

**ERASMUS +**

**HIGHER EDUCATION – INTERNATIONAL CAPACITY BUILDING**

**Erasmus+ Project**

**New Study Program in Space Systems and Communications Engineering**

**(SPACE.COM)**

**Invitation to Tender for Equipment Procurement –**

**Ground Station LAB2**

**(Uzbekistan)**

#SPACECOM2020

Dear Sir/Madam,

We kindly invite you to submit your **tender for the supply of Equipment to the project partner universities in Uzbekistan** (see the technical specifications provided in the Part-III of the main document) within the framework of the Project “*New Study Program in Space Systems and Communications Engineering*” – (*SPACE.COM)*, co-funded by the **ERASMUS+ Programme of the European Union**.

When preparing your tender, please be guided by the invitation to tender.

Tenders should be submitted in English **by Email** tospacecom.tender@gmail.com not later than **28.08.2020** (Tashkent local time).

We kindly ask you to ensure that the tender is **signed, stamped, and in the PDF format**. An acknowledgement of receipt will be sent to you accordingly.

In all cases, please add the below reference: #SPACECOM2020 “Invitation to Tender for Equipment Procurement – Ground Station LAB2 (Uzbekistan)”.

*For any additional information, please, contact us* ***only*** *by Email.*

Dr. Khabibullo Nosirov

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# Annex 1: Company Information Sheet

#SPACECOM2020 “Invitation to Tender for Equipment Procurement – Ground Station LAB2 (Uzbekistan)”

*Please, fill in all fields.*

|  |
| --- |
| **Bidderʼs Information** |
| **Company legal name**  |  |
| **Company legal address**  |  |
| **Company E-Mail** |  |
| **Company authorized representative**(name, address, telephone number(s), fax number(s) and e-mail address) |  |
| **Attached are copies of the following documents:*** A photocopy of the trade name registration papers
 |

# Annex 2: Equipment Description

#SPACECOM2020 “Invitation to Tender for Equipment Procurement – Ground Station LAB2 (Uzbekistan)”

*Please, fill in all fields.*

|  |
| --- |
| **Ground Station LAB2: //The table of equipment required for one university** |
| **#** | **Required Technical Specifications and Standards** | **Quantity** |
| ***#1C*** | ***HF/VHF/UHF-Allmode-Transceiver with D-Star DV-Mode*** |  ***1 pc*** |
| **1** | **Intuitive Touch Screen Interface: 48.6 mm x 75.9 mm** |  |
| **2** | **HF/50/70/144/430MHz Multi-band, Multi-mode** |  |
| **3** | **A high-performance 32-bit floating point IF DSP delivers rich digital signal processing features, including digital IF filter, digital twin PBT, noise reduction, CW auto tune, etc.** |  |
| **4** | **DSP Controlled AGC Function Loop** |  |
| **5** | **D-STAR DV Mode (Digital Voice + Data)** |  |
| **6** | **DR (D-STAR Repeater) Mode Operation** |  |
| **7** | **SD Memory Card Slot for Saving Data** |  |
| **8** | **Easy Vehicle Mounting with Optional MBF-1** |  |
| **9** | **Optional RS-BA1 IP Remote Control Software** |  |
| **10** | **Built-in RTTY Functions** |  |
| **11** | **CW full break-in, CW receive reverse, CW auto tuning** |  |
| **12** | **Optional multi-function microphone, HM-151** |  |
| **13** | **RF speech compressor controlled by the DSP** |  |
| **14** | **495 regular, 4 call, 6 scan edge and 900 DR mode repeater channels** |  |
| **15** | **4 channels TX voice memories** |  |
| **16** | **±0.5ppm frequency stability** |  |
| **17** | **12kHz IF output for DRM (Digital Radio Mondiale) receive** |  |
| **18** | **Straight Forward Operation** |  |
| **19** | **Software Keypad** |  |
| **20** | **Separate control panel** |  |
| **21** | **Controller Mounted Speaker and Jacks** |   |
| **22** | **All interfaces cables and connectors must be included** |  |
|  |
| ***#2C*** | ***Power Supply to ICOM Transceiver*** |  ***1 pc*** |
| **1** | **External switching power supply unit** |  |
| **2** | **13.8 VDC ± 5%, at 25 Amps** |  |
| **3** | **Input voltage is 120 VAC (85-135 VAC)** |  |
| **4** | **The rear panel has 14 inch output cord with 4-pin plug prewired for the IC-7100, IC-7200, IC-7410 and IC-7600, IC-9100** |  |
| **5** | **4.4 x 3.7 x 11.3 inches 6 lbs. 10 oz.**  |  |
|  |
| ***#3C*** | ***YAESU G-5500 Azimuth/Elevation combination Rotator*** |  ***1 pc*** |
| **1** | **Wind Load: 1,0 m²** |  |
| **2** | **K-Factor: 60 (Turning Radius x Weight of Ae)** |  |
| **3** | **Stationary Torque AZ: 4.000 kg/cm** |  |
| **4** | **Stationary Torque EL: 4.000 kg/cm** |  |
| **5** | **Rotation Torque AZ: 600 kg/cm** |  |
| **6** | **Rotation Torque EL: 1.400 kg/cm** |  |
| **7** | **Max Vertical Load: 30 kg** |  |
| **8** | **Max Vertical Intermittend Load: 100 kg** |  |
| **9** | **Backlash AZ: 1º** |  |
| **10** | **Backlash EL: 1º** |  |
| **11** | **Mast Size AZ: ø 38-62 mm** |  |
| **12** | **Mast Size EL: ø 38-62 mm** |  |
| **13** | **360º Rotation Time AZ: 70sec @ 50Hz** |  |
| **14** | **180º Elevation Time EL: 80sec @ 50Hz** |  |
| **15** | **Boom Diameter EL: ø 32-43** |  |
| **16** | **Rotator Diameter x Height: ø186 x W254 x H350 mm** |  |
| **17** | **Weight: 7,8 kg** |  |
| **18** | **Cable Requirement: 2 x 6 (# cores/wires) - 1 for each AZ + EL** |  |
|  |
| ***#4C*** | ***Mast preamplifier 70cm/430-450 MHz*** |  ***1 pc*** |
| **1** | **Freq Range MHz (MHz): 430 – 440** |  |
| **2** | **Insertion Loss (dB): 0.15** |  |
| **3** | **Noise Figure (dB): 0.7** |  |
| **4** | **Amplification (dB): typ. 12 – 22** |  |
| **5** | **Max. Power: Mit Sequencer: 500 (SSB), 300 (FM), mit VOx: 50 W FM** |  |
| **6** | **Current Intake (A): 0.320** |  |
| **7** | **Max. Power Handling: 500W** |  |
| **8** | **Noise Figure: 0.8000** |  |
| **9** | **Connector A: N Socket** |  |
| **10** | **Connector B: N Socket** |  |
| **11** | **Supported Bands: 70cm** |  |
| **12** | **Max. Mast Diameter (mm): 58** |  |
| **13** | **Adjustable gain, low noise and good large-signal response** |  |
| **14** | **Amplifier is built with a GaAs MMIC of the latest technology on high quality microwave substrate in SMD technology** |  |
| **15** | **UV-resistant plastic housing** |  |
| **16** | **Galvanized mast clamps with stainless steel screws** |  |
|  |
| ***#5C*** | ***X-Quad Antenna 432 MHz*** |  ***2 pcs*** |
| **1** | **Switchable polarisation possible (hor, vert, circ. right, circ. left, diagonal)** |  |
| **2** | **Short boom length and comapct overall size** |  |
| **3** | **Can be mounted ion front of mast or centrally on mast** |  |
| **4** | **Weight [kg]: 1.600000** |   |
| **5** | **Stacking Distance: 110.0000** |   |
| **6** | **Max. Power Handling: 1000W** |   |
| **7** | **Number of Elements: 2 x 18** |  |
| **8** | **Stacking Distance (cm): 110** |  |
| **9** | **Front Back Ratio (dB): 21** |  |
| **10** | **Half Power Beam Width (3dB) Vertical: 36** |  |
| **11** | **Half Power Beam Width (3dB) Horizontal: 36** |  |
| **12** | **Supported Bands: 70cm** |  |
| **13** | **Length [m]: 12.7 m** |  |
| **14** | **Height [m]: 22 cm** |  |
|  |
| ***#6C*** | ***Lightning protection N Bu/St 400W*** |  ***2 pcs*** |
| **1** | **Max. Power 500-3000 MHz (W): 400** |  |
| **2** | **Insertion Loss 500 MHz (dB): < 0.3** |  |
| **3** | **Insertion Loss 1500 MHz (dB): < 0.3** |   |
| **4** | **Insertion Loss 3000 MHz (dB): < 0.3** |  |
| **5** | **Upper frequency limit (kHz): 3000** |   |
| **6** | **Max. Power 30-500 MHz (W): 400** |  |
| **7** | **Max. Power 0-30 MHz (W): 400** |  |
| **8** | **Breakthrough Voltage (V): 1000** |   |
| **9** | **Max. Power Handling: 400W** |  |
| **10** | **Connector B: N Socket** |  |
| **11** | **Connector A: N Plug** |  |
| **12** | **Size W x H x D: 77 x 41 x 21** |  |
| **13** | **For in-line use** |  |
| **14** | **Can be used in the coax cable directly at the antenna base** |  |
| **15** | **M4 thread for connection of a grounding wire** |  |
| **16** | **Weight [kg]: 0.110000** |  |
|  |
| ***#7C*** | ***Coaxial Cable 40m*** | ***1 pc*** |
| **1** | **Highly flexible, low-loss innovative coaxial cable** |  |
| **2** | **Use up to 8 GHz** |  |
| **3** | **Low-loss PE-LLC dielectric** |  |
| **4** | **Gas content of more than 70%** |   |
| **5** | **7-wire hybrid inner conductor with aluminum core and welded copper sheath** |  |
| **6** | **Double shielding** |  |
| **7** | **User-friendly solderless N connector** |  |
| **8** | **Low attenuation, ultra-flexible, anti-radiation safe** |  |
| **9** | **Can be used up to the microwave range** |  |
| **10** | **Diameter: 10.2 ± 0.2 mm** |  |
| **11** | **Impedance: 50 ± 2 Ω** |  |
| **12** | **Attenuation at 1 GHz / 100 m: 13.49 dB** |  |
|  |
| ***#8C*** | ***Coax switch 4fold 2xN 2xPL*** | ***2 pcs*** |
| **1** | **Solid aluminium case** |  |
| **2** | **Available with PL or N connectors (female)** |  |
| **3** | **Excellent frequency response up to 600MHz (CO-201)** |  |
| **4** | **Max. Power Handling: 1500W** |  |
|  |
| ***#9C*** | ***R&S®FS 300 Spectrum Analyzer*** |  ***2 pcs*** |
| **1** | **Frequency range: 9 kHz to 3 GHz** |  |
| **2** | **Frequency counter with 1 Hz resolution** |  |
| **3** | **Resolution bandwidths (–3 dB): 200 Hz to 1 MHz**  |  |
| **4** | **Video bandwidths: 10 Hz to 1 MHz** |  |
| **5** | **Displayed average noise level: < –110 dBm, typ. –115 dBm (300 Hz)** |  |
| **6** | **Intermodulation-free range: < –70 dBc at –36 dBm input level** |  |
| **7** | **SSB phase noise, 10 kHz offset: < –90 dBc (1 Hz)** |  |
| **8** | **Level uncertainty: < 1.5 dB, typ. 0.7 dB** |  |
| **9** | **Maximum input level +33 dBm** |  |
| **10** | **Measurement functions: TOI, TDMA power, frequency counter, noise marker**  |  |
| **11** | **Display type: 5.4 inch active color LCD** |  |
| **12** | **Remote control via USB interface** |  |
| **13** | **Detector: peak** |  |
| **14** | **High picture refresh rate** |  |
| **15** | **Scalar network analysis** |  |
| **16** | **Internal memory for settings and traces** |  |
| **17** | **Locating EMC weak spots** |  |
| **18** | **Ergonomic user interface** |  |
| **19** | **All interfaces cables and connectors must be included** |  |
|  |
| ***#10C*** | ***LCR Bridge/Meter*** | ***1 pc*** |
| **1** | **Measurement range: 20 Hz to 200 kHz (69 steps)** |  |
| **2** | **Basic accuracy: 0.05 %** |  |
| **3** | **Measurement rate: up to 12 values/s** |  |
| **4** | **Automatic or manual selection of circuit type (serial, parallel)** |   |
| **5** | **Measurement functions: L, C, R, |Z|, X, |Y|, G, B, D, Q, Φ, ∆, M, N** |  |
| **6** | **Transformer measurement: mutual inductance and ratio*** **Internal: 0 V to 5 V/0 mA to 200 mA (resolution: 10 mV/1 mA)**
* **External: 0 V to 40 V (bias voltage only)**
 |  |
| **7** | **RS-232/USB dual interface for remote control, optionally IEEE-488 (GPIB)** |  |
| **8** | **Fanless design** |  |
| **9** | **All cables and connectors must be included** |  |
|  |  |  |
| ***#11C*** | ***Arbitrary Function Generator*** | ***1 pc*** |
| **1** | **Waveforms: Sine, Square, Ramp, Noise, Arbitrary Waveform** |  |
| **2** | **Arbitrary Waveform:*** Sample Rate: 20 MSa/s
* Repetition Rate: 10MHz
* Waveform Length: 4k points
* Amplitude Resolution: 10 bit
* Non-Volatile Memory: 4k points

**Frequency Characteristics:*****Range**** Sine, Square: 0.1Hz - 5MHz

***Resolution*** * Sine, Square, Ramp: 0.1Hz

***Accuracy*** * Stability: ±20 ppm
* Aging: ±1 ppm, per 1 year
* Tolerance: ≦ 1 mHz

**Output Characteristics:*****Amplitude*** * **Range:**

1 mVpp to 10 Vpp (into 50Ω), 0.1Hz～20MHz2 mVpp to 20 Vpp (open-circuit), 0.1Hz～20MHz 1 mVpp to 5 Vpp (into 50Ω), 20MHz～25MHz2 mVpp to 10 Vpp (open-circuit), 20MHz～25MHz* **Accuracy:** ± 2% of setting ±1 mVpp (at 1 kHz/into 50Ω without DC offset)
* **Resolution:** 1 mV or 3 digits
* **Flatness:**

± 1% (0.1dB) ≦100kHz± 3% (0.3 dB) ≦5MHz± 4% (0.4 dB) ≦12MHz± 20% (2 dB) ≦20MHz± 5% (0.4 dB) ≦25MHz(sine wave relative to 1 kHz/into 50Ω)* **Units: Vpp, Vrms, dBm**

**Offset:*** **Range:**

±5 Vpk AC+DC (into 50Ω)±10Vpk AC+DC (Open circuit)±2.5 Vpk AC+DC (into 50Ω) for 20MHz-25MHz±5Vpk (Open circuit) for 20MHz-25MHz* **Accuracy:** 2% of setting + 10 mV+ 0.5% of amplitude

**Output:*** **Impedance:** 50Ω typical (fixed) > 300kΩ (output disabled)
* **Protection (main output):** Short-circuit protected by overload relay automatically disables main output

**SYNC Output:*** **Level:** TTL-compatible into>1kΩ
* **Impedance:** 50Ω nominal
* **Rise or Fall Time:** ≦25ns

**Sine wave Characteristics:*** **Harmonic Distortion:**

–55 dBc DC ~ 200kHz, Ampl > 0.1Vpp–50 dBc 200kHz ~ 1MHz, Ampl > 0.1Vpp–35 dBc 1MHz ~ 5MHz, Ampl > 0.1Vpp–30 dBc 5MHz ~ 25MHz, Ampl > 0.1Vpp**Square wave Characteristics:*** **Rise/Fall Time:** ≦25ns at maximum output (into 50Ω load)
* **Overshoot:** < 5%
* **Asymmetry:** 1% of period+1 ns
* **Variable Duty Cycle:**

1.0% to 99.0% ≦ 100kHz20.0% to 80.0% ≦ 5 MHz40.0% to 60.0% ≦10MHz50% ≦ 25MHz(1% Resolution for full Frequency Range)**Ramp Characteristics:*** **Linearity:** ＜ 0.1% of peak output
* **Variable Symmetry:** 0% to 100% (0.1% Resolution)
 |  |
| **3** | **Store/Recall: 10 Groups of Setting Memories** |  |
| **4** | **Interface: USB(Device)** |  |
| **5** | **Display: LCD** |  |
| **6** | **Power Source: AC100～240V, 50～60Hz** |  |
| **7** | **Power Consumption: 25 VA** |  |
| **8** | **Operating Environment:** * Temperature to satisfy the specification: 18 ~ 28∘C
* Operating temperature: 0 ~ 40∘C
* Relative Humidity:

≤ 80%, 0 ~ 40°C ≤ 70%, 35 ~ 40°C* Installation category: CAT Ⅱ
 |  |
| **9** | **Operating Altitude: 2000 meters** |  |
| **10** | **Storage Temperature: - 10 ~ 70∘C, Humidity: ≤70%** |  |
| **11** | **All cables and connectors must be included** |  |
|  |
| ***#12C*** | ***Phase line 2m f. X-Quad w. connectors*** | ***2 pcs*** |
| **1** | **Combines the two radiators to one cable** |  |
| **2** | **For circular polarization** |  |
|  |
| ***#13C*** | ***Power splitter 2 m f. 2 antennas, 2000W*** | ***2 pcs*** |
| **1** | **Max. Power Handling: 2000W** |  |
| **2** | **Supported Bands: 2m** |  |

# Annex 3: Commercial Offer

Note –

*The Company must accomplish the commercial offer for equipment on its letterhead clearly showing the companies complete name and address.*

To: The Rector of TUIT

Prof. Tulkin Teshabaev

|  |
| --- |
| ***Commercial offer for the equipment supply within the framework of the project***  ***New Study Program in Space Systems and Communications Engineering*** ***(SPACE.COM)***#SPACECOM2020 “Invitation to Tender for Equipment Procurement – Ground Station LAB2 (Uzbekistan)” |

Name of Company \_\_ **\_\_\_\_\_\_\_\_\_**\_\_\_\_

**Ground Station LAB2**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Item** | **Description** | **Quantity****(pcs) for 1 University** | **Unit Price (EUR)** | **Total Price per item (EUR) for 1 University** | **Grand Total Price per item (EUR) for 6 Universities** |
| **1** | **2** | **4** | **5** | **6=4 х 5** | **7** |
| #1C | Allmode-Transceiver with D-Star DV-Mode | 1 |  |  |  |
| #2C | Power Supply | 1 |  |  |  |
| #3C | YAESU G-5500 Azimuth/Elevation combination Rotator | 1 |  |  |  |
| #4C | Mast preamplifier 70cm/430-450 MHz | 1 |  |  |  |
| #5C | X-Quad Antenna 432 MHz | 2 |  |  |  |
| #6C | Lightning protection N Bu/St 400W | 2 |  |  |  |
| #7C | Coaxial Cable 40m | 1 |  |  |  |
| #8C | Coax switch 4fold 2xN 2xPL | 2 |  |  |  |
| #9C | R&S®FS 300 Spectrum Analyzer | 2 |  |  |  |
| #10C | HM8118 LCR Bridge/Meter | 1 |  |  |  |
| #11C | AFG-72005 Arbitrary Function Generator | 1 |  |  |  |
| #12C | Phase line 2m f. X-Quad w. connectors | 2 |  |  |  |
| #13C | Power splitter 2 m f. 2 antennas, 2000W | 2 |  |  |  |
| **Total Amount (Euro) excluding VAT** |  |  |

Total amount in words (for 1 University): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Grand total amount in words (for 6 Universities): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If there is a discrepancy between words and figures, the amount in words shall prevail

Warranty conditions:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Delivery conditions:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Delivery period:

\_\_\_\_\_\_ days from the date of signature of the contract

Name

In the capacity of

Signed

Duly authorized to sign the company for and on behalf of

Date

Stamp