TECHNICAL REPORT A-020/2011

DATA SUMMARY

LOCATION

Date and Time	**Wednesday, June 29, 2011; 5:15 p.m. local time**
Place	**L'Ampolla (Tarragona)**

AIRCRAFT

Tuition	**EC-LBG**
type and model	**AT-802A AIR TRACTOR**
Exploitative	**AVIALSA T-35, SL**

engines

type and model	**PRATT AND WHITNEY PT6A-67F**
Number	**1**

CREW

pilot in command

Age	**43 years**
License	**Airline Transport Pilot, ATPL(A)**
total flight hours	**4,454 hours**
Flight hours in type	**370hrs**

INJURIES

	dead	serious	light/unharmed
Crew			**1**
passengers			
Others			

DAMAGE

Aircraft	**important**
other damage	**None**

FLIGHT DATA

Operation type	**Aerial work – Commercial – Fire fighting**
flight phase	**Splashdown**

REPORT

Approval date	**June 28, 2012**

1. INFORMATION ON THE FACTS

1.1. flight review

On Wednesday, June 29, 2011 at 3:25 p.m. local1, a fire alert was received at the Sabadell base in the Vendrell area (Tarragona), which activated the two amphibious aircraft at said base. The EC-LBG aircraft took off loaded with water from the Sabadell airport together with another aircraft of similar characteristics, with which it would proceed to work jointly on the extinction. The EC-LBG aircraft flew with the call sign V-03, and was in second position compared to the other aircraft that went with it; that is, the other, with callsign V-01, would carry out all the actions first, followed by EC-LBG, which would later result in accidents.

Both aircraft took off from Sabadell airport at 15:45 and were en route, the pilot of the V-01 radioed for the activation of the loading protocol in the port of Tarragona. After coordinating with the corresponding air means, both aircraft made the first discharge on the fire at 16:15 and proceeded to refill water in the port of Tarragona. The reloads were completed without incident and both aircraft made their respective discharges at 16:25.

The next reloading could not be carried out in the port of Tarragona, due to a warning that ships were entering that port, and both aircraft proceeded to carry it out in the Ebro Delta, arriving at the delta at 5:00 p.m. There was no documentation on board the aircraft regarding the water refilling operation in the Ebro Delta area.

After reconnaissing the area and choosing the place (northern area of the delta) and the direction in which they would proceed to reload (heading 120º), aircraft V-01 reloaded without incident at 5:10 p.m., leaving meanwhile the other aircraft orbiting around it observing the maneuver at an altitude of about 500 ft.

Then, leaving a margin of time to avoid turbulence and waves, the aircraft EC-LBG with callsign V-03 proceeded to reload in approximately the same place, and in the same direction and direction, although slightly to the left.

Once aircraft EC-LBG had stabilized in the water at the appropriate speed, just before proceeding with the scooping maneuver (opening of the hoppers, also known as scoops, for the entry of water into the tanks) *2 ,* the pilot

[1] All times in this report are local unless expressly stated otherwise.
[2] The reloading maneuver in this model of amphibious aircraft requires first to land the aircraft on the water at about 55 kt of speed over the water, stabilize it and then lower the scoops (hoppers) to allow the passage of water to the tanks.

felt a strong yaw to the left accompanied by a strong deceleration.
His attempts to correct with the right pedal and applying power were unsuccessful and he opted to make an emergency ditching, which was very brief, as the aircraft was stranded on top of a sandbank that was barely 20-30 cm deep that was not seen by the pilots in the aerial reconnaissance of the area. The heading presented by the aircraft once grounded was 80º.

The two aircraft floats detached and the fuselage rested on the right float. The aircraft had other visible damage to the engine propellers, wings and fuselage.

The pilot, before disconnecting the systems and leaving the aircraft by his own means, reported to the V-01 pilot that he was unharmed. A fisherman from the area approached the aircraft and took the pilot to the mainland.

Figure 1 shows the entry course of the aircraft to the recharge area and the final location where it was left.

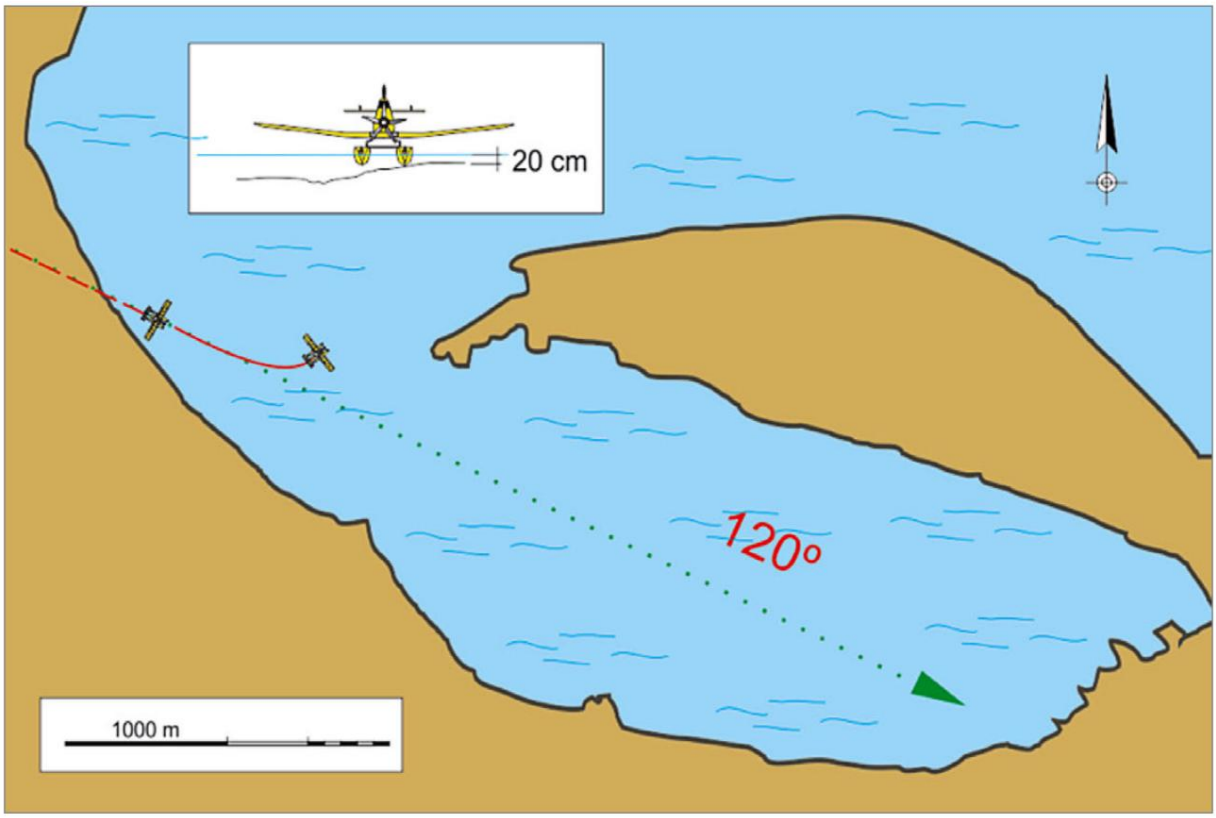

Figure 1

1.2. Damage suffered by the aircraft

The aircraft suffered damage of varying degrees, which can be summarized as:

• Damage to the entire fuselage. • Damage to the gate assembly. • Significant damage to the left demiplane, affecting the control surfaces And control.

• Damage to the right wing, with slight damage to the control surfaces and control.

• Damage to the motor base. • Destruction of the propeller. • Damage to the engine, with breakage of the power box and internal damage. • Breakage of the uprights of both floats, which were detached from the aircraft.

• Significant damage to the floats.

Figures 2 and 3 show the state of the aircraft after the accident.

Figure 2

Figure 3

1.3. Staff Information

The pilot had, up to the day of the accident, accumulated experience of 4,454 flight hours, of which 370 had been flown in the AT-802 aircraft type.

In the last 90 days he had flown 27:20 h, 13:45 h in the last 30 days, 10 h in the last 10 days and in the last 24 h he had flown 4:05 h.

He had a Commercial Pilot License since 1991 and was an Airline Transport Pilot since 2003, with the latter license valid until 04/11/2012.

It also had the ratings of AT-802 until 04/30/2012 and AT-802 amphibious until 03/31/2013. Likewise, it had the qualification of agroforestry until 11/30/2011 and single-engine land aircraft until 10/31/2011.

His medical certificate was valid, the date of his last renewal being 12/22/2010.

1.4. Information about the aircraft

The Air Tractor AT-802A aircraft, S/N3 802A-0317, had been manufactured in 2009 and registered EC-LBG in Spain in October of the same year.

According to the information contained in its registration certificate, with registration number 8655 and valid until 12/31/2012, the owner is AIR TRACTOR EUROPE, SL, with AVIALSA T-35, SL being the lessee and operator.

It had all the necessary licenses and authorizations to operate, specifically:

- Certificate of airworthiness, number 6907, issued on 06/11/2009, valid until 05/30/2012.
- Airworthiness

review certificate, with authorization number ES.MG.100.RA.001, issued on 05/31/2011, valid until 05/30/2012.

At the time of the accident, the aircraft had accumulated 334:30 h and the same for the engine, having made 261 flights, with 664 landings and 231 starts.

The empty weight of the aircraft is 4,090 kg, its maximum takeoff weight 7,257 kg and it is equipped with 1 Pratt & Whitney PT6A-67F engine, S/N RZ0013.

The propeller the engine is equipped with is a Hartzell, model HC-B5MA-3D/M11691NS, S/N HBA-1648. The propeller accumulated the same operating hours as the engine.

[3] Serial number.

The floats that make up the amphibious aircraft are manufactured by Wipaire, model 10000A, S/N 10081 and 10082 (left and right respectively). They were installed in the aircraft on June 10, 2009, when it had 26:15 flight hours, according to STC4 of EASA5 10015353, Rev. 3.

According to the maintenance records, the last 50-hour service was carried out on May 12, 2011, and the 100-hour service on February 28, 2011.

The weight and balance of the aircraft was established within the operating limits of the aircraft throughout the flight.

1.5. weather information

According to information provided by the Aeronautical Applications Service of the State Meteorological Agency (AEMET) of the Ministry of Environment, Rural and The most probable weather conditions6 prevailing in the Fangar del Delta del Ebro area at the time of the accident were the following:

- Light wind on the surface with a maximum gust of 11 to 12 kt in the direction of ESE7 component (about 120º).
- Good visibility on the surface.
- Slightly cloudy sky (1/8) with the base of the clouds between 1,500 and 2,000 m.
- Surface temperature of 25 ºC.
- Relative air humidity: 70%.
- Pressure at sea level: around 1,015 hPa.
- There were no significant meteorological phenomena, nor stormy activity in the interval considered.
- There were no reports of adverse phenomena or electric shocks in the area.

1.6. essays and research

1.6.1. *witness statements*

In addition to confirming the times and sequence of events described above, the pilots of aircraft V-03 and V-01 declared respectively:

[4] Supplement to the type certificate.
[5] European Aviation Safety Agency.
[6] These conditions have been calculated taking into account data from the Tortosa Observatory (about 18 km), the automatic station that AEMET has in Sant Jaume (about 10 km), synoptic maps, satellite images, radar and downloads. electric at 5:00 p.m. and 5:15 p.m.
[7] East South East.

pilot statement

Upon arriving at the Ebro Delta, in the area close to the town of L'Ampolla, the two pilots carried out a complete check of their respective aircraft and proceeded to carry out a geographical study of the area at 500 ft AGL8 to design the reloading maneuver . .

The weather conditions they estimated were partially covered skies (2/8) with a ceiling of 9,000 ft above the recharge zone, visibility of more than 20 km and a light wind between 8 and 10 kt from the southeast without appreciable gusts. The wave was small, short, ripple9 type , ideal for reloading. No floating objects or boats were seen in the area.

There were clouds in formation that were not in the vertical of the recharge zone, but they did cast their shadow on it (and therefore, there was luminosity outside the shadow that contrasted with it).

He waited for his partner to carry out the reloading manoeuvre, heading approximately 120º, and then he did the same. He had never replenished water in the Ebro Delta and at all times he was attentive to the maneuver that his companion was carrying out, staying in orbit at 500 ft AGL.

When the zone was free, and after waiting for some time for the turbulence and waves to subside, he proceeded to reload, following the same heading his partner had taken and in the same place, although slightly to the left. Contact with the water was very smooth, and before scooping the aircraft began to yaw to the left and decelerate. The yaw was not corrected either by applying the right pedal or power, so he decided to make a forced ditching.

Once the cabin had been secured, and with the aircraft completely stopped, he informed his colleague that he was fine and left the aircraft without any problems. To his astonishment, he was stranded on a shallow dune bank, about 20 cm.

In his opinion, the prevailing light on the horizon, the shadow on the surface, and the uniform color of the water prevented him from seeing the shallow submerged sandbank.

He was rescued by a fisherman in a boat and brought to the mainland without incident.
On the way, the fisherman confirmed the presence of this type of dunes in recent times and their high mobility, which are moving and making it difficult, even for them, to avoid them.

[8] On the ground (Above Ground Level).
[9] The ripple wave is a soft wave with relief that usually occurs in windy conditions around 10 kt. This type of wave is very suitable for the water recharge maneuver.

Statement from the pilot who was flying ahead

A few miles before reaching the Ebro Delta, they carried out a checklist for the aircraft to enter the established zone (complete checklist for the configuration of the aircraft for the scooping manoeuvre). The list was read aloud, leaving for later the cargo area geographic (surface reading) and the cabin geographic, with the so-called "end points": train, let's go overboard, four blue lights, flaps, trim tab and helix.

They made an orbit at 500 ft AGL to later continue at a lower altitude and complete the corresponding geographic or surface reading, establishing a defined tailwind, a base and an end.

The description of the situation they found was: locally covered in the vertical, with clouds forming, clear on the horizon, strong light and reflection, with a SE10 wind of 8-10 Kt, defined, without gusts. Absence of orography in the surroundings, surface of short waves, small ripples. There was no turbulence or gust, there were no floating objects or obstacles, the area was free of boats in the area and in the surroundings, and there was no apparent lack of depth in the chosen location.

He then told the V-03 pilot not to make the approach until he had finished loading and to wait a while to avoid turbulence and waves from the preceding aircraft.

The place was familiar to him, but he hadn't been there for a long time. It described a wide base section and loaded approximately 120º with a very slight crosswind component of around 20º from the right.

The maneuver was completed without noticing any anomalies, with a water load of between 500 and 550 gallons approximately, within the load and balance limits for this aircraft with the remaining fuel.

He ascended until he was in orbit at about 500 ft AGL and observed his companion's recharge. The V-03 reload was in the same place parallel to the one he did, but slightly to the left. Contact seemed normal, and after a few seconds a drift to the left was observed with loss of acceleration and finally braking and splashing of water, leaving the aircraft parked on what appears to be a sandbank, with the floats damaged. The pilot, just before disconnecting the systems, reported that he had been unharmed.

It remained orbiting in the vertical, and pressed the Ágora emergency switch on the Tarragona channel, at the same time that it reported the incident on the radio and that the pilot had been unharmed, communicating with a fire helicopter in the vicinity of Reus that gave the warning to the airport.

[10] Southeast.

He believes that the prevailing conditions of light and strong reflection on the surface, along with areas of darker water, could have led them to believe in the existence of depth.

1.8. Additional Information

1.8.1. *Operations manual*

The information contained in the Operations Manual of the company AVIALSA T-35, SL does not expressly refer to procedures to ensure the depth of the water in the splashdown and/or water recharge areas.

Nor does it expressly refer to what documentation must be on board the aircraft regarding the water refilling operation in established areas.

Nor does it refer to the areas established for ditching.

1.8.2. *Specific documentation of amphibious operations*

The company AVIALSA T-35, SL has its own document called «Catalonia Water Points. Reservoirs, lakes and ports" updated on April 17, 2011, applicable to AT 802 SEA aircraft, which includes the following information on the northern area of the Ebro Delta11:

NORTH EBRO DELTA

Wide areas for loading. Pay attention to the swell and distance between waves in less protected areas. Large crop areas in the vicinity.

11 The document expressly mentions that "All the reservoirs are located with the north above the photo."

After the accident, the document was revised on August 17, 2011, and the new information related to the northern area of the Ebro Delta became:

DELTA DEL EBRO NORTE

Actualizado 1 Julio 2011

Zona Delta, con abundantes bancos de arena. La zona central del estrechamiento presenta un carril con profundidad, limitado a los lados y en su entrada con bancos de arena. El carril central es ancho, apto siempre que sus límites queden nítidamente a la vista. Comentan los pescadores, que este banco de arena esta creciendo rápidamente, haciendo temer que termine anulando la renovación de agua ya que puede llegar a cerrar y estancar la zona.

2. ANALYSIS

The weather conditions at the accident site were propitious for the operation and did not pose any obstacles to carrying it out, although the light conditions in the area contributed to incorrect perception of water depth in the area.

The sandbank below the surface of the water that the pilots did not see was to the left of the first aircraft's refueling port. The second aircraft began the water refilling maneuver in the same place as the first, parallel to it, but further to the left.

At the moment of contact with the water, the depth was adequate, since the yaw occurred later, after having stabilized the speed and preparing to lower the scoops. It was at that moment that he found himself in such a situation that below his left float there was only a scant 20 cm of depth, while below his right float there was sufficient depth. Thus, the left float made contact with the sand and caused a yaw to the left and deceleration; deceleration that became more intense when both floats climbed the sandbar and caused structural damage to the uprights that caused both to detach.

The damage to the aircraft is consistent with a low speed on touchdown, consistent with that required for the water reloading maneuver.

On the other hand, the pilots of the two aircraft that carried out the maneuver (the first was successful and the second resulted in an accident) did not design the maneuver according to the information contained in the documentation of the company AVIALSA T-35, SL in force at the time regarding to the usual water refilling points in Catalonia.

Said documentation preferably indicated two areas in the northern part of the Ebro Delta, with defined directions. The water recharge in the case of this accident was carried out in an area that is intermediate between the two that are proposed and is not related to them.

The pilot who flew in second place (and who turned out to be injured) had never refilled water in the area, while the pilot who flew in first place had done so, but some time ago.

The accident of aircraft EC-LBG during the water refilling maneuver occurred due to a poor choice of the area in which the maneuver was carried out, specifically due to the lack of water depth.

3. CONCLUSION

3.1. conclusions

- The pilot had all the necessary qualifications and permits to carry out the fire fighting activity.
- The pilot had more than 4,000 flight hours and was continuously dedicated to the Firefighting.

• The pilot's activity with the AT-802A was 370 h, having flown 10 h in the last 10 days with this aircraft model.

• The aircraft had all the necessary licenses and authorizations to carry out firefighting activities.

• Just over a month and a half before the accident, the aircraft had passed a 50 h review and four months before the accident that of 100 h. • The aircraft landed at an adequate speed and well configured. • The aircraft carried out the water refill maneuver parallel to something to the left of where the preceding aircraft had done it successfully minutes before. • The choice of the area where the water was recharged was not in accordance with what was stipulated in the document of the company AVIALSA T-35, SL called «Catalonia Water Points. Reservoirs, lakes and ports" then in force for the northern area of the Ebro Delta.

• The document of the company AVIALSA T-35, SL called «Catalonia Water Points. Reservoirs, lakes and ports» did not have up-to-date information regarding the northern area of the Ebro delta, as confirmed by the revision to it after the accident, which substantially modifies the information contained in the previous version. • The information contained in the Operations Manual of the company AVIALSA T-35, SL contains insufficient information on water recharge operations. Specifically, it does not say anything about depth perception depending on light conditions.

• The prevailing light conditions in the area were not the most propitious for clearly discern the depth of the water.

• The area of the North of the Ebro Delta has local peculiarities that were not taken into account by the pilots (nor by the company AVIALSA T-35, SL) when choosing the water recharge area.

3.2. Causes

The cause of the accident was the impact against an obstacle (dune bank) when carrying out a water replenishment maneuver in the sea in an area where the necessary water depth did not exist.

The fact that the pilot who flew first reloaded without incident could have contributed to the fact that the second pilot (with no experience in the area) reloaded with a lower perception of danger and did not correctly assess the sensation of depth of the water.

4. SAFETY RECOMMENDATIONS

REC 09/12. AVIALSA T-35, SL, as responsible for the operation, is recommended to include in the Operations Manual, in the section on additional information that must be carried on board, documentation on the specific areas recognized for water recharge.