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IMPLEMENTATION OF ELECTRONIC TERRAIN AND OBSTACLE DATA (eTOD) TECHNICAL SPECIFICATION

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1. INTRODUCTION

1.1 Project scope and purpose

Electronic Terrain and Obstacle Data (eTOD), in the context of Annex 15 to the Chicago Convention, are specific sets of terrain and obstacle data in certain areas of the country's territory and around airports.

Terrain datasets represent a uniformly spaced grid of points, each at a given elevation. Depending on the elevation capture method, the final set may include vegetation and/or man-made structures. Annex 15 prescriptions stipulate that terrain data sets should include only terrain data, without other objects.

Obstacle datasets are 3D models (points, lines, polygons) of objects that meet certain criteria set out in Annex 15 or are assessed to pose a risk to aviation according to other applicable norms.

The provisions of Annex 15 are reflected in Implementing Regulation (EU) 2017/373. Additional guidance and recommendations are given in documents developed by EUROCONTROL and EUROCAE.

The main purpose of the project is to build an eTOD database with parameters and quality corresponding to the requirements of the regulating documents, compatible with the existing systems in BULATSA, to be used centrally by all interested departments in BULATSA as well as by third parties.

1.2 Expected results and benefits

Within the project implementation, the following results are expected to be achieved:

- Creation of a single centralised source (database) of terrain and obstacles data compliant to the applicable regulating documents and compatible with the systems in BULATSA – existing by the deadline for implementation of the project ;
- Minimising the risk of using incorrect or incomplete data, and thus ensuring safety in the provision of air navigation services (ANS);
- Allowing the provision of the data to interested parties outside BULATSA.

1.3 Abbreviations

| Abbreviation | Meaning |
|--------------|---|
| eTOD | Electronic Terrain and Obstacle Data |
| BULATSA | Bulgarian Air Traffic Services Authority |
| ANS | Air navigation services |
| TBD | To be defined |
| SLA | Service Level Agreement |
| KoM | Kick-Off Meeting |
| ICAO | International Civil Aviation Organization |
| AIM | Aeronautical Information Management |
| DPS | Data Product Specification |
| ARP | Airport |
| TMA | Terminal Manoeuvring Area |
| RWY | Runway |
| OLS | Obstacle limitation surfaces |
| PrMS | Project Master Schedule |
| PMP | Project management plan |
| QMS | Quality Management System |
| QMP | Quality management plan |
| RMS | Risk Management System |

1.4 NOMENCLATURE

Shall – Tenderer **shall** be compliant with the requirement;

Should – Tenderer **shall** be compliant with the requirement but may propose alternative suggestion/s and/or solution/s to cover it.

2. GENERAL PROJECT PLANNING AND LIFECYCLE

2.1 Project planning

eTOD-TS-REQ-1 To participate in the Tender, each Tenderer **shall** carry out preliminary planning of the project execution.

eTOD-TS-REQ-2 In its Tender, the Tenderer **shall** specify the stages of the project implementation.

ADDITIONAL INFORMATION: The Contracting Authority has defined the following stages, that may be subject to change depending on the project implementation strategy of the Tenderers:

- Business analysis;
- Project concept;
- Data collection;
- Data processing;
- Verification and validation;
- Creation of datasets;
- Provision of datasets;
- Monitoring.

eTOD-TS-REQ-3 In its Tender, the Tenderer **shall** provide the following information for each stage:

| Stage | Deadline | Deliverables |
|-------------------------------|--------------------------|-----------------|
| Business analysis | T ⁰ + 2 month | Report |
| Project concept | T ⁰ + 3 month | Concept |
| Data collection | TBD by Tenderer | TBD by Tenderer |
| Data processing | TBD by Tenderer | TBD by Tenderer |
| Verification and validation | TBD by Tenderer | Report |
| Creation of datasets | TBD by Tenderer | Report |
| Provision of datasets | TBD by Tenderer | Datasets |
| WARRANTY AND SLA PHASE | | |
| Monitoring | TBD by Tenderer | Datasets |

ADDITIONAL INFORMATION: T⁰ is the date of entering into force of the Contract.

eTOD-TS-REQ-4 Overall project duration **shall not** exceed **16 (sixteen) months** from T⁰ (excluding Warranty and SLA phase).

eTOD-TS-REQ-5 In its Tender, the Tenderer **shall** detail all activities proposed for execution in each stage.

eTOD-TS-REQ-6 The milestones, deadlines and deliverables **shall** be agreed upon at the Kick-Off Meeting (KOM).

eTOD-TS-REQ-7 Next stage **shall** be started upon the approval by the Contracting Authority of the deliverables required within the current stage.

eTOD-TS-REQ-8 All inputs for reviews of completed project stages and deliverables acceptance meetings **shall** be compliant with the Technical specification and submitted for approval to the Contracting Authority within 5 (five) working days prior to the respective review/meeting.

ADDITIONAL INFORMATION: The Contracting Authority's conclusions regarding the outcome of a stage review will be documented in a bilateral review protocol which will be provided to the Contractor following the respective deliverable.

eTOD-TS-REQ-9 The Contractor **shall** consider the following documents applicable to the Project:

- ICAO Annex 15 – Aeronautical Information Services, 16th Edition, Amendment 40;
- Commission implementing regulation (EU) 2017/373;
- Certification Specifications and Guidance Material for Aerodrome Design (CS ADR-DSN) Issue 6, Annex to ED Decision 2022/006/R;
- EUROCONTROL Terrain and Obstacle Data Manual, 3rd Edition;
- EUROCAE ED-98C – User requirements for terrain and obstacle data;
- EUROCAE ED-99D – User requirement for aerodrome mapping information.

ADDITIONAL INFORMATION: If a dispute arises between the Contractor and the Contracting Authority, the documents listed above will be used as a reference.

2.2 Lifecycle

2.2.1 Business analysis

eTOD-TS-REQ-10 The Contractor **shall** perform a Business analysis aimed at investigating as a minimum the following:

- The existing tools used in BULATSA;
- The data formats the tools are working with;
- The existing data in BULATSA;
- BULATSA's AIM platform and specify the AIXM schema to be used for the deliverable;
- BULATSA BAID procedure design system;
- Any other information relevant to the project implementation.

ADDITIONAL INFORMATION: The scope of the Business analysis may be extended over the items listed above.

eTOD-TS-REQ-11 The Contractor **shall** provide to the Contracting Authority a report containing the outcome of the Business analysis.

2.2.2 Project concept

eTOD-TS-REQ-12 The Contractor **shall** develop a comprehensive Project concept.

eTOD-TS-REQ-13 The Project concept **shall** contain all relevant activities, tasks, etc., to reach the required goal of the project addressing either operational or technical matters.

eTOD-TS-REQ-14 The Project concept **shall** be approved by the Contracting Authority.

2.2.3 Data collection

eTOD-TS-REQ-15 The Tenderer **shall** describe in its Tender the methods and technics to be used for the collection of the terrain and obstacle data in different areas specified in Section 7.

eTOD-TS-REQ-16 The Tenderer **shall** describe the expected data quality and other parameters of each method to support its suitability.

eTOD-TS-REQ-17 The Tenderer **shall** describe its approach to coordinate reference systems and presumed methods for transformation between different reference systems/ frames.

eTOD-TS-REQ-18 The Tenderer **shall** describe its approach for collecting and delivering aerodrome mapping data.

2.2.4 Data processing

eTOD-TS-REQ-19 The Tenderer **shall** describe in its Tender the methods and technics to be used for data processing.

ADDITIONAL INFORMATION: For more information, see Section 3.1.6.

2.2.5 Verification and validation

eTOD-TS-REQ-20 The Contractor **shall** define and agree with the Contracting Authority a methodology for verification and validation.

eTOD-TS-REQ-21 The methodology **shall** address all verification and validation procedures and activities.

eTOD-TS-REQ-22 The Contractor **shall** develop all verification and validation plans, procedures and other relevant activities.

eTOD-TS-REQ-23 The Contractor **shall** apply the verification and validation procedures which ensure that corruption is avoided throughout the processing of the routine data.

eTOD-TS-REQ-24 The Contractor **shall** apply verification and validation procedures aimed at avoiding corruption at any stage of the entire process and **shall** include additional processes as needed to address potential risks.

eTOD-TS-REQ-25 The Contractor **shall** provide to the Contracting Authority a report documenting the outcome of the verification and validation activities.

2.2.6 Creation of datasets

eTOD-TS-REQ-26 The Tenderer **shall** describe in its Tender the methods and technics to be used for the creation of datasets.

2.2.7 Provision of datasets

eTOD-TS-REQ-27 The Tenderer **shall** propose in its Tender the means to deliver terrain and obstacle datasets.

eTOD-TS-REQ-28 The means to deliver terrain and obstacle datasets **shall** be approved by the Contracting Authority.

eTOD-TS-REQ-29 The Contractor **shall** deliver data by means which are agreed by the Contracting Authority.

eTOD-TS-REQ-30 The Contractor **shall** deliver all relevant supporting documentation together with the data.

eTOD-TS-REQ-31 The Contractor **shall** deliver the eTOD data at BULATSA head office at the address: 1, Brussels Blvd, 1540 Sofia, Bulgaria.

2.2.8 Monitoring

eTOD-TS-REQ-32 The Tenderer **shall** propose in its Tender a monitoring program for the delivered updated terrain and obstacle data.

eTOD-TS-REQ-33 The monitoring program **shall** cover error tracking and removal, data monitoring and update, changes in coverage and other relevant maintenance procedures.

eTOD-TS-REQ-34 The monitoring program **shall** cover 2 (two) years after the completion of the current project.

eTOD-TS-REQ-35 The Contractor **shall** provide annual monitoring at least for Area 2a, 2b, 2c for a period of 2 years.

eTOD-TS-REQ-36 Following each monitoring cycle, the Contractor **shall** prepare a change map and monitoring report describing the significant changes - new, changed or removed objects and terrain details, including but not limited to:

- Construction (new, changed or destroyed);
- Roads (new, changed or destroyed);
- Earthworks.

eTOD-TS-REQ-37 Following each monitoring cycle, the Contractor **shall** deliver the updated data in compliance with the requirements stated in the present Technical specification.

3. GENERAL TECHNICAL REQUIREMENTS

3.1 Data Quality Requirements

3.1.1 Reference Systems

eTOD-TS-REQ-38 The horizontal reference system **shall** be BGS 2005.

eTOD-TS-REQ-39 If a different horizontal reference system is used this **shall** be documented together with the transformation parameters to BGS 2005 or WGS-84.

eTOD-TS-REQ-40 The vertical reference system **shall** be EVRS 2007.

eTOD-TS-REQ-41 If a different vertical reference system is used this **shall** be documented together with the transformation parameters to EVRS 2007 or EGM96.

3.1.2 Accuracy

eTOD-TS-REQ-42 The Contractor **shall** deliver data with horizontal and vertical accuracy, which is equal to or better than the specifications in the numerical requirements (See Section 3.1.7) for the relevant zones.

3.1.3 Resolution

eTOD-TS-REQ-43 The Contractor **shall** deliver data with horizontal and vertical resolution, which is commensurate with the actual data accuracy.

eTOD-TS-REQ-44 The Contractor **shall** deliver data with horizontal and vertical resolution which is equal to or better than the specifications in the numerical requirements (see Section 3.1.7) for the relevant zones.

3.1.4 Post spacing

eTOD-TS-REQ-45 The Contractor **shall** deliver terrain data with post spacing which is equal to or smaller than the specifications in the numerical requirements (See Section 3.1.7) for the relevant zones.

3.1.5 Confidence level

eTOD-TS-REQ-46 The Contractor **shall** determine the accuracy of obstacle and terrain data upon on 90 per cent confidence level.

3.1.6 Integrity

eTOD-TS-REQ-47 The Contractor **shall** apply suitable data management procedures to maintain the integrity of the data according to the integrity classification specified in the numerical requirements (See Section 3.1.7) for the relevant zones.

eTOD-TS-REQ-48 The Contractor **shall** apply data management procedures which ensure that corruption is avoided throughout the processing of the routine data (for Area 1).

eTOD-TS-REQ-49 The Contractor **shall** apply data management procedures which ensure that corruption does not occur at any stage of the entire process and include additional processes as needed to address potential risks in the overall system architecture to further ensure the essential data (for Area

2).

eTOD-TS-REQ-50 The Tenderer **shall** describe the data management procedures which will be used.

3.1.7 Numerical requirements

eTOD-TS-REQ-51 The minimum numerical requirements for terrain data **shall** be as follows:

| | Area 1 | Area 2 | Area 3 | Area 4 |
|--------------------------|---------------------------------|--------------------------------|-----------------------------------|----------------------------------|
| Post spacing | 3 arc seconds (approx. 90 m) | 1 arc second (approx. 30 m) | 0.6 arc seconds (approx. 20 m) | 0.3 arc seconds (approx. 9 m) |
| Vertical accuracy | 30 m | 3 m | 0.5 m | 1 m |
| Vertical resolution | 1 m | 0.1 m | 0.01 m | 0.1 m |
| Horizontal accuracy | 50 m | 5 m | 0.5 m | 2.5 m |
| Confidence level | 90% | 90% | 90% | 90% |
| Integrity classification | routine | essential | essential | essential |

Table 1: Minimum numerical requirements for terrain data.

eTOD-TS-REQ-52 The minimum numerical requirements for obstacle data **shall** be as follows:

| | Area 1 | Area 2 | Area 3 | Area 4 |
|--------------------------|-------------|---------------|-------------------|-----------|
| Horizontal accuracy | 50 m | 5 m | 0.5 m | 2.5 m |
| Horizontal resolution | 1 sec | 1/10 sec | 1/10 sec | |
| Vertical accuracy | 30 m | 3 m | 0.5 m | 1 m |
| Vertical resolution | 1 m or 1 ft | (1 m or 1 ft) | (0.1 m or 0.1 ft) | 0.1 m |
| Confidence level | 90% | 90% | 90% | 90% |
| Integrity classification | routine | essential | essential | essential |

Table 2: Minimum numerical requirements for obstacle data.

3.2 Models and Formats of the Delivered Data

eTOD-TS-REQ-53 The Tenderer **shall** propose in its Tender the models and formats be used for delivery of the terrain and obstacle data for the different areas.

ADDITIONAL INFORMATION: The Contractor **should** consider the terrain at least in GeoTIFF format.

ADDITIONAL INFORMATION: The Contractor **should** consider the obstacles, at least in AIXM 5.1 model format and ESRI .shp format.

eTOD-TS-REQ-54 The Tenderer **should** follow the guidance in the EUROCONTROL TOD Manual regarding models and formats of the data.

eTOD-TS-REQ-55 The Contractor **shall** deliver data according to models and formats which are agreed upon by the Contracting Authority during the Business analysis stage.

3.3 Data Product Specification (DPS)

eTOD-TS-REQ-56 The Contractor **shall** deliver DPS for each data set.

eTOD-TS-REQ-57 The delivered DPS **shall** comply with specifications of ISO Standard 19131.

eTOD-TS-REQ-58 The Contractor **should** follow the guidance in EUROCONTROL TOD Manual regarding the data product specification.

3.4 Metadata

eTOD-TS-REQ-59 The Contractor **shall** deliver each dataset together with at least the minimum set of metadata that ensures traceability.

eTOD-TS-REQ-60 Each dataset delivered by the Contractor **shall** include the following minimum set of metadata:

- a) the names of the organisation or entities providing the dataset;
- b) the date and time when the dataset was provided;
- c) period of validity of the dataset;
- d) any limitations with regard to the use of the dataset.

eTOD-TS-REQ-61 The delivered metadata **shall** comply with specifications of ISO Standard 19115 for geographic information metadata.

eTOD-TS-REQ-62 The Contractor **should** follow the guidance in EUROCONTROL TOD Manual regarding metadata.

4. SPECIFIC REQUIREMENTS FOR OBSTACLE DATASETS

4.1 Content of obstacle datasets

eTOD-TS-REQ-63 Obstacle datasets **shall** contain the digital representation of the vertical and horizontal extent of the obstacles.

eTOD-TS-REQ-64 Obstacles data **shall** not be included in terrain datasets.

eTOD-TS-REQ-65 Obstacle data elements are features that **shall** be represented in the datasets by points, lines or polygons.

eTOD-TS-REQ-66 The Area 2a obstacle data collection surface **shall** have a height of 3 m above the nearest runway elevation measured along the runway centre line, and for those portions related to a clearway, if one exists, at the elevation of the nearest runway end.

eTOD-TS-REQ-67 The Area 2b obstacle collection surface **shall** have a 1,2 % slope extending from the ends of Area 2a at the elevation of the runway end in the direction of departure, with a length of 10 km and a splay of 15% to each side; obstacles less than 3 m in height above the ground need not be collected.

eTOD-TS-REQ-68 The Area 2c obstacle collection surface **shall** have a 1,2 % slope extending outside Areas 2a and 2b at a distance of not more than 10 km from the boundary of Area 2a; the initial elevation of Area 2c shall be the elevation of the point of Area 2a at which it commences; obstacles less than 15 m in height above the ground need not be collected.

eTOD-TS-REQ-69 The Area 2d obstacle collection surface **shall** have a height of 100 m above the ground.

eTOD-TS-REQ-70 The Area 3 obstacle collection surface **shall** extend 0.5 m above the horizontal plane passing through the nearest point on the aerodrome movement area.

4.2 Attributes

eTOD-TS-REQ-71 Attributes specification **shall** be agreed upon during the Business analysis stage.

eTOD-TS-REQ-72 The following obstacle feature attributes **shall** be recorded in the obstacle datasets, as stated in the table (Mandatory/Optional).

| Obstacle attribute | Mandatory/Optional |
|-----------------------------|--------------------|
| Area of coverage | Mandatory |
| Data originator identifier | Mandatory |
| Data source identifier | Mandatory |
| Obstacle identifier | Mandatory |
| Horizontal accuracy | Mandatory |
| Horizontal confidence level | Mandatory |
| Horizontal position | Mandatory |

| | |
|--|-----------|
| Horizontal resolution | Mandatory |
| Horizontal extent | Mandatory |
| Horizontal reference system | Mandatory |
| Elevation | Mandatory |
| Height | Optional |
| Vertical accuracy | Mandatory |
| Vertical confidence level | Mandatory |
| Vertical resolution | Mandatory |
| Vertical reference system | Mandatory |
| Obstacle type | Mandatory |
| Geometry type | Mandatory |
| Integrity | Mandatory |
| Date and time stamp | Mandatory |
| Unit of measurement used | Mandatory |
| Operations | Optional |
| Effectivity | Optional |
| Lighting | Mandatory |
| Marking | Mandatory |
| Status (EUROCAE ED-98C) | Optional |
| Obstacle Id number (EUROCAE ED-98C) | Optional |
| Operator / Owner (ICAO Data Catalogue) | Mandatory |
| Material (ICAO Data Catalogue) | Mandatory |

Table 3: Obstacle attributes.

eTOD-TS-REQ-73 The Tenderer **shall** present its approach to collect and manage the information for each of the attributes.

eTOD-TS-REQ-74 The Tenderer **should** adhere to the guidance in the EUROCONTROL TOD Manual regarding the attributes of the data.

5. SPECIFIC REQUIREMENTS FOR TERRAIN DATASETS

5.1 Content of terrain datasets

eTOD-TS-REQ-75 Terrain datasets **shall** contain a digital representation of the terrain surface in the form of continuous elevation values at all intersections (points) of a defined grid, referenced to a common datum.

eTOD-TS-REQ-76 A terrain grid **shall** be angular or linear and shall be of regular or irregular shape.

eTOD-TS-REQ-77 Terrain datasets **shall** include spatial (position and elevation), thematic and temporal aspects for the surface of the Earth containing naturally occurring features excluding obstacles.

eTOD-TS-REQ-78 Only one feature type, i.e., terrain, **shall** be provided.

eTOD-TS-REQ-79 Within the area covered by a 10 km radius from the ARP, terrain data **shall** comply with the Area 2 numerical requirements.

eTOD-TS-REQ-80 In the area between 10 km and the TMA boundary or 45-km radius (whichever is smaller), data on terrain that penetrates the horizontal plane 120 m above the lowest runway elevation **shall** comply with the Area 2 numerical requirements.

eTOD-TS-REQ-81 In the area between 10 km and the TMA boundary or 45-km radius (whichever is smaller), data on terrain that does not penetrate the horizontal plane 120 m above the lowest runway elevation **shall** comply with the Area 1 numerical requirements.

5.2 Attributes

eTOD-TS-REQ-82 Attributes specification **shall** be agreed upon during the Business analysis stage.

eTOD-TS-REQ-83 The following terrain feature attributes **shall** be recorded in the terrain datasets, as stated in the table below (Mandatory/Optional).

| Terrain attribute | Mandatory/Optional |
|-----------------------------|--------------------|
| Area of coverage | Mandatory |
| Data originator identifier | Mandatory |
| Data source identifier | Mandatory |
| Acquisition method | Mandatory |
| Post spacing | Mandatory |
| Horizontal reference system | Mandatory |
| Horizontal resolution | Mandatory |
| Horizontal accuracy | Mandatory |
| Horizontal confidence level | Mandatory |
| Horizontal position | Mandatory |

| | |
|---------------------------|-----------|
| Elevation | Mandatory |
| Elevation reference | Mandatory |
| Vertical reference system | Mandatory |
| Vertical resolution | Mandatory |
| Vertical accuracy | Mandatory |
| Vertical confidence level | Mandatory |
| Surface type | Optional |
| Recorded surface | Mandatory |
| Penetration level | Optional |
| Known variations | Optional |
| Integrity | Mandatory |
| Date and time stamp | Mandatory |
| Unit of measurement used | Mandatory |

Table 4: Terrain attributes.

eTOD-TS-REQ-84 The Tenderer **shall** present its approach to collect and manage the information for each of the attributes.

eTOD-TS-REQ-85 The Tenderer **should** adhere to the guidance in the EUROCONTROL TOD Manual regarding attributes of the data.

6. SPECIFIC REQUIREMENTS FOR AERODROME MAPPING DATA

eTOD-TS-REQ-86 As specified by AIS.TR.365 of Annex VI to Regulation 2017/373, the aerodrome mapping datasets **shall** contain the digital representation of aerodrome features.

eTOD-TS-REQ-87 ISO standards for geographic information **shall** be used as a reference framework.

eTOD-TS-REQ-88 Aerodrome mapping data products **shall** be described following the relevant data product specification standard.

eTOD-TS-REQ-89 The content and structure of aerodrome mapping datasets **shall** be defined in terms of an application schema and a feature catalogue.

eTOD-TS-REQ-90 The Tenderer **shall** describe its approach to the provision of aerodrome mapping data.

eTOD-TS-REQ-91 The Tenderer **shall** propose options for delivering the groups of data elements described in EUROCAE ED-99D.

eTOD-TS-REQ-92 The Contractor **shall** deliver the data elements as agreed by Contracting Authority.

7. GEOGRAPHIC SCOPE OF THE PROJECT

eTOD-TS-REQ-93 The coverage areas for sets of electronic terrain and obstacle data **shall** be those specified by AIS.TR.350 of Annex VI to Regulation 2017/373.

eTOD-TS-REQ-94 The obstacle limitation surfaces **shall** be those specified by Chapter H of Certification Specifications And Guidance Material For Aerodrome Design (CS ADR-DSN) Issue 6.

ADDITIONAL INFORMATION: The take-off flight path area consists of a quadrilateral area on the surface of the earth lying directly below and symmetrically disposed about, the take-off flight path. This area has the following characteristics:

- a) it commences at the end of the area declared suitable for take-off (i.e., at the end of the runway or clearway as appropriate);
- b) its width at the point of origin is 180 m (600 ft), and this width increases at the rate of 0.25D to a maximum of 1 800 m (6 000 ft), where D is the distance from the point of origin;
- c) it extends to the point beyond which no obstacles exist or to a distance of 12.0 km (6.5 NM), whichever is the lesser.

7.1 AREA 1

eTOD-TS-REQ-95 The Contractor **shall** deliver terrain data for the entire territory of the Republic of Bulgaria, referred hereinafter as Area 1, in accordance with all applicable requirements stated in the present document.

eTOD-TS-REQ-96 The Contractor **shall** deliver obstacle data for obstacles in Area 1 whose height is 100 m or higher above ground in accordance with all applicable requirements stated in the present document.

7.2 Sofia Airport

7.2.1 Terrain

eTOD-TS-REQ-97 The Contractor **shall** deliver terrain data within Area 2 of Sofia airport as follows:

- a) In the area extending to a 10-km radius from the ARP; and
- b) Within the area between 10 km and the TMA boundary or a 45-km radius (whichever is smaller), where terrain penetrates a horizontal terrain data collection surface specified as 120 m above the lowest runway elevation.

eTOD-TS-REQ-98 The Contractor **shall** deliver terrain data within the take-off flight path areas for RWY 09 and RWY 27 of Sofia airport.

eTOD-TS-REQ-99 The Contractor **shall** deliver terrain data within the lateral extent of the aerodrome obstacle limitation surfaces of Sofia airport, established according to the provided aerodrome data.

eTOD-TS-REQ-100 The Contractor **shall** deliver terrain data within Area 3 of Sofia airport.

eTOD-TS-REQ-101 The Contractor **shall** deliver terrain data within Area 4 for RWY 27 of Sofia airport.

eTOD-TS-REQ-102 The Contractor **should** deliver any relevant terrain data which is available additionally.

7.2.2 Obstacles

eTOD-TS-REQ-103 The Contractor **shall** include in the obstacle data set all obstacles within Area 2 that are assessed as being a hazard to air navigation.

ADDITIONAL INFORMATION: The obstacles within Area 2 which present a hazard to air navigation will be provided by BULATSA after the signature of the contract.

eTOD-TS-REQ-104 The Contractor **shall** deliver obstacle data for those obstacles that penetrate the relevant obstacle data collection surface in Area 2a, 2b, 2c, 2d and Area 3 of Sofia airport, established according to the provided aerodrome data.

ADDITIONAL INFORMATION: The obstacle data collection surfaces are specified in Section 4.

eTOD-TS-REQ-105 The Contractor **shall** deliver obstacle data for objects within Area 4 for RWY 27 of Sofia airport, which are higher than 1 m above the terrain.

eTOD-TS-REQ-106 The Contractor **shall** deliver obstacle data for those obstacles that penetrate the obstacle limitation surfaces (OLS) of Sofia airport established according to the provided aerodrome data.

ADDITIONAL INFORMATION: The following OLS are expected to be established and analysed for Sofia airport:

- Outer horizontal surface
- Conical surface
- Inner horizontal surface
- Approach surface and transitional surface for RWY 09 and RWY 27
- Inner approach surface, inner transitional surface, and balked landing surface for RWY 27
- Take-off climb surface for RWY 09 and RWY 27.

It should be noted that there are certain areas (See Figure 9 – EUROCONTROL TOD Manual, page 58) where the Area 2 surfaces with the 1.2% slope are situated above the obstacle limitation surfaces and, therefore, less restrictive for obstacle data collection. Nevertheless, all obstacles penetrating an OLS **shall** be included in the Area 2 obstacle data set.

eTOD-TS-REQ-107 The Contractor **shall** deliver obstacle data for the objects in the take-off flight path areas, which project above a plane surface having 1.0 % slope and having a common origin with the take-off flight path areas for RWY 09 and RWY 27 of Sofia airport.

eTOD-TS-REQ-108 The Contractor **should** deliver any relevant obstacle data which is available additionally.

eTOD-TS-REQ-109 The Contractor **shall** coordinate with the Contracting Authority the shape and extent of applicable areas and surfaces during the Business analysis.

7.2.3 Aerodrome Mapping Data

eTOD-TS-REQ-110 The Contractor **shall** deliver aerodrome mapping datasets for Sofia airport.

7.2.4 Aerodrome Data

RWY Data

See AIP Bulgaria, pt. LBSF AD 2.12

Lateral Limits of TMA SOFIA

433400N 0222918E - 432843N 0224739E -
432332N 0230528E - 431942N 0231846E -
430904N 0234828E - 430543N 0241314E -
424218N 0240948E - 423937N 0240746E -
423140N 0240146E - 422233N 0242216E -
421403N 0241521E - 421849N 0240441E -
421833N 0235425E - 421612N 0224130E -
425256N 0223806E - National border with Serbia -
433400N 0222918E

Aerodrome movement area

See AIP Bulgaria, page LBSF AD 2 - 41.1

7.3 Varna Airport

7.3.1 Terrain

eTOD-TS-REQ-111 The Contractor **shall** deliver terrain data within Area 2 of Varna airport as follows:

- a) In the area extending to a 10-km radius from the ARP; and
- b) Within the area between 10 km and the TMA boundary or a 45-km radius (whichever is smaller), where terrain penetrates a horizontal terrain data collection surface specified as 120 m above the lowest runway elevation.

eTOD-TS-REQ-112 The Contractor **shall** deliver terrain data within the take-off flight path areas for RWY 09 and RWY 27 of Varna airport.

eTOD-TS-REQ-113 The Contractor **shall** deliver terrain data within the lateral extent of the aerodrome obstacle limitation surfaces of Varna airport, established according to the provided aerodrome data.

eTOD-TS-REQ-114 The Contractor **shall** deliver terrain data within Area 3 of Varna airport.

eTOD-TS-REQ-115 The Contractor **should** deliver any relevant terrain data which is available additionally.

7.3.2 Obstacles

eTOD-TS-REQ-116 The Contractor **shall** include in the obstacle dataset all obstacles within Area 2 that are assessed as being a hazard to air navigation.

ADDITIONAL INFORMATION: The obstacles within Area 2 which present a hazard to air navigation will be provided by BULATSA after the signature of a contract.

eTOD-TS-REQ-117 The Contractor **shall** deliver obstacle data for those obstacles that penetrate the relevant obstacle data collection surface in Area 2a, 2b, 2c, 2d and Area 3 of Varna airport, established according to the provided aerodrome data.

ADDITIONAL INFORMATION: The obstacle data collection surfaces are specified in Section 4.

eTOD-TS-REQ-118 The Contractor **shall** deliver obstacle data for those obstacles that penetrate the obstacle limitation surfaces (OLS) of Varna airport established according to the provided aerodrome data.

ADDITIONAL INFORMATION: The following OLS are expected to be established and analysed for Varna airport:

- Outer horizontal surface
- Conical surface
- Inner horizontal surface
- Approach surface and transitional surface for RWY 09 and RWY 27
- Take-off climb surface for RWY 09 and RWY 27.

It should be noted that there are certain areas (See Figure 9 – EUROCONTROL TOD Manual, page 58) where the Area 2 surfaces with the 1.2% slope are situated above the obstacle limitation surfaces and, therefore, less restrictive for obstacle data collection. Nevertheless, all obstacles penetrating an OLS **shall** be included in the Area 2 obstacle data set.

eTOD-TS-REQ-119 The Contractor **shall** deliver obstacle data for the objects in the take-off flight path areas, which project above a plane surface having 1.0 % slope and having a common origin with the take-off flight path areas for RWY 09 and RWY 27 of Varna airport.

eTOD-TS-REQ-120 The Contractor **should** deliver any relevant obstacle data which is available additionally.

eTOD-TS-REQ-121 The Contractor **shall** coordinate with the Contracting Authority the shape and extent of applicable areas and surfaces during the business analysis.

7.3.3 Aerodrome Mapping Data

eTOD-TS-REQ-122 The Contractor **shall** deliver aerodrome mapping datasets for Varna airport.

7.3.4 Aerodrome Data

RWY Data

See AIP Bulgaria, pt. LBWN AD 2.12

Lateral Limits of TMA VARNA

434317N 0272246E - 434113N 0280532E -
434037N 0281703E - 432527N 0283309E -
431837N 0283327E - 431110N 0283346E -
430257N 0283105E - 425301N 0280519E -
425301N 0275402E - 425531N 0273912E -

425643N 0273159E - 430216N 0272013E -
430817N 0270723E - 431621N 0270640E -
432350N 0265052E - 433321N 0265552E -
433806N 0271335E - 434317N 0272246E

Aerodrome movement area

See AIP Bulgaria, page LBWN AD 2 - 41.1

7.4 Burgas Airport

7.4.1 Terrain

eTOD-TS-REQ-123 The Contractor **shall** deliver terrain data within Area 2 of Burgas airport as follows:

- a) In the area extending to a 10-km radius from the ARP; and
- b) Within the area between 10 km and the TMA boundary or a 45-km radius (whichever is smaller), where terrain penetrates a horizontal terrain data collection surface specified as 120 m above the lowest runway elevation.

eTOD-TS-REQ-124 The Contractor **shall** deliver terrain data within the take-off flight path areas for RWY 04 and RWY 22 of Burgas airport.

eTOD-TS-REQ-125 The Contractor **shall** deliver terrain data within the lateral extent of the aerodrome obstacle limitation surfaces of Burgas airport, established according to the provided aerodrome data.

eTOD-TS-REQ-126 The Contractor **shall** deliver terrain data within Area 3 of Burgas airport.

eTOD-TS-REQ-127 The Contractor **should** deliver any relevant terrain data which is available additionally.

7.4.2 Obstacles

eTOD-TS-REQ-128 The Contractor **shall** include in the obstacle data set all obstacles within Area 2 that are assessed as being a hazard to air navigation.

ADDITIONAL INFORMATION: The obstacles within Area 2 which present a hazard to air navigation will be provided by BULATSA after the signature of a Contract.

eTOD-TS-REQ-129 The Contractor **shall** deliver obstacle data for those obstacles that penetrate the relevant obstacle data collection surface in Area 2a, 2b, 2c, 2d and Area 3 of Burgas airport, established according to the provided aerodrome data.

ADDITIONAL INFORMATION: The obstacle data collection surfaces are specified in Section 4.

eTOD-TS-REQ-130 The Contractor **shall** deliver obstacle data for those obstacles that penetrate the obstacle limitation surfaces (OLS) of Burgas Airport established according to the provided aerodrome data.

ADDITIONAL INFORMATION: The following OLS are expected to be established and analysed for Burgas airport:

- Outer horizontal surface
- Conical surface
- Inner horizontal surface
- Approach surface and transitional surface for RWY 04 and RWY 22
- Take-off climb surface for RWY 04 and RWY 22.

It should be noted that there are certain areas (See EUROCONTROL TOD Manual, page 58, Figure 9) where the Area 2 surfaces with the 1.2% slope are situated above the obstacle limitation surfaces and, therefore, less restrictive for obstacle data collection. Nevertheless, all obstacles penetrating an OLS **shall** be included in the Area 2 obstacle data set.

eTOD-TS-REQ-131 The Contractor **shall** deliver obstacle data for the objects in the take-off flight path areas, which project above a plane surface having a 1.0 % slope and having a common origin with the take-off flight path areas for RWY 09 and RWY 27 of Burgas airport.

eTOD-TS-REQ-132 The Contractor **should** deliver any relevant obstacle data which is available additionally.

eTOD-TS-REQ-133 The Contractor **shall** coordinate with the Contracting Authority the shape and extent of applicable areas and surfaces during the business analysis.

7.4.3 Aerodrome Mapping Data

eTOD-TS-REQ-134 The Contractor **shall** deliver aerodrome mapping datasets for Burgas Airport.

7.4.4 Aerodrome Data

RWY Data

See AIP Bulgaria, pt. LBBG AD 2.12

Lateral Limits of TMA BURGAS

430817N 0270723E – 425643N 0273159E –
425531N 0273912E – 425301N 0275402E –
425301N 0280519E – 424835N 0280830E –
423547N 0280810E – 422342N 0275818E –
421338N 0275007E – 421254N 0273743E –
421120N 0271216E – 423006N 0264602E –
424234N 0264604E – 424943N 0264607E –
425851N 0264611E – 430038N 0265005E –
430817N 0270723E

Aerodrome movement area

See AIP Bulgaria, page LBBG AD 2 - 41.1

7.5 Plovdiv Airport

7.5.1 Terrain

eTOD-TS-REQ-135 The Contractor **shall** deliver terrain data within Area 2 of Plovdiv airport as follows:

- a) In the area extending to a 10-km radius from the ARP; and
- b) Within the area between 10 km and the TMA boundary or a 45-km radius (whichever is smaller), where terrain penetrates a horizontal terrain data collection surface specified as 120 m above the lowest runway elevation.

eTOD-TS-REQ-136 The Contractor **shall** deliver terrain data within the take-off flight path areas for RWY 09 and RWY 27 of Plovdiv airport.

eTOD-TS-REQ-137 The Contractor **shall** deliver terrain data within the lateral extent of the aerodrome obstacle limitation surfaces of Plovdiv airport, established according to the provided aerodrome data.

eTOD-TS-REQ-138 The Contractor **shall** deliver terrain data within Area 3 of Plovdiv airport.

eTOD-TS-REQ-139 The Contractor **should** deliver any relevant terrain data which is available additionally.

7.5.2 Obstacles

eTOD-TS-REQ-140 The Contractor **shall** include in the obstacle data set all obstacles within Area 2 that are assessed as being a hazard to air navigation.

ADDITIONAL INFORMATION: The obstacles within Area 2 which present a hazard to air navigation will be provided by BULATSA after the signature of a Contract.

eTOD-TS-REQ-141 The Contractor **shall** deliver obstacle data for those obstacles that penetrate the relevant obstacle data collection surface in Area 2a, 2b, 2c, 2d and Area 3 of Plovdiv airport, established according to the provided aerodrome data.

ADDITIONAL INFORMATION: The obstacle data collection surfaces are specified in Section 4.

eTOD-TS-REQ-142 The Contractor **shall** deliver obstacle data for those obstacles that penetrate the obstacle limitation surfaces (OLS) of Plovdiv airport established according to the provided aerodrome data.

ADDITIONAL INFORMATION: The following OLS are expected to be established and analysed for Plovdiv airport:

- Outer horizontal surface
- Conical surface
- Inner horizontal surface
- Approach surface and transitional surface for RWY 12 and RWY 30
- Take-off climb surface for RWY 12 and RWY 30.

It should be noted that there are certain areas (See EUROCONTROL TOD Manual, page 58, Figure 9) where the Area 2 surfaces with the 1.2% slope are situated above the obstacle limitation surfaces and,

therefore, less restrictive for obstacle data collection. Nevertheless, all obstacles penetrating an OLS **shall** be included in the Area 2 obstacle data set.

eTOD-TS-REQ-143 The Contractor **shall** deliver obstacle data for the objects in the take-off flight path areas, which project above a plane surface having a 1.0 % slope and having a common origin with the take-off flight path areas for RWY 12 and RWY 30 of Plovdiv airport.

eTOD-TS-REQ-144 The Contractor **should** deliver any relevant obstacle data which is available additionally.

eTOD-TS-REQ-145 The Contractor **shall** coordinate with the Contracting Authority the shape and extent of applicable areas and surfaces during the business analysis.

7.5.3 Aerodrome Mapping Data

eTOD-TS-REQ-146 The Contractor **shall** deliver aerodrome mapping datasets for Plovdiv airport.

7.5.4 Aerodrome Data

RWY Data

See AIP Bulgaria, pt. LBPD AD 2.12

Lateral Limits of TMA PLOVDIV

422233N 0242216E - 422229N 0242813E -
421729N 0243935E - 421546N 0244329E -
421437N 0244606E - 421359N 0244732E -
421200N 0245200E - 421228N 0250210E -
421300N 0251400E - 420830N 0252803E -
420529N 0252729E - 415400N 0252520E -
414638N 0252358E - 414815N 0250613E -
415325N 0245344E - 415700N 0244500E -
420220N 0243156E - 420650N 0242535E -
420924N 0242156E - 421403N 0241521E -
421818N 0241848E - 422233N 0242216E

Aerodrome movement area

See AIP Bulgaria, page LBPD AD 2 - 41.1

7.6 Gorna Oryahivitsa Airport

7.6.1 Terrain

eTOD-TS-REQ-147 The Contractor **shall** deliver terrain data within Area 2 of Gorna Oryahivitsa airport as follows:

- a) In the area extending to a 10-km radius from the ARP; and
- b) Within the area between 10 km and the TMA boundary or a 45-km radius (whichever is smaller), where terrain penetrates a horizontal terrain data collection surface specified as 120 m above the lowest runway elevation.

eTOD-TS-REQ-148 The Contractor **shall** deliver terrain data within the take-off flight path areas for RWY 09 and RWY 27 of Gorna Oryahivitsa airport.

eTOD-TS-REQ-149 The Contractor **shall** deliver terrain data within the lateral extent of the aerodrome obstacle limitation surfaces of Gorna Oryahivitsa airport, established according to the provided aerodrome data.

eTOD-TS-REQ-150 The Contractor **shall** deliver terrain data within Area 3 of Gorna Oryahivitsa airport.

eTOD-TS-REQ-151 The Contractor **should** deliver any relevant terrain data which is available additionally.

7.6.2 Obstacles

eTOD-TS-REQ-152 The Contractor **shall** include in the obstacle data set all obstacles within Area 2 that are assessed as being a hazard to air navigation.

ADDITIONAL INFORMATION: The obstacles within Area 2 which present a hazard to air navigation will be provided by BULATSA after the signature of the Contract.

eTOD-TS-REQ-153 The Contractor **shall** deliver obstacle data for those obstacles that penetrate the relevant obstacle data collection surface in Area 2a, 2b, 2c, 2d and Area 3 of Gorna Oryahivitsa airport, established according to the provided aerodrome data.

ADDITIONAL INFORMATION: The obstacle data collection surfaces are specified in Section 4.

eTOD-TS-REQ-154 The Contractor **shall** deliver obstacle data for those obstacles that penetrate the obstacle limitation surfaces (OLS) of Gorna Oryahivitsa airport established according to the provided aerodrome data.

ADDITIONAL INFORMATION: The following OLS are expected to be established and analysed for Gorna Oryahivitsa airport:

- Outer horizontal surface
- Conical surface
- Inner horizontal surface
- Approach surface and transitional surface for RWY 09 and RWY 27
- Take-off climb surface for RWY 09 and RWY 29.

It should be noted that there are certain areas (See Figure 9 – EUROCONTROL TOD Manual, page 58) where the Area 2 surfaces with the 1.2% slope are situated above the obstacle limitation surfaces and, therefore, less restrictive for obstacle data collection. Nevertheless, all obstacles penetrating an OLS **shall** be included in the Area 2 obstacle data set.

eTOD-TS-REQ-155 The Contractor **shall** deliver obstacle data for the objects in the take-off flight path areas, which project above a plane surface having 1.0 % slope and having a common origin with the take-off flight path areas for RWY 09 and RWY 27 of Gorna Oryahivitsa airport.

eTOD-TS-REQ-156 The Contractor **should** deliver any relevant obstacle data which is available additionally.

eTOD-TS-REQ-157 The Contractor **shall** coordinate with the Contracting Authority the shape and extent of applicable areas and surfaces during the business analysis.

7.6.3 Aerodrome Mapping Data

eTOD-TS-REQ-158 The Contractor **shall** deliver aerodrome mapping datasets for Gorna Oryahivitsa airport.

7.6.4 Aerodrome Data

RWY Data

See AIP Bulgaria, pt. LBGO AD 2.12

Lateral Limits of TMA GORNA

432059N 0252515E - 432011N 0260122E -
431521N 0260843E - 431551N 0262500E -
430551N 0262533E - 430521N 0260931E -
425842N 0255400E - 430158N 0253359E -
430303N 0251015E - 430238N 0245910E -
431238N 0245827E - 431303N 0250933E -
432059N 0252515E

Aerodrome movement area

See AIP Bulgaria, page LBGO AD 2 - 41.1

8. CONTRACTOR RESPONSIBILITIES

eTOD-TS-REQ-159 Unless stated otherwise, the Contractor **shall** be responsible for the execution of all requirements and tasks listed in the Technical specification.

eTOD-TS-REQ-160 The Contractor **shall** implement the project according to the proposed and agreed Project Master Schedule (PrMS).

eTOD-TS-REQ-161 The Contractor **shall** obtain all necessary permissions for the project implementation (for access, execution of the activities in the areas of the airports, etc.) including the requirements set forth in Ordinance No. RD-02-20-16 of August 5, 2011, for the planning, execution, control and acceptance of aerial photography and the results of various remote methods for scanning and interpreting the earth's surface, if applicable.

eTOD-TS-REQ-162 The Contractor **shall** collect data and information about terrain and obstacles from state bodies, airport administrations, operators, and other sources, including the data available in BULATSA.

eTOD-TS-REQ-163 The Contractor **shall** bear full responsibility for all activities performed by its sub-contractors (including quality and timely completion).

9. PROJECT MANAGEMENT

9.1 Project management plan

eTOD-TS-REQ-164 The Tenderer **shall** submit as part of the tender an initial version of a Project management plan (PMP), aligning its content with the stages of project implementation determined by the Contracting Authority.

eTOD-TS-REQ-165 The PMP **shall** be agreed upon at the Kick-off meeting (KoM).

eTOD-TS-REQ-166 The Tenderer **shall** document in the PMP its project implementation organisation, describing all processes, procedures and document templates planned to be implemented/used.

eTOD-TS-REQ-167 The Tenderer **shall** document in the PMP the scope of the project and include in it all the activities planned to be carried out for its implementation.

eTOD-TS-REQ-168 The project management plan **shall** include a Work Breakdown Structure for the entire project scope.

9.2 Roles and responsibilities

eTOD-TS-REQ-169 The Contractor **shall** provide a list of the persons, incl. their resumes (CVs), who will be involved in implementing the project.

eTOD-TS-REQ-170 The Contractor **shall** submit for approval to the Contracting Authority any change of the specified persons as per requirement eTOD-TS-REQ-169 at least 5 (five) working days before the change implementation.

9.3 Communication

eTOD-TS-REQ-171 All written communication/correspondence between the Contracting Authority and the Contractor **shall** be conducted in English.

eTOD-TS-REQ-172 The Tenderer **shall** document in the PMP the mechanisms that will be used to formally exchange project information with the Contracting Authority.

eTOD-TS-REQ-173 The formal written communication/correspondence related to the performance of the contract **shall** be solely between the Contracting Authority's and Contractor's project managers, who coordinate and disseminate information within their respective organisations.

eTOD-TS-REQ-174 Documentation related to the performance of the contract **shall** be officially filed in the Document and post registry office of the Contracting Authority.

9.4 Meetings

eTOD-TS-REQ-175 The Contractor **shall** envisage the following types of meetings within the project implementation:

- Kick-off meeting - KoM;
- High-level meetings between the management of both parties;
- Meetings related to the project implementation:
 - Project status review meetings;

- Meetings to review completed project stages and plan upcoming ones;
- Meetings for project deliverables acceptance;
- Technical/expert meetings.

eTOD-TS-REQ-176 Project status review meetings **should** be organised at least once a month and should address the following topics:

- Progress achieved and results completed for the last reporting period;
- Schedule execution review;
- A detailed plan for the activities in the next reporting period;
- Review of the Project management plan and other project documents, if necessary;
- Risk review;
- Review of the Action items list and the current project activities;
- Review of received change requests and/or implemented changes;
- Other matters at the discretion of the project managers of both parties

eTOD-TS-REQ-177 All meetings **shall** be held at the headquarters in Sofia, Bulgaria unless the parties have agreed otherwise.

ADDITIONAL INFORMATION: It is permissible to use a teleconference connection means to conduct the meetings.

eTOD-TS-REQ-178 The Contractor **shall** prepare an agenda before each meeting and provide it to the Contracting Authority at least 3 (three) working days before the start of the meeting.

eTOD-TS-REQ-179 The Contractor **shall** chair all meetings unless otherwise agreed by the parties.

eTOD-TS-REQ-180 The Contractor **shall** prepare minutes of each project meeting and submit them for approval by the Contracting Authority no later than 2 (two) days after the meeting.

eTOD-TS-REQ-181 All tasks and upcoming activities arising during the meetings **shall** be reflected in the minutes with assigned responsibilities and deadlines, as well as in the Action items list in order to track their implementation.

9.5 Project supervision, control and reporting

eTOD-TS-REQ-182 The Tenderer **shall** establish and document in the initial version of the PMP a system for supervision and control of the implementation of the project.

eTOD-TS-REQ-183 The Contractor **shall** implement a supervision and control system throughout the whole project life cycle.

eTOD-TS-REQ-184 The Contractor **shall** establish and document in the PMP a system for periodic reporting of project progress and comparison of progress with established project plans and schedules.

eTOD-TS-REQ-185 The reporting frequency **shall** be defined and agreed upon with the Contracting Authority.

ADDITIONAL INFORMATION: Reporting periods are calculated from the date of signing the

contract.

eTOD-TS-REQ-186 The Contractor **shall** submit to the Contracting Authority the prepared report within 5 (five) days after the end of the defined reporting period.

eTOD-TS-REQ-187 The reports **shall** address the following:

- The progress achieved during the relevant period in relation to the established plans and schedules;
- Project risks review, including identifying new ones, if applicable;
- Action items list status;
- The progress achieved in relation to the quality of the product, taking into account any problems that may have arisen and the need to repeat activities.

eTOD-TS-REQ-188 In addition to periodical reports, the Contractor **shall**, at the request of the Contracting Authority, also prepare ad-hoc reports.

eTOD-TS-REQ-189 In the event of the occurrence of significant events that impede the progress of the implementation of the successful completion of the contract (e.g., that would affect the cost to the Contracting Authority and/or the schedule), the Contractor **shall** notify the Contracting Authority no later than 3 (three) working days from the occurrence of the event.

9.6 Project schedule

eTOD-TS-REQ-190 As part of the Tender, the Tenderer **shall** submit a project master schedule including all activities described in the PMP.

eTOD-TS-REQ-191 The schedule baseline **shall** be agreed upon at the KoM.

eTOD-TS-REQ-192 The schedule **shall** be prepared in MS Project or equivalent.

eTOD-TS-REQ-193 The schedule **shall** be provided in editable format for the Contracting Authority's internal purposes (change of view, progress tracking, etc.).

eTOD-TS-REQ-194 The schedule **shall** contain the duration and interrelationships between the activities.

eTOD-TS-REQ-195 The schedule **shall** allow tracking the percentage completion of the activities as compared to the planned one at a given moment.

eTOD-TS-REQ-196 In the project implementation schedule, the Tenderer **shall** define key events (milestones) related to achieving an important result or completion of an important product of the project implementation, as well as important events that affect the implementation.

9.7 Quality management

eTOD-TS-REQ-197 In its Tender, the Tenderer **shall** describe the Quality Management System (QMS) intended to be applied during the Project execution.

eTOD-TS-REQ-198 The QMS **shall** be documented in the PMP or as a separate document.

eTOD-TS-REQ-199 The Quality management plan – QMP (as part of the PMP or as a separate document) **shall** be agreed upon at the KoM.

eTOD-TS-REQ-200 Quality Management of the project **shall** be performed both:

- At project management and processes level (quality assurance);
- At the level of the products (quality control).

eTOD-TS-REQ-201 The quality control procedures **shall** ensure, as a minimum, the compliance to the data quality requirements in Section 3.1.

eTOD-TS-REQ-202 The Contractor **shall** apply all aspects of its Quality Management Plan and other management requirements necessary to ensure the quality of the product, processes and/or services.

eTOD-TS-REQ-203 The Contractor **shall** ensure the application of QMP by its sub-contractors, vendors/suppliers and consultants.

eTOD-TS-REQ-204 The quality management activities **shall** consist of quality activities ensuring that the processes and products meet the Contract quality requirements both in the Contractor's organisation and within sub-contracting/co-contracting companies.

eTOD-TS-REQ-205 Tools supporting the QMS **shall** be documented.

9.8 Risk management

eTOD-TS-REQ-206 In its Tender, the Tenderer **shall** describe the Risk Management System intended to be applied during the Project execution in the draft Risk management plan (RMP) referenced in the PMP or as a separate document.

eTOD-TS-REQ-207 The RMP **shall** be agreed upon at the KoM.

eTOD-TS-REQ-208 The Contractor **shall** apply a Risk Management System (RMS) in order to ensure the on-time performance of the Contract within the agreed cost frame and specifications stated in the present technical specification.

eTOD-TS-REQ-209 In its Tender, the Tenderer **shall** document the following elements:

- Reference to standards related to RMS intended to be used during the Contract execution;
- Description of the way risks are identified, assessed, mitigated, controlled and reported;
- Description of the responsibilities in the Contractor's organisation related to risk management;
- Description of the practical application of the RMS (forms, tools, reporting, and interactions with BULATSA);
- Description of the risks identified by the Contractor at Contract signature and the corresponding mitigation measures.

eTOD-TS-REQ-210 The Risk Management System applicable to the Contract **shall** be documented and maintained by the Contractor.

eTOD-TS-REQ-211 The Contractor **shall** apply all aspects of its Risk Management Plan and shall ensure their application by its Sub-contractors, vendors/suppliers, and consultants.

eTOD-TS-REQ-212 Risk Management **shall** be a responsibility of the whole Contractor's project organisation and shall be detailed in the Risk Management Plan.

eTOD-TS-REQ-213 Implementation of the risk treatment **shall** be monitored and reported to BULATSA at the PPR.

eTOD-TS-REQ-214 The management of any risk **shall** be a function of its Risk Factor.

eTOD-TS-REQ-215 Risks with high probability and/or high impact **shall** be reported to BULATSA by e-mail as soon as such level is validated for a given risk.

10. CONFIGURATION MANAGEMENT

eTOD-TS-REQ-216 The Contractor **shall** apply a Configuration Management System to identify, control, report, and audit all deliverables under the Contract.

eTOD-TS-REQ-217 The Configuration Management System applicable to the Contract **shall** be documented in the PMP Configuration Management section or in a separate document (Configuration Management Plan).

eTOD-TS-REQ-218 The PMP Configuration Management section (or a separate document) **shall** be developed and maintained by the Contractor and accordingly submitted to the approval of BULATSA at the Kick-Off Meeting.

eTOD-TS-REQ-219 The Contractor **shall** apply all aspects of its Configuration Management System and also ensure their application by its sub-contractors and/or consultants.

eTOD-TS-REQ-220 The Contractor's Project Manager and BULATSA Project Manager **shall** be in charge of assessing the contractual impacts of the technical changes, if any.

eTOD-TS-REQ-221 The Configuration Management System **shall** consolidate the processes and procedures regarding the performance of the stated below main Configuration Management activities as defined in most standards:

- Configuration Identification;
- Configuration Control;
- Configuration Status Accounting;
- Configuration Audits.

eTOD-TS-REQ-222 A document or product that has been formally reviewed and agreed upon **shall** be baselined and represent the basis for further developments.

eTOD-TS-REQ-223 In order to modify a baseline, formal Technical change control procedures **shall** be required.

eTOD-TS-REQ-224 If the Contractor or BULATSA intends to propose changes to any baseline identified above, a Technical change **shall** be agreed upon by both parties.

eTOD-TS-REQ-225 Tools supporting the Configuration Management System **shall** be described in the Tender.

eTOD-TS-REQ-226 The Structure and contents of the forms, templates and files used for the Configuration Management System **shall** be described.

11. INCIDENT AND PROBLEM MANAGEMENT

eTOD-TS-REQ-227 The Contractor **shall** apply an Incident and Problem Management System in order to identify, record, classify, analyse, resolve, recover, report, close, and trace any problem with any deliverable occurring during the contract execution.

eTOD-TS-REQ-228 The Tenderer **shall** describe the proposed Incident and Problem Management System, organisation and process in the PMP Quality Management Section or in a separate document.

eTOD-TS-REQ-229 The Incident and Problem Management System **shall** be maintained by the Contractor and submitted to BULATSA for approval at KoM.

eTOD-TS-REQ-230 The Incident and Problem Management System **shall** define the set of attributes to identify and describe each Problem and resolution schedule.

eTOD-TS-REQ-231 The Contractor **shall** set up an organisation responsible for Incident and Problem Management.

eTOD-TS-REQ-232 The Incident and Problem Management System **shall** include the reporting of a Problem, its recording, analysis, and recovery.

eTOD-TS-REQ-233 The Incident and Problem Management System **shall** provide tracing of each step from the occurrence of the problem to its closure.

12. WARRANTY AND SERVICE LEVEL AGREEMENT

eTOD-TS-REQ-234 As part of its Tender, the Tenderer **shall** provide a draft Service Level Agreement (SLA).

eTOD-TS-REQ-235 The SLA **shall** cover the period of 2 (two) years of warranty.

eTOD-TS-REQ-236 Contracting Authority **shall** approve the SLA during the Project concept stage.

eTOD-TS-REQ-237 The Contractor **shall** perform the activities described in the SLA for the whole period of its execution.

eTOD-TS-REQ-238 During the period of execution of the SLA, the Contractor **shall** correct every incompliance of the project products with the requirements of the Contract, identified by the parties.