



GENERAL INSPECTORATE OF AVIATION

APPROVES  
Acting  
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Commander

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**MARKET CONSULTATION DOCUMENT**

*on drawing up technical specifications and estimating the value*

*for the procurement (and commissioning) of D-level Full Flight Simulators for Eurocopter EC-135 / Airbus H-135 helicopters*

**A. Useful information**

*Considering the provisions of art. 139 of the Law no. 98/2016 on Public Procurement as amended and supplemented, General Inspectorate of Aviation intends to organize a market consultation for the procurement of D-level Full Flight Simulators for Eurocopter EC-135 / Airbus H-135 helicopters and to inform economic operators of how the interaction will be managed in consultations.*

*This document provides a summary of the market consultation process for drawing up the technical specifications and estimating value in order to procure D-level Full Flight Simulators for Eurocopter EC-135 / Airbus H-135 helicopters. This document does not represent the decision of the Contracting Authority related to the content of the Contracting Strategy for the procurement procedure associated with this market consultation.*

*The information provided by the respondent persons/organizations participating in the consultation meetings will not bring advantages or disadvantages to them in the process of the award procedure associated with this market consultation. The responses or the participation of the economic operators at this market consultation will not constitute a reason for exclusion in the future award procedure.*

*This market consultation does not aim at selecting a particular bidder for the future award procedure. This market consultation precedes the awarding procedure to which it belongs and does not*





replace the selection process. Respondents / participants do not submit requests for participation or offers/tenders in response to this market consultation.

Participation in this market consultation is purely voluntary. The contracting authority does not grant or provide financial compensation for the participants at the market consultation and does not reimburse the expenses incurred when participating in it.

Information received by the Contracting Authority during the market consultation will be used in planning and implementation of the future procurement procedures, in compliance with the legislation on public procurement, especially to avoid distortion of competition in the future award procedure and not to violate the principles of non-discrimination and transparency. During the consultation process, the Contracting Authority will take all measures to preserve the confidentiality of the information declared by the participants in the consultation as confidential, classified or protected by an intellectual property right.

No information contained in this document, in documents published in SEAP or through any other media in connection with this consultation process or any communication made between the Contracting Authority and any person / organization in connection with this market consultation may not be invoked as part of a contract, agreement or any other similar form.

The Contracting Authority publishes this document in SEAP in the "Market Consultation" section.



## Content

<b>1. Market consultation context .....</b>	<b>Error! Bookmark not defined.</b>
<b>2. Summary of the market consultation process .....</b>	<b>5</b>
i. Estimated timetable of activities and major stages of the market consultation process .....	5
ii. Approaches to be used in market consultation .....	6
iii. Topics to be addressed with the consultation participants .....	7
<b>3. Expected outcome of the market consultation process.....</b>	<b>7</b>
<b>4. Other relevant information to demonstrate the application of public procurement principles during market consultation.....</b>	<b>8</b>
<b>5. Annex .....</b>	<b>8</b>





## 1. Market consultation context

### *a) Overview of the causes that led to the need to market consultation:*

To increase flight safety, namely to optimize and streamline the operating process in specific missions where GIA crews are using aircraft type EC-135 / H-135, it is imperative to purchase flight simulators.

The Flight Simulator is designed to train pilots to increase flight safety by: improving the speed of reaction and how to deal with various special situations that may arise during flight missions, crew resource management and standardizing the mission approach through a uniform training.

The flight simulator provides:

- reduction of pilot training costs;
- the possibility of training regardless of the weather conditions or the availability of aircraft for training flights;
- the possibility of simulating special cases impossible to train in a real flight;
- the recurrence necessary to maintain pilots' ability to fly in conditions without visibility (instrument flight);
- the possibility of training pilots for various approaches in missions in mountain areas, with the use of winch, night vision devices (NVG), etc.

By performing the training on the flight simulator and not in a real flight, the flight resource of the aircraft in service, respectively the resource of the actual equipment for performing the specific missions (FLIR, SX 16, NVG, Flotability, etc.) is protected, and their operating time is considerably increased.

Human error is the main cause of aviation accidents worldwide. Simulator training has the role of minimizing this factor, increasing the level of professionalism in operation. Simulator training does not train the flight technique and does not replace the real training, instead, by using the simulator you can train the way of thinking and managing the various situations that can occur during the flight.

### *b) Causes / factors that determined the Contracting Authority to consult the market*

Under Art. 139 from Law no. 98/2016 and Art. 18 from H.G. no. 395/2016, the contracting authority may conduct a market consultation process, as part of the public procurement process, if it is desired to purchase products / services / works with a high degree of technical, financial or contractual complexity, or in areas with rapid technological progress.

Thus, GIA considers that the procurement of level D Full Flight Fimulators for Eurocopter EC-135 / Airbus H-135 helicopters is both a product of high technical complexity and one with a high degree of complexity financial. The procurement is based on the need to equip the GIA with a device capable of providing the required training for the pilots in order to simulate special cases and different operational situations.





c) *Expected results of the Contracting Authority following market consultation*

Based on the technical specification draft, attached in the appendix to this document, economic operators / participants will make proposals for the development of a complete technical specification, the contracting authority will draw up (taking into account the opinions, suggestions, recommendations and / or proposals received) the appropriate ***technical specification*** to its necessity and ***estimate the value*** of the level D full Flight simulators for Eurocopter EC-135 / Airbus H-135 helicopters.

**2. Summary of the market consultation process**

**i. Estimated timetable of activities and major stages of the market consultation process**

<b>Nr. crt.</b>	<b>Actiiviy name</b>	<b>Duration</b>	<b>Date/time</b>	<b>Notes</b>
1	Publish the Market Consultation Notice		28.08.2018	
2	Deadline for submission of tenders/bids		11.09.2018 11:00 o'clock	
3	Opening of tenders/bids		12.09.2018 11:00 o'clock	
4	Drawing up of "opening minutes"		12.09.2018	
5	Consultation rounds		17- 21.09.2018 *	
6	Centralizing information of consultation notes and drafting "Market Consultation Report"		24.09.2018	
7	Publish the " Market Consultation Report " for the bidders/participants		28.09.2018	

\* The dates and times for consultations shall be communicated by the contracting authority to the economic operators / participants subsequently.

**ii. Approaches to be used in market consultation**

Description of the ways and means to be used in the interaction with economic operators / participants, taking into account the two main steps of the market consultation process:

1



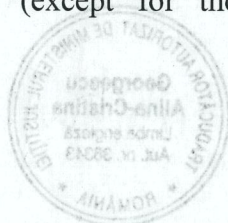


Step 1:

- i. Sending opinions / suggestions / recommendations (in the form of the attached technical specification, as requested in the Consultation Notice, in detailed form) by **10.09.2018 at 11:00** at GIA's headquarters from Calea Ion Zăvoi street no. 14, sector 1, Bucharest, or via e-mail, at achizitie.ia@mai.gov.ro.
- ii. If appropriate, economic operators / participants will indicate in their proposals the technical or financial part or parts thereof, which the participants declare to be confidential, classified or protected by an intellectual property right.
- iii. The language in which the opinions / suggestions / recommendations should be drafted and in which the consultation will be held – Romanian or English.
- iv. Persons authorized to assist in the opening of the opinions / suggestions / recommendations: Multidisciplinary team. In order to protect the information declared by economic operators / participants as confidential, classified or protected by an intellectual property right, team members will sign confidentiality statements.
- v. Date, time and place of accessing opinions / suggestions / recommendations:
  - *Date and time of accessing opinions/ suggestions/recommendations: 11.09.2018, at 11:00*
  - *Place of accessing opinions/ suggestions/recommendations: GIA `s headquarters from Calea Ion Zăvoi street no. 14, sector 1, Bucharest.*
- vi. The session ends with a "**Minute**" signed by the members of the multidisciplinary team. The "Minutes" shall include the names of the economic operators and the main technical and financial elements.

Step 2:

- i. The contracting authority will organize, between 17-21 September 2018, individual consultation meetings with each economic operator / participant who expressed their interest in participating, organized to create a framework for explaining and / or discussing the opinions / suggestions / recommendations made by them.
- ii. Consultation meetings will be held in the presence of legal / empowered representatives of economic operators / participants, after a timetable communicated by the multidisciplinary team, based on the opinions / suggestions / recommendations submitted by the economic operators / participants.
- iii. Each consultation meeting with each economic operator / participant will end with a "**minute**" that will contain information about the participants, the topics discussed, the confirmation of the information submitted by the participants of the consultation meeting (except those declared confidential by participating individuals / organizations / operators) and will be signed by the multidisciplinary team and by the legal representatives / authorized agents of the economic operators.
- iv. The information resulting from all the consultation meetings will be centralized in a "**Market Consultation Report**", which will also include the market consultation context, the summaries of the market consultation process, the outcome of the market consultation process and other relevant information (except for those declared as confidential by the participating individuals /





organizations / operators) and which will be signed to the members of the multidisciplinary team and which will subsequently be subject to the approval of decision makers within the GIA.

- v. The "**Market Consultation Report**" will be published in SEAP, in the Announcements/Ads section - Market Consultation

**iii. Topics to be addressed with the consultation participants**

During each individual consultation meeting conducted during Step 2, at least the following will be discussed::

- a. Opinions / suggestions / recommendations / proposals made by participating individuals / organizations / economic operators regarding technical specifications.
- b. Opinions / suggestions / recommendations / proposals made by participating individuals / organizations / economic operators on value estimation.
- c. A summary of the comments and questions addressed to participants and by the participants will be made.
- d. Comments from other stakeholders invited to participate in consultations, if appropriate.

**3. Expected outcome of the market consultation process:**

- i. List of conclusions of the market consultation process based on the suggestions, recommendations and opinions expressed and discussed.
- ii. List of the most important questions that emerged from market consultation that need to be dealt with, before finalizing the *development of technical specifications* to meet the needs of the Contracting Authority (if applicable).
- iii. Contracting Authority's ability, based on suggestions, recommendations, proposals, opinions expressed and discussed to complete the *development of technical specifications* to meet the needs of the Contracting Authority și
- iv. The Contracting Authority's ability, based on the suggestions, recommendations, proposals and opinions expressed and discussed to *correctly estimate the value* of the level D Full Flight Fimulators for Eurocopter EC-135 / Airbus H-135 helicopters.

**4. Other relevant information to demonstrate the application of public procurement principles during market consultation**

- i. measures taken by the Contracting Authority to comply with the provisions of procurement law with regard to paying special attention not to distort competition in the future award procedure and not to violate the principles of non-discrimination and transparency:
  - a. publishing the Market Consultation Notice in SEAP, informing potential bidders, submission by participants / organizations / economic operators of their opinions / suggestions / recommendations / proposals to the indicated email address or sending them to the IGAV headquarters;
  - b. opening all opinions / suggestions / recommendations / proposals on the same date and time;
  - c. conducting consultation meetings, individually, with each participant / organization / economic operator;





- d. a "**minute**" at the end of each individual consultation meeting;
  - e. publishing the "**Market Consultation Report**" in SEAP;
  - f. future procurement procedure will contain information related to this market consultation.
- ii. measures taken by the contracting authority to preserve the confidentiality of the information declared by the participants to the consultation as confidential, classified or protected by an intellectual property right:
- a. The possibility for economic operators / participants to mention in the proposals the technical or financial part or parts thereof, which the participants declare to be confidential, classified or protected by an intellectual property right;
  - b. signing a confidentiality statement by the members of the multidisciplinary team;
  - c. The "**Market Consultation Report**" shall not contain the information declared by the individuals / organizations / economic operators as confidential;
  - d. "**Market Consultation Report**" will be published in SEAP and will be available to all participants and stakeholders.

## 5. Annex

Annexes to the Market Consultation Document:

- i. Annex 1 TECHNICAL SPECIFICATION - LEVEL - D FULL FLIGHT SIMULATOR FOR EUROCOPTER EC-135 / AIRBUS H-135 HELICOPTERS.

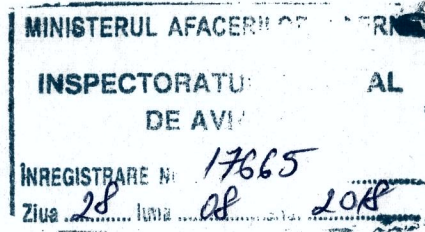
CHAIRMAN OF THE MULTIDISCIPLINARY TEAM

Commander

Cătălin-Paul DACHE







**APROB**  
**(Î) INSPECTOR GENERAL**  
*Comanda*  
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## ANNEX No. 1

### TECHNICAL SPECIFICATION

### FULL FLIGHT SIMULATOR LEVEL- D FOR EUROCOPTER EC-135 / AIRBUS H-135 HELICOPTERS

#### A. GENERAL CONDITIONS

The legislation underlying the elaboration of the following technical specifications, which is applied in the elaboration of the technical specification:

The EC-135 / Airbus H-135 Helicopter Flight Simulator must be EASA certified in accordance with CS-FSTD (H) / 26.06.2012 or the EASA document certifying flight simulation requirements for helicopters.

The proposed flight simulator type shall be in the EASA-class D-FFS category in accordance with international aviation legislation (according to CS-FSTD - H document / 26.06.2012) on helicopter flight simulation (helicopter training devices) specifications.

The flight simulator must be brand new and the manufacturer has to have experience in producing helicopter flight simulators. The Flight Simulator should be suitable for the training and certification of pilots performing Romanian Ministry of Internal Affairs (MIA) specific missions (HEMS missions, missions in support of MIA structures, search and rescue missions, insertion / extraction missions using the helicopter hoist, sling-load operations using the helicopter cargo hook, VFR and IFR flights for dual pilot / single pilot missions, mountain missions, rescue missions over sea, night missions using NVG) the possibility of simulating all emergency cases according to the flight manual for helicopters EC-135 / H-135 variant T2 + CPDS.

The process of delivery and commissioning will start after the signing of the contract and will last no more than 18 months.

#### **The flight simulator must contain the following:**

- An EC-135/H-135 T2+ CPDS cockpit that replicates the helicopter and which has to be a full-scale replica of the helicopter simulated (1:1 scale), in accordance with EASA CS-FSTD (H) / 26.06.2012 document. Additional required crew member duty stations and those required bulkheads aft of the pilot seats are also considered part of the cockpit and shall replicate the helicopter;
- The Full Flight Simulator D-Level complete 6-axis movement package, consistent with the real aerodynamic features of the EC-135 T2 + helicopter (to accurately simulate the movements and forces generated by ground contact, ground and flight failures and by the aerodynamic forces specific to the EC-135 helicopters), in accordance with EASA CS-FSTD (H) / 26.06.2012 document.
  - A visual system in accordance with EASA CS-FSTD (H) / 26.06.2012 document.
  - A flight instructor operation station located inside the simulator, in accordance with EASA CS-FSTD (H) / 26.06.2012 document.



- A station outside the simulator (in debriefing room) in order to allow real-time visualization of simulated images and cockpit images for real-time flight training and post-training to conduct general debriefings.
- An average of 8-10 work-stations (in the briefing room) linked with a common network with a dedicated software for theoretical training and testing the crews before simulated flight training.
- The infrastructure related to the flight simulator operation in accordance with the specifications issued by the simulator manufacturer and the national legislation in force for a safe and optimal operation.

## B OPERATIONAL REQUIREMENTS

The simulator will be compatible for the following types of simulated situations and missions, as follows:

- Training that includes the accurate simulation of all the emergency situations described in the Flight Manual (FLM and FLM Supplements) of the EC-135 T2 + CPDS helicopter, with the possibility of updating the software with the appearance of modified, reviewed or newly inserted ways of managing the emergency situations according to the EC-135/H-135 T2+ helicopter Flight Manual.

- Synthetic training for initial or recurring type rating for VFR / IFR single-pilot / dual-pilot missions or EMS (Emergency Medical Services) / Air Ambulance missions for search and rescue missions at land / sea, for Operator Proficiency Check (OPC).

Simulation training (VFR / IFR single-pilot / dual-pilot during day and night) of missions specific to the Romanian Ministry of Internal Affairs with regard to the **Emergency Medical Services / Air Ambulance**, as follows :

- With the possibility to land / take-off in / out of unknown and undeveloped terrain / landing spots;
- With a database that contains all airports and heliports from Romania (with complete and up-to-date instrumental procedures);
- With the possibility to land / take off on / from the field straight or inclined (simulating the modification of the Mast Moment indication according to the real helicopter's limitations);
- With the possibility of landing / take-off on dry or soft ground (allowing the simulation of the landing gear to sink in soft area where applicable);
- With accurate simulation of the ground effect and the influence of the airflow on the elements in the environment;
- With the possibility of landing / take off in / from all land areas from the map (plain areas, hill areas and mountain areas);
- With the possibility to fly, land / take off to / from seaside areas (landing on the beach with the possibility of generating the glare effect -commandable from the instructor panel- caused by raising the sand, landing on ship, landing on the oil platform, landing on water using the helicopter floatation system);
- Simulating EMS missions for flight, landing / take-off in / from areas with a high level of details, with 3D structures and obstacles, with lights / beacons and markings according to reality and with a surrounding environment reproduced in detail (image resolution of at least 1m) should be possible for at least the following cases:
  - Flight and landing / take-off at / from at least 6 obstacle zones in a dry environment in the plain area (3 obstacle zones) and hill area (3 obstacle zones) for the training of the three types of vertical take-offs / landings (VTOL 1,2, and 3) according to the dimensions and specifications from the EC-135 T2 + variant flight manual (a plain area and a hillside area according to VTOL I - Surface Level / Elevated Heliport, a plain area and a hillside area according to VTOL II - Short Field and a plain area and a hillside area according to VTOL III - Confined Area);



- Flight and landing / take-off for a mountainous area in Romania (Făgăraș Mountains) respecting the actual altitudes and performance limitations of the aircraft for operation at the respective altitudes and environments;

- A database that permits to generate road accidents scenarios in different locations selected by the instructor;

- A database containing at least one elevated certified heliport (Elevated Heliport - LROD Oradea County Hospital Landing Platform), with landing platform, beacons, lights, 3D buildings and the environment in the heliport area;

- A database of at least one surface heliport (LRCH Heliport: SMURD Constanta), with the landing platform, beacons, lights, 3D buildings and the environment in the heliport area;

- A database that contains at least one offshore oil platform with landing platform, beacon, lights and 3D structures;

- A database of at least one landing site within a hospital (Târgu-Mureș Emergency County Hospital), with the landing platform, beacon, lights, 3D buildings and the environment in the heliport area;

- A database comprising at least one Romanian airport (LRBS), including the Operational Base of the General Inspectorate of Aviation (G.I.o.A.) - Headquarters no. 2 of the Bucharest Aviation Special Unit, with the runway, taxiways, aprons, with parking areas and helicopter platforms, beacons (including the G.I.o.A. HAPI lights), lights, ATC Towers, Hangars, SMURD containers, SMURD reservoir, Terminals and other 3D buildings within the airport and the surrounding area around the airport.

- For all types of missions there must be the possibility of simulation of all emergency situations commandable from the instructor panel;

- For all types of missions there should be the possibility of changing the atmospheric (weather) conditions ordered by the instructor, by realistic simulation of their effects;

- For all types of missions there must be a possibility of landing / taking off with blindness effect caused by surfaces covered with snow, sand or dust, commanded by the instructor;

- For all types of missions, it must be possible to freeze the scenario, replay it from any phase of the flight, ordered by the instructor;

- For all airports in Romania, it must be possible to update the database on all specific procedures, every 28 days, according to AIP Romania, with the possibility of updating them, including on the navigation systems on board the simulator cockpit;

- For all types of night missions, it must be possible to simulate their execution using NVG (night vision devices) with a NVG cabin compatibility;

- For all types of missions, it must be possible to use the fixed and mobile landing lights and the landing lights in IR mode;

- For all types of missions, there must be the compatibility for using the SX-16 type search light (with all functions and limitations according to FMS);

- For all types of missions, the hoist system, the cargo hook system and the rappel system must be operational and hoist missions, sling-load missions and rappel missions must be carried out with respect to the change in center of gravity and in respect to the limitations imposed by using these systems according to EC-135/H-135 FLM / FMS;

- For all types of missions, the mirror system can be used according to the FMS limitations;

- For all types of missions, the weather radar may be used according to the limitations in the FMS, respectively the limitations and features in its operating manual;

- For all types of missions, FLIR device can be used according to FMS;

- For all types of missions, the helicopter can be equipped with a functional floatability system and to be capable of landing on water using the floatability system in case of emergency;



- For all types of missions, the helicopter must be equipped with the fully functional EURONAV system with an updated database for the entire territory of Romania and with the possibility to periodically update the database;
- For all types of missions, there must be an available database to allow flight, take-off and landing on / from all over Romania's territory.
- Simulating search and rescue missions day and night as follows:
  - With the possibility of generating disaster scenarios (flooded localities, earthquake destroyed localities, vegetation fires, massive fires in populated areas) in which the winch system can be used;
  - With the possibility of generating disaster scenarios (flooded localities, earthquake destroyed localities, vegetation fires, massive fires in populated areas) in which the cargo hook can be used;
  - With the possibility of generating disaster scenarios (flooded localities, earthquake destroyed localities, vegetation fires, massive fires in populated areas) in which the SX-16 search light (with IR compatibility) can be used;
  - With the possibility of generating disaster scenarios (flooded localities, earthquake destroyed localities, vegetation fires, massive fires in populated areas) in which the mirror system can be used;
  - With the possibility of generating disaster scenarios (flooded localities, earthquake destroyed localities, vegetation fires, massive fires in populated areas) in which the NVG devices with the IR compatibility for fixed and mobile landing lights can be used;
  - With the possibility of generating disaster scenarios (flooded localities, earthquake destroyed localities, vegetation fires, massive fires in populated areas) in which the FLIR system can be used;
  - With the possibility of generating scenarios for the search of a victim (which can be generated in different areas by the instructor) in a mountainous area (Fagaras mountain range) and the possibility of extracting the victim with the winch system or the cargo hook system based on the information on the location of the victim (coordinates);

### **C. GENERAL SPECIFICATIONS ACCORDING TO CS-FSTD(H)/26.06.2012 EASA**

- The Flight Simulator must be in accordance with Full Flight Simulator level D for helicopters requirements, according to EASA CS-FSTD (H) / 26.06.2012 document. The minimum technical specifications for the D-FFS for helicopters according to EASA are as follows:
  - A cockpit that is a full-scale replica of the helicopter simulated. Additional required crew member duty stations and those required bulkheads aft of the pilot seats are also considered part of the cockpit and all replicate the helicopter. A cockpit that replicates the helicopter.
  - The cockpit, including the instructor's station shall be fully enclosed. A cockpit, including the instructor's station that is sufficiently closed off to exclude distractions.
  - There must be full size panels with functional controls, switches, instruments and primary and secondary flight controls, which shall be operating in the correct direction and with the correct range of movement. Functional controls, switches, instruments and primary and secondary flight controls sufficient for the training events to be accomplished, shall be located in a spatially correct area of the cockpit.
  - Lighting for panels and instruments shall be as per the helicopter. Lighting for panels and instruments shall be sufficient for the training events
  - Cockpit ambient lighting environment shall be dynamically consistent with the visual display and sufficient for the training event.
  - The ambient lighting should provide an even level of illumination which is not distracting to the pilot.
  - Relevant cockpit circuit breakers shall be located as per the helicopter and shall function accurately when involved in operating procedures or malfunctions requiring or involving flight crew response.
  - Effect of aerodynamic changes shall comply with various combinations of airspeed and power normally encountered in flight, including the effect of change in helicopter attitude, aerodynamic and propulsive forces and moments, altitude, temperature, mass, centre of gravity location and



configuration. Aerodynamic and environment modelling shall be sufficient to permit accurate systems operation and indication.

- Aerodynamic modelling must include ground effect, effects of airframe and rotor icing (if applicable), aerodynamic interference effects between the rotor wake and fuselage, influence of the rotor on control and stabilisation systems, and representations of nonlinearities due to sideslip, vortex ring and retreating blade stall.

- Validation flight test data shall be used as the basis for flight and performance and systems characteristics. Representative/generic aerodynamic data tailored to the helicopter with fidelity sufficient to meet the objective tests and sufficient to permit accurate system operation and indication.

- All relevant cockpit instrument indications shall automatically respond to control movement by a crew member, helicopter performance, or external simulated environmental effects upon the helicopter.

- All relevant communications, navigation, caution and warning equipment shall correspond to that installed in the helicopter. All simulated navigation aids within range shall be usable without restriction. Navigational data shall be capable of being updated.

- Navigation equipment corresponding to that of a helicopter, with operation within the tolerances typically applied to the airborne equipment. This shall include communication equipment (interphone and air/ground communications systems).

- Navigational data with the corresponding approach facilities. Navigation aids should be usable within range without restriction.

- In addition to the flight crew member stations, at least two suitable seats for the instructor and an additional observer shall be provided permitting adequate vision to the crew members' panel and forward windows. Observer and instructor seats need not represent those found in the helicopter but shall be adequately secured to the floor of the FFS, fitted with positive restraint devices and shall be of sufficient integrity to safely restrain the occupant during any known or predicted motion system excursion.

- FFS systems shall simulate the applicable helicopter system operation, both on the ground and in flight.

- Systems shall be operative to the extent that normal, abnormal, and emergency operating procedures appropriate to the simulator application can be accomplished. Once activated, proper system operation shall result from system management by the flight crew and not require input from instructor controls.

- The instructor shall be able to control system variables and insert abnormal or emergency conditions into the helicopter systems.

- Independent freeze and reset facilities shall be provided.

- Control forces and control travel which correspond to that of the replicated helicopter shall be provided. Control forces shall react in the same manner as in the helicopter under the same flight conditions. Control forces and control travel shall be representative of the replicated helicopter under the same flight conditions as in the helicopter. Control forces and control travel shall broadly correspond to that of the simulated helicopter. Control forces and control travels shall respond in the same manner under the same flight conditions as in the simulated helicopter.

- Cockpit control dynamics, should replicate the simulated helicopter. Free response of the controls shall match that of the helicopter within the given tolerance. Initial and upgrade evaluation shall include control free response (cyclic, collective, and pedal) measurements recorded at the controls. The measured responses shall correspond to those of the helicopter in ground operations, hover, climb, cruise, and auto-rotation.

- Ground handling and aerodynamic programming to include the following:

- Ground effect - hover and transition IGE.

- Ground reaction - reaction of the helicopter upon contact with the landing surface during landing to include strut deflections, tire or skid friction, side forces, and other appropriate data, such as weight and speed, necessary to identify the flight condition and configuration.

- Ground handling characteristics - control inputs to include braking, deceleration turning radius and the effects of crosswind.

- Instructor controls shall be provided for:

- (i) wind speed and direction

- (ii) turbulence

- (iii) other atmospheric models to support the required training



- (iv) adjustment of cloud base and visibility
- (v) temperature and barometric pressure.
- Representative stopping and directional control forces for at least the following landing surface conditions based on helicopter related data, for a running landing:
  - (i) dry
  - (ii) wet (soft surface and hard surface)
  - (iii) icy
  - (iv) patchy wet
  - (v) patchy icy
- Transport delay - Transport delay is the time between control input and the individual hardware (systems) responses.
  - As an alternative, a latency test may be used to demonstrate that the FSTD system does not exceed the permissible delay.
  - Latency - Relative response of the visual system, cockpit instruments and initial motion system response shall be coupled closely to provide integrated sensory cues. These systems shall respond to abrupt pitch, roll, and yaw inputs at the pilot's position within the permissible delay, but not before the time, when the helicopter would respond under the same conditions. Visual scene changes from steady state disturbance shall occur within the system dynamic response limit but not before the resultant motion onset.
  - Self-testing for FSTD hardware and programming to determine compliance with the FSTD performance tests. Evidence of testing shall include FSTD number, date, time, conditions, tolerances, and the appropriate dependent variables portrayed in comparison with the helicopter standard.
  - A system allowing for timely continuous updating of FSTD hardware and programming consistent with helicopter modifications.
  - The FSTD operator shall submit a QTG in a form and manner acceptable to the competent authority. A recording system shall be provided that will enable the FSTD performance to be compared with QTG criteria.
  - FSTD computer capacity, accuracy, resolution and dynamic response shall be sufficient for the qualification level sought.
  - Daily pre-flight documentation either in the daily log or in a location easily accessible for review.

#### **D. MOTION SYSTEM**

- Motion cues as perceived by the pilot shall be representative of the helicopter, e.g. touch down cues should be a function of the simulated rate of descent.
- A motion system with 6 degrees of freedom synergistic platform motion system.
- A means of recording the motion response time as required
- Special effects programming to include the following:
  - (1) runway rumble, oleo deflections, effects of groundspeed and uneven surface characteristics;
  - (2) buffet due to translational lift;
  - (3) buffet during extension and retraction of landing gear;
  - (4) buffet due to high speed and retreating blade stall;
  - (5) buffet due to vortex ring;
  - (6) representative cues resulting from:
    - (i) touch down
    - (ii) translational lift;
  - (7) anti-torque device ineffectiveness;
  - (8) buffet due to turbulence.
- Characteristic vibrations/buffets that result from operation of the helicopter and which can be sensed in the cockpit. Simulated cockpit vibrations to include seat(s), flight controls and instrument panel(s), although these need not be tested independently.



## E. VISUAL SYSTEM

- Visual system shall be capable of meeting all the standards of this paragraph and the respective paragraphs of validation tests as well as functions and subjective tests as applicable to the level of qualification requested by the FSTD operator.

- Visual system capable of providing at least a 45 degrees horizontal and 30 degree vertical field of view simultaneously for each pilot.

- Visual system capable of providing at least a 75 degrees horizontal and 40 degrees vertical field of view simultaneously for each pilot.

- "Continuous" cross cockpit, minimum visual field of view providing each pilot with 180 degrees horizontal and 60 degrees vertical.

- A means of recording the visual response time for the visual system shall be provided.

- Visual cues to assess rate of change of height, height AGL, translational displacements and rates, during take-off, low altitude/low airspeed manoeuvring, hover, and landing.

- Test procedures to quickly confirm visual system colour, RVR, focus, intensity, level horizon, and attitude as compared with the specified parameters.

- A minimum of 10 levels of occulting. This capability should be demonstrated by a visual model through each channel.

- Surface (Vernier) resolution shall be demonstrated by a test pattern of objects shown to occupy a visual angle of not greater than 3 arc minutes in the visual display used on a scene from the pilot's eye point.

- Light-point size shall not be greater than 6 arc minutes.

- Daylight, dusk, and night visual scenes with sufficient scene content to recognise aerodromes, operating sites, terrain, and major landmarks around the FATO area and to successfully accomplish low airspeed/low altitude manoeuvres to include lift-off, hover, translational lift, landing and touch down.

- A visual database sufficient to support the requirements, including:

(i) Specific areas within the database needing higher resolution to support landings, take-offs and ground cushion exercises and training away from an aerodrome/operating site. Including elevated FATO, helidecks and confined areas.

(ii) For cross-country flights sufficient scene details to allow for ground to map navigation over a sector length equal to 30 minutes at an average cruise speed.

(iii) For offshore airborne radar approaches (ARA), harmonised visual/radar representations of installations.

(iv) For training in the use of night vision goggles (NVG) a visual display with the ability to represent various scenes with the required levels of ambient light/colour.

- Daylight, twilight (dusk/dawn) and night visual capability for system brightness and contrast ratio criteria as applicable for level of qualification sought.

- Daylight, twilight (dusk/dawn) and night visual capability for system brightness and contrast ratio criteria as applicable for level of qualification sought.

- The visual system should be capable of producing, as a minimum: A scene content comparable in detail with that produced by 6 000 polygons for daylight and 7 000 visible light-points for night and dusk scenes for the entire visual system.

- Surface contrast ratio:

Demonstration model - not less than 5:1.

Light-point contrast ratio - not less than 25:1.

Highlight Brightness. The minimum light measured at the pilot's eye position should be: 20 cd/m<sup>2</sup> (6 ft-Lamberts).

## F. SOUND SYSTEMS

- Significant cockpit sounds, and those, which result from pilot actions corresponding to those of the helicopter shall be provided.

- Sound of precipitation, windshield wipers, the sound resulting from a blade strike and a crash condition when operating the helicopter in excess of limitations.

- Realistic amplitude and frequency of cockpit acoustic environment.

- The volume control shall have an indication of sound level setting which meets all qualification requirements.



## F. INFRASTRUCTURE

For the commissioning and optimal operation of the simulator, it is necessary to build a special purpose building. Architecture, structural strength, installations of all types and the foundation are all dependent on the type of simulator, technical specifications and operational requirements. All the characteristics of the construction will be determined by the specialized company that will execute the simulator in order to ensure its guarantee. The environment in which it will be located and the optimal operating conditions will lead to a certain technical solution.

The construction will meet the current legislation and regulations and all the steps of executing a public investment:

- The Decision no. 907 / 2016- regarding the elaboration phases and the framework content of the technical and economic documentation related to the public-financed investment objectives / projects.
- Law no.10/1996 on the quality of construction.
- Law no. 50/1991 regarding the authorization of the execution of the construction works.
- Law no. 319/2006 on safety and health at work
- The decision no. 1091/2006 on the minimum safety and health requirements for the workplace.

Seismic Design P100-1 / 2013.

- CR-1-1-4 / 2012 - Evaluation of wind action on constructions.
- CR-1-1-3 / 2012 - Evaluation of the action of snow on the constructions.
- The Order of the Ministry of Health no. 119/2014 for the approval of the Public Hygiene and Public Health Standards on the living environment of the population.
- Emergency Ordinance no. 195/2005 on environmental protection.
- Technical regulations on the design and execution of foundations.

The proposed site is located on a land owned by the Romanian State.

The land has no level differences (flat land) and is bordered by

- At North: Calea Ion Zăvoi
- At South: Bucharest Baneasa International Airport
- At East and West: land owned by the Romanian State and currently in the administration of

G.I.o.A.

The main purpose of the construction is to ensure the optimum operation of the flight simulator to be purchased. In this respect, the technical conditions necessary for its realization will be dictated by the requirements imposed by the technical specifications of the simulator.

Minimum requirements for the functions and destinations of the construction are:

- the simulator room: for its layout and the equipment required for installation;
- 2 technical rooms: for the disposal of the various servers required;
- 2 offices: for instructors and mission planning equipped with a workstation / office and a printer / office.
- 1 briefing room: to ensure the necessary training of staff, equipped with 8-10 workstations and a printer.
- 1 debriefing room: equipped with one workstation and a printer, for viewing and discussing items that were simulated during the development of the sessions at the end of each mission.
- 2 changing rooms - fitted with 4 wardrobes, each.
- 2 toilets – one for ladies, one for men.

Possibilities for securing utilities to the land on which the simulator is to be located:

**Water supply**



Near the land, at a distance of approximately 185m there is a drilling with a depth of 230m. Water supply to the General Inspectorate of Aviation and the Bucharest Aviation Special Unit is performed from this drill.

### **Sewerage**

The removal of waste water is carried out using a waste water pumping station to the sewerage network existence. The waste water pumping is located at a distance of approximately 250 m and the sewerage network existence is located at a distance of approximately 8 m to the limit of the property.

### **The supply of natural gas**

At present, the natural gas installation starts from the existing connection at the DN1 intersection with the Calea Ion Zăvoi. Consider making a new connection to the existing one or extending the entire network.

### **Electricity**

The existence of a transformer station at the beneficiary's premises, approximately 200m from the location of the simulator.

The take-off point is set at the level of voltage of 0.4 kV at the PTZ 4229 (energy capacity, property of the operator of the network, which is connected to the user)

The final maximum power that can be absorbed is 369.56 kVA.

\* workstation includes: a desk / work desk, a PC, an office chair, audio system.

## **PREȘEDINTE ECHIPĂ MULTIDISCIPLINARĂ**

*Comandor*

Cătălin-Paul DACHE