

**ERASMUS +**

**HIGHER EDUCATION CAPACITY BUILDING**

**Erasmus+ Project**

**New and Innovative Courses for Precision Agriculture**

**(NICOPA)**

**Invitation to Tender for Equipment Procurement - PAL-Set**

**(Uzbekistan)**

 **#NICOPA/12.08/2020/UZ**

Prepared by:

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<https://ecm-academy.de/index.php/en/>

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 and Innovative Courses for Precision Agriculture*”- (*NICOPA)*, co-funded by the **ERASMUS+ Programme of the European Union**.

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

**Please note** that partial delivery of equipment for PAL-Set is possible. You can submit commercial offers for selected items from the PAL-Set.

Tenders should be submitted in English **by email to** info@ecm-academy.denot later than **Wednesday, September 9, 2020 at 17:00 (Berlin local time)**.

We kindly ask you to be 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:* ***#NICOPA/12.08/2020/UZ “Invitation to Tender for Equipment Procurement - PAL-Set (Uzbekistan)”****.*

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

Sincerely yours,

EXOLAUNCH GmbH

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# Annex 1: Company Information Sheet

#NICOPA/12.08/2020/UZ “Invitation to Tender for Equipment Procurement - PAL-Set (Uzbekistan)”

*Please, fill in all fields.*

|  |
| --- |
| **Bidderʼs Information** |
| **Company legal name**  |  |
| **Company legal address**  |  |
| **Company website** |  |
| **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

#NICOPA/12.08/2020/UZ “Invitation to Tender for Equipment Procurement - PAL-Set (Uzbekistan)”

*Please, fill in all fields.*

|  |
| --- |
| **PAL-Set: //The table of equipment required** |
| **#** | **Required Technical Specifications and Standards** | **Quantity** |
| ***#PAL1*** | ***Wireless solar panel and battery powered data logger*** |  ***1 pc*** |
| **1** | Durable and flexible data logger for all climatic conditions, powered by rechargeable batteries and a solar panel. The logger is equipped with: * rain gauge
* global radiation sensor
* combined air temperature and relative humidity sensor
* wind speed sensor
 |  |
| **2** | **Sensors layout:** * **5 digital inputs:** automatic sensor recognition, supporting sensor chains (max. 600 sensors)
 |  |
| **3** | Extension connector: Radio access point or Sentek Drill & Drop or ultrasonic wind sensor or two extra chain connectors – Pessl Instruments bus cable nodes |  |
| **4** | **Memory:** 8 MB flash memory |  |
| **5** | **Internet connectivity:** GPRS, HDSPA, UMTS, WiFi, LTE class 1, LTE class M (Q2/2020) |  |
| **6** | **Alert:** SMS, user configurable via website |  |
| **7** | **Dimensions without sensors:** 41 cm L x 13 cm W x 7 cm H |  |
| **8** | **Weight without sensors:** 2.2 kg |   |
| **9** | **Measuring interval:** 5 minutes (by default) |  |
| **10** | **Logging interval:** 10-120 min (user selectable) |  |
| **11** | **Transmission frequency:** User selectable |  |
| **12** | **Battery:** 6V, 4.5AH, Operating range: -35 °C to 80 °C |  |
| **13** | **Solar panel:** Dimensions: 13.5 x 13.5 cm, 2-Watt solar panel |  |
| **14** | **Rain gauge -** The mechanic consists of a magnet, which moves past a reed switch and opens or closes the circuit. The double spoon tips left or right and does not lose any water due to a very fast switching mechanics. The resolution with a surface of 200 cm2 is 0.2 mm

|  |  |
| --- | --- |
| Sensor Type | Double tipping bucket rain gauge |
| Output | Switch signal |
| Switch | Reed contact, solid state |
| Sensitivity | 1 tip per 0.2 mm or 1 tip per 0.5 mm |
| Collector Surface | 200 cm2 |
| Evaluation | Digital |
| Maximum Rain | 12 mm/minute |
| Dimensions | 185 mm diameter x 250 mm H |
| Accuracy | ±5% |

 |  |
| **15** | Global radiation sensor - The IM506D Pyranometer is designed for field measurements of global solar radiation in agricultural, meteorological and solar energy studies. In clear, unobstructed daylight, the Pessl Instruments pyranometer has favourable results compared to the first-class thermopile-type pyranometers but is priced at just a fraction of the cost.Sensor - LI-200SZCalibration - Calibration against Kipp and Zonen CMP3 under daylight.Absolute error max. 5%, typically 3%Stability - 2% drift on 2-year useTime to measure - 10 µsTemperature dependency - 0.15% per °CCosines correction - Sensor corrects up to 80° degreesAzimuth - 1% error over 360 degree at 45-degree elevationOperating temperature range - -20°C to 65°COperating relative humidity range - 0 to 100%Sensor - PhotodiodeHousing - Weatherproof PAS case with acrylic diffuser, stainless steel hardwareSize - 35 mm diameter, 45 mm heightWeight - 114 gEvaluation - Pulse Wide Modulation 0-80% = 0-2000 W/m²Spectral range - 300-1100 nm |  |
| **16** | Combined air temperature and relative humidity sensorMeasures relative humidity and temperature with outstanding accuracy and repeatability. It has an integrated data acquisition and calibration history. Dew point, VPD and delta T calculations available.Temperature sensor - PT1000 1/3 Class BHumidity sensor -ROTRONIC Hygromer® IN-1Accuracy with standard adjustment profile at 23°C and 10, 35, 80 % rh ± 0.8% rh / ± 0.1 °CAccuracy with high precision adjustment profile at 23 °C and 10, 20, 30, 40, 50, 60, 70, 80, 90 % rh ± 0.5% rh / 0.1 °CResolution, AirChip3000 Typically 0.02 % rh, 0.01 °CLong-term stability < 1 % rh, 0.1°C / yearHumidity response time t 63 - 3 secondsMeasurement range - 0…100 % rh, -100…200 °CElectronics operating range -50-100 °C and 0-100 % rhOutput signals Serial port RS485Audit trail & electronic records FDA 21CFR Part 11 and GAMP compliantPower supply & consumption 3.2 V / 4 mAHousing/probe material PolycarbonateFilter Polyethylene insert, polycarbonate cageStandards CE-compliant 2007/108/EG |  |
| **17** | **Wind speed sensor -** IM512CD is a cup type anemometer for low cost and long term, accurate wind measurements for all kinds of use. It calculates average wind speed in the specific time period.Range - 0 to 50 m/s, gust survival 60m/sSensor - 12 cm diameter cup wheel assembly, 40 mm diameter hemispherical cupsTurning Factor - 75 cmDistance Constant (63% recovery) - 2.3 mThreshold - 1.1 m/sTransducer - Stationary CoilTransducer Output - AC sine wave signal induced by rotating magnet on cup wheel shaft. 100 mVpp at 60 rpm. 6 Vpp at 3600 rpmOutput Frequency - 1 cycle per cup wheel revolution. 0.75 m/s per Hz |  |
|  |
| ***#PAL2*** | ***Chain Node Interface*** |  ***1 pc*** |
| **1** | **External Box**  |  |
| **2** | **Possible connections (up to 6 soil sensors):*** 1 Pessl Instruments sensor
* 4 Watermark sensors
* 1 soil temperature sensor
 |  |
|  |
| ***#PAL3*** | ***Chain Node Interface*** |  ***1 pc*** |
| **1** | SDI12 Chain Node Interface  |  |
| **2** | **Possible connections (up to 2 soil sensors):**• Sentek Drill & Drop different types |  |
|  |
| ***#PAL4*** | ***Soil Temperature Sensor*** |  ***1 pc*** |
| **1** | **Temperature sensor**The Soil Temperature Sensor is a PT1000 in a waterproof stainless-steel housing.The sensor output is a duty-cycle signal. |  |
| **2** | **Operating temperature range:** -30°C to +75°C |  |
| **3** | **Supply DC Voltage (range):** 4,57 – 7 V |  |
| **4** | Accuracy: ±0.1 °C (-30 °C to +75 °C) |  |
| **5** | Supply current max. 200 μA |  |
| **6** | Calibration error max. 0.25 °C (23 °C) |  |
| **7** | Long term drift max. 0.1 °C |  |
| **8** | **Data transmission:** Rs 485 Digital signal (temperature data sent on demand of iMETOS main board) |  |
|  |
| ***#PAL5*** | ***Irrometer Watermark Soil Moisture Sensor*** | ***1 pc*** |
| **1** | **Part**  |  |
| **2** | **Size:** 2.2 cm diameter x 5 cm length |  |
| **3** | **Measuring Principle:** Soil water tension correlated with electrical resistance in granular matrix |  |
| **4** | **Working range:** 0 to 200 kPa |   |
| **5** | **Precision:** 5% |   |
| **6** | **Evaluation:** Analog |   |
| **7** | **Cable:** 5 meters |  |
|  |
| ***#PAL6*** | ***Irrometer Tensiometer*** | ***1 pc*** |
| **1** | **Part**  |  |
| **2** | **Instrument body materials** - Butyrate body, ceramic tip, neoprene stopper |  |
| **3** | **Weight** - 30 cm weights 0.439 kg. It increases 0.114 kg per 30 cm |  |
| **4** | **Ceramic tip** - White tip – used for most soil types |  |
| **5** | **Operating suction** - 0-90 kPa |  |
| **6** | **Operating temperature range** - 0°C to 50°C |  |
| **7** | **Reservoir dimensions** - Height: 120-130 mm including cap;Diameter: 51-55 mm including cap |  |
| **8** | **Body tube dimensions** - Lenght: ranges from 15 to 90 cmDiameter: 22 mm |  |
|  |
| ***#PAL7*** | ***Soil moisture sensor***  | ***1 pc*** |
| **1** | **Volumetric water content (VWC):** * **Range:** 0−0.57 m3/m3 (0%−57% VWC)
* **Resolution:** 0.0008 m³/m³ (0.08% VWC) in mineral soils from 0−0.50 m³/m³ (0%−50% VWC)
* **Accuracy:** With standard calibration equation, 0.03 m³/m³ (3% VWC) typical in mineral soils that have solution electrical conductivity <10 dS/m

**NOTE:** With soil-specific calibration, ±0.02 m³/m³ ( ±2% VWC) is typical in any soil |  |
| **2** | **Dimensions:** 16.0 cm (6.3 in) length; 3.3 cm (1.3 in) width; 0.8 cm (0.3 in) height |  |
| **3** | **Prong length:** 10 cm (3.94 in) |  |
| **4** | **Operating temperature range:** -40 to 50 °C |   |
| **5** | **Cable length:** 5 m, 10 m |  |
| **6** | **Supply voltage (VIN to GND):** * **Minimum:** 3.6 VDC at 12 mA
* **Maximum:** 15 VDC at 20 mA
 |   |
| **7** | **Measurement duration:** Maximum 10 ms |  |
| **8** | **Temperature accuracy:** ±0.3 |  |
| **9** | **Output:** Analog and digital |   |
|  |
| ***#PAL8*** | ***Drill & Drop probe SE*** | ***1 pc*** |
| **1** | Probe lengths 60 cm (24”) / 90 cm (36”) / 120 cm (48”) |  |
| **2** | **Number of sensors:**6-12 for each type of measurement placed at each 10 cm: 6-12x soil temperature, 6-12x soil moisture, 6-12x salinity (VAC) |  |
| **3** | Outer Probe Diameter (Top-Bottom: 27-29.5 mm / 26-30 mm / 24.5-29.5 mm |  |
| **4** | Moisture (VWC) range - Oven dry to saturation |   |
| **5** | **Method:** Capacitance based technology |  |
| **6** | **Resolution:** **Moisture (VWC):** 1:10000**Salinity (Triscan) (VIC, Volumetric Ion Content):** 1:6000**Temperature:** 0.3 °C |  |
| **7** | **Moisture precision:** ±0.03 % vol. |  |
| **8** | **Temperature accuracy:** ±2 °C at 25 °C |  |
| **9** | **Operating temperature range:** -20°C to +60°C |  |
|  |
| ***#PAL9*** |  ***Single camera***  | ***1 pc*** |
| **1** | **Sensors & lens:*** **Image Processor:** Novatek NTK96660 high-performance processor
* **Image Sensor:** 16MP Sony EXMOR R CMOS BSI image sensor
* **Lens:** 70ᵒ Ultra-low distortion glass lens / F2.8 Aperture
* **G Sensor:** High performance g-sensor
 |  |
| **2** | **Display:** 1,5" LCD display |  |
| **3** | **Size & Weight:*** **Dimensions:** 59 mm x 30 mm x 41 mm (same as GoPro)
* **Weight:** 64 g
 |  |
| **4** | **Battery:*** Rechargeable high-density lithium-ion battery (950mAh)
* Up to 90 minutes of recording on 1080p 60fps
* Charging through USB port
 |  |
| **5** | **Ports:** * Micro USB Port
* Micro HDMI Port
* Micro SD Card Slot
 |  |
| **6** | **Storage:** Compatible with Micro SD card (up to 64GB) Class 10 and above |  |
| **7** | **Connectivity:*** WiFi (range: up to 100 m)
* Bluetooth 4.0 (range: up to 10 m)
 |  |
| **8** | **Video Format & Resolutions:** * **Video Compression Format:** High-definition H.264 image encoding
* **Video Format:** MP4
* **Resolution:**
* 2160P @ 24 fps
* 1440P @ 30 fps
* 1080P @ 60/48/30/24 fps
* 960P @ 60/48 fps
* 720P @ 120/60/48 fps
* 480P @ 240 fps
 |  |
| **9** | **Audio:** * Built-in microphone
* External microphone supported
 |  |
| **10** | **Photo:** * 16 Megapixels
* 4608 x 3456 Maximum resolution
* 2 - 60s Time-lapse mode
 |  |
| **11** | **Features:** * External trigger through micro HDMI (RC servo PWM signal)
* AV output
* RAW output
* Manual white balance
* Gyro image stabilization
 |  |
|  |
| ***#PAL10*** | ***Multispectral-Camera*** | ***1 pc*** |
| **1** | **Weight:** Altum + DLS 2: 406.5 g (14.34 oz), Altum: 357 g (12.6 oz), DLS2: 49 g (1.73 oz), Wi-Fi Adapter: 2 g (0.07 oz), USB stick: 9 g (0.32 oz) |  |
| **2** | **Dimensions:** 8.2 cm x 6.7 cm x 6.45 cm, (3.2 in x 2.6 in x 2.5 in) |  |
| **3** | **External Power:** 4.9 - 25.2 V |  |
| **4** | **Power Input:** 5.5/7.0/10 W (standby, average, peak) |  |
| **5** | **Spectral Bands:** Blue, green, red, red edge, near infrared (NIR) |  |
| **6** | **RGB Color Output:** High-resolution, global shutter, aligned with all bands |  |
| **7** | **Thermal:** LWIR thermal infrared8-14um. Radiometrically calibrated |  |
| **8** | **Sensor Resolution:** 2064 x 1544 (3.2 MP per EO band) at 120 m (400 ft) AGL 81cm per pixel (thermal) at 120 m |  |
| **9** | **Capture Rate:** 1 capture per second (all bands), 12-bit RAW |  |
| **10** | **Interfaces:** Aircraft: Trigger input, top of frame out, 1 PPS out. 3.3V isolated IO, 2x USB 3.0 SuperSpeed ports for WiFi or Ethernet and USB 3.0 Storage |  |
| **11** | **Field of View:** 48° x 37° (multispectral), 57° x 44° (thermal) |  |
| **12** | **Focal lenght:** 8 mm multispectral, 1.77 mm thermal |  |
| **13** | **Storage:** USB 3.0 compatible storage devices |  |
|  |
| ***#PAL11*** | ***Handheld Crop Sensor*** | ***1 pc*** |
| **1** | **Key Benefits:*** Addresses field variability
* Determines fertilizer rates by using the current crop condition
* Adjusts application rates automatically based on readings taken by the sensors as applicator travels through the field
* Can often be used with existing rate control systems
* Works in any weather condition—day or night
* Easy to install, easy to calibrate, easy to use
 |  |
| **2** | **Trimble Display Compatibility:*** TMX-2050™ display
* FmX® integrated display
 |  |
| **3** | **The sensor emits brief bursts of red and infrared light and then measures the amount of each type of light that is reflected back from the plant** |  |
| **4** | **The sensor continues to sample the scanned area as long as the trigger remains engaged** |   |
| **5** | **The sensor displays the measured value in terms of an NDVI reading (ranging from 0.00 to 0.99) on its LCD display screen** |  |
| **6** | **High-quality optical sensor to instantly measure plant vigor** |  |
| **7** | **Easy-to-read display, even in sunlight** |  |
| **8** | **Simple pull-type trigger and comfortable hand grip** |   |
| **9** | **Micro USB charging port** |  |

# 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: EXOLAUNCH GmbH, address: Reuchlin Str. 10, 10553 Berlin, Germany

|  |
| --- |
| ***Commercial offer for the equipment supply within the framework of the project***  ***New and Innovative Courses for Precision Agriculture******(NICOPA)***#NICOPA/12.08/2020/UZ “Invitation to Tender for Equipment Procurement - PAL-Set (Uzbekistan)” |

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

**PAL-Set**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **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 3 Universities** |
| **1** | **2** | **4** | **5** | **6=4 х 5** | **7** |
| #PAL1 | Wireless solar panel and battery powered data logger | 1 |  |  |  |
| #PAL2 | Chain Node Interface | 1 |  |  |  |
| #PAL3 | Chain Node Interface | 1 |  |  |  |
| #PAL4 | Soil Temperature Sensor | 1 |  |  |  |
| #PAL5 | Irrometer Watermark Soil Moisture Sensor | 1 |  |  |  |
| #PAL6 | Irrometer Tensiometer | 1 |  |  |  |
| #PAL7 | Soil moisture sensor  | 1 |  |  |  |
| #PAL8 | Drill & Drop probe SE | 1 |  |  |  |
| #PAL9 | Single camera  | 1 |  |  |  |
| #PAL10 | Multispectral-Camera | 1 |  |  |  |
| #PAL11 | Handheld Crop Sensor | 1 |  |  |  |
| **Total Amount (Euro) excluding VAT** |  |  |

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

Grand total amount in words (for 3 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