



WORKING PAPER

**FIRST UNASSIGNED HIGH SEAS AIRSPACE SPECIAL
COORDINATION MEETING (SCM/1)**

Lima, Peru, 22 to 24 July 2019

- Agenda Item 3: Determination of services and facilities**
3a. Airspace user outline
3b. Potential solutions

AIR NAVIGATION SERVICES IN UNASSIGNED HIGH SEAS AIRSPACE

(Presented by Peru)

SUMMARY

This working paper presents information on the current CNS/ATM capability of Peru, as well as future plans for a potential provision of air traffic, alert and SAR services in the unassigned high seas airspace named NO FIR.

References

- Report of the Ninth workshop/meeting of the SAM Implementation Group (SAM/IG/22) Lima, Peru, 22–26 May 2017.
- ICAO letter LT 2/3A.52-SA402 to the civil aviation authority of Peru (DGAC).
- DGAC Peru letter N° 590-2017-MTC/12.04 to ICAO.

1. Background

1.1 Peru, as a signatory of the Chicago Convention since 1944, administers all civil aviation activities within its area of responsibility, based on the standards and recommended practices established in the Annexes to said Convention, and in compliance with the commitments acquired.

1.2 The Peruvian Civil Aviation Law, No. 27261, establishes that the civil aviation authority is exercised by the General Directorate of Civil Aviation - DGAC, as a specialised unit of the Ministry of Transport and Communications, with the technical, administrative and financial autonomy necessary for the fulfilment of the functions defined by the Law and its regulations.

1.3 According to the aforementioned Law, the General Directorate of Civil Aviation is qualified to establish, administer, operate and maintain navigation aid, aeronautical radio communication, and air traffic control services, and may delegate these activities to another State-owned entity.

1.4 Pursuant to the Law, through express delegation, the General Directorate of Civil Aviation has delegated the provision of air navigation services to the *Corporación Peruana de Aeropuertos y Aviación Comercial* - CORPAC S.A.

1.5 Likewise, Civil Aviation Law No. 27261, Article 150, and its Regulation, Article 296, stipulate that the Ministry of Defence, through the Peruvian Air Force, is the body responsible for organising and directing actions aimed at locating aircraft and rescuing crew members and passengers.

1.6 Annex 11 to the Chicago Convention defines the flight information region (FIR) as the airspace of defined dimensions within which flight information and alert services are provided. **Attachment 1** presents the current configuration of the FIRs in the CAR, NAM and SAM Regions.

1.7 Furthermore, the foreword of Annex 11 states that the standards and recommended practices contained in said Annex apply to those parts of the airspace under the jurisdiction of a contracting State wherein air traffic services are provided, and also in those cases in which a contracting State accepts the responsibility of providing air traffic services over the high seas or in airspace of undetermined sovereignty. A contracting State accepting such responsibility may apply the standards and recommended practices in a manner consistent with that adopted for airspace under its jurisdiction.

1.8 Also, paragraph 2.5.2 establishes that the designation of particular portions of the airspace or particular aerodromes shall be as follows:

2.5.2.1 Flight information regions. Those portions of the airspace where it is determined that flight information service and alerting service will be provided shall be designated as flight information regions.

With regard to the establishment and designation of units providing air traffic services, Annex 11, paragraph 2.10, indicates that air traffic services shall be provided by units established and designated as follows:

2.10.1 Flight information centres shall be established to provide flight information service and alerting service within flight information regions, unless the responsibility of providing such services within a flight information region is assigned to an air traffic control unit having adequate facilities for the discharge of such responsibility.

1.9 Based on the above, the unassigned high seas airspace may be designated as a FIR within which the Peruvian State undertakes to provide the flight information and alert service. **Attachment 2** presents the requirements established in Annex 11 for the provision of the following services: Chapter 4 - Flight information service, Chapter 5 - Alerting service, and Chapter 6 - Air traffic services requirements for communications, paragraphs 6.2.2 and 6.2.3.

1.10 The Peruvian aeronautical system in the air navigation field consists of the Directorate General of Civil Aviation - DGAC in its capacity as aviation authority, and CORPAC S.A. as the air navigation services provider delegated by the State.

1.11 This separation between authority and provider permits independent safety oversight of all air navigation areas operated by CORPAC S.A., *i.e.* the provision of air traffic services, communications, navigation and surveillance systems, aeronautical information services and meteorological products.

1.12 Likewise, the organisation in charge of providing search and rescue services in the Lima FIR is the Peruvian Air Force (FAP) Command of Operations, which, through its Aeronautical Search and Rescue Coordination Centre (RCC SAR FAP) and five aeronautical rescue sub-centres (SCSA), plans,

coordinates and directs the actions of FAP personnel and of those that collaborate in SAR operations (army, national police, maritime search and rescue service, civil aviation and other State and private organisations). The DGAC is the entity in charge of monitoring compliance with Annex 12 standards contained in national regulation RAP 312, with periodic inspections of national SAR services centre and sub-centres.

2. Discussion

Aeronautical communication and ATS surveillance services

2.1 CORPAC is the air navigation service provider of air traffic services, aeronautical telecommunications services, aeronautical information services and aeronautical meteorological services.

2.2 Pursuant to Annex 11 to the Chicago Convention, Peru has established the Lima FIR, where CORPAC, through its ATS unit, provides flight information and alert services within the parameters established in the aforementioned Annex.

2.3 To this end, it has HF and VHF communications, satellite stations, national and international VSAT networks, which guarantee bidirectional communications between the Lima Area Control Centre (ACC) and aircraft in the Lima FIR, as well as between the Lima ACC and the ACCs of adjacent States.

2.4 At present, CORPAC is implementing the surveillance service through ADS-C and CPDLC, conducting tests with actual traffic of international commercial aircraft equipped with FANS avionics provided by an international air-ground data link service provider in the oceanic area of the Lima FIR. These tests continue and a contract is to be signed for the implementation of the service this year.

2.5 The aeronautical meteorological service is also under the responsibility of CORPAC, which has one Meteorological Watch Office in Lima (MWO SPIM) that prepares SIGMETs and volcanic ash advisories, and conducts surveillance of adverse meteorological phenomena for en-route aviation, identifying their location and evolution. To provide these services, the MWO SPIM has satellite imagery systems, a graphic SIGMET tool, and coordinates procedures with the Buenos Aires VAAC in the event of volcanic ash suspended in the atmosphere. In order to have an appropriate meteorological service oriented to air traffic services, a letter of agreement was signed between the two services.

2.6 All of these services are provided in compliance with the provisions of ICAO Annex 3 – Aeronautical Meteorology.

2.7 **Attachment 3** describes the equipment and capacity available to CORPAC to guarantee the provision of the services under its responsibility.

Aeronautical search and rescue services

2.8 Peru has officially incorporated the text of ICAO Annex 12 – Search and Rescue, in its national regulation RAP 312 – Search and rescue, and is signatory to the Multilateral Agreement on Search and Rescue, signed in Lima, on 16 May 1973.

2.9 Civil Aviation Law No. 27261 of 10 May 2000, Article 150, and its Regulation of 26 December 2001, Article 296, stipulates that the Ministry of Defence, through the Peruvian Air Force, is the entity in charge of organising and directing the actions aimed at locating aircraft and assisting crew members and passengers.

2.10 Legislative Decree No. 1139, Law of the Peruvian Air Force, establishes that this armed institution leads air power activities and participates in airspace endeavours, in the economic and social development of the country, in the execution of civic and social support actions in coordination with public entities, and in civil defence activities.

2.11 The Regulation of the aforementioned Law, approved through Supreme Decree N° 017-2014-DE of 24 December 2014, specifies that the Command of Operations manages the Peruvian Air Force System of Operations and supervises the subsystems and processes in its area of competence.

2.12 The National Aeronautical Search and Rescue Plan (SAR National Plan) establishes that SAR operations will be conducted throughout the Lima FIR Search and Rescue Region (SRR), under the centralized control of the Aeronautical Rescue Coordination Centre (RCC SAR-FAP), located in the FAP Command of Operations (COMOP), and will be executed in a decentralised manner under the responsibility of the aeronautical rescue sub-centres (SCSA) under the responsibility of Air Force groups. The plan was drafted taking into account the standards and recommended practices contained in Annex 12 and the International Aeronautical and Maritime Search and Rescue (IAMSAR) manual.

2.13 The National SAR Plan states that the Aeronautical Rescue Coordinating Centre (RCC SAR-FAP), the Aeronautical Rescue Sub-Centres (SCSA) and the Search and Rescue Units (USR) of the Peruvian Air Force constitute "executing agencies". The RCC SAR-FAP, located in the Command of Operations of said armed institution, is in charge of promoting the efficient organisation of SAR services and coordinating the conduction of SAR operations in the Lima FIR. The area of responsibility of the RCC SAR-FAP is divided into five (05) SCSAs, which are under the responsibility of the General Commanders of the Air Force Groups, distributed as follows:

SUB-CENTRES	AIR GROUP	HEAEQUARTERS
SCSA1	Air Group N° 1	Piura
SCSA2	Air Group N° 2	Callao
SCSA3	Air Group N° 3	Arequipa
SCSA4	Air Group N° 4	Pucallpa
SCSA5	Air Group N° 5	Iquitos

2.14 The National SAR Plan states that "supporting bodies" include the Ministry of Health, the Peruvian army, the Peruvian navy, the Peruvian national police, DGAC, CORPAC, the Peruvian general voluntary fire brigade, the National Institute of Civil Defence (INDECI), the social health insurance (EsSalud), the National Society of Mining, Oil and Energy (SNMPE), and civil aviation companies.

2.15 The National Plan on Search and Rescue Coordination, approved by Supreme Resolution No. 071-DE/MGP of 12 February 1998, regulates the operation of the National Search and Rescue Coordination Committee, through which Peru acts to safeguard people's lives in the event of maritime, air and land accidents, as well as in the event of disasters, and is made up by the ministries of Foreign Affairs, Defence, Health and Transport and Communications, and INDECI.

2.16 The National SAR Coordination Plan establishes that the Peruvian Air Force's Command of Operations is responsible for the aeronautical search and rescue service. It also defines the agencies responsible for the integration of efforts and coordinated search and rescue operations at the national level.

2.17 Peru is associated to the International COSPAS-SARSAT programme as provider of the land segment, which is managed by the MGP's General Directorate of Captaincy and Coast Guard (DICAPI) and is integrated into the FAP aeronautical search and rescue system.

2.18 **Attachment 4** to this working paper describes SAR equipment and capabilities to guarantee the services for which it is responsible.

Maritime search and rescue services

2.19 Decree Law No. 17824 of 23 September 1969, which created the corps of captaincy and coast guard; Legislative Decree No. 1147, which regulates capacity building of the armed forces in the competencies of the national maritime authority - General Directorate of Captaincy and Coast Guard; and the Peruvian navy law, approved through Legislative Decree No. 1138 of 9 December 2012, establish that the national maritime authority is tasked with ensuring safety and protecting human life in the maritime environment in accordance with applicable national regulations and international instruments to which Peru is a party.

2.20 The regulations of Legislative Decree No. 1147 approved by Supreme Decree No. 015-2014-DE of 26 November 2014, establish that the national maritime authority is responsible for conducting search and rescue operations for individuals in danger in the maritime environment.

2.21 Similarly, the International Convention on Safety of Life at Sea (SOLAS-74), ratified by Peru through Supreme Decree No. 339-81 of 17 November 1981; Legislative Resolution No. 24820 of 25 May 1988; and the International Convention on Maritime Search and Rescue (SAR-79), define responsibilities for the provision of assistance to persons in distress at sea and the adoption of measures to be taken by any coastal State for coastal oversight and the provision of search and rescue services.

2.22 With Directorial Resolution N° 664-2016 MGP/DGCG of 16 May 2016, the General Directorate of Captaincy and Coast Guard - national maritime authority, approved the National Plan for Maritime, Fluvial and Lacustrine Search and Rescue (DICAPI N° 010-2016 dated 16 May 2016). It establishes the search and rescue (SAR) system under the jurisdiction of the maritime authority, from the moment an emergency alert is received, through the use of available and organised SAR personnel and resources, with the purpose of locating and providing the corresponding assistance in a timely manner to individuals in danger, avoiding or reducing the loss of human lives that any disaster or accident may cause.

2.23 The maritime SAR area of responsibility extends from the Peruvian coast up to meridian 120° W, and borders the SAR areas of responsibility of Ecuador, United States, France (Papeete) and Chile, in accordance with the areas declared in the module of the International Maritime Organization Integrated Global Maritime Information System (GISIS).

2.24 In this respect, the General Directorate of Captaincy and Coast Guard, in order to meet its commitments with the International Maritime Organization concerning maritime search and rescue operations, has established the Peruvian Mission Control Centre (PEMCC), which covers the assigned SAR area up to meridian 120° W using high-tech tools, such as the COSPAS-SARSAT International Satellite Search and Rescue System Programme, which works with the GEO and LEO constellations; the Position Information System (SHIPREP); the Water Traffic Information and Monitoring System (SIMTRAC); and the Maritime Mobile Service belonging to the Global Maritime Distress and Safety System (SMSSM).

2.25 The PEMCC has five (5) rescue coordination centres (RCC) under the chiefs of captaincy districts, of which three (3) are in the maritime field and two (2) in the riverine field. There are also nineteen (19) search and rescue coordination sub-centres under the responsibility of the General Directorate of Captaincy and Coast Guard port captaincies, along the entire coast and the fluvial and lacustrine areas.

2.26 **Attachment 5** to this working paper presents the equipment and capabilities used by the maritime SAR service to ensure the provision of the services under its responsibility.

3. **Conclusion**

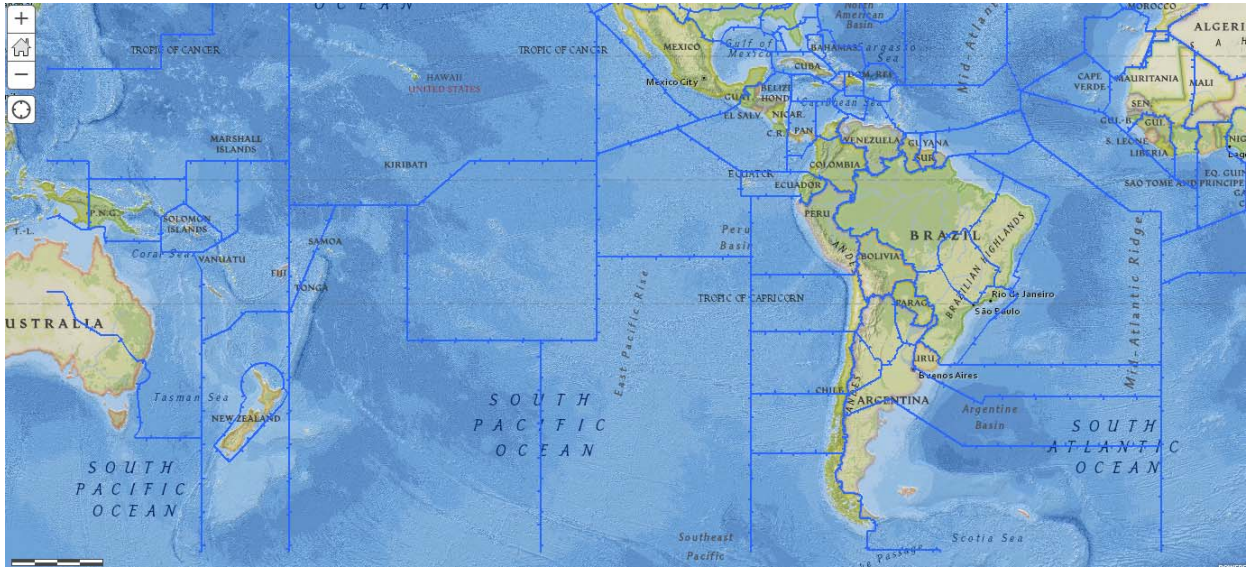
3.1 The foregoing shows that:

- Peru has the capacity and infrastructure required to provide flight information and alert services to the unassigned high seas airspace called NO FIR, as required by Annex 11 to the Chicago Convention.
- Peru has the capacity and infrastructure required to provide air search and rescue services to the unassigned high seas airspace called NO FIR, as required by Annex 12 to the Chicago Convention.
- Currently, the area of maritime search and rescue responsibility of the maritime SAR service coincides with meridian 120 W of the NO FIR area.

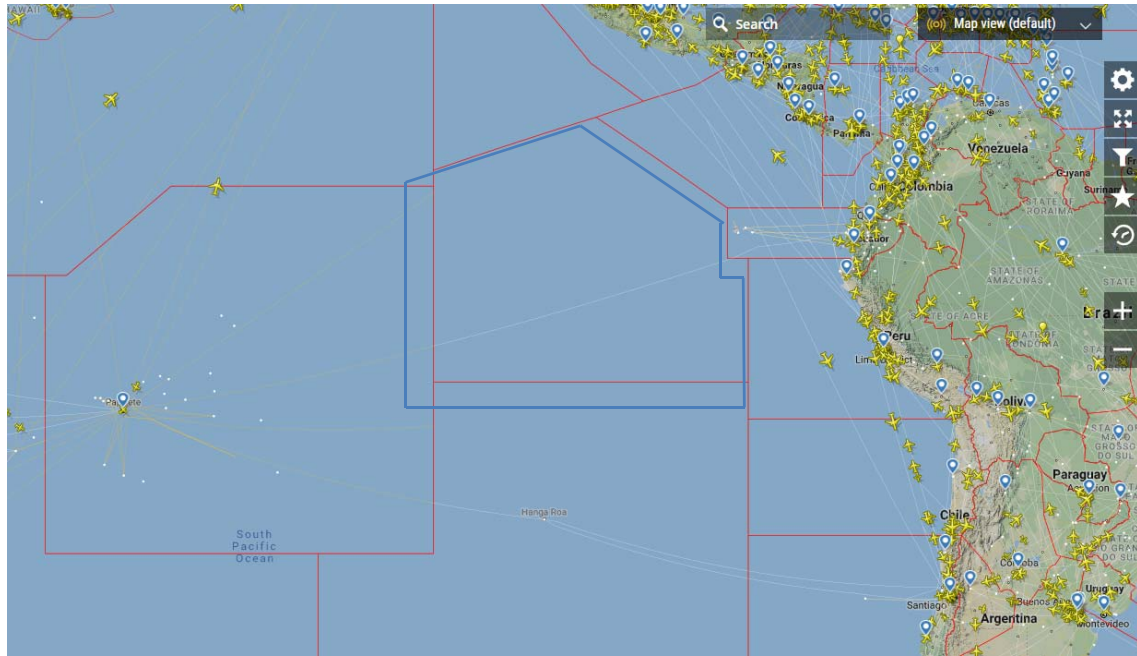
4. **Suggested action**

4.1 The Meeting is invited to consider the proposal made by Peru to provide air navigation services in unassigned high seas airspace known as NO FIR.

ATTACHMENT 1



LIMA FIR IN THE CAR/SAM REGION



UNASSIGNED HIGH SEAS AIRSPACE – NO FIR ZONE

ATTACHMENT 2

(ANNEX 11, CHAPTERS 4 TO 6)

CHAPTER 4. Flight information service

- 4.1 Application
- 4.2 Scope of flight information service
- 4.3 Operational flight information service broadcasts
- 4.4 VOLMET broadcasts and D-VOLMET service

CHAPTER 5. Alerting service

- 5.1 Application
- 5.2 Notification of rescue coordination centres
- 5.3 Use of communication facilities
- 5.4 Plotting aircraft in a state of emergency
- 5.5 Information to the operator
- 5.6 Information to aircraft operating in the vicinity of an aircraft in a state of emergency

CHAPTER 6. Air traffic services requirements for communications

- 6.1 Aeronautical mobile service (air-ground communications)
- 6.2 Aeronautical fixed service (ground-ground communications)
- 6.3 Surface movement control service
- 6.4 Aeronautical radio navigation service

ATTACHMENT 3

AIR NAVIGATION SERVICES PROVIDED BY THE STATE ANSP

The strategic vision of CORPAC S.A. is: "To be a leader in the management and provision of air navigation and airport services in South America" (2017-2021 Strategic Plan). It has been established as an institutional strategic action "*to extend the air traffic oversight service coverage of the Peruvian airspace*".

Currently, CORPAC S.A. has the following CNS/ATM capabilities:

LIMA ACC ATC CONTROL CENTRE. – Implemented in 2013 through the ICAO TCB Technical Cooperation Project. The Project included:

- 1 AIRCON 2100 Air Control Centre System
- 8 IRS-20MP/S Mode S Secondary Radar Stations
- 1 Primary Radar Station
- 1 GSS-20 ADS-B Station
- 1 SDC-2000 Voice Switching System
- 1 AIRCON 2100 Air Control Centre Simulator.

UPGRADING OF THE AIR CONTROL CENTRE. - In December 2017, the software and hardware were upgraded and training was provided to air traffic control personnel and CNS technical personnel. Technical support from the manufacturer is available. It includes the following ATM enhancements:

- ATS interfacility data communications (AIDC). Currently, the AIDC service is operational with the Guayaquil ACC and pre-operational with the Bogota and Iquique ACCs for transfer of control.
- Processing of ADS-B, ADS-C, WAM reports, external tracker.
- Improved dynamic adjustment of radars, which reduces error by taking into account all radars, rather than reducing radar pair errors.
- Controller/pilot data link communications (CPDLC).
- Improved path calculation, definition of multiple altitude restrictions in take-off/arrival and in exiting the FIR.
- New meteorological messages: ASHTAM, PIREP, AIREP, TC.
- Lateral route compliance tools based on PBN requirements.
- MTCO conflict trials before introducing XFL, CFL, GRM / DCT tactical orders.
- Improved STCA and MSAW conflict detection using CFL and ROCO
- Approach Monitoring Notice (APM), call sign, duplicate ADS-B/Mode S
- Mode S selected runway altitude alert
- ADS-C alerts (NIC, RIE, Emergency, quality).
- Arrival management (AMAN).
- Improved display in SDD, FDD, TFSD positions.

DIGITAL NETWORK INTERCONNECTING THE SAM REGION WITH THE CARIBBEAN/NORTH AMERICAN REGION (REDDIG- MEVA)

CORPAC S.A. participates in ICAO Regional Project RLA/03/901 - REDDIG Management System and Satellite Segment Administration.

Since 2003, the South American satellite digital network – REDDIG is operational, providing international connectivity to all South American States for ATS aeronautical communications: ATS speech channels, AMHS/AFTN messaging, radar data exchange, achieving better quality communications, availability and reliability between ACCs that provide aeronautical services to all FIRs.

REDDIG Nodes:

- 17 nodes
- 14 States
- 1 MEVA interconnection node (Tegucigalpa-COCESNA)
- 2 Master stations (Manaus & Ezeiza)



REDDIG II IS A DUAL (SATELLITE VSAT & GROUND) IP NATIVE NETWORK

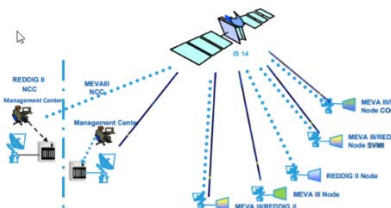
MEVA III: REGIONAL NETWORK



- 17 nodes
- 19 States/Territories
- 2 REDDIG interconnection nodes (Colombia and Venezuela)
- 2 Master stations (Atlanta & Miami)



MEVA III-REDDIG II NETWORK INTERCONNECTION OVERVIEW



- MEVA-REDDIG interconnection started its operation in 2010.
- Fully compliant with ICAO technical considerations to support air navigation services.

Achieved a full CAR/SAM aviation telecommunication service.

ACC INTERCONNECTED TO THE OTHER ADJACENT ACCs OF THE REGION

REDDIG provides international connectivity to all South American States for ATS aeronautical communications, AMHS/AFTN messaging and radar data exchange between area control centres (ACCs).



PERUVIAN AERONAUTICAL SATELLITE NETWORK (RESAP)

CORPAC S.A. has been updating an investment project called VSAT Satellite Communications, consisting of a network of 40 satellite stations at aerodromes and remote CNS stations for the exclusive use of CORPAC aeronautical telecommunications among ATS units, COM/MET/AIS offices and air-ground VHF radio communication repeaters. It includes integration of the existing 8-node VSAT-Radar satellite network.

Note: Through ICAO TCB Regional Project PER/08/802, CORPAC S.A. implemented a network of 8 SSR secondary radar stations, 1 primary radar (INFO) and a VSAT-Radar satellite communication network.

The existing VSAT-Radar satellite network has been operating since 2014, offering national connectivity to the Lima ACC in order to obtain: radar surveillance data, air-ground VHF en route communications, AMHS aeronautical messaging, ATS speech communications, and remote maintenance, control and management communications.



AIR-GROUND DATA LINK FOR ADS-C SURVEILLANCE AND CPDLC COMMUNICATIONS

For the provision of ADS-C surveillance services and CPDLC data communications, CORPAC S.A. plans to hire air-ground aeronautical data link services, with properly equipped aircraft, with coverage of the entire Lima FIR airspace, with capacity to expand air navigation services to unassigned high seas airspace (NO-FIR).

To this end, CORPAC S.A. initiated in 2018 administrative procedures and the formulation of terms of reference for hiring the "Air-Ground Data Link Service for ADS-C and CPDLC Systems of the Area Control Centre", for an initial period of 34 months.

After conducting a market study, it was established that an international contract was required. This contract should be concluded by July 2019.

ADS-B-SATELLITE SURVEILLANCE

In addition to the implementation of ADS-C and in anticipation of the use of new technology, in February 2018 AIREON LLC sent CORPAC S.A. a draft Memorandum of Understanding (MoU) for the establishment of a technical cooperation relationship to study and analyse the technical-operational characteristics and potential benefits of the satellite ADS-B surveillance service in Peruvian airspace, as well as for the assessment of integration (merger) of this ADS-B surveillance information into the data processing system of the Air Traffic Control Centre.

Subsequently, a cost-benefit analysis should be carried out to extend the coverage of the air traffic surveillance service in Peruvian airspace through space based ADS-B.

ATTACHMENT 4

AIR SEARCH AND RESCUE SERVICE

To carry out this type of mission, the State has an L-100-20 (Hercules) and C-27J (Spartan) aircraft for the identification of resources, technical and logistic capabilities of both aircraft for SAR operations in unassigned high seas airspace (NO FIR zone), and to carry out the following planning:

- a.- range of both aircraft in the FIR area of responsibility (meridian 90°W and 68° 50'W) Annex “A”.

The means available (L-100-20 / C-27J aircraft) enable 100% coverage of the FIR area of responsibility.

AERONAVES	CONFIG	ALCANCE SAR		ALCANCE TOTAL (*)	TIEMPO DE VUELO TOTAL	TIEMPO PATRÓN DE BÚSQUEDA
		IDA	VUELTA			
HÉRCULES L-100-20	CON TQS AUX.	1,269 MN	1,269 MN	2,538 MN	11.4 HRS	1.0 HORA
	SIN TQS AUX.	810 MN	810 MN	1,620 MN	8.0 HRS	1.0 HORA
SPARTAN C-27J	SIN TQS AUX.	978 MN	978 MN	1,956 MN	9.0 HRS	1.0 HORA

(*) Total scope, calculating one hour of SAR operations, plus another hour of remaining fuel to land at Trujillo (SPRU) and Pisco (SPSO), alternate aerodromes for Jorge Chavez International Airport.

- b.- Range of both aircraft (Hercules and Spartan) in the unassigned high seas airspace (NO FIR zone) (M 90°W and 120°W)

The unassigned high seas airspace (NO FIR zone) covers an area in the Pacific Ocean starting at 750 NM, covering 2'700,000 NM². In this sense, the L-100-20 and C-27J aircraft can cover the area from meridian 90°W to the NO FIR zone, according to the following:

- 1) Departure from Jorge Chavez International Airport (SPJC) Annex “A”

AEROPUERTO INTERNACIONAL JORGE CHAVEZ (SPJC) A LA ZONA NO FIR						
AERONAVES	CONFIG	ZONA NO FIR		ALCANCE TOTAL	TIEMPO DE VUELO DENTRO DE NO FIR	TIEMPO PATRÓN DE BÚSQUEDA
		INGRESO	SALIDA			
HÉRCULES L-100-20	CON TQS AUX.	519 NM	519 NM	2,538 NM (*)	3.8 HRS	1.0 HORA
	SIN TQS AUX.	60 NM	60 NM	1,620 NM (**)	0.4 HRS	1.0 HORA
SPARTAN C-27J	SIN TQS AUX.	228 NM	228 NM	1,956 NM (***)	1.6 HRS	1.0 HORA

- a) (*) Total range of the L-100-20 aircraft with auxiliary tanks, from Jorge Chavez International Airport (SPJC), travelling 750 NM (Lima FIR), entering the unassigned high seas airspace (NO FIR zone) up to a maximum distance of 519 NM, plus the return flight, making a total of 2,538 NM.
- b) (**) Total range of the L-100-20 aircraft without auxiliary tanks, from Jorge Chavez International Airport (SPJC), travelling 750 NM (Lima FIR), entering the unassigned high seas airspace (NO FIR zone) up to a maximum distance of 60 NM, plus the return flight, making a total of 1,620 NM.
- c) (***) Total range of the C-27J aircraft, from Jorge Chavez International Airport (SPJC), travelling 750 NM (Lima FIR), entering the unassigned high seas airspace (NO FIR zone) up to a maximum distance of 228 NM, plus the return flight, making a total of 1,956 NM.

2) Departure from the FAP El Pato Air Base– Talara (SPTP) Annex “B”

The aircraft must go from Jorge Chavez International Airport (SPJC) to the FAP El Pato Air Base - Talara (SPTP), from where they will begin their journey to the unassigned high seas airspace (NO FIR zone).

BASE AEREA FAP EL PATO – TALARA (SPTP) A LA ZONA NO FIR						
AERONAVES	CONFIG	ZONA NO FIR		ALCANCE TOTAL	TIEMPO DE VUELO DENTRO DE NO FIR	TIEMPO PATRÓN DE BÚSQUEDA
		INGRESO	SALIDA			
HÉRCULES L-100-20	CON TQS AUX.	749 NM	749 NM	2,538 NM (*)	5.8 HRS	1.0 HORA
	SIN TQS AUX.	290 NM	290 NM	1,620 NM (**)	2.1 HRS	1.0 HORA
SPARTAN C-27J	SIN TQS AUX.	458 NM	458 NM	1,956 NM (***)	3.3 HRS	1.0 HORA

- a) (*) Total range of the L-100-20 aircraft with auxiliary tanks, from FAP El Pato Air Base– Talara (SPTP), travelling 520 NM (Lima FIR), entering the unassigned high seas airspace (NO FIR zone) up to a maximum distance of 749 NM, plus the return flight, making a total of 2,538 NM.
- b) (**) Total range of the L-100-20 aircraft without auxiliary tanks, from FAP El Pato Air Base– Talara (SPTP), travelling 520 NM (Lima FIR), entering the unassigned high seas airspace (NO FIR zone) up to a maximum distance of 290 NM, plus the return flight, making a total of 1,620 NM.
- c) (***) Total range of the C-27J aircraft, from FAP El Pato Air Base– Talara (SPTP), travelling 520 NM (Lima FIR - SPIM), entering the unassigned high seas airspace (NO FIR zone) up to a maximum distance of 458 NM, plus the return flight, making a total of 1,956 NM.

3) Departure from Baltra I Galapagos Islands Airport, Ecuador (SEGS) Annex “C”

- a) The aircraft must go from Jorge Chavez International Airport (SPJC) to Baltra I Galapagos Islands Airport, Ecuador (SEGS), from where it will begin its journey to the unassigned high seas airspace (NO FIR zone) (considering whether a technical stopover at FAP El Pato Air Base– Talara (SPTP) is necessary).
- b) Consideration should be given to the time required for obtaining overflight permit from Ecuador entry to, and operation from, the Baltra I airport in Galapagos Islands, Ecuador (SEGS) to the unassigned high seas airspace (NO FIR zone).

SALIDA DESDE EL AEROPUERTO BALTRA I ISLAS GALAPAGOS – ECUADOR (SEGS)						
AERONAVES	CONFIG	ZONA NO FIR		ALCANCE TOTAL	TIEMPO DE VUELO DENTRO DE NO FIR	TIEMPO PATRÓN DE BÚSQUEDA
		INGRESO	SALIDA			
HÉRCULES L-100-20	CON TQS AUX.	1,164 NM	1164 NM	2,538 NM (*)	8.6 HRS	1.0 HORA
	SIN TQS AUX.	705 NM	705 NM	1,620 NM (**)	5.2 HRS	1.0 HORA
SPARTAN C-27J	SIN TQS AUX.	873 NM	873 NM	1,956 NM (***)	6.2 HRS	1.0 HORA

- (1) (*) Total range of the L-100-20 aircraft with auxiliary tanks, from Baltra I airport, in Galapagos Islands, Ecuador (SEGS), travelling 105 NM (Lima FIR), entering unassigned high seas airspace (NO FIR zone) up to a maximum distance of 1,164 NM, plus the return flight, making a total of 2,538 NM.
- (2) (**) Total range of the L-100-20 aircraft without auxiliary tanks, from Baltra I Galapagos Islands Airport, Ecuador (SEGS), travelling 105 NM (Lima FIR), entering the unassigned high seas airspace (NO FIR zone) up to a maximum distance of 705 NM, plus the return flight, making a total of 1,620 NM.
- (3) (***) Total range of the C-27J aircraft, from the Baltra I airport in Galapagos Islands, Ecuador (SEGS), travelling 105 NM (Lima FIR - SPIM), entering unassigned high seas airspace (NO FIR zone) up to a maximum distance of 873 NM, plus the return flight, making a total of 1,956 NM.

Note should be taken that the C-27J (Spartan) aircraft is equipped with a communications, navigation and identification system called Communication / Navigation / Identification - Management System (CNI-MS) that allows for efficient SAR operations, and which can be configured for up to four (4) types of search patterns. It also has the ability to release lifeboats to the sea through its rear ramp (capacity: 25 persons).

At present, the Peruvian *Grupo Aéreo* N° 8 has three (3) of these boats, as well as one (1) high frequency (HF) system for long-range communications from these lifeboats (land / sea / air). It should be noted that, in order to maximise the search and rescue effort, the following equipment will be purchased:

a.- L-100-20 Hercules aircraft

- 1) Two (2) external tank kits, one (1) kit per aircraft.

- 2) One (1) Search and Rescue Operation Planning piece of software, to be installed in the FAP 382 Hercules aircraft, which has Flight Management System (FMS).
- 3) One Air Drop System (ADS), necessary for launching cargo in order to provide an efficient response.
- 4) One (1) Direction Finder DF-500 unit, for receiving radio signal beacons (ELT or PLB).
- 5) Four (4) lifeboats (25 persons each).
- 6) Two (2) high frequency (HF) units for land / sea / air communications.

b.- C-27J Spartan aircraft

- 1) One (1) high frequency (HF) unit for long distance communications.
- 2) Two (2) lifeboats for 25 persons, for launching by ramp to the ocean.

In this regard, once the cargo is launched through the rear ramp of either the Spartan C-27J or Hercules L-100-20 aircraft (lifeboats, medicines, food, first aid kit, etc.), the Peruvian Air Force specialised rescue divers would be able to approach the site using the motor boat, stabilise the people to be rescued, and provide any medical attention as first response team. If so required, rescuers could also dive in search of survivors in the wreckage site; this aid is of utmost importance to preserve the lives of the survivors of a disaster, waiting for assistance and final rescue through larger vessels.

Based on the above, it can be concluded that the aforementioned aircraft are capable of partially covering the unassigned high seas airspace (NO FIR zone). There are plans to purchase the requested material in order to meet the requirements of Peru in a safe and efficient manner.

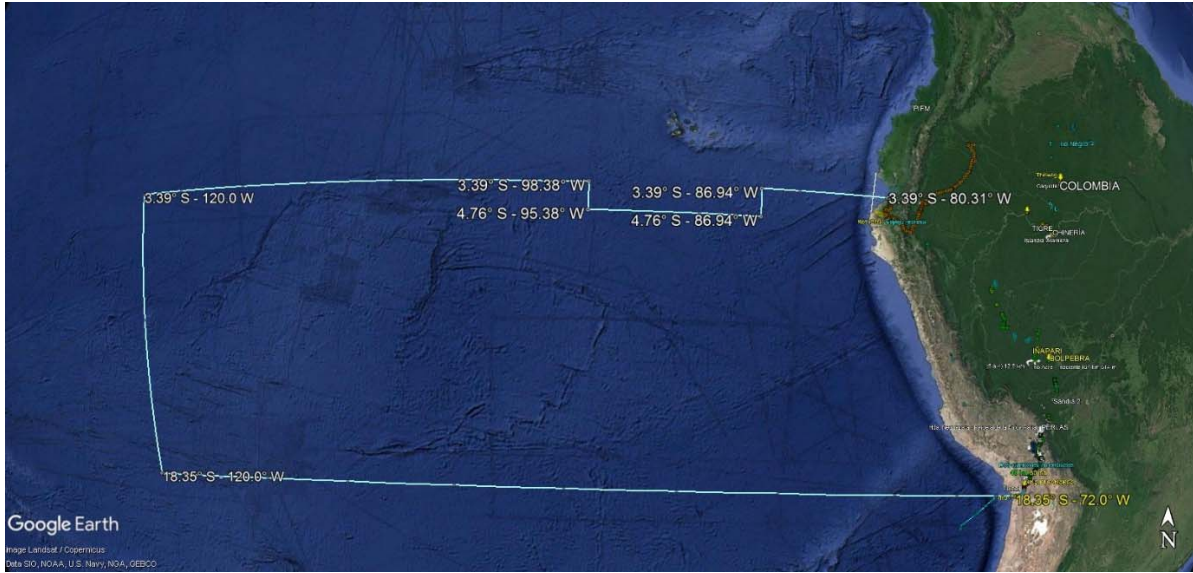
ATTACHMENT 5**MARITIME SEARCH AND RESCUE SERVICE**

In order to fulfil its SAR responsibilities under the area assigned to Peru, the State has the following:

- a. Ocean patrol boat, with a deck and hangar to transport one (1) SAR helicopter.
- b. 20-knot sea patrol boats, and two (2) 50-knot RIB motor boats.
- c. Coast patrol boats.
- d. Sliders.
- e. Nautical motorcycles.
- f. Ground vehicles.
- g. In addition, according to the National SAR Plan, the General Command of Operations in the Pacific Ocean of the Peruvian Navy will assign any ground or air equipment to the General Directorate of Captaincy and Coast Guard when longer-range units are required, thus providing full coverage to the Peruvian area of SAR responsibility.

Also, the following investment projects under the responsibility of the maritime authority are currently underway to optimise surveillance and SAR capacities.

INVESTMENT PROJECT	SCOPE OF THE PROJECT
Optimisation of capabilities to conduct surface coastguard and SAR operations in the area of responsibility.	Maritime patrol boats (10)
Establishment of maritime interdiction services in the maritime domain.	Interdiction patrol boats (24)
Improvement and extension of maritime traffic service at the port of Callao.	VTS Callao
Installation of a comprehensive electronic surveillance system for the area between the coast and mile 50 of the Peruvian maritime domain.	SIVE-50 (2) fixed surveillance stations and (2) mobile surveillance stations, COSPAS MEOSAR system
Expansion of the capacity to carry out surface coastguard operations with OPV patrol boats in the maritime domain and SAR area of responsibility.	Ocean patrol boats (3) OPV
Establishment of the maritime information centre for the Latin American region.	IFC
Improvement and expansion of search and rescue services of the national maritime authority in the district of Captaincy 3 (southern zone of Peru).	Four (4) maritime HMB-SAR surveillance helicopters



MARITIME FIR AREA

— END —