

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

Contract title : Supply and installation of equipment for navigation monitoring system on the Danube River

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Publication reference : EuropeAid/138044/IH/SUP/RS

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.

LIST OF ABBREVIATIONS

AIS	Automatic identification system
AtoN	Aids to Navigation
CEVNI	European Code for Inland Waterways
CPU	Central Processing Unit
DDR memory	Double data rate memory
ECC memory	Error-correcting code memory
EPFS	Electronic Position Fixing System

EPS	Expanded Polystyrene
FATDMA	Fixed Access Time Division Multiple Access
HDD	Hard disk drive
HDMI	High-Definition Multimedia Interface
IALA	International Association of Lighthouse Authorities
IPA	Instrument for pre-accession assistance
IP camera	Internet protocol camera
IPS	In-plane switching
IP68	International protection (rating)
IT	Information Technology
LAN	Local area network
LCD	Liquid-crystal display
LED	Light Emitting Diode
MMSI	Maritime Mobile Service Identity
MPEG	Moving Picture Experts Group
ONVIF	Open Network Video Interface Forum
PC	Personal computer
RAID	Redundant array of independent disks
RAL	Color matching system
RAM	Random Access Memory
RATDMA	Random Access Time Division Multiple Access
RIS	River Information Services
RS-232	Recommended Standard 232 (computer serial interface)
SAS	Serial Attached SCSI (Small Computer System Interface)
SNMP	Simple Network Management Protocol
SSD	Solid-state drive
UNECE	United Nations Economic Commission for Europe
UPS	Uninterruptible power supply
USB	Universal Serial Bus
UV	Ultraviolet
WiFi	Wireless local area network

1.1. Description of the Work

The subject of the contract is the supply, delivery, unloading, installation, training, commissioning and testing by the Contractor of the following goods in given quantities for specified locations in Serbia according to the List of distribution locations defined in Appendix II and the List of installation locations defined in Appendix I:

Item Number	Quantity	Item Title	Location / Quantity
1	55	AIS AtoN red lantern – type 1	Makiš, Obrenovački put 12, Belgrade / 55
2	60	AIS AtoN green lantern – type 1	Makiš, Obrenovački put 12, Belgrade / 60
3	4	AIS AtoN white lantern – type 1	Makiš, Obrenovački put 12, Belgrade / 4
4	30	AIS AtoN red lantern – type 3	Makiš, Obrenovački put 12, Belgrade / 30
5	20	AIS AtoN green lantern – type 3	Makiš, Obrenovački put 12, Belgrade / 20
6	55	Red buoy (CEVNI 1.B)	Makiš, Obrenovački put 12, Belgrade / 55
7	70	Green buoy (CEVNI 2.B)	Makiš, Obrenovački put 12, Belgrade / 70
8	30	Solid State Drive	Makiš, Obrenovački put 12, Belgrade / 30
9	2	Server	Makiš, Obrenovački put 12, Belgrade / 1 End Recipient's Headquarter, Francuska 9, Belgrade / 1
10	2	Backup storage system	Makiš, Obrenovački put 12, Belgrade / 1 End Recipient's Headquarter, Francuska 9, Belgrade / 1
11	3	Weather station with WiFi	Bogojevo / 1 Vajuga village / 1 Brnjica / 1
12	8	IP camera	Bogojevo / 2 Novi Sad / 2 Belgrade / 2 Makiš, Obrenovački put 12, Belgrade / 2

Item Number	Quantity	Item Title	Location / Quantity
13	4	Network video recorder	Bogojevo / 1 Novi Sad / 1 Belgrade / 1 Makiš, Obrenovački put 12, Belgrade / 1
14	2	Network switch	Makiš, Obrenovački put 12, Belgrade / 1 End Recipient's Headquarter, Francuska 9, Belgrade / 1
15	1	UPS	Makiš, Obrenovački put 12, Belgrade / 1
16	10	Desktop workstation	End Recipient's Headquarter, Francuska 9, Belgrade / 10
17	20	LCD monitor	End Recipient's Headquarter, Francuska 9, Belgrade / 20
18	1	Central AtoN Monitoring Workstation PC	End Recipient's Headquarter, Francuska 9, Belgrade / 1
19	6	Wall mountable LCD monitor	End Recipient's Headquarter, Francuska 9, Belgrade / 6
20	5	Notebook workstation	End Recipient's Headquarter, Francuska 9, Belgrade / 5
21	8	Rugged notebook workstation	End Recipient's Headquarter, Francuska 9, Belgrade / 8

This equipment will be used for increasing the capacity and safety of navigation by development and integration of a navigation monitoring system on the Danube River. This system relies on existing RIS infrastructure, especially tracking and tracing component of the RIS that has been already implemented in the Republic of Serbia within IPA 2007, utilizing AtoN transponder technology to monitor remotely status, position and functionality of the physical marking system on the Serbian stretch of the Danube River. Vessel tracking and tracing considers the function of maintaining status information of the vessel, such as the current position and characteristics, as well as retrieving of information concerning the whereabouts of the vessel and, if needed, information about cargo, consignments and equipment. Tracking and tracing is already deployed alongside the Danube. The key-technology used for setting tracking and tracing systems is AIS based transponder technology. Infrastructure implemented on shore enables competent authorities to receive information about vessel ID, position, movement, etc. Practically the entire Danube River is covered with AIS, while the extensive transponder equipment programme has taken place in different countries resulting in appropriate equipment of the Danube fleet.

1.2. Technical specifications

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
1	<p>AIS AtoN red lantern – type 1</p> <p>Technical specification requirements for construction:</p> <ul style="list-style-type: none"> • All components in compact housing with light on the top • Maximum total weight of 20kg • Waterproof IP68 • On/off option • Replaceable battery • Replaceable AIS AtoN equipment • Replaceable solar panels <p>Technical specification requirements for light:</p> <ul style="list-style-type: none"> • Red LED light source (according to IALA Recommendation E-108) • Remote control for light • Visibility range more than 3 nautical miles • Horizontal output of 360° • Minimum vertical divergence of 7° • Supports flashing interval 0.7/2.8 (on/off) or 0.5/2.5 (on/off) • Possible adjustment of intensity • LED light life expectancy more than 100,000 hours <p>Technical specification requirements for AIS</p>			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<p>AtoN:</p> <ul style="list-style-type: none"> • AIS AtoN type 1 • Supports both FATDMA and RATDMA operation • Completely configurable over RS-232, USB or LAN port • Configurable slots and intervals for all outgoing AIS messages • Configurable channels and power level • Configurable MMSI target for addressed messages • Provides AIS message 21Configurable AIS message 21 parameters <ul style="list-style-type: none"> ○ MMSI number ○ Name ○ Type of AtoN ○ Type of EPFS ○ Dimensions and antenna position ○ Nominal position ○ Off position threshold • Provides AIS message 6 with information about status of battery voltage, solar voltage, light status and light flash settings • Set of tools required for installation and servicing of the provided AIS AtoN lanterns • Cable/adaptor for connection of AIS AtoN equipment to USB or LAN port • Software for configuration of AIS AtoN 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<p>equipment</p> <ul style="list-style-type: none"> • Software for configuration of light • Remote controller for light <p>Warranty:</p> <ul style="list-style-type: none"> • The warranty must remain valid for one year after provisional acceptance. <p>Supporting documentation:</p> <ul style="list-style-type: none"> • Installation manual • Maintenance manual • User manual 			
2	<p>AIS AtoN green lantern – type 1</p> <p>Technical specification requirements for construction:</p> <ul style="list-style-type: none"> • All components in compact housing with light on the top • Maximum total weight of 20kg • Waterproof IP68 • On/off option • Replaceable battery • Replaceable AIS AtoN equipment • Replaceable solar panels <p>Technical specification requirements for light:</p> <ul style="list-style-type: none"> • Green LED light source (according to IALA Recommendation E-108) • Remote control for light • Visibility range more than 3 nautical miles • Horizontal output of 360° • Minimum vertical divergence of 7° 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> • Supports flashing interval 0.7/2.8 (on/off) or 0.5/2.5 (on/off) • Possible adjustment of intensity • LED light life expectancy more than 100,000 hours <p>Technical specification requirements for AIS AtoN:</p> <ul style="list-style-type: none"> • AIS AtoN type 1 • Supports both FATDMA and RATDMA operation • Completely configurable over RS-232, USB or LAN port • Configurable slots and intervals for all outgoing AIS messages • Configurable channels and power level • Configurable MMSI target for addressed messages • Provides AIS message 21Configurable AIS message 21 parameters <ul style="list-style-type: none"> ○ MMSI number ○ Name ○ Type of AtoN ○ Type of EPFS ○ Dimensions and antenna position ○ Nominal position ○ Off position threshold • Provides AIS message 6 with information about status of battery voltage, solar voltage, light status and light flash settings 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> Contains set of tools required for installation and servicing of the provided AIS AtoN lanterns Contains cable/adaptor for connection of AIS AtoN equipment to USB or LAN port Contains software for configuration of AIS AtoN equipment Contains software for configuration of light Contains remote controller for light <p>Warranty:</p> <ul style="list-style-type: none"> The warranty must remain valid for one year after provisional acceptance. <p>Supporting documentation:</p> <ul style="list-style-type: none"> Installation manual Maintenance manual User manual 			
3	<p>AIS AtoN white lantern – type 1</p> <p>Technical specification requirements for construction:</p> <ul style="list-style-type: none"> All components in compact housing with light on the top Maximum total weight of 20kg Waterproof IP68 On/off option Replaceable battery Replaceable AIS AtoN equipment Replaceable solar panels 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<p>Technical specification requirements for light:</p> <ul style="list-style-type: none"> • Red LED light source (according to IALA Recommendation E-108) • Remote control for light • Visibility range more than 3 nautical miles • Horizontal output of 360° • Minimum vertical divergence of 7° • Supports flashing interval 0.5/0.5 (on/off) • Possible adjustment of intensity • LED light life expectancy more than 100,000 hours <p>Technical specification requirements for AIS AtoN:</p> <ul style="list-style-type: none"> • AIS AtoN type 1 • Supports both FATDMA and RATDMA operation • Completely configurable over RS-232, USB or LAN port • Configurable slots and intervals for all outgoing AIS messages • Configurable channels and power level • Configurable MMSI target for addressed messages • Provides AIS message 21Configurable AIS message 21 parameters <ul style="list-style-type: none"> ○ MMSI number ○ Name ○ Type of AtoN 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> ○ Type of EPFS ○ Dimensions and antenna position ○ Nominal position ○ Off position threshold ● Provides AIS message 6 with information about status of battery voltage, solar voltage, light status and light flash settings ● Contains set of tools required for installation and servicing of the provided AIS AtoN lanterns ● Contains cable/adaptor for connection of AIS AtoN equipment to USB or LAN port ● Contains software for configuration of AIS AtoN equipment ● Contains software for configuration of light ● Contains remote controller for light <p>Warranty:</p> <ul style="list-style-type: none"> ● The warranty must remain valid for one year after provisional acceptance. <p>Supporting documentation:</p> <ul style="list-style-type: none"> ● Installation manual ● Maintenance manual ● User manual 			
4	<p>AIS AtoN red lantern – type 3</p> <p>Technical specification requirements for construction:</p> <ul style="list-style-type: none"> ● All components in compact housing with 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<p>light on the top</p> <ul style="list-style-type: none"> • Maximum total weight of 20kg • Waterproof IP68 • On/off option • Replaceable battery • Replaceable AIS AtoN equipment • Replaceable solar panels <p>Technical specification requirements for light:</p> <ul style="list-style-type: none"> • Red LED light source (according to IALA Recommendation E-108) • Remote control for light • Visibility range more than 3 nautical miles • Horizontal output of 360° • Minimum vertical divergence of 7° • Supports flashing interval 0.7/2.8 (on/off) or 0.5/2.5 (on/off) • Possible adjustment of intensity • LED light life expectancy more than 100,000 hours <p>Technical specification requirements for AIS AtoN:</p> <ul style="list-style-type: none"> • AIS AtoN type 3 • Supports both FATDMA and RATDMA operation • Completely configurable over RS-232, USB or LAN port • Configurable slots and intervals for all outgoing AIS messages 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> • Configurable channels and power level • Configurable MMSI target for addressed messages • Provides AIS message 21 • Configurable AIS message 21 parameters <ul style="list-style-type: none"> ○ MMSI number ○ Name ○ Type of AtoN ○ Type of EPFS ○ Dimensions and antenna position ○ Nominal position ○ Off position threshold • Provides AIS message 6 with information about status of battery voltage, solar voltage, light status and light flash settings • Receive remote control AIS message for changing light status (on/off), light flash settings and light intensity settings • Configurable AIS data repeating mode • Contains set of tools required for installation and servicing of the provided AIS AtoN lanterns • Contains cable/adaptor for connection of AIS AtoN equipment to USB or LAN port • Contains software for configuration of AIS AtoN equipment • Contains software for configuration of light 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> Contains remote controller for light <p>Warranty:</p> <ul style="list-style-type: none"> The warranty must remain valid for one year after provisional acceptance. <p>Supporting documentation:</p> <ul style="list-style-type: none"> Installation manual Maintenance manual User manual 			
5	<p>AIS AtoN green lantern – type 3</p> <p>Technical specification requirements for construction:</p> <ul style="list-style-type: none"> All components in compact housing with light on the top Maximum total weight of 20kg Waterproof IP68 On/off option Replaceable battery Replaceable AIS AtoN equipment Replaceable solar panels <p>Technical specification requirements for light:</p> <ul style="list-style-type: none"> Green LED light source (according to IALA Recommendation E-108) Remote control for light Visibility range more than 3 nautical miles Horizontal output of 360° Minimum vertical divergence of 7° Supports flashing interval 0.7/2.8 (on/off) or 0.5/2.5 (on/off) 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> Possible adjustment of intensity LED light life expectancy more than 100,000 hours <p>Technical specification requirements for AIS AtoN:</p> <ul style="list-style-type: none"> AIS AtoN type 3 Supports both FATDMA and RATDMA operation Completely configurable over RS-232, USB or LAN port Configurable slots and intervals for all outgoing AIS messages Configurable channels and power level Configurable MMSI target for addressed messages Provides AIS message 21 Configurable AIS message 21 parameters <ul style="list-style-type: none"> MMSI number Name Type of AtoN Type of EPFS Dimensions and antenna position Nominal position Off position threshold Provides AIS message 6 with information about status of battery voltage, solar voltage, light status and light flash settings Receive remote control AIS message for changing light status (on/off), light flash 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<p>settings and light intensity settings</p> <ul style="list-style-type: none"> • Configurable AIS data repeating mode • Contains set of tools required for installation and servicing of the provided AIS AtoN lanterns • Contains cable/adaptor for connection of AIS AtoN equipment to USB or LAN port • Contains software for configuration of AIS AtoN equipment • Contains software for configuration of light • Contains remote controller for light <p>Warranty:</p> <ul style="list-style-type: none"> • The warranty must remain valid for one year after provisional acceptance. <p>Supporting documentation:</p> <ul style="list-style-type: none"> • Installation manual • Maintenance manual • User manual 			
6	<p>Red buoy (CEVNI 1.B)</p> <p>Technical specification requirements for stability and exploitation:</p> <ul style="list-style-type: none"> • Buoy must be designed to stay in position in free-flow sections of Inland waterways anchored with maximum of 3x230kg concrete sinkers and maximum 2 anchore 10mm chains (each of 25m in lenght) • It must be possible to mount and carry delivered AIS AtoN lantern with 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<p>minimum effects on buoy stability and without hindering light and radar reflector function</p> <p>Technical specification requirements for physical dimensions:</p> <ul style="list-style-type: none"> • Maximum diameter 1300mm • Minimum focal plane of completely assembled buoy (including supplied AIS enabled lantern) 1200mm • Maximum overall height of completely assembled buoy (including supplied AIS enabled lantern) 3400mm • Maximum draught (without mooring equipment) 760mm • Maximum weight (without mooring equipment and AIS AtoN lantern) 300kg <p>Technical specification requirements for buoy hull / floating section:</p> <ul style="list-style-type: none"> • Must have a round shaped intersection on the water surface • Made from UV-stabilized (minimum UV 15) virgin polyethylene (minimum medium density) and moulded in one piece • Minimum 7mm wall thickness • Floating section must use one of the following methods to prevent buoy from sinking when water fills one of the floating section chambers: <ul style="list-style-type: none"> ○ Filling with closed cell polyurethane foam 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> ○ Filling with expanded polystyrene foam EPS ○ Splitting buoy hull into sealed chambers using barriers ○ Modular buoy floating section ● Red buoy color must be RAL 3028 or similar within recommended spectrum (IALA Recommendation E-108) <p>Technical specification requirements for lifting and mooring eyes:</p> <ul style="list-style-type: none"> ● Lifting eyes must be positioned on the top plane of the floating section ● Lifting eye opening must be at least 40 mm in width ● Mooring eyes must be made from stainless or galvanized ● Mooring eye must have a rounded opening at least 17mm in diameter ● Lifting and mooring eyes must support minimum workload capacity of 10,000N without deformations or damage and minimum breaking workload of 40,000N <p>Technical specification requirements for buoy mast / top section:</p> <ul style="list-style-type: none"> ● Made from UV-stabilized (minimum UV 15) virgin polyethylene (minimum medium density) and moulded in one piece ● Minimum 4mm wall thickness ● Red buoy top section (CEVNI 1.A and 1.B) colour must be RAL 3028 or similar 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<p>within recommended spectrum (IALA Recommendation E-108) and with cylindrical shape</p> <p>Technical specification requirements for buoy mounted passive radar reflector:</p> <ul style="list-style-type: none"> • Made from aluminium • Visible on inland navigation radars from at least 800 meters • Optimal radar detection must be achievable in downstream and upstream direction (according to UNECE) <p>Technical specification requirements for documentation:</p> <ul style="list-style-type: none"> • Technical documentation with drawings and dimensions • Instructions for disassembly and assembly of modular parts of the buoy and mounted equipment in English and Serbian • Instructions for making smaller repairs on the polyethylene parts of the buoy in English and Serbian <p>Package content requirements:</p> <ul style="list-style-type: none"> • Set of tools required for installation and servicing of the provided buoys and mounted equipment • Repair kit for polyethylene parts of the buoy enough to make a smaller repair <p>Warranty:</p> <ul style="list-style-type: none"> • The warranty must remain valid for one year after provisional acceptance. <p>Supporting documentation:</p>			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> • Installation manual • Maintenance manual • User manual 			
7	<p>Green buoy (CEVNI 2.B)</p> <p>Technical specification requirements for stability and exploitation:</p> <ul style="list-style-type: none"> • Buoy must be designed to stay in position in free-flow sections of Inland waterways anchored with maximum of 3x230kg concrete sinkers and maximum 2 anchore 10mm chains (each of 25m in lenght) • It must be possible to mount and carry delivered AIS AtoN lantern with minimum effects on buoy stability and without hindering light and radar reflector function <p>Technical specification requirements for physical dimensions:</p> <ul style="list-style-type: none"> • Maximum diameter 1300mm • Minimum focal plane of completely assembled buoy (including supplied AIS enabled lantern) 1200mm • Maximum overall height of completely assembled buoy (including supplied AIS enabled lantern) 3400mm • Maximum draught (without mooring equipment) 760mm • Maximum weight (without mooring equipment and AIS AtoN lantern) 300kg <p>Technical specification requirements for buoy hull / floating section:</p>			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> • Must have a round shaped intersection on the water surface • Made from UV-stabilized (minimum UV 15) virgin polyethylene (minimum medium density) and moulded in one piece • Minimum 7mm wall thickness • Floating section must use one of the following methods to prevent buoy from sinking when water fills one of the floating section chambers: <ul style="list-style-type: none"> ○ Filling with closed cell polyurethane foam ○ Filling with expanded polystyrene foam EPS ○ Splitting buoy hull into sealed chambers using barriers ○ Modular buoy floating section • Green buoy colour must be RAL 6037 or similar within recommended spectrum (IALA Recommendation E-108) <p>Technical specification requirements for lifting and mooring eyes:</p> <ul style="list-style-type: none"> • Lifting eyes must be positioned on the top plane of the floating section • Lifting eye opening must be at least 40 mm in width • Mooring eyes must be made from stainless or galvanized • Mooring eye must have a rounded opening at least 17mm in diameter 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> Lifting and mooring eyes must support minimum workload capacity of 10,000N without deformations or damage and minimum breaking workload of 40,000N <p>Technical specification requirements for buoy mast / top section:</p> <ul style="list-style-type: none"> Made from UV-stabilized (minimum UV 15) virgin polyethylene (minimum medium density) and moulded in one piece Minimum 4mm wall thickness Green buoy top section (CEVNI 2.A and 2.B) colour must be RAL 6037 or similar within recommended spectrum (IALA Recommendation E-108) and with conical shape on the top of the buoy <p>Technical specification requirements for buoy mounted passive radar reflector:</p> <ul style="list-style-type: none"> Made from aluminium Visible on inland navigation radars from at least 800 meters Optimal radar detection must be achievable in downstream and upstream direction (according to UNECE) <p>Technical specification requirements for documentation:</p> <ul style="list-style-type: none"> Technical documentation with drawings and dimensions Instructions for disassembly and assembly of modular parts of the buoy and mounted equipment in English and Serbian 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> Instructions for making smaller repairs on the polyethylene parts of the buoy in English and Serbian Package content requirements: <ul style="list-style-type: none"> Set of tools required for installation and servicing of the provided buoys and mounted equipment Repair kit for polyethylene parts of the buoy enough to make a smaller repair Warranty: <ul style="list-style-type: none"> The warranty must remain valid for one year after provisional acceptance. Supporting documentation: <ul style="list-style-type: none"> Installation manual Maintenance manual User manual 			
8	Solid State Drive Technical specification requirements: <ul style="list-style-type: none"> 2.5" form factor Minimum 240 GB storage capacity SATA interface Warranty: <ul style="list-style-type: none"> The warranty must remain valid for one year after provisional acceptance. 			
9	Server Technical specification requirements: <ul style="list-style-type: none"> Rack mountable housing Maximum 2U height Sliding rails for mounting into rack 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> • All hardware components must support virtualization • Flash media for virtualization • 2x CPU <ul style="list-style-type: none"> ○ Minimum 10 physical cores per CPU ○ Minimum 2.2GHz per physical core ○ Hyper-threading or equivalent technology • 32GB of ECC RAM minimum 2133MHz • 4TB of RAID 1 storage • SAS hard drives with minimum 12Gbps and 7200rpm • Redundant power supply • Minimum 2x LAN ports with minimum 1Gbps <p>Warranty:</p> <ul style="list-style-type: none"> • The warranty must remain valid for one year after provisional acceptance. <p>Supporting documentation:</p> <ul style="list-style-type: none"> • Installation manual • User manual 			
10	<p>Backup storage system</p> <p>Technical specification requirements:</p> <ul style="list-style-type: none"> • Network attached storage • 19" Rack mountable rail system • Minimum 8-bay (support for 8 SAS HDDs) 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> • Supports RAID 5 configuration • network adapter with minimum 2x ports with 1 Gbps • Redundant power supply • Preinstalled appropriate operating system • 8x SAS HDD <ul style="list-style-type: none"> ○ 3.5" size ○ Minimum 2TB storage space for each HDD ○ Minimum 6Gbps SAS ○ Minimum 7200rpm <p>Warranty:</p> <ul style="list-style-type: none"> • The warranty must remain valid for one year after provisional acceptance. <p>Supporting documentation:</p> <ul style="list-style-type: none"> • Installation manual • User manual 			
11	<p>Weather station with WiFi</p> <p>Technical specification requirements:</p> <ul style="list-style-type: none"> • Minimum IP65 enclosure • Integrated battery • Solar panels with power controller • AC or DC power source connection • Minimum integrated sensors <ul style="list-style-type: none"> ○ Wind speed and direction ○ Air temperature ○ Atmospheric pressure ○ Water temperature • IP data interface for providing sensor data 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<p>over WiFi</p> <p>Warranty:</p> <ul style="list-style-type: none"> The warranty must remain valid for one year after provisional acceptance. <p>Supporting documentation:</p> <ul style="list-style-type: none"> Installation manual Maintenance manual User manual 			
12	<p>IP camera</p> <p>Technical specification requirements:</p> <ul style="list-style-type: none"> Minimum IP66 housing MPEG-4 or H.264 encoding Compatible with ONVIF standard Focal length range from 3mm or lower to 10mm or higher Autofocus Full HD resolution (1920x1080) Controllable frame rate with minimum achievable frame rate of 25fps Minimum wide dynamic range 120dB Support for dual stream (NVR + direct) <p>Warranty:</p> <ul style="list-style-type: none"> The warranty must remain valid for one year after provisional acceptance. <p>Supporting documentation:</p> <ul style="list-style-type: none"> Installation manual Maintenance manual User manual 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
13	Network video recorder Technical specification requirements: <ul style="list-style-type: none"> • Minimum storage capacity 2 TB • Real time recording per channel support for 1080p (2MP) on 25fps • Compatible with ONVIF standard • Minimum support for connecting two IP cameras simultaneously • Minimum supported incoming bandwidth 40Mbps • Overwriting of oldest video with new video • Remote accessibility of recorded data for download Warranty: <ul style="list-style-type: none"> • The warranty must remain valid for one year after provisional acceptance. Supporting documentation: <ul style="list-style-type: none"> • Installation manual • Maintenance manual • User manual 			
14	Network switch Technical specification requirements: <ul style="list-style-type: none"> • 19" rack mountable • Minimum 8 10/100/1000 Mbit ports Warranty: <ul style="list-style-type: none"> • The warranty must remain valid for one year after provisional acceptance. Supporting documentation:			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> • Installation manual • User manual 			
15	<p>UPS</p> <p>Technical specification requirements:</p> <ul style="list-style-type: none"> • 230 V / 50 Hz input • Minimum 4000 VA output power capacity • Minimum 4 standard output plugs IEC 320 C13 • SNMP interface • Self-test capable • Minimum 6 hours autonomy on 500 W load • Maintenance-free batteries • All relevant cables, connectors and screws needed for installation included <p>Warranty:</p> <ul style="list-style-type: none"> • The warranty must remain valid for one year after provisional acceptance. <p>Supporting documentation:</p> <ul style="list-style-type: none"> • Installation manual • Maintenance manual • User manual 			
16	<p>Desktop workstation</p> <p>Technical specification requirements:</p> <ul style="list-style-type: none"> • CPU with minimum 4 physical cores on 3 GHz or more with Hyper-threading or equivalent technology • Minimum 8 GB DDR3 or DDR4 RAM 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> • Minimum 240 GB SSD • Minimum 1 TB, 7200 rpm HDD • CD/DVD optical drive • Gigabit Ethernet network adapter • Wireless keyboard & mouse • Video card with min 1 GB and support for connecting 2 monitors running 1920x1200 resolution • Preinstalled operating system with graphical interface <p>Warranty:</p> <ul style="list-style-type: none"> • The warranty must remain valid for one year after provisional acceptance 			
17	<p>LCD monitor</p> <p>Technical specification requirements:</p> <ul style="list-style-type: none"> • 23-24" LCD monitor • Minimum 1920x1200 resolution • IPS panel with viewing angle min 178°/178° • Response time 6ms or less • Non-glare screen <p>Warranty:</p> <ul style="list-style-type: none"> • The warranty must remain valid for one year after provisional acceptance. <p>Supporting documentation:</p> <ul style="list-style-type: none"> • Installation manual • User manual 			
18	<p>Central AtoN Monitoring Workstation PC</p> <p>Technical specification requirements:</p>			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> • CPU with minimum 4 physical cores on 3.5 GHz or more with Hyper-threading or equivalent technology • Minimum 32 GB DDR3 or DDR4 RAM • Minimum 240 GB SSD • Minimum 1 TB, 7200 rpm HDD • CD/DVD optical drive • Gigabit Ethernet network adapter • Wireless keyboard & mouse • Video card with: <ul style="list-style-type: none"> ○ minimum 4 GB GDDR5 RAM ○ support for connecting and extending desktop on 6 monitors running at their native resolution provided as item 19 ○ all necessary ports and equipment to connect monitors provided as item 19 • Preinstalled operating system with graphical interface <p>Warranty:</p> <ul style="list-style-type: none"> • The warranty must remain valid for one year after provisional acceptance. 			
19	<p>Wall mountable LCD monitor</p> <p>Technical specification requirements:</p> <ul style="list-style-type: none"> • Minimum 40" maximum 43" LCD monitor • Minimum 1920x1080 resolution • Wall mountable installation option 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> Thin bezel (max 20 mm on all sides) All screws and wall mount included Appropriate Display-port/HDMI cables and converters included IPS panel with viewing angle minimum 178°/178° Response time 10ms or less Non-glare screen <p>Warranty:</p> <ul style="list-style-type: none"> The warranty must remain valid for one year after provisional acceptance. <p>Supporting documentation:</p> <ul style="list-style-type: none"> Installation manual User manual 			
20	<p>Notebook workstation</p> <p>Technical specification requirements:</p> <ul style="list-style-type: none"> 15.6" form factor 1920x1080 resolution non-glare screen 4 physical cores with hyper-threading technology or equivalent Minimum 8 GB DDR3 or DDR4 RAM Minimum 240 GB SSD Gigabit network adapter Integrated WiFi adapter Preinstalled operating system with graphical interface <p>Warranty:</p> <ul style="list-style-type: none"> The warranty must remain valid for one year after provisional acceptance. 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	Supporting documentation: <ul style="list-style-type: none"> User manual 			
21	Rugged notebook workstation Technical specification requirements: <ul style="list-style-type: none"> Minimum 11" and maximum 14" form factor Minimum 1366x768 resolution non-glare screen Durable and rugged build, capable of shock & vibration absorption 2 physical cores with hyper-threading technology or equivalent Minimum 4 GB RAM Minimum 500 GB HDD Gigabit network adapter Integrated wifi adapter Minimum 2 USB ports RS232 port or appropriate USB adapter Preinstalled operating system with graphical interface Warranty: <ul style="list-style-type: none"> The warranty must remain valid for one year after provisional acceptance. Supporting documentation: <ul style="list-style-type: none"> User manual 			
For items 1, 2, 3, 4, 5, 6, 7, 9, 10, 11,	Installation Requirements for installation of AIS AtoN lanterns and buoys: <ul style="list-style-type: none"> Installation will be done on the dry in 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
12, 13, 14, 15	<p>Makiš location with possibility for testing in the water on the same location</p> <ul style="list-style-type: none"> • Upgrade of the AIS AtoN firmware according to Inland AtoN message 21 definition in the currently adopting Tracking & Tracing 2.0 standard which will allow configuration and sending of message 21 for Inland waterways • 55 of supplied AIS AtoN lanterns shall be installed on existing buoys or their radar reflectors owned by the End Recipient. Detailed drawing of the buoys are provided Appendix III – Buoy Schematic Drawing (c4f_Appendix III - Buoy schematic drawings.pdf). Supplier has to ensure and provide necessary adapter if required for mounting of the provided AIS AtoN lanterns on the specified buoys. <p>Requirements for installation of servers and associated equipment:</p> <ul style="list-style-type: none"> • One server, backup storage system and network switch will be installed in the rack of the existing RIS centre with all required infrastructure available • Second server, backup storage system, network switch and UPS will be installed in the existing rack on the Makiš location with all required infrastructure available • Test hardware by installing temporary OS <p>Requirements for installing weather stations:</p> <ul style="list-style-type: none"> • One weather station will be installed on location no. 1 – Bogojevo 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<ul style="list-style-type: none"> One weather station will be installed on location no. 4 – Vajuga One weather station will be installed on location no. 5 – Brnjica Test accessibility of data in RIS centre <p>Requirements for installing IP cameras:</p> <ul style="list-style-type: none"> Two IP cameras will be installed on location no. 1 – Bogojevo Two IP cameras will be installed on location no. 2 – Novi Sad Two IP cameras will be installed on location no. 3 – Belgrade Check video accessibility in RIS centre <p>Requirements for installing network video recorders:</p> <ul style="list-style-type: none"> One network video recorder will be installed on location no. 1 – Bogojevo One network video recorder will be installed on location no. 2 – Novi Sad One network video recorder will be installed on location no. 3 – Belgrade Check interconnection with IP camera 			
For all items	<p>Transport</p> <p>Requirements for transport and delivery:</p> <ul style="list-style-type: none"> All items should be delivered, unloaded and placed in Makiš storage area for quantity check 			
For items 1, 2, 3, 4, 5, 6, 7	<p>Training</p> <p>Requirement for training:</p> <ul style="list-style-type: none"> Organization of three training events for 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<p>up to 10 people per training event</p> <ul style="list-style-type: none"> • Training should cover the following topics: <ul style="list-style-type: none"> ○ installation, usage and maintenance of AtoNs (item no. 1, 2, 3, 4 and 5) ○ installation, handling and maintenance of buoys (item no. 6 and 7) • Estimated training event duration 1 day • All participants should be issued a certificate that they have successfully completed the training • Training location will be Makiš (location no. 6), provided by the End Recipient 			
For all items	<p>Warranty</p> <p>Tenderers must provide a contact person which will coordinate replacement/maintenance/repair of supplied equipment during the warranty period of one year after provisional acceptance.</p> <p>Offer must include warranty service description including:</p> <ul style="list-style-type: none"> • Service organisation contact data including name, postal address, telephone number, fax number and e-mail address • Guaranteed maximum response time to submitted maintenance support request (fax or e-mail) of 1 (one) working day • Guarantee that all items can be repaired or alternatively replaced within a maximum 			

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	period of 6 weeks from the submitted maintenance support request; Guarantee that genuine spare will be available for a period of minimum 3 years from the date of final acceptance of the equipment.			

Appendix I – Installation locations

Installation location no. 1 - Bogojevo

Location	Bogojevo
Coordinates	Lat 45 31.685 N / Lon 019 05.021 E
Internet connection	Existing on the site at the location of the rack with the base station, provided by the End Recipient
Required licences and permits	Provided by the End Recipient in time for installation
Position of the rack containing the base station	On the silo building
Power supply	Existing on the location at the rack of the base station
Type of rack	Indoor
Height	50 m
Horizontal distance to water surface	15 m
Camera installation instructions	Cameras to be mounted on top of the silo Camera 1 (downstream direction) <ul style="list-style-type: none"> • Horizontal angle: 95° • Vertical angle (0° is horizontal): -10° Camera 2 (upstream direction) <ul style="list-style-type: none"> • Horizontal angle: 300° • Vertical angle (0° is horizontal): -10°
Distance of the camera location from the rack	10 m
Weather station installation instructions	Weather station to be mounted at the bank, and temperature sensor to be able to measure water temperature of the Danube River Type of bank: concrete quay wall Installation to be performed in accordance to technical specification of the producer

Installation location no. 2 – Novi Sad

Location	Novi Sad
Coordinates	Lat 45 15.446 N / Lon 019 51.266 E
Internet connection	Existing on the site at the location of the rack with the base station, provided by the End Recipient
Required licences and permits	Provided by the End Recipient in time for installation
Power supply	Existing on the location at the rack of the base station
Position of the rack containing the base station	On the building
Height	40 m
Horizontal distance to water surface	40 m
Camera installation instructions	Cameras to be mounted on top of the building Camera 1 (downstream direction) <ul style="list-style-type: none"> • Horizontal angle: 48° • Vertical angle (0° is horizontal): -4° Camera 2 (upstream direction) <ul style="list-style-type: none"> • Horizontal angle: 145° • Vertical angle (0° is horizontal): -7°
Distance of the camera location from the rack	4 m

Installation location no. 3 - Belgrade

Location	Belgrade
Coordinates	Lat 44 49.840 N / Lon 020 27.340 E
Internet connection	Provided by the End Recipient, at the location of the rack
Required licences and permits	Provided by the End Recipient in time for installation
Power supply	Existing on the location at the rack
Position of the rack	At the top of the structure

Height	cca 20 m
Horizontal distance to water surface	10 m
Camera installation instructions	<p>Cameras to be mounted on the top of the structure</p> <p>Camera 1 (downstream direction)</p> <ul style="list-style-type: none"> • Horizontal angle: 153° • Vertical angle (0° is horizontal): -2° <p>Camera 2 (upstream direction)</p> <ul style="list-style-type: none"> • Horizontal angle: 275° • Vertical angle (0° is horizontal): 0°
Distance of the camera location from the rack	5m

Installation location no. 4 - Vajuga

Location	Vajuga village
Coordinates	Lat 44 33.437 N / Lon 022 32.672 E
Internet connection	Existing on the site at the location at the rack, provided by the End Recipient
Required licences and permits	Provided by the End Recipient in time for installation
Power supply	Existing on the location at the bank
Position of the rack	On the pontoon of the end recipient
Type of rack	Outdoor
Horizontal distance from the water surface	Not applicable
Weather station installation instructions	<p>Weather station to be mounted at the bank, and temperature sensor to be able to measure water temperature of the Danube River</p> <p>Type of bank: concrete embankment</p> <p>Installation to be performed in accordance to technical specification of the producer</p>

Installation location no. 5 - Brnjica

Location	Brnjica
Coordinates	Lat 44 39.395 N / Lon 021 45.975 E
Internet connection	Existing on the site at the location of the rack with the base station, provided by the End Recipient
Required licences and permits	Provided by the End Recipient in time for installation
Power supply	Existing on the location at the rack of the base station
Position of the rack containing the base station	In the facility at the bank
Type of rack	Indoor
Height	On the ground
Horizontal distance to water surface	5 m
Weather station installation instructions	Weather station to be mounted at the bank, and temperature sensor to be able to measure water temperature of the Danube River Type of bank: fortified rock bank Installation to be performed in accordance to technical specification of the producer

Installation location no. 6 - Makiš

Location	Obrenovački put 12, Belgrade Right bank of the Sava river, RKM 12.55
Coordinates	Lat 44 45.364 N / Lon 020 20.595 E
Internet connection	Existing on the site, provided by the End Recipient

Installation location no. 7 – End Recipient's Headquarters (Directorate for Inland Waterways)

Location	Francuska 9, Belgrade
Coordinates	Lat 44 49.072 N / Lon 020 27.753 E
Internet connection	Existing on the site, provided by the End Recipient

Appendix II – Distribution

Location no 1. – Bogojevo	
Item no.	Quantity on this location
11	1
12	2
13	1

Location no 2. – Novi Sad	
Item no.	Quantity on this location
12	2
13	1

Location no 3. – Beograd	
Item no.	Quantity on this location
12	2
13	1

Location no 4. – Vajuga	
Item no.	Quantity on this location
11	1

Location no 5. – Brnjica	
Item no.	Quantity on this location
11	1

Location no 6. – Makš	
Item no.	Quantity on this location
1	55
2	60

3	4
4	30
5	20
6	55
7	70
8	30
9	1
10	1
12	2
13	1
14	1
15	1

Location no 7. – End Recipient's Headquarters (Directorate for Inland Waterways)	
Item no.	Quantity on this location
9	1
10	1
14	1
16	10
17	20
18	1
19	6
20	5
21	8

Appendix III – Buoy schematic drawings

See **c4f_Appendix III - Buoy schematic drawings** attached to section B. Draft Contract and Special Conditions with annexes.