface unit and per time unit. The accumulation over time leads to the assessment of the biomass. Biomass (in this context, phytomass), herein defined as above-ground mass per unit area of living plant material (GCOS 107 & 145)

Burnt area (ECV T.10)

Surfaces where vegetation is damaged or destroyed by fires.

Active fires (ECV T.10)

Surfaces where fires are detected at the time of observation.

Land surface temperature (ECV T.12)

Temperature of the apparent surface of land (bare soil or vegetation) - Physical unit: [K] (CEOS)

Second priority biogeophysical parameters

soil moisture (ECV T.11)

Amount of water (m^3/m^3) contained in soil layers identified according to their depth measured from the top surface.

Areas of water bodies (ECV T.1.1)

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Areas of water bodies: permanent and seasonal, natural and man-made, independently of their size. Include but are not restricted to the lakes of the Global terrestrial Network for lakes (GTN-L).

Water level (lakes and rivers) (ECV T.1.2)

Measurement at regular intervals of the level of water bodies, including lakes and rivers.

Phenology

Identification of the date of occurrence of key phases of the vegetation development cycle, in particular the start, maximum of development, and the end of growing season.

3.1.2 Input data

3.1.2.1 Data warehouse

Input data for this contract shall be in first place the relevant products offered as part of the “data warehouse” contract established between the European Commission and the European Space Agency for the period 2010-2014. The applicable document is: GMES Space Component Data Access Portfolio: Data Warehouse 2011-2014 (ESA – GMES-PMAN-EOPG-TN-11-0006).

Data access conditions are defined under section 5.6.2 of the above mentioned document: “Institutions and bodies of the EU”. The contractor must take all steps needed regarding licensing issues and physical access to the data so as to avoid service delay or disruption during contract execution.

The data set of specific relevance for the execution of the present contract is DWH_MG3_CORE_04/05 (06/07) - Optical worldwide LR/MR

3.1.2.2 Additional data sets

In view of service continuity and evolution additional data sets will or might have to be accessed, including, but not limited to, as needs arise:

METOP/AVHRR

NOAA/AVHRR

PROBA-V

MODIS

Sentinel 3

EUMETSAT CDOP output data

Note: in case of necessity other input data than the ones mentioned here above upon request and/or approval of the contracting authority.

If required specific arrangements for data procurement shall be taken in due time.

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3.1.2.3 Ancillary data sets

Ancillary data sets include any type of data set other than satellite imagery described in the previous sections that might be required by the properties of the processing algorithm chosen by the contractor, i. a. for initial process training, for parameterization or for validation.

The contractor shall make these datasets available under its own responsibility.

3.1.3 Algorithms and processing chains

The processing chains shall be available by the contractor for the purpose of the contract.

No part of it may be covered by legal protections such as it would be operated as a black-box or could not be maintained and upgraded for the purpose of the completion of this contract.

Detailed documentation of the processing chain shall be provided at the start of contract execution. The documentation shall describe the real implementation that has been done and provide all information needed to document the requirements here after.

The level of detail should allow recomputing the output data in an independent way in order to understand for example the origin of any unexpected behaviour of the product.

Choice of appropriate algorithms and processing procedures to meet user requirements shall be the responsibility of the contractor.

The baseline requirement is for the processing chains to generate output data with the accuracy requirements defined in section 3.1.4.6 .

The processing chains shall include all necessary components to deliver “top of canopy” output data

The processing chains shall include all necessary components to eliminate or minimize atmospheric and angular effects in an explicit or implicit manner.

The processing chain may include any component of pre-processing or post-processing aimed at correcting or improving the quality of input data and at optimizing the performances of output data with regard to accuracy requirements.

At the time of offer submission the various components of processing chains shall have been submitted to, and accepted for publication by peer-reviewed journals of international fame and registered in reference systems such as DOAJ, SCOPUS, THOMPSON ISI WEB OF KNOWLEDGE, EBSCO, etc. Note: the tenderer may make use of / refer to algorithms developed and published by third party teams provided that he/she can ensure algorithm maintenance by qualified scientists.

At the start of contract execution all specific instances of algorithm implementation and parameterization shall have been documented and submitted to documented technical review processes.

At the time of offer submission the processing chains shall have been submitted to documented technical review processes

At the time of offer submission the output data shall have been submitted to documented calibration and validation exercises

Where applicable the output data shall have been submitted at the time of offer submission to documented

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inter-comparison exercises.

The contractor's processing chains may be adapted as part of output of activities defined under lot 1 component 3 "algorithm maintenance and evolution".

3.1.4 Technical specifications of the output data to be delivered

The specifications described in this section are applicable to each component of lot1.

3.1.4.1 Geometric properties

Pixel size of output data shall be defined on a per-product basis so as to facilitate the multi-parameter analysis and exploitation.

The baseline pixel size shall be 1 km. Other finer or coarser resolutions may be defined later on.

The target baseline location accuracy shall be $1/3$ of the at-nadir instantaneous field of view.

Pixel co-ordinates shall be given for centre of pixel.

3.1.4.2 Geographical coverage

Global window

The initial window definition is aligned on the specification of the VEGETATION data to be procured as part of the data warehouse programme (see section 3.1.2.1) for the most widely used output data:

geographic projection: lat long, geodetical datum: WGS84

pixel size: $1/112^\circ$ - accuracy: min 10 digits

coordinate position: pixel centre

global window coordinates: UL: 180W-75N, BR: 180E, 56S (40320 col, 14673 lines)

continental windows:

Continental windows may be asked by the contracting authority to satisfy specific user needs.

Wherever applicable, continental windows shall be drawn from global output data.

Africa window (AMESD – MESA user needs)

- ⤴ Geographic projection: lat long, geodetical datum: WGS84
- ⤴ Pixel size and accuracy: $1/112^\circ$ - accuracy: min 10 digits
- ⤴ Coordinate position: centre of pixel
- ⤴ Window coordinates: UL: 26W-38N, BR: 60E-35S, 9633 col, 8177 lines, first col: 17249, first line: 4145

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Europe window (MARSOP user needs)

The Europe Window shall abide to the INSPIRE specifications on coordinates reference systems – guidelines (ref: D2.8.I.1, 2099-09-07)

Window details (TBC)

Datum: ETRS 89

Geographic projection: Lambert Azimutal Equal Area

Projection ellipsoid: GRS80

True origin at $Lon_0 = 10.00^\circ$, $Lat_0 = 52.00^\circ$

Map shift: false Easting $X_0 = 4\,321\,000$ m, false northing $Y_0 = 3\,210\,000$ m

Image framing: UL is fixed at $X_{min} = 2\,275\,000$ m, $Y_{max} = 5\,415\,000$ m. BR is TBD

Pixel size and accuracy

Coordinate position: centre of pixel

Other windows may be defined by the contracting authority according to needs

3.1.4.3 Data structure specifications

Initial specification (valid for start of contract, the specifications may evolve according to contractor proposal and/or user request, shall be subject to formal review process as described elsewhere)

Where applicable data coding shall follow INSPIRE specifications.

For 8-bit data the range of used values and the values reserved for specific purposes (e. g. ocean, cloud, missing data) shall be harmonized among output data

For 16-bit data, data shall be “big-endian” coded

For 16-bit data, the coding shall relate directly to the value of biogeophysical parameters.

Ancillary information shall include at least the following:

- ⤴ The number of measurements per pixel used to generate any synthesis product
- ⤴ The per-pixel date of the individual measurement or the start-end dates of the period actually covered
- ⤴ Quality indicators, with explicit per-pixel identification of the cause of anomalous parameter result.

Specific requirement for the “*service continuity*” activity line of lot 1: the data coding (i.e. number of bits, range of values, usage of reserved values, content of status map, conversion to physical values formulas) as well as the naming convention, shall be fully consistent with the one used by the VGT4Africa, DevCoCast and Geoland 2 (defined as “v0 products” in the geoland terminology) projects. All the needed information is provided in the “VGT4Africa user manual” (link:

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http://www.vgt4africa.org/PublicDocuments/VGT4AFRICA_user_manual.pdf).The rationale behind this requirement is to ensure seamless continuity of the services and without additional adaptation costs on the user side.)

3.1.4.4 Data format specifications

For the “service continuity” activity line of lot 1 the format of the images shall be consistent with the “traditional” VGT S10 output data as described in the VEGETATION user guide website (<http://www.vgt.vito.be/pages/VegetationSystem/products.htm>) and briefly summarized on the VGT FAQ web page (<http://www.vgt.vito.be/faqnew/index.html>).

The rationale behind this requirement is to ensure seamless continuity of the services and without additional adaptation costs on the user side.

For the other activity lines the format will be chosen by the contracting authority among the following list of geo-referenced formats:

HDF4 for EOS (asa HDF-EOS2) + external ZIP compression

HDF5 for EOS (asa HDF-EOS5) (with internal compression

NetCDF (CF extension)

Geotiff or BigTIFF files (i. e. evolution of the TIFF format to support files larger than 4 GB).

Tiling shall be avoided for 1km resolution data and coarser resolution. For resolutions higher than 1km user-oriented approaches (e g continental windows) shall be used.

3.1.4.5 Time definitions

As a baseline the biophysical parameters are computed by and representative of dekad, I. E. for ten-day periods (“dekad”) defined as follows: days 1 to 10, days 11 to 20 and days 21 to end of month for each month of the year.

As a trade-off between timeliness and removal of atmosphere-induced noise in data, the time integration period may be extended to up to two dekads for output data that will be asked in addition to or in replacement of the baseline based output data.

The contractor shall deliver the output data in a timely manner, I. e. within 3 days after the end of each dekad.

3.1.4.6 Accuracy requirements

Baseline: wherever applicable the bio-geophysical parameters should meet the internationally agreed accuracy standards laid down in document “Systematic Observation Requirements for Satellite-Based Products for Climate”. Supplemental details to the satellite based component of the Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC. GCOS-#154, 2011”.

Wherever appropriate the bio-geophysical parameters shall be validated and compared to CEOS CAL/VAL

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data sets.

Target: considering data usage by that part of the user community focussed on operational monitoring at (sub-) national scale, accuracy standards may apply not on averages at global scale, but at a finer geographic resolution and in any event at least at biome level (see section biome definition).

3.1.4.7 *Biome definition for validation and data accuracy assessment purposes*

Biome categories to be taken into consideration for validation purposes should be either the 14 ones of the ecoregion map described in Olson & al (2011) or an equivalent internationally accepted standard.

3.1.5 Technical documentation

For each bio-geophysical parameter the contractor shall maintain the following documentation, subject to audit and review.

- ✦ Project management plan with schedule of tasks
- ✦ Algorithm technical baseline document (public domain)
- ✦ Product and service specification document
- ✦ Architecture and component design document
- ✦ Product user manual including I. a. data/ product data structure and format description (public domain)
- ✦ Scientific validation report (incl. validation plan) (public domain)
- ✦ Product validation report (incl. validation plan) (public domain)
- ✦ System and Service validation report (incl. validation plan – public domain)

3.1.6 Maintenance and evolution activities

3.1.6.1 Definitions

Three types of maintenance and evolution activities are considered in this lot:

Preventive maintenance. Activities are based on a strategy aiming at replacing, overhauling, updating items or components before failure occurs or before the failure develops into a major defect.

Corrective maintenance. Activities required to correct a failure that has occurred in the system or in the process so as to restore it into its operational conditions within the accepted limits and tolerances.

Typically software maintenance combines these two aspects, but with an emphasis on corrections. Software modifications are aimed to correct faults, to improve performances or other attributes, or to adapt to a modified environment

Evolution. Activities aimed at the adaptation of the process or system to evolving user requirements, operation environments and availability of input data. They respond both to developer and user learning, where more accurate requirements are based on the past experience with the application.

Preventive maintenance and corrective maintenance have to be considered for the purpose of this contract as part of the normal activities of lot 1 components 1 and 2.

Activities related to “evolution” have to be considered for the purpose of this contract as part of lot 1 components 3.

3.1.6.2 Implementation

The contractor shall be responsible for the identification of potential impact of maintenance / evolution activities on the user (e. g. delay in data availability, modification of output data properties).

In case of possible impact the registered users shall be informed without delay by the contractor by email on the nature of the impact and how to overcome possible problems in data use. The information shall be made available at the same time on the web site (see section 3.3.2.1).

In case of impact user feedback shall be pro-actively obtained by the contractor in order to identify the most appropriate timing of implementation of corrective maintenance.

3.1.7 Data distribution policy

Data distribution shall be fully compliant with the GMES data policy which ensures open access to output data¹

Pre-identified institutional users are identified in the GMES/GIO Work-programme)

Open access shall be ensured to other users

The contractor shall be responsible of the archival and distribution of the output data generated by the

¹ see article 9 “GMES data and information policy” of the GIO Regulation (EU) n° 911/2010 of 22/08/2010, Official Journal of the European Union L276/1 of 20/10/2010 and derived implementation provisions.

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other service components, namely “service continuity”, “service evolution”, “new output data”, “re-processing” and; if needs arise, data inherited from previous projects.

3.1.8 Audit and reviews

The contractor of lot 1 shall participate to the audit and review process described in lot 2 as part of the activities of the specific components of lot 1.

The contractor shall ensure as appropriate the preparation and provision of the required documentation (see list in the section 3.1.5 “technical documentation”) for audit and reviews.

Upon request of the contracting authority the contractor of lot 1 shall implement the recommendations formulated by the audit and review panels as part of lot 2 activities when these recommendations lead to corrective maintenance activities. When recommendations lead to “algorithm maintenance and evolution activities” the contracting authority shall decide whether or not to initiate such activities to implement the recommendations.

3.1.9 Data and service quality monitoring

Requirements here after shall apply to components “service continuity”, “data production”, “re-processing” and “distribution”

The contractor shall be responsible for the definition and operation of a data and service quality monitoring.

The data quality monitoring function shall include at least the following properties:

- ✦ It shall be product specific (for each occurrence of each bio-geophysical parameter)
- ✦ The occurrence and timeliness of production shall be checked
- ✦ The output data quality shall be checked for l. a.
 - missing data (input and output),
 - data input and output out of expected range,
 - geometry anomalies
- ✦ generation of reports containing the above-mentioned elements

The service quality monitoring function shall include at least the following properties:

- ✦ Data distribution and availability shall be checked up to the end user where applicable
- ✦ Archive integrity / readability verification at regular intervals
- ✦ generation of reports containing the above-mentioned elements

The reports shall be available within 4 days after the 10-day period of raw data acquisition for service continuity and data production, and 1 day after production for re-processing.

The report shall be integrated in the “progress emails” and “interim reports” (see Technical Annex).

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The report shall be made available in the same time-frame on the web-site (see section 3.3.2.1).

3.2 Lot 1 - Component 1 “production”

This component includes three specific activity lines:

- ⤴ Service continuity,
- ⤴ Data production,
- ⤴ Archive re-processing

3.2.1 Activity line : Service continuity

3.2.1.1 Purpose

The purpose of this component of lot 1 is to ensure availability of a number of bio-geophysical parameters which have been produced on a pre-operational basis in the framework of other FP6 and FP7 projects, in particular VGT4Africa, DevCoCast and Geoland 2, and which have been used by user communities that have developed operational applications requiring continued access to such data. Specific reference is made here to the AMESD programme in Africa (implemented by the African Union Commission on behalf of the ACP secretariat and five Regional Economic Commissions (RECs) in Africa: ECOWAS, IGAD, CEMAC, IOC and SADC, and with the support from the European Development Fund.

It should be noted that this component is expected to be discontinued during project lifetime, data provision is expected to be replaced by data coming from component 2 when they become available and the user community is ready for their use.

3.2.1.2 Product definition

The biophysical parameters that shall be generated are the following:

1. NDVI
2. VPI
3. FCOVER
4. DMP
5. Water bodies

3.2.1.3 Geographic area

The geographic area to be covered is the “Africa window” defined in section 3.1.4.2 .

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3.2.1.4 Time constraints

The contractor shall produce and deliver the above-mentioned biophysical parameters as from first dekad of 2013. In case of delays in the start of activities the contractor shall ensure production and delivery of the output data as from this date within the shortest delays in parallel to the “timely” production.

The contractor shall produce and deliver timely the output data as defined in section 3.1.4.5

3.2.1.5 Product accuracy

Specific accuracy requirements are defined for this component. They complete the general requirements described in the section 3.1.4.6 : “accuracy requirements”

Where applicable the bio-geophysical parameters delivered as part of this component should meet the general target requirements laid down in GCOS 154.

The biophysical parameters delivered as part of this component shall be compatible with the data provided to the AMESD Programme as part of the pre-operational phase ensured by the VGT4Africa, DevCoCast and Geoland2 programmes. (The rationale for this is that the above-mentioned AMESD users exploit the parameters in temporal analyses through various methods based on data inter-comparisons).

To this end the contractor shall produce the required output data with a sufficient level of inter-operability with the previous output data. This sufficient inter-operability level is considered to be guaranteed if:

- ⤴ Either exactly the same algorithms and their ad hoc tuning used for the above-mentioned pre-operational phase to produce the data actually received by the users are used for this activity
- ⤴ Or the contractor is able to provide evidence (for each biogeophysical parameter and for each case: text, actual numerical values and graphs) that the output data are comparable to the ones delivered in the pre-operational phase for the following aspects: time consistency, spatial consistency and value range consistency. The three conditions to be met for a product to be declared inter-operable are as follows:
 - (1) for each bio-geophysical parameter the target overall score of similarity must be: “at least 95% of all pixels are within 5% of the corresponding pixel value in the reference data set”.
 - In addition bias specific to particular conditions should be avoided.
 - (2) geographical bias: for each bio-geophysical parameter the sampled pixels shall be distributed and analysed in equal quantities among the biomes (see section 3.1.4.7 for biome definition) to in the region of interest. For each biome at least 2/3 of all pixels must be within 5% value of the corresponding pixel value in reference dataset”
 - (3) value range bias: for each bio-geophysical parameter the sampled pixels shall be analysed separately for the following ranges of observed values in the reference data sets (assuming that observed min ref parameter is set to 0%) and max is set to

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100%): 0-10%, 10-35%, 35-65%, 65-90%, 90-100%. For each specific range of value at least 2/3 of pixels must be within 5% of the corresponding pixel value in the reference data set”

Note: Statistical representativeness: the analysis may be carried out on a statistically significant number of points of each image instead of the whole data set, provided that the spatial distribution of the sample is demonstrated to be consistent with the above-mentioned criteria and to ensure statistical significance of results.

3.2.1.6 *Input data*

Input data to be used shall be the data set DWH_MG3_CORE_04/05 (06/07) - Optical worldwide LR/MR of the EC – ESA data warehouse contract (see section 3.1.2.1 details).

3.2.1.7 *Output data properties*

Output data properties shall be compliant with the specifications laid down in section 3.1.4.3 and 3.1.4.4 of the general requirements specifically for this activity line.

File structure and file format must be identical to the data provided to the AMESD Programme as part of the pre-operational phase ensured by the VGT4Africa, DevCoCast and Geoland2 programmes

3.2.1.8 *Product delivery*

Data delivery for this component shall be ensured in the following way: geonetcast + ftp (see further details in sections 3.3.3.3 and 3.3.3.2)

3.2.1.9 *Audit and review*

The contractor shall prepare and make available in due time the documentation submitted to audit/review (see list of documents in section “general requirements”).

The contractor shall participate to collocation meetings, provide answers and clarification to the panel.

The contractor shall timely implement the audit and review panel recommendations requested by the Contracting Authority; and wich belong to corrective maintenance activities.

The contractor shall report to the contracting authority on all actions taken.

3.2.2 Activity line “Data production”

3.2.2.1 *Activities and expected results of the sub-component*

The activities to be carried out in this sub-component are related to the processing of low resolution satellite data initially from the data-warehouse contract (see section 3.1.2.1), and if needed from other data sources (see section 3.1.2.2), to generate bio-geophysical parameters (“output data”) according to requirements described here-after.

3.2.2.2 *Product definition*

See section 3.1.1

The contracting authority may require the production of only a part of the list of output data.

3.2.2.3 *Algorithms and processing chains*

See section 3.1.3

3.2.2.4 *Time constraints*

See section 3.1.4.5

The contractor shall start producing and delivering the above-mentioned biophysical parameters maximum 20 working days after signature of specific contracts.

3.2.2.5 *Input data*

See sections 3.1.2.1 and 3.1.2.2

Note: when the contracting authority will ask bio-geophysical parameters which already belong to the EUMETSAT CDOP list the processing may be restricted to their adaptation to specific user needs, such as time integration or re-mapping to specific geographic reference systems.

3.2.2.6 *Output data accuracy*

See sections 3.1.4.6 and 3.1.4.7

3.2.2.7 *Output data properties*

See section 3.1.4

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3.2.2.8 *Output data delivery*

See lot 1 component 2 “distribution” (section 3.3)

3.2.2.9 *Technical documentation*

See section 3.1.5

3.2.2.10 *Audit and review*

The auditing and reviewing mechanism to which contractor of lot 1 will participate is defined in sections 4.2.1 and 4.2.2

The contractor shall prepare and make available in due time the documentation submitted to audit/review (see list of documents in section 3.1.4).

The contractor shall participate to collocation meetings as defined in sections 4.2.1 and 4.2.2 , and provide answers and clarification to the panel.

The contractor shall timely implement the audit and review panel recommendations requested by the Contracting Authority; and wich belong to corrective maintenance activities.

The contractor shall report to the contracting authority on all actions taken.

3.2.3 Activity line “archive re-processing”

3.2.3.1 Purpose

The purpose of this component is to generate from archived data bio-geophysical parameters with exactly the same algorithms as the ones used in the other components in order to provide the user with times series that are sufficiently long so as to allow them comparison of current situation with historical events.

3.2.3.2 Product definition

See section 3.1.1

The contracting authority may require the production of only a part of the list of output data.

3.2.3.3 Algorithms and processing chains

See section 3.1.3

3.2.3.4 Time constraints

The contractor should start producing and delivering the above-mentioned biophysical parameters within maximum 20 working days after signature of a specific contract.

The contractor shall produce and deliver the output data over time steps defined in section 3.1.4.5

The contractor shall operate a production infrastructure table to generate at least one year of output (including several bio-geophysical parameters) in two weeks.

3.2.3.5 input data

See corresponding section under “general requirements”

3.2.3.6 Output product accuracy

See sections 3.1.4.6 and 3.1.4.7

3.2.3.7 Output data properties

See corresponding section under “general requirements”

3.2.3.8 Product delivery

See lot 1 component 2 “distribution” (section 3.3)

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Re-processed data may be asked to be delivered on hard disks

3.2.3.9 *Technical documentation*

See corresponding section 3.1.5

3.2.3.10 *Audit and review*

The auditing and reviewing mechanism to which the contractor of lot 1 will participate is defined in sections 4.2.1 and 4.2.2

The contractor shall prepare and make available in due time the documentation submitted to audit/review (see list of documents in section 3.1.4).

The contractor shall participate to collocation meetings as defined in sections 4.2.1 and 4.2.2 , and provide answers and clarification to the panel.

The contractor shall timely implement the audit and review panel recommendations requested by the Contracting Authority; and wich belong to corrective maintenance activities.

The contractor shall report to the contracting authority on all actions taken.

3.3 Lot 1 component 2: “Distribution”

3.3.1 Purpose

The purpose of this component is to distribute the biogeophysical parameters generated in the framework of the other components as well as related documentation and to provide the user interface.

This component includes the following specific activity lines:

- ✦ “user interface”,
- ✦ “data access”,
- ✦ “archive delivery”

Whenever applicable INSPIRE guidelines on data model, metadata and web services shall be followed (see INSPIRE web site at <http://inspire.jrc.ec.europa.eu>).

Whenever applicable (web site, documentation, etc.) the contractor shall ensure due visibility and make use of the European Commission graphic charter and disclaimer.

3.3.2 Activity line “user interface”

The user interface shall be composed of the following elements:

- ✦ A web site
- ✦ The user support

3.3.2.1 The web site

The web-site shall be the main entry point to access processed output data and related information by users.

The web-site operated by the contractor may be a pre-existing one.

The main functions that are expected from the web site are the following:

- ✦ access to the catalogue of processed data
 - anonymous
 - free-of-charge
 - access to meta-information (i. a. identification of the version of each critical software component used to generate output data)
 - access to quick-look (jpg, colour table, sub-sampled)
- ✦ access to the processed data (archive)
 - free-of-charge access (no invoicing system is required),

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- requires verified registration of the user, includes on-line acceptance of the terms and conditions of the GMES product license.
- after registration points to the download page
- define product
- define start and end of time series
- define of pre-identified windows or user-specific Region of Interest
- download of selected output data
- ▲ subscription to a “technical issue warning” mailing list
 - requires a specific registration of the user (should be proposed at the time of the registration of the user) ,
 - requires to set up a technical communication procedure, allowing to inform the users without any delay about the production incidents that could impact the proper use of the delivered product(s). This email should provide clear information about the nature and the possible impact (from a user point of view) of the problem, as well as how to overcome it.
 - Obviously, the information provided by email should be also available on the website and should be archived.
- ▲ subscription to new output data
 - free-of-charge (no invoicing system is required),
 - requires verified registration of the user,
 - requires alerting the user of new product availability (automatic email message),
 - requires access to user-specific protected ftp area
 - requires choice of tiles or of user-defined ROI
 - define product
 - define start and end of time series
- ▲ access to downloadable relevant information for each product, I. a.
 - product description
 - algorithm description
 - file format description
 - version identification and properties / evolution of software components consistent with meta-information as above-mentioned
 - results of validation and inter-comparison, actual scores vs. international standards.
 - known problems

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- bibliographic references (downloadable or with hyperlink)

In addition to the above described website, an asset would be the implementation of Web Services (WMS and WCS) according to the OGC specifications (see <http://www.opengeospatial.org/standards/wms> and <http://www.opengeospatial.org/standards/wcs>)

The web-based service shall be compliant with INSPIRE guidelines on metadata structure and web service.

3.3.2.2 *The user support*

The user support shall be provided through email and through telephone only during working hours, 5 days a week.

The user support shall be provided in English. The user support may be provided in other languages as well.

The support shall manage user requests so as to maximize satisfaction, also by re-directing requests to most appropriate staff inside the contractor's entities and to other institutions if appropriate.

The support shall maintain the web-based FAQ and feed it with requests from users and corresponding answers.

3.3.2.3 *Audit and review*

The auditing and reviewing mechanism to which contractor of lot 1 will participate is defined in sections 4.2.1 and 4.2.2

The contractor shall prepare and make available in due time the documentation submitted to audit/review (see list of documents in section 3.1.4).

The contractor shall participate to collocation meetings as defined in sections 4.2.1 and 4.2.2 , and provide answers and clarification to the panel.

Upon request of the contracting authority the contractor shall timely implement the audit and review panel recommendations requested by the Contracting Authority; and wich belong to corrective maintenance activities.

The contractor shall report to the contracting authority on all actions taken.

3.3.3 *Activity line “data access”*

This activity includes mainly the operation of a data storage capacity, the data distribution through ftp and through EUMETCast.

3.3.3.1 *Data storage capacity*

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The contractor is expected to keep all data throughout the lifetime of the project in an on-line data storage.

The data storage capacity shall include all raw data acquired for the completion of all production activities defined in the other components of lot 1

The data storage capacity shall include all processed data generated in the framework of production activities defined in the other components of lot 1.

The data storage capacity shall include all ancillary data required for the completion of production activities defined in the other components of lot 1.

The data storage capacity shall be interfaced to the web-based catalogue.

The data storage capacity shall be organized in such a way that access to any of its component can be granted according to the rules laid down by the GMES data policy to external users through the ftp protocol.

3.3.3.2 Data distribution through ftp

The ftp site shall ensure timely access to newly processed data (data available and downloaded by user less than 3 days after end of dekad

The ftp site shall ensure access to archived data. Archived data are understood here as any type of data that was processed before the most recent output data. They therefore may include (1) data retrieved from previous processing activities outside the framework of this contract, (2) data generated by the activities under the present contract.

The ftp site shall be accessible 365days/year, 7days/week, 24hours/day. The overall system shall be organized so as to able to recover full access to all data within max three days in case of failure such as disk crash or cyber attack.

The ftp site shall provide at least the following properties:

Access to the ftp site shall be granted only after due registration (see above under web-site).

Access priority shall be established to ensure fastest access to most recent output data

Provide batch download possibility (time series)

Provide the data according to the regions of interest (RoI: TBD)

3.3.3.3 GEONETCast

Definition

GEONETCast is a specific Task identified in the GEO Work Plan² and is led by EUMETSAT, the United States, China, and the World Meteorological Organization (WMO). GEONETCast is a near real time, global network

² GEO workplan 2012-2015 – revision 1, 11 Dec. 2011

link: http://www.earthobservations.org/documents/work%20plan/GEO%202012-2015%20Work%20Plan_Rev1.pdf

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of satellite-based data dissemination systems designed to distribute space-based, air-borne and in situ data, metadata and output data to diverse communities (GEO, 2006³). EUMETSAT operate GEONETCast over the following continents: Europe, Africa, Latin America.

A number of pre-identified users of the present service make already use of this service. This is the case in particular of the EDF-funded AMESD programme and of its successor, the MESA programme, which ensure continued data reception and processing infrastructure provision and maintenance in all south-Saharan countries of Africa.

Upon request from the contracting authority the contractor shall distribute output data through this system. Data distribution request issued by the contracting authority will include: the list of output data, the time period to be covered, the geographic continent to be covered.

The contractor shall be responsible for

- ✦ The payment of the data distribution fees to EUMETSAT (use of telecommunication bandwidth).
- ✦ The compression of data before distribution.
- ✦ The data push into the EUMETSAT data distribution system in a timeframe compatible with the day+3 timeliness requirement for data availability at user premises.

3.3.3.4 *Audit and review*

The auditing and reviewing mechanism to which contractor of lot 1 will participate is defined in sections 4.2.1 and 4.2.2

The contractor shall prepare and make available in due time the documentation submitted to audit/review (see list of documents in section 3.1.4).

The contractor shall participate to collocation meetings as defined in sections 4.2.1 and 4.2.2 , and provide answers and clarification to the panel.

Upon request of the contracting authority the contractor shall timely implement the audit and review panel recommendations requested by the Contracting Authority; and wich belong to corrective maintenance activities.

The contractor shall report to the contracting authority on all actions taken.

3.3.4 *Activity line “archive Delivery”*

At any time during the project, and upon request from the contracting authority the contractor shall deliver part of or the complete archive (including input and output data).

³ GEO 2006: GEONETCast initiative of GEO.

Links: http://www.earthobservations.org/documents/geonetcast/GEONETCast_workshop_20060503-final.ppt, <http://www.earthobservations.org/geonetcast.shtml>

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The archive shall be provided either through ftp or on hard disk (TBD).

The delivery address in Europe shall be defined in due time.

The requested archive may include:

- ⤴ All the processed output,
- ⤴ All the related documentation accessible from the web site
- ⤴ Database structure
- ⤴ All raw EO data
- ⤴ Ancillary data used for the production of the bio-geophysical parameters

3.4 Lot 1 Component 3: “algorithm maintenance and evolution”

3.4.1 Activities and expected results of the component

The activities to be carried out in this sub-component are related in particular to the adaptation of existing algorithms to new input datasets that will have to be used in view of the replacement of the initial dataset provided under the data-warehouse contract. A specific case in point to be considered here is the termination of a specific Earth Observation mission, or the failure of a key component onboard an Earth Observation satellite.

3.4.2 Input data

See section 3.1.2.2

3.4.3 Product definition

See list of biogeophysical parameters in the section 3.1.1

Output data may be (TBD in due time) the result of a processing applied to raw data or to existing biogeophysical parameters (e. g. EUMETSAT CDOP output data) with different time and spatial properties if their accuracy properties meet the specific requirements.

3.4.4 Output data accuracy

See corresponding section 3.1.4.6

3.4.5 Output data properties

See section 3.1.4

3.4.6 Baseline requirements

The contractor shall undertake the necessary preparatory activities such as analysis, test, calibration and inter-comparison needed to adapt their algorithms and processing chains to the new input data.

The results shall be submitted to independent review(s) organized as part of lot2 activities prior to operational exploitation.

The recommendations made by the review panel shall be implemented as part of the activities of the sub-contract.

3.4.7 Definition of deliverables

The deliverables may include, as appropriate:

- Relevant documents identified under the section “general requirements”
- all documents needed for the successful completion of reviews as identified in lot 2
- Report of actions taken following recommendations from review panel.
- Demonstration product dataset to show the functioning of the processing chain.

3.4.7.1 Audit and review

The auditing and reviewing mechanism to which contractor of lot 1 will participate is defined in sections 4.2.1 and 4.2.2

The contractor shall prepare and make available in due time the documentation submitted to audit/review (see list of documents in section 3.1.4).

The contractor shall participate to collocation meetings as defined in sections 4.2.1 and 4.2.2 , and provide answers and clarification to the panel.

Upon request of the contracting authority the contractor shall timely implement the audit and review panel recommendations requested by the Contracting Authority; and wich belong to corrective maintenance activities.

The contractor shall report to the contracting authority on all actions taken.

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4 Lot 2: “Product and Service independent evaluation”

4.1 Structure of lot 2

The lot 2 is structured in two components: (I) “management of audit and reviews”, and (ii) “management of the technical user group”

4.2 Lot 2 Component 1: “management of audit and reviews”

This component includes two activity lines: “audit” and “review”.

Project reviews considered here are reviews organized according to the general principles laid down in the document “space management - organization and conduct of review” (ECSS), but following a simplified process. This lot will cover only the “external reviews” i. e. reviews that will be held with external experts.

4.2.1 Activity line “audit”

4.2.1.1 Purpose

The “audit” is understood here as a “kick off” technical review. It will thus be a one-off operation that will equally cover scientific and engineering aspects of the service.

The purpose of the “*audit*” is to check that the various elements of components 1 and 2 of lot 1 the contractor of this lot intends to operate in the framework of GIO-GL were satisfactorily submitted to a series of internal and external reviews, up to and including the “operation readiness” review following ECSS standards and definitions, prior to the signature of the GIO-GL contract.

4.2.1.2 Organization

The audit process is expected to be a one-off operation. In agreement with the contractor of lot1 and the contracting authority it may be split in several sub-sessions for practical reasons (e. g. the contractor operates several production sites).

The typical key steps for the audit process⁴ should be the following:

⁴ Based on ECSS-M-ST-10-01C, 2008: Space management – organization and conduct of reviews. (available from <http://www.ecss.nl/>).

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✦ Audit preparation

- Deliver an “audit organization note”, including list of documents submitted to audit, collect feedback from lot1 contractor, get approval from contracting authority
- Set up the audit board, identify audit board chairperson, get approval from contracting authority
- Define date of audit meeting with lot 1 contractor and contracting authority
- Collect documents from lot 1 and distribute them to audit board (1 month before meeting)
- Co-ordinate with chairperson distribution of tasks in the audit board (1 month before meeting)
- The audit board analyses documentation and issues Review Item Discrepancy (RID) notes and forward to lot2 contractor (until one week before meeting)
- RIDs are submitted to lot 1 contractor for preparation of written comments before audit
- During this phase an “initial audit board” meeting will be organized

✦ Audit collocation meeting

- Lot 1 contractor presents a synthesis of their documents and focus on answers to RIDs
- With Lot 2 contractor secretarial support audit board examines answers to RIDs, addresses key issues identified, assesses severity of problems and identifies items needing action. Decides on acceptance, acceptance with reserves, or refusal. Establishes the audit report identifying recommended actions and corresponding responsible entities, with a specific view on (a) activities belonging to corrective maintenance, (b) activities belonging to evolution maintenance, (c) activities belonging to internal project review management

✦ Audit follow-up

- Lot 2 contractor distributes the report to Lot 1 contractor and the contracting authority
- Lot 1 contractor provides to audit board and contracting authority a note on actions taken regarding corrective maintenance and internal project review management.
- The contracting authority decides, if appropriate, on actions to be taken regarding evolution maintenance.
- During this phase an “audit close out” meeting will be organized with the audit board members two weeks after the collocation meeting..

A typical timing for the whole audit cycle could be about one month and a half.

Interaction between contractors of lot 1 and lot 2 during these activities does not involve any right of injunction or authority of one contractor on the other one. Such right of injunction or authority rests entirely in the contracting authority

Detailed auditing procedure, including the timing of operations will be agreed upon during the specific

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contract kick-off meeting between the contractor and the contracting authority.

The audit board shall be composed of typically five, and if needed by the complexity of the work up to 10 independent experts proposed by the contractor and the contracting authority. The final list shall be approved exclusively by the contracting authority.

The contracting authority is a de facto observing member of the panel.

The contracting authority may designate experts from its staff as audit board members.

The contracting authority may designate experts from independent institutions (e. g. ESA, EUMETSAT) for their specific technical competences or to ensure the consistency of the auditing process.

The meeting place may be the production premises of the lot 1 contractor.

The contractor of lot 1 shall participate to the audit meetings.

The contractor of lot 2 may propose reviewing experts from his/her own entity

The contractor of lot 2 shall be responsible of the organization of the meeting secretariat before during and after the meetings, including agenda drafting and preparation of minutes.

Documents prepared by the contractor of lot 2 shall be submitted to the approval of the contracting authority prior to distribution.

Meeting minutes shall be submitted to participants review and approval.

The contractor of lot 2 shall be responsible for all aspects of meeting logistics (l. a. meeting room setting and booking, provision of beamer, provision of soft and hard copies of documents to participants, hotel booking, local transport if needed).

The contractor shall cover participation costs (transport and daily allowance) of five experts per meeting. The tariffs to be used are the ones applicable to EC experts.

4.2.1.3 Deliverables

The contractor of lot 2 shall deliver the following documents:

- ▲ Audit organization note
- ▲ Audit report (including list of participants)

4.2.2 Activity line: Organization of review meetings

4.2.2.1 Purpose

The purpose of the reviews is to verify progress made towards readiness for operation of the processing chains operated by the contractor, in particular in the case of evolution of this processing infrastructure in the framework of lot 1 – component 3. They will cover the various aspects, including requirements, design, integration, system test and validation, up to the readiness for operation stage, but in a condensed way considering time constraints.

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This component covers only “external reviews”, i. e. reviews with external experts. The frequency of these review cycles should be typically twice a year.

4.2.2.2 Organization

The reviewing process shall be organized following the general principles laid down in the document “space management - organization and conduct of review” (ECSS).

The typical key steps for the review process are the following:

- ✦ Review preparation
 - Deliver a “review organization note”, including list of documents submitted to review, collect feedback from lot1 contractor, get approval from contracting authority
 - Set up the review board, identify review board chairperson, get approval from contracting authority
 - Define date of review meeting with lot 1 contractor and contracting authority
 - Collect documents from lot 1 and distribute them to review board (1 month before meeting)
 - Co-ordinate with chairperson distribution of tasks in the review board (1 month before meeting)
 - The review board analyses documentation and issues Review Item Discrepancy (RID) notes and forward to lot2 contractor (until one week before meeting)
 - RIDs are submitted to lot 1 contractor for preparation of written comments before review
 - During this phase an “initial review board” meeting will be organized
- ✦ Review collocation meeting
 - Lot 1 contractor presents a synthesis of their documents and focus on answers to RIDs
 - With Lot 2 contractor secretarial support review board examines answers to RIDs, addresses key issues identified, assesses severity of problems and identifies items needing action. Decides on acceptance, acceptance with reserves, or refusal. Establishes review report identifying recommended actions and corresponding responsible entities, with a specific view on (a) activities belonging to corrective maintenance, (b) activities belonging to evolution maintenance, (c) activities belonging to internal project review management
- ✦ Review follow-up
 - Lot 2 contractor distributes the report to Lot 1 contractor and the contracting authority
 - Lot 1 contractor provides to review board and contracting authority a note on actions taken regarding corrective maintenance and internal project review management.
 - The contracting authority decides, if appropriate, on actions to be taken regarding following steps regarding evolution maintenance activities.

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- During this phase a “review close out” meeting will be organized with the review board members two weeks after the collocation meeting..

A typical timing for the whole audit cycle could be about one month and a half.

Interaction between contractors of lot 1 and lot 2 during these activities does not involve any right of injunction or authority of one contractor on the other one. Such right of injunction or authority rests entirely in the contracting authority

Detailed procedure, including the timing of operations , will be agreed upon during the specific contract kick-off meeting between the contractor and the contracting authority.

The review board shall be composed of typically 5 independent experts proposed by the contractor and the contracting authority. The final list shall be approved exclusively by the contracting authority.

The contracting authority is a de facto observing member of the panel.

The contracting authority may designate experts from its staff as audit board members.

The contracting authority may designate experts from an independent institutions (e. g. ESA, EUMETSAT) for their specific technical competences or to ensure the consistency of the auditing process.

The meeting place may be the production premises of the lot 1 contractor.

The contractor of lot 1 shall participate to the audit meetings.

The contractor of lot 2 may propose reviewing experts from its own entity

The contractor of lot 2 shall be responsible of the organization of the meeting secretariat before during and after the meetings, including agenda drafting and preparation of minutes.

Documents prepared by the contractor of lot 2 shall be submitted to the approval of the contracting authority prior to distribution.

Meeting minutes shall be submitted to participants review and approval.

The contractor of lot 2 shall be responsible for all aspects of meeting logistics (l. a. meeting room setting and booking, provision of beamer, provision of soft and hard copies of documents to participants, hotel booking, local transport if needed).

The contractor shall cover participation costs (transport and daily allowance) of five experts per meeting. The tariffs to be used are the ones applicable to EC experts.

4.2.2.3 Deliverables

The contractor of lot 2 shall deliver the following documents for each review meeting:

- ✦ Review organization note
- ✦ Review report (including list of participants)

4.3 Component 2: “management of the technical user group”

A technical user group will be set up to provide feedback at technical level to the global land service mainly on two aspects: approval and evolution of output data and service specifications, as appropriate, and evaluation of service and product usefulness and adequacy. The user group will be mainly but not exclusively composed of technicians from main user programmes identified in the GMES/GIO work-programme⁵.

The contractor of lot 2 will ensure the implementation of this component through two types of activities: “GL user group meetings”, and “inter-operability analysis”.

4.3.1 Activity line “GL user group meetings”

The contractor shall be responsible for all aspects of meeting logistics (i. a. meeting room setting and booking, provision of beamer, provision of soft and hard copies of documents to participants, hotel booking, local transport if needed).

The contractor shall cover participation costs (transport and daily allowance) of up to five participants per meeting. These participants may come from overseas countries. The tariffs to be used are the ones applicable to EC experts (ref).

The contractor shall be responsible of the organization of the meeting secretariat before during and after the meetings, including agenda drafting and preparation of minutes.

The definition or final approval of the list of participants shall be ensured by the contracting authority.

The contracting authority is a de facto observing member of the user meetings.

The contracting authority shall designate staff members from internal user services to participate to user meetings.

The expected number of participants will be around 10 and not above 20.

The meeting frequency may be one to three per year.

The meeting place shall be in Europe

The meeting place may be the premises of the contracting authority or any other place approved by the contracting authority.

Documents prepared by the contractor shall be submitted to the approval of the contractor prior to distribution.

⁵ GIO Work Programme 2012 - European Earth monitoring programme (GMES) and its initial operations (2011 – 2013). European Commission C(2011)8027 of 11 November 2011 - link: http://ec.europa.eu/enterprise/policies/space/files/gmes/gio_wp2012_final_en.pdf

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Meeting minutes shall be submitted to participants for review and approval.

4.3.2 Activity line: inter-operability analysis

4.3.2.1 Scope

The activities to be carried out in this sub-component are related to the inter-comparison of datasets of biogeophysical parameters according to requirements described here-after. The expected results are a comprehensive description of similarities / discrepancies between these datasets so as to identify (i) ways to exploit them either together or as backup solutions (in case of failure of a system), and (ii) where possible simple conversion laws between data sets.

4.3.2.2 Input data

The analysis may be applied upon request from the contracting authority (based i. a. on recommendations from the user group) to one or several of the parameters described in section 3.1.1 and produced as part of component 1 of lot 1.

Additional data sets submitted to analysis may be acquired from other providers.

4.3.2.3 Product definition

The biophysical parameters to be analysed belong to the list referred to in section 3.1.1

4.3.2.4 Baseline analysis requirements

The analysis shall be carried out so as to be fully representative of all possible geographical and seasonal situations

The method for the spatial, temporal and data range distribution of samples defined for service continuity shall apply

The analysis shall provide in statistical terms (e. g. correlation law, correlation coefficient, differences between min, max, averages, amplitudes, etc.) a statement regarding overall similarity / discrepancy between datasets

The residuals of the correlation analysis shall be analysed in terms of their spatial, seasonal and value range distribution.

The analysis shall qualify overall similarities and discrepancies by biome.

Detailed analysis shall cover a number of reference sites (typically 100 x 100 km) for each biome. Their number and location shall be agreed upon by the contracting authority on behalf of the users.

The analysis shall provide one or several product transformation laws so as to ensure easy switch between datasets by end users.

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If several transformation laws are proposed their conditions of applications shall be described in the most appropriate way (e.g. conditional to value range, to biome, to spatial mask, to period of the year, etc.).

If simple transformation laws cannot be proposed the reasons for this impossibility should be clearly identified and recommendation should be made regarding alternative approach(es).

4.3.2.5 Definition of deliverables

The deliverable is a report that includes an executive summary of a few pages and all detailed results of the analyses.

5 Appendix 1: list of applicable documents

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CBD 1992: Convention on Bio-Diversity. Link: <http://www.cbd.int/doc/legal/cbd-en.pdf>

European Commission: REGULATION (EU) No 911/2010 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 September 2010 on the European Earth monitoring programme (GMES) and its initial operations (2011 to 2013). Official Journal of the European Union L 276/1 of 20.10.2010.

link: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32010R0911:EN:NOT>

ECSS: European Cooperation for Space Standardization

general link: <http://www.ecss.nl/>

ECSS-M-ST-10-01C, 2008: Space management – organization and conduct of reviews.

(available from <http://www.ecss.nl/>).

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CEOS EO handbook: <http://www.eohandbook.com/>

GCOS. 2006. "Systematic Observation Requirements for Satellite-Based Output data for Climate". Supplemental details to the satellite based component of the Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC. GCOS-107 (WMO/TD No. 1338)

link: <http://www.wmo.int/pages/prog/gcos/Publications/gcos-107.pdf>

Related link: <http://gosis.org/ios/MATRICES/ECV/ecv-matrix.htm>

GCOS 2011: SYSTEMATIC OBSERVATION REQUIREMENTS FOR SATELLITE-BASED DATA OUTPUT DATA FOR CLIMATE - 2011 Update. Supplemental details to the satellite-based component of the "Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC (2010 Update)". GCOS 154

<http://www.wmo.int/pages/prog/gcos/documents/SatelliteSupplement2011Update.pdf>

GEO 2006: GEONETCast initiative of GEO.

Links: http://www.earthobservations.org/documents/geonetcast/GEONETCast_workshop_20060503-final.ppt, <http://www.earthobservations.org/geonetcast.shtml>

GEO workplan 2012-2015 – revision 1, 11 Dec. 2011

link: http://www.earthobservations.org/documents/work%20plan/GEO%202012-2015%20Work%20Plan_Rev1.pdf

GIO Work Programme 2012 - European Earth monitoring programme (GMES) and its initial operations (2011 – 2013). European Commission C(2011)8027 of 11 November 2011

link: http://ec.europa.eu/enterprise/policies/space/files/gmes/gio_wp2012_final_en.pdf

GLC 2000 database

reference: E. BARTHOLOME and A. S. BELWARD, 2005: GLC2000: a new approach to global land cover mapping from Earth observation data. International Journal of Remote Sensing Vol. 26, No. 9, 10 May 2005, 1959–1977

Link to database: http://bioval.jrc.ec.europa.eu/output_data/glc2000/glc2000.php

Global Land Working Group 2010: "GLOB-Land Service", the Global component of the GMES Land Monitoring Core Service. working paper of the working group on the Global component of the GMES Land Monitoring Core Services. V 3.0. hyperlink:

http://www.acceptance.ec.europa.eu/enterprise/policies/space/files/gmes/services/global_land_service_e

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[n.pdf](#)

GMES Space Component Data Access Portfolio: Data Warehouse 2011-2014 (ESA – GMES-PMAN-EOPG-TN-11-0006)

link: see link on page http://gmesdata.esa.int/web/gsc/data_access

METOP (EUMETSAT)

link: <http://www.eumetsat.int/Home/Main/Satellites/Metop/index.htm>

Olson, D. M, E. Dinerstein, E.D. Wikramanayake, N.D. Burgess, G.V.N. Powell, E.C. Underwood, J.A. D'amico, I. Itoua, H.E. Strand, J.C. Morrison, C.J. Loucks, T.F. Allnutt, T.H. Ricketts, Y. Kura, J.F. Lamoreux, W.W. Wettenberg, P. Hedao, & K.R. Kassem. 2001. Terrestrial Ecoregions of the World: A New Map of Life on Earth. BioScience 51:933-938 <http://www.worldwildlife.org/science/ecoregions/WWFBinaryitem4809.pdf>

PROBA-V gap filler mission

link to ESA page: http://www.esa.int/esaMI/Proba/SEMD16ZVNUF_0.html

link to PROBA-V International User Committee web page: <http://probav-iuc.org/>

UNCCD 1992: Convention to Combat Desertification; link: <http://www.unccd.int/en/about-the-convention/Pages/Text-overview.aspx>

UNFCCC 1992: Framework Convention on Climate Change. Link: <http://unfccc.int/resource/docs/convkp/conveng.pdf>

“VGT4Africa user manual” (link: http://www.vgt4africa.org/PublicDocuments/VGT4AFRICA_user_manual.pdf)