ICERS II

C.T.R.T Guide

In Cockpit Emergency Resolution System

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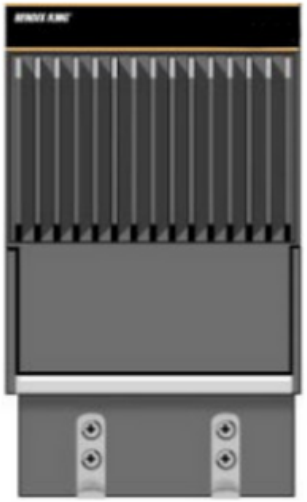
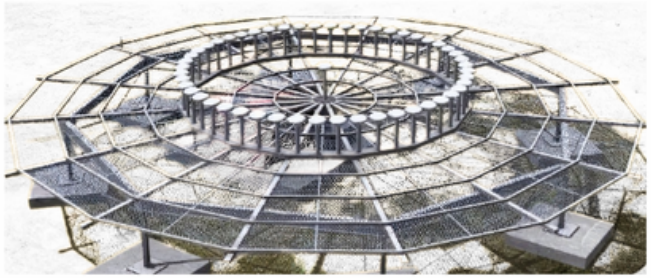
C.T.R.T Equipment

Remote-Mounted Hardware



C.T.R.T Processor

C.T.R.T Transceiver



Omnidirectional Antenna

CAUTIONS

In all cases, both an emergency, alert and/or warning should be communicated with the aircraft.
Be aware of aircraft movement in cases where the C.T.R.T is connected to the aircraft's A.E.S., as it may be out of range of the ground equipment.

NOTES

Respecting to cases of fraudulent casualties, the aeronautical personnel in charge is the one who decides whether or not it is an act of this nature, depending on the information available.

SECTION III : SYSTEM CONSIDERATIONS

SECTION III EXPLAINS CONSIDERATIONS OF THE SYSTEM; WARNINGS AND LIMITATION, CAUTIONS AND NOTES..

WARNINGS AND LIMITATION

Attention should be paid to the equipment from time to time to test its correct operation, as well as to take care of the case in case of emergencies, until it is landed.
Properly use the commands to be sent, with their respective order.

Introduction

C.T.R.T (Control Tower Receiver and Transmitter) equipment is an ICERS system module, which is located in ground, and managed by the Air Traffic Control. Its function is to wirelessly connect the cockpit equipment (A.E.S.) with the air traffic controllers, advertising about emergencies and/or alerts, and giving the possibility to send commands or instructions to other A.E.S..

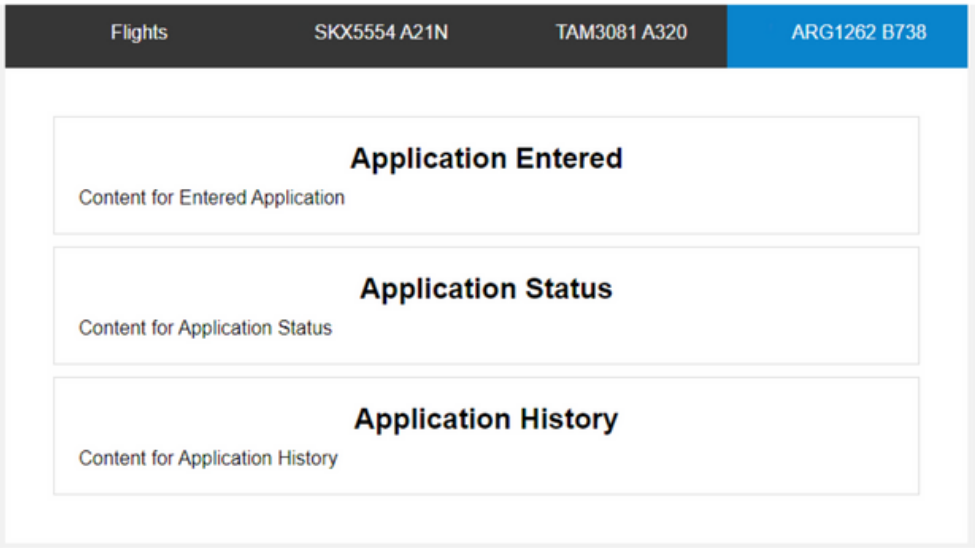
SECTION I : OPERATION

SECTION I DESCRIBES BASIC OPERATION OF THE C.T.R.T SYSTEM.

- Compatible and independent of the ATC system.
- Determines the existence of crew inconveniences.
- Determines the best options to perform an emergency landing.
- Provides ground information and aural and luminous announcements.
-Synthesized voice

C.T.R.T Display

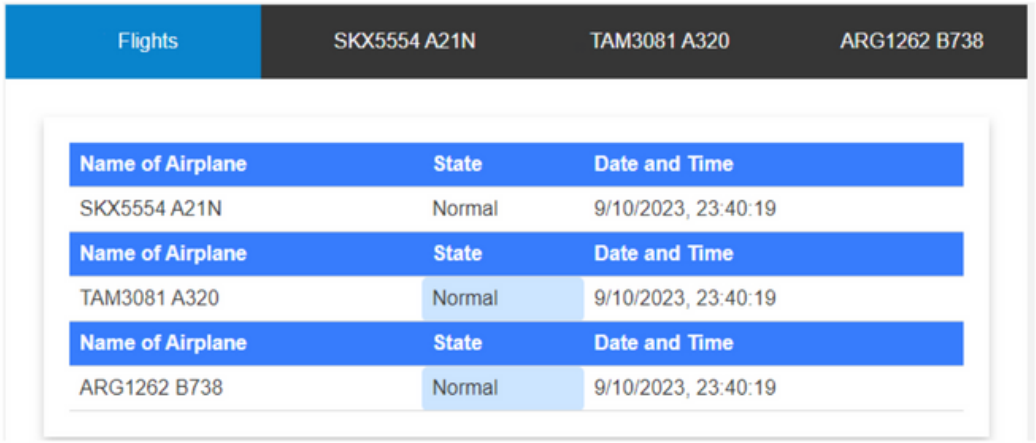
In the following sections, each aircraft is specifically discussed.



These sections will be specific to each aircraft in the C.T.R.T airspace, within them there is a space called "Application Entered" in which different commands can be entered, also the history of sent commands will be shown in "Application History", and finally the history of the events that occurred in the aircraft will be shown on the screen in "Application Status".

C.T.R.T Display

The display shows the different sections it has:



The "Flights" tab appears as the main one, showing the current flights the C.T.R.T module is aware of. Each flight has its name, date and time, and its status which can be: "Normal", "Alert" and "Emergency" depending on what the C.T.R.T receives from that aircraft.

C.T.R.T Operation

Functions:

The first function that the C.T.R.T has automatically, is to interrogate each aircraft that is in its airspace, this is achieved by sending signals periodically and receiving the reception message from the different aircraft.

When an A.E.S. receives this signal, it automatically sends its unique code and the aircraft identifier, so the C.T.R.T knows that the aircraft has a code (2353 example) and that it is in its airspace.

The second function is to send commands from the C.T.R.T to the A.E.S.. These commands are manually triggered by the operator. The system is designed so that it is only necessary to send commands in case of an emergency.

The third function of C.T.R.T is the possibility of being able to calculate the best option for emergency landings, taking into account factors such as, fuel, local terrain, weather, aircraft model, weight, etc.

C.T.R.T Operation

Cases:

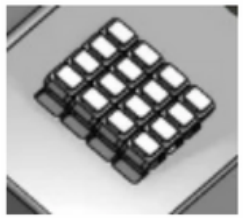
In emergencies, C.T.R.T will receive a message with the following data: A.E.S. code (of the aircraft in emergency), the event that occurred and aircraft data. Each of these data will be used by the team:

- The A.E.S. code, to show on screen the aircraft under emergency, together with fact that occurred, and the possibility to send commands.
- The aircraft data, so that in case an emergency landing is necessary, the best option can be calculated.
- In normal conditions, the C.T.R.T will send a signal periodically to detect aircraft and these will send their A.E.S. code and identifier, then the ground equipment will display them on screen.

Database:

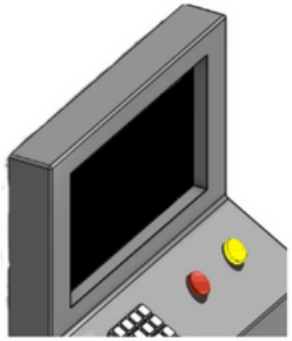
C.T.R.T operates with a pre-filled database, witch includes information about nearby airports and their constantly updated conditions. The equipment will take data from this database in order to be able to make calculations when it is necessary to make landings.

C.T.R.T Control Unit



Keyboard: This element is used to interact with the display, both to enter commands and to scroll through the display tabs.

Lights: The lights provide luminous indications in case of emergency, alert or warning, in this case it will be the red light for emergencies and amber light for alerts and warnings.



Display: all interactions with the C.T.R.T and the display of aircraft, their facts and data, and the commands sent are performed from here.

SECTION II : EQUIPMENT

SECTION II DESCRIBES CONTROLS THE PANEL AND THE DISPLAY.

C.T.R.T Equipment

Commands

The ground equipment has several commands among them:

- "Connect": This command tells the A.E.S. to save the C.T.R.T code so that only its messages are read, i.e. the A.E.S. only responds to the connected ground equipment.
- "Disconnect": This command does the opposite process of the "connect" command, telling the A.E.S. to delete the C.T.R.T code from its memory.
- "Connect to": This command tells the A.E.S. to erase the current C.T.R.T code from its memory and place the new C.T.R.T code in its place.
- "Activate A.E.S.": This command remotely activates the A.E.S..
- "Parameters for landing": This command sends the parameters for landing (such as airport ILS frequency, airport GPS location, airport altitude, etc.), informs A.E.S. that this message has the on-board computer as its endpoint.

Commands

- "Permission to Land": This command allows the aircraft to land at the previously established airport.
- "Deny Landing": This command does not allow the aircraft to land at the previously established airport.
- "Disable A.E.S.": This command disables the A.E.S. that was previously remotely activated.
- "Change Route By": This command instructs the aircraft to change the route from the airport that was assigned to a new one.

Not all commands are addressed to the A.E.S., but also to the on-board computer, and it is in these commands that the A.E.S. acts as a mediator.

The commands with destination to the on-board computer are:

"Change Route By", "Deny Landing", "Permission to Land" and "Parameters for Landing".

While the commands defined for A.E.S. are:

"Connect", "Disconnect", "Connect to", "Activate A.E.S." and "Disconnect A.E.S.".

Indications and Voice Announcements

Case	Visual	Voice Announcement
Manual activation	Red light	"Emergency, Emergency"
No wearing of the bracelet	Amber light	“Alert Alert, Alert”
A.E.S. deactivation	Amber light	“Alert Alert, Alert”

Note: in cases of sleepiness and hypoxia there are 2 different warnings, depending on the 30 seconds, this happens because the A.E.S. performs 2 alerts to the C.T.R.T: one of them when the pilots appear hypoxia or drowsiness and have 30 seconds to press the reaction button (in this case it is taken as an alert, since the situation can still be recovered). On the other hand, after 30 seconds of no response, it is established that the crew is not in an optimal state to pilot the aircraft.

Voice Announcements:

The C.T.R.T has 2 audible warnings, one for alerts and the other for emergencies, the idea of having these is to alert the entire control tower of the event, so that they are aware of the fact, especially if it is an emergency.

Indications and Voice Announcements

Indications:

The C.T.R.T has two indicator lights, an amber warning light and a red emergency light. For warnings, the amber warning light will be used. Each light corresponds to the following events:

Case	Visual	Voice Announcement
Hypoxia (after 30 seconds)	Red light	"Emergency, Emergency"
Hypoxia (before 30 seconds)	Amber light	“Alert Alert, Alert”
Pilot death	Amber light	“Alert Alert, Alert”
Both Pilots dead	Red light	"Emergency, Emergency"
Sleepiness (after 30 seconds)	Red light	"Emergency, Emergency"
Sleepiness (before 30 seconds)	Amber light	“Alert Alert, Alert”

Operation

Under normal conditions, the C.T.R.T does not require excessive operator control, except for periodic checks for failures. When there is an emergency, alert or warning, light and sound indicators will light up, showing the aircraft involved and a tab to send commands and visualize its history.

In case of a notification, a particular information will be indicated, such as "These warnings are not necessarily of a state of alert or emergency”, always depending on the context of the event.

In case of alert, it indicates an event that occurred, which could be a potential emergency. In these cases it is recommended to pay full attention to the alert flights.

In case of emergency, it indicates an event that occurred, which requires a quick intervention by C.T.R.T. In these cases, the aircraft may crash in a short time.

For each case, use of commands is enabled. Whenever the Air Traffic Control needs to use them, the first command to send must be "Connect" so that no C.T.R.T intervenes in following communications with that aircraft.

Operation

Then you can use the different commands, but there are some that have a specific use, for example "Parameters for landing", this command must be sent after telling the equipment to prepare the message with all its contents for landing.

In case the aircraft is leaving the range of the C.T.R.T, 2 actions can be performed:

Send the command "Connect to" to connect to the next C.T.R.T, this means that the other control tower is aware of the fact and that the aircraft is heading to that airspace.

Send the command "Disconnect" so that the other C.T.R.T can connect.

System failure

In case of a failure in the C.T.R.T equipment, the equipment must be disconnected and the nearest air traffic controllers must be notified.

Failures can occur in several parts of the equipment, either in its processor, display, receiver or transmitter, in each case it will be demonstrated in a different way:

Processor failure case: in this case it is likely that the display will not show information on screen and simply no parts of the equipment will work.

Case of display failures: in this case it may not show anything (as in the previous case) or it may show errors in the aircraft history sampling.

Case of Receiver or Transmitter failure: in this case it may not show any aircraft on screen.

In either case the air traffic control shall proceed to deactivate the C.T.R.T.