

Service description

**Satellite project: IT development and
Mission-related consulting services**

- over 2 lots -

Award No.: OV-080-26

Client:

Technical University of Berlin, The President
Straße des 17. Juni 135
10623 Berlin

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1 BRIEF DESCRIPTION OF THE SERVICE – ACROSS ALL LOTS

As part of the in-orbit demonstration mission RACCOON IOD (**Robust And seCure post quantum COmmunication fOr critical iNfrastructure**), the Technical University of Berlin (TU Berlin, hereinafter referred to as the client – AG) intends to procure partial services for the realization of the project.

During the project period, four small satellites (3U cubesats, 3 flight models (FMs), 1 flight spare (FS)) will be developed, built and launched into low Earth orbit within 24 months. This will be followed by a mission period of 12 months in orbit.

The mission builds on the predecessor mission RACCOON PoC, in which a demonstrator for a scientific payload was developed. This payload is used to test a **cognitive radio concept** for robust and secure satellite communication. In addition, **RACCOON OS** was developed as an open-source operating system for small satellites that meets current cybersecurity requirements and implements relevant CCSDS standards.

The aim of the RACCOON IOD mission and thus part of this tender is the triangulation of radio signals in orbit by means of a **formation of three cubesats**. The satellites must be able to record signals, the evaluation of which on the ground enables the **geolocation of the signal sources with the** help of suitable algorithms. The possibility of launching a fourth cubesat in the formation will be reviewed in phase 1 (May 2026 to March 2027) of the project and is to be implemented if necessary. In addition, the RACCOON OS developed in the PoC mission will be used, tested and further developed in orbit. The **intelligent transceiver** developed in the PoC phase will also be operated on board the satellites to demonstrate robust and secure satellite communication.

To achieve the project goals, a service will be tendered for the further development of ground station software and for consulting on the mission concept and the payload.

The exact contents and minimum technical requirements are defined in the following lot descriptions:

- Lot 1: Ground Station Software
- Lot 2: Consulting mission concept + payload

Any bidder (in short: the bidder) can submit a bid **for one, several or all lots**, there is no lot limitation.

2 DESCRIPTION OF SERVICES – ACROSS ALL LOTS

In the following, the minimum criteria (MK) are described with the required components and parameters of the services to be procured per lot and the task description to be fulfilled with the offer is discussed in detail. Unfulfilled requirements will lead to the exclusion of the respective offer.

The agreed service and delivery deadlines are binding. Delays in delivery and service must be reported to TU Berlin immediately. This applies if, due to significant and unforeseeable circumstances of political and/or economic proportions, supply bottlenecks or disruptions in the supply chains occur that are not within the Contractor's area of responsibility. With the prompt notification of this to TU Berlin, the expected delivery times at this time must also be communicated.

2.1 LOT 1 GROUND STATION SOFTWARE

Below are the minimum requirements for LOT 1.

2.1.1 Basis of the contract

The service is awarded on the basis of the EVB-IT system contract. The EVB-IT system contract is part of the tender documents and is generally binding.

Deviations from this are only permissible in justified exceptional cases. In this case, the bidder must submit a comprehensible and comprehensive justification in the tender, from which it follows why an application of the EVB-IT system contract is not possible in the specific case.

2.1.2 Background and objective

The subject of this lot is the further development of the existing open source ground station software **Yamcs** to support standardized space protocols according to ECSS and CCSDS as well as the creation of a generally applicable operating concept.

The focus is on:

- the implementation and extension of **ECSS PUS services**
- Customization of the user interface and API
- the creation of an **overall operational concept (Concept of Operations)**

The goal is a **fully functional open-source ground segment** that can be used for individual missions and constellations.

The prerequisite is that the contractor (contractor) has **demonstrable experience with Yamcs** and further develops the existing software base.

All documents ff. must be prepared in English as a PDF and must comprise at least five pages.

2.1.3 Service description

The project is divided into two phases:

Phase 1 "Mission Design" (expected 06.07.2026 ¹– 28.02.2027)

In this phase, the following work packages must be worked on:

- Servicesblock 1: Time-based & Position-based Scheduled Commands
- Service Block 2: Parameter Management Service
- Service block 3: Housekeeping service

Phase 2 "AIV & Operations" (optional extension) (expected 01.03.2027 – 28.02.2028)

In this phase, the fourth work package will take place:

Service Block 4: Concept of Operations

Phase 2 is an optional expansion option, which will be applied for in the course of Phase 1 and is expected to be approved in early 2027. This optional service must be offered by the bidder in a binding manner. The Contractor will be informed of the decision as to whether this optional extension option will be additionally commissioned by 28.02.2027 at the latest.

Servicesblock 1: Time-based & Position-based Scheduled Commands

As part of this service block, the Contractor will take over the extension of the existing ground station software **Yamcs** with basic support for **time-based and position-based planned commands** in accordance with **ECSS PUS ST[11]** and **ECSS PUS ST[11]** respectively. **PUS ST[12]**. The aim is to provide functionality that allows operators to plan time- or orbitally referenced commands, enter them on board and manage them via the user interface and the API.

- **Scope of Tasks of the Contractor**
- Extension of the existing **PUS Command Post-Processor** in Yamcs with additional command attributes for scheduled commands.
- Implementation and processing of the following attributes for **time-based commands**:
 - On-board Release Time
 - Sub-schedule ID
 - Group

¹ The start of the service is based on the date of the award. If necessary, the contract can be awarded earlier, in which case the start of the service must be implemented promptly by the contractor in consultation with the client.

- Implementation and processing of the following attributes for **position-based commands**:
 - Orbit Number
 - Angle
 - Sub-schedule ID
 - Group
- Automatic embedding of regular commands in a **PUS(11,4)** or **PUS(12,4)** command, if the corresponding attributes are set.
- Extension of the user interface in **yamcs-web** so that operators can set these attributes when sending regular commands.
- Extension of the **Python API** so that the same functions can also be used script-based.
- Publication of the **Request ID** as an additional column in the command history for later identification of the planned command in the on-board schedule.
- Adaptation of a suitable example in **the Yamcs Simulator** to demonstrate the newly implemented capabilities.
- Provision of unit and integration tests for the developed functionality.

Results

- Operators must be able to generate time- or position-based telecommands and enter them in on-board schedules.
- The same functions are available via **both yamcs-web** and the **Python API**.
- The functionality is demonstrated and tested in the simulator.

Service Block 2: Parameter Management Service

As part of this service block, the Contractor will implement the full support of the **ECSS PUS Parameter Management Service ST[20]** in Yamcs. The goal is to provide a **generic XTCE-based implementation** for reading and writing parameters via standardized telecommands and telemetry, including support for different parameter types and multiple operations.

Scope of Tasks of the Contractor

- Development of a **generic XTCE implementation** of the telecommands and telemetry provided for in the standard for the parameter Management Service ST[20].
- Implementation of functions for:
 - **Single Get**
 - **Multi Get**
 - **Single Set**
 - **Multi Set**

- Support of parameters of different types and encodings, in particular:
 - Integer
 - Float
 - String
- Implementation of logic in which the operator **does not have to manually select the parameter type**, but the implementation automatically supports the correct type handling.
- Implementation of indirect parameter referencing for the assignment between sent telecommands and the corresponding response parameters.
- Investigation and, if necessary, extension of the XTCE modeling, insofar as necessary for the support of "single set" or "multi set".
- Addition and adaptation of the user interface in **yamcs-web**, insofar as this is necessary for the use of the ST[20] functionality.
- Customization and extension of functionality in the API.
- Adaptation of a suitable example in the existing **Yamcs simulator** for the simulation of ST[20] capabilities.
- Execution of unit and integration tests.
- Preparation of the associated technical documentation.

Results

- Operators must be able to request and set parameter values via the standardized ST[20] interface.
- The parameters specified by the AG must be able to be read or written in one operation.
- The implementation is generic, XTCE-based and usable in Yamcs.

Service block 3: Housekeeping service

As part of this service block, the Contractor is responsible for implementing the support of the **ECSS PUS Housekeeping Service** in Yamcs. The goal is to provide a **generic XTCE-based implementation** for configuring and decoding housekeeping reports, especially for periodic and requested reports.

Scope of Tasks of the Contractor

- Development of a **generic XTCE implementation** of selected telecommands and telemetry of the housekeeping service.
- Create an XTCE-based description of parameters and containers for housekeeping data.
- Support for telecommands to configure:

- **Periodic reporting**
- **on-request Reporting**
- Ensuring that housekeeping reports can be decoded and displayed by Yamcs.
- Use of existing TM/TC screens and APIs, unless a specialized housekeeping interface is provided.
- Support for a workflow where housekeeping definitions are prepared and transferred to the system via XTCE/MDB as well as scripting.
- Adaptation of a suitable example in the existing **Yamcs simulator** to simulate housekeeping functionality.
- Execution of unit and integration tests.
- Preparation of the technical documentation (deviation from point 2.1.2: at least 10 pages)

Results

- Operators must be able to configure the generation of housekeeping reports.
- Housekeeping reports must be able to be decoded and displayed by Yamcs.
- Housekeeping functionality is proven in the simulator.

Service Block 4: CCSDS / PUS Concept of Operations (optional expansion option)

As part of this work block, the Contractor is responsible for the preparation of a **generally applicable Concept of Operations** for satellite missions that use **CCSDS and PUS protocols**. The aim is to provide a structured and practice-oriented guide for operators of single missions and constellations, including safety aspects and automation.

The service block will be **started in phase 1** and **continued and finalized in phase 2** as an optional expansion option.

Scope of Tasks of the Contractor

- Creation of a structured **operator guide / handbook** for the operation of satellite missions using CCSDS and PUS.
- Description of the basic concepts and interrelationships of:
 - Commands
 - Telemetry
 - Command Acknowledgements
 - The Link Protocol
 - Broadcasts
- Description of procedures for:

- Request from Health Telemetry
- Leverage real-time and periodic telemetry
- Modification of on-board parameters
- Initiation of experiments or scheduled commands
- Download payload data
- Description of recommended procedures for:
 - Encryption
 - Authentication
 - Safe operating procedures
- Description of concepts for:
 - Automation of mission operations
 - Satellite constellation support
- Consideration of the RACCOON-IOD mission characteristics
- Integration of review and improvement loops with the working group. To this end, there will be regular online meetings once a month, which will be initiated by the working group.

Results

- A generally applicable written operating concept for satellites that produce CCSDS and PUS protocols.
- Develop a practice-oriented (written) manual for operators.
- Write down recommendations for safe operating procedures and constellation operations.

2.1.4 Technical requirements

Below are all the technical requirements that are relevant to the offer. These must be taken into account by the bidder in the bid. The described verifications (Analysis(A), Test(T), Review (R)) are relevant for meeting the requirements.

ID	Requirement	Verification
PM-01	All developments must be versioned and documented in a comprehensible manner.	R
PM-02	The deployed employees must remain available for the entire duration of the project.	R

PM-03	All software artifacts must be handed over to the WG in an appropriate form (either in the repository or archive).	R
SW-01	All implementations must be fully integrated into the existing Yamcs architecture.	R
SW-02	XTCE must be used for all PUS services.	R
SW-03	The functions must be usable via yamcs-web as well as via the API.	R
SW-04	The implementations must be compatible with the Yamcs Simulator.	R
SW-05	The software must be testable and reproducible.	R + T
SW-06	Time-Based Scheduled Commands must be implemented.	R
SW-07	Position-Based Scheduled Commands must be implemented.	R
SW-08	Parameter management must be fully implemented.	R
SW-09	Telecommands must be automatically embedded in PUS commands	R
SW-10	Multiple operations (Multi Get/Set) must be supported.	R
COM-01	It must be possible to support and resume interrupted transmissions.	R
UI-01	The user interface must support the scheduling of time-based commands.	R
UI-02	The user interface must allow parameter access (Get/Set).	R
UI-03	The API must support all new features.	R
UI-04	Operability for operators must be guaranteed.	R
DOK-01	The Contractor must prepare technical documentation for all implemented functions.	R
DOK-02	The Contractor must create a Concept of Operations.	R
DOK-03	All documents must be provided in English and in PDF format.	R
DOK-04	The minimum length of documentation is five pages, exception: service block 3 = 10 pages	R

2.1.5 Contractor's service team

All minimum criteria mentioned here must be met and proven by suitable documents (e.g. curriculum vitae, certificates, project references).

If the minimum criteria are not fully met, the bid will be excluded from the further procedure.

Category	Minimum criterion (MK)	Description
Quantity	At least one person in a leading position	The team must include at least one person who meets all the requirements.
Experience	Yamcs	The employee must have demonstrable experience with Yamcs (development/integration).

Experience	ECSS PUS	The employee must demonstrate experience with ECSS PUS.
Experience	CCSDS	The employee must demonstrate experience with CCSDS.
Experience	Software Development	The employee must have at least 5 years of experience in software development.
Experience	Space software	The employee must demonstrate experience in ground-based space systems or mission software
Language	Language skills	The employee employed must have business fluency in German and English.

2.1.6 Milestone plan

The project milestones result from the completion of the respective work blocks 1 – 4. The specified deadlines of phases 1 and 2 must be complied with in a binding manner. If a service block has been completed and it has been accepted by the Client, it is considered to have been fulfilled.

2.1.7 Payment plan

Payments are made after completion and acceptance by the AG of the individual service blocks.

Description	%- Payment of the offer price
	<i>According to OV-080-26 Price sheet, rider lot 1, item 1:</i>
Service block 1	30 %
Service block 2	40%
Service block 3	30%
<i>Service block 4 – if commissioned</i>	<i>100% acc. OV-080-26 Price Sheet, Rider Lot 1, Pos. 2</i>

The remuneration is paid plus the applicable statutory value added tax.

2.1.8 Maximum price

The maximum price for Phase 1 is **€28,050.42 net or €33,380.00 gross**.

The maximum price for phase 2 is **€21,008.40 net or €25,000.00 gross**.

Bidders who submit a higher bid price will be excluded from the further procedure.

All costs, including incidental costs (e.g. travel, food and accommodation costs), must be included in the total price. Claims beyond the offer cannot be asserted against TU Berlin.

2.1.9 Place of service

All development work must take place on the Contractor's own premises. The AG does not provide any workplaces here.

Other place of service at the TUB: Technical University, Marchstraße 12-14, 10587 Berlin

2.1.10 Documents to be submitted

In addition to the required self-declarations (see award documents), the following points must be presented in writing in the tender. If the following points are not presented in writing, the offer will be excluded.

- **TUB - Offer letter from the bidder:** Please submit this document completed with the offer.
- **TUB - Price sheet (ZK²):** Please submit this completed document with the offer.
- **TUB - Declarations to be submitted by the company EU (EC):³** Please submit this document completed with the offer.
- **TUB - References (EK):** In order to prove the minimum requirements for the service team to be used in 2.1.4, the bidder must submit at least one reference in the form of a suitable overview. These must be services performed in the last 5 years. Evidence is valid that proves that comparable services have been provided. This includes publications at conferences or journals, order receipts or similar documents.

² CC = Award criterion

³ EK = Suitability Criterion

Comparable services are in the field of ground station software or mission software in space travel.

The references must contain the following information: company/authority, type and scope of the service, service period, service data.

- **TUB - CV (EK):** The bidder presents his/her team to be deployed in accordance with point 2.1.5 with a CV that may be anonymised.

- **TUB - Presentation of services of the bidder (EK):**
The tender must contain a structured presentation of the services offered. In doing so, it must be described in a comprehensible manner which services the bidder offers and how they meet the requirements of the service description (phases, service blocks, technical requirements and service team).
This description must be described on a maximum of 10 pages.

2.1.11 Award criterion and weighting

Taking into account all the circumstances, the contract will be awarded to the most economical tender. The evaluation is based on the submitted offer. Therefore, it is in the interest of the bidder to provide all requested information in as much detail and accuracy as possible.

The award criterion is **100% of the total bid price net.**

2.2 LOT 2 – CONSULTING MISSION CONCEPT + PAYLOAD

Below are the minimum requirements for LOT 2.

2.2.1 Background and objective

The subject of this lot is the technical support of the client in the development and validation of the mission concept of the RACCOON IOD mission with a special focus on regulatory framework conditions as well as on radio technology (RF) consistency and feasibility.

The lot includes support in the mission design, the independent processing of the regulatory requirements in the area of frequency use as well as the continuous independent expert analysis and evaluation of the RF concept of the mission.

The aim is to ensure the technical, regulatory and radio feasibility of the mission, to identify risks at an early stage and to iteratively improve the quality of the mission design.

For this purpose, the Contractor (Contractor) shall provide in particular:

- Contributions to the mission concept,
- a complete regulatory analysis
- full frequency coordination,
- a continuous technical evaluation of the RF design,
- as well as recommendations for the optimization of antenna concept, frequency use and communication architecture.

2.2.2 Service description

The project is divided into two phases. This lot includes services in both phases.

The lot is purely a service. All technical systems, simulations and system models are provided by the AG. Business trips and coordination are to be taken into account in the offer price.

Phase 1 "Mission Design" (expected 06.07.2026⁴ – 28.02.2027)

In this phase, the mission concept will be supported as well as the initial regulatory and RF technical assessment.

Service blocks:

⁴ The start of the service is based on the date of the award. If necessary, the contract can be awarded earlier, in which case the start of the service must be implemented promptly by the contractor in consultation with the client.

- Service block 1: Support mission concept (RF & system reference)
- Service Block 2: Regulatory Framework and Frequency Management (Part 1)
- Service Block 3: Expert Review RF Concept (Part 1)

Phase 2 "AIV & Operations" (01.03.2027 – 28.02.2028, optional extension)

In this phase, regulatory topics are deepened and finalized as well as the ongoing RF evaluation.

Service blocks:

- Service block 2 (continued): Regulatory framework and frequency management (Part 2)
- Service Block 3 (Continued): Expert Review RF Concept (Part 2)

Phase 2 will be applied for in the course of Phase 1. Approval is expected in Q1 2027. Therefore, Phase 2 is currently an **optional expansion. This optional service must be offered by the bidder in a binding manner. The Contractor will be informed of the decision as to whether this optional extension option will be additionally commissioned by 28.02.2027 at the latest.**

Service block 1: Support mission concept (RF & system reference)

The contractor supports the working group in the development and iteration of the mission concept with a focus on radio technology and system-relevant aspects.

Scope of Tasks of the Contractor

- Analysis and evaluation of the mission architecture with regard to RF-relevant aspects (frequencies, data rates, communication paths).
- Support for mission analyses and simulations with a focus on:
 - Orbitparameter, Drift und Coverage,
 - communication windows and ground station accesses,
 - Data processing and downlink strategies.
- Assess consistency between mission objectives, payload requirements, and communications architecture.
- Identification of critical dependencies (formation, contact times, frequency use).
- Advice on the design and selection of the antenna concept
- Support in the iteration of the mission architecture to ensure technical feasibility.

Minimum scope of services

The Contractor must deliver at least the following content:

- Analysis of at least **3 mission scenarios** (different orbit/communication configurations)
- Rating of at least:
 - **3 Communication architectures** (focus on different downlink strategies)
 - **3 critical dependencies** (at least formation, coverage, contact times)

- Documented rating of at least:
 - **2 antenna concepts** including comparison
- Identification and description of at least:
 - **5 Technical Risks in Mission Design**

Dependencies and boundary conditions

- Responsibility for the mission concept remains with the working group.
- The Contractor provides only technical contributions and evaluations.

Service Block 2: Regulatory Framework and Frequency Management

The Contractor is responsible for the complete analysis and implementation of the regulatory requirements in the area of frequency use.

Scope of Tasks of the Contractor

Phase/Part 1:

- Identification of all relevant regulatory frameworks (national and international).
- Analysis of frequency use in the context of the mission.
- Identification of regulatory requirements regarding:
 - transmitting power,
 - frequency ranges,
 - Beacon concepts.
- Assessment of the regulatory feasibility of the mission.

Phase/Part 2:

- Implementation of frequency coordination and preparation of frequency allocation.
- Preparation and submission of the necessary applications and documents (Depending on the development of the framework conditions for the regulation.
- Processing of objections from other operators (when coordinating frequencies for satellites)
- Processing of objections and voting in case of potential risk of interference due to subsequent International Telecommunication Union (ITU) applications
- Derivation of mission-specific regulatory requirements.

Results

- Assessment of regulatory requirements.
- Frequency Utilization Strategy.
- Spectrum applications and ITU documentation.
- Logging of frequency coordination

Minimum scope of services

The Contractor must deliver at least the following content:

- Identification and description of at least:
 - **3 relevant regulatory frameworks**
- Implementation and documentation of:
 - at least **1 complete frequency usage analysis**
- Creation of:
 - at least **1 frequency usage application (draft version)**
 - at least **1 complete ITU-related document set (draft)**
- Identification and evaluation of at least:
 - **3 Regulatory risks**
- Derivation of at least:
 - **3 Mission-specific regulatory requirements**

Dependencies and boundary conditions

- Close coordination with the AG required.
- Requirements must be compatible with mission concept and system design.

Service block 3: Expert review RF concept

The Contractor undertakes an independent, continuous expert assessment of the RF concept of the mission.

Scope of Tasks of the Contractor

The scope of tasks is uniform over both phases of the project. In phase 1, the Preliminary Design Review (PDR) is carried out, in phase 2 the Critical Design Review (CDR) and the Flight Readiness Review (FRR). Counselling is necessary throughout until the FRR, which is expected to take place in February 2028.

- Systematic review of all mission-relevant steps with regard to:
 - consistency,
 - feasibility,
 - technical risks.
- Verification of:
 - Assumptions,
 - parameters,

- Interfaces.
- Analysis and evaluation of:
 - antenna concepts,
 - Frequency use,
 - Link budget and data rates,
 - I/Q data processing.
- Identification of technical vulnerabilities and risks.
- Derivation of concrete recommendations for improvement.
- Integration of results into system documents.

Results

- Written technical assessments and reviews, in PDF format and English.
- Documented risks and optimization suggestions in PDF format and English.

Minimum scope of services

The Contractor must deliver at least the following content:

- Implementation of at least:
 - **3 structured RF reviews** (before PDR, before CDR, before FRR)
- Analysis and evaluation of at least:
 - **5 central RF parameters** (at least link budget, frequency usage, data rate, antenna concept, interfaces)
- Identification and documentation of at least:
 - **5 Technical Vulnerabilities or Risks**
- Derivation of at least:
 - **5 concrete recommendations for improvement**

Dependencies and boundary conditions

- Inputs from several work packages.
- Close coordination with the working group required through regular online meetings (at least once a month for one hour each).

2.2.2.1 TECHNICAL REQUIREMENTS

Below are all the technical requirements that are relevant to the offer. These must be taken into account by the bidder in the bid. The described verifications (Analysis(A), Test(T), Review (R)) are relevant for meeting the requirements.

ID	Requirement	Verification
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PM-01	The Contractor must regularly (at least monthly) participate in coordination meetings with the AG. The working group initiates the meetings, which take place online.	R
PM-02	The Contractor ensures that all documents are versioned and maintained in a comprehensible manner.	R
PM-03	The Contractor is obliged to comply with the schedule specified by the Client.	R
PM-04	The deployed employee must remain available for the entire term.	R
PM-05	All documents must be prepared in English and made available in PDF format.	R
SYS-01	The Contractor must analyze and evaluate the mission concept with regard to RF aspects.	R
SYS-02	The Contractor must evaluate communication parameters (frequency, data rate, coverage).	R
SYS-03	The Contractor must analyze dependencies between orbit, formation and communication and prepare a report on them.	R
SYS-04	The contractor must evaluate the antenna concept and make recommendations for selection.	R
SYS-05	The Contractor must evaluate the consistency between mission requests and the RF system.	R
REG-01	The Contractor must carry out frequency coordination for all relevant frequency bands. These are at least: UHF (TT&C), S-Band Uplink, X-Band Downlink	R
REG-02	The Contractor must prepare and submit the frequency applications.	R
REG-03	The contractor must fully comply with regulatory requirements (ITU, national).	R
REG-04	The Contractor must identify and assess regulatory risks.	R
RFV-01	The Contractor must review and evaluate all mission steps for RF consistency	R
RFV-02	The Contractor must identify technical risks in the RF system.	R
RFV-03	The Contractor must analyze and evaluate link budget and data rates	R + A
RFV-04	The Contractor must derive concrete recommendations for improvement and make them available to the Client in the form of presentations or documents	R

2.2.3 Contractor's service team

All minimum criteria mentioned here must be met and proven by suitable documents (e.g. curriculum vitae, certificates, project references).

If the minimum criteria are not fully met, the bid will be excluded from the further procedure.

Category	Minimum criterion (MK)	Description
Quantity	At least one person in a leading position	The Contractor's team must consist of at least one person who is in a management position and meets the following minimum criteria.
Experience	Satellite communication	The assigned employee must have at least 10 years of experience in the field of satellite communications or RF systems in their CV. In particular, the deployed employee must be able to demonstrate practical experience in the use of RF payloads for geolocation in the CV.
Experience	Frequency coordination	The deployed employee must have at least 10 years of verifiable experience in the field of frequency coordination and frequency allocation (ITU, national authorities) and must provide evidence of this in their CV. In this case, the employee must have demonstrably carried out both the regulatory steps (ITU registration, correspondence with national authorities) and the technical steps (link budget, impact analyses, coordination meetings) independently.
Language	Language skills	The employee employed must have business fluency in German and English.
Availability	Attending a meeting	The Contractor must ensure that he is available for a status meeting with the AG once a month.
Availability	Project duration	The assigned employee must be available for the entire duration of the project, including an optional extension.

2.2.4 Milestone plan

The project milestones result from the completion of the respective work blocks 1 – 3. The specified deadlines of phases 1 and 2 must be adhered to in a binding manner. If a service block has been completed and it has been accepted by the Client, it is considered to have been fulfilled.

2.2.5 Payment plan

Payments are made after completion and acceptance by the AG of the individual service blocks.

Description	%- Payment of the offer price
Phase 1	<i>acc. to OV-080-26 Price sheet, rider lot 2, item 1</i>
Service block 1	30 %
Service block 2	40%
Service block 3	30%
Phase 2 – if commissioned	<i>acc. to OV-080-26 Price sheet, rider lot 2, item 2</i>
Service block 2	50%
Service block 3	50%

The remuneration is paid plus the applicable statutory value added tax.

2.2.6 Maximum price

The maximum price for Phase 1 is **€25,210.00 net or €30,000.00 gross**.

The maximum price for phase 2 is **€24,790.00 net or €29,500.00 gross**

Bidders who submit a higher bid price will be excluded from the further procedure.

Claims beyond the offer cannot be asserted against TU Berlin.

2.2.7 Place of service

All development work must take place on the Contractor's own premises. The AG does not provide any workplaces here. The monthly meetings take place online. The working group initiates the meetings and provides the digital meeting room.

Other place of service at the TUB: Technical University, Marchstraße 12-14, 10587 Berlin

2.2.8 Documents to be submitted

In addition to the required self-declarations (see award documents), the following points must be presented in writing in the tender. If the following points are not presented in writing, the offer will be excluded.

- **TUB - Offer letter from the bidder:** Please submit this document completed with the offer.
- **TUB - Price sheet (ZK⁵):** Please submit this completed document with the offer.
- **TUB - Declarations to be submitted by the company EU (EC):⁶** Please submit this document completed with the offer.
- **TUB - References (EK):** In order to prove the minimum requirements for the service team to be deployed in 2.2.3, the bidder must submit at least two references in the form of a suitable overview. These must be services performed in the last 10 years. Evidence is valid that proves that comparable services have been provided. This includes publications at conferences or journals, order receipts or similar documents.

Comparable services are in the field of consulting for satellite communications and frequency coordination.

The references must contain the following information: company/authority, type and scope of the service, service period, service data.

- **TUB - CV (EK):** The bidder presents his/her team to be deployed in accordance with point 2.2.3 with a CV that may be anonymised.
- **TUB - Presentation of services of the bidder (EK):**
The tender must contain a structured presentation of the services offered. In doing so, it must be described in a comprehensible manner which services the bidder offers and how they meet the requirements of the service description (phases, service blocks, technical requirements and service team).
This description must be described on a maximum of 10 pages.

2.2.9 Award criterion and weighting

⁵ CC = Award criterion

⁶ EK = Suitability Criterion

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Taking into account all the circumstances, the contract will be awarded to the most economical tender. The evaluation is based on the submitted offer. Therefore, it is in the interest of the bidder to provide all requested information in as much detail and accuracy as possible.

The award criterion is **100% of the total bid price net.**