# *ANNEX II + III:* TECHNICAL SPECIFICATIONS + TECHNICAL OFFER

**Contract title: Supply of astronomical equipment for the project ELECTRA p 1/14**

**Publication reference:** **HUSRB/1903/31/0046-6/astronomical equipment 6.1.1; 6.1.2; 6.1.3; 6.1.4; 6.1.5; 6.1.6; 6.1.7; 6.1.8; 6.1.9**

**Columns 1-2 should be completed by the contracting authority**

**Columns 3-4 should be completed by the tenderer**

**Column 5 is reserved for the evaluation committee**

Annex III - the contractor's technical offer

The tenderers are requested to complete the template on the next pages:

* Column 2 is completed by the contracting authority shows the required specifications (not to be modified by the tenderer),
* Column 3 is to be filled in by the tenderer and must detail what is offered (for example the words ‘compliant’ or ‘yes’ are not sufficient)
* Column 4 allows the tenderer to make comments on its proposed supply and to make eventual references to the documentation

The eventual documentation supplied should clearly indicate (highlight, mark) the models offered and the options included, if any, so that the evaluators can see the exact configuration. Offers that do not permit to identify precisely the models and the specifications may be rejected by the evaluation committee.

The offer must be clear enough to allow the evaluators to make an easy comparison between the requested specifications and the offeredspecifications.

**Lot no. 1 – Planetarium projector**

| **1.**  **Item number** | **2.**  **Specifications required** | **3.**  **Specifications offered** | **4.**  **Notes, remarks,  ref to documentation** | **5.**  **Evaluation committee’s notes** |
| --- | --- | --- | --- | --- |
| **1** | **Planetarium projector** with next characteristics – **1 set:**  DLP Projector  \* Laser light source  \* 6000 ANSI Lumens High Brightness  \* True 4K UHD HDR  \* 3D  \* Big zoom & Lens shift  \* 360-degree Projection  \* HD BaseT  \* Projector and remote control ID setting  Display:  Projection System DLP Single 0.67" XPR 4K  DMD type DC3 DMD Chip  Native Resolution 4K UHD (3840 x 2160)  Brightness 6000 ANSI Lumens  Contrast Ratio\* 3,000,000:1  Display Color 30 Bits (1.07 billion colors)  Aspect Ratio Native 16:9 (8 aspect ratio selectable)  Light Source Laser  Optical:  Optical block: Right angle with mirror  Throw Ratio 1.38~2.02  Zoom Ratio 1.47x  Lens Control Manual Zoom and Focus  Lens shift Manual lens shfit, V: ±60 %; H: ±25 %  Keystone Correction NA  Projection Offset NA  Projection Size 30" ~ 300 |  |  |  |
|  | Special Feature:  Security Bar - Security Bar  Feature:  4K UHD, HDR, 3D, Projector/ Remote Control ID Setting, Auto High Altitude Mode, HDBaseT, LAN Control, 360∘Projection, 4K Upscaling, True Zoom. 24/7 Hours Operating. IP6X Dust Proof Engine. Liquid Cooling System.  Compatibility: Resolution Support VGA (640 x 480) to 4K (3840 x 2160)  Horizontal Frequency 15K ~135KHz  Vertical Scan Rate 23~120Hz  HDTV Compatibility SDTV(480i/576i), EDTV (480p/576p, HDTV (720p, 1080i 60/50, 1080P 50/60/30/25/24, 3840x2160p 60/50/30/25/24)  Power:  Power Consumption (Max/Normal/Eco) Max 745W/ Normal 655 W/ Eco 470 W  Standby Power Consumption Normal < 0.5W, Network <2W  Power Supply 100 ~ 240V AC  Operation Condition:  Noise Level (Normal/Eco) 37 /34 dBA  Operating Temperature 0 ~ 40°C  Accessories  Accessories (Standard) Power Cord  Remote control (RCA011)  Lens cover  AAA Batteryx2  Installation Guide  Cable Tie Setx2  Rubber Cap  Accessories (Optional) Ceiling Mount CMG5 (5J.JFY10.001)  OSD  Platform: Aluminum Support |  |  |  |
|  | Delivery place must be Trg Dositeja Obradovića no. 3, 21000 Novi Sad |  |  |  |
|  | Warranty period must be min. 2 (two) years from the date of provisional acceptance |  |  |  |

**Lot no. 2 - Astronomical telescope, camera and other astronomical equipment**

| **1.**  **Item number** | **2.**  **Specifications required** | **3.**  **Specifications offered** | **4.**  **Notes, remarks,  ref to documentation** | **5.**  **Evaluation committee’s notes** |
| --- | --- | --- | --- | --- |
| **1** | **Light Shroud for RC TRUSS Telescopes** with next characteristics – **1 pc:**  Light shroud be appropriate to protect:  - Suitable for 16" RC Truss Telescopes  - Protects against stray light, dust and dew  - Can remain at the telescope, but also quickly be mounted or unmounted  - Without hook-and-loop shapes which could entangl |  |  |  |
| **2** | **USB Focuser for telescope** with next characteristics – **1 pc:**  Robotic focusing motor for telescope.  Compatible with most focusers, to remotely control focuser without vibration and with high precision.  With precise control motor with integrated electronics achieves precision of 0.7 microns.  ASCOM driver or equiv. and configuration software.  Robotic focusing motor for telescope designed for astrophotography. It must be appropriate to SESTO SENSO software or equivalent that allows to directly control the focuser and ASCOM drivers or equivalent can use it with the astrophotography software solutions like BackyardEOS, BackyardNikon, MaximDL, FocusMax, Voyager, Sequence Generator Pro or equivalent. Software must be appropriate to allow user to adjust various advanced settings:  - Movement speed and acceleration/deceleration ramps  - Motor torque to increase the focuser weight load capacity of the camera when the focuser is stationary  - Moving and positioning test with reading of steps number |  |  |  |
|  | - Selection of pre-settings for low, medium and heavy loads  - Reading of stored settings in the internal electronics  - Reading of temperature (requires optional temperature probe)  Compact, lightweight and integrated design  Robotic focusing motor for telescope has three ports:  - One 12V power supply port that powers the motor and integrated electronics  - Second USB connection port  - A third port allows for connecting an optional temperature sensor. This enables auto focus adjustment procedures with the ambient temperature variation.  - Compatible with many focusers.  - Input voltage: 12V  - Material: Aluminium  - Type: Focuser  - Type of build: Motors & Controls |  |  |  |
| **3** | **Electronic Collimator for RC Telescopes and all other Types of Telescopes** with next characteristics – **1 pc:**  Smart device allows you to collimate your Newtonian, SC and RC telescope through a laptop or an Android device or equivalent OS in a simple, precise and fast way.  - Quick and easy: Collimate your instrument in just 4 steps  - Can check if the center mark on the primary mirror is made correctly or not. |  |  |  |
|  | - Increased level of pixel accuracy, also suitable for Newtonians faster than f/5  - T2 thread (M42x0.75) to minimize installation errors  - Thanks to the collimation assistance feature the result is shown immediately on the screen.  - You can also use the screenshot feature to save the result of the collimation.  - Comes with two adapters for easier installation to the telescope  - Comes with OTG adapters for the USB connection to an Android smartphone |  |  |  |
| **4** | **Control Unit for Telescopes and Astrophotography** with next characteristics – **1 pc:**  Control all the instruments used in astrophotography: no more uncomfortable laptops, large batteries or annoying cables on the field.  - Integrates a computer running OS simmilar to Windows 10 Enterprise or equivalent, a USB hub, a power bridge and a WiFi system  - Low power consumption of 600 mA (average)  - USB and 12 V power out ports, the latter ones show the consumption via software  - Monitors sky quality  - Aluminum case PLUS compatible that can be connected in various ways to your telescope  - Additional features: GPS sensor, sky quality sensor and dark mode with all LED lights turned off  - SSD space: 120 GB  - RAM memory: min. 4 GB |  |  |  |
| **5** | **Flat field Panel** with next characteristics **– 1 pc:**  - Flatfield diameter 590 mm illuminated area  - Total diameter 714 mm  - With 220 V inverter  - Perfectly even illumination over the entire area  - The complete spectrum is available, even working with narrowband emission line filters is possible  - Significantly lighter than flat field generators with backlight  - Readily mounted in a rigid frame with protected edge  - An opaque front plate provides additional protection to the foil and gives an even more uniform illumination |  |  |  |
| **6** | **Astronomical CMOS Mono camera with filter wheel and filters** with next characteristics **– 1 set:**  - The full frame sensor with a diagonal of approximately 43mm  - light sensitivity and the very low amplifier  - USB 3.0  - DDR3 memory buffer for stable data transfer with USB2.0 - to minimizes amplifier glow  - Peltier cooling up to 35 °C under ambient conditions  - CMOS sensors  - High resolution by 3.76 µm pixels  - High sensitivity (QE ca. 80%)  - 16-bit ADC  Size of chip (mm): 24 x 36 (Full Frame) |  |  |  |
|  | Megapixel: 61,2  Pixel size: 3,8  Resolution Photograph (Pixel): 9600 x 6400  Bit depth (Bit): 16  Active cooling: yes  Interfaces: USB 3.0 & USB 2.0  Connection (to the telescope): M54  Operating temperature: -5 - 45  Images per second: 2 (at full resolution)  Full Well Capacity: 51k  Flange focal distance (mm): 17,5  Power supply: 12 (3A)  buffer memory (Megabyte): 256  Internal memory: DDR3 RAM |  |  |  |
|  | 1. *Compact filter wheel for mono cameras* - used for astrophotography with L-RGB filters and nebula filters**:**   - Aluminium housing  - Stepper motor for the filter exchange - from NPM  - Thickness: 20 mm  - Powered via USB - low power consumption  - Connection at telescope side: M54x0.75 female, M48x0.75 female and T2 female  - Suitable for mounted 2" filters or unmounted 50.4 mm filters - no vignetting even with larger sensors or faster telescopes  - This filterwheel was developed for the full-frame camera.  - Max. number of filter slots (piece): 7  - Filter slot: 2"  - Connection (to the telescope): M54  - Optical length (mm): 20  - Power supply USB 2.0  - Motor-powered: yes  - Series: EFW |  |  |  |
|  | 1. *2 Inch Filter Set Ultra-Narrowband Highspeed H-Alpha, O-III, S-II - CMOS optimized***:**   Ultra - narrowband H-alpha nebula filter by Baader-Planetarium for astrophotography with CMOS sensors for high contrast for fast telescopes and telephoto lenses from f/3.4 to f/1.8  - H-Alpha - 3,5 nm FWHM  - O-III - 4 nm FWHM  - S-II - 4 nm HWB  - 2" mounted with filter thread on both sides  - Low profile filter cell - height only 6 mm  - Optimized for CMOS sensors (Color and MONO)  - Especially suitable for fast telescopes or fast refractors and camera lenses  - Reflex blocker coating against reflections in combination with correctors placed near the filter  - The 4 nm at S-II and O-III offer a better harmonization of the exposure time with the H-alpha filter  - Identical filter thicknesses for parfocality  - Blackened edges  - The front side is marked in the form of a black outer edge (front side indicator)  - The edge of the filter is sealed, so no moisture can get in  - Life-Coat - an even harder coating for a virtually unlimited lifetime  - Central wavelength (nm): 656,3 & 500,7 & 671,7  - Half-value width (nm): 3,5 & 4  - Frame: 2" |  |  |  |
|  | - Mount material: Aluminium  - Connection (to the telescope): 2"  - Appropriate for...f/10 - f/3.5  - filter thickness (mm): 2  - Type: Filters  - Type of build: line filter  - Series: Ultra-Narrowband   1. *UV/IR blocking filter and the R-G-B filter set - the filters are optimized for modern CMOS cameras:*   - Filter size 2" mounted - filter thickness 2 mm  - Low profile filter mount with only 6 mm height  - Set of luminance filter (UV/IR) and R-G-B filter set  - RGB (Red/Green/Blue) filter with high transmission for the respective color channel  - Luminance filter (UV/IR blocking) with 98% transmission over the entire visible spectrum  - Anti-reflective coating "Reflex-Blocker" - stray light and reflections are reduced to an unprecedented level  - Balanced RGB design allows images to be captured with equal exposure time per color channel  - Blackened edges with front side indicator (blackened outer edge towards telescope)  - Life-Coat - an even harder coating for a virtually unlimited lifetime  - Each filter is delivered in a stackable plastic packaging with imprint  - Frame: 2"  - filter thickness (mm): 2  - Number (piece): 4  - Transmission: 98  - passband (nm): 400-510, 490-580, 595-690, 420-685  - Type of build: L-RGB Filters  - Series: L-RGB CMOS |  |  |  |
| **7** | **Telescope mount containing GoTo system** with next characteristics – **1 pc:**  - Versatile German Equatorial Mount  - High-quality workmanship  - payload 100 kg  - 20" positioning accuracy, 1" tracking accuracy (at 15 min tracking time)  - Absolute encoders determine the position even if one axis is shifted by hand  - 12°/sec positioning speed and satellite tracking  Standard configuration of all HPS Mounts - 4-lines stand-slone keypad with metal housing and heated screen  - embedded computer controller with Linux managment system for complete remote use of the mount incl. all functions such as satellite tracking, moon feature and more - Interface: RS232, Ethernet, Wi-Fi - Connectors for: GPS, autoguider, keypad, mount, Aux and Remote Switch - Latest QCI software (Version 2.x)  Connection cables, counterweight bar - PC software must be adequate for Virtual Keypad, Clock Sync Tool, Multi Mount, ASCOM driver or equivalent  *5" Dovetail Clamping Plate*  This plate must be designed to handle very heavy instruments.  - Needs a 5" slide bar as counterpart  - Made of CNC machined aluminum, black anodized, thus precise and durable  - Three safety locking set screws (non-marring)  - Diameter of the clamp: 450 mm |  |  |  |
|  | *Stainless steel counterweight 20 kg*  Stainless steel counterweight for mount  - weight: up to 20 kg  - bore: 50 mm  - material: stainless steel  - Handle clamping for quick balancing of the weight  - Final clamping by allen key  *High End Power Supply for the mounts*  Power: 240 V  Output voltage: from 22 to 29 V  Output current: 10.5 A  *Pier and Tripod Adapter*  - Steel column flange for mount  - For connecting the mount to columns and tripods.  *Transport box for forwarding shipment of mount*  - mandatory if the mount is delivered by freight forwarding. |  |  |  |
| **8** | **16 inch - 20 inch f/8 Ritchey Chretien Astrograph** - Carbon OTA **-** with next characteristics **– 1 pc:**  **-** Aperture: 16 inch ( 406 mm ) ;  - Focal length (mm) 3250  - Aperture ratio (f/) 8  - Resolving capacity 0,28  - Limit value (mag) 15,5  Main mirror´s construction: hyperbolic  - Secondary mirror material: Quartz  - Primary mirror – Material: Quartz  - Secondary mirror diameter (mm): 190  - Reflectivity: 94%  - 6" Losmandy-style mounting plate |  |  |  |
|  | Delivery place must be Trg Dositeja Obradovića no. 3, 21000 Novi Sad |  |  |  |
|  | Warranty period must be min. 2 (two) years from the date of provisional acceptance |  |  |  |