DATA SUMMARY

LOCATION

Date and time	**Wednesday, 5 March 2008; 08:25 local time[1]**
Site	**Yaiza (Island of Lanzarote)**

AIRCRAFT

Registration	**EC-FJV**
Type and model	**AEROSPATIALE AS-350B2**
Operator	**Helicópteros Insulares, S. L.**

Engines

Type and model	**TURBOMECA ARRIEL 1D1**
Number	**1**

CREW

Pilot in command

Age	**49 years old**
Licence	**CPL(H)**
Total flight hours	**3,500:00 h**
Flight hours on the type	**1,000:00 h**

INJURIES

	Fatal	Serious	Minor/None
Crew		**3**	
Passengers			
Third persons			

DAMAGE

Aircraft	**Significant**
Third parties	**None**

FLIGHT DATA

Operation	**Aerial work – Commercial – Photography**
Phase of flight	**Maneuvering**

REPORT

Date of approval	**28 January 2009**

[1] All times in this report are local. UTC time coincides with local time in Lanzarote on that date.

1. FACTUAL INFORMATION

1.1. History of the flight

The helicopter took off from Yaiza heliport with three people aboard, the pilot, a camera operator and a director, for the purpose of filming an automobile commercial.

To this end, traffic had been closed off along a 2 km stretch of road LZ-703, which goes from Las Breñas to Golfo, on the Lanzarote´s island west coast. The work consisted of filming a vehicle traveling along the closed stretch of road from a camera on the helicopter.

A Tyler Camera Systems mount, specifically designed for Eurocopter helicopter models AS-350 and AS-355, had been installed onboard. This mount is certified by the FAA under Supplemental Type Certificate STC SH5050NM, and had been installed according to instructions provided by the manufacturer and which require, among other things, that the aircraft's rear seat be removed. The mount can be used to install the camera on either the right or left side. In this particular case, the camera was situated in the right side of the helicopter.

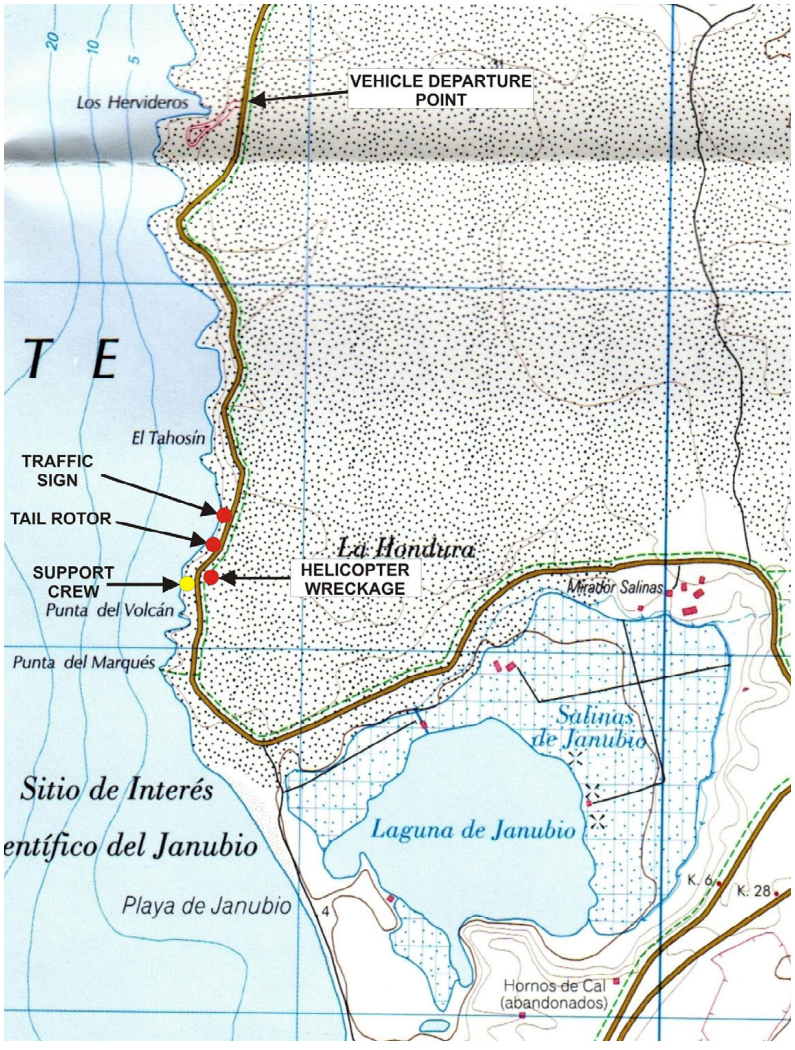

Figure 1. Map of the area

Several vehicles were used. They departed one by one from a parking lot located in the vicinity of Los Hervideros, and headed along the road to the south to a location 2 km away from the point of departure.

While filming the ninth take, the helicopter's anti-torque rotor struck a traffic sign on the road, which caused the tail rotor to detach. The helicopter

immediately started to rotate about its central axis and ended up impacting the ground just over 100 m from the initial impact point.

Members from the support crew in the surrounding area immediately alerted emergency services and initially rendered aid to the occupants, who were subsequently evacuated to a medical center.

All three occupants onboard the aircraft were seriously injured.

From the available weather information (high-resolution satellite images, radar reflectivity images and wind and pressure maps), it is estimated that at the time and place of the accident skies were partly cloudy or clear, winds were from 050° to 070° at 8 to 12 kt, visibility was good and the temperature was around 18 °C.

1.2. Damage to aircraft

The aircraft was seriously damaged as a consequence of the impacts, first with the traffic sign and then with the ground. The damage was mainly limited to the tail rotor, the tail boom, the main rotor, the landing skids and the fuselage.

1.3. Aids to navigation

1.3.1. *Radar track*

The aircraft was first picked up on the radar of the Canaries Control Center at 07:43:58, at which time it was over the sea, although very close to the coast, at a point halfway between Salinas de Janubio and El Golfo. The aircraft's transponder was not relaying any altitude information.

Over the next 30 minutes, it is observed that the aircraft maneuvered in the area between El Golfo and Salinas de Janubio, for the most part flying over the sea. During this time there were several lapses in radar coverage, possibly due to the low altitude at which the helicopter was flying.

Figure 2. Traffic sign with the helicopter in the background

At 08:20:00 the aircraft was over the sea off the coast of Hervideros, flying at a ground speed of 30 kt. The signal was lost during the next radar sweep and recovered at 08:20:40, with the aircraft now to the south of the previous radar return, very close to the coast and flying at 60 kt.

The signal was lost once again and recovered once more at 08:21:10. At that time, the aircraft was over ground near Salinas de Janubio.

The aircraft's radar return was lost once more, this time permanently, as the signal was not detected again.

1.4. Wreckage and impact information

The stretch of road where the accident took place is in a fairly flat area covered completely by lava.

Figure 1 shows where the vehicles departed from, and their destination, which is where the ground support crew was located, the location of the traffic sign against which the tail rotor impacted, as well as the final location of the tail rotor and main aircraft wreckage.

The initial impact was between the tail rotor and a traffic sign warning of dangerous curves (Figure 2). The triangular part of the sign was bent practically from top to bottom, and was perforated in the center. The signpost was bent at its base at a 60º angle from the vertical and in the direction of the aircraft's flight, and slightly toward the road.

Figure 3. Anti-torque rotor

The tail rotor was found fifty meters further away, in the aircraft's direction of motion and to the right of the road. It had detached due to the breakage of the tail gearbox fittings, the drive shaft and the pitch control linkage. Of the two tail rotor blades, one was practically undamaged while the other one had broken near the root.

The main helicopter wreckage, which was turned on its right side, was 125 m from the

traffic sign and to the left of the road. The nose of the helicopter faced northeast. The three main rotor blades showed significant damage from the impact with the ground.

The final part of the tail cone, along with the vertical stabilizers and the skids, were found next to the main wreckage, but separated from the aircraft. None of these components showed signs of having struck the traffic sign.

The tip of the right skid was found on the other side of the road, 17 m away from the main wreckage.

1.5. Tests and research

1.5.1. *Eyewitness statements*

One support crew member, who was at the southern end of the stretch of road that had been closed to traffic, was interviewed.

This person stated that four vehicles were being used for filming. The vehicles departed one by one from the stretch of road nearest Hervideros in the direction of Salinas de Janubio, that is, they traveled from north to south. They were filmed by the camera in the helicopter while covering this route, at the start of which the helicopter was high over the sea. He went on to state that the helicopter was over the sea and flying parallel to the car for most of the trajectory, but that at times he saw it go inland and cross the road, going behind the car. During this part of the run the helicopter was flying considerably lower.

Before the accident they had filmed 7 or 8 takes. At the time of the accident the eyewitness was at the curve where the aircraft would eventually impact.

The area where the traffic sign against which the helicopter impacted is flat. Leading up to it in the direction of flight there is a section with an uphill gradient. This eyewitness stated that in all of the takes, including the one with the accident, the helicopter and the car converged vertically, since the latter went up as the helicopter descended.

This person noted that in the moments prior to the impact with the sign, he did not see the helicopter perform any strange maneuvers or motions, it was simply flying very low. He heard the impact against the sign and saw something detach from the helicopter, which started to spin about its vertical axis. He estimated it spun once or twice before impacting the ground.

2. ANALYSIS

2.1. Analysis of the flight

The radar track of the flight provides information on the progress of the aircraft in the filming area, and shows the helicopter flying most of the time over the sea and a short time over land, which concurs with information provided by one of the members of the ground crew.

As for the aircraft's altitude, and as noted in point 1.3.1, the aircraft's transponder was not supplying this information. Thus it is impossible to determine the altitude from the radar data. It was also impossible to determine the altitude at which radars lose their signal in the area of the flight, which would have at least allowed for a determination of the specific altitude below which the aircraft was flying when the radar signal was lost.

The only source of information regarding the flight altitude, therefore, was that provided by one of the members of the ground crew, who indicated that the aircraft was flying very close to the ground before impacting the sign.

2.2. Possible impact sequence

The impact of the tail rotor with the traffic sign caused the signpost to bend, pivoting about its base, such that the top part of the sign bent back and down enough so as not to be impacted by the second blade. This hypothesis is consistent with the condition of the sign after the accident, as it was bent at a 60° angle from the vertical.

In addition, the orientation of the crease, practically vertical, as well as the angle of the signpost provide some idea of the aircraft's direction of motion: following the direction of the road. This same conclusion is reached upon observing the location of the aircraft wreckage. Likewise, from the distance between the wreckage, and in particular the tail rotor, and the sign, it can be deduced that when the first impact took place, the aircraft's horizontal speed was significant. The fact that no part of the helicopter impacted the ground during the first impact is indicative of an essentially zero descent rate.

Given that no other part of the helicopter aside from the tail rotor impacted the sign, it follows that at the time of the initial impact, the aircraft was possibly following the road at level flight, very close to the ground, with a slight slip to the right, such that the cockpit was over the center of the road and the tail rotor over the right edge, which would concur with the scenario described by the member of the ground support crew.

3. CONCLUSIONS

3.1. Findings

The accident is considered to have been the result of filming while the aircraft was flying at a very low altitude over the road, with a slight slip to the right, which resulted in the tail rotor impacting a sign, causing the rotor to detach and the pilot to lose control of the aircraft.