PETROBRAS	TECHNICAL SPECIFICATION	Nº: I-ET-3010.00-5515-762-PPT-001	
	CLIENT: SRGE		SHEET: 1 of 19
	JOB: OPERATIONAL RADIO		
	AREA: -		
TIC	TITLE: AERONAUTICAL COMMUNICATION SYSTEM		INTERNAL
			OI/CS

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1. SUBJECT

1.1 The subject of this document is to establish the criteria and basic characteristics for the detailed design, supply and installation an Exclusive Telecommunications Station – CAT-M (Estação de Telecomunicações Exclusivas – CAT M) or ETEX CAT-M, that shall be installed in PETROBRAS FPSO Unit.

1.2 The ETEX CAT-M shall enable all aeronautical communication and air navigation aid to be done and record between the FPSO Unit and helicopters' pilot and to be monitored helicopters approaches, landings and take offs.

1.3 The ETEX CAT-M Station System shall be installed in FPSO Unit and will be composed for the following subsystems: Audio and Video Recorder System, Helideck Monitoring System (HMS) and Aeronautical Radio Communication.

2. ABBREVIATIONS

ABNT	Associação Brasileira de Normas Técnicas (Brazilian Association of Technical Standards)
AC	Alternating Current
AM	Amplitude Modulation
ANATEL	Agência Nacional de Telecomunicações (Brazilian Telecommunication Authority)
ANSI	American National Standards Institute
ART	Anotação de Responsabilidade Técnica (Technical Responsibility Note)
ASTM	American Society for Testing and Materials
ATS	Automatic Transfer Switch
AWG	American Wire Gauge
CAP	Project Approval Certificate
CAT	Category
CATV	Community Antenna Television
CCR	Central Control Room
CCTV	Closed Circuit Television
CODEC	Codifier & Decodifier
CREA	Conselho Regional de Engenharia e Agronomia (Brazilian Engineering Counsel)
DECEA	Departamento de Controle do Espaço Aéreo Brazilian Department of Airspace Control
DC	Direct Current
DIO	Dispositivo Intermediário Óptico (Optical Distribution Drawer)
DPC	Ports and Coasts Department
ETEX	Estação de Telecomunicações Exclusivas (Exclusive Telecommunications Station)
FPSO	Floating, production, storage and offloading
GMDSS	Global Maritime Distress Safety System
GPS	Global Positioning System
HMS	Helideck Monitoring System
ICA	Aeronautical Command Instructions
IEC	International Electrotechnical Commission
IEEE	Institute of Electric and Electronic Engineers
INMETRO	Instituto Nacional de Metrologia (National Institute of Metrology)
IMO	International Maritime Organization
IP	Internet Protocol
IS	Intrinsic Safe

ITU	International Telecommunication Union
LAN	Local Area Network
LSZH	Low Smoke Zero Halogen
MODU	Mobile Offshore Drilling Unit
OSI	Open Systems Interconnection
PLL	Phase Locked Loop
PoE	Power over Ethernet
PTT	Push To Talk
RF	Radio Frequency
SMA	Aeronautical Mobile Service
TIA	Telecommunications Industry Association
SOLAS	Safety of Life at Sea
UPS	Uninterruptible Power Supply
UTP	Unshielded Twisted Pair
VHF	Very High Frequency
VSWR	Voltage Standing Wave Ratio

3. REFERENCE DOCUMENTS, CODES AND STANDARDS

3.1 International Standards

a. IEC 60079: Electrical apparatus for explosive gas atmospheres - all parts

b. IEC 60092-502: Electrical installations on ships

c. IEC 60331: Tests for electric cables under fire conditions - circuit integrity – all parts

d. IEC 60529: Degrees of protection provided by enclosures (IP code)

e. IEC 60533: Electrical and electronic installations in ships - electromagnetic compatibility

f. IEC 60945: Maritime navigation and radiocommunication equipment and systems – general requirements – methods of testing and required test results

g. IEC 61000: Electromagnetic compatibility (EMC) series - all parts

h. IEC 61892-7: Mobile and fixed offshore units - electrical installations - part 7: hazardous area

i. IEC 61892-1: Mobile and fixed offshore units – Electrical installations – Part 1: General requirements and conditions

j. IMO Harmonization of GMDSS Requirements for Radio Installations on Board SOLAS Ships.

k. IMO LSA Code – International Life-Saving Appliance Code.

l. IMO MODU Code - Code for the Construction and Equipment of Mobile Offshore Drilling Units.

m. IMO Resolution A.1021 – Codes on Alerts and Indications.

n. IMO Resolution A.801 – Provision of Radio Services for the Global Maritime Distress and Safety System.

o. IMO Resolution A.888 – Criteria for the Provision of Mobile-Satellite Communication Systems in the Global Maritime Distress and Safety System (GMDSS).

p. IMO SOLAS – International Convention for the Safety of Life at Sea.

q. MODU Code 11.6 and IMO MSC.80(70) as required in MODU Code 11.8.

r. ISO 7240-19 – Fire Detection and Alarm Systems - Design, installation, commissioning and service of sound systems for emergency purposes.

3.2 Brazilian Standards

INMETRO PORTARIA Nº 115 (21/março/2022): regulamento de avaliação da conformidade de equipamentos elétricos para atmosferas potencialmente explosivas, nas condições de gases e vapores inflamáveis e poeiras combustíveis;

a. NR-10: Segurança em instalações e serviços em eletricidade;

b. NR-37: Segurança e saúde em plataformas de petróleo;

c. ANATEL: Resolutions of Agência Nacional de Telecomunicações;

d. ICA 63-10: Estações Prestadoras de Serviços de Telecomunicações e Tráfego Aéreo;

e. ICA 63-25 – Preservação e Reprodução de Dados de Revisualizações e Comunicações AST;

f. NORMAM 201/DPC – Embarcações Empregadas na Navegação em Mar Aberto;

g. NORMAM 223/DPC – Homologação de Helideques Instalados em Embarcações e em Plataformas Marítimas.

h. MCA 101-1: Instalação de estações meteorológicas de superfície e de altitude (2018).

3.3 Classification Society

3.3.1. The detailed design shall be submitted to approval by Classification Society. The design and installation shall take into account their requirements and comments.

4. GENERAL REQUIRMENTS

4.1 The power supply of this system is scope of technical specification document: I-ET-3010.00-5515-762-PPT-002 - GMDSS AND OPERATIONAL RADIO SYSTEMS.

4.2 For more technical requirements details regarding antennas mounting and cables launching, CONTRACTOR shall consider, at least, the guideline on item 5 of “HARMONIZATION OF GMDSS REQUIREMENTS FOR RADIO INSTALLATIONS ON BOARD SOLAS SHIP”, issued by IMO and IEC standards.

4.3 For more technical requirements details regarding electromagnetic and electrical subjects, CONTRACTOR shall consider, at least, the guideline on items 6 up to 8

of “HARMONIZATION OF GMDSS REQUIREMENTS FOR RADIO INSTALLATIONS ON BOARD SOLAS SHIP”, issued by IMO and IEC standards.

4.4 For PETROBRAS detailed design requirements for installation, configuration, tests training and commissioning, CONTRACTOR shall comply with the DESCRIPTIVE MEMORANDUM I-MD-3010.00-5510-760-PPT-001 – GENERAL CRITERIA FOR TELECOMMUNICATIONS DESIGN.

4.5 For telecommunications symbols, the Detailed Design shall comply with the Technical Specification: I-ET-3000.00-0000-940-P4X-002 – SYMBOLS FOR PRODUCTION UNITS DESIGN.

4.6 For telecommunications TAGs, the Detailed Design shall comply with the Technical Specification: I-ET-3000.00-1200-940-P4X-001 – TAGGING PROCEDURE FOR PRODUCTION UNITS DESIGN.

4.7 All electrical requirements for telecom package shall be in accordance with I-ET-3010.00-5140-700-P4X-003 – ELETRICAL REQUIREMENTS FOR PACKAGES FOR OFFSHORE, I-ET-3010.00-5140-700-P4X-001 - SPECIFICATION FOR ELECTRICAL DESIGN FOR OFFSHORE UNITS, I-DE-3010.00-5140-700-P4X-003 - GROUNDING INSTALLATION TYPICAL DETAILS and I-ET-3010.00-5140-700-P4X-005 - REQUIREMENTS FOR HUMAN ENGINEERING DESIGN FOR ELECTRICAL SYSTEMS OF OFFSHORE UNITS.

4.8 The ETEX audio and video recording requirements are described in I-ET-3010.00-5514-76A-PPT-001 – HULL CCTV SYSTEM.

4.9 The Environmental System and HMS - Helideck Monitoring System requirements are described in I-ET-3010.00-5521-931-PEA-001 – METOCEAN DATA ACQUISITION SYSTEM.

4.10 CONTRACTOR shall provide all the materials to completely installation of all equipment that compose the ETEX-M.

4.11 All radio communication equipment required by ICA-63-10 standards, for aeronautical communication between helicopter pilot and the FPSO shall be installed at the Operational Radio Console in the Radio Room.

4.12 ETEX CAT-M system and the audio and video record system shall be designed according to:

4.12.1. MODU Code 11.6 and with IMO MSC.80(70) as required in MODU Code 11.8;

4.12.2. ICA 63-10 and ICA 63-25;

4.12.3. Brazilian Association of Technical Standards (Associação Brasileira de Normas Técnicas – ABNT);

4.12.4. Brazilian Department of Airspace Control (Departamento de Controle do Espaço Aéreo - DECEA);

4.12.5. Ports and Coasts Department (Departamento de Portos e Costas – DPC);

4.12.6. International Maritime Organization – IMO;

4.12.7. International Electrotechnical Commission – IEC;

4.12.8. NORMAM 223/DPC – Normas da Autoridade Marítima para Homologação de Helipontos Instalados em Embarcações e em Plataformas Marítimas.

5. SYSTEM DEFINITIONS

5.1 Aeronautical Communications System

5.1.1. This system provides radio communication between pilots, FPSO radio operator and HLO – Helicopter Landing Officer, during helicopter landing and take-off operations in order to improve both flight and passenger safety.

5.2 Helideck Video Monitoring

5.2.1. This system provides helideck monitoring by the FPSO radio operator during the landings and take-offs operations and also the rest of time without operations in helideck in order to improve the safety during the landing and take-offs. This video monitoring system is scope of CCTV System and its technical requirements are described in I-ET-3010.00-5514-76A-PPT-001 – HULLCCTV SYSTEM.

5.2.2. CCTV workstation with keyboard, mouse and monitor to be used by Radio Operator to access audio and video records shall be available on his workstation table.

5.2.3. Rack for Aeronautical Communication

a. ETEX-M Audio and Video Record System shall be installed in adequate and dedicated rack in the Radio Room.

b. This rack shall be closed by key or locker.

c. Inside this rack it is intended to be installed encoders, patch panel, NVR, energy circuit breakers from UPS electrical panel trough ATS.

5.3 Radio Communication and Helideck Video Recorder System

5.3.1. This system shall have record and replay technology, with at least 02 (two) audios and 03 (three) video channels, offering an instant synchronous replay access and integrated replay and data management.

5.4 Helideck Monitoring System (HMS)

5.4.1. The HMS is designed to measure helideck motion during helicopter landing and take-off operations in order to improve both flight and passenger safety.

5.4.2. The HMS used to analyze helideck motion during helicopter landings to improve safety in hostile weather conditions.

5.4.3. The HMS monitors helideck attitude and vertical velocity, wind speed and direction, air temperature and barometric pressure and presents this information to indicate landing conditions.

5.4.4. The HMS shall provide helideck real-time monitoring of motion and weather conditions.

5.4.5. A status light shall be installed in helideck area in order to indicate the operational helideck conditions.

6. TECHNICAL REQUIRMENTS

6.1 For each RF cable, before it ingresses to radios consoles, it shall be protected by Coaxial RF Surge Protector/Arrestor (Figure 1) due to atmospheric discharge.

Figure 1: RF Surge Protector/Lighting Arrestor

6.2 The equipment and accessories installed in outdoor or industrial areas shall be suitably rugged and their external bodies shall be made in non-metallic material, suitable for harsh environments and in accordance with IEC and ABNT standards, apart from the ones whose classification area require to be metallic as Ex-d junction boxes.

6.3 Brackets, bolts, nuts, washers and any other mechanical fixing elements shall be made in stainless steel.

6.4 In case of difficulty for supplying some equipment and accessory with external body made with non-metallic materials, CONTRACTOR shall submit them for analysis and approval of PETROBRAS.

6.5 It shall be avoided equipment and accessories with their external bodies built in aluminum alloy. Anything different shall be submitted to PETROBRAS approval. In case of approval, this alloy shall not contain in its composition more than 0.25 % of copper and shall comply with the ASTM-B-179 standard (ANSI alloy 356.1).

6.6 The equipment and accessories shall attend the ingress protection degree standard IEC 60529, protection type defined in IEC 61892, and IEC 60079 for electrical devices installed in hazardous areas.

6.7 All equipment that will make part of technical proposal shall have type approval certificate by Classifying Society and technical conformity with the International and National standardization organism: IMO, ABNT, DECEA, IEC, INMETRO and ANATEL.

6.8 The equipment and materials shall be supplied packed suitable for long periods of storage and be protected against mechanical impact and adverse weather conditions.

6.9 CONTRACTOR shall submit the calculation reports with the total loss for each RF cable that will be used in this system before the purchase order for analysis and approval by PETROBRAS. At least, these calculation reports shall present all information below:

a. Distances between the radios and antennas;

b. The quantity of connections;

c. The datasheet of the RF cables and connectors;

d. The RF power output of the Radio, total loss of the radiant system and RF power output in the antenna;

e. The RF free space propagation.

6.10 CONTRACTOR shall submit the calculation reports with the total loss for each RF cables that will be used for this system before the purchase order for analysis and approval by PETROBRAS.

6.10.1. These memories calculation shall have information about distances between the radios and antennas, the quantity connections, the datasheet of the RF cables and connectors, the RF power output in the Radio, total loss of the radiant system and RF power output in the antenna.

6.11 All RF cables shall be tested and certified with appropriate instrument. All tests results shall be submitted to PETROBRAS. The parameters tested shall be at least:

a. VSWR;

b. Distance to fault (VSWR);

c. Return Loss;

d. Cable Loss.

6.12 The Voice Radio Communication and Helideck Video Recorder Systems shall be powered as following:

a. In alternate current (AC): 220 VAC;

b. From platform emergency energy system (UPS).

6.13 CONTRACTOR shall surrender, at least, the technical information of ETEX-M equipment, materials and accessories listed below:

6.13.1. For radios transceptors: description, frequency range coverage, channel spacing, RF output power, antenna impedance, sensitivity, selectivity.

6.13.2. For RF cables: cover material, impedance, capacitance, inductance, weight, minimum bending, attenuation x frequency (dB/100m), relative propagation velocity.

6.13.3. For others equipment: electrical power voltage and consumption, thermal dissipation, equipment dimensions, weight, interfaces (I/O), list of accessories.

6.13.4. The frequency channel informed by Brazilian Air Force department shall be locked in all Aeronautical VHF base stations radios in order to avoid the radio operator changes it.

6.13.5. In outdoor areas, exposed to a marine atmosphere, CONTRACTOR shall beware to mitigate the galvanic corrosion of equipment, antennas, panels, boxes, coaxial cables fixing accessories. For reference only, follow the example in Figure 2.

Figure 2: Insulation to avoid galvanic corrosion.

6.13.6. CONTRACTOR shall utilize tubing term-contractile materials (adhesive lined heat shrink tube) as a sealant form for ending, cable splices or bundling of cables (Figure 3). It shall create a barrier against water, moisture, dirt and other environmental contaminants.

Figure 3: Connections protection

6.13.7. In order to avoid extra efforts on the connection of the RF cable to the antenna, the use of a flexible RF tail shall be mandatory to make this connection (Figures 4 and 5).

Figure 4: RF flexible tail

Figure 5: RF cable and RF flexible tail connection

6.14 Aeronautical Radios Communications System

6.14.1. The VHF-AM frequency (Brazilian / SMA COM): 118,000 to 136,975 MHz.

6.14.2. Maximum channel spacing of 25 kHz.

6.14.3. The effective radiated power shall be such as to provide a field strength of, at least, 75 microvolts per meter (minus 109 dBW/m^2).

6.14.4. The VHF/AM-SMA shall ensure communication between the FPSO and the helicopter, up to, at least, 25 (twenty five) nautical miles away.

6.14.5. The VHF-AM system, in normal operational conditions, will be the following polar graph:

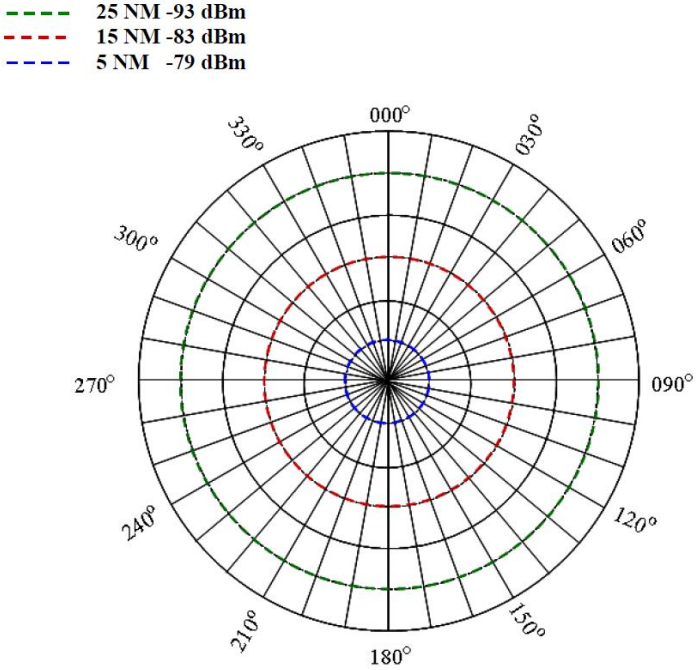

Figure 6: Polar Graph

6.15 Helideck Video Monitoring

6.15.1. For technical specifications requirements and details see document I-ET-3010.00-5514-76A-PPT-001 – HULL CCTV SYSTEM.

6.16 Voice Radio Communication and Helideck Video Recorder System.

6.16.1. For technical specifications requirements and details see document I-ET-3010.00-5514-76A-PPT-001 – HULL CCTV SYSTEM.

6.17 Helideck Monitoring System (HMS)

6.17.1. The HMS shall be designed on Modular System architecture and it shall be utilized multiple sensors for following parameters measurement:

a. Motions (Heave, pitch, roll);
b. Wind speed and direction;
c. Air temperature;
d. Humidity;
e. Dew point;
f. Barometric pressure;

6.17.2. The HMS shall display, at least, all listed below relevant values:

6.17.2.1. Motion parameters:

a. Heave, pitch, roll, surge, sway, yaw;
b. Heave rate, acceleration and period;
c. Helideck inclination;
d. Motion and wind severity;

6.17.2.2. Meteorological:

a. Barometric pressure;
b. Wind speed and direction;
c. Air temperature, dew point and relative humidity;

6.17.3. Advanced features in the HMS include:

a. Logging capability;
b. Electronic transmission of data using TCP/IP;
c. Live vessel data available;
d. Check and verification module and procedures;
e. Real-time presentation of roll, pitch, heave amplitude and heave rate;
f. Meteorological data acquisition and presentation available;

g. Desire possibility to redundant air pressure sensors;

h. Output of motion and meteorological data on serial line or ethernet.

6.17.4. Radio room monitor

a. It shall be foreseen 01 (one) monitor installed in the Radio Room to display all movements data and meteorological data from HMS system.

6.17.5. Helideck Status Light

a. It shall be provided a helideck status light in order to signalize the helideck status for helicopters operation.

6.17.6. All technical specifications for the Environmental System and HMS - Helideck Monitoring System requirements are described in I-ET-3010.00-5521-931-PEA-001 – METOCEAN DATA ACQUISITION SYSTEM.

7. SCOPE OF SUPPLY

7.1 CONTRACTOR shall supply, install, test and commission the Air Traffic and Telecommunications Service Provider Stations – CAT “M” (ETEX - “M”), within the scope of the Contract and in accordance with this Technical Specification.

7.2 The ETEX - M shall be composed by:

a. Aeronautical Radios Communications System;

b. Helideck Video Monitoring (Not scope of this technical specification);

c. Voice Radio Communication and Helideck Video Recorder System (Not scope of this technical specification);

d. Helideck Monitoring System (HMS) (Not scope of this technical specification).

7.3 Aeronautical Radio Communications System

7.3.1. **Aeronautical VHF base stations**

7.3.1.1. For operation in the Aeronautical Mobile Service (SMA) attending to Brazilian and International legislations (ITU-T) it shall be supplied, installed and commissioned 02 (two) Fixed Transceiver VHF/AM-SMA.

7.3.1.2. The VHF/AM-SMA base stations foreseen to be installed in the Operational Radio Console shall be composed by the following devices:

a. 02 (two) Fixed Transceivers;

b. 02 (two) Microphones;

c. 02 (two) Loudspeaker;

d. 02 (two) Power Supply.

7.3.2. Technical Specifications

7.3.2.1. Each fixed transceiver shall comply with the following characteristics:

a. Technology: Totally "solid state";

b. Operation Frequency Range: From 118 to 137 MHz;

c. Frequency Stability: Better than 3 ppm;

d. Number of Channels: Minimum of 3 (three) channels with the following frequencies: 130.125 MHz, 131.275 MHz and 131.325 MHz;

e. Type of Emission: 6K80A3EJN;

f. Receiver Sensitivity: 2 μV for 10 dB SINAD;

g. RF Power Output: 50 WRMS;

h. Input RF impedance: 50 Ohm;

i. Minimum Spacing Channel: 25 KHz;

j. RF power reduction key in the transmission;

k. Protection against output overload and short-circuit;

l. Protection against antenna impedance mismatching;

m. Protection against overheating;

n. Audio compression in transmission;

o. RF connections type UHF/50 Ohm or type N/50 Ohm;

p. External loudspeaker and headphone output;

q. Internal power supply in 220 VAC (+ 15 %), 60 Hz;

r. Input in DC from the Battery Charger;

s. Protection against polarity inversion for the DC power supply;

t. Tx/Rx signaling;

u. Connector for microphone;

v. Audio output connection for audio recorder device;

w. Frequency change blocking functionality.

7.3.2.2. Microphone

a. Hand microphone with PTT key and support for fixation at the Operational Radio Console.

7.3.2.3. Loudspeaker

a. For installation at the Operational Radio Console.

7.3.2.4. RF Coaxial Cable

a. The coaxial cable shall be attended the following characteristics:

i. Maximum Attenuation (for VHF-SMA frequencies): 2.69 dB/100m;

ii. Minimum relative propagation velocity: 88%.

7.3.2.5. Antenna, with the following specs:

a. Fiberglass material;

b. Omni-directional antenna type coaxial dipole;

c. Vertical polarization;

d. 2.7 dBi for RF gain;

e. VSWR < 1.4:1;

f. RF impedance equal to 50 Ohms.

7.3.2.6. External power supply

a. If the transceiver does not have an internal DC power supply and have a single DC input, the Supplier shall provide a power supply in 220 VAC (+ 15 %), 60 Hz. In this case, the power supply shall switch to an external DC voltage to feed the transceiver in case of failure in AC voltage.

b. For Power Supply technical requirements, CONTRACTOR shall consider, as a guideline, all standard documents listed below:

i. “Harmonization of GMDSS requirements for radio installations on board SOLAS ship”, issued by IMO;

ii. The chapter 9, Brazilian Maritime Regulation NORMAM-27, issued by DPC;

iii. The Brazilian Aeronautical Regulation ICA 63-10, issued by DECEA.

7.3.3. **Aeronautical VHF portable transceivers**

7.3.3.1. For operation in the Aeronautical Mobile Service (VHF/AM-SMA), according to Brazilian and International Legislation (ITU-T), it shall be supplied 02 (two) VHF/AM-SMA PORTABLE TRANSCEIVERS comply with the following specifications:

a. Technology: Synthesized-PLL;

b. Frequency Range: From 118 to 137 MHz;

c. Number of Channels: Up to 16 ITU;

d. Frequencies programming: Preferably via software;

e. Type of Emission: 6K80A3EJN (AM);

f. RF Power output: 5 WRMS;

g. Protection against overheating;

h. Audio compression in transmission;

i. Minimum Spacing Channel: 25KHz ;

j. Internal loudspeaker and headphone output;

k. Channel selector;

l. Volume control;

m. Tx/Rx signaling;

n. Hands-free operation.

7.3.3.2. For each portable transceiver it shall be supplied the following accessories:

a. 02 (two) batteries (Lithium or Nickel Cadmium type), sealed, rechargeable, for a minimum autonomy time of 06 (six) hours;

b. 02 (two) single battery charger;

c. 02 (two) hand microphone with PTT key and built-in loudspeaker;

d. 02 (two) noise canceling radio headset microphone with hands PTT button and cable and connector;

e. 01 (one) telescopic or flexible vertical antenna type;

f. 01 (one) leather carrying kit with shoulder belt and belt fitting;

g. Audio plug adapters if necessary.

7.3.3.3. The single chargers for VHF aeronautical portable radios shall be installed in the following locations:

a. 01 at Reception/Briefing, for ALPH;

b. 01 at Safety Office.

c. 02 as spare ones.

7.3.4. **Programming kit**

7.3.4.1. CONTRACTOR shall supply 01 (one) kit with hardware accessories, with cables, and software with licenses for programming the fixed and portable transceivers.

7.4 Helideck Monitoring System (HMS)

7.4.1. This system is part of the METOCEAN system, specified in the document in I-ET-3010.00-5521-931-PEA-001– METOCEAN DATA ACQUISITION SYSTEM, and shall be foreseen the installation of 01 (one) monitor inside the radio room close to the operation radio console.

7.5 Helideck CCTV cameras

7.5.1. It shall be installed cameras to monitor the helideck operations and foreseen one CCTV monitor in the radio room. For this technical specification requirements see the document I-ET-3010.00-5514-76A-PPT-001– HULL CCTV SYSTEM.

7.5.2. The Figure 7 shows the helideck area to be monitored (approach, landing, take off and departure).

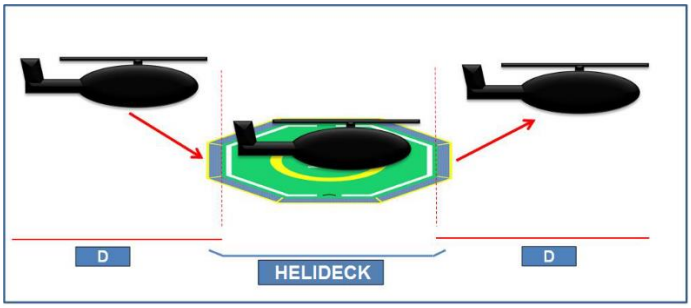

Figure 7: The helideck area to be monitored by CCTV cameras

8. COMMISSIONING

8.1 CONTRACTOR shall be responsible to realize a technical commissioning activity, check, test and evaluate the operation of equipment, panels, installations, protections and RF covering, in order to permit or authorize their use under normal operating conditions.

8.2 The following verifications, at least, shall be verified as scope of commissioning activities in accordance with Contract and this Technical Specification.

a. Check hardware and network environments;

b. Basic commissioning: after checking the physical environment of the products, check whether, the basic information such as software system, license, and system time is correct, ensuring that the system is running properly;

c. After checking physical environments, check basic information for accuracy. The basic information includes the software system, licenses, and system time. This ensures that the local equipment works properly and suits interconnection commissioning;

d. Device check: Check devices to ensure that the device status meet deployment requirements and prepare for access commissioning and basic service commissioning;

e. Check and record values of VSWR, return loss and distance to fail obtained from properly calibrated Anritsu Cell Master Tool or similar for each device installed.

f. HMS display: configure all meteorological and HMS sensors and DADAS software so that the information can be displayed on dedicate monitor in Radio Room.

g. CCTV image: configure HULL CCTV System so that helideck dedicated camera can display its image on a dedicated monitor in Radio Room.

h. Audio and video recording: configure audio and video server recording software so that audio and video can be recorded and retrieved.

8.3 PETROBRAS shall realize a visual inspection to check the presence of all items listed on the detailed design and fill in the configurations and handbooks:

a. Equipment configurations;
b. Antennas systems;
c. Antennas cables;
d. Lightning protection;
e. Masts, towers (stays, painting, lightning, …);
f. Wiring, security devices, frames, panels, racks, receivers, energy, software implantation;
g. Handbooks;
h. Marking (Equipment Homologation and Operation Certificate);
i. Technical and legal documentation.

8.4 As a matter of acceptance, it is expected radio equipment configured and locked with final allowed frequency and other parameters to operate in site operation and tested between them and with mobile radios and tested with helicopter.

9. LEGALIZATION REQUIREMENTS

9.1 All radios equipment shall be homologated by ANATEL (Brazilian Government Authority) for SMA operation as per Resolution n° 715/2019 - Aprova o Regulamento de Avaliação da Conformidade e de Homologação de Produtos para Telecomunicações.

9.2 CONTRACTOR shall provide to PETROBRAS all documents and forms required to legalize the ETEX-M System to be installed in the PETROBRAS FPSO Unit, subject of this technical specification, including the payment of the ART (technical responsibility term) to CREA.

9.3 CONTRACTOR shall be responsible to provide the “Formulário Simplificado para Licenciamento – ANATEL” and “Formulário ANATEL 165”, as well as the station and frequency forms, and all other documents necessary for the legalization of stations and frequencies with ANATEL, in compliance with applicable telecommunications law.

9.4 CONTRACTOR shall be responsible to issue all documents required by Brazilian Air Force department in order to issue the DCI (Declaração de Conformidade Inicial/Declaration of Initial Conformity).

9.5 PETROBRAS shall receive the documents mentioned above at least, 200 days before the unit leaves the shipyard.

9.6 CONTRACTOR shall provide the requested signed report of ANATEL resolution number 700 about Evaluation of Human Exposure to Electric, Magnetic and Electromagnetic Fields Associated with the Operation of Radiocommunication Transmitting Stations.

10. SHUTDOWN TELECOMMUNICATIONS SYSTEM

10.1 To meet the requirements of IEC 60079-0 and CENELEC CLC / TR 50427, CONTRACTOR shall provide a shutdown telecommunication system to avoid ignition risks when flammable gases leak is detected in the antenna deck/top roof.

10.2 The aeronautical VHF base station radios shall be turned off when fire and gas panel detects flammable gases in the antenna deck/top roof.

10.3 This automation can be done in the electrical panel or inside the radio operation console.