1.5.4 Cockpit door locking system

Note: the following descriptions apply to D-AIPX and are based on information supplied by Airbus and Germanwings as of the date of the publication of this report.

A door separates the cockpit and passenger cabin. Its core consists of a composite *"sandwich"* type structure made of prepreg sheets covering a *"honeycomb core"*. The outer prepreg sheets are designed to ensure bullet-proofing. A door escape hatch is pre-cut on its lower part. The latter can only be used from the cockpit. It is used in emergencies when the door is stuck. Unlike the cockpit door which opens towards the inside of the cockpit, the door escape hatch can only be opened in the opposite direction.

Three electrically-controlled locks are used to lock the door as soon as it is closed. A rotating handle system on the door is used to mechanically unlock it from the cockpit.

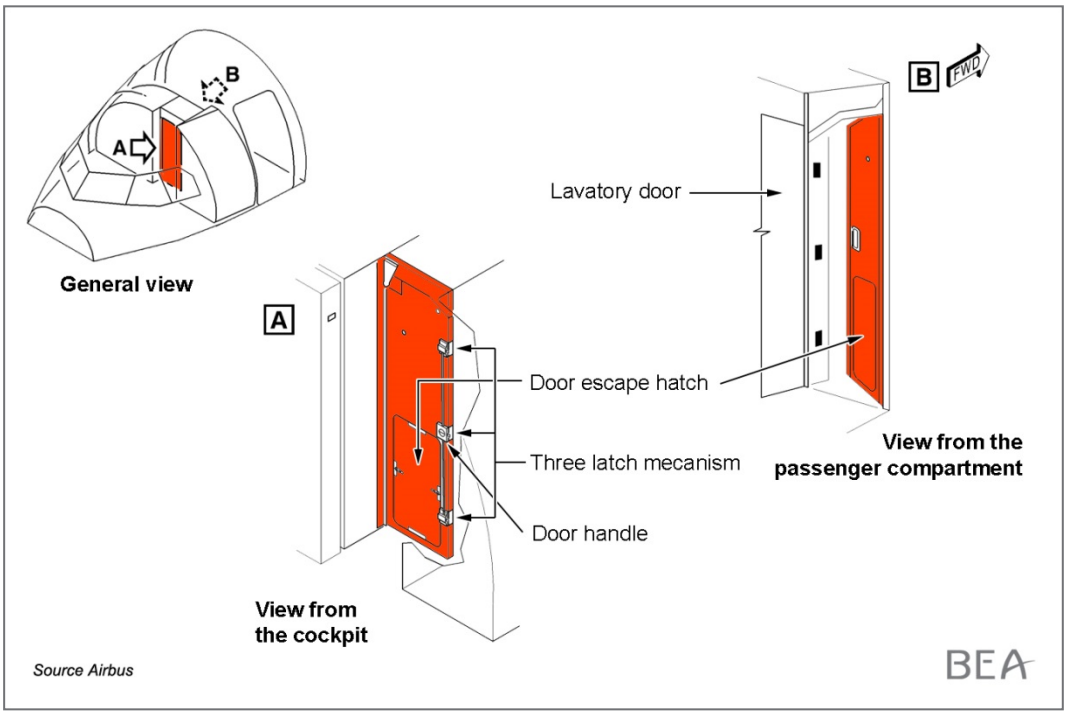

Figure 2 - cockpit access door

The cockpit door locking system (CDLS) is used to electrically control the locking and unlocking of the door.

Its main components are:

- A keypad with 12 keys (numbers 0 to 9, "*" and "#") located on the side wall of the control screen of the passenger compartment used by the cabin crew (the Forward Attendant Panel - FAP), in the passenger compartment. The keyboard also has two LEDs (green and red).
- A three-position switch, located in the cockpit on the centre pedestal (see figures 3 and 5). A return spring keeps the switch in the NORM position. Manual input is used to select the UNLOCK or LOCK position. There is also an indicator next to the switch, labelled OPEN and FAULT.

- A control unit (CKPT DOOR CONT) located on the top panel of the cockpit. Two pressure sensors are installed on this display to measure the pressure in the cockpit and monitor any sudden change. It also has LEDs that light up in case of malfunctions involving the three door locks or the system computer.
- A buzzer, located in the cockpit on the top panel, which sends an acoustic signal.

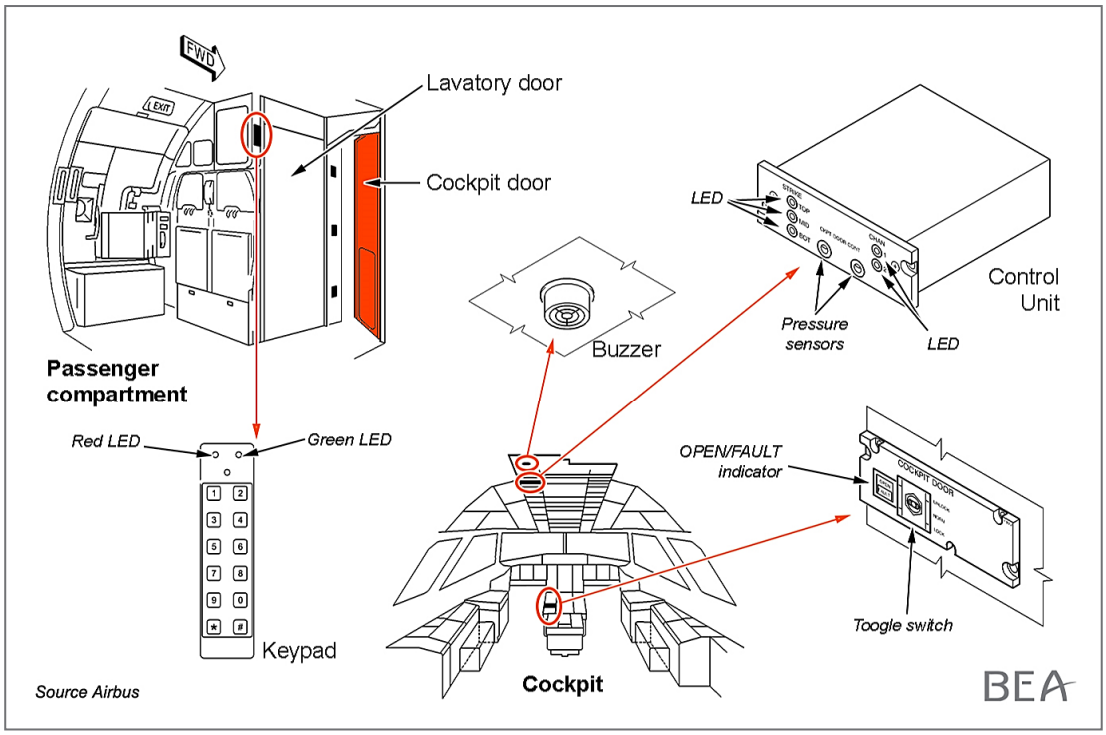

Figure 3 - cockpit door locking system

In the cockpit, the crew has two touchscreens located in front of the sidesticks. These screens retransmit the video from three cameras[8] filming:

- the access door to the cockpit;
- the left front main door of the aeroplane;
- the right front main door of the aeroplane.

[8]Each crew member can select the camera they want to display on their screen.

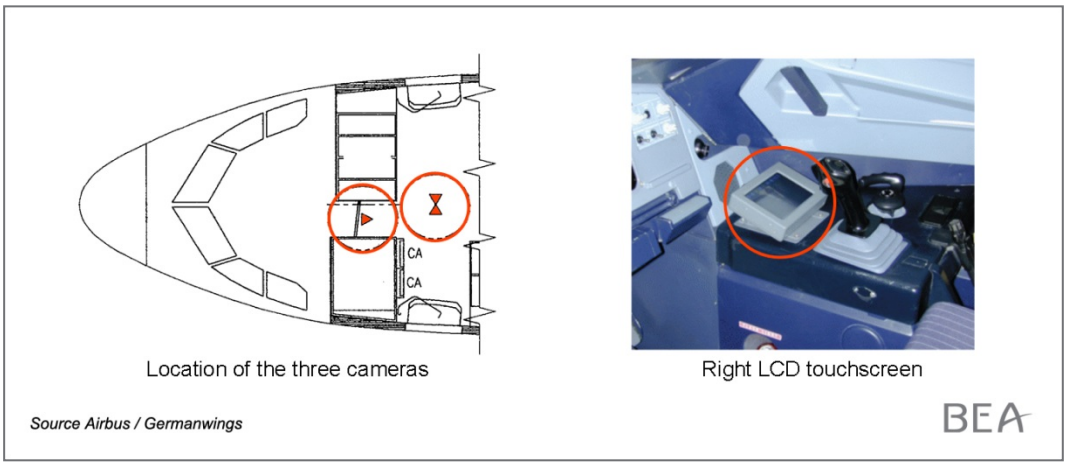

Figure 4 - surveillance cameras and monitor

The cockpit door locking system parameters can be set by each airline and for each aeroplane.

To request access to the cockpit from the passenger compartment, the normal one-digit access code followed by "#" must be entered on the keypad. A one-second acoustic signal from the buzzer sounds in the cockpit to warn the crew that someone wishes to enter. The pilots can then consult their monitoring screen.

The flight crew then moves the three-position switch:

Figure 5 - door control switch

- If they pull and maintain the switch in the UNLOCK position, the door unlocks. The acoustic signal stops. The green LED lights up continuously on the keypad to indicate the door has been unlocked. The door must then be pushed in order to open it. A magnet in the cockpit is used to keep the door in the open position.
- If the flight crew moves the switch to the LOCK position, the door is kept locked. The acoustic signal stops. The red LED lights up continuously on the keypad to indicate locking is voluntary. Any interaction with the keypad is then disabled for 5 minutes (until the extinction of the red LED)[9]. At any time, the crew in the cockpit may cancel this locking by placing the switch in the UNLOCK position. The door then immediately unlocks.
- In the absence of any input on the switch, the door remains locked. No LEDs light up on the keypad. The acoustic signal stops after one second.

[9] Any new selection of the LOCK position re-starts a 5-minute de-activation window.

In case of emergency (suspected flight crew incapacitation, for example), a three-digit code followed by "#" can be dialled on the digital keypad. The acoustic signal then sounds continuously in the cockpit for 15 seconds and the green LED on the keypad starts to flash.

If the flight crew does not respond during these 15 seconds, the door unlocks for 5 seconds. The green LED lights up continuously to indicate the door has been unlocked and the acoustic signal stops. The door only needs to be pushed in order to open it. After these five seconds have elapsed, the door locks again.

If the flight crew toggles the switch during those 15 seconds, the acoustic signal stops and the system reacts according to the command (UNLOCK/LOCK).

Note 1: Toggling the switch is not necessarily correlated with a request to access the cockpit. At any time, the crew can select the LOCK or UNLOCK position. The LOCK position overrides and resets any previous selection.

Note 2: In case of a power failure in this system, the access door to the cockpit is unlocked but remains closed.

When the door is open, the OPEN indicator lights up continuously. If an emergency procedure is initiated (three-digit code followed by "#"), the OPEN LED starts to flash.

1.5.5 Communication from the passenger cabin to the cockpit

Intercoms are present in the passenger compartment to allow the pilots and the flight attend-ants to communicate during the flight.

Each crew member can select the intercom they wish to contact. To get in touch with the cockpit, the *"CAPT"* key must be selected (figure 6).

When the *"CAPT"* key is selected:

- the ATT LED flashes on the three audio control panels (ACP) present in the cockpit;
- an acoustic signal, the *"cabin call"*, lasting three seconds, sounds in the cockpit (it is inhibited during the take-off and landing phases);
- the message *"CAPTAIN"* is displayed on the monitor of the cabin crew (AIP – At-tendant Indication Panel) when the *"CAPT"* key has been selected.

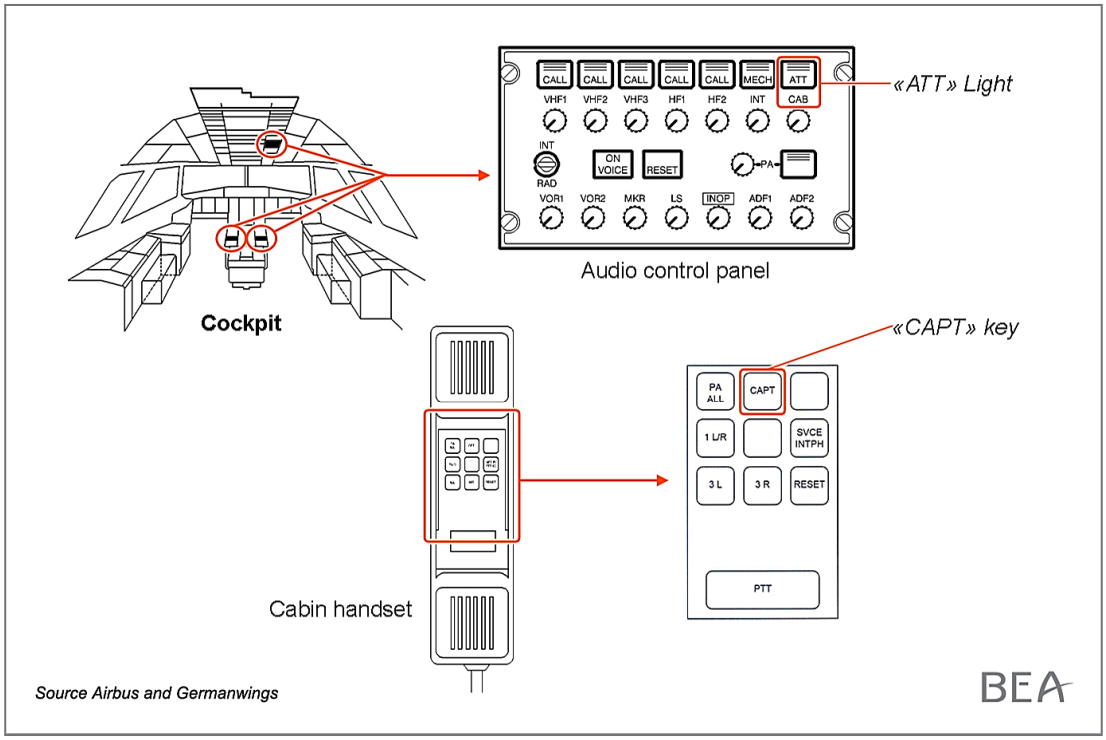

Figure 6 - intercom and communication system