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TECHNICAL SPECIFICATION AND REQUIREMENTS

“Flight calibration services of navigation aids”

Prepared by Navigation and Airports (NAV)

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1 Introduction

1.1 General description of the needs

In the period of 3 years (from 1st March 2025 till end of March 2028) the selected bidder shall perform Flight calibration services of navigation aids (here after also Flight inspection) at the following airports:

- LJLA
- LJMB
- LJPZ
- LJCE

1.2 Purpose of this Document

The purpose of this document is to define the service specifications and requirements, specific requirements for the service provider and the technical specifications and requirements for flight calibration services of navigation aids.

The effort of the flight inspection service is to procure the calibration work and the measurement task on the Radio Navigational Aids, Communication Systems, Sensors Systems and procedures in Slovenia with associated airports: Airport Jožeta Pučnika Ljubljana (LJLJ), Airport Edvarda Rusjana Maribor (LJMB), Airport Portorož (LJPZ), Airport Cerklje ob Krki (LJCE) and for en-route procedures as well.

Flight inspection is expected to be carried out in accordance with **ICAO standards, documents Doc. 8071 regulations and EU recommendations in two phases per year**. Periodic inspection of ILS/DME LJB, ILS/DME MAR and ILS/DME CKL shall be performed in March and in September. Besides that, the periodic inspection shall be performed in September for every device mentioned in Article 3.5.4 to meet the expected milestones and completion of the services.

Information contained in this material should be used exclusively for preparing an offer and should not be handed over to third party without permission from Contracting Authority.

2 Terminology

The following terms are used within this tender documentation:

- **Contracting Authority:** means Slovenia Control, Slovenia Air Navigation Services, Limited, Zg. Brnik 130n, 4210 Brnik – aerodrom, Slovenia in short SCL.
- **Contractor:** means company or Service Provider, which is performing Flight calibration services.
- **Office Hours:** means hours between 08:00 – 17:00 CET during working days.
- **Working Day:** means normal working days (Monday - Friday) in force in the Contractor's country, excluding the public holidays.

3 Service Specifications and Requirements

3.1 Flight Inspection Execution Time Frame, Milestones

The Contractor shall conduct detailed site pre-surveys to determine the optimum location/procedure and technical data needed for execution, preparing the required technical/operative documentation and manuals (before execution) for each site and all the procedures for designated flight inspection and measurement activities in Slovenia.

Flight check and measurements are expected to be carried out in accordance with ICAO standards, documents and Eurocontrol recommendations basically on the four airports locations, Ljubljana, Maribor, Portorož and Cerklje ob Krki and other location where are located en-route devices as well (see chapter 3.5.4). The requested flight inspection task must be evaluated throughout the established en-routes and sector service volumes resumed by experts from Contracting Authority and checked to be free of interference from any undesired source.

The Contractor shall develop and maintain an integrated master program schedule showing the planned and actual start date, durations and completion tasks of key activities to be performed within one week in March and one week in September (w12, w37) to meet the expected milestones and completion of the services.

3.1.1 EXPECTED SCHEDULE

Expected milestones for the project execution are given in **Table 1**.

Activity	Month	Week	Year
Periodic inspection	March	Within three days, w12	2025-2028
Periodic inspection	September	Within five days, w37	2025-2027

Table 1: Expected milestones

It is expected that the schedule is fixed as stays in Table 1. In case of any change of the expected week, the final exact week (+/- 1 week) must be scheduled at least 30 days before the starting day, which means that Contractor is obligated to inform contact person from Contracting Authority at least 30 days earlier as a starting day.

3.2 Operative documentation for execution

3.2.1 ATC manual

The Contractor shall prepare an appropriate Operative documentation for execution (ATC Manual-guide book, flight routes & orbits, Safety case Assessment) with graphical presentation of the flight check and measurements execution and key activities within the agreed time frame, comprising:

- Charts with all FI procedures/orbits drawn inside separately for each site and phase;
- Detail information and description (locations/routes, orbits and altitudes, timings...);
- All flights, procedures and time schedules & durations shall be fully represented;

See also chapter 3.3 of this document.

3.2.2 Technical manual

The Contractor shall prepare an appropriate Operative documentation for technical staff, which include flight inspection procedures for periodic flight inspection/calibration for each radio navigation aid, also represented by nominal number of flights, duration with technical procedures for each phase of flight in chronological order for technical staff needs (alarms, width, coverage, ...). Draft report on the flight inspection/calibration for each system (samples of temporary and final reports) shall be included.

See also chapter 3.3 of this document.

3.2.3 Safety case assessment (FHA - Functional Hazard Assessment)

The Contractor shall prepare an appropriate document-Safety case assessment, associated with the VHF communication service, operational frequencies, navigation aids and measuring procedures (risk reduction and mitigation).

The safety case analyses of the Flight check activities for all locations, sites and en-routes and the FHA risk assessment (risk reduction and mitigation) shall be performed in accordance with Regulation (EU) No 376/2014 and validated EASA Safety Requirements, and will comprise all the main activities to identify "cause of failure condition" and what can go wrong in connection with the VHF communication service including safety requirements associated with the operational communications, frequencies and measuring flight check procedures. Standby equipment must be checked during any requested commissioning inspection.

The outage time of the particular system and frequency during the flight check and measurements shall be determined by the facts and the safety analysis considered in the hazard mitigation time frame has to be carried out to reduce or eliminate the risk from hazards and their effects in compliance with Regulation (EU) No 376/2014.

See also chapter 3.3 of this document.

3.3 Miscellaneous

The Contractor shall, within 10 days after signing the contract, submit the documents referred to chapters 3.2.1, 3.2.2 and 3.2.3 (i.e., ATC Manual, Technical Manual, and Safety Case Assessment - Functional Hazard Assessment) to the Contracting Authority's email address specified in the contract for review.

Within 15 days after the Contracting Authority's approval of these documents, the Contractor shall deliver the final, harmonized versions in both physical and electronic form to the Contracting Authority's address specified in the contract. Each document must be signed and delivered in six (6) copies.

ATC and ATSEP (technical staff) briefing with Contractor staff before flight check on Contracting Authority side is mandatory for every periodic flight check. Timing, technical specification, procedures including communications and critical situation will be exposed.

The impact of the flight inspection to the normal traffic will be kept to a minimum and harmonized with the regular air traffic.

Contractor will (for Contracting Authority technical staff) introduce Technical manual on site, which includes interpretation of reports. Contractor shall perform assistance to technical staff in

comparison between flight and ground measurements later on in case of necessity.

In case that operative documentation is changed by any reason it must be introduced properly to Contracting Authority 30 days before executing flight check at the latest.

3.4 REFERENCE DOCUMENTS

- ICAO Annex 10, Comm., Volume II, current version with attachments
- ICAO Annex 11, ATS, current version with attachments
- ICAO Annex 14, ATS, current version with attachments
- ICAO Annex 2, current version with attachments
- FAA Order 6750.16C, Siting for Instrument Navigation Systems, current version
- CAP 670 Air Traffic Services Safety Requirements, current version
- CAP 760 Conduct of Hazard Identification, Risk Assessment and Mitigation, current version
- Doc. 4444 Rules of the Air, current version
- ICAO Document 8168-OPS/611: Volume II - Construction of Visual and Instrument Flight Procedures, current version with attachments
- STANAG 3374 AEt P-1 (B)-- Flight Inspection of NATO Radio/Radar Navigation and Approach Aids,
- AFMAN 11-225, United States Standard FAA Manual, current version
- ICAO, Manual on Testing of Radio Navigation Aids. (Doc 8071) Volume I — Testing of Ground-based Radio Navigation Systems, current version
- ISO 9000/9001, current version
- Regulation (EU) 2018/1139, current version
- ESARR3, 4 - EUROCONTROL Safety Regulatory Requirement, current version

In case that regulation is changed during implementation of the public procurement or later on, selected bidder will have to assure that all services that are object of the contract are going to be executed according to such changed regulations with no additional costs for the Contracting Authority.

3.5 Requirements for Contractor - equipment and services

3.5.1 Quality and Reliability of equipment and services

The flight inspection and measuring system requires high degree of reliability and availability. The quality and availability of system should therefore comply with the ICAO requirements and standards in accordance with the ICAO Doc 8071 regulations and Euro Control recommendations.

- Aircraft and ground support flight inspection equipment shall be calibrated to a standard traceable to the National Institute of Standard and Technology. Portable/Utility class equipment, installed in aircraft for the purpose of conducting measurements, must be installed in accordance with approved procedures.
- The flight inspection receivers and the complete system incl. the antennas shall be regularly calibrated to a standard traceable to the National Institute of Standard and Technology, all the documents and certificates from which the calibration is evident will be included in accordance with the SIS EN ISO/IEC 17025 standard.
- The Contractor shall assure that the flight inspection tasks and measuring procedures in case of sensors (MSSR[MODE-S], PSR, ADS...) must be conducted to FL350.

- The Contractor shall have a fully automatic, modern flight inspection system coupled to the autopilot of the aircraft to ensure that all procedures are flown with the highest accuracy and repeatability at all times, what in turn guarantees that all results of one facility are exactly comparable.
- The flight inspection system shall use a PDGPS (Precision DGPS) to ensure the highest accuracy.
- The flight inspection system shall have transponder pulse decoder system which complies with Regulation (EU) 2023/1770 with capability of real time processing of SSR interrogation pulses and for Mode S information as well.
- The flight inspection system shall have capability for pulse analysis on the 1030MHz for secondary surveillance radar (SSR) uplink band.
- Automatic flight inspection system shall be installed in aircraft in accordance with EASA regulation (Supplemental Type Certificate issued by EASA).
- The Contractor shall have an approved and certified flight operation and shall provide a high-quality service approved by a national authority and quality management certificate and in accordance with JAR FCL-1.
- The maintenance is performed in accordance with JAR 145, the respective European regulations 2042/2003.
- The Contractor shall have the capability and resources for urgent repair (on site) of the aircraft or flight inspection system in case of malfunctions.

3.5.2 Electromagnetic Compatibility (EMC) and safety

System for flight check activities shall be compatible with other systems and shall not degrade the performance of other nearby systems. No radiation harmful to the users shall be emitted.

3.5.3 Standards and non-compulsory criteria

All installations and equipment shall comply with the statutory obligations, regulations, specifications, standards, guides, codes of practice and other documents issued by the authorities, institutions and organizations referred to in the Specifications or in the Employer's drawings, including but not limited to the following: ISO; IEC; BS; DIN/VDE or equivalent and ICAO - International Standards and Recommended Practices.

With regard to design, manufacturing, components, parts and testing, the equipment must comply with ISO, IEC, CE, national SIS standards, SIS EN ISO/IEC 17025 standard and the Regulation (EU) 2018/1139.

Technical characteristics and performance of equipment in operation must be in accordance with ETSI, ERC, EN, ITU-T in ITU-R standards and recommendations

3.5.4 Description of systems and locations for provision of services

Flight Check/Measurements are generally scheduled every 6 month (two times periodic inspection per year, milestones related to Table 1) of the following radio navigation aids, in case of need sensors systems (MSSR(MODE-S), PSR, ADS...WAM) and communication aids as well will be performed to determine the system operability, restrictions, minimum en-route altitude and adequate coverage and to be free of interference from an undesired source to navigational requirements according to ICAO standards, Eurocontrol regulations and recognized by experts from Contracting Authority:

I.) Ljubljana / Brnik - LJLJ

- ILS/DME LJB CAT III
- Terminal DVOR/DME-LBL
- NDB-MG/L
- DVOR/DME-DOL
- VOR/DME-ILB (VOR ILB currently out of service-do not consider when the costs will be calculated for this tender)
- PAPI-30
- SALS-30
- PAPI-12
- CHAPI-heliport.
- *optional VHF comm. ("en-route" check)*
- *optional (PSR/MSSR/WAM) sensor system check*

II.) Portorož - LJPZ

- VOR/DME-POR
- NDB-PZ/L (currently out of service-do not consider when the costs will be calculated for this tender)
- PAPI

III.) Maribor - LJMB

- ILS/DME MAR CAT I
- NDB-MI/L
- NDB-MR/L
- PAPI-32
- PAPI-14

IV.) Cerklje ob Krki - LJCE

- NDB-CE
- NDB-RK
- DDF
- ILS/DME-CKL
- DVOR/DME-COK
- PAPI

Lighting and PAPI/VASI is checked at the same time as the ILS. This guarantees the same reference accuracy as for ILS Flight Calibration. In case an ILS is not available on a specific runway, PAPI/ VASI will be checked according to references provided by the ground-based components of the Flight Inspection System.

The flight inspection intervals should be in accordance with ICAO standards and Eurocontrol regulations; ILSs within 180 days periodicity of checks (2 x periodic inspection- the inspection period may be extended in the future by comparison with results, good history & GND Inspection etc., to comply ICAO recommendations), DME -LJB, DME MAR and DME CKL at the same time with ILS, the rest of navigation aids most likely annually.

The Contractor should consider that the flight inspection tasks and measuring procedures, including ferry flights, must be conducted where possible in the way to minimize overall costs.

3.5.5 Reports

A **Preliminary Inspection Report** with operational status for each system will be provided on completion of the Flight check program on daily base and in case of restrictions, the appropriate NOTAM shall be proposed from Contractor side in written form.

A **Final Inspection Report** plus drawings, analyses and copies of the various computer and recorder printouts and electronic version (send on e-mail address to the Contracting Authority contact person) shall be forwarded to Contracting Authority as soon as practicable after returning to Main Base, but at the latest within 7 days after completed inspection. All requests for facility adjustments must be specified. In case of need for NOTAM announcement, the text must be attached. Flight inspection certification must be based on facility performance.

The Contractor Flight Inspection staff shall be available to discuss about any aspect of the inspection with the Contracting Authority technical staff when the need arises.

3.5.6 Start-up terms

The first periodic check is expected to be performed in week 12 in year 2025.

3.5.7 The proposal shall comprise:

The Bidders must submit the following documents, certificates, data and lists or statements in the same order of sequence as follows:

- a) statement that the Service provider is complied with ICAO and Eurocontrol recommendations and furthermore, in case the regulations changed in the period of validity of this contract (2025-2028), and statement that the Service provider is going to (shall) adapt to the new regulation,
- b) statement that the Service provider is complied with paragraph "Requirements for Contractor-equipment and services" in this document with all evidences.
- c) statement that the Service provider has the necessary skills, licences, resources and competence including knowledge of English language to undertake the task of the Flight inspection, and that Service provider is compliance to (fulfilment of) the requirements defined in this document,
- d) statement, that the longest response time is 48 hours-availability of Contractor's service at an unexpected time (the longest response time is expecting in 48 hours as the latest). The longest response time means that Contractor is ready for flight check on Contracting Authority site, started from time of contacting Contractor from Contracting

Authority side.

e) type and performances of the aircraft used for flight calibration checks.

3.6 Competencies of the service provider

The Bidders shall submit references regarding the flight inspection and calibration of ILSs (Instrument Landing Systems) CAT I, II, and III. These references shall be separately and comprehensively reviewed. A detailed list should include the following:

- Countries and international airports where the services were provided,
- Types of navigation aids inspected,
- Operational categories of the ILSs (CAT I, II, and III),
- The number of ILS CAT I, II, and III systems inspected per year, and
- The number of CAT III calibrations performed over the last five years.

We require that, within the five-year period (2020–2024), the bidder has performed at least 50 flight checks of ILSs in general. Additionally, the bidder must demonstrate the completion of at least 25 flight checks of ILS CAT III B, which is a mandatory minimum requirement.

3.7 Required Service Provider facilitation of compliance monitoring

The Service Provider shall ensure, in compliance to the AMC1 ATM/ANS.OR.B.015, that the Service Provider has the necessary skills, licences, resources and competence to undertake the task of the Flight inspection, and that Service Provider is compliance to (fulfilment of) the requirements defined in this document and in case of need or when required, able to fully cooperate with relevant Competent Authority (CAA, EASA, ...).

The Service Provider shall ensure, as per Regulation (EU) 2017/373 ATM/ANS.OR.B.015(b), that to Competent Authority of the country of domicile of the Contracted Authority is given access to the Service Provider to determine continued compliance with the applicable requirements under Regulation (EU) 2017/373.

4 Acronyms, abbreviations and phrases

ADS	Automatic Dependent Systems
ATSEP	Air Traffic Safety Electronic Personnel
ATC	Air Traffic Control
PDGPS	Precision Differential Global Positioning System
DDF	Digital Direction Finder
DME	Distance Measuring Equipment
DVOR	Doppler VHF Omnidirectional Radio range
ETSI	European Telecommunications Standard Institute
ERC	European Radio Committee
ERC REC	ERC Recommendation
FL	Flight Level
FMS	Fault Management System (or similar)
HSB	Hot Standby
HW	Hardware
ILS	Instrument Landing System
IDU	In-Door Unit
ITU	International Telecommunications Union
ITU-T	ITU Standards Telecommunications Series
ITU-R	ITU Standards Radio Series
KZPS	Kontrola zračnega prometa Slovenije, KZPS d.o.o. (Slovenia Control, Slovenian Air Navigation Services, Limited)
LM	Local Monitoring
LOC	Localizer
MSSR/PSR	Surveillance Radar
MTBF	Mean Time Between Failures
MTTR	Mean Time To Repair
NAVAID	Navigational Aid
NDB/L	Non-Directional Beacon/Locator
ODU	Out-Door Unit
RF	Radio Frequency
RR	Radio Relay
SCL	Slovenia Control (Kontrola zračnega prometa Slovenije, KZPS d.o.o.)
SW	Software
VHF	Very High Frequency
VOR	VHF Omnidirectional Radio range
VSEP	Vertical Standard Equipment Practice
WAM	Wide Area Multilateration