Ref. Ares(2026)4001577 - 17/04/2026

ANNEX II + III: TECHNICAL SPECIFICATIONS + TECHNICAL OFFER

Contract title: Supply of Equipment for Mersin ITS SAP- Lot 2 (TR14SPL201) **p 1 /…**

Publication reference: EC-ENEST/ANK/2026/EA-OP/0040

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 offered specifications.

Abbreviations

ABS	Anti-Lock Braking System
ASR	Acceleration Slip Regulation
CMOS sensor	Complementary metal–oxide–semiconductor, the active-pixel sensor
EBS	Electronic braking system
CE	Conformité Européenne
EC	European Commission
ECE	Economic Commission of European
ERA	End Recipient of Assistance- Mersin Metropolitan Municipality
EUROPLUG	2 side mounted earthing poles
EU	European Union
FOV	Field of view
HVAC	Heating Ventilation Air Conditioning
IEC	International Electro technical Commission
IP	Internet Protocol
ISO	International Standards Organization
IT	Information Technology
KM	Kilo Meter
KPI	Key Performance Indicator
KW	Kilo Watt
KWH	Kilo Watt Hour
Lux	Illuminance
M	Meter
MB	Megabyte
Mm	Millimeter
MMM	Mersin Metropolitan Municipality
MNVR	Mobile Network Video Recorder
Nm	Newton Meter
PVC	Polyvinyl Chloride
SORT	Standardized On Road Test
TS	Turkish Standards
UNECE	United Nations Economic Commission of Europe
V	Volts

VFOV	Vertical field of view

1. General Requirements

The MMM's existing IT infrastructure consists of several hundred virtual machines distributed across three separate data centers. Servers are managed by a central virtualization platform. Windows Server and Linux operating systems are used together. Active Directory-based identity management and corporate e-mail system are among the core services. For citizens, an e-government integration platform, a zoning information system, city transportation and tourism applications, and financial management systems are offered. The network is segmented with VLAN-based segmentation. More than 100 field locations are connected to the center via MPLS. Inter-location communication is provided through encrypted tunnels. Private APN connections over the mobile network are also part of the infrastructure. Central authentication is managed with RADIUS. Backup is operated on multiple storage layers with workloads classified according to different levels of criticality. System performance is monitored 24/7 with an SNMP-based monitoring tool. The security infrastructure is multi-layered. Hardware and virtual firewalls are used for perimeter security. Network access control (NAC) prevents unauthorized devices from accessing the network. Web applications are protected by an application layer firewall (WAF). EDR/XDR solutions and antivirus software are active at endpoints. A dedicated gateway is provided for email security. Database activities are monitored with a database activity monitoring (DAM) solution. Data loss prevention (DLP) system is active. Zero-trust network access (ZTNA) is implemented. All events are logged by a central SIEM and a 5651-compliant log management system. Regular vulnerability scanning is also part of the security processes.

1.1. Offered supplies must be provided complete with necessary accessories and/or parts to ensure that the supplied items can operate to required technical and quality specifications.

1.2. The contractor is fully responsible for proper connections of supplied items to existing infrastructure for smooth installation and operation.

1.3. The type of voltage in Türkiye is 220 V (mono phase) and 380 V (tri phase + neutral). All hardware must be suitable or adapted for direct connection to the standard power outlets in Türkiye. The type of electrical outlets generally installed in Türkiye is the type with 2 side mounted earthing poles (EUROPLUG). All plugs of all goods will have to fit exactly. The contractor shall evaluate the supplied current, the quality of the current and the fluctuations of the current and take the necessary precautions to avoid damage to the equipment.

1.4. The supplies must be compliant with CE standards. Wherever reference is made in the technical specifications to specific standards and codes to be met, provisions of the latest edition or revision of the relevant standards in effect, shall apply, unless otherwise stated in this technical specification.

1.5. The supplies should comply with the regulations concerning safe operation, energy saving and environmental safety, in line with the policies or the practical measures in use within the European Union (EU) and Türkiye.

1.6. During the installation of supplied items, the contractor will be responsible for providing measures for any Health & Safety risks associated with supplies provided.

1.7. All offered supplies must be suitable for operation in climatic conditions in place of delivery (please refer to "Draft Contract and Special Conditions, including annexes").

2. Technical Documents to be provided during the implementation period

2.1. Please refer to Article 31 of Special Conditions of the Contract for obligatory documents needed for the Provisional Acceptance.

3. Installation and Commissioning Requirements

3.1. Please refer to the Article 25 of Special Conditions of the Contract.

3.2. The contractor shall make available all tools, materials and equipment required for transport, assembling, installation and commissioning.

3.3. The contractor shall provide all tools and equipment needed for testing of supplies.

3.4. The contractor shall perform starting-up, installation and commissioning of the supplies by trained and authorized personnel in accordance with Article 25 of Special Conditions.

3.5. Consumptions on site during the installation and commissioning shall be borne by the contractor.

3.6. Subscription for all utility connections such as internet, electricity, water, etc. to relevant authorities shall be under a responsibility of MMM.

3.7. Full assembly and complementary engineering related to the installation and put into operation will be borne by the contractor including integration of other software / hardware (already existing[1] or to be provided by the ERA).

Connection to main electrical, mechanical, water, air and/or gas supplies from the equipment to the existing infrastructure shall be done according to the rules and regulations of Türkiye. Recovering any damage to building structure that may occur during the installation of goods is under the responsibility of the contractor.

3.8. Any other components which are not explicitly mentioned but required for fully functioning of the system shall be provided by the contractor during installation and commissioning.

3.9. All data shall be stored in Türkiye in accordance with Presidential Decree No:2019/12 published on 30823 numbered, 06.07.2019 dated Official Gazette. All the user data entered, collected, or produced shall be the sole property and under ownership of MMM.

4. Health and Safety

4.1. The contractor shall be fully responsible for applying the Health and Safety procedures in accordance with the legislation published by Republic of Türkiye, Ministry of Labor and Social Security during the manufacturing, delivering, assembling, installation, commissioning and testing. Moreover, the contractor shall be responsible for advising MMM and the Contracting Authority of any Health and Safety risks associated with supplies provided and suitable protective measures.

4.2. Supplies shall be designed to operate safely taking into account the characteristics of the terrain and its surroundings, atmospheric and meteorological conditions, any possible structures, and obstacles located in the vicinity either on the ground or in the air in such a way as to cause no nuisance or pose no danger under operation or servicing conditions or in the event of an operation to rescue persons.

5. Training Requirements

5.1. Following installation and commissioning of supplies, the contractor shall provide trainings for MMM staff.

5.2. The tenderers shall include in their offer a training plan according to requirements in this Technical Specifications (duration, topics provided in tables hereunder are requested as minimum). The contractor (if required) may extend training durations and topics covered.

5.3. Trainings shall be realized in Turkish or English with simultaneous translation when necessary.

5.4. Trainings shall be provided by qualified instructors.

5.5. All necessary accessories, materials and documentation for the trainings shall be provided by the contractor.

5.6. Unless otherwise required, trainings shall be realized in MMM facilities.

5.7. The trainings shall be recorded by the contractor and provided as a separate media to MMM for future use.

Lot No.		**Min. no. of training days**	**Max. no. of participants**	**Content of the trainings**
Lot 2	Traffic Management System Equipment	2	10	Trainings shall include theoretical training and applied training. The trainings shall cover topics including but not limited to: • Overview and terminology; • Basic usage training; • Maintenance and troubleshooting; • User interface; • Health and safety requirements.

6. Warranty requirements

6.1. Please refer to Article 32 and Article 33 of Special and General Conditions of the Contract and Warranty Regulation of Turkish Law as published on Official Gazette no.29029 dated 13.06.2014.

6.2. Only original or approved by the manufacturer(s) spare parts should be used in any repair service.

6.3. For Lot 2, the tenderer shall provide a list of spare parts for informative purposes only.

7. Visibility

7.1. All projects /contract implemented under this programme shall comply with the latest Visibility Guidelines for European Commission Projects in Türkiye published by the EU Delegation to Türkiye. Please refer to Article 9 of Special and General Conditions of the Contract.

7.2. Proper material and size compatible with specifications and dimensions of supplies shall be offered by contractor and approved by Contracting Authority after the commencement of the Contract.

7.3. Label shall be designed in accordance with the Article 9 and article 29 of Special and General Conditions of the Contract.

7.4. The contractor shall take the necessary measures to ensure the visibility of the European Union co-financing. These measures must comply with the latest Communication and Visibility Requirements for EU-funded external action, laid down and published by the European Commission.

LOT 2 – Traffic Management System Equipment

This Lot consists of Item 2.1 – Passenger Counting Sensor, Item 2.2 – Mobile Network Video Recorder (MNVR)

1. **General requirements**

1.1 Please refer to the Article 25 of Special Conditions of the Contract.
1.2 The contractor shall make available to himself all tools, materials and equipment required for transport, unloading and removal of packing materials from delivery location in accordance with Article 29 of Special Conditions. The contractor shall perform relevant tasks by trained and authorized personnel.
1.3 The contractor shall provide all tools and equipment needed for testing of supplies.
1.4 Any other components which are not explicitly mentioned but required for fully functioning of the system shall be provided by the contractor.

2. **Technical documents to be provided during the implementation period**

2.1 Please refer to Article 31 of Special Conditions of the Contract for obligatory documents needed for the Provisional Acceptance.

3. **Installation and Commissioning Requirements**

3.1. For Item 2.1- Passenger Counting Sensor, the contractor shall be responsible for the supply, installation, and configuration of Passenger Counting Sensors including:

- Installation and calibration of sensors in buses/minibuses/Dolmuş to accurately detect and record passenger count data.
- Supplying suitable Passenger Counting Sensor and MNVR devices compatible with buses/minibuses/Dolmuş' specifications and infrastructure.
- Integration with existing onboard systems and/or central software platforms (to be provided by the ERA) for data transmission and analysis.

3.2 For Item 2.2- Mobile Network Video Recorder (MNVR), the contractor shall be responsible for the supply, installation, and configuration of MNVR including:

- Supply of Mobile NVR hardware units with sufficient storage capacity and processing power.
- Installation and integration of Mobile NVR units with existing surveillance camera systems in vehicles.
- Configuration of network connectivity for remote access and monitoring of video feeds.
- Implementation of storage management protocols to ensure efficient use of storage space and data retention policies.

1. Item number	2. Specifications required	3. Specifications offered	4. Notes, remarks, ref to documentation	5. Evaluation committee's notes
2.1	**Passenger Counting Sensor** The sensor shall be installed to the buses and Dolmuş in order to count the passengers.			
	Manufacturer's name; product model/type:			
	Country of origin:			
	Quantity: 1250			
2.1.1	The sensor shall detect and count boarding and alighting passengers.			
2.1.2	The sensor shall be capable of counting passengers at a speed consistent with typical boarding and alighting rates, with minimal latency.			
2.1.3	The sensor shall have a wide detection range to cover the entry and exit points of bus doors effectively.			
2.1.4	The sensor shall detect the passenger density in the vehicle while the vehicle is in motion and transmit it to the data center for each bus stop.			

2.1.5	The sensor shall support at least 1080p 30 fps 1920x1080 resolution.			
2.1.6	The sensor shall be designed to operate on the bus's electrical system, with voltage compatibility and power consumption optimized for onboard use. The sensor’s power consumption shall be less than 24W.			
2.1.7	The sensor shall support HTTP/ HTTPS, NTP, IPv4 or fully comply with ITxPT minimum standard (inventory, APC, time, GNSS).			
2.1.8	The sensor's working temperature shall cover the range of -20°C to +55°C.			
2.1.9	The sensor shall support Web Interface.			
2.1.10	The sensor shall have IP65 or higher protection level to provide protection against dust ingress and water spray.			
2.1.11	The sensor shall be compatible with various bus door designs or ceiling.			
2.1.12	The sensor shall support standard communication interfaces for buses (such as RS485, RS232, or) for seamless integration with onboard systems and data transmission.			
2.1.13	The sensor shall have real-time data transmission capability via wired or wireless connection (e.g., Wi-Fi,			

	Bluetooth) to onboard or offboard data storage and processing systems.			
2.1.14	The sensor shall comply with privacy regulations by anonymizing passenger data and ensuring that no personally identifiable information is collected or stored.			
2.1.15	The sensor shall have at least following maintenance features; -Self-diagnosis capabilities -Easy access for cleaning and servicing.			
2.1.16	The sensor shall be at least 1 / 2.4 〃 2M pixel CMOS type.			
2.1.17	The sensor shall have at least M12- 2.2 mm lens, maximum M12 2.7 mm lens.(shall be between 2.2 mm to 2.7 mm) The FOV shall be at least 120° and VFOV shall be at least 62,5°.			
2.1.18	The signal/noise ratio of the sensor shall not be less than 50 dB.			
2.1.19	The sensor shall have a minimum of 3 meters infrared (IR) support.			
2.1.20	The sensor shall have high accuracy rate of at least 90% in counting passenger boarding and alighting events to provide reliable data for transportation planning and management.			

2.1.21	The sensor shall generate and transmit the alarms to the center in case of emergency and abnormal events.			
2.1.22	The sensor shall comply with following standards as minimum: EN50155 - IEC60068-2-7EH – IP66 – EN50102 – ROHS – FCC – EMC – CE standards.			
2.1.23	The passenger counting camera shall have a global shutter feature			
2.1.24	All equipment supplied shall be fully compliant with the requirements mentioned in the ”directive on the modificaiton of the directive for manufacturing, modification and assembly of vehicles” published in the Official Gazette No. 32817, dated 18.02.2025.			
2.2	**Mobile Network Video Recorder (MNVR)**			
	Manufacturer’s name; product model/type:			
	Country of origin:			
	Quantity: 668			
2.2.1	MNVR shall support 8 IP channels.			
2.2.2	MNVR video output shall support 1 ch HDMI, 1 ch CVBS and 1 ch VGA.			

2.2.3	MNVR shall support H264/H265 video compression			
2.2.4	MNVR shall support 3G or 4G network and optional to support WIFI.			
2.2.5	The MNVR shall support 1 × M.2 SSD and shall be supplied with a minimum of one 1 TB M.2 SSD.			
2.2.6	MNVR shall support at least 1 × SIM card slot, 1 × USB2.0 or better, 1 × RS232; 2 × RS485, and at least 4-channel input and 1-channel output, 1-channel pulse speed detection and optional control panel (monitor)			
2.2.7	MNVR's operating temperature shall cover the range of -30°C to +55°C, and operating humidity shall be between 10% to 90% or larger.			
2.2.8	MNVR shall have shock-proof and vibration-resistant design to withstand the harsh conditions of vehicle environments.			
2.2.9	MNVR shall have a built-in GPS module for accurate location tracking			
2.2.10	MNVR shall have compatibility with vehicle power systems (12V or 24V DC) for direct integration into the vehicle's electrical system.			

2.2.11	The MNVR device shall have EN 50155, E-Mark, and ISO 16750-3 certifications.			
2.2.12	MNVR shall have compatibility with mobile applications or web-based interfaces for remote access to live video feeds and playback of recorded footage. It shall have multi-user access with role-based permissions to ensure secure access control.			
2.2.13	MNVR shall have software development kit and application programming interface support in order to integrate with the software of different manufacturers and shall also allow changes to be made on the firmware.			
2.2.14	MNVR shall have support for event-based recording triggered by predefined events such as motion detection, G-force impact, or external alarm signals.			
2.2.15	The MNVR device will be integrated with the 112 Emergency Call Center.			
2.2.16	It must have the capability for remote updates and remote access to recordings by the designated control center.			
2.2.17	It must ensure that the footage is stored securely, encrypted, and without interruption.			
2.2.18	If the vehicle where the device is installed has an emergency button, when			

	the button is pressed, the device should enter alarm mode and record the time intervals of pre-alarm (30 seconds before the alarm) and post-alarm (5 minutes after the alarm) by tagging them as alarm events. The pre-alarm and post-alarm parameters should be remotely adjustable by the designated control center.			
2.2.19	It should be able to detect the vehicle's ignition status and start data recording within 1 minute at the latest after the ignition is turned on.			
2.2.20	After the ignition is turned off, it should remain on by default for 15 minutes, and this duration should be adjustable via parameters.			
2.2.21	It must have the capability to transmit video via unicast and multicast.			
2.2.22	It must have a USB Type-C port.			
2.2.23	It must have the feature that ensures existing recorded footage is not affected in case of a power disconnection.			
2.2.24	The device must support both static and dynamic IP			
2.2.25	The device must have an SD card feature.			