Do you know your ATC/TCAS panel ?

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1 | TCAS Fault leads to AIRPROX

Shortly after takeoff from London Heathrow, the ECAM alert TCAS FAULT was triggered in an Airbus A340-600. The ECAM procedure consists in setting the TCAS mode to standby. Unfortunately, the effects of the action were not the expected ones: the crew inadvertently switched off both transponder and TCAS instead of selecting the TCAS stand-by mode as per ECAM procedure. The Air Traffic Control secondary radar information was temporarily lost and prevented the automatic update of the flight data. In other words, the aircraft disappeared from the ATC radar screen and was not able to respond to other aircraft TCAS interrogation.
During this time the Tower Traffic Controller tried to contact the approach centre. Although several attempts were made the calls were not answered. Unknown to the approach controller, the aircraft was climbing in conflict with another departing aircraft. As the aircraft transponder was not responding, no TCAS alerts nor Short Term Conflict Alert (in Air Traffic Control) triggered and the minimum separation reduced to 3.7 NM and 0 ft.

2 | TCAS controls

Let us have a closer look to the ECAM procedure and to the TCAS controls, to understand this scenario.

When the TCAS fails, the ECAM procedure indicates (on A340/330): TCAS MODE……..STBY (See fig 1).

Fig 1: CAS FAULT ECAM procedure on A330/340

Fig 2: Gables 40 ATC/TCAS control panel

The crew is expected to set the faulty system on standby.
In the above event, the airline had chosen for its fleet the TCAS panel, which is shown in figure 2.

On this panel, a single rotating selector enables the crew to switch between several modes, linked to ATC transponder and/or TCAS. When the selector is placed in **TA/RA** or **TA ONLY** positions, both TCAS and ATC transponder operate. But if the selector is placed in one of the three other positions (**XPNDR, ALT RPTG OFF, STBY**), then the TCAS is on standby mode.
In their intention to set the TCAS only on standby mode, as requested by the ECAM, the crew turned the selector until it reached the **STBY** position. They did not immediately realize that this position set both the TCAS **and the ATC transponder** on standby mode.

TCAS + Transponder in standby

TCAS standby / Transponder On

TCAS + Transponder ON

3 Other TCAS Control Panels

Several types of panels are available to customers, and pilots have to pay attention to the switches layout when operating them, as functions may differ from a panel to an other.

On Airbus basic TCAS panel, the controls are split into two parts:

- one side of the panel is dedicated to ATC transponder controls
- the other side is dedicated to TCAS control.

Fig 3: Basic ATC/TCAS control panel

Setting the TCAS mode to standby is done by setting the appropriate switch to the STBY position. The switch is easily identified, as it is located with other TCAS controls, and separated from ATC transponder controls (see fig 3).

When the TCAS switch is placed on the STBY position, the TCAS is electrically supplied but is inoperative, and the ATC transponder still operates normally. As a result, there will be no TCAS TA or RA on board the aircraft whose TCAS has been set to stand-by. However, the ATC transponder will be able to continue responding to potential intruder interrogation, and TA/RA information will continue to operate on-board the intruder.

Other designs exist for ATC/TCAS panel, on which TCAS setting on standby is achieved by setting the selector to XPNDR, STBY, ON or OFF, depending on which TCAS control panel is installed. On Gables 10 panel, for example, the selector should be turned from the normal TA/RA position to the ON position to set the TCAS on standby (see Figure 4). The ON legend is related to the ATC Transponder only. This is indicated by the fact that the ON legend is out of the settings related to the TCAS, that are gathered by a line associated to a TCAS label.

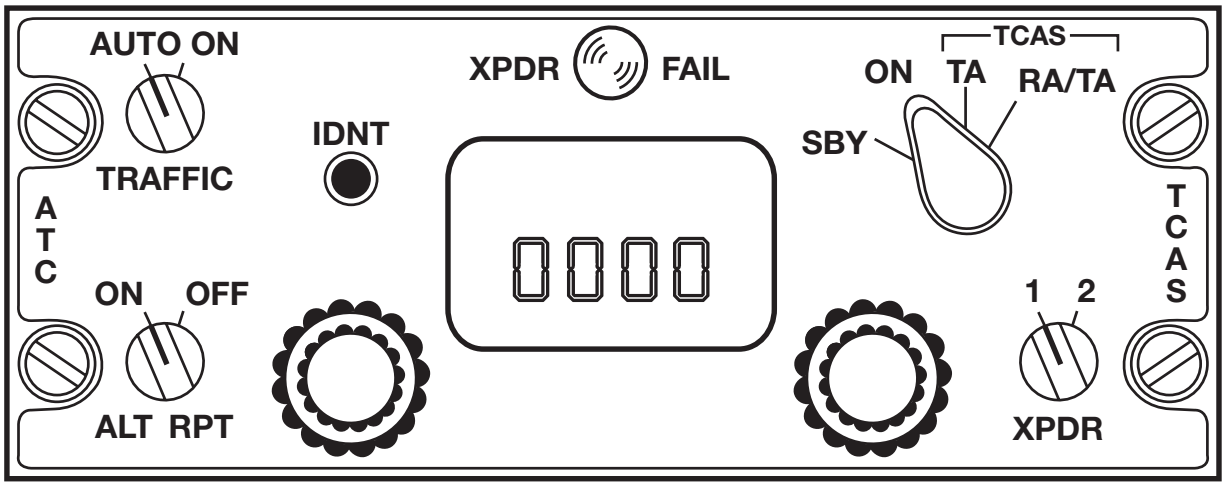

Fig 4: Gables 10 ATC/TCAS control panel – TCAS on standby

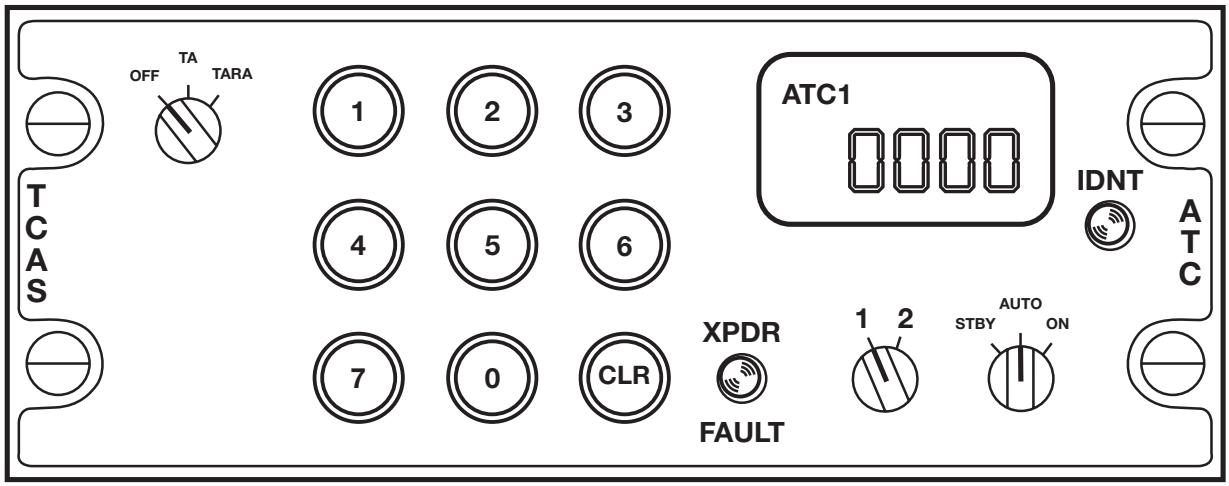

Fig 5: Gables 20 ATC/TCAS control panel – TCAS on standby

On Gables 20 panel, ATC transponder and TCAS have dedicated controls. TCAS is set on standby by placing the TCAS selector to the OFF position (see Figure 5).

4 New ECAM procedure

Setting the TCAS to standby mode can be achieved by setting the selector to XPNDR, STBY, ON or OFF, depending on which TCAS control panel is installed.

The Flight Warning Computer that generates the ECAM procedure in case of a TCAS fault has no means of determining what type of ATC/TCAS control panel is installed. It is therefore not possible to provide the crew with a customized ECAM procedure indicating the setting to be reached for each panel.

This is why the TCAS FAULT ECAM procedure is generic and provides the objective of the action to be performed: TCAS MODE……STBY. It is then up to the crew to place the right selector in the right position.

ECAM Change

Setting the TCAS on stand-by when it is faulty enables to remove the TCAS FAULT flags on PFD and ND.

But the related in-service event highlighted the difficulty for the crew to use the right setting when the word “STBY” is displayed on the ECAM with a panel that differs from the AIRBUS standard one. Airbus then decided to remove the action line TCAS MODE…..STBY from the ECAM procedure and to accept the drawback of the flags remaining on PFD and ND after the failure. This modification will be effective upon fitting with new FWC standards. This modification is only applicable to Long Range aircraft, as the TCAS FAULT procedure is crew awareness only (no action line) on Single Aisle and A380 aircraft, and there is no ECAM warning for TCAS failure on A300/A310 family.

In the interim period before FWC standards are installed, AIRBUS published an OEB to inform crews not to apply the action line TCAS MODE…..STBY, in the case of a TCAS FAULT ECAM caution. The TCAS FAULT ECAM caution should be considered as a “crew awareness”.

This information was dispatched to airlines through FOT 999.0138/06 on 11th December 2006. The crews are informed of the deviation from ECAM procedure by:

- OEB **68/1** for **A330** aircraft (cancelled by FWC STD 2)
- OEB **82/1** for **A340** aircraft (cancelled by FWC STD L11 for A340-200/300 aircraft and FWC STD T2 for A340-500/600 aircraft)

Safety First

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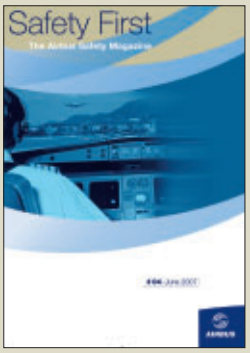

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