

TECHNICAL SPECIFICATIONS + TECHNICAL OFFER

Contract title: *Joint Forest fire monitoring and suppression in Western Serbia*

Publication reference:

Column 1-2 should be completed by the Contracting Authority

Column 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 his 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 which do not 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.

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ABBREVIATIONS

The following abbreviations are used consistently throughout this document.

CMOS	Complementary Metal–Oxide–Semiconductor
DVD.	Digital Versatile Disc
FOV	Filed Of View
GIS	Geographic Information System
HD	Hard Disk (Computer)
IP	International Protection Code
IR	Infra-Red
MIMO	Multiple-Input and Multiple-Output
MoI	Ministry of Interior
NIR	Near-Infra-Red
OEM	Original Equipment Manufacturers
PC	Personal Computer
PDF	Portable Document Format
PIN	Personal Identification Number
PTZ	Pan/Tilt/Zoom
RAM	Random Access Memory
TB	TeraByte
TCP-IP	Transmission Control Protocol - Internet Protocol
TIR	Thermal InfraRed
TX-RX	Transmitting-Receiving
UAV	Unmanned Aerial Vehicle
USB	Universal Serial Bus
VIS	Visible

1 OVERVIEW

1.1 BACKGROUND

The forests in Serbia cover 29.1% of the territory out of which 56.2% are state owned forests. State forests are predominantly large forest complexes, they have a relatively favourable structure and the method of their administration and management has always been on a considerably higher level compared to private forests. Private forests are parts of smaller complexes, they are usually divided into a great number of small-size parcels and their state and yield potentials are poorer, therefore they do not have (despite the large area they occupy) a very significant timber processing capacities. The forests are mainly endangered by human activities: over logging and, especially in this region, fires. More than 50,000 hectares of forests in the area of Western Serbia are endangered by forest fires (National park "Tara" 22,000 ha and Forest District Loznica 39,357 ha of forests). Most of this area is categorised as IV, V and VI level of danger from fire, and that is 84% of all forests in this region).

Forest fires are a serious social and economic problem. They are classified as the factors which, in a short time period, can cause great damage, both material (destroyed timber, costs of suppression, reclamation of burned sites), and ecological, which are generally much greater. The occurrence of forest fires mostly depends on the weather conditions, but also on forest state and forest structure. Due to the extreme heat and long drought periods experienced in past years, the number of large forest fires has drastically increased. According to the data from the Ministry of Interior - Sector for Emergency Management, during the 2012, the firefighting/rescue unit intervened in suppression of 34,554 fires. Out of this number, 25,179 fires were in open area.

The project aims to reduce the number of forest fires and areas affected by forest fires in West Serbia region through improved detection and information transfer mechanisms and increased efficiency of the forest fires protection and suppression system.

The overall objective of the project (with the equipment purchased under this supply tender) is increasing capacity for reaction in emergency situations. The project will introduce a new technology that will improve detection and information transfer in emergency situations. It will also provide valuable experience and guidelines for gradual expanding the system on the territory of the whole country and its applicability in all emergency situations. It will raise prevention capabilities of the Sector which would result in decrease of number of fires that occurred in the open, as well as increase number of timely extinguished fire, and number of rescued people and property.

Since the project is implemented in the cross-border region it will have a positive effect on the joint activities in forest fire suppression through faster exchange of information related to forest fires and mutual help in case of emergency.

1.2 GENERAL REQUIREMENTS

All items must confirm to regulations and Standards of EC, ISO, IEC that apply to each and every item. The Tenderer has to provide a certificate of conformity (CE or similar) at the stage of issuing the Provisional Acceptance certificate.

The supplies shall include all accessories necessary for proper operation of the equipment such as, but not limited to power cables, interconnect cables, adapters, connectors, input devices (examples: LV power cables, Coax cables, CAT5 cables) to make the provided equipment fully operational and functioning fitting intended purpose.

The objective to purchase UAV and fixed cameras systems is to perform early fire detection and monitoring the forested areas of the Western Serbia.

The successful bidder shall provide a stand-alone solution which includes all equipment, techniques and training needed in order to operate the UAV and the cameras, acquire, geo-localize and archive images.

All requirements listed in the next sections of this specification shall be considered as the minimum acceptable qualifying criteria.

1.3 ORGANIZATION AND ADDITIONAL REQUIREMENTS

Since the beneficiaries of the project are the Ministry of Agriculture and Environmental Protection (Forestry Directorate) and the Ministry of Interior (MoI) - Sector for Emergency Management, the ownership of the acquired goods will be divided among the entities according to the primary user of the system. This is important for the future maintenance and the cost of ownership.

In that sense, the Ministry of Agriculture, Forestry and Water Management will transfer the ownership of the goods to Public Enterprise “Srbijašume” specifically the monitoring system with cameras, communication equipment and UAVs.

All equipment for the forestry administration will be delivered by the contractor to Public Enterprise “Srbijašume” the Forest Enterprise Valjevo, St. Andre Savcica 10, Valjevo. The beneficiary undertakes to distribute the equipment from the Forest Enterprise Valjevo to other forest enterprises-users.

Stationary cameras and signal transfer equipment will be mounted by the contractor on to the existing poles located at the following locations (coordinates):

- Tornicka boboja etv
44.195555°N 19.553611°E

- Debelo brdo
44.135547°N 19.693876°E

- Magles
44.157942°N 19.870614°E

- Divcibare
44.112436°N 19.97484°E

- Gornji Lajkovac
44.173055°N 20.087262°E

The contractor will undertake to obtain at his own risk and expense any official authorisations and carry out all customs formalities for the supplied goods including the technical inspection of goods and homologation in full accordance with positive legislation in the Republic of Serbia, so that the delivered equipment could be immediately operational and put to use.

The main aim of the project is to contribute to the capacity building of the beneficiary in order to

1. increase the capacity of the forest operator to detect forest fires, transfer the information and reduce reaction time

2. increase the technical capacity of the regional Sector for Emergency Management and Public Enterprise “Srbijašume” in forest fire suppression.

To achieve these objectives, the following equipment should be acquired:

1.3.1 Monitoring system based on cameras and UAV

The cameras should perform the monitoring of the areas of interest allowing the early detection of forest fires by the operator. By acquiring cameras and installing those on the existing poles in the border regions the visible distance will be increased to at least 10 km in air line which will allow for a substantially larger area of land to be constantly under monitoring. The said cameras, rotating on 360° angle will observe the border with Bosnia and Herzegovina area. The monitoring system has to fulfil the following tasks:

1.3.1.1 Cameras (5 pcs)

5 PTZ High resolution thermal (TIR) and optical (VIS/NIR) digital camera for the continuous monitoring of the forested areas of the Western-Serbia allowing the operator to detect (through smoke or thermal anomalies detection) fires at early stage through the triangulation method. Camera thermal imaging sensor must be minimum 640x512 resolution with support for contrast adjustment.

1.3.1.2 Transmission (6 pcs)

TX-RX system digital encrypted for transmitting the images acquired by cameras to the control room (and command vehicle) and remotely control the cameras. The transmission system should be able to support 100 MBps network throughout. The system must be able to achieve bidirectional point to point communication between sites as well as omni directional coverage of required area. Each transmitter must act as IP network router in order to select best network path in given conditions. GIS and “Push to talk” capability must be integrated in every radio. Network control interface must be accessible at every network node through web based interface. The transceiver must have a spectrum analyzer capable to measure interferences at currently selected channel.

1.3.1.3 Computer (2 pcs)

1 Server computer for image acquisition and archiving connected to the monitors for images displaying.

1 Workstation for controlling cameras, showing in a GIS environment the instantaneous FOV of cameras and processing camera and UAV images.

1.3.1.4 UAV (2 pcs)

Unmanned Aerial Vehicle equipped with a VIS/NIR (optical and low light camera) and TIR (Thermal imaging sensor/night vision) sensors for monitoring the area of interest: detect fires, assess vegetation status, monitor illegal activities, etc. UAV must be a multi-copter enough stable for surveillance purposes equipped with gasoline-electric hybrid powered system with minimum flight time of 4hrs. HD video downlink must be integrated in remote controller.

1.3.1.5 Monitor (2 pcs)

2 24" monitors for displaying cameras and UAV images in the control room.

1.3.1.6 Results

The software and hardware should allow the data acquisition, transmission to the control room and deliver at least the following results:

- Monitoring the area of interest providing videos and images at high resolution and transmitting the data to the Control room, showing the imaged FOV in a GIS environment.
- Plan observation mission and perform monitoring of the area of interest with UAV system and acquire, transmit and process georeferenced VIS/NIR and TIR images.

1.3.1.7 Training of Personnel and Tutorial

The contractor will be in charge for training in groups in compliance with their qualifications and position in the future projects. 4 people should be trained on the spot (FMU Valjevo, FE Loznica). The training shall be performed with following specialized lessons:

- Camera management
- Utilization of the UAV system
- Data processing and analysis incl. GIS software
- Transmitting system characteristics and maintenance

Together with the equipment, manuals have to be provided describing handling of cameras, transmission, system, UAV and software for image processing.

1.4 BENEFICIARY'S RESPONSIBILITY

In order to ensure smooth project implementation and to provide the Contractor with the necessary information, the Beneficiary has agreed to provide:

- Availability of an operational Team;
- Access to the towers on which cameras should be mounted and transmission systems and electric power, including permissions to install the equipment;
- Acceptance and storage of delivered goods under this contract;
- Providing a space for assembling the system and training of the Project team;
- Operating the system after provisional and final acceptance.

1.5 SCOPE OF THE TENDER

The subject of this tender is the supply of equipment for increasing the capacity of the forest operator to detect forest fire, transfer the information and reduce reaction time in 1 (one) lot:

Lot 1 : Survey systems

- Monitoring cameras
- UAV
- Transmission system
- Computers
- Training with the systems
- Manuals
- Warranty service
- Documentation.

1.6 DESCRIPTION OF ITEMS AND SUPPORTING DOCUMENTATION

Tenderers are required to demonstrate that the offered specifications are responsive to the Tender Dossier requirements identifying model, manufacturer and country of origin of each individual item in their Technical Offer providing necessary documentation (catalogues, guides, brochures, manuals, booklets, etc.) with detailed technical specifications for all items being offered thus enabling the Contracting Authority to verify the information provided in the offer. All documentation shall be in English language, including the technical specification of the manufacturer (Data Sheets) and must be provided both in hardcopy and electronic version in PDF format (CD or DVD) at least one set for each delivered device.

1.7 MANUALS

The manuals shall describe all necessary steps to use the acquired equipment correctly with detailed description of:

- Assembling and disassembling of the complete hardware and software of the system
- All the documentation required for the installation, interconnection, alignment, maintenance of the equipment and devices.

On site:

- Installation of the cameras
- Installation of the telecommunication system
- Booting of computer and camera control software
- Assembling and test the UAV
- System check on site test of the whole system
- Data acquisition
- Data processing
- Assessment of results
- Mapping and presentation of results

The manual shall be in English and in Serbian language. 4 copies should be provided together with an electronic copy on USB flash-drive.

1.8 FINAL DOCUMENTATION

Final documentation shall contain at least:

- a) A complete list of equipment. It shall include name, description, part and revision number, quantity and warranty specification,
- b) Documentation related to all hardware and software included
- c) Manual (see 1.7)
- d) Request for provisional acceptance

In English and Serbian language in 4 copies and an electronic version on USB flash-drive

1.9 MAINTENANCE AND WARRANTY CONDITIONS

The Contractor is in charge of installing the cameras, the telecommunication systems, the fire detection system.

The Contractor must guarantee correct operation of the fire detection system for at least 12 months after the provisional acceptance according article 32 of the General Conditions (SUP).

2 year is the minimum warranty for each equipment supplied.

The Contractor should guarantee, in the case of a malfunction of the camera or transmission system, determination of malfunction within 48 hours. Repair of malfunction should be done in accordance with OEM policy.

The warranty shall cover:

- a) All functionalities of the equipment (required and offered),
- b) All defects in material and workmanship, including those when the equipment does not have the exact parameters or features specified by the manufacturers;
- c) Repairs of detected damages to components of the equipment, including replacement of damaged parts with new ones if repair is not possible;
- d) Repairing detected faults, defects and functional failures in both the equipment and the software;
- e) All software updates shall be available 5 years after Provisional Acceptance.

The warranty services will be provided on every site in the Republic of Serbia where the system is in operation during the warranty period.

During the warranty period, the Contractor shall designate contact person(s) able to support the Beneficiary with information related to the operation of the equipment installed. For this purpose the Contractor(s) shall provide contact telephone numbers plus e-mail addresses for reporting malfunction.

This number(s) and e-mail(s) shall be used also for reporting all defects and/or failures of the equipment.

During the warranty period the Contractor shall provide the support services.

1.10 VISIBILITY

All supplies shall comply with the visibility Manual for EU External Actions (https://ec.europa.eu/europeaid/communication-and-visibility-manual-eu-external-actions_en).

The cameras, UAV should be clearly identified, and visibly carry the EU flag and the phrase “Provided with the support of the EU” in English and in Serbian . The EU flag should be displayed at least as prominently as the logos of all parties involved in the action on the cameras and UAV.

1.11 SUPPLY DELIVERY

The end of the delivery period shall be 6 months after commissioning date. The location of assembling of the cameras, computers, will be provided by Beneficiary. Consequently, these will be the place of delivery of all items belonging to the cameras, transmission system, UAV and necessary for installation and survey and assessment of results.

The Tenderer must provide the necessary measures to prevent any damage during delivery, installation, integration and customization stages. If any damage occurs during delivery, installation, integration and customization stages, the Tenderer must appropriately rectify it.

At the end of this assembling period, all items supplied, including hardware and accompanying software must be fully operational and the staff chosen by the Beneficiary will have been given full training for safe and efficient use of the items.

There will be no partial provisional acceptance. Provisional acceptance will depend on the supply of all the equipment, on the requested software installation, integration and customization, as well as requested training having been satisfactorily completed.

1. Item Number	2. Specifications Required		3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
1. TENDER DOSSIER REQUIREMENTS LOT 1: MONITORING EQUIPMENT (CAMERAS AND UAV SYSTEM)					
All tenders submitted must comply with the requirements in the tender dossier and comprise:					
1.1	Monitoring camera	Quantity : 5			
Manufacturer's name					
Product/type, model:					
<ul style="list-style-type: none"> a) Outdoor High resolution digital VIS/NIR and TIR dual sensor video camera providing coloured images during the day and Thermal imaging during the night. b) PTZ mounted, installed on already existing towers, Automatic scanning (360° horizontal in less than 5 min (minimum), -90°+40 vertical). Ability to manually and remotely control camera. Registration of azimuth/elevation/zoom values. c) VIS/NIR Image sensor ½ 8" Progressive Scan CMOS. d) Min illumination Color: 0.05 Lux; BW : 0.01Lux e) Zoom: optical 49 X, digital 16 X (minimum). f) Thermal image sensor vanadium oxid uncooled focal plane arrays (maximum resolution 640x512), Response waveband 8 – 14 µm. Focal length up to 100mm g) Operational temperature, at least, -40° C to 60° C. h) Level of protection IP66 (International Protection code). i) PC compatible software for camera control, image archiving and GIS localization of the observed area and smoke and/or thermal anomalies detection. j) User Manual in Serbian and English, Training. k) 2 years warranty minimum. 					

1. Item Number	2. Specifications Required		3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	l) Certificate of conformity to regulations and Standards of EC, ISO, IEC.				
1.2	Cameras data Transmission system	Quantity : 6			
	Manufacturer's name:				
	Product/type, model:				
	a) TX-RX transmission system 8 Watts, 2200-2500MHz for cameras video/pictures transmission and remote camera control b) Antenna, Sector, 4x4 MIMO, Dual Polarized, 15 dBi, c) Video/Pictures/Data transmission with beamforming, capable to support land sites, vehicle transmission and UAV video/data transmission. d) Minimum 100Mbs e) Installation of the system and training, User manual in English and Serbian. f) 2 years maintenance warranty.				
1.3	Computer (for control room)	Quantity : 2			
	Manufacturer's name				
	Product/type, model:				
	a) 1 Server computer for camera images				

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<p>archiving with Operative System included , 8 Core processor, 64 GB Ram, 2 TB internal memory</p> <p>b) Hard Disk 4 TB for image storage</p> <p>c) Graphics card</p> <p>d) 2 internet cards 10/1000 Gigabit</p> <p>e) 4 USB port.</p> <p>f) 2 monitor 24"</p> <p>g) 1 Workstation including Operative System and keyboard for cameras remote control, 6 Core processor, 32 GB Ram, 1 TB HD.</p> <p>h) Graphics card</p> <p>i) 2 internet cards Gigabit</p> <p>j) 4 USB port</p> <p>k) 2 year warranty minimum.</p> <p>l) Certificate of conformity to</p>			

1. Item Number	2. Specifications Required		3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	regulations and Standards of EC, ISO, IEC.				
1.4	Monitor(for control room)	Quantity : 2			
	Manufacturer's name				
	Product/type, model:				
	a) monitor 24"				
	Product/type, model:				
1.5	UAV Monitoring	Quantity : 2			
	Manufacturer's name:				
	Product/type, model:				
	<p>The hybrid multi-copter UAV surveillance system should have at least the following characteristics:</p> <ul style="list-style-type: none"> a) Flight duration 4 h minimum b) Flight altitude up to 2000 m, at least c) Flight speed up to 15 m/s, at least d) Range up 100 km, at least e) UAV dimension Wheelbase around 1600mm f) Possibility of planning the mission and perform programmed or manual flight, Automatic take-off and landing. 				

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	g) Equipped with a optical zoom camera 3-axis high stabilised gimbol with 10x10 optical zoom camera and IR camera. Ground resolution up to 4 cm (depending on the flight height). h) Equipped with a Thermal camera (8 - 12 μm, wavelength interval), possibility to control camera (pan/tilt) from ground. Operational temperature, at least: -20° to +50°; temperature range, at least: -40 - +500; Resolution 640x480 minimum. i) Autoobject tracking function j) PC software for mission control, mission planning, image processing. k) Training l) User manual in English and Serbian m) 2 year minimum warranty. n) Certificate of conformity to regulations and Standards of EC, ISO, IEC.			
Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
1.5	Training	Quantity: Lump Summ		

	<p>The training foresees that 4 people should be trained on the spot (FMU Valjevo, FE Loznica). The training shall be performed with following specialized lessons:</p> <ul style="list-style-type: none">• Camera management• Utilization of the UAV system• Data processing and analysis incl. GIS software• Transmitting system characteristics and maintenance			
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