

### CHAPTER 3.1 - FACTS ESTABLISHED BY THE INVESTIGATION

F-GGED held an separate and valid Certificate of Airworthiness.

It was maintained in compliance with the regulations in force.

During the entirety of the flight which led to the accident it was within the limits of mass and load distribution.

It was in an airworthy condition with no known failures.

On this type of aircraft anomalies relative to the processing of VOR data by on-board systems had been notified. They had formed the subject of an Notice to Airmen (NOTAM) and of an operational procedure. The Investigation did not find evidence of any malfunction within the processing system for VOR data, nor any sign that the crew had noticed flutter in the VOR indication resulting from such malfunction, in the course of the alignment phase to the approach path before descent towards the runway.

Faults likely to affect the operation of DME systems of the type installed on F-GGED had been identified. They had formed the subject of a Notice to Airmen and of an operational procedure. Modifications specified by the equipment manufacturers had not yet been made to the DME equipment of F-GGED. However, on the basis of technical data available, the Investigation was able to refute the theory that a failure associated with "deaf mode", "sleeping mode" or "jumping mode" had occurred around the moment the decision was taken to place the aircraft in descent mode towards the runway.

Anomalies in the FCU on the A320 were notified some months after the accident. The Investigation did not find evidence of any malfunction of the FCU installed on F-GGED. Nevertheless, it was not possible to rule out the hypothesis of a failure in the push-button which controls the change of mode, or of a corruption in the target value displayed by the pilot on the FCU before it was captured by the Autopilot computer.

F-GGED was not equipped with a Ground Proximity Warning System (GPWS).

The STR VOR ground station was functioning normally. The flight inspection showed that the characteristics of the signal transmitted were within the tolerances sanctioned by the ICAO. However, irregularities due to the recombining of the direct signal and signals reflected by areas of high

ground were discovered in the approach path sector, between 9 and 8 NM from the STR station. These irregularities were of such a kind as to give rise to fluctuations in on-board indications after the aircraft was put into descent mode, on the segment corresponding to the trajectory, especially as F-GGED's flight path was abnormally low over the scan horizon of the ground station.

The VOR-TAC 05 approach procedure to Strasbourg is derogatory in three areas, owing to the constraints imposed by the Strasbourg air traffic environment and the surrounding mountains. In particular, the Intermediate Approach segment does not contain a level section.

The crew possessed the statutory certificates, licences and Type Ratings necessary to complete the flight. On Airbus A320s, the Captain had 162 hours experience, the Co-pilot 61 hours.

Toxicological analyses showed the Captain's blood alcohol level to be nil, while the Co-pilot had a level of under 0.30 g/l.

The Captain was the pilot at the controls.

The crew had planned to carry out an ILS 23 approach followed by a visual manoeuvre for runway 05 which was in use. The Controller, for his part, was expecting them to carry out a direct VOR-TAC 05 approach.

During the arrival phase, after the aircraft had passed ANDLO and the crew had signalled their intention to carry out an ILS 23 approach followed by a visual manoeuvre for runway 05, the Controller informed the crew that this would not be possible until a delay had elapsed due to three IFR departures on runway 05.

Up to this moment, the crew and the Controller were not aware of the differences in their respective plans.

The crew changed its strategy and chose to carry out a VORTAC 05 procedure in order to avoid the announced delay.

To shorten the VOR-TAC 05 procedure, the Controller suggested the crew be given radar guidance to take them to the ANDLO point. The crew accepted this proposition.

Radar guidance did not enable the crew to align the aircraft on the approach track to ANDLO.

Once authorised for Final Approach, the crew began the descent, even though the aircraft was still approximately ten degrees to the left of the approach track.

The descent commenced at 11 NM from STR TACAN, i.e. at the nominal published distance.

The aircraft's vertical speed stabilised at 3,300 ft/mn, instead of the figure of approximately 800 ft/mn corresponding to the glide path complying with the published procedure for the nominal approach speed.

The flight mode utilised for the final turn and the descent was a "selected" Autopilot mode. The flight path reference was not modified between the final turn and the exact moment of the accident and it was almost certainly an HDG-VS reference.

The auto-thrust was in SPEED mode.

At the exact moment of the accident the aircraft was in configuration 2, with the gear down.

It was night time and the aircraft was flying in conditions of zero visibility.

The aircraft crashed into La Bloss mountain, which has a height of 826 m (2,710 ft). The point of impact is located at an altitude of 799 m (2,620 ft), approximately 0.8 NM to the left of the runway approach track, 10.5 NM from the threshold of runway 05, and 8.2 NM from the STR VOR and TACAN ground stations.

Cabin preparation procedures for landing had been carried out and all the occupants of the aircraft were seated with their seat belts fastened, apart from one member of the cabin crew.

Nine people survived the accident.

The Emergency Locator Transmitter was destroyed on impact.

Search operations culminated in the discovery of the aircraft a little more than four hours after the accident.