

**ENR 4. RADIO NAVIGATION AIDS / SYSTEMS****ENR 4.1 RADIO NAVIGATION AIDS -EN-ROUTE**

| <i>Name of Station<br/>(VOR/VAR)</i> | <i>ID</i> | <i>FREQ<br/>(CH)</i>   | <i>Hours of<br/>Operation</i> | <i>Coordinates</i>      | <i>ELEV<br/>DME<br/>antenna</i> | <i>Remarks</i>     |
|--------------------------------------|-----------|------------------------|-------------------------------|-------------------------|---------------------------------|--------------------|
| 1                                    | 2         | 3                      | 4                             | 5                       | 6                               | 7                  |
| VOR/DME<br>CARRASCO<br>➡ (12°W)      | CRR       | 116.9 MHZ<br>(CH 116X) | H24                           | 344957.8S<br>0560130.5W | 30 M                            | Coverage<br>100 NM |
| VOR/DME<br>DURAZNO<br>➡ (12°W)       | DUR       | 117.5 MHZ<br>(CH 122X) | H24                           | 332122.5S<br>0562945.8W | 90 M                            | Coverage<br>100 NM |
| VOR/DME<br>CURBELO<br>➡ (12°W)       | LDS       | 117.6 MHZ<br>(CH 123X) | H24                           | 345129.9S<br>0550530.2W | 30 M                            | Coverage<br>100 NM |

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**ENR 4.2 SPECIAL NAVIGATION SYSTEMS**

| <i>Name Of Station<br/>(ID) or chain</i> | <i>Type of SVC</i> | <i>Frequency</i>                           | <i>Hours of<br/>operation</i> | <i>Coordinates<br/>TRANS STN</i> | <i>Remarks</i>                                                                                   |
|------------------------------------------|--------------------|--------------------------------------------|-------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------|
| 1                                        | 2                  | 3                                          | 4                             | 5                                | 6                                                                                                |
| Global Positioning<br>System (GPS)       | Satellital         | L1 -<br>1575.42 MHZ<br>L2 -<br>1227.60 MHZ | H24                           | -                                | Use authorized as<br>✎ primary en-<br>✎ route navigation<br>✎ aid and within<br>oceanic airspace |

### ✈️ENR 4.2.1 GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS)

Global navigation satellite system (GNSS) is the generic name used by ICAO to define any overall range system to determine position and hour, which comprises one or more satellite constellation, onboard receivers and several integrity monitoring systems, including those appropriate augmentation devices to comply with the operational performance requirements.

#### **(GPS) Global Positioning System description**

##### a) Space segment

24 NAVSTAR satellites arranged in 6 orbital planes (four by plane) at 20,200 KM above the earth. Completing an orbit every 12 hours and are located so that a minimum of 4 satellites will be seen from a user anywhere in the world. Each satellite has high precision atomic clocks to synchronize messages, which are used by the onboard receivers to compute the distance to the user

##### b) Control segment

One Master Station, 5 monitoring stations and 3 antennas which monitor and control the satellite system

##### c) User segment

GPS onboard receiver. Knowing satellite positions, GPS could determine the exact location by measuring the delay that the signal takes to reach the receiver, converting that measure into distance. Four satellites measures will be required to obtain a 3 dimension (3D) navigation fix.

#### **ONBOARD RECEIVER**

##### a) For VFR use

Use limitations:

- 1.- If Receiver autonomous integrity monitoring (RAIM) is not available, it could not warn the pilot in case of a faulty satellite was sending erroneous signals;
- 2.- Inadequate antenna installation and absence of database unable to update itself could also disturb the proper signal reception; and
- 3.- Incorrect waypoints insertion also could cause navigation error.

These receptors have in their Operations Manual a Note:

### FOR VFR USE ONLY

and should not be used, under any circumstances, for IFR flights

#### b) For IFR use

Approved IFR receivers must comply with requirements detailed in Federal Aviation Administration (FAA) Technical Standard Order TSO C-129a (TECHNICAL STANDARD ORDER TSO C-129a AIRBORNE SUPPLEMENTAL NAVIGATION EQUIPMENT USING THE GLOBAL POSITIONING SYSTEM) of 20 FEB 96 and must be installed according to FAA AC-20-138 (AIRWORTHINESS APPROVAL OF GPS NAVIGATION EQUIPMENT FOR USE AS A VFR AND IFR SUPPLEMENTAL NAVIGATION SYSTEM) of 25 MAY 94.

These receivers has the (Receiver Autonomous Integrity Monitoring - RAIM) function. This function detect the failure of a GPS signal by comparing position information and time obtained from varied 4 satellite combinations, from a joint of at least 5 satellites in sight.

If a faulty satellite is detected, the receiver warns pilot that the system is not appropriate for navigational use, must switch to traditional navigation methods.

A minimum of 6 satellites must be in sight if RAIM function is desirable, after detection and faulty satellite deactivation from navigation solution.

### USE OF GPS WITHIN MONTEVIDEO FIR

1. Within República Oriental del Uruguay jurisdictional airspace, it is possible to use GPS as the **only primary aid** to navigation.

### OPERATIONAL REQUIREMENTS FOR GPS USE WITHIN URUGUAYAN OCEANIC AIRSPACE

- 1.1 For GPS use as primary navigation device within the República Oriental del Uruguay oceanic airspace, pilots must comply with the procedures and operation techniques described in the aircraft GPS IFR Receiver Manufacturer Operator Manual and with those described in N8110.60 / FAA.
- 1.2 Pilot in command should have the appropriate knowledge about:
  - a) Fundamentals of GPS navigation
    - i. Software use
    - ii. Hardware operations and GPS interfaces with other navigation systems
    - iii. Data base update procedures
    - iv. Equipment limitation
  - b) GPS operation
  - c) Before departure procedures
  - d) Enroute procedures
  - e) Emergency/contingency procedures

- 1.3 Uruguayan registered aircraft could use GPS as primary navigation device and, must have the airworthiness certificate issued by the competent authority.

## ✈ ONBOARD EQUIPMENT

### 1.4 ✈ GPS Double navigation system for oceanic flights.

In accordance with ICAO Annex 6 to the Convention on International Civil Aviation, Chapter 7 Communication Equipment and Onboard Navigation, paragraph 7.2.4 and to the Notice N8110.60 of F.A.A., point 4 paragraph f, Performance Requirements, the aircraft must be equipped with double GPS navigation system which must comply with technical specifications detailed in paragraph 5.2 of that AIC.

### 1.5 ✈ Technical specifications.

GPS navigation systems used over oceanic airspace flights must comply with technical requirements specified in FAA Technical Standard Order C-129a (Airborne Supplemental Navigation Equipment Using the GPS) of 20 FEB 96, with those contained in Notice N8110.6 of FAA (GPS as a Primary Means of Navigation for Oceanic/Remote Operations) of 4 DEC 96 and must have been installed in accordance with FAA Circular AC-20-130a (Airworthiness Approval of Navigation or Flight Management System Integrating Multiple Navigation Sensors) and/or to Circular AC 20-138 of FAA (Airworthiness Approval of GPS Navigation Equipment for Use as a VFR and IFR Supplemental Navigation System) of 25 MAY 94, as appropriate.

In addition, the aircraft must have the GPS navigation systems connected with FMS, or Auto Pilot, or Flight Director.

## ✈ REQUIRED GPS SATELLITE GEOMETRY

### 1.6 ✈ Overview

GPS navigation accuracy depends mostly of satellite geometry related with the receiver.

A minimum of four satellites simultaneously over horizon to obtain a three dimension fix (3-D).

RAIM technique could be used if five satellites are in a proper position range with the receiver, so five independent positions could be calculated. If the information compared between them does not fit, the receiver deduces that one satellite is giving incorrect information, and a warning light turns on the equipment panel (failure detection).

If there are six or more satellites in range, more positions could be calculated and receiver could identify exactly which satellite fails and exclude it from position calculations (failure exclusion).

From the foregoing it is clear that pilots should take into consideration that if there are only four satellites in view of receiver in case of any defective, such failure will not be reported by the receiver.

### 1.7 Procedures in case of GPS navigation failure

(Ref. Order 8400.10 of FAA Appendix 4 HBAT 95-09 "Guidelines for Operational Approval of GPS to Provide the Primary means of Class II Navigation in Oceanic and Remote Areas of Operation")

- a) Lost of navigation function (*four satellites in sight or less*)  
If GPS receiver indicates a lost of navigation warning, the pilot will use immediately dead reckoning navigation (D/R) until GPS navigation could be reestablished.
- b) Lost of RAIM (*five satellites in sight or less*)  
If GPS receiver indicates lost of RAIM, navigation integrity will be obtained by comparing GPS position with an extrapolated calculated position of last verified position against true airspeed, heading and estimated winds. If both positions do not fit within 10 NM, pilot will reassume immediately dead reckoning navigation (D/R) until the excluding function or navigation integrity reappear.
- c) Fault detection warning (*less of 6 satellites in sight*)  
If GPS receiver indicates a fault detection warning (faulty satellite), pilot could continue navigation by using positions obtained by GPS, if monitors continually the actual dead reckoning of position ambiguity which appears on GPS display and was obtained from Failure Detection and Exclusion algorithm (FDE). If that value exceed 10 NM or is not available, the pilot will immediately reassume dead reckoning navigation (D/R) until faulty satellite was excluded.  
In that three examples, if navigate with GPS is not possible, the pilot will report to ATC **"GPS navigation lost"** and when reassume GPS navigation **"GPS navigation reestablished"**

### FLIGHT PLAN

In the Flight Plan form blank 10 the letter "R" must be inserted. In blank 18 the following letters must be inserted NAV/GPS-RNAV when GPS IFR receivers are available for oceanic airspace flights.

### DEFINITIONS

- a) **Algorithm**  
Step by step procedure to solve problems.
- b) **Augmentation**  
Technique that provides the system with input data (input) in addition to those derived from the(s) principal(s) constellation(s) in a new service to provide distance information, or corrections or improvements in input data. This allows the system to improve performance in relation to that be obtained only with the basic information (raw data) from the satellites.
- c) **Continuity**  
The ability of the whole system to perform its function without interruption during the planned period of operation. The risk of continuity is the probability that the system is interrupted and not provides guidance information for the proposed operation

d)  **(Fault Detection and Exclusion - FDE)**

GPS equipment capability for:

1. Satellite failure detection which affects navigation, and
2. Possibility to exclude these satellite automatically from the navigation solution

e)  **Availability**

Percentage of time that services are usable navigation system.

f)  **Integrity**

Navigation system capability to send appropriate warnings to users when the system must not be used with navigation objectives.

g) **Airborne Autonomous Integrity Monitoring - AAIM**

Onboard augmentation technique which is enhanced by the availability of the navigation function. This includes the INS, who can impersonate the GNSS antennas when aircraft satellite equipment are masked or when there is sufficient number of satellites to reach a more accurate time reference, a particular combination of data entry sensor through filtering techniques, and so on.

h)  **Receiver Autonomous Integrity Monitoring - RAIM**

Onboard augmentation technique for which a receiver / processor determines the integrity of GPS navigation signals using only GPS signals or the signals augmented with altitude information. This determination is obtained through an ongoing monitoring of the received signals. At least one other satellite, in addition to those used for navigational purposes, should be available to the receiver to perform RAIM.

i)  **Dead Reckoning - D/R**

Navigation made only by means of calculations based on airspeed, course, heading, wind direction and speed, ground speed and elapsed time

j)  **Accuracy**

It is the ability of a navigation aid to warn the pilot that it has failed or is giving incorrect markings.

k)  **Flight Management System - FMS**

Interactive computer system and display navigation to assist the pilot in flight with maximum economy by a route previously planned, defined in terms of waypoints and altitude changes.

l)  **Global Navigation Satellite System - GNSS**

Global System for determining position and time, which includes one or more satellite constellations, receivers onboard monitoring systems and system integrity, augmented as necessary to support the required navigation performance for the actual phase of operations.

m)  **Main navigation system**

Navigation system approved for a given operation or phase of flight and must meet accuracy and integrity, but not with the availability and continuity. Security is achieved by limiting flights to specific time periods and with certain procedural restrictions.

**n) Airborne-Based Augmentation System - ABAS**

GPS Built-in receivers/processors augmentation system installed onboard the aircraft. Could be AAIM or RAIM type.

**INFORMATION ABOUT GPS CONSTELLATION STATUS**

Information about GPS NAVSTAR satellites constellation availability could be obtained by contact U.S. Coast Guard Center, internet address:

☛ <http://www.navcen.uscg.gov/>

**WARNING**

It is the responsibility of the pilot in command of the aircraft which plans to conduct an oceanic airspace flight to verify their GPS receivers are in comply with FAA/TSO-129A, and are installed according to the AC 20-130A and / or 20-138 / FAA and meet the performance requirements of the N8110.60/FAA.

It will also be responsibility of the pilot in command to meet the other requirements of Chapter ENR 4.2 Global Navigation Satellite System (GNSS).

It should be understood that República Oriental del Uruguay is not responsible for the continuity of the GPS signals

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## ENR 4.3 NAME-CODE DESIGNATORS FOR SIGNIFICANT POINTS

| <i>Name-code designator</i> | <i>Coordinates</i>          | <i>ATS routes or other routes</i> | <i>Remarks, including supplementary definition of positions where required</i> |
|-----------------------------|-----------------------------|-----------------------------------|--------------------------------------------------------------------------------|
| 1                           | 2                           | 3                                 | 4                                                                              |
| AKNUS                       | 341957.96S<br>0575012.96W   | SUCA IAC RNAV (GNSS) 13           | Nil                                                                            |
| AKPOD                       | 322757S<br>0533341W         | UM540                             | Nil                                                                            |
| AKSET                       | 342848.96S<br>0575552.98W   | SUCA IAC RNAV (GNSS) 13           | Nil                                                                            |
| ALBES                       | 332209.24S<br>0564234.20W   | SUDU IAC RNAV (GNSS) 10           | Nil                                                                            |
| ALDUS                       | 313429.83S<br>0580641.90W   | SUSO IAC RNAV (GNSS) 05           | Nil                                                                            |
| ANKIR                       | ☛310617.95S<br>☛0553644.03W | ☛SURV IAC RNP RWY 05 IF           | Nil                                                                            |
| ANLUN                       | 304230S<br>0563605W         | UL324 UM418                       | Nil                                                                            |
| ANRUP                       | 334741S<br>0561209W         | UM402 UN857                       | Nil                                                                            |
| ARAPE                       | 310100S<br>0572213W         | W19 W20                           | Nil                                                                            |
| AROMO                       | 333002S<br>0550244W         | A310 W18                          | Nil                                                                            |
| ASIVA                       | 335026S<br>0562035W         | P526 W19                          | Nil                                                                            |
| ASUMA                       | 315203S<br>0540919W         | A310                              | Nil                                                                            |
| BISOK                       | 325246S<br>0564041W         | P526 W19                          | Nil                                                                            |
| ☛BOBUM                      | ☛305426.27S<br>☛0552422.02W | ☛SURV IAC RNP RWY 23 FAF          | Ni                                                                             |
| BOLAT                       | 333949S<br>0540039W         | A305                              | Nil                                                                            |

| <i>Name-code<br/>designator</i> | <i>Coordinates</i>        | <i>ATS routes or other routes</i> | <i>Remarks, including<br/>supplementary definition of<br/>positions where required</i> |
|---------------------------------|---------------------------|-----------------------------------|----------------------------------------------------------------------------------------|
| 1                               | 2                         | 3                                 | 4                                                                                      |
| BUTSI                           | 331149.53S<br>0562459.14W | SUDU IAC RNAV (GNSS) 21           | Nil                                                                                    |
| CUARA                           | ☛302313S<br>☛0562750W     | UL324                             | Nil                                                                                    |
| DAGUS                           | 350217S<br>0560725W       | A306 A310 UL405 UM792             | Nil                                                                                    |
| DAMEV                           | 322001.29S<br>0580324.23W | SUPU IAC GNSS (RNAV) 20           | Nil                                                                                    |
| DAMPA                           | 312935.18S<br>0580212.84W | SUSO IAC RNAV (GNSS) 05           | Nil                                                                                    |
| DARKA                           | 351758S<br>0561502W       | A310 UM792                        | Nil                                                                                    |
| DAYMA                           | 314714S<br>0570514W       | UL324 UP526                       | Nil                                                                                    |
| DIDER                           | 332152.08S<br>0563636.48W | SUDU IAC RNAV (GNSS) 10           | Nil                                                                                    |
| DORVO                           | 344258S<br>0573102W       | A305 UM424 UN857                  | Nil                                                                                    |
| DRACA                           | 342524S<br>0562227W       | W25                               | Nil                                                                                    |
| EGDOK                           | 343214.89S<br>0573508.94W | SUCA IAC RNAV (GNSS) 31           | Nil                                                                                    |
| EGUPI                           | 342519.80S<br>0575054.30W | SUCA IAC RNAV (GNSS) 13           | Nil                                                                                    |
| EKEKI                           | 310706S<br>0561124W       | W16 W25                           | Nil                                                                                    |
| ENSAS                           | 315440S<br>0570849W       | UL324 UM534                       | Nil                                                                                    |
| ENTED                           | 331047S<br>0563348W       | UN741 UP526                       | Nil                                                                                    |
| ESORI                           | 331625.70S<br>0562720.32W | SUDU IAC RNAV (GNSS) 21           | Nil                                                                                    |

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|---------------------------------|---------------------------|-----------------------------------|----------------------------------------------------------------------------------------|
| 1                               | 2                         | 3                                 | 4                                                                                      |
| GAMOT                           | 305640S<br>0552937W       | UA432 UM654                       | Nil                                                                                    |
| GEBAR                           | 342423.34S<br>0575302.34W | SUCA IAC RNAV (GNSS) 13           | Nil                                                                                    |
| GEMOT                           | 332058.38S<br>0561843.92W | SUDU IAC RNAV (GNSS) 10           | Nil                                                                                    |
| GEMSU                           | 301600S<br>0573818W       | P526 UP526 W19                    | Nil                                                                                    |
|                                 |                           |                                   |                                                                                        |
| GUTUD                           | 302245.87S<br>0564220.45W | SUAG IAC RNAV (GNSS) 11           | Nil                                                                                    |
| GUVIN                           | 342302S<br>0561737W       | W23                               | Nil                                                                                    |
| GUVON                           | 335332S<br>0572303W       | UL417 UN741                       | Nil                                                                                    |
|                                 |                           |                                   |                                                                                        |
| ILMUL                           | 320844S<br>0562832W       | UM402 UM654                       | Nil                                                                                    |
| ILNAN                           | 302323.06S<br>0563636.27W | SUAG IAC RNAV (GNSS) 11           | Nil                                                                                    |
|                                 |                           |                                   |                                                                                        |
| ILSIM                           | 314400S<br>0563232W       | UM402 UM534                       | Nil                                                                                    |
| ISALA                           | 314034S<br>0542647W       | A314                              | Nil                                                                                    |
|                                 |                           |                                   |                                                                                        |
| KOSPI                           | 344202S<br>0563856W       | W29                               | Nil                                                                                    |
| KUDEN                           | 310234.38S<br>0553250.46W | SURV IAC RNP RWY 05 FAF           | Nil                                                                                    |
| KUGUG                           | 342939.60S<br>0574103.40W | SUCA IAC RNAV (GNSS) 31           | Nil                                                                                    |

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|---------------------------------|---------------------|-----------------------------------|----------------------------------------------------------------------------------------|
| 1                               | 2                   | 3                                 | 4                                                                                      |
| KUKEN                           | 341058S<br>0581302W | UL324 UM654                       | Nil                                                                                    |
| LITOS                           | 342732S<br>0544334W | A305                              | Nil                                                                                    |
| LOLIL                           | 315259S<br>0570303W | UM534 UP526                       | Nil                                                                                    |
| LOMID                           | 335308S<br>0561945W | UN857 UP526                       | Nil                                                                                    |
| LUCIO                           | 350318S<br>0555218W | A306 UL405                        | Nil                                                                                    |
| MEVIV                           | 311839S<br>0571546W | W19 W25                           | Nil                                                                                    |
| MIGOT                           | 305248S<br>0564042W | UM402 UL324                       | Nil                                                                                    |
| MIMOL                           | 322033S<br>0541319W | W3, W18, UM792, UN857             | Nil                                                                                    |
| MOLBI                           | 342050S<br>0553018W | UM540                             | Nil                                                                                    |
| MONSA                           | 342056S<br>0561053W | P526 W19 UP526                    | Nil                                                                                    |
| MUKIB                           | 304311S<br>0564213W | UM418 UM402                       | Nil                                                                                    |
| ✈ MUMET                         | 330038S<br>0560353W | SUDU RNAV (GNSS)RWY 21            | Nil                                                                                    |
| NEMAS                           | 343503S<br>0571111W | W29                               | Nil                                                                                    |
| NIGRO                           | 315744S<br>0535501W | UM792                             | Nil                                                                                    |
| NIMBO                           | 343049S<br>0562932W | B555 UL417                        | Nil                                                                                    |

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|-------------------------------------------------------------------------------------|---------------------|-----------------------------------|----------------------------------------------------------------------------------------|
| 1                                                                                   | 2                   | 3                                 | 4                                                                                      |
| KUKEN                                                                               | 341058S<br>0581302W | UL324 UM654                       | Nil                                                                                    |
| LITOS                                                                               | 342732S<br>0544334W | A305                              | Nil                                                                                    |
| LOLIL                                                                               | 315259S<br>0570303W | UM534 UP526                       | Nil                                                                                    |
| LOMID                                                                               | 335308S<br>0561945W | UN857 UP526                       | Nil                                                                                    |
| LUCIO                                                                               | 350318S<br>0555218W | A306 UL405                        | Nil                                                                                    |
| MEVIV                                                                               | 311839S<br>0571546W | W19 W25                           | Nil                                                                                    |
| MIGOT                                                                               | 305248S<br>0564042W | UM402 UL324                       | Nil                                                                                    |
| MIMOL                                                                               | 322033S<br>0541319W | W3, W18, UM792, UN857             | Nil                                                                                    |
| MOLBI                                                                               | 342050S<br>0553018W | UM540                             | Nil                                                                                    |
| MONSA                                                                               | 342056S<br>0561053W | P526 W19 UP526                    | Nil                                                                                    |
| MUKIB                                                                               | 304311S<br>0564213W | UM418 UM402                       | Nil                                                                                    |
|  |                     |                                   |                                                                                        |
| NEMAS                                                                               | 343503S<br>0571111W | W29                               | Nil                                                                                    |
| NIGRO                                                                               | 315744S<br>0535501W | UM792                             | Nil                                                                                    |
| NIMBO                                                                               | 343049S<br>0562932W | B555 UL417                        | Nil                                                                                    |

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|---------------------------------|---------------------------|-----------------------------------|----------------------------------------------------------------------------------------|
| 1                               | 2                         | 3                                 | 4                                                                                      |
| OGMAR                           | 331735S<br>0540856W       | A309                              | Nil                                                                                    |
| OGRUN                           | 320343S<br>0535034W       | UN857                             | Nil                                                                                    |
| OKBAM                           | 311001.41S<br>0554037.90W | SURV IAC RNP RWY 05 IAF           | Nil                                                                                    |
| OPSOS                           | 322418S<br>0565125W       | P526 G680                         | Nil                                                                                    |
| ORELO                           | 310216.57S<br>0554155.58W | SURV IAC RNP RWY 05 IAF           | Nil                                                                                    |
| OSIXO                           | 304642.06S<br>0552541.31W | SURV IAC RNP RWY 23 IAF           | Nil                                                                                    |
| PABOT                           | 341536S<br>0565134W       | UL417 UN857                       | Nil                                                                                    |
| PAPIX                           | 342458S<br>0580002W       | A314 UN741                        | Nil                                                                                    |
| PONPA                           | 335625S<br>0571859W       | A314 B555 UA314                   | Nil                                                                                    |
| PORLI                           | 313419S<br>0560010W       | UM534 UM654                       | Nil                                                                                    |
| PUKAL                           | 311019.54S<br>0553132.47W | SURV IAC RNP RWY 05<br>IAF/MAHF   | Nil                                                                                    |
| PUMIL                           | 323227S<br>0564820W       | UM654 UP526                       | Nil                                                                                    |
| RAVEL                           | 342802S<br>0544249W       | UM424                             | Nil                                                                                    |
| REBIN                           | 325758S<br>0570718W       | W23 W27                           | Nil                                                                                    |
| REGOV                           | 341956S<br>0560029W       | W15                               | Nil                                                                                    |

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|---------------------------------|---------------------------|-----------------------------------|----------------------------------------------------------------------------------------|
| 1                               | 2                         | 3                                 | 4                                                                                      |
| RODOV                           | 305004S<br>0574817W       | UM418                             | Nil                                                                                    |
| SANDU                           | 321204S<br>0573323W       | W23                               | Nil                                                                                    |
| SASKU                           | 304754S<br>0572651W       | UM418 UP526                       | Nil                                                                                    |
| SEKLO                           | 300629S<br>0564758W       | UM402                             | Nil                                                                                    |
| SEKMI                           | 312605S<br>0575903W       | W20, W23, W25                     | Nil                                                                                    |
| SIMOL                           | 321130.14S<br>0580150.34W | SUPU IAC RNAV (GNSS) 20           | Nil                                                                                    |
| SOLIS                           | 342057S<br>0552529W       | A309                              | Nil                                                                                    |
| SUGRA                           | 321234S<br>0581124W       | UM534                             | Nil                                                                                    |
| SURBO                           | 342658S<br>0575738W       | Corredor SURBO VFR                | Nil                                                                                    |
| TELAK                           | 342034S<br>0553938W       | A310 W18    UM792                 | Nil                                                                                    |
| TEMAL                           | 314501S<br>0555526W       | W15, W16                          | Nil                                                                                    |
| TESAD                           | 333931S<br>0570052W       | W25                               | Nil                                                                                    |
| TIDRU                           | 340057S<br>0550102W       | A309                              | Nil                                                                                    |
| TILDA                           | 333820S<br>0574432W       | UL417 UM654                       | Nil                                                                                    |
| TOGAL                           | 333131S<br>0575406W       | UL417 UL324                       | Nil                                                                                    |

| <i>Name-code<br/>designator</i> | <i>Coordinates</i>        | <i>ATS routes or other routes</i> | <i>Remarks, including<br/>supplementary definition of<br/>positions where required</i> |
|---------------------------------|---------------------------|-----------------------------------|----------------------------------------------------------------------------------------|
| 1                               | 2                         | 3                                 | 4                                                                                      |
| TOKAM                           | 344653S<br>0564256W       | A305 UM424                        | Nil                                                                                    |
| TOLEP                           | 324341S<br>0530510W       | UM424 UM661                       | Nil                                                                                    |
| TOSIB                           | 342106S<br>0551955W       | UM661                             | Nil                                                                                    |
| TULIO                           | 313223S<br>0543001W       | G680                              | Nil                                                                                    |
| UBLAM                           | 303935S<br>0560944W       | UM418                             | Nil                                                                                    |
| UGELO                           | 324042S<br>0530850W       | A305                              | Nil                                                                                    |
| UGIMI                           | 345858S<br>0565302W       | A306 UL405                        | Nil                                                                                    |
| UGRES                           | 321627.18S<br>0580244.75W | SUPU IAC GNSS (RNAV) 20           | Nil                                                                                    |
| UGURA                           | 323525S<br>0531922W       | A309                              | Nil                                                                                    |
| UMRUD                           | 312632S<br>0543841W       | UN741                             | Nil                                                                                    |
| URURI                           | 311810S<br>0550726W       | UM534                             | Nil                                                                                    |
| UTNAR                           | 305442.95S<br>0551517.69W | SURV IAC RNP RWY 23<br>IAF/MAHF   | Nil                                                                                    |
| VANUD                           | 305042.32S<br>0552029.41W | SURV IAC RNP RWY 23 IF            | Nil                                                                                    |
| VUDUP                           | 325854S<br>0562018W       | UM402 UN741                       | Nil                                                                                    |
| VUKAS                           | 342013S<br>0560637W       | UM402                             | Nil                                                                                    |

| <i>Name-code<br/>designator</i> | <i>Coordinates</i>        | <i>ATS routes or other routes</i> | <i>Remarks, including<br/>supplementary definition of<br/>positions where required</i> |
|---------------------------------|---------------------------|-----------------------------------|----------------------------------------------------------------------------------------|
| 1                               | 2                         | 3                                 | 4                                                                                      |
| XUXIP                           | 304658.24S<br>0551637.10W | SURV IAC RNP RWY 23 IAF           | Nil                                                                                    |

| <i>Name IDENT<br/>(coordinates)</i>                                               | <i>Type and<br/>intensity<br/>(1 000 candelas)</i>                                | <i>Characteristics</i>                                                            | <i>Operating<br/>Hours</i>                                                        | <i>Remarks</i> |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------|
| 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5              |
|  |  |  |  |                |
| Punta José Ignacio<br>345100S/0543800W (*)                                        | Marine<br>1.150                                                                   | Flg W<br>ev 2 sec                                                                 | HN                                                                                |                |
| Punta Palmar<br>340400S/0533300W (*)                                              | Marine<br>1.150                                                                   | Flg W<br>ev 6 sec                                                                 | HN                                                                                |                |