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Ver. 8

**ULISES V 5000-I 2.5.X**

**Technical Manual**

**Operator Position User Manual**

**Language: English**



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**CONTROL DEL DOCUMENTO / DOCUMENT CONTROL**

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**REGISTRO DE MODIFICACIONES / RECORD OF CHANGES**

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# Introduction

“HMI.EXE” is an application that provides VCS end users with the means needed to use the telephony and radio resources provided by this system.

Its main purpose is to provide users of the ULISES V 5000 system with an intuitive and direct environment for operation, within the limitations that a computer presents, in addition to providing more information and quick access to that information.

The application is designed to use TFT and touchscreen technologies to the maximum advantage to allow users to access the desired functions quickly.

This application can be configured (during installation) to display one of the following types of interfaces:

* ENAIRE Interface. Adapts to the sizes and functions of ENAIRE specification for Control TOWERS in Spain.
* ASECNA interface. Adapts to the dimensions and functions of the requirements established by ASECNA for its air navigation management centres (Control Centres and Towers).

# General Format of the Screen

The general format of the screen is divided into the following areas:

* General information panel or Header
* Radio panel
* Telephony panel
* Hotline panel

The following figures show the format of the AENA and ASECNA interfaces.

|  |  |
| --- | --- |
|  |  |
| **Figure 1. General Screen Format in the ENAIRE interface.** | **Figure 2. General Screen Format in the ASECNA interface.** |

Each of these interfaces has specific features for each of the areas that make it up.

General Information Panel or Header

It is at the top of the screen. It is shown in the figure below:

|  |  |
| --- | --- |
|  |  |
| **Figure 3. General Information Area or Header in the ENAIRE interface.** | ****Figure 4. General Information Area or Header in the ASECNA interface.**** |
| This panel is divided into the following zones:   * Application logo * Presence of JACKS and SPLIT control * Telephony Information Key * Messages Window * Brightness Control * RING Volume Control | This panel is divided into the following zones:   * Application logo * Local date and time of the machine * Presence of JACKS and SPLIT control * Telephony Information Key * Key to access the BRIEFING function * Messages Window * Brightness Control * RING Volume Control |

## Radio panel

Occupies the central left part of the screen. Provides the controls for operating the radio sub-system. It is shown in the figure below:

|  |  |
| --- | --- |
|  |  |
| **Figure 5. Radio panel in the ENAIRE interface.** | **Figure 6. Radio panel in the ASECNA interface.** |
| This panel contains the following elements:   * Control of radio speaker volume * Control of headphone volume * PTT Software Key * RTX Group function Key * Radio Pages Control * Radio Position Access Area (up to 15 per page) | This panel contains the following elements:   * Volume control for radio speaker 1. * Volume control for radio speaker 2 (normally HF). * Control of headphone volume * PTT Software Key * RTX Group function Key * Radio Pages Control * Radio Position Access Area (up to 15 per page) * Area for selective calls (for HF frequencies) |

## Telephony Panel

Occupies the central right part of the screen. Provides the controls for operating the telephony with previous call sub-system. It is shown in the figure below:

|  |  |
| --- | --- |
|  |  |
| **Figure 7. Telephony panel in the ENAIRE interface.** | **Figure 8. Telephony panel in the ASECNA interface.** |
| This panel contains the following elements:   * Volume Control Area * Page Control Area (up to 3 pages) * Direct Access Button Area (up to 16 per page). * Telephony Functions Area * Access to the indirect access management screen. * Cancel Key. | This panel contains the following elements:   * Volume Control Area * Page Control Area (up to 9 pages) * Direct Access Button Area (up to 20 per page). * Telephony Functions Area * Access to the indirect access management screen. * Cancel Key. |

The criteria for the organisation of the DAs in the panels with grouped sectors are:

* 1. The keys of the first sector (lowest SACTA Id.) that makes up the grouping in its original position.
* 2. The keys of the rest of the sectors in the available gaps.
* 3. If the entire panel is already occupied, the keys with the lowest priority will be eliminated.

In addition to this, the Indirect Access screen shown below will be superimposed on the central part:

|  |  |
| --- | --- |
|  |  |
| **Figure 9. Telephone Page. Indirect access control in the ENAIRE interface.** | **Figure 10. Telephony page. Indirect access control in the ASECNA interface.** |

This screen contains the following elements:

* Phone dialler, which consists of the corresponding keypad, delete key, pause and DISPLAY.
* MEM key to access the telephone directory.
* Pick up/hang up key.
* Call log keys.
* Telephony functions area. This last zone shows a different format for each one of the interfaces shown in figures 7 and 8.

## Hotline Panel

Occupies the bottom of the screen. Offers the operation control for the Hotline sub-system. It is shown in the figure below:

|  |  |
| --- | --- |
|  |  |
| **Figure 11. Hotline Panel in the ENAIRE interface.** | **Figure 12. Hotline Panel in the ASECNA interface.** |

The Hotline Communications Area has one single area for Hotline Selection. The Auxiliary Functions, which in this case are limited to the hotline speaker control, are included in the Volume Control Area for Auxiliary Telephony Functions.

The hotline panel in the ENAIRE interface may contain up to 20 elements arranged in two rows, while the ASECNA interface may contain 10 elements arranged in a single row.

# General operation

Corresponds to the functions indicated or accessible through the general information panel or Header panel:

## CLIENT LOGO

Displays the name of the terminal and indicates the operational status using the following colour code.

|  |  |
| --- | --- |
|  | Terminal operational. |
|  | Terminal in Cleaning Mode. |
|  | Terminal Isolated. |

**Table 1. Indication of Status, Client logo**

## Date and Time

This zone is available only in the ASECNA interface. It displays the local date and time of the machine where the operator terminal is running.

## JACKS and SPLIT indicators

These indicate the connection or disconnection of each pair of JACKS in the Panel. If they are inserted, they will be green, and red if not.

|  |  |
| --- | --- |
| JACKS not inserted | JACKS inserted |
| Jacks rojosJacks rojos | Jacks verdesJacks verdes |

**Table 2. Indication of JACK Status.**

## SPLIT Control

Indicates the status of Separation or Integration of ROLES in Terminals. When this key is pressed, a window will open that will allow the separation of Radio, Hotlines and Telephony.

|  |  |
| --- | --- |
| Normal or Integrated Mode (Instructor-Student) |  |
| Split Mode (Executive-Assistant) |  |

**Table 3. Indication of SPLIT Mode.**

In Normal Mode, the audio of radio, telephony and hotline will be sent to all of the JACKS that are inserted. When PTT is pressed by any of them, a radio transmission will be sent, although the instructor has PTT priority over the student.

In Split Mode, depending on the selection, the telephone and hotline communications will be sent over one of the connectors, and radio communications over the other; the PTT will be operational on this second connector.

In the other selection, the radio and hotline audio will reach and will be transmitted over a pair of connectors, and only the PTT of these connectors will be operational. The other pair will have the telephone communications.

To switch from one mode to another, at least one Jack must be inserted in each pair of connectors, and a window will open to allow the current selection to be changed after confirming the change.

In Split mode, if one of the connectors is removed, the system will return to Normal mode.

## INFO Key

The INFO control gives access to the management of telephony dependencies and call log (the latter is only in the ASECNA interface). The appearance and functions will be covered in the chapter on telephone operation.

## BRIEFING

The control labelled with a RED circle under the INFO control gives access to the BRIEFING function, which will be described in the section on special functions.

## Messages Window

This window displays the events and situations that occur during the operation of the system, such as conversations established, holds, warnings and other incidents that occur in the system.

…

**Figure 13. Messages Window.**

## BRIGHTNESS CONTROL

Regulates the brightness of the screen. A short press on the left button decreases the brightness, and a short press on the right button increases it. The bar at the bottom indicates the selected level of brightness.



**Figure 14. Brightness Control**

## RING Volume

Regulates the incoming call RING Volume. A short press on the left button decreases the volume, and a short press on the right button increases it. The bar at the bottom indicates the volume level.



**Figure 15. RING Volume Control.**

A long press on this control cancels the audible signal of incoming calls, which will be indicated as shown in the figure below.



**Figure 16. RING Off.**

## Bad Operation

In general, if an operator executes a Bad Operation or an action that is unauthorized or not configured as explained in this document, referred to as “*Bad Operations”*, the system will immediately detect the anomaly and the normal functioning of the system will not be affected.



**Figure 17. Indication of Bad Operations**

The user will receive an audible signal indicating this. The warning that the operator will receive through the headphones will be an acoustic signal indicating an incorrect action for the operation (Bad Operation). The audible tone will be superimposed on the Headphone signal.

## Cleaning Mode

The purpose of the cleaning function, which is activated by pressing the upper left area of the screen, is to clean the screen.



**Figure 18. Cleaning Mode Control**

When the button is deactivated, on a white background, cleaning cannot be done. This means that the screen is active and if it is touched, since it is a touchscreen, the keys in the Panel will be activated directly. If the button is active (as shown in the figure), the Panel screen can be cleaned. While this mode is active, communications remain active, as well as the audible signals. To reactivate the panel, reinsert the JACKS. A window indicating that cleaning mode is active will be displayed while the system is in this mode.

## No JACKS in panel

When the operator JACKS are removed from an operating position, the radio channels selected on the headphones automatically switch to the speaker, and if no JACK is connected, after the number of minutes configured, they will switch to standby. Any established telephone communications will be cut off, and the retransmission groups will be undone.

If no JACKS are inserted for the configured number of minutes, the screensaver shown below will be displayed.



**Figure 19. Screensaver**

In any of these statuses, the incoming telephony audio, incoming telephone call RING and incoming Hotline audio will be sent to the terminal. Just insert any operator Jack to activate the terminal.

## Unconfigured panel

The operator terminals with no assigned SECTORS through SECTORISATION display the following TFT panel:

|  |  |
| --- | --- |
|  |  |
| **Figure 20. Terminal Out of Sectorization in the ENAIRE interface.** | **Figure 21. Terminal Out of Sectorization in the ASECNA interface.** |

As shown in the image above, **FS** (Out of Sectorization) is displayed on the terminal name. These operator terminals only have Radio resources.

# Radio operation

## General concepts

The terms that will be applied later in the text of this document are the following.

|  |  |
| --- | --- |
|  |  |
| **Assigned** | Of the Radio Units that the Supervisor has configured for the user in a particular Panel of the three that are available, those that are in one of the three rows of the four columns of the Radio Panel will be assigned in the Radio Panel. |
| **Selected** | A Radio Unit assigned in a particular Radio Panel position may be selected in three different ways:   * Standby: A Radio Unit with this type of selection will only receive indicator lights in response to SQUELCH reception. * RX: A Radio Unit with this type of selection will receive indicator lights and audio signals in response to SQUELCH reception either over the speaker or headphones. * TX/RX: A Radio Unit with this type of selection will receive indicator lights and audio signals in response to SQUELCH reception and also allows transmission when the operator presses PTT (PUSH TO TALK). |
| **Transmission** | A Radio Unit selected in TX, transmission, when the User presses PTT. |
| **Button/Push-button** | Each one of the Software switches available to the User on the screen to carry out the operation. |
| **DISPLAY** | Any space on the screen reserved for writing significant letters and numbers of a specific concept. There are two different displays in the Radio Panel. |
| **Identification** | The identification of a panel is the name that appears in the top left of the screen or TFT, made up of 10 alphanumeric characters. This name can be programmed from the Manager/Supervisor position. |
| **SQUELCH** | Receiving Squelch means that a Radio Unit has detected a signal on the same frequency to which it is tuned and with sufficient reception level. When a SQUELCH is detected, it triggers the Reception process of a Radio Unit in the system. |
| **Reception** | In connection with the previous concept, reception by a Radio Unit means that there is an audible signal from a Radio Unit available to the User if it has been assigned in RX or TX/RX on its panels. If standby has been selected, SQUELCH will be indicated without the audio reaching the physical means available to the User to listen to it. |

**Table 4. General concepts**

## Volume control of the radio headphones and speaker

This regulates the radio speaker and headphone volume. A short press on the left button decreases the volume, and a short press on the right button increases it. The bar at the bottom indicates the volume level.

|  |  |
| --- | --- |
|  |  |
| **Figure 22 Control of Radio Headphone and Speaker Volume in the ENAIRE interface.** | **Figure 23. Control of Radio Headphone and Speaker Volume in the ASECNA interface.** |

## Control of radio pagination

This allows the movement between the different pages configured in radio.



**Figure 24. Radio Pagination Controls.**

When the ‘arrow’ buttons are pressed, the display passes to the next or previous page that has radio channels configured. The central part of the key indicates the current page of the selection.



**Figure 25. Page Indication.**

The display will pass through the different configured radio pages. When the page is changed, all of the assigned frequencies will automatically change to STANDBY.

## Radio channels area

The central part of the Radio Panel has a window with 15 keys (TC) for selecting radio channels [5 columns x 3 rows], which include the buttons for selecting the operating modes of each assigned Radio Channel, a DISPLAY and a series of indicator lights. Channel selection is done using direct execution software buttons.

The radio panel can also contain VHF frequencies and HF frequencies. These are distinguished by the green colour of the text of the key identification area.

|  |  |
| --- | --- |
|  |  |
| **Figure 26. Layout of a conventional Radio Key.** | **Figure 27. Layout of an HF Radio Key.** |

The elements that make up the radio channel selection key are shown below:

|  |
| --- |
| Tx Control  Frequency Identifier  RX Control  PTT Indicator  SQH Indicator |
| **Figure 28 . Layout of a conventional Radio Key.** |

* Frequency Identifier. This is at the top of the key and it consists of 2 lines of text and a coloured background. The first line of text indicates the frequency that identifies the channel and the second line of text identifies the operation to which the frequency is dedicated.
* Transmission Control Area. This is on the lower left side of the key; in standby, it is displayed with the text TX in white on a grey background.
* Reception Control Area. This is on the lower right side of the key; in standby, it is displayed on a grey background.
* SQUELCH and PTT indicators.

## Radio channel modes

This section describes the different modes of a radio channel and how this status is displayed on the HMI.

|  |  |
| --- | --- |
| Mode | INDICATOR |
| Channel on standby., |  |
| Channel assigned in Rx on speaker. |  |
| HF Channel assigned in Rx on HF speaker. |  |
| Channel assigned in Rx on headphones. |  |
| Channel assigned in Tx/Rx on speaker. |  |
| Channel assigned in Tx/Rx on headphones/microtelephone. |  |
| Channel assigned in Tx/Rx on headphones and included in a retransmission group. |  |

**Table 5. Indication of Radio Channel modes**

## Radio channel statuses

The possible different statuses are described below:

|  |  |  |
| --- | --- | --- |
| **Radio channel statuses** | | |
| ***Status*** | ***Mode*** | ***Indication*** |
| Channel on standby SQUELCH ICON GREEN. | Any mode. On standby, audio does not reach the physical means available to the user to listen to it. |  |
| Channel assigned and in reception (background of the frequency indicator and the Rx indicator is WHITE, and Speaker or Headphones icon). | Rx Mode, the audio reaches the headphones/speaker depending on which is selected. |  |
| PTT.  Assigned and Tx Operation (PTT) only carrier. | Tx/Rx mode on speaker or headphones and Rx mode on speaker or headphones. |  |
| Assigned and Tx Operation (PTT) only carrier, without carrier detection. | Tx/Rx mode on speaker or headphones and Rx mode on speaker or headphones. |  |
| External retransmission. Indicated with a black R on a red background, in the right part of the channel identification zone. | Any mode. |  |
| Channel involved in facility sequence, indicated in two ways, with a yellow background in the channel identification zone or with a flashing yellow background. | Any mode. |  |
| Channel cannot be selected (Malfunction). | Any mode. |  |
| Channel involved in Blocking/Bad Operation because the channel is in Tx by another user. | Tx/Rx mode on speaker or headphones. |  |

**Table 6. Indication of Radio Channel Statuses**

## Transitions between modes

### VHF Channel:

|  |  |
| --- | --- |
| **Sequence** | **INDICATOR** |
| Starting from standby to Rx and vice-versa: With a short press in the RX zone, carry out the following sequence : | BD21298_BD21298_BD21298_ |
| With a long press on the RX zone, with speaker or headphones in RX selected, switches to standby. | BD21298_ |
|  | BD21298_ |
| Starting from Standby to Tx and vice-versa: With a short press in the TX zone, while on standby, carry out the following sequence: | BD21298_BD21298_BD21298_BD21298_ |
| With a short press in the RX zone, with TX assigned and speaker selected, carry out the following sequence: | BD21298_BD21298_BD21298_ |
| With a long press on the RX zone, with TX assigned and speaker or headphones in RX selected, switches to standby. | BD21298_ |
|  | BD21298_ |

### HF Channel

|  |  |
| --- | --- |
| **Sequence** | **INDICATOR** |
| For an HF channel, starting in standby to RX and vice-versa: With a short press in the RX zone, carry out the following sequence : | BD21298_  BD21298_ BD21298_  BD21298_ |
| With a long press on the RX zone, with speaker or headphones in RX selected, switches to standby. | BD21298_ |
|  | BD21298_ |
|  | BD21298_ |
| Starting from Standby to Tx and vice-versa: With a short press in the TX zone while on standby, carry out the following sequence: | BD21298_BD21298_BD21298_ BD21298_ |
| With a short press in the RX zone, with TX assigned and speaker selected, carry out the following sequence: | BD21298_BD21298_ BD21298_ |
| With a long press on the RX zone, with TX assigned and speaker or headphones in RX selected, switches to standby. | BD21298_ |
|  | BD21298_ |
|  | BD21298_ |

## Radio Facilities

Comprises the controls shown in the figure below:



**Figure 29. Controls associated with Radio Facilities**

The different functions in this area are explained below:

### PTT. Software Transmission Control.

A radio channel must be assigned in TX/RX when this key or the associated external button is pressed. If PTT is allowed, the colour of the key will change to blue, and if this is not possible, bad operation will be indicated by the bad operation tone. The indicator in the radio channel is the one described in section 2.10 of the documentation.

|  |  |
| --- | --- |
| **STANDBY** | **ACTIVE** |
|  |  |

**Table 7. PTT Control.**

When the key or external button is released, the key returns to standby.

### Rtx. Control of Retransmission Programming.

Makes it possible to enter channels assigned in Tx/Rx in a retransmission group. There must be at least two channels assigned in Tx/Rx, because the smallest possible group is two channels.

If there are less than two channels assigned in Tx/Rx, the key will be light grey, as shown in fig. 24

When the Rtx key is pressed, it will switch to flashing yellow, indicating the programming status of the retransmission group in progress.

When you press on a channel in the facility sequence, this is entered into the group or removed from the group, depending on its previous status.



**Figure 30. Control of Retransmission Programming.**

After the channels have been added to a group, when you press the Rtx key again, the changes will be made, if possible.

In an existing group, if there is a SQUELCH that is being retransmitted to the rest of the frequencies, it will not be possible to dissolve a group or to delete a frequency from the group. A pop-up window indicates the corresponding warning. On the other hand, a frequency can be added to the group if a SQUELCH is received.

The removal of the two JACKS in the operator terminal makes it possible to dissolve a retransmission group formed previously without taking the SQUELCH condition into account.

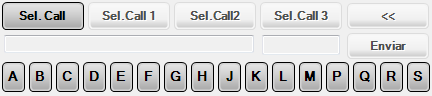
### Selective call

The selective call function is accessed by pressing the button that is provided for this purpose at the bottom of the radio area, in the ASECNA interface.



****Figure 31. Button to access the selective call area.****

The selective call button is only active while the operator has an HF frequency selected in TX. When this button is pressed, the selective call work area will be displayed, as shown in the figure below:

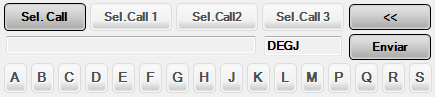


****Figure 32. Selective call area****

The generation of SEL-CALL tones of the HMI application of is based on the following document:

ICAO: AERONAUTICAL TELECOMMUNICATIONS, Annex 10 to the Convention on International Civil Aviation, Volume I, 4th edition of 1985 (amended 1987).

To send a SEL-CALL tone, press the keys of the letters which appear in the corresponding field:



****Figure 33. Selection of tones to make SEL-CAL****

As shown in figure 25, after the four tones (characters) have been entered, the keys that correspond to the tones are deactivated, and on the other hand, the *SEND* key is activated and may be pressed to send the tones.

During the process of sending the selective call, messages with the call status are displayed in the information field. These messages may be:

|  |  |
| --- | --- |
| Starting SELCAL call... | The process for sending the tones is initiated. |
| Sending SELCAL tones... | The transmitter is ready to send the tones and they are sent. |
| Error in SELCAL call | The selective call ended with an error; the tones were not sent. |
| Tones selected for sending | The message that is displayed corresponds to the same tones that were to be transmitted. The selective call was completed successfully. |

If the selective call was completed successfully, the code of the transmitted tones is memorised in the buttons *Sel.Call1, Sel.Call2*  and *Sel.Call3* sequentially. These buttons can be used later to select the corresponding tones and send them with the *SEND* key.

After a tone is entered, it can be deleted with the ‘<<’ key.

The selective call area is closed by pressing the *Sel. Call* button again or unassigning the HF frequency that was selected in Tx mode.

# Telephony Operation

This section describes the Characteristics/Capacities of each one of the elements and functions associated with the telephony operation.

## Direct Access Button Area

This area allows the individual selection of each available Direct Access Telephony Circuit. In the access area, there are 15 keys per page, with the last position being the same for all pages, which will be the position through which IA calls enter. There are 3 pages available, to facilitate the unique selection of each one of the 42 possible telephone lines.

Each one of these telephone line keys indicates the operational status of one line, and along with the associated function keys, implement the system operations.

The last DA key on each page is reserved for future uses.

Each telephone line key is defined by a ±16 characters ID represented on 2 lines of text, with information regarding the identification of the destination. The Key background indicates the status of the associated service according to the colour code:

|  |  |
| --- | --- |
| **STATUS** | **VIEW** |
| Standby |  |
| Incoming, Flashing Orange |  |
| Incoming Priority, Rapid Flashing Orange |  |
| Outgoing |  |
| On Hold, Flashing Green |  |
| Conversation |  |
| Memorised |  |
| Block, busy |  |
| Congestion, Flashing Red |  |
| Out of service / Destination Unreachable |  |

**Table 8. Telephony Terminal Statuses**

## Telephony Functions Area

This Area will allow the individual selection of all of the User Telephony Functions implemented in the system and assigned to the position.

|  |  |
| --- | --- |
|  |  |
| **Figure 34 . Control of Telephony Functions in ENAIRE interfaces.** | **Figure 35. Control of Telephony Functions in ASECNA interfaces.** |

### Hold Function

The hold function allows the user to temporarily disconnect an established communication in order to carry out another telephone operation and then return to the original call. A previously existing conversation is required to use this function. When this button is pressed, the conversation in progress is put on hold, with the Hold key displayed in yellow.

|  |  |
| --- | --- |
| **STATUS** | **VIEW** |
| Hold Standby |  |
| Hold Active |  |

****Table 9. Hold Control Status.****

The corresponding telephone access key will change from steady to flashing green. In the messages window, the line Talking with: XXXX will disappear and Holds: XXXX will appear.

### Priority Function

The Priority function allows the authorised calling user to increase the priority level of his outgoing call to the Emergency level. This is only allowed for ATS destinations, not for point-to-point lines, external networks or SIP telephones.

An outgoing call for which the Priority function has previously been invoked becomes an Emergency Call.

An Emergency Call to an Operator position will be indicated by the Ulises System with a ‘priority’ ring.

An Emergency Call to an extension of the Secure Telephony Network of ULISES in BUSY status will become an INTRUSION.

An Emergency Call to the ATS Network (AGVN) will be attempted to be completed even if there are no available circuits at the origin or destination to complete the call because they are all occupied by lower priority calls.

INTERVENTION. An Outgoing Call on the ATS network with priority lower than Emergency, if it CANNOT be completed due to CONGESTION, becomes an Emergency Call when the Priority Key is pressed.

At that point, an Intervention scenario is initiated at the origin or destination. In this scenario, **a circuit occupied by a call with a priority lower than Emergency is selected** for Intervention/Interruption to complete the Priority or Emergency Call.

A warning period of 10 seconds begins during which the collaterals who are using the intervened circuit will hear an interruption warning tone consisting of an intermittent 1 KHz tone at a cadence of 500 ms ON/OFF. During this period of time, the collaterals must terminate their conversation.

If after this period, the circuit is not free because the conversation that was in progress has not been terminated, the system forces the termination and establishes the New Priority Call over that circuit.

Intrusion: This will allow the user to intrude (conference) with a collateral in a status of.

### Intrusion

This function will allow a calling party to establish communication with another busy user by breaking into a communication established between the called party and a third user. The intrusion status is the same as a conference in which any of the users may leave the conference call by simply hanging up.

|  |  |
| --- | --- |
| **STATUS** | **VIEW** |
| Priority Standby |  |
| Priority Active |  |

**Table 10. Priority Control.**

#### Priority intrusion on a secure line (only in version 2.5.4 to 2.5.8)

A priority call can be made over a secure telephone that is holding a conversation with a third party. This situation is indicated on the position with the direct access of the secure telephone showing busy status (see Table 8. Telephone terminal statuses).

In this situation, if the operator presses the *Priority* key and then the direct access key in busy status, a priority call will be started over the collateral corresponding to that direct access and a conference call will be initiated with the participants who are currently talking at that time with the secure extension.

The participants of the original conversation will hear a one-second warning tone to inform them of the call intrusion.

Once the conference call has been established, the direct access that was intruded will show the conversation status (see Table 8. Telephone terminal statuses).

In the message windows of the operator terminals, texts related to the intrusion will be displayed for the intruded user and the intruder. If the intruded element is a terminal or the subscription function is available to the members of the established conference call, the conference participants will also be displayed (on IP telephones of the unit’s PABX, the subscription function is not available to the participants of conference calls).

The operator can leave the conference call by pressing the direct access key of the secure telephone that is being intruded or by pressing the HANG UP/PICK UP key. The participants of the original conversation will continue the conversation.

When the first person to terminate the call is the Intruded Secure Extension, the conference call is terminated.

When the first person to terminate the call is the Operator who initiated the INTRUSION, the intruded conversation will continue.

### Listening Function

The listening function allows an authorised user to listen in on another internal user who will previously authorise the listening for the requesting party.

|  |  |
| --- | --- |
| **STATUS** | **VIEW** |
| Listening Standby |  |
| Listening underway | Flashing |
| Listening Active |  |
| Listening Rejected |  |

****Table 11. LISTENING Control Statuses****

The user who is listening will not be able to take or initiate another telephone call.

The user who is being listened to will not be able to cancel the listening. The cancel key which cancels all of the operator terminal calls is disabled. Calls may be cancelled individually by using their keys.

### Transfer Function

This function allows calls in progress to be transferred to another position. In order for the key to be on standby, there must be at least one call with conversation or one call on hold.

|  |  |
| --- | --- |
| **STATUS** | **VIEW** |
| Transfer Standby |  |
| Transfer in progress | Flashing |

**Table 12. TRANSFER Control Statuses**

### Conference Call Function[[1]](#footnote-1)

This function allows up to six (6) collateral internal or external conversations to be added to a conference call. The manager is the party that initiates the function, adds the collaterals and ends the conference. To create the conference call, the manager begins with one conversation in progress and another on hold. The conference call is created when the Conference Call key is pressed. To add new conversations to the conference call, the conference will be on hold, and when the Conference Call key is pressed again, the conference call will be formed with the conversation in progress and those on hold.

|  |  |
| --- | --- |
| **STATUS** | **VIEW** |
| Conference Standby |  |
| Conference underway |  |

****Table 13. . Control Statuses of the CONFERENCE CALL.****

### Global key for Indirect/Direct Access Control

The DA and IA keys will always display the same information in colour on the window that is not active at any given time.

If the indirect access window is active, the displayed key will be the DA key, and it will display the information corresponding to the status of the Direct Access lines that are not visible, and when the Indirect Access window is not active, the IA key will be displayed instead, with the information corresponding to the statuses of the Indirect Access lines that are not visible.

|  |  |  |
| --- | --- | --- |
| **STATUS** | **COLOUR** | **VIEW** |
| On Standby All of the functions of the IDA screen on hold | Grey |  |
| Outgoing Call in progress | Blue |  |
| Incoming Call | Orange  Flashing |  |
| Priority Incoming Call | Orange  Rapid flashing |  |
| Communication established | Green |  |
| Busy/malfunction | Red |  |
| Congestion | Red  Flashing |  |
| On hold | Green  Flashing |  |
| Call not answered (memorised) | Orange |  |

****Table 14. IA Key Indications****

According to the following criteria:

* The warning signal for unanswered calls (Orange) will disappear when the calls are deleted from the corresponding window.
* The incoming call indication will take priority over all other indicators.
* The indication of the statuses Invitation to dial, Outgoing Call in progress, communication established and BUSY / CONGESTION / MALFUNCTION (yellow, blue, green, red) take priority over the statuses of ON HOLD (flashing green) / UNANSWERED CALL NOTIFICATION / DIAL TONE (yellow) but not over the incoming call statuses.
* The UNANSWERED CALL NOTIFICATION (Orange) will be replaced by the indication of any of the other defined statuses.

### Cancel Hang up Key

The cancel hang up key allows users to end any telephone communication in progress. The information that is provided by the key is encoded according to the following colour code:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | **STATUS** | **VIEW** | | Standby |  | | Hangup Tone |  | | |  |  | | --- | --- | | **STATUS** | **VIEW** | | Standby |  | | Hangup Tone |  | |
| **Table 15. CANCEL Key statuses in ENAIRE interfaces.** | ****Table 16. CANCEL Key statuses in ASECNA interfaces.**** |

This is also used to cancel system functions and indications. If there are several functions active at the same time, the order of cancellation is as follows:

Calls established and with conversations in progress.

Outgoing Call Tone.

Hangup Tone.

## Indirect Access Control Window (IA)

Made up of the key that will be used to switch from the Direct Accesses window to the Indirect Accesses window, or vice-versa, in addition to indicating the status of the calls present in the page to which they give access using a colour code.

Incoming Indirect Access calls will be taken using the key 15+1, which is available in each one of the three DA pages.

|  |  |
| --- | --- |
|  |  |
| **Figure 36. IA Control Window in ENAIRE interfaces.** | **Figure 37. IA Control Window in ASECNA interfaces.** |

This window opens to make a call to a destination that is not preprogrammed (Dialling) or to open the destination book.

### Management of Recent Calls

This is made up of an area the allows users to memorise and manage the last four incoming and outgoing calls in the system arriving through IA positions.



**Figure 38. Recent Calls.**

Each call will be identified by the caller number or identifier.

### Management of Outgoing Calls

Made up of the following fields:

* Alphanumeric Keypad. “PICK UP” Key. To activate Dialling.
* MEM key from the destination list of the position managed by a supervisor.
* Keys for the last four calls

Alphanumeric keypad

This has the same structure as a telephone dial from 0-9 on an Alphanumeric Display that shows the digits and provides a button to delete the last digit entered with a short press or all of the digits by means of a long press.

The ‘,’ can be pressed at any time to indicate that the dialling should pause (for example to wait for a tone from a switchboard), as well as the special digits ‘\*’ and ‘#’.

The operation consists of entering the desired digits and then pressing the pick up key. This key will remain deactivated if no digits have been entered in the display or if the digits entered are insufficient to make a call. When it is displayed on standby, the call can be made.

Prefixes

To make a call by indirect access, the first two digits to be dialled will correspond to the prefix of the network over which the call will be made[[2]](#footnote-2). There are two preset networks with the corresponding prefixes:

* PSTN Network. To make an outgoing call, dial the prefix 04 followed by the corresponding subscriber number.
* Secure Network. To make an outgoing call, dial the prefix 01, followed by the subscriber number.

MEM Key

When you press the MEM key, the key will change to ACTIVE status and a window will open with the user’s telephone directory that can be used to make outgoing calls.

The procedure consists of selecting one of the destinations from the directory, which will switch to the “function in progress” indication (yellow background) and then press the Accept key that has changed to standby, and the call will be made to the selected destination.

|  |  |
| --- | --- |
|  |  |
| **Figure 39. IA Page. MEM Key in ENAIRE interfaces.** | **Figure 40. IA Page. MEM Key in ASECNA interfaces.** |

Info Key

The key is located on the General information panel or Header. This key opens a screen that provides access to two telephony utilities: the AGVN Numbering Plan and the local telephone call log.[[3]](#footnote-3)

1. **Dependencies-User**

When you click the *Dependencies-User* button, a screen opens to display the defined areas of the AGVN plan. When you click on the Ids or use the direction keys at the bottom, you will move between countries, as shown in the figure on the next page:

|  |  |
| --- | --- |
|  |  |
| **Figure 41. Directory of Dependencies and Users. Scenario 1 in ENAIRE interfaces.** | **Figure 42. Directory of Dependencies and Users. Scenario 1 in ASECNA interfaces.** |

If you select a country and expand the information, the FIRs that are in the Numbering Plan Tables will appear, as shown in the figure below:

|  |  |
| --- | --- |
|  |  |
| **Figure 43. Directory of Dependencies and Users. Scenario 2 in ENAIRE interfaces.** | **Figure 44 Directory of Dependencies and Users. Scenario 2 in ASECNA interfaces.** |

When one of the FIRs is selected, the Dependencies are displayed, as shown in the figure below:

|  |  |
| --- | --- |
|  |  |
| **Figure 45. Directory of Dependencies and Users. Scenario 3 in ENAIRE interfaces.** | **Figure 46 Directory of Dependencies and Users. Scenario 3 in ASECNA interfaces.** |

When you click one of the dependencies, the AGVN numbers and characteristics of the dependency will be displayed, along with the PSTN number, if applicable, as shown in the figure below:

|  |  |
| --- | --- |
|  |  |
| **Figure 47. Directory of Dependencies and Users. Scenario 4 in ENAIRE interfaces.** | **Figure 48 Directory of Dependencies and Users. Scenario 4 in ASECNA interfaces.** |

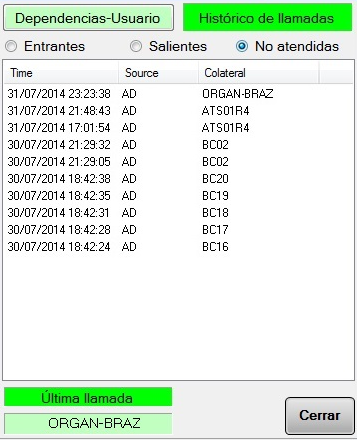
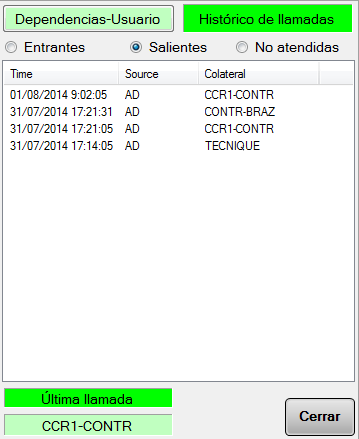
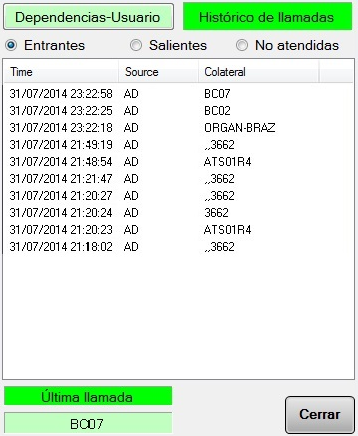
When you reach this status, you can make a call to the user by clicking the “Call” button, or close the window by clicking “Close”. The “Close” key is always on standby to allow you to close the INFO window at any time.

1. **Call log[[4]](#footnote-4)**

The INFO key provides access to the local log of telephone calls made by the operator. This log shows the result of the recent calls broken down into outgoing, incoming and unanswered calls, up to a maximum of ten records.

As shown in the figure, the information contained for each call is: Date/Time, access type (direct or indirect) and the collateral who made the call (in the case of incoming calls) or to whom the call was made (for outgoing or unanswered calls).

In addition, at the bottom of the call log window, the collateral of the last call corresponding to the selected call group is displayed.



**Figure 49. Log of incoming, outgoing and unanswered calls.**

### Statuses of the pick up key

The statuses associated with the ‘PICK UP’ key are shown in the table below:

|  |  |  |
| --- | --- | --- |
| **STATUS** | **COLOUR** | **VIEW** |
| Standby | Grey |  |
| Outgoing | Blue |  |
| Conversation | Green |  |
| Busy, Congestion or Blocked | Red or flashing red |  |
| No permission to make an outgoing call through the selected interface. | Yellow |  |

**Table 17. Hang up / Pick up statuses.**

## Volume Control Area

### Volume of Hot line and Telephony Speaker

The adjustment of the hotline and telephony speaker volume is done using the following keys:

* Volume up key
* Volume down key
* Linear indicator of the current volume level



****Figure 50. Telephony Speaker Volume Control****

### Telephony Headphones Volume

The headphone volume is adjusted using the following keys:

* Volume up key
* Volume down key
* Linear indicator of the current volume level



****Figure 51. Volume Control of Telephony Headphones****

## Control of Pages in Direct Access Telephony

Consists of an access key for each one of the pages of DA telephone lines.

|  |  |
| --- | --- |
|  |  |
| ****Figure 52 Control of Telephony Pagination in ENAIRE interfaces.**** | **Figure 53 Control of Telephony Pagination in ASECNA interfaces.** |

The information that is provided by the page access key is colour coded.

* Standby, Grey
* With activity, it will encode a colour sequence depending on the status of the collaterals in this page, according to the following table.
* If there are several statuses in the same page, the colour indication of the page will be handled in the following order:

|  |  |  |
| --- | --- | --- |
| **STATUS** | **COLOUR** | **VIEW[[5]](#footnote-5)** |
| Incoming Call | Flashing Orange |  |
| Priority Incoming Call | Rapid Flashing Orange |  |
| Outgoing Call | Blue |  |
| Conversation | Green |  |
| Busy | Red |  |
| Congestion | Flashing Red |  |
| On hold | Flashing Green |  |
| Memorised | Orange |  |

**Table 18. Status of the Pagination Keys**

# Hotline Operation

## Hotline Selection Area

This area allows you to individually select each one of the available Hotlines to facilitate the correct selection of the selected channel. The final arrangement of these keys will conform to the operational configuration of the panel. These keys do not interlock; i.e., to maintain a conversation, you will need to keep the Hotline key pressed.

Each key is divided into two parts:

1. **TX Status Zone.** This occupies the top of the key and it displays an identification text (on two lines, 4 characters each) or representative icon for the associated line service.
2. **RX Status Zone.** Occupies the bottom of the key.

The indication of the operational statuses of a particular hotline service is provided by changes in the colour of the different zones of the hotline key.

|  |  |  |  |
| --- | --- | --- | --- |
| **STATUS** | **VIEW** | **TX-ZONE** | **RX-ZONE** |
| Standby |  | GREY | GREY |
| Outgoing call (Tx) |  | GREEN | GREY |
| Incoming call (Rx) |  | GREY | GREEN |
| Two-way Communication |  | GREEN | GREEN |
| Called party busy |  | RED | GREY |
| Memorisation (call notification, when the user is busy). |  | GREY | Yellow |
| Cannot be selected (Malfunction) |  | LIGHT GREY WITH RED X | LIGHT GREY WITH RED X |

**Table 19. Operational Statuses of Hotlines**

The Incoming Call indication (RX zone of the HL key green) will be maintained for 5 seconds after the completion of the communication. This is to allow the operator to identify the calling party, if it was not possible to view the indicator during the communication while engaged in other tasks.

## Operation through Hotline

Communications that are established through Hotline are normally one-way, although two-way communications are possible. Hotline transmission inhibits radio transmission. Reception is always on the Hotline speaker. The following functions can be carried out:

* Transmission by Hotline
* Reception by Hotline

### Transmission by HL

Carry out the following sequence of actions to transmit by HL.

|  |  |  |  |
| --- | --- | --- | --- |
| **STEP** | **ACTION** | **VIEW** | **RESPONSE** |
| 1 | Initial Conditions |  | At least one HL service configured. |
| 2 | Press and hold HL key while talking. |  | HL key Status, TX zone in “Outgoing Call” |
| 3 | Destination User Busy |  | TX Zone of HL key “Busy” |
| 4 | Destination User transmitting at the same time (Two-way Transmission) |  | TX Zone of HL key “Outgoing Call”  RX Zone of HL key “Incoming Call” |
| 5 | Malfunction on the Line |  | Red X on grey background |

**Table 20. Procedure for Transmission by HL**

### Reception by HL

The operator does not have to initiate any sequence to receive audio. The indications on the panel follow the following sequence:

|  |  |  |  |
| --- | --- | --- | --- |
| **STEP** | **ACTION** | **VIEW** | **RESPONSE** |
| 1 | Initial Conditions |  | At least one HL service configured. |
| 2 | A call is received |  | RX Zone of HL key “Incoming Call”.  The audio is received directly on the speaker.  The incoming call indication is maintained for a time (configurable) after the end of the communication |
| 3 | User presses HL key and transmits at the same time (Two-way Transmission) |  | TX Zone of HL key “Outgoing Call”  RX Zone of HL key “Incoming Call” |
| 4 | Call not accepted (user transmitting over another HL, Busy status) |  | RX Zone of HL key “Memorisation”.  The “Memorisation” indicator is maintained until it is acknowledged by the user. |

**Table 21. Procedure for Reception by HL**

# Special Functions[[6]](#footnote-6)

Special functions are functions that are not communications but that are used to provide assistance and security to the operator’s work.

## Local recording on terminal

This function makes it possible to locally record and replay all voice communications made on the position in the last thirty (30) minutes. This function can be configured on each position by the System Supervisor.

The recordings are organised by sessions, indicating the date and time of the end of the recording, its duration and the session to which it corresponds.

The recording log will be deleted when the terminal is rebooted and when a new sectorisation is received.

### Session Recording

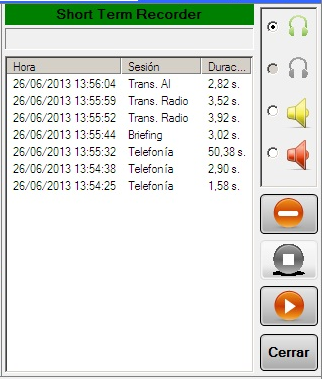
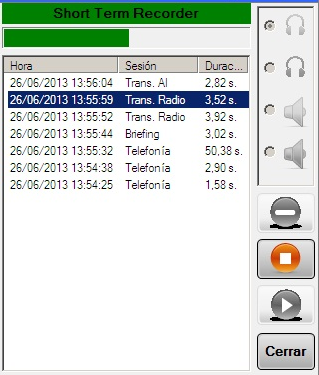
Provided that the Sector has been configured by the System Supervisor with the Recording Function, all of the terminal’s audio sessions will be recorded automatically.

Sessions may be:

* Radio Reception. Recording begins and ends with the presence or not of SQL; if there is more than one channel in RX with SQL, the session starts with the first SQL and ends with the last one.
* Radio Transmission. Recording begins and ends with the PTT action.
* Telephone Conversation. Recording begins and ends with the conversation status and end of the conversation on the terminal.
* Hotline Reception. Recording continues during call reception.
* Hotline Transmission. Recording continues during call transmission.
* BRIEFING function. Recording continues while the BRIEFING function is active.

### Session Replay

To play back sessions, the user presses the REPRODUCTION button that is located in the Telephony Functions zone, see figure 21, page 24. When the REPRODUCTION key is pressed, the following window opens:

**Figure 54. Local Replay on the Terminal, Standby and Replay**

A bar is displayed at the top to indicate the replay status.

The central screen shows all of the audio sessions recorded on the terminal, indicating the date and time when the session recording finished, the type of session to which it belongs and its duration.

The following are displayed on the right side of the window, from top to bottom:

* A box that contains the audio devices that can be used for replay - executive headphones, assistant headphones, Radio speaker and Hotline speaker. The replay medium cannot be changed during replay.
* Delete button. Allows the selected session to be deleted.
* End Replay Button. Ends the replay in progress.
* Replay Button. Begins the replay of the selected file.
* Close Key. Closes the Local Replay on Terminal function.

If, during session replay, PTT is pressed or a Transmission by Hotline is done, the replay will stop automatically and the Replay Function will close.

The Close button shows the telephony activity indicator, just like the DA and IA keys in table 13, page 27.

## BRIEFING function

The BRIEFING function consists of a mechanism for recording the status of the terminal and the environment that it controls during the operator switchovers. The information recorded is voice information (audio).

The general information panel contains the BRIEFING key, as shown in the figure below:



**Figure 55. BRIEFING Function**

When you press the BRIEFING key, a message opens with two buttons, Accept or Cancel. If you click Accept, the BRIEFING session indicated in the messages window will begin.

When you press the key again, the recording and BRIEFING function will close. This session will also close automatically if:

* PTT is pressed
* If a TX Hotline call is made
* If an outgoing telephone call is made.
* After thirty (30) seconds of activity of the function.

# Annexes

## SCREENSHOTS IN ENGLISH

## SCREENSHOTS IN FRENCH

|  |  |
| --- | --- |
| Figure | NECESSARY |
| Figure 1 |  |
| Figure 2 |  |
| Figure 3 | N.A |
| Figure 4 | N.A |
| Figure 5 | N.A |
| Figure 6 |  |
| Figure 7 |  |
| Figure 8 |  |
| Figure 9 |  |
| Figure 10 |  |
| Figure 11 | N.A |
| Figure 12 | N.A |
| Table 1 | N.A |
| Table 2 | N.A |
| Table 3 | N.A |
| Figure 13 | N.A. |
| Figure 14 | N.A. |
| Figure 15 | N.A |
| Figure 16 | N.A |
| Figure 17 |  |
| Figure 18 | N.A |
| Figure 19 |  |
| Figure 20 |  |
| Figure 21 |  |
| Table 4 | N.A |
| Figure 22 | N.A |
| Figure 23 | N.A |
| Figure 24 | N.A |
| Figure 25 | N.A |
| Figure 26 | N.A |
| Figure 27 | N.A. |
| Figure 28 | N.A |
| Table 5 | N.A |
| Table 6 | N.A |
| Figure 29 | N.A |
| Table 7 | N.A |
| Figure 30 | N.A |
| Figure 31 |  |
| Figure 32 |  |
| Figure 33 |  |
| Table 8 | N.A |
| Figure 34 |  |
| Figure 35 |  |
| Table 9 |  |
| Table 10 |  |
| Table 11 |  |
| Table 12 |  |
| Table 13 |  |
| Table 14 | N.A. |
| Table 15 |  |
| Table 16 | N.A. |
| Figure 36 |  |
| Figure 37 |  |
| Figure 38 | N.A. |
| Figure 39 |  |
| Figure 40 |  |
| Figure 41 |  |
| Figure 42 |  |
| Figure 43 |  |
| Figure 44 |  |
| Figure 45 |  |
| Figure 46 |  |
| Figure 47 |  |
| Figure 48 |  |
| Figure 49 |  |
| Table 17 | N.A. |
| Figure 50 | N.A |
| Figure 51 | N.A |
| Figure 52 | N.A |
| Figure 53 | N.A |
| Table 18 | N.A |
| Table 19 | N.A. |
| Table 20 | N.A. |
| Table 21 | N.A. |
| Figure 54 |  |
| Figure 55 | N.A |
|  |  |

# Glossary of Terms

|  |  |
| --- | --- |
| **A/G** | Air / Ground |
| **ACC** | Area Control Centre |
| **DA** | Direct Access |
| **IA** | Indirect Access |
| **ATC** | Air Traffic Control |
| **ATM** | Air Traffic Management |
| **ATS** | Air Traffic System |
| **AGVN** | Air Traffic Ground Voice Network |
| **ATS-N5** | UIT-N5 Protocol for ATS |
| **ATS-QSIG** | QSIG protocol in ATS systems |
| **ATS-R2** | R2 protocol in ATS systems |
| **CB** | Central Battery |
| **LB** | Local Battery |
| **BROADCAST** | Means of transmitting to all devices on a network |
| **CD** | Compact Disk |
| **Cd** | Candela |
| **CD-ROM** | Compact Disk – Read Only Memory |
| **EC** | European Community |
| **CELP** | Code excited linear prediction. Voice encoding algorithm |
| **CODEC** | Encoder-Decoder |
| **COTS** | Commercial Off The Shelf |
| **CPU** | Central Processing Unit |
| **dBm** | Decibel-milliwat |
| **DTMF** | Dual-tone multi-frequency signalling. Analogue Telephony Protocol |
| **ETHERNET** | LAN networks standard |
| **ETM** | Multi-protocol Test Equipment |
| **ETSI** | European Telecommunications Standards Institute |
| **EUROCAE** | European Organization for Civil Aviation Equipment |
| **FULL-DUPLEX** | Simultaneous send and receive transmission mode |
| **FXO** | Foreign eXchange Office. Subscriber mode telephone interface. |
| **FXS** | Foreign eXchange Station. Central Mode Telephone Interface |
| **HF** | High Frequency. Electromagnetic spectrum band in the frequency range of 3 MHz to 30 MHz |
| **HMI** | Human Machine Interface |
| **HTTP** | Hypertext Transfer Protocol |
| **Hz** | Hertz |
| **IP** | Internet Protocol. Basic communications protocol |
| **IPDV** | IP PACKET DELAY VARIATION. See JITTER |
| **ISA** | Industry Standard Architecture |
| **JITTER** | Deviation or displacement in a periodic parameter of a signal. |
| **LAN** | Local Area Network |
| **HL** | Hotline (Instant Access) |
| **LCD** | Liquid Crystal Display |
| **NEHL** | Normalised External Hotline |
| **LD-CELP** | Low-Delay Code Excited Linear Prediction |
| **m** | metres |
| **MB** | MegaByte |
| **MEDIA** | Information contained in a transmission |
| **MHz** | MegaHertz |
| **MULTICAST** | Information sent over a network to multiple destinations simultaneously |
| **NTP** | Network Time Protocol. Network synchronisation protocol |
| **ICAO** | International Civil Aviation Organisation |
| **PABX** | Private Automatic Branch eXchange |
| **PICT** | Tower Control Integrated position |
| **PROXY** | Program or device that performs an action in representation of another. |
| **ERSS** | Equipment Room Supervision Station |
| **ORSS** | Operations Rooms Supervision Station |
| **PSTN** | Public Switched Telephone Network |
| **PTT** | Push to talk |
| **QSIG** | RDSi-based Telephony Signalling Protocol |
| **RAM** | Ramdom Access Memory |
| **RD** | Radio |
| **ISDN** | Integrated Services Digital Network |
| **ISDN-B** | Integrated Services Digital Network Basic Interface |
| **RFC** | Request for Comments |
| **RTCP** | Real time control protocol. RTP sessions control |
| **RTP** | Real-time Transport Protocol. Protocol for transporting data over IP |
| **RX** | Reception |
| **s** | seconds |
| **SACTA** | Automated Air Traffic Control System of Enaire |
| **VCS** | Voice Communications System |
| **SDP** | Session Description Protocol |
| **SIP** | Session Initiation Protocol. Session Management Protocol over IP |
| **SNIFFER** | Software or Hardware element that can intercept and log data network traffic |
| **SNMP** | Simple Network Management Protocol. IP networks Management Protocol |
| **SOAP** | Simple Object Access Protocol |
| **SQUELCH** | Indicates presence of a Valid Signal in Radio Reception |
| **G/A** | Ground/Air |
| **G/G** | Ground / Ground |
| **TACC** | Terminal Area Control Centre |
| **TC** | Radio channel key |
| **TCL** | Indirect Access Telephone Line key |
| **TCP** | Transmission Control Protocol |
| **TF** | Telephony |
| **TFT** | Thin Film Transistor |
| **TL** | Hotline key |
| **TT** | Telephone Line key |
| **TWR** | ToWeR (Control Tower) |
| **TX** | Transmission |
| **SCU** | Sector Control Unit |
| **UDP** | User Datagram Protocol |
| **UHF** | Ultra High Frequency. Electromagnetic spectrum band in the frequency range of 300 MHz to 3 GHz. |
| **UIT-T** | UIT Telecommunications Standardisation Sector |
| **UNICAST** | Means of sending information from a single sender to a single recipient |
| **USB** | Universal Serial Bus |
| **VHF** | Very High Frequency. Electromagnetic spectrum band in the frequency range of 30 MHz to 300 MHz |
| **VICTOR** | Tower Control and Display |
| **VoIP** | Voice over IP. Technology for transmitting audio signals in IP data packets |
| **W** | watt |
| **WAN** | Wide Area Network |
| **WEB** | World Wide Web. System of documents connected by hypertext links, available on a network. |
| **XML** | Extensible Markup Language |

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| NLOG | 4.2.3 | X |  |  | BSD-3-Clause | https://www.nuget.org/packages/NLog/4.2.3 |
| WebSocket4Net | 0.14.1 | X |  |  | Apache-2.0 | https://www.nuget.org/packages/WebSocket4Net/ |
| JSON.NET | 7.0.1 | X |  |  | MIT | https://www.nuget.org/packages/Newtonsoft.Json/7.0.1 |
| #Snmp Library | 8.5.0.0 | X |  |  | MIT | https://www.nuget.org/packages/Lextm.SharpSnmpLib/8.5.0 |
| PJ-SIP | 1.6 | X |  |  | GPL v2.0 | <http://www.pjsip.org/download.htm> |
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| #Snmp Library | 7.0.0.1 | X |  |  | MIT | https://www.nuget.org/packages/Lextm.SharpSnmpLib/7.0.0.2 |
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| O.S. Yellow Dog | 2.4.1 | X | X |  | GPL v2.0, LGPL v.2.1 | http://www.fixstars.com/en/technologies/linux/ |
| oSip Library | 2.3.5 |  | X |  | LGPL v3 | <ftp://ftp.gnu.org/gnu/osip> |
| xOSip Library | 2.3.5 | X |  |  | GPL v2.0 | <http://download.savannah.nongnu.org/releases/exosip/> |
| jRtp Library | 3.7.1 | X |  |  | MIT | http://research.edm.uhasselt.be/jori/page/CS/Jrtplib.html |
| Snmp++ Library | 3.3.1 | X |  |  | Particular license | http://agentpp.com/download.html |
| Agent++ Library | 4.0.2 | X |  |  | Apache 2 Open Source | http://agentpp.com/download.html |
| mongoose server | 5.6 | X |  |  | GPL v2.0 | https://github.com/cesanta/mongoose/releases/tag/5.6 |
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| jQuery | 2.1.3 | X |  |  | [MIT/Boost Software License](https://jquery.org/license/) | https://code.jquery.com/jquery/ |
| Angular JS | 1.5.3 | X |  |  | MIT | https://code.angularjs.org/1.5.3/ |
| Bootstrap | 3.3.5 | X |  |  | MIT | https://github.com/twbs/bootstrap#copyright-and-license |
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1. Only in ASECNA interfaces. [↑](#footnote-ref-1)
2. Except for ATS network calls, for which the subscriber number will be dialled without a prefix. [↑](#footnote-ref-2)
3. Only in ASECNA interfaces. [↑](#footnote-ref-3)
4. Only in ASECNA interfaces. [↑](#footnote-ref-4)
5. This table shows only the graphics that correspond to the pagination control format used in the ASECNA interface. [↑](#footnote-ref-5)
6. Only accessible in the ASECNA interface. [↑](#footnote-ref-6)