

# CIAIAC

COMISIÓN DE  
INVESTIGACIÓN  
DE **A**CCIDENTES  
E **I**NCIDENTES DE  
**A**VIACIÓN **C**IVIL

## Interim Statement A-002/2010

Accident involving an  
AgustaWestland AW139 helicopter,  
registration EC-KYR, operated  
by Inaer, off the Almería coast  
on 21 January 2010 at 19:16 UTC



GOBIERNO  
DE ESPAÑA

MINISTERIO  
DE FOMENTO



# Interim Statement

## A-002/2010

---

**Accident involving an AgustaWestland  
AW139 helicopter, registration EC-KYR,  
operated by Inaer, off the Almeria coast  
on 21 January 2010 at 19:16 UTC**



GOBIERNO  
DE ESPAÑA

MINISTERIO  
DE FOMENTO

SECRETARÍA DE ESTADO  
DE TRANSPORTES

COMISIÓN DE INVESTIGACIÓN  
DE ACCIDENTES E INCIDENTES  
DE AVIACIÓN CIVIL

Edita: Centro de Publicaciones  
Secretaría General Técnica  
Ministerio de Fomento ©

NIPO:  
Depósito legal: M. 23.129-2003  
Diseño y maquetación: Phoenix comunicación gráfica, S. L.

---

COMISIÓN DE INVESTIGACIÓN DE ACCIDENTES E INCIDENTES DE AVIACIÓN CIVIL

Tel.: +34 91 597 89 63  
Fax: +34 91 463 55 35

E-mail: [ciaiac@fomento.es](mailto:ciaiac@fomento.es)  
<http://www.ciaiac.es>

C/ Fruela, 6  
28011 Madrid (España)

## **Foreword**

This report constitutes the interim statement described in paragraph 6.6 Annex 13 of the Convention on International Civil Aviation. The statement includes the most relevant factual information. The information provided is subject to change as the investigation progresses.

In accordance with the provisions of Law 21/2003 and pursuant to Annex 13 of the International Civil Aviation Convention, with Article 12.2 of Act on Air Safety 21/2003 and with article 1.4. and 21.2 of Regulation 389/1998, the investigation is exclusively of a technical nature, and its objective is the prevention of future civil aviation accidents and incidents by issuing, if necessary, safety recommendations to prevent from their reoccurrence. The investigation is not pointed to establish blame or liability whatsoever, and it's not prejudging the possible decision taken by the judicial authorities. Therefore, and according to above norms and regulations, the investigation was carried out using procedures not necessarily subject to the guarantees and rights usually used for the evidences in a judicial process.

Consequently, any use of this report for purposes other than that of preventing future accidents may lead to erroneous conclusions or interpretations.

This report was originally issued in Spanish. This English translation is provided for information purposes only.



**Table of contents**

---

<b>Abbreviations</b> .....	vi
<b>Data summary</b> .....	vii
<b>0. General</b> .....	1
<b>1. History of the flight</b> .....	1
<b>2. Aircraft information</b> .....	5
<b>3. Personnel information</b> .....	5
<b>4. Flight recorders</b> .....	6
<b>5. Investigation</b> .....	6
5.1. Structure .....	6
5.2. Engines .....	7
5.3. Emergency radiobeacon .....	7
5.4. Fuel .....	8
5.5. Medical and pathological information .....	8
<b>6. Status of the investigation</b> .....	8

### **Abbreviations**

00°	Degrees
AAIB	Air Accident Investigation Board (UK)
ATC	Air Traffic Control
CIAIAC	Comisión de Investigación de Accidentes e Incidentes de Aviación Civil
CLH	Compañía Logística de Hidrocarburos
CVR	Cockpit Voice Recorder
DH	Decision Height
EASA	European Aviation Safety Agency
ELT	Emergency Locator Transmitter
ft	Feet
FTR	Force Trim Release
GS	Ground Speed
h	Hour(s)
hPa	Hectopascal(s)
INTA	Instituto Nacional de Técnica Aeroespacial
kt	Knot(s)
MCL	Master Caution Light
METAR	Aerodrome Routine Weather Report
min	Minute
NM	Nautical miles
P/N	Part Number
ROV	Remote Operated Vehicle
SAR	Search and Rescue
SASEMAR	Sociedad de Salvamento y Seguridad Marítima
S/N	Serial Number
TQ	Torque
UTC	Coordinated Universal Time

## DATA SUMMARY

## LOCATION

Date and time	Thursday, 21 January 2010; 19:16 UTC
Site	36° 46.6' N 002° 21.1' W 4.5 NM south of the Almería Airport

## AIRCRAFT

Registration	EC-KYR
Type and model	AgustaWestland AW139
Operator	Inaer

## Engines

Type and model	Pratt & Whitney PT6C-67C
Number	2

## CREW

	Pilot in command	Copilot
Age	38 years	43 years
Licence	Commercial helicopter pilot	Commercial helicopter pilot
Total flight hours	4,000 h	1,200 h
Flight hours on the type	2,500 h	130 h

## INJURIES

	Fatal	Serious	Minor/None
Crew	3	1	
Passengers			
Third persons			

## DAMAGE

Aircraft	Destroyed
Third parties	None

## FLIGHT DATA

Operation	Aerial work – Commercial – Government (search and rescue)
Phase of flight	En route

## REPORT

Date of approval	24 November 2010
------------------	------------------



## 0. GENERAL

On Thursday, 21 January 2010, at 19:16:02<sup>1</sup>, an AgustaWestland AW139 helicopter, registration EC-KYR, operated by Inaer, impacted the ocean as the result of a controlled flight into the sea while returning to Almeria airport, after concluding a search and rescue training flight lasting 2 hours and 16 minutes. The helicopter sank to a depth of 91 meters some 4.5 NM south of Almeria Airport and was destroyed as a consequence of the impact. Of the four persons onboard (pilot, copilot, hoist operator and rescue swimmer), only the hoist operator survived the accident.

The efforts to locate and recover the helicopter and its occupants were led by the Maritime Safety and Rescue Agency (SASEMAR, from its initials in Spanish).

The search area was determined by the position indicated by the beacon in the helicopter's recorder, by the fuel slick and surface debris and by the last radar return. The helicopter's emergency locator transmitter (ELT) beacon failed to activate.

With the exception of structural debris that appeared on the surface and which was recovered in the days following the accident, the task of recovering the helicopter fuselage began on 30 January 2010. Prior to this recovery task, the helicopter's position and condition were thoroughly recorded using an ROV<sup>2</sup>. On 31 January, an effort was made to raise the helicopter fuselage and the decision was made to move it to a shallower area so that swimmers could be brought in. On Monday, 1 February, the helicopter was raised from a depth of 23 meters to the rescue vessel Clara Campoamor, where it was placed in fresh water and its recorder extracted. On 2 February the main wreckage of the helicopter was taken to a hangar at the Ocaña aerodrome and the recorder was taken to England for processing and analysis.

## 1. HISTORY OF THE FLIGHT

Aircraft EC-KYR started its operations on the day of the accident at 17:00 with the start-up of its engines. It was the first flight of the day, a nighttime search and rescue (SAR) training flight involving the pilot, copilot, hoist operator and rescue swimmer.

Weather conditions throughout the flight were good. The sun set that day at 17:33 UTC and there was a waxing crescent moon. The visibility at Almeria Airport<sup>3</sup> was in excess of 10 km, with few clouds with bases between 1,500 and 2,500 feet, variable

---

<sup>1</sup> All times in this report are the UTC times obtained from the helicopter's data recorder. There is a 12-second delay in the ATC reference times with respect to the recorder times. To obtain local time for the season of the year in which the accident took place, add 1 hour to UTC.

<sup>2</sup> ROV (Remotely Operated Vehicle) is an unmanned underwater robot.

<sup>3</sup> METAR information for Almeria Airport between 17:00 and 20:00 UTC.

## Interim Statement A-002/2010

---

southeasterly (140°) to northeasterly (040°) winds at 3 to 5 knots and a pressure of between 1022 and 1023 Hpa.

The crew had started its activity at noon (local time) as part of the day shift schedule (from 12:00 to 00:00). It was the first flight of the day and the exercises planned were as follows:

- The first exercise was an approach to hover.
- The second exercise involved rescuing survivors from a vessel, in this case the Salvamar Denévola, and consisted of conducting an approach to the moving vessel, lowering the rescue dummy<sup>4</sup> and rescue swimmer to the Salvamar using the hoist and raising them again.
- The third exercise involved rescuing survivors at sea using the Salvamar as the support ship. The exercise consisted of conducting an approach to a stationary vessel and lowering the rescue swimmer into the water to simulate the loss of the swimmer. Once the rescue swimmer was in the water, the helicopter would fly about 5 NM out so as to lose all references before returning and proceeding with the search and rescue operation.

The initial contact with ATC was at 17:06:00. It was the copilot who contacted the tower at Almeria to request clearance to take off and to inform controllers that they would be conducting activities to the south of the airfield for about two and a half hours. At 17:10:02 the helicopter took off normally and headed some 26 NM southeast of the airport, off the coast of Cabo de Gata, to conduct the first exercise.

The recording of the voices in the cockpit started at 17:14:06, with the helicopter flying at an altitude of about 1,000 ft. Two minutes later, while still flying out to the first exercise area, the captain briefed the crew on the three exercises they were going to do.

The first exercise was not completed due to problems with the wind, as a result of which they decided to do a manual climb to 500 ft, done by the copilot, and choose a better positioned ship for the maneuver.

By 17:34:54 they had chosen another ship close to the first. The maneuver was carried out some 30 NM from Almeria Airport and also off the coast of Cabo de Gata. The copilot was the pilot flying. The maneuver was completed at 17:53:46, with a takeoff in manual from a hover to 500 ft.

Three minutes later, at 17:56:49, they proceeded on course 331° toward the exercise area with the Salvamar, with which they had arranged to conduct the second and third

---

<sup>4</sup> The dummy is used during training exercises as a stand-in for the victim to be rescued.

exercises at 19:15 local time (18:15 UTC). The transit took place at an altitude of 500 ft above sea level. At 18:08:22, the captain reported to Almería tower that they were some 9 NM south of the airport, where they would remain at an altitude of 500 ft or less.

At 18:19:27, they started their operations with the Salvamar, which confirmed a wind speed of 5 knots from 090°. The captain briefed the crew and the Salvamar on the exercise they would be performing and gave them some specifics. The approach to the vessel was conducted by the copilot and at 18:28:49, the captain, now the pilot flying, started the hovering and hoist operations over the ship. The exercise concluded at 18:42:59 with a stationary climb in SAR Transition Up mode<sup>5</sup>.

Once the transition up was complete, the captain once more reviewed the final exercise with the crew and arranged to conduct the search for the rescue swimmer more realistically with the lights on the Salvamar Denévola turned off. At 18:54 they started to hover in order to lower the rescue swimmer into the water and six minutes later, at 19:00:25, with the swimmer in the water and the helicopter hovering, they commenced a transition up after informing the swimmer that they were leaving so they could commence the search. At 19:06:32 they located the swimmer and started recovery operations.

By 19:13:39 the swimmer was onboard and the helicopter was a little under 5 NM southwest of Almería Airport at an altitude of 100 ft. The hoist operator reported the “door closed and secure and cabin clear” finishing the training exercise. From that moment on, the return flight to Almería airport was initiated. The captain began a manual climb, announcing he was disengaging “HOVER and RHT”<sup>6</sup>. From then until impact, the Flight Director was kept in standby and the captain was the pilot flying.

Two minutes and 10 seconds elapsed from the time the helicopter started the ascent (19:13:52) until impact (19:16:02), during which:

- ground speed (GS) increased gradually from 0 to 110 knots,
- the course was kept practically constant at 82° without starting any turns toward the airport, and
- it climbed for one minute to an altitude of 950 ft (19:14:56) before descending for approximately another minute until impacting the water.

At 210 ft, 14 seconds after starting the climb, the copilot contacted the crew of the Salvamar to sign off.

---

<sup>5</sup> SAR modes are operations specifically designed and certified for SAR activities. The SAR TU (transition up) mode defines a profile for climbing from a low speed and altitude that places the aircraft at an altitude of 200 ft and 80 knots.

<sup>6</sup> Hover and RHT modes are two Flight Director modes that allow the helicopter to hover and maintain a set altitude, respectively.

## Interim Statement A-002/2010

---

The maximum climb rate of 1700 ft/min was recorded at 450 ft and a GS of 50 kt (19:14:20).

At an altitude of 720 ft (19:14:31), the copilot called the Almeria control tower to ask for landing instructions at the captain's request.

At 19:14:56 the aircraft was, at 950 ft, at the highest point in its climb at a GS of 90 kt and rotor torque of 40%, following a series of inputs to the FTR<sup>7</sup> on the collective during the final 20 seconds of the climb.

From then on the helicopter started a descent from 950 ft to 750 ft at a rate of 500 ft/min.

Upon reaching that altitude, at 19:15:20, a new input was provided to the collective that decreased TQ to 36%. The descent rate increased to 1,000 ft/min and was maintained until 19:15:48, by which time the helicopter had descended to 320 ft. At 570 ft the FTR switch on the collective was actuated again, resulting a new drop in torque to 30%. The captain then requested the before landing checklist.

The descent rate increased once more and reached 1,600 ft/min at 19:15:52 with the aircraft at 260 ft. ATC asked if they wanted to refuel upon returning to the airport, resulting in an exchange between the pilots to check the time and to determine whether they had time to refuel. Since that moment until the impact the angle of descent was 8°.

At 19:15:56, with the helicopter at 150 ft, the Master Caution Light and the aural "LANDING GEAR LANDING GEAR" warning were actuated just as the captain confirmed to the copilot that it was early enough and that they could refuel. The data recorder confirmed the acknowledgment of the Master Caution Light two seconds later along with one final input to the FTR, which produced a drop in the descent rate.

At 19:15:59, three seconds after the caution was received, the helicopter was at 65 ft at a GS of 110 kt and descending at 1,400 ft/min.

After the landing gear acoustic warning, the "ONE HUNDRED AND FIFTY FEET" warning was heard in the cockpit, just as the copilot was contacting ATC to confirm their intention to refuel. Two seconds later, with the copilot still talking to ATC, at 19:16:02, the helicopter impacted the water, cutting off the transmission. There was no record of any discussion among the crew regarding the landing gear or 150 ft altitude warnings they had received.

---

<sup>7</sup> The FTR Force Trim push-button is a switch on the collective that, when pressed, disengages the collective Force Trim suspending collective trimming and force feel.

At the time of the accident, the decision heights (DH) selected were 40 ft for the captain and 70 ft for the copilot.

The last data recorded indicate a course of 81°, a GS of 110 kt, and a descent rate of 250 ft/min with 3.5° of pitch and a 1° roll angle to the right.

The flotation system was armed at the time of the accident.

## **2. AIRCRAFT INFORMATION**

The helicopter, an AgustaWestland AW139, has a type certificate issued by the EASA (European Aviation Safety Agency). Helicopter EC-KYR, serial number 31228, was delivered following manufacture to the owner and registered on 25 June 2009.

The helicopter was equipped with two PT6C-67C Pratt & Whitney engines. Engine number 1, serial number PCE-KB0469, was manufactured on 25/09/2008. Engine number 2, serial number PCE-KB0467, was manufactured on 15/09/2008. Both engines were installed new on the helicopter and had a total of 384:35 flight hours, the same as the helicopter.

The helicopter was properly insured at the time of the accident.

The aircraft's previous flight had been on the day before, Thursday, 20 January. It had been a local daytime flight departing from and returning to Almeria and lasting two hours, after which it took on 1,000 liters of fuel.

## **3. PERSONNEL INFORMATION**

The captain, 38 years of age, had a commercial helicopter pilot license and was AW139 and instrument rated. He had a valid medical certificate at the time of the accident. He had been working at Inaer for two and a half years. He had a total experience of 4,000 flight hours, 2,500 on biturbine, 335 on the AW139 and 870 on SAR operations.

The copilot, 43 years of age, had a commercial helicopter pilot license and was AW139 and instrument rated. He had a valid medical certificate at the time of the accident. He had been working at the company for one year. He had a total experience of 1,200 flight hours, 130 on biturbine, 100 on the AW139 and 80 on SAR operations.

The hoist operator, 49 years of age, had been at the company for 17 years and had 1,830 flight hours. He had 1,800 hours of SAR experience and 50 on the AW139.

The rescue swimmer, 33 years of age, had been at the company for three years and had 290 flight hours. He had 300 hours of SAR experience, 94 on the AW139.

#### **4. FLIGHT RECORDERS**

The helicopter was equipped with a Penny&Giles combination recorder, P/N D51 615-102, which recorded both flight and cockpit voice data. The recorder was recovered on 1 February 2010 at approximately 22:00 local time, along with the main helicopter wreckage. It had been submerged for 11 days at a depth of 91 meters.

Once it was removed from the helicopter, it was preserved in fresh water and transported in that condition to AAIB<sup>8</sup> facilities in the United Kingdom on 2 February where it was performed the read out. Despite not exhibiting any impact damage externally and having its electrical connections intact, the water pressure to which it had been subjected had affected the memory, which had to be cleaned and dried, a process that was started on the same day, 2 February.

Once the memory was dried, the data were downloaded on Friday, 5 February.

The flight parameters were obtained without any problems on that same day and validated satisfactorily. The nominal duration of the data recorder is 25 hours. In this case, data were recorded for 25 hours, 16 minutes and 51 seconds.

The channels containing the cockpit voice recording could not be downloaded properly at the AAIB facilities, as a result of which the CVR was taken to the manufacturer for processing. On Monday, 8 February 2010, all of the CVR channels were able to be downloaded, thus providing investigators with the communications during the last two hours of the flight and, specifically, at the time of the accident.

#### **5. INVESTIGATION**

##### **5.1. Structure**

The main helicopter fuselage was initially found at coordinates 46.6145N 002° 21.1665W, approximately 4.5 NM south of the Almeria Airport in 91 m of water.

The footage of the helicopter taken by the ROV showed a compact debris field, with most of the damage confined to the front of the helicopter, such that the cockpit and

---

<sup>8</sup> The AAIB (Air Accident Investigation Branch) is the official aviation accident investigation agency in the United Kingdom.

most of the passenger cabin had disappeared. The tail cone was still in place, though it was broken. The main rotor was also in its original position and was attached to the fuselage. The blades on the tail rotor were practically intact.

On 23 March 2010, with the support of the manufacturer AgustaWestland, it was conducted a full structural inspection of the helicopter wreckage at the Ocaña aerodrome. This inspection generally served to confirm the strong high-speed frontal impact with the helicopter in level flight. The doors had blown out, indicative of high water pressure entering the helicopter from the front toward the rear and then outward. The damage to the main rotor was consistent with the sudden stoppage of the rotor under power. The aft fuselage and the tail cone were bent upward and to the right, resulting from high inertial loading as a consequence of the impact and of the tail rotor.

The findings of this inspection rule out any structural problems prior to impact and are consistent with the recorder data and with the findings of the engine inspection.

## **5.2. Engines**

On 2 and 3 March 2010, with the support of the manufacturer Pratt and Whitney, it was disassembled and inspected the helicopter's two PT6C-67C engines.

The engines had been washed in abundant fresh water after recovery, which aided in preserving them until the inspection. The external appearance of the engines was good and they did not show any significant impact damage or denting.

The findings of this inspection reveal that the engines were operating under power at the time of the accident and rule out the mechanical failure of any engine component prior to impact.

## **5.3. Emergency radiobeacon**

The emergency beacon, manufactured by HR Smith 15-503-134-1, was found separated from the support that attached it to the fuselage. The rest of the system, consisting of the beacon ejection unit, the attachment unit and the configuration unit, was removed from the fuselage, preserved in fresh water and sent to the manufacturer for analysis. The beacon itself was not found.

The manufacturer concluded that the beacon ejection was triggered by g-forces above the limit value and that the ejection process appeared to have been normal. No more definitive conclusions could be drawn because the beacon, which contains the transmitter and antenna, was not found.

### 5.4. Fuel

Samples of the JET A-1 fuel were taken from refueling station no. 371 at the Almeria Airport, which was the last to supply helicopter EC-KYR with fuel. These samples were analyzed at CLH and INTA laboratories.

The results of the tests and analyses confirmed that the fuel complied with specifications and did not show any evidence of any microbiological contamination.

### 5.5. Medical and pathological information

The results of the autopsies and biological and toxicological analyses conducted on the pilot, copilot and rescue swimmer indicate that they all died from trauma produced by the impact. No toxic or psychoactive substances were found in their blood.

## 6. STATUS OF THE INVESTIGATION

Inspections and studies carried out have ruled out aspects concerning the helicopter performance as a direct cause of the accident.

The accident investigation is focusing on the operational aspects of the flight; specifically, on studying the flight and crew resource management procedures in place at the company, the adherence by the crew to the procedures, the transition between SAR exercises and operations and normal flight, and the conditions under which crews are trained and operate at the company.

Information is being gathered on the operating and training regulations, requirements and practices applicable to SAR operations in Spain and in other European countries.

Aspects involving possible spatial disorientation, as well as certain ergonomic factors in the cockpit, are being studied to determine their influence on the accident.

As for the structure, the failure of the ELT and of the flotation system to activate is being analyzed in cooperation with the manufacturer.