European Environment Agency

Annex I

TENDER SPECIFICATIONS

GMES Fast Track Service Precursor on land monitoring

High resolution core land cover data for built-up areas, including degree of soil sealing, 2006

Data enhancement in support of Member States requirements

EEA/SES/09/003

1. Background

In 2007 the EEA procured, by open tender, services aiming at the creation of a "high a resolution dataset on core land cover data for built-up areas, including degree of soil sealing", also called imperviousness. The dataset is part of the "*GMES Fast Track Service Precursor on land monitoring*" and thus based on IMAGE2006 satellite data in national projection.

The above referred service consisted of two products: (1) an intermediate layer with the degree of imperviousness at 20m pixel resolution and (2) a quality assured and validated, 1 ha layer of built-up areas (cells with imperviousness ≥ 80%) with an overall accuracy > 85%.

Even though the quality assured 1 ha layer meets the requested service specifications, there is a need for specific enhancements of the intermediate layer with the degree of imperviousness at 20 m pixel resolution in order to increase the interest at member country level. EEA, member and collaborating countries, are especially interested in the pixel layer at full spatial resolution (20m) which could be used to better integrate national and European requirements.

EEA, member and collaborating, countries were asked to perform a qualitative assessment[1] and each provided a report containing the findings of the assessment. Some of the countries decided to perform a quantitative assessment[2] based on the recommendations prepared by ETC-LUSI. Both, the qualitative and quantitative assessment, were part of a verification procedure, embedded in a Quality Control process.

The objective of the verification procedure is the enhancement of the quality of the product and is, therefore, incorporated into the production process. After verification the production continues by using the findings of the verification.

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[1] EEA, 2008, Guidelines for verification of high resolution soil sealing layer - Qualitative assessment

[2] ETC-LUSI, 2008, Recommendations - Quantitative assessment high-resolution soil sealing layer

As a consequence, and following the comments of the Member States, there is a need for:

- Improvement of the definition of the product;
- Removal of all CLC class 1.3.x surfaces. Mine, dump and construction sites (CLC class 1.3.x) are not considered as impervious surfaces by most countries and should be removed;
- Removal of specific errors identified during the verification procedure (e.g. gaps, beaches, bare soil);

The original layers that will be subject to enhancements are:

- 38 (one per country[3]) raster layers (in national projection) containing the degree of imperviousness at pixel level (20m resolution) ranging from 0 to 100%, with the associated metadata;
- 1 seamless raster layer (in European projection) containing the degree of imperviousness at pixel level (20m resolution) ranging from 0 to 100%, with the associated metadata; this layer was derived from the previous ones;
- 1 seamless raster layer (in European projection) containing the degree of imperviousness aggregated to 100m cells (aggregation of 25 cells at pixel level) ranging from 0 to 100%, with the associated metadata; this layer is used to derive the built-up layer composed by the cells ≥ 80% imperviousness, (this threshold may change, according to specific needs); this layer was derived from the previous;
- 1 raster layer (in European projection) of 100 x 100m cells; cell values represent the number of "valid" 20 x 20m cells (i.e. containing a value between 0 and 100%) within one 100 x 100m cell, used for the calculation of the imperviousness level of the 100m cell, with the associated metadata.

The definitions applied are:

- Built-up area is defined by the substitution of the original (semi) natural cover or water surface with an artificial, often impervious cover. This artificialisation is usually characterised by a long duration (FAO Land Cover Classification System, 2005);
- Imperviousness (or degree of soil sealing) is estimated in relation to the pixel area;
- Built-up areas at 1 ha level are defined by an average sealing degree per 1 ha unit above 80%;
- Classification accuracy per hectare (100 x 100m) of the built-up and non built-up areas should be above 85%;

[3] See 3.3 for identification of the countries involved

The products are based on multi-temporal SPOT 4/5 and IRS-P6 images for two dates in a time window of 2006 +/- 1 year, covering approximately 5.8 Mio km².

All impervious surfaces, independent of a minimum mapping unit, were to be mapped. Translated into thematic objects, the following land cover classes were concerned:

- Urban fabric (residential areas and isolated buildings);
- Industrial, commercial and transport units;
- Mine, dump and construction sites;
- Greenhouses;

For these areas, the actually impervious area is mapped, not the functional limitations, i.e., the runway of an airport is mapped but not the grass around it.

The thematic pixel values are:

0 – Non-built up areas, water bodies inland;

1-100 - sealing values in percentage of the area;

254 – Unclassifiable areas (clouds, shadows, etc.);

255 – No Data (no thematic information)

The aggregation of the pixel (20 m) data to the 1 ha unit followed an averaging method in the sequence described below:

- Projection of the national layers to the European coordinate reference system (CRS) for the purposes of producing a seamless European layer;
- Aggregation of pixels (5x5) to 1 ha units along the following decision tree:
  - 13 or more pixels with a valid degree of imperviousness?
    - If yes, calculate average degree of imperviousness (taking into account cells with a valid degree of imperviousness only)
    - If no, assign NODATA or UNCLASSIFIABLE to the 1 ha unit.

      NODATA is used for non-artificial areas;

      UNCLASSIFIABLE is used for areas without valid input data, e.g. areas under clouds.

2. Subject of the contract

The overall objective is the enhancement of the seamless European high resolution core land cover dataset of built-up areas, including degree of soil sealing, for the reference year 2006, based on the refinement of the original specifications that clearly emerged from the verification procedure, which is part of a Quality Control process.

3. Description

3.1 Description of the service

The existing 38 raster layers (in national projection) containing the degree of imperviousness at pixel level (20m resolution) ranging from 0 to 100% were extracted from multispectral SPOT/IRS satellite data (IMAGE2006) resampled to 20 m ground resolution using semi-automatic image classification. The data was produced in full spatial resolution, i.e. 20 m by 20 m, which provides the best possible core data for any further analysis.

These individual raster layers will be enhanced on the basis of the criteria described below, identified as the most relevant during the verification process done by the countries.

The data content will need to be enhanced by going back into the original GIS data. Ideally it would require the review of the complete territory (approx. 5.8 Mio km²) in order to address the requested enhancements. All 38 countries will have to be checked. However, methods for targeting the potential update areas might be applied in an attempt to optimise effort and time.

For targeting those areas the following ancillary data will be made available to the successful tenderer:

- CLC2000 and CLC2006 [4] and change datasets between 2000 and 2006;
- Member countries verification reports, which contain information about problem areas;
- Outline of Urban Atlas[5] cities.

The original overall accuracy value of > 85% for the European 1 ha layer will remain unchanged.

An external, independent, statistical validation of the enhanced dataset is expected to take place in 2010.

Tenderers shall propose a methodology to enhance the data content. All enhancements must be done to the individual country datasets (20m) in national projection. The 1 ha layer must be reconstituted after conclusion of the enhancements.

The improvements will focus on:

(a) Removal of CLC class 1.3.x objects

Objects corresponding to CLC class 1.3.x (mines, quarries, dump and construction sites) must be removed from the 20m pixel layer. The functional outline of these objects should be

[4] At the date of publication of the current call for tender, 20 countries had finished CLC2006

[5] DG ENTR project for the delivery of land use/cover maps of major European urban agglomerations

removed while buildings belonging to these units must be maintained and their degree of imperviousness must be assessed.

The removed objects should be stored in an independent layer and provided.

It is expected that the update will still leave an unknown number of gravel pits and quarries in the database (mainly those with very small areas).

(b) Closing of gaps in settlements

Gaps in settlements (errors of omission) must be corrected. Member States reported that special roof types were often not mapped as impervious areas. Furthermore, parts of discontinuous urban fabric were not mapped. These areas should be included in the new dataset.

In order to reduce the review area, the update should be done only for those cities included in the Urban Atlas project from DG REGIO/ENTR (320 cities). The area should include the complete Larger Urban Zone (LUZ) and the Urban Audit delineation.

(c) Correction of airports and harbours

Misclassification (errors of omission and errors of commission) of airports and harbour areas should be corrected.

(d) Misclassifications

Errors of commission related to beaches, sand and dunes (3.3.1), bare rock (3.3.2) and sparsely vegetated areas (3.3.3) should be corrected.

Ocean beaches should be reviewed for the entire length of the European coast, with special focus on Bulgaria, Ireland and Italy.

Post-processing:

After the update of the 20m pixel country datasets, those must be mosaicked for the production of the European dataset (European projection) and aggregated from pixel level to 1 ha units.

During the recalculation of the degree of imperviousness for the updated areas it must be ensured that the degree of imperviousness for the uncorrected areas is not changed.

Metadata:

For the metadata accompanying the data, it is suggested to include the new definition (the layers in reference should be referred to as “degree of imperviousness”) and to describe special cases (like the exclusion of mines and quarries and the inclusion of greenhouses as part of the impervious area).

3.2 Input data

The work shall be produced on the basis of the following satellite data, acquired primarily in the reference year 2006 (+/- 1 year), with 4 spectral bands, re-sampled to 20 m ground resolution using cubic convolution interpolation and covering 2 dates:

SPOT (-4/-5) HRVIR, 20m;

IRS-P6/LISS-III, 20m.

Each coverage was achieved with a mixture of both above types of data.

Coverage 1: composed of 2076 scenes

cloud-free/gap-free for 38 countries (gap over Azores);

Coverage 2: composed of 1598 scenes

cloud-free/gap-free for 34 countries (gaps over Azores)

Iceland no 2nd coverage;

Larger gaps in SE, FI and NO

The images are geometrically corrected towards national projection systems.

3.3 Geographic coverage

The product to be delivered shall cover the **EU27 and neighbouring countries,** meaning, all 32 EEA member countries (namely: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France[6], Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, the Netherlands, Norway[7], Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom) as well as the 6 western Balkan countries (namely Albania, Bosnia-Herzegovina, Croatia, Former Yugoslavian Republic of Macedonia, Montenegro and Serbia). The number of countries involved is 38. The area covered is, approximately, 5.8 Mkm^2.

3.4 Structure of the technical offer

The tenderer is expected to propose:

- An assessment of the user requirements;

[6] The French Overseas Departments and Territories are not included.

[7] The Svalbard archipelago is not included.

- A detailed description of the methodological approach, particularly, on the image processing methods, production flow, QA/QC, data management and the ancillary data that will be used;
- A detailed time planning of the production process;
- Description of team composition, key personnel including CVs;
- Description of similar services carried out during the past five years.

3.5 Deliverables

The deliverables to be produced are:

1. Project management plan, for the kick-off meeting;
2. 38 (one per country) updated raster layers (in national projection) containing the degree of imperviousness at pixel level (20m resolution), ranging from 0 to 100%, with the associated metadata;
3. 38 updated country delivery reports;
4. 1 updated raster layer (in European projection) containing the degree of imperviousness at pixel level (20m resolution), ranging from 0 to 100%, with the associated metadata;
5. 1 updated raster layer (in European projection) containing the degree of imperviousness aggregated to 100m cells (aggregation of 25 cells at pixel level), ranging from 0 to 100%, with the associated metadata;
6. 1 updated raster layer (in European projection) of 100 x 100m cells; cell values represent the number of valid 20 x 20 m cells (i.e. containing a value between 0 and 1005) within one 100 x 100m cell used for the calculation of the imperviousness level of the 100m cell, with the associated metadata.
7. A layer with the identification of updated areas (20m, European projection);
8. A layer with the removed objects belonging to class 1.3.x;
9. Final report.

The individual country datasets of the 20m layer shall be prepared in national projection.

The integrated European raster layers (20 and 100m) shall be prepared in the same European CRS.

The European raster layers shall be delivered as follows:

- In tiles, applying the same tiling as the current datasets; and
- In one seamless file.

The service provider shall update the existing country delivery reports. The country delivery reports summarise all the information related to the technical specifications of the data, format description, metadata and estimated accuracy (as a result of internal QA/QC). The service provider shall give an indication of the expected improvements of the overall accuracy.

Delivery format:

The delivery format is ERDAS IMAGINE image (IMG), as the original datasets, or GeoTiff.

In general, the same specifications as for the original dataset must be maintained (aggregation algorithm, projection parameters, tiling, resampling). Details are available in the EEA-FTSP-Sealing_DeliveryReport-EuropeanMosaic Issue 1.0 (31.10.2008), section 4 (documentation for tenderers).

The project management plan (deliverable 1) shall be generated by the service provider for the kick-off meeting which will take place around 2 weeks after contract signature. The project management plan shall be the controlling document for the project, permitting to define, organize and monitor all the activities.

The project management plan shall provide a feasible and effective breakdown of the activities and shall include the following items:

- Description of methodology;
- Staffing Plan and Key Personnel;
- Tasks breakdown and content with deliverables and delivery milestones;
- Facilities and Resources;
- Project schedule and reporting;
- Internal QA/QC procedures

3.6 Meetings

- Kick-off meeting to take place by video or teleconference, around 2 weeks after signature of the contract.

In this meeting the service provider shall present the project management plan including description of the methodology and proposed schedule for the completion of work.

- Intermediate progress meetings (by video or teleconference), if needed.

These meetings will be requested by the EEA and are dedicated to evaluate project progress, risk analysis and problem solving. In case some major adjustments need to be done, the project management plan shall be updated and submitted for EEA's approval.

- Final meeting to take place by video or teleconference.

At the final meeting the service provider is requested to present an overview of the performed activities, achievements, lessons learnt and provision of deliverables (not later than 5 months after contract signature).

3.7 Reporting

- The service provider is expected to provide one updated report per country, amounting to 38, that go together with the country datasets and one updated report per European dataset produced. The original reports will provided.

- The service provider is expected to provide a final report to be presented at the final meeting. The final report shall include all information on applied methodology, performed activities and lessons learnt.

3.8 Place of work

The work is to be carried out at the service provider's premises.

3.9 Duration of contract, volume and contractual conditions

The duration of the contract will be 5 months from its entry into force (signature by the last contracting party).

Estimated value of the contract: max. €250.000. **Offers exceeding this value will be discarded**.

The contractual conditions are as stated in the draft service contract included in the tender documentation.

4. Documentation for tenderers

The following documentation is available:

1. 38 country delivery reports, containing the technical specifications and a description of the national data being delivered; a summary of the production process; format description; metadata; and the estimated accuracy of the data.

2. The European mosaic delivery report (EEA-FTSP-Sealing_DeliveryReport-EuropeanMosaic Issue 1.0 – issued on 31.10.2008);

3. 31 reports - qualitative assessment (following EEA, 2008, Guidelines for verification of high resolution soil sealing layer - Qualitative assessment) performed by the countries;

4. 6 reports - quantitative assessment (following ETC-LUSI, 2008, Recommendations - Quantitative assessment high-resolution soil sealing layer) performed by the countries;

5. http://www.eionet.europa.eu/gis/geographicinformationstandards.html (for finding information on EEA metadata standards);

6. http://www.eionet.europa.eu/gis/docs/EEA_GISguide_v2.doc (for finding information on EEA recommendations for projections and preferred data formats).

7. http://www.eea.europa.eu/documents/emas (Environmental management at the EEA)

8. LUZ shapefile

9. Urban Audit shapefile

5. Financial offer

Tenderers shall quote the total price for the service specified in this document, including a breakdown of all costs (staff and non-staff).

Prices shall be fixed and not subject to any revision.

Under Articles 3 and 4 of the Protocol on the Privileges and Immunities of the European Communities and Headquarters Agreement between the Agency and the Government of Denmark of 17 August 1995, the Agency is exempt from all charges, taxes and dues, including value added tax; such charges may not therefore be included in the calculation of the price quoted; the VAT amount must be indicated separately.

The price tendered must be all-inclusive and expressed in euro, including for countries that are not part of the euro zone (any exchange risks are the contractor's).

The costs incurred in preparing and submitting tenders to be borne by the tenderers and cannot be reimbursed.

6. Criteria

6.1 Exclusion criteria

Candidates or tenderers shall be excluded from participation in a procurement procedure if:

(a) they are bankrupt or being wound up, are having their affairs administered by the courts, have entered into an arrangement with creditors, have suspended business activities, are the subject of proceedings concerning those matters, or are in any analogous situation arising from a similar procedure provided for in national legislation or regulations;

(b) they have been convicted of an offence concerning their professional conduct by a judgment which has the force of res judicata;

(c) they have been guilty of grave professional misconduct proven by any means which the contracting authority can justify;

(d) they have not fulfilled obligations relating to the payment of social security contributions or the payment of taxes in accordance with the legal provisions of the country in which they are established or with those of the country of the contracting authority or those of the country where the contract is to be performed;

(e) they have been the subject of a judgment which has the force of res judicata for fraud, corruption, involvement in a criminal organisation or any other illegal activity detrimental to the Communities' financial interests;

(f) following another procurement procedure or grant award procedure financed by the Community budget, they have been declared to be in serious breach of contract for failure to comply with their contractual obligations.

Tenderers must provide a declaration on their honour, duly signed and dated, stating that they are not in any of the situation listed above (see Annex 1).

The tenderer to whom the contract will be awarded must provide the evidence confirming the declaration referred to in the previous point unless this obligation is waived by the contracting authority.

The contracting authority shall accept as satisfactory the following evidence:

i) For points (a), (b) and (e) a recent extract from the judicial record, or failing that, a recent equivalent document issued by a judicial or administrative authority in the country of origin or provenance showing that those requirements are satisfied. Where the tenderer is a legal person and the national legislation of the country in which the tenderer is established does not allow the provision of such documents for legal persons, the documents should be provided for natural persons, such as the company directors or any person with powers of representation, decision making or control in relation to the tenderer.

ii) For point (d) recent certificates or letters issued by the competent authority of the State concerned. These documents must provide evidence covering all taxes and social security contributions for which the tenderer is liable, including for example, VAT, income tax (natural persons only), company tax (legal persons only) and social security contributions.

Where any document referred to above is not issued in the country concerned and for other cases of exclusion, it may be replaced by a sworn or, failing that, a solemn statement made by the interested party before a judicial or administrative authority, a notary or a qualified professional body in his country of origin or provenance.

Contracts may not be awarded to candidates or tenderers who, during the procurement procedure:

(a) are subject to a conflict of interest;

(b) are guilty of misrepresentation in supplying the information required by the contracting authority as a condition of participation in the contract procedure or fail to supply this information.

6.2 Selection criteria (as indicated in Section III.2. (Conditions for participation) of the Contract notice)

6.3 Award criteria

The contract will be awarded to the tenderer whose tender offers best value for money in terms of the following criteria.

Tenders will be ranked in accordance with the following formula:

$$X = TM_{a\text{-}c} / P \text{ of which}$$

TM = Technical merit for a, b and c (maximum 100 p.); and

P = Price (in EUR).

Technical merit:

Tenders will be awarded merit points in function of the following criteria:

a. Understanding of the objectives of the contract and the work to be carried out, as documented by means of:

- Assessment of EEA's requirements as specified in section 3 (max 30 p. / min. 15 p.);

b. Robustness of methodological approach (max 40 p. / min. 20 p.), as documented by means of:

   - Image processing methods to accomplish the work (max. 20 p.);

   - Proposed production flow, QA/QC, data management and ancillary data that will be used (max 20 p.);

c. Production and time plan according to which all countries can efficiently be covered within the timeframe of the contract (max. 30 p. / min. 15 p.);

Tenders scoring less than 50% of the maximum score of each criterion (a – c) or less than 65 points in total will not be considered for the award of the contract.

The tenderer whose tender scores the highest value in terms of technical merit against price will be awarded the contract.

7. Further information

Submitting an offer implies acceptance by the tenderer of all terms and conditions of the draft contract and its annexes.

8. Environmental considerations

The EEA runs a certified environmental management system (EMAS) and aims to minimise the environmental impact of all its activities, including those carried out under contract. The future contractor will, therefore, be requested to consider the EEA environmental management

guidelines in the implementation of the contract, in particular, those relating to business travel/electronic means of communication, paper and energy consumption. Further information
on the EMAS system can be found on the EEA homepage:
http://www.eea.europa.eu/documents/emas.

Moreover, it is strongly recommended that tenders are submitted in an environmentally friendly way, e.g., by choosing a simple and clear structure (list of contents and consecutive page numbering), double-sided printing, limiting attachments to what is required in the technical specifications (no additional material) and avoiding plastic folders or binders.

Annexes:

1. Declaration on exclusion criteria
2. Identification sheet