Kristina Kostova

From: Grégory A. Krulic <gkrulic@jetsupport.com>
Sent: 07 май 2020 г. 17:59
To: Kristina Kostova
Subject: The Bulgarian Government intends to buy to HEMS new helicopters https://www.mh.government.bg/bg/profil-na-kupuvacha/pazarni-konsultacii/
Attachments: Tech_Specs_BUL.PDF

Dear Ms Kostova,
Greetings from JSSI.
I trust this e-mail finds you well.

I am sending you this e-mail following the information of the public tender for the HEMS new helicopters.
In partnership with Alidaunia, a HEMS helicopter operator in Italy, JSSI & Alidaunia have provided the attached document with some comments on the tender request.
Please find the comments attached.

JSSI and Alidaunia would be happy to help the process by providing consulting experience in the field of the HEMS helicopter selection, support, operations and maintenance. Please feel free to contact me at your convenience.

I look forward to hearing from you soon.
Best regards,
Grégory Krulic.

Grégory Krulic | Director of Business Development
Direct +34 (910) 380728 Mobile + 34 600 404 899
Jet Support Services, Inc.
website | facebook | linkedin | twitter | instagram

No	Technical specifications/requirements
1	**A twin-engine HEMS-type helicopter with specialised equipment and devices for emergency medical services**
1.10	The project is aimed at procuring 2 (two) newly-manufactured helicopters for emergency medical services, transport of patients in need and medical teams. The helicopters shall be outfitted with a specialised emergency medical services interior, medical equipment and devices, and modern avionics, meeting the latest EASA standards and requirements, able to perform the full spectrum of missions that may be assigned by the Ministry of Health.
1.20	The set of missions shall cover as follows:
1.30	- HEMS (Helicopter Emergency Medical Service) – emergency medical services where the immediate and rapid transportation is essential, by transporting over land of as follows:
	(a) medical personnel; or
	(b) medical supplies (equipment, blood, organs, tissues, cells, drugs); or
	(c) ill or injured persons and other persons directly involved.
1.40	The specified initial information for the helicopter selection indicates that the mission profile calls for as follows: - Single-Pilot/Dual-Pilot – dual pilot with the capability to perform certain missions with one pilot only; - Equipped for Day and Night IFR operations - Category A (Cat 1), Performance Class 1 operation The equipment shall meet the requirements set in Regulation (EC) No 965/2012
2.	**General requirements**
2.01	The helicopter shall be new and shall be delivered with the latest software version for the avionics and the other equipment.
2.02	The helicopter shall be provided with a type certificate, issued in accordance with the applicable EASA requirements and under the EASA CS 27 certification specifications.
2.03	The helicopter shall be outfitted with avionics and systems for high performance and safe operations for flying over urban areas and forests/mountains, and landing on non-prepared sites with limited size, including in urban environment at high ambient air temperatures and on sites with high elevation above sea level.
2.04	The medical equipment of the helicopter shall be compliant with standard BG EN-13718-2:2015 or equivalent – HEMS category, and the flight performance shall allow the helicopter to be used for primary and secondary emergency medical service missions.
2.05	The helicopter shall be capable of day and night operation, in the conditions of Visual Flight Rules, day and night (VFR Day & Night), including with the use of night vision imaging systems (NVIS), and be also capable for Instrument Flight Rules (IFR) operations, with flight crew of one or two pilots, in accordance with the applicable requirements of Regulation (EC) 965/2012.
2.06	The flight/navigation equipment of the helicopter shall allow optimum working conditions for the flight crew, reliable handling and navigation in instrument-flying conditions day/night, in all weather conditions (excluding icing conditions), when flying over urban areas and forests/mountains. The flight/navigation equipment shall allow also single-pilot helicopter flying and navigation.

ha eliminato: and not used for demonstration purposes, manufactured and¶
equipped no earlier than one year before the delivery date, which is proved by the EASA Form¶
52 certificate (Aircraft Statement of Conformity),

No	Technical specifications/requirements
2.07	The helicopter shall be powered by two engines equipped with FADEC and shall be certified for Category A, Performance Class 1 – with design capabilities for safe take-off/landing or continuing the flight in one engine inoperative (OEI) conditions, without consequences for the crew, medical attendants, the transported patients and the aircraft.
2.08	In order to be suitable for training and future flight crew checks, the helicopter shall be equipped with dual controls and the engine controls shall allow OEI training (simulated mode of operation), by getting one of the engines in the 'Training Idle' mode.
2.09	From flight safety point of view in case of emergency landing, the helicopter design shall feature the Crash-Resistant structure for the fuselage, fuel tanks and the seats, which shall be outfitted with four-point inertial safety belts for the pilots and as a minimum three-point safety belts for the medical crew.
2.10	The helicopter shall be provided with the capability for quick installation and removal of the specialized medical equipment and seats in the medical compartment, in order to be rendered suitable for transportation of medical personnel and patients.
2.11.	The helicopter design shall be in accordance with standard BDS EN-13718-2:2015 or equivalent, as follows. - Loading of the medical personnel and patient from helicopter side provided with sliding door; - Sealed floor of the entire cabin, as per art. 4.5 of the standard.
3.	**Helicopter HEMS mission (work) configuration**
3.01	The helicopter HEMS mission configurations shall be used as a reference and comparison between the different helicopters to be proposed by the participants in the tender procedure. For the calculation in the helicopter operating capabilities for the HEMS mission, the helicopter shall be proposed in the following mission configuration, with the weight of the necessary medical and other equipment as described below; the weight of the medical and the other necessary equipment and devices shall be added to the weight of the empty equipped helicopter. The candidate shall describe in details the content of the HEMS configuration and the additional weight of each component of the medical and the other equipment, which is not included in the helicopter's baseline equipped empty weight. The additional weight shall mandatory include as follows: - the weight of the medical interior and the medical equipment/devices – according to the candidate's proposal; - the mission equipment and the additional equipment on board if applicable. - the flight crew weight, medical attendants weight and the patient weight; - number of the flight crew, medical attendants and patient: 2 (two) members of the flight crew, 2 (two) medical attendants in the EMS compartment and 1 (one) patient on a stretcher. The requirements for the helicopter configuration for the HEMS mission are described in art.14
3.02	The additional weight shall mandatory include as follows:
3.03	- the mission equipment and the additional equipment on board the helicopter, if applicable;
3.04	The weight of the flight crew, medical attendants and patient shall be 85 kg each
3.05.	Helicopter structure provided with engine, main transmission, hydraulic systems and cooling systems attachment points, built-in steps and handles for easing the daily servicing of the helicopter.

ha eliminato: s

ha eliminato: both sides of the

ha eliminato: ,

ha eliminato: s

Commentato [PS1]: Check if art reference is correct

ha eliminato: s

ha eliminato: or 2 (two)

Commentato [PS2]: Check if art reference is correct

No	Technical specifications/requirements
4.	**Flight Performance and Technical Requirements**
4.01	All proposed specifications and performances shall be indicated at Maximum Take-Off Weight (MTOW), International Standard Atmosphere (ISA) and zero wind speed conditions, unless otherwise stated.
4.02	Maximum cruise speed in horizontal flight (True Air Speed) - at ISA, S/L, MTOW – not less than 130 kt (240 km/h).
4.03	Service ceiling – not less than 9,842.52 ft (3,000 m)
4.04	Hover ceiling HIGE in ISA+20 conditions – not less than 9,700 ft (2,957 m)
4.05	Hover ceiling HOGE in ISA+20 conditions – not less than 5,000 ft (1,524 m)
4.06	Maximum payload (MTOW minus the basic helicopter empty weight) - not less than 1100 kg
4.07	Maximum range at SL, at best range cruise speed – not less than 270 nm (500 km) with auxiliary fuel tank if applicable
4.08	Maximum flight endurance – not less than 2.5 hours with auxiliary fuel tank if applicable.
4.09	Speed limits of the wind, side-on, when in hover at S/L – minimum 30 kt (55 km/h)
5	**HEMS Mission**
5.01	The helicopter in the HEMS mission configuration shall be capable of performing a reference (typical) HEMS mission, at a range of no less than 340 km, for transporting a patient on stretcher, without activating the 'FUEL LOW' warning light, in the following conditions:
5.02	- Flight is carried out in ISA+20 conditions, at 5,000 ft (1,524 m), at 130 kt cruise speed (240 km/h), with fuel reserve for 30 minutes at maximum endurance speed. The flight crew includes 2 (two) pilots, 2 (two) medical crew in the EMS compartment and 1 (one) patient on stretcher, each weighing 85 kg plus 70 kg electro-medical equipment. It is allowed use of an auxiliary fuel tank if necessary.
5.03	The candidates shall submit the necessary calculations, demonstrating that the helicopter can perform a Category A, Performance Class 1 take-off with this load and indicate the maximum range. The calculations shall use data taken from the helicopter's Rotorcraft Flight Manual, and copies of the pages from the flight manual, from where data was sourced, shall be attached to the annex with the mission calculations.
5.04	Operational temperature range – lower limit -25°C; upper limit – at least 45°C.
5.05	External noise level in take-off, fly-over and approach shall be below the ICAO Annex 16, Vol 1 requirements.
5.06	When the main rotor is turning, the clearance between the blade tips and the ground shall be no less than 2.40 m with controls in neutral position.
5.07	The helicopter shall be equipped with landing gear – wheels or skids, allowing operations from unprepared landing sites.
5.08	The sliding doors of the medical compartment shall be opened and locked in flight.
6.	**Engine**

ha eliminato: s

ha eliminato: endurance

ha eliminato: t

6.01	Qty 2 gas-turbine (turboshaft) engines, equipped with as follows: - a full authority digital engine control (FADEC); - fire warning detector, - chip detectors; - OEI training mode; - oil systems and oil cooling system; - ,
6.02	The engine start-up shall be provided from an external ground power unit and from the on-board battery in the electrical system.

ha eliminato: - overspeed (max rpm) protection system;¶

ha eliminato: 2-engine

ha eliminato: automatic control system when the main rotor rpm is changed.

No	Technical specifications/requirements
6.03	The transmission of the helicopter shall consist as follows: - Main gearbox and tail gearbox/gearboxes, equipped with chip detectors; - Main shafts – Qty 2, a transmission tail shaft; - oil system and oil cooling system of the main gearbox, and oil system for the tail gearboxes.
6.04	The engine compartment shall be equipped with fire warning system and fire extinguishers.
6.05	The rotor system shall use blades with anti-abrasive strips on the leading edge.
6.06	The control systems shall include a minimum of two hydraulic systems.
6.07	A trim control system shall be provided for the helicopter control system.
6.08	Baseline provisions shall be provided for the easy use of main rotor tracking and balance system.
6.10	The helicopter shall be equipped with a Stability Augmentation System (Yaw-SAS) or equivalent.
7.	**Colour scheme**
7.01	For better visibility and ease of recognition, the following scheme shall be used: - Main colour - white - Addition could on the top of fuselage – yellow (RAL 1016); - Blue reflecting emblem 'Star of Life' with a minimum size of 300mm, applied on at a suitable place on both rear fuselage sides, the nose and also on the bottom fuselage, with a minimum size of 500 mm; - A yellow (RAL 1016) reflecting strip, 30cm wide, running on both sides of the helicopter, at the side door handle level; - An inscription 'Спешна медицинска помощ' (Emergency Medical Service), on both sides of the helicopters, with a minimum height of 100mm, with reflecting main letters in fluorescent red (RAL 3024).
7.02	The blades of the main and tail rotor shall in two colours (white and red).
7.03	The fuselage shall be painted with colour scheme and markings compliant to the applicable regulations and approved in advance by the Contracting Authority.
7.04	Stickers for project visualisation (indication of the funding source).
8.	**Cockpit and EMS compartment**
8.01	Cockpit doors provided with ejecting mechanisms.
8.02	Energy-absorbing pilot seats, with adjustable position and provided with headrests.
8.03	The cabin shall be provided with outside steps for easy embarking and disembarking of the pilots and the medical personnel.
8.05	The helicopter shall be equipped with dual controls. The controls of one of the pilots shall be deactivated during single-pilot operations.
8.06	The cabins shall be provided with ventilation and heating systems, for providing a normal working environment for the pilots, medical personnel and the patient, in accordance with standard BDS EN-13718-2:2015 or equivalent. The heater shall use bleed air from the engines.
8.07	The windshield shall be provided with wipers for normal visibility during missions in all weather conditions.
8.08	The helicopter shall be equipped with ice detector.

ha eliminato: 6.09

ha eliminato: Mast moment indication shall be provided (indication for the maximum torque)

ha eliminato: 8.04

ha eliminato: The cabins shall be provided with panels for noise and vibrations levels reduction when engines¶ are operating.

ha eliminato: s

No	Technical specifications/requirements
8.09	The cockpit and the EMS compartment shall be equipped with enough headsets (pilot helmets) for intercom purposes, in accordance with standard EN-13718:2:2015 or equivalent.
8.10	The cockpit shall be provided with space for placing pilot's equipment. The pilot workplaces shall be equipped with lighting enabling normal work during night operations. In the NVIS operations variant, the lighting shall be compatible with the NVG equipment.
8.11	Glass cockpit-type flight/navigation equipment with colour multi-function displays for displaying the information to the flight crew, with the minimum configuration as follows: - Radio nav aids VOR/DME/ILS/MB - Automatic direction finder – ADF - Radar Altimeter - Integrated navigation system with a GPS - Autopilot (automatic flight control system), as a minimum 3-axis, duplex (AFCS 3-axis Duplex) - Flight Director coupled to FMS (Flight Management System), with updated data-base upon helicopter delivery - Transponder with ADS-B Out and S modes - Digital Moving Map using a display in front of the flight crew. - Warning & Caution Advisory System or equivalent. - Fuel Quantity Indication - Main gearbox status – oil pressure and temperature, - Dual voltmeter - Outside air temperature (OAT) meter - Dual ammeter for the generators - Torque indicator (TQ) - Engine status – N1 RPM, oil pressure PM, oil temperature TM, turbine outlet temperature TOT, FADEC operation information and EEC operation information, code messages (fault codes) and diagnostic tests (self-tests); - Warning on reaching and exceeding the maximum levels of torque (TQ), turbine outlet temperature (TOT), gas-generator rpm (N1). - Warning Aural Signalisation or equivalent; - Indicators for the MGB rpm and engine rpm data (NR, N2-1 and N2-2)
8.12	Communications management system for external and internal communicants, with panels for the pilot and co-pilot, and selector panels for the selection of the communication options.
8.13	Emergency Locator Transmitter (ELT) working at 121,5 MHz, 243 MHz and 406 MHz with automatic activation.
8.14	Traffic Avoidance System.
8.15	Terrain Awareness and Warning System.
8.16	Cockpit voice and flight data recorder (CVFDR).
8.17	Weather radar with a colour display.
8.18	The flight equipment, which supplies information to the PFD, shall include as a minimum the following instruments: magnetic compass, attitude indicator/horizontal situation indicator, speed meter, altimeter and rate of climb meter.
8.19	Clock .
8.20	Magnetic compass.

ha eliminato: and devices, such as maps, table charts and tablet computers

ha eliminato: MTPM

ha eliminato: MTTM

No	Technical specifications/requirements
8.21	Pitot / static system with electrical heating.
▼	▼
▼	▼
8.24	Radar Altimeter.
8.25	Air Data Computer.
8.26	Indicated airspeed (Vi) indicator (AI).
8.27	GPS/NAV/COM equipment for the pilot and co-pilot, connected and operating together with the control system.
8.28	Stand-by VSI (horizon) with independent power supply.
9.	**Communication equipment**
9.01	Qty 2 VHF-radios for ATC communications with frequency range 118-136,975 MHz and an 8,33 KHz frequency spacing.
9.02	VHF/UHF multi-band radio (30-960 MHz).
9.03	Provision of the TETRA radio (to be provided by the Contracting Authority - MoH), working in the 380-400 MHz band, including the antenna and wiring, and its integration to the helicopter communication system. – *optional*
9.04	GSM commutation equipment, integrated with the helicopter communication system. – *optional*
9.05.	Provision for GSM equipment (to be provided by the Contracting Authority – MoH).
10	**Lighting**
10.01	The helicopter shall be equipped with position lighting (red, green, white).
10.02	Anti-collision light.
11	**Electrical system**
11.01	Electrical systems providing normal power supply for the consumers upon start-up of the engines and various flight regimes, including in emergency situations. The systems shall include:
11.02	- Qty 2 starter-generators with the respective work parameters, providing the reliable start-up of the engines on the ground and in flight, and the normal operation of the entire equipment of the helicopter, including the medical equipment.
11.03	- a battery with the respective work parameters, providing reliable engine start-up on the ground and in flight, and the normal operation of the essential consumers for continuing and flight and performing a safe emergency landing in case of a complete failure of the main power supply sources.
11.04	- A connector for electing supply a ground power unit.
11.05	- Connectors, enabling the power supply of the installed stationary and mobile medical equipment.
12.	**General equipment**
12.01	Main rotor brake.
12.02	Take-off/landing searchlight, compatible with Gen 3 NVGs.
12.03	Wire strike protection.
12.04	External loudspeakers with at least 250 W power and by-tonal siren, for sound signals and public address by the flight crew.
12.05	Emergency exits for the cockpit and the EMS compartment as per CS27 requirements.
12.06	NVG-compatible (Gen 3 NVG) lighting in the cockpit and EMS compartment.
12.07	Night Vision Goggles (NVG) - Gen 3, Class B according to MIL STD-3009 or equivalent. – *optional*

ha eliminato: 8.22

ha eliminato: System for static switching and back up.

ha eliminato: 8.23

ha eliminato: Engine cycle counting system.

No	Technical specifications/requirements
12.08	Separation curtain between the cockpit and the medical compartment.
12.09	Auxiliary fuel tank (if applicable)
13	**The helicopter shall be delivered with the following equipment, which is not included in the HEMS mission configuration.**
13.01	A provision for a steerable searchlight, controlled by the flight crew, fitted with an IR filter, compatible with Gen 3 NVGs. - *optional*
13.04	A steerable searchlight, controlled by the flight crew, fitted with an IR filter, compatible with Gen 3 NVGs. – *optional*
13.05	A provision for an external rescue hoist with a minimum 230 kg capacity and at least 70 m cable length. – *optional*
13.06	An external rescue hoist with a minimum 230 kg capacity and at least 70 m cable length. – *optional*
13.07	A provision for a cargo hook for external sling cargo transport, with a minimum 500 kg capacity. The helicopter shall be equipped with a cargo hook camera or a mirror. – *optional*
13.08	A cargo hook for external sling cargo transport, with a minimum 500 kg capacity. The helicopter shall be equipped with a cargo hook camera or a mirror. – *optional*
13.09	Slump pads and snow surface landing pads/platforms, installed on the landing gear legs or skids. – *optional*
13.10	Engine dust protection filters. – *optional*
14	**EMS (Patient) Compartment**
14.01	The EMS compartment shall be compatible with standard BDS EN-13718-2:2015 or equivalent for helicopter equipped for HEMS missions.
14.02	The EMS compartment shall provide easy and safe loading and unloading of the patient, medical personnel and the medical loads. It shall provide a safe distance between the upper part of the stretcher and the top of the door opening to avoid wounding a patient.
14.03	The EMS compartment shall be equipped with a Qty 1 stretcher and a minimum of Qty 3 (three) crash-resistant seats for the medical and/or technical personnel
14.04	The seats shall be equipped with three-point safety belts and their position shall enable direct access to the patient and the medical equipment during the entire mission and at least one of the seats shall be steerable.
14.05	The ceiling, walls and the inner part of the doors of the EMS compartment shall be lined with hygienic surfaces to provide good isolation, and which are resistant to mechanical and chemical contacts, and easy to cleaning and disinfecting.
14.06	The interior materials shall be non-flammable as per the applicable requirements of CS-27.
14.07	The position and attachment of the medical equipment and devices in the EMS compartment shall allow free access and interaction between the medical personnel during patient manipulation and monitoring.
14.08	The medical equipment/devices shall be attached to certified retainers, allowing quick installation and removal.
14.09	An incubator installation provision shall be provided, together with uninterrupted power supply, meeting standards BDS EN 13976-1:2011 and BDS EN-13976-2:2011 or equivalents.

ha eliminato: 13.02

ha eliminato: Auxiliary fuel tank, if not included in the main configuration – *optional*

ha eliminato: 13.03

ha eliminato: MGB vibration absorbing system. – *optional*

ha eliminato: s

ha eliminato: The medical equipment and devices shall be used without obstructing isles, emergency exits or patient loading/unloading sites.

No	Technical specifications/requirements
14.10	The interior of the EMS compartment shall be designed to minimise the risk of injury, without sharp edges. The open shelves shall be with rounded ends and fabricated from material, absorbing the energy in case of impact. In case drawlers are provided, these shall be fixed and protected from self-opening in flight, with suitable locks.
14.11	The edges of the roof, floor, side walls, floor and the doors of the EMS compartment shall be fabricated or sealed in a way to avoid liquids infiltration.
14.12	The floor covering shall provide adequate grip for the medical personnel, including when wet. It shall be durable and easy to clean and liquid draining, and shall cover the entire length and width of the EMS compartment.
14.13	The places for installation of medical equipment/devices, medical products and drugs shall be in suitable locations, easy to access during the patient manipulation on the stretcher.
14.15	The EMS compartment shall be provided with mounts for attaching the sufficient number of oxygen bottles, providing a minimum of 2,000 l of compressed oxygen.
14.16	The helicopter shall be provided with the electrical systems for power supply of the medical equipment with 12V and 220 V, and other operating voltages, compliant to art. 4.3 of standard BDS EN-13718-2:2015 or equivalent. The electrical outlets with different voltage shall be with differing design in order to avoid mistakes when plugging the power supply cord. A sufficient number of 12 V DC outlets shall be provided, situated in places to allow easy connection of the medical equipment. Each outlet shall be market with the nominal voltage and amperage, and shall be provided with signalisation when in use.
14.17	The electrical power supply system for the medical equipment in the EMS compartment shall allow switching from a ground power supply to the on-board electrical system - by the pilot or by the medical personnel – upon pilot's command.
14.18	It is allowed to use AC power supply for the medical equipment, meeting the requirements of art. 4.3. of standard BDS EN13718-2:2015 or equivalent, by using an inverter available for use with the medical devices that use such power supply. The inverter shall be connected to the airframe ground.
14.19	The helicopter, when parked on the ground, shall be provided with an external point connecting to ~220 V AC mains, to enable charging of the batteries of the medical devices in the EMS compartment, which are connected to 12 V or 28 V DC outlets or other working voltage. The helicopter shall be provided with means to prevent earth leakage currents.
14.20	The EMS shall be provided with adequate interior light, meeting the requirements in art. 4.2.2. (4.2.4 of standard BDS EN 13718-2:2015 or equivalent.
14.21	The EMS compartment shall be reconfigurable for transport of minimum Qty 6 (six) passengers with adding additional seats, for a medical team transportation. The necessary quantity of crash-resistant seats shall be delivered together with the helicopter.
14.22	The medical equipment is provided in attachment name :"Medial Equipment.docx"

ha eliminato: 14.14

ha eliminato: The EMS compartment shall be provided with mounts/retainers for a minimum of Qty 2 infusion bottles and Qty 2 infusion syringe pumps.

ha eliminato: The use of the bottles shall meet the requirements for safe transportation and use of compressed gas (high-pressure) bottles.

Commentato [PS3]: Check if art reference is correct