



Co-funded by the  
Erasmus+ Programme  
of the European Union

**ERASMUS +**

**HIGHER EDUCATION CAPACITY BUILDING**

**Erasmus+ Project**

**New and Innovative Courses for Precision Agriculture  
(NICOPA)**

**Invitation to Tender for Equipment Procurement  
(Turkmenistan)**

**#NICOPA/12.08/2020/TM**

Prepared by:

EXOLAUNCH GmbH

Address: Reuchlin Str. 10, 10553 Berlin,  
Germany

Email: [info@ecm-academy.de](mailto:info@ecm-academy.de)

Website:

<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 Turkmenistan** (see the technical specifications provided in the Part-III of this 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**.

**The tender will be announced for two laboratories: PAL-Set & VCR-Set.**

Companies that want to participate in the tendering process for the supply of Equipment for two laboratories must submit a separate commercial offer for each laboratory.

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

**Please note** that in the tender procedure may also participate commercial offers for some of the items presented in the technical specifications of PAL-Set provided in the Part-III of this document. Partial delivery of equipment for PAL-Set is possible.

The tenderer must complete all annexes and provide all information for VCR-Set. Only completed annexes will be accepted for consideration.

Tenders should be submitted in English **by email to** [info@ecm-academy.de](mailto:info@ecm-academy.de) not 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/TM “Invitation to Tender for Equipment Procurement + LAB Name (Turkmenistan)”.*

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

Sincerely yours,

EXOLAUNCH GmbH

**Contents**

- Part I - Project Description ..... 4**
  - 1.1. About NICOPA ..... 4
  - 1.2. NICOPA Partners – Project Consortium..... 4
  - 1.3. Disclaimer ..... 5
  
- Part II – Tender Specifications ..... 5**
  - 2.1. Object of the Tender..... 5
  - 2.2. Special Conditions..... 5
  - 2.3. Currency and Language of the Tender ..... 6
  - 2.4. Submission of the Tenders: Means and Deadline ..... 6
  - 2.5. Documents to be Submitted by the Tenderer ..... 6
  - 2.6. Deadline for Engagement..... 6
  - 2.7. Subcontracting..... 7
  - 2.8. Terms of delivery ..... 7
  - 2.9. Goods Delivery Time ..... 7
  - 2.10. Terms of payment..... 7
  - 2.11. Evaluation and Award of the Contract..... 7
  - 2.12. Evaluation Committee..... 8
  - 2.13. Questions, Notification of Results ..... 8
  
- Part III – Bill of Quantities and Technical Specifications..... 10**

## Part I - Project Description

### 1.1. About NICOPA

The “New and Innovative Courses for Precision Agriculture” – NICOPA (project reference number 597985-EPP-1-2018-1-KZ-EPPKA2-CBHE-JP) is a three-year duration multi-country joint project co-funded by the Erasmus+ Capacity Building in the Field of Higher Education Programme of the European Union (EU) launched in 2018. The aim of the project is to modernize curricula in precision agriculture using new technologies: Geographic Information System (GIS), Big Data, Remote Sensing. The project will create the environment for education of high skilled specialists in line with labor market and according to EU best practices and Bologna process.

Anticipated project outputs and results:

- Review of the current curricula in precision agriculture through analysis
- Agreement on instructional strategy and guidelines for BA/MSc curricula design including the use of new Educational Technologies
- A set of new core curricula and transferable modules including innovative teaching facilities
- Updated current two cycle curricula and programs in precision agriculture according to the Bologna requirements and the new developments
- Developed, implemented and accredited new practice-oriented, student-focused core, and transferable curricula including ECTS
- Bringing the Higher Education Institutions of the partner country closer to labor market. Besides that, innovative teaching facilities: a new equipped laboratory PAL, a class VCR, Precision agriculture using sensing data Service Office PASO (Precision Agriculture Service Office).

### 1.2. NICOPA Partners – Project Consortium

The following institutions (P) from Partner and European countries are involved in the project consortium:

- P1 S.Seifullin Kazakh Agro Technical University (KATU), Astana/Kazakhstan
- P2 Technische Universität Berlin (TUB), Berlin/Germany
- P3 The Agricultural University Plovdiv (AU), Bulgaria/Plovdiv
- P4 Czech University of Life Sciences (CULS), Czech Republic/Prague
- P5 EXOLAUNCH GmbH (EXO), Berlin/Germany
- P6 Shokan Ualikhanov Kokshetau State University (KokSU),  
Kokshetau/Kazakhstan
- P7 North Kazakhstan State University Named After Manash Kozybayev (NKSU),  
Petropavlovsk/Kazakhstan
- P8 Turkmen Agricultural University Named after S.A. Niyazov (TAU),  
Ashgabat/Turkmenistan
- P9 The Turkmen state architecture and construction institute (TSITC), Ashgabat/  
Turkmenistan
- P10 Turkmen Agricultural Institute (TAI), Dashoguz/Turkmenistan
- P11 National University of Uzbekistan (NUUZ), Tashkent /Uzbekistan

- P12 Tashkent University of Information Technologies (TUIIT),  
Tashkent/Uzbekistan
- P13 Tashkent Institute of Irrigation and Agricultural Mechanization Engineers  
(TIAME), Tashkent/Uzbekistan
- P14 Ministry of Education and Science, Astana/Kazakhstan
- P15 The State Inspection for Supervision of Quality in Education,  
Tashkent/Uzbekistan
- P15 Ministry of Education of Turkmenistan, Ashgabat/Turkmenistan

### **1.3. Disclaimer**

*"This project has been funded with support from the European Commission. This document reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein".*

## **Part II – Tender Specifications**

### **2.1. Object of the Tender**

EXOLAUNCH GmbH (Reuchlin Str. 10, 10553 Berlin, Germany) announces a tender for the procurement of the equipment to the project partners universities in Turkmenistan (TM) (see 2.8), within the technical specifications provided in the Part-III of this document.

This document represents an invitation to tender for the supply of computer, multimedia, audio & video and other equipment as part of NICOPA Project co-funded by the ERASMUS+ Programme of the European Union.

The tenderer must complete all annexes and provide all information for VCR-Set. Only completed annexes will be accepted for consideration.

Partial delivery of equipment for PAL-Set is possible. You can submit commercial offers for selected items from the PAL-Set.

This invitation to tender is in no way binding on the contracting authority. The contracting authority's contractual obligation commences only upon the signature of the contract with the successful tenderer.

### **2.2. Special Conditions**

1. According to the agreements between EU and the mentioned above project partner countries, all equipment purchased and any provision of services within the framework of Erasmus+ projects is exempted from taxes (including Value Added Tax (VAT)), duties and charges. An appropriate Certificate for the VAT exemption will be provided by the project partners universities – recipients of the equipment (see 2.8).

2. VAT is not considered as an eligible project cost, the commercial offer and later an invoice must not include VAT (“Erasmus+ Programme Guide” of Grant Agreement).

3. In order to be eligible for exemption from the abovementioned taxes (including VAT), duties and charges the equipment procured within this tender should be delivered as CIP Incoterms,

as well the seller clears the goods for export and is responsible for delivery of these goods at an agreed place of shipment. (e.g. customs warehouse).

4. The manufacturer brand of all PC items must be a company that is listed in the rating from Gartner or/and IDC.

5. Certification requirement: ISO 9001 certification of the manufacturer; CE Mark.

6. All participants of a tender procedure agree to provide after the tender MAF (manufacturer authorization form) on Workstation, AIO and Notebook with the name of the project and the competition number to confirm warranty service in the country of delivery. Equipment supplied must have service centers in the country of delivery.

7. It is necessary to provide together with commercial offer links to the sites or datasheets of the manufacturers of all items.

### **2.3. Currency and Language of the Tender**

The tenders shall be presented in EURO for both the unit prices and the overall amount of the commitment. The currency of payment will be also in EURO. The tenders shall be presented in English.

### **2.4. Submission of the Tenders: Means and Deadline**

Tenders should be submitted in English by email to [info@ecm-academy.de](mailto:info@ecm-academy.de) not later than **Wednesday, September 9, 2020 at 17:00 (Berlin local time)**. No offer may be submitted or modified after this date.

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/TM “Invitation to Tender for Equipment Procurement + LAB Name (Turkmenistan)”.

### **2.5. Documents to be Submitted by the Tenderer**

The tenderer must complete all annexes and provide all information.

Additional documents such as instructions and operating manuals shall be required with the delivery of equipment.

All necessary supporting documents and international certificates required in the country of destination for customs clearance must be provided.

***Companies that want to participate in the tendering process for the supply of Equipment for two laboratories must submit a separate commercial offer for each laboratory.***

### **2.6. Deadline for Engagement**

Tenderers shall remain bound by their tenders for a period of thirty (30) days from the closing date for submission on **Wednesday, September 9, 2020 at 17:00 (Berlin local time)**.

## 2.7. Subcontracting

It is prohibited for the tenderers to subcontract parts of the tender to third parties.

## 2.8. Terms of delivery

Term of delivery is customs control point airport in Ashgabat, TM (CIP), if possible, by means of door to door transportation.

The full addresses and contact details of the responsible persons in partner universities will be provided after the signature of the contract with the selected supplier.

The following 3 (three) universities are involved in this call for tender as the recipients of goods:

No	Partner	Acronym	Location
P8	Turkmen Agricultural University Named after S.A. Niyazov	TAU	Ashgabat/Turkmenistan
P9	The Turkmen state architecture and construction institute	TSITC	Ashgabat/Turkmenistan
P10	Turkmen Agricultural Institute	TAI	Dashoguz/Turkmenistan

## 2.9. Goods Delivery Time

The delivery period may not exceed 60 days from the date of signature of the contract with the selected supplier.

## 2.10. Terms of payment

There is no prepayment. 100% payment should be made only after delivery of the equipment and a final inventory of the equipment at the partner university. Payment will be made within two weeks from the submission of a written confirmation from the partner university with the inventory number in the above-mentioned universities (see 2.8).

## 2.11. Evaluation and Award of the Contract

The key principles that shall govern the process of evaluation of tenders are listed as follows:

- Non-discrimination: Any discrimination with regard to tenderers on the basis of nationality is forbidden.
- Equal treatment: All tenders submitted within the set deadline are to be treated equally. They will be evaluated on the basis of the same terms, conditions and requirements set in the tender documents.
- Transparency: Detailed written records are being kept of all actions of the evaluation panel. All decisions taken will be sufficiently justified and documented. In this way, any discriminatory behaviour can be prevented and if not prevented, then monitored.
- Confidentiality: The process of evaluation of tenders is confidential. Information concerning the process of evaluation of tenders and the award recommendation is not to be disclosed to the tenderers or to any other person who is not officially concerned

with the process until information on the award of the contract is communicated to all tenderers.

Exclusion criteria: Tenderers are excluded from participation in procurement procedures if:

- they have submitted a tender that does not meet all the requirements provided in this document, including the ones in clause 2.5.
- they are bankrupt or being wound up, are having their affairs administered by the courts, have entered into an arrangement with creditors, have suspended business activities, are the subject of proceedings concerning those matters, or are in any analogous situation arising from a similar procedure provided for in national legislation or regulations,
- they have been convicted of an offence concerning their professional conduct by a judgment which has the force of res judicata,
- they have not fulfilled obligations relating to the payment of social security contributions or the payment of taxes in accordance with the national legal provisions,
- they have been the subject of a judgment which has the force of res judicata for fraud, corruption, involvement in a criminal organisation or any other illegal activity.

In the selection process only will be considered the suppliers who would provide delivery of the equipment to all of the above-mentioned universities (see 2.8).

Selection criteria: tenderers will be selected based on the following criteria:

1. Having submitted the tender that complies with all of the specifications, requirements and offers the lowest price, as well as all other evaluation criteria indicated, shall be selected;
2. Having the necessary economic, financial, technical and professional capacity to perform the contract.

Award criteria: the awarded tender/tenders will be the one who offered the best quality and price tender out of those submitted by tenderers which are not excluded, and which meet the selection criteria.

The awarded tenderer should:

1. Be in full compliance of tender to the tender specifications, bill of quantities and technical specifications;
2. Provided technical information for all the equipment to be supplied.

The contract will be awarded to the tenderer whose tender has been found to be in conformity with the invitation to tender. The award method will be the "best value for money" meaning that the winning tender is the one offering the best quality/price ratio, taking into account the criteria announced in the specifications.

## **2.12. Evaluation Committee**

Tenders will be evaluated by the NICOPA Project Tender Evaluation Committee comprising at least 5 (five) members appointed for the purpose.

## **2.13. Questions, Notification of Results**

Participants' questions should be sent no later than 10 days before the deadline for submitting tender proposals by email to [info@ecm-academy.de](mailto:info@ecm-academy.de) with the reference



#NICOPA/12.08/2020/TM “Invitation to Tender for Equipment Procurement + LAB Name (Turkmenistan)”. Clarifications will be sent within 3 days.

Tenderers will be notified of the results within 10 days from the closing date for submission by email. Thus, it is important to provide the email of the main contact person.

## Part III – Bill of Quantities and Technical Specifications

The following base **PAL-Set** (for 1 University) is planned for procurement within this tender (total 3 sets):

<b>PAL-Set: //The table of equipment required</b>		
<b>#</b>	<b>Required Technical Specifications and Standards</b>	<b>Quantity</b>
<b>#PAL1</b>	<b><i>Wireless solar panel and battery powered data logger</i></b>	<b><i>1 pc</i></b>
<b>1</b>	Durable and flexible data logger for all climatic conditions, powered by rechargeable batteries and a solar panel. The logger is equipped with: <ul style="list-style-type: none"> <li>- rain gauge</li> <li>- global radiation sensor</li> <li>- combined air temperature and relative humidity sensor</li> <li>- wind speed sensor</li> </ul>	
<b>2</b>	<b>Sensors layout:</b> <ul style="list-style-type: none"> <li>- <b>5 digital inputs:</b> automatic sensor recognition, supporting sensor chains (max. 600 sensors)</li> </ul>	
<b>3</b>	Extension connector: Radio access point or Sentek Drill & Drop or ultrasonic wind sensor or two extra chain connectors – Pessl Instruments bus cable nodes	
<b>4</b>	<b>Memory:</b> 8 MB flash memory	
<b>5</b>	<b>Internet connectivity:</b> GPRS, HDSPA, UMTS, WiFi, LTE class 1, LTE class M (Q2/2020)	
<b>6</b>	<b>Alert:</b> SMS, user configurable via website	
<b>7</b>	<b>Dimensions without sensors:</b> 41 cm L x 13 cm W x 7 cm H	
<b>8</b>	<b>Weight without sensors:</b> 2.2 kg	
<b>9</b>	<b>Measuring interval:</b> 5 minutes (by default)	
<b>10</b>	<b>Logging interval:</b> 10-120 min (user selectable)	
<b>11</b>	<b>Transmission frequency:</b> User selectable	
<b>12</b>	<b>Battery:</b> 6V, 4.5AH, Operating range: -35 °C to 80 °C	
<b>13</b>	<b>Solar panel:</b> Dimensions: 13.5 x 13.5 cm, 2-Watt solar panel	
<b>14</b>	<b>Rain gauge</b> - 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 cm <sup>2</sup> is 0.2 mm Sensor Type            Double tipping bucket rain gauge Output                    Switch signal Switch                     Reed contact, solid state	

	<p>Sensitivity 1 tip per 0.2 mm or 1 tip per 0.5 mm</p> <p>Collector Surface 200 cm<sup>2</sup></p> <p>Evaluation Digital</p> <p>Maximum Rain 12 mm/minute</p> <p>Dimensions 185 mm diameter x 250 mm H</p> <p>Accuracy ±5%</p>	
15	<p>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.</p> <p>Sensor - LI-200SZ</p> <p>Calibration - Calibration against Kipp and Zonen CMP3 under daylight.</p> <p>Absolute error max. 5%, typically 3%</p> <p>Stability - 2% drift on 2-year use</p> <p>Time to measure - 10 μs</p> <p>Temperature dependency - 0.15% per °C</p> <p>Cosines correction - Sensor corrects up to 80° degrees</p> <p>Azimuth - 1% error over 360 degree at 45-degree elevation</p> <p>Operating temperature range - -20°C to 65°C</p> <p>Operating relative humidity range - 0 to 100%</p> <p>Sensor - Photodiode</p> <p>Housing - Weatherproof PAS case with acrylic diffuser, stainless steel hardware</p> <p>Size - 35 mm diameter, 45 mm height</p> <p>Weight - 114 g</p> <p>Evaluation - Pulse Wide Modulation 0-80% = 0-2000 W/m<sup>2</sup></p> <p>Spectral range - 300-1100 nm</p>	
16	<p>Combined air temperature and relative humidity sensor</p> <p>Measures 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.</p> <p>Temperature sensor - PT1000 1/3 Class B</p> <p>Humidity sensor -ROTRONIC Hygromer® IN-1</p> <p>Accuracy with standard adjustment profile at 23°C and 10, 35, 80 % rh ± 0.8% rh / ± 0.1 °C</p> <p>Accuracy with high precision adjustment profile at 23 °C and 10, 20, 30, 40, 50, 60, 70, 80, 90 % rh ± 0.5% rh / 0.1 °C</p> <p>Resolution, AirChip3000 Typically 0.02 % rh, 0.01 °C</p> <p>Long-term stability &lt; 1 % rh, 0.1°C / year</p> <p>Humidity response time t 63 - 3 seconds</p>	

	<p>Measurement range - 0...100 % rh, -100...200 °C  Electronics operating range -50-100 °C and 0-100 % rh  Output signals Serial port RS485  Audit trail &amp; electronic records FDA 21CFR Part 11 and GAMP compliant  Power supply &amp; consumption 3.2 V / 4 mA  Housing/probe material Polycarbonate  Filter Polyethylene insert, polycarbonate cage  Standards CE-compliant 2007/108/EG</p>	
17	<p><b>Wind speed sensor</b> - 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/s  Sensor - 12 cm diameter cup wheel assembly, 40 mm diameter hemispherical cups  Turning Factor - 75 cm  Distance Constant (63% recovery) - 2.3 m  Threshold - 1.1 m/s  Transducer - Stationary Coil  Transducer Output - AC sine wave signal induced by rotating magnet on cup wheel shaft. 100 mVpp at 60 rpm. 6 Vpp at 3600 rpm  Output Frequency - 1 cycle per cup wheel revolution. 0.75 m/s per Hz</p>	
#PAL2	<b>Chain Node Interface</b>	<b>1 pc</b>
1	<b>External Box</b>	
2	<p><b>Possible connections (up to 6 soil sensors):</b></p> <ul style="list-style-type: none"> <li>- 1 Pessl Instruments sensor</li> <li>- 4 Watermark sensors</li> <li>- 1 soil temperature sensor</li> </ul>	
#PAL3	<b>Chain Node Interface</b>	<b>1 pc</b>
1	SDI12 Chain Node Interface	
2	<p><b>Possible connections (up to 2 soil sensors):</b></p> <ul style="list-style-type: none"> <li>• Sentek Drill &amp; Drop different types</li> </ul>	
#PAL4	<b>Soil Temperature Sensor</b>	<b>1 pc</b>
1	<p><b>Temperature sensor</b>  The Soil Temperature Sensor is a PT1000 in a waterproof</p>	

	stainless-steel housing. The sensor output is a duty-cycle signal.	
2	<b>Operating temperature range:</b> -30°C to +75°C	
3	<b>Supply DC Voltage (range):</b> 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	<b>Data transmission:</b> Rs 485 Digital signal (temperature data sent on demand of iMETOS main board)	
<b>#PAL5</b>	<b><i>Irrrometer Watermark Soil Moisture Sensor</i></b>	<b><i>1 pc</i></b>
1	<b>Part</b>	
2	<b>Size:</b> 2.2 cm diameter x 5 cm length	
3	<b>Measuring Principle:</b> Soil water tension correlated with electrical resistance in granular matrix	
4	<b>Working range:</b> 0 to 200 kPa	
5	<b>Precision:</b> 5%	
6	<b>Evaluation:</b> Analog	
7	<b>Cable:</b> 5 meters	
<b>#PAL6</b>	<b><i>Irrrometer Tensiometer</i></b>	<b><i>1 pc</i></b>
1	<b>Part</b>	
2	<b>Instrument body materials</b> - Butyrate body, ceramic tip, neoprene stopper	
3	<b>Weight</b> - 30 cm weights 0.439 kg. It increases 0.114 kg per 30 cm	
4	<b>Ceramic tip</b> - White tip – used for most soil types	
5	<b>Operating suction</b> - 0-90 kPa	
6	<b>Operating temperature range</b> - 0°C to 50°C	
7	<b>Reservoir dimensions</b> - Height: 120-130 mm including cap; Diameter: 51-55 mm including cap	
8	<b>Body tube dimensions</b> - Length: ranges from 15 to 90 cm Diameter: 22 mm	
<b>#PAL7</b>	<b><i>Soil moisture sensor</i></b>	<b><i>1 pc</i></b>

1	<b>Volumetric water content (VWC):</b> <ul style="list-style-type: none"> <li>- <b>Range:</b> 0–0.57 m<sup>3</sup>/m<sup>3</sup> (0%–57% VWC)</li> <li>- <b>Resolution:</b> 0.0008 m<sup>3</sup>/m<sup>3</sup> (0.08% VWC) in mineral soils from 0–0.50 m<sup>3</sup>/m<sup>3</sup> (0%–50% VWC)</li> <li>- <b>Accuracy:</b> With standard calibration equation, 0.03 m<sup>3</sup>/m<sup>3</sup> (3% VWC) typical in mineral soils that have solution electrical conductivity &lt;10 dS/m</li> </ul> <b>NOTE:</b> With soil-specific calibration, ±0.02 m <sup>3</sup> /m <sup>3</sup> (±2% VWC) is typical in any soil	
2	<b>Dimensions:</b> 16.0 cm (6.3 in) length; 3.3 cm (1.3 in) width; 0.8 cm (0.3 in) height	
3	<b>Prong length:</b> 10 cm (3.94 in)	
4	<b>Operating temperature range:</b> -40 to 50 °C	
5	<b>Cable length:</b> 5 m, 10 m	
6	<b>Supply voltage (VIN to GND):</b> <ul style="list-style-type: none"> <li>- <b>Minimum:</b> 3.6 VDC at 12 mA</li> <li>- <b>Maximum:</b> 15 VDC at 20 mA</li> </ul>	
7	<b>Measurement duration:</b> Maximum 10 ms	
8	<b>Temperature accuracy:</b> ±0.3	
9	<b>Output:</b> Analog and digital	
<b>#PAL8</b>	<b><i>Drill &amp; Drop probe SE</i></b>	<b><i>1 pc</i></b>
1	Probe lengths 60 cm (24") / 90 cm (36") / 120 cm (48")	
2	<b>Number of sensors:</b> 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	<b>Method:</b> Capacitance based technology	
6	<b>Resolution:</b> Moisture (VWC): 1:10000 Salinity (Triscan) (VIC, Volumetric Ion Content): 1:6000 Temperature: 0.3 °C	
7	<b>Moisture precision:</b> ±0.03 % vol.	
8	<b>Temperature accuracy:</b> ±2 °C at 25 °C	
9	<b>Operating temperature range:</b> -20°C to +60°C	

#PAL9	Single camera	1 pc
1	<b>Sensors &amp; lens:</b> <ul style="list-style-type: none"> <li>- <b>Image Processor:</b> Novatek NTK96660 high-performance processor</li> <li>- <b>Image Sensor:</b> 16MP Sony EXMOR R CMOS BSI image sensor</li> <li>- <b>Lens:</b> 70° Ultra-low distortion glass lens / F2.8 Aperture</li> <li>- <b>G Sensor:</b> High performance g-sensor</li> </ul>	
2	<b>Display:</b> 1,5" LCD display	
3	<b>Size &amp; Weight:</b> <ul style="list-style-type: none"> <li>- <b>Dimensions:</b> 59 mm x 30 mm x 41 mm (same as GoPro)</li> <li>- <b>Weight:</b> 64 g</li> </ul>	
4	<b>Battery:</b> <ul style="list-style-type: none"> <li>- Rechargeable high-density lithium-ion battery (950mAh)</li> <li>- Up to 90 minutes of recording on 1080p 60fps</li> <li>- Charging through USB port</li> </ul>	
5	<b>Ports:</b> <ul style="list-style-type: none"> <li>- Micro USB Port</li> <li>- Micro HDMI Port</li> <li>- Micro SD Card Slot</li> </ul>	
6	<b>Storage:</b> Compatible with Micro SD card (up to 64GB) Class 10 and above	
7	<b>Connectivity:</b> <ul style="list-style-type: none"> <li>- WiFi (range: up to 100 m)</li> <li>- Bluetooth 4.0 (range: up to 10 m)</li> </ul>	
8	<b>Video Format &amp; Resolutions:</b> <ul style="list-style-type: none"> <li>- <b>Video Compression Format:</b> High-definition H.264 image encoding</li> <li>- <b>Video Format:</b> MP4</li> <li>- <b>Resolution:</b> <ul style="list-style-type: none"> <li>• 2160P @ 24 fps</li> <li>• 1440P @ 30 fps</li> <li>• 1080P @ 60/48/30/24 fps</li> <li>• 960P @ 60/48 fps</li> <li>• 720P @ 120/60/48 fps</li> <li>• 480P @ 240 fps</li> </ul> </li> </ul>	

9	<b>Audio:</b> <ul style="list-style-type: none"> <li>- Built-in microphone</li> <li>- External microphone supported</li> </ul>	
10	<b>Photo:</b> <ul style="list-style-type: none"> <li>- 16 Megapixels</li> <li>- 4608 x 3456 Maximum resolution</li> <li>- 2 - 60s Time-lapse mode</li> </ul>	
11	<b>Features:</b> <ul style="list-style-type: none"> <li>- External trigger through micro HDMI (RC servo PWM signal)</li> <li>- AV output</li> <li>- RAW output</li> <li>- Manual white balance</li> <li>- Gyro image stabilization</li> </ul>	
<b>#PAL10</b>		
	<b>Multispectral-Camera</b>	<b>1 pc</b>
1	<b>Weight:</b> 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	<b>Dimensions:</b> 8.2 cm x 6.7 cm x 6.45 cm, (3.2 in x 2.6 in x 2.5 in)	
3	<b>External Power:</b> 4.9 - 25.2 V	
4	<b>Power Input:</b> 5.5/7.0/10 W (standby, average, peak)	
5	<b>Spectral Bands:</b> Blue, green, red, red edge, near infrared (NIR)	
6	<b>RGB Color Output:</b> High-resolution, global shutter, aligned with all bands	
7	<b>Thermal:</b> LWIR thermal infrared 8-14um. Radiometrically calibrated	
8	<b>Sensor Resolution:</b> 2064 x 1544 (3.2 MP per EO band) at 120 m (400 ft) AGL 81cm per pixel (thermal) at 120 m	
9	<b>Capture Rate:</b> 1 capture per second (all bands), 12-bit RAW	
10	<b>Interfaces:</b> 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	<b>Field of View:</b> 48° x 37° (multispectral), 57° x 44° (thermal)	
12	<b>Focal length:</b> 8 mm multispectral, 1.77 mm thermal	



13	<b>Storage:</b> USB 3.0 compatible storage devices	
<b>#PAL11</b>	<b><i>Handheld Crop Sensor</i></b>	<b><i>1 pc</i></b>
1	<b>Key Benefits:</b> <ul style="list-style-type: none"> <li>- Addresses field variability</li> <li>- Determines fertilizer rates by using the current crop condition</li> <li>- Adjusts application rates automatically based on readings taken by the sensors as applicator travels through the field</li> <li>- Can often be used with existing rate control systems</li> <li>- Works in any weather condition—day or night</li> <li>- Easy to install, easy to calibrate, easy to use</li> </ul>	
2	<b>Trimble Display Compatibility:</b> <ul style="list-style-type: none"> <li>- TMX-2050™ display</li> <li>- FmX® integrated display</li> </ul>	
3	<b>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</b>	
4	<b>The sensor continues to sample the scanned area as long as the trigger remains engaged</b>	
5	<b>The sensor displays the measured value in terms of an NDVI reading (ranging from 0.00 to 0.99) on its LCD display screen</b>	
6	<b>High-quality optical sensor to instantly measure plant vigor</b>	
7	<b>Easy-to-read display, even in sunlight</b>	
8	<b>Simple pull-type trigger and comfortable hand grip</b>	
9	<b>Micro USB charging port</b>	

The following base **VCR-Set** (for 1 University) is planned for procurement within this tender (total 3 sets):

<b>VCR-Set: //The table of equipment required</b>		
<b>#VCR1</b>	<b>Personal Computer All in One</b>	<b>12 pcs</b>
1	<b>Form-factor: AIO</b>	
2	<b>CPU not less than Intel i7-10510U or equivalent by CPU mark</b>	
3	<b>RAM not less than 8GB DDR4 2666MHz</b>	
4	<b>SSD not less than 256Gb</b>	
5	<b>HDD not less than 1000 Gb</b>	
6	<b>Keyboard USB with Numpad Eng/Rus</b>	
7	<b>Mouse USB optical</b>	
8	<b>Webcam HD</b>	
9	<b>I/O interfaces:</b> <ul style="list-style-type: none"> <li>- Audio jacks: Mic/Headset ports</li> <li>- Wireless data transmission 802.11 b/g/n - 1</li> <li>- Video output HDMI – 2 in/out, Display port -1</li> <li>- LAN-port Gigabit Ethernet (RJ-45) - 1</li> </ul>	
10	<b>Audio not less than High Definition Audio</b>	
11	<b>Screen Size and Resolution not less than 27" IPS 1920x1080</b>	
12	<b>Operating System not less than Windows 10 Professional 64bit, English, Russian</b>	
13	<b>All interfaces cables and connectors must be included</b>	
<b>#VCR2</b>	<b>Mobile Workstation</b>	<b>1 pc</b>
1	<b>Form-factor: Mobile workstation. Laptop.</b>	
2	<b>CPU not less than Intel i7-9750H or equivalent by CPU mark</b>	
3	<b>RAM not less than 16GB DDR4 2666MHz</b>	
4	<b>SSD not less than M.2 512Gb PCIe NVME Class 40</b>	
5	<b>Graphics Card not less than Nvidia Quadro P620 w/ 4GB GDDR5</b>	
6	<b>Screen Size not less than 15,6"</b>	
7	<b>Keyboard Eng/Russian (Qwerty)</b>	
8	<b>Operating System - Windows 10 Professional 64 bit, English, Russian</b>	

9	<b>All interface cables and connectors must be included</b>	
<b>#VCR3</b>		
	<i>Notebook</i>	<i>2 pcs</i>
1	Screen Size not less than 15,6" 1920x1200 Full HD	
2	CPU not less than Intel i7 10750H or equivalent by CPU mark	
3	RAM not less than 16GB DDR4 2666MHz	
4	SSD not less than 1Tb M.2 NVME	
5	Graphic Card not less GTX1650Ti 4Gb GDDR6 or equivalent by GPU mark	
6	Keyboard Eng/Russian (Qwerty)	
7	Battery not less than 6 Cell	
8	External ports and connectors: USB 3.1, HDMI, Display port	
9	Operating System not less than Windows 10 Professional 64bit, English, Russian	
10	<b>All interface cables and connectors must be included</b>	
<b>#VCR4</b>		
	<i>Color MFD A3</i>	<i>1 pc</i>
1	Print method: Inkjet	
2	Available functions: Print, Copy, Scan (A4, A3)	
3	Interface: USB 2.0 / Ethernet / Wi-Fi	
4	Ink supply - refillable container	
5	<b>All interface cables and connectors must be included</b>	
<b>#VCR5</b>		
	<i>Monochrome MFD A4</i>	<i>1 pc</i>
1	Print method: laser monochrome	
2	Functions: Print/scan/copy	
3	Print speed: single sided not less than 30 p/m (A4), double sided not less than 15 p/m (A4 both sides)	
4	Paper input (Standard) not less than 250 sheets	
5	Paper output not less than 150 sheets	
6	Standard cartridge capacity (ISO/IEC 19752) not less than 3000 pages	
7	Connectivity: USB 2.0/Gigabit Ethernet/ Wireless	
8	<b>All interfaces cables and connectors must be included</b>	

<b>#VCR6</b>	<b><i>Personal Cloud Storage</i></b>	<b><i>2 pcs</i></b>
<b>1</b>	<b>CPU not less than Marvell Armada 380 1,3Ghz</b>	
<b>2</b>	<b>RAM not less than 512Mb</b>	
<b>3</b>	<b>Two 2.5" or 3.5" SATA II hard disk interface</b>	
<b>4</b>	<b>Not less than one Gigabit Ethernet RJ-45 connector</b>	
<b>5</b>	<b>Not less than two USB 3.0 ports</b>	
<b>6</b>	<b>Not less than one USB 2.0 port</b>	
<b>7</b>	<b>20 Tb HDD must be included</b>	
<b>8</b>	<b>All interfaces cables and connectors must be included</b>	
<b>#VCR7</b>	<b><i>Digital Camera (Kit)</i></b>	<b><i>1 pc</i></b>
<b>1</b>	<b>Type: Pentamirror</b>	
<b>2</b>	<b>Effective pixels not less than 18Mp APS-C sensor</b>	
<b>3</b>	<b>Viewfinder 9-point AF optical</b>	
<b>4</b>	<b>Inbuilt WiFi</b>	
<b>5</b>	<b>LCD Screen not less than 6.8 cm (2.7")</b>	
<b>6</b>	<b>All interfaces cables and connectors, optical lens 18-55mm must be included</b>	
<b>#VCR8</b>	<b><i>Smart Board</i></b>	<b><i>1 pc</i></b>
<b>1</b>	<b>Type: Interactive board wall mount or floor stand</b>	
<b>2</b>	<b>Screen size not less than 77 inches</b>	
<b>3</b>	<b>Touch: Enables you to write, erase and perform mouse functions by touching the interactive whiteboard with your finger or a pen</b>	
<b>4</b>	<b>SMART lesson activities must be included</b>	
<b>5</b>	<b>SMART collaborative learning software must be included</b>	
<b>6</b>	<b>All interfaces cables and connectors, usb pen, wallmount or floor stand must be included</b>	
<b>#VCR9</b>	<b><i>Projector</i></b>	<b><i>1 pc</i></b>
<b>1</b>	<b>Type: Ultra-short throw</b>	

2	<b>Colour Light Output not less than 3,200 Lumen- 1,900 Lumen (economy)</b>	
3	<b>Interfaces USB 2.0 Type B, HDMI in (2x), Stereo mini jack audio in (3x), VGA out, Wireless LAN IEEE 802.11b/g/n</b>	
4	<b>Resolution not less than XGA 1920x1080</b>	
5	<b>Projection System 3LCD Technology</b>	
6	<b>All interfaces cables and connectors and wallmount must be included</b>	
<b>#VCR10</b>		
	<b><i>Smart TV</i></b>	<b><i>1 pc</i></b>
1	<b>Type: Smart TV</b>	
2	<b>Diagonal not less than 55 inches</b>	
3	<b>Screen resolution not less than 3840x2160 dpi</b>	
4	<b>OS Android</b>	
5	<b>Built-in camera - Preferable</b>	
6	<b>All interfaces cables and connectors must be included</b>	
<b>#VCR11</b>		
	<b><i>UPS</i></b>	<b><i>1 pc</i></b>
1	<b>Form factor - Tower</b>	
2	<b>Power Capacity (VA) not less than 1500VA</b>	
3	<b>Waveform – pure sinewave output</b>	
4	<b>Remote Management Interface - USB</b>	
5	<b>Power Device Features – LCD display, AVR</b>	
<b>#VCR12</b>		
	<b><i>24 port Gigabit Switch</i></b>	<b><i>1 pc</i></b>
1	<b>10/100/1000 Mb/s Ethernet unmanaged switch</b>	
<b>#VCR13</b>		
	<b><i>Mobile Workstation</i></b>	<b><i>3 pcs</i></b>
1	<b>Form-factor: Mobile workstation. Laptop.</b>	

2	<b>CPU not less than Intel i7-9750H or equivalent by CPU mark</b>	
3	<b>RAM not less than 16GB DDR4 2666MHz</b>	
4	<b>SSD not less than M.2 512Gb PCIe NVME Class 40</b>	
5	<b>Graphics Card not less than Nvidia Quadro P620 w/ 4GB GDDR5</b>	
6	<b>Screen Size not less than 15,6"</b>	
7	<b>Keyboard Eng/Russian (Qwerty)</b>	
8	<b>Operating System - Windows 10 Professional 64 bit, English, Russian</b>	
9	<b>All interface cables and connectors must be included</b>	