TECHNICAL REPORT
A-015/2021

Accident on 08 May 2021, involving a STORM FURY RG aircraft, registration EC-XSB, off the coastline of Cala Reona (Murcia, Spain)

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GOBIERNO DE ESPAÑA
MINISTERIO DE TRANSPORTES, MOVILIDAD Y AGENDA URBANA
SUBSECRETARÍA
COMISIÓN DE INVESTIGACIÓN DE ACCIDENTES E INCIDENTES DE AVIACIÓN CIVIL

NOTICE

This report is a technical document that reflects the point of view of the Civil Aviation Accident and Incident Investigation Commission (CIAIAC) regarding the circumstances of the accident and its causes and consequences.

In accordance with the provisions in Article 5.4.1 of Annex 13 of the International Civil Aviation Convention; and with articles 5.6 of Regulation (UE) nº 996/2010, of the European Parliament and the Council, of 20 October 2010; Article 15 of Law 21/2003 on Air Safety and articles 1 and 21.2 of Regulation 389/1998, this 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.

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ABBREVIATIONS

º ‘ “	Degrees, minutes, seconds
º	Sexagesimal degrees
AEMET	Spanish State Meteorological Agency
AESA	Spanish National Aviation Safety Agency
AGL	Above ground level
AIP	Aeronautical Information Publication
AIR	Air control instrument rating
AMSL	Above Mean Sea Level
AP	Autopilot
CTR	Control Traffic Region
DGAC	Civil Aviation General Directorate
E	East
EFIS	Electronic Flight Instrument System
EICAS	Engine Indicating and Crew Alerting System
ft	Feet
GPS	Global Positioning System
h	Hour
IFR	Instrumental flight rules
IMC	Instrumental meteorological conditions
kg	Kilogramme
km	Kilometres
kt	Knot
L	Left-hand runway of two parallel runways
LELC	ICAO code for Air Base of San Javier (Murcia)
LELC APP	Approach control unit at San Javier Air Base
LETX	ICAO code for La Totana Aerodrome (Murcia)
m	Metre
m^2	Metres squared
METAR	Aviation routine weather report
MFD	Multi Function Display
MHz	Megahertz
N	North
O	West
PFD	Primary Flight Display
PPL (A)	Private Pilot License (aeroplane)

QNH	Query Nautical Height
R	Right-hand runway of two parallel runways
RADAR	Radio Detection and Ranger
RCC	Rescue Coordination Centre
S	South Sierra compulsory reporting point
SPECI	Special Aviation Weather Report
TCAS	Traffic and Collision Avoidance System
THR	Threshold
MT	Metric Tonne
TWR	Tower
VFR	Visual Flight Rules

TECHNICAL REPORT

A-015/2021

Owner and Operator:	Private
Aircraft:	STORM FURY XL RG, registration EC-XSB (Spain)
Date and time of incident:	08 May 2021 a 11: 21 h (local time[1])
Site of accident:	Geographical coordinates 37º 37,2' N- 0º 42,0' W off the coastline of Cala Reona (Murcia)
Persons on board:	1 (crew)
Phase of flight:	En route
Flight rules:	VFR
Type of flight:	General Aviation – Private – Local flight
Date of approval:	23 February 2022

SYNOPSIS

Summary:

The amateur-built STORM FURY XL RG aircraft, registration EC-XSB, took off from La Totana Aerodrome (Murcia) with only the pilot on board to carry out a local flight together with another MB AIRCRAFT VL3 aircraft, registration EC- XRC, which was it was following.

Both aircraft headed to the southeast of the airfield and, on reaching the coastal area, headed east out to sea and into the control area of San Javier Air Base, with whose tower they were in contact.

When they were close to Cabo de Palos, off the coast of Cala Reona[2] (Murcia), they encountered a cloud bank that extended almost from sea level to an altitude of 1,500 ft.

The EC-XRC aircraft did not enter the cloud bank, but the EC-XSB aircraft did and moments later crashed into the sea and sank to a depth of 17 m at 37º 37.2 'N - 0º 42.0' W, 700 m from the coast.

The pilot died on impact. The aircraft was submerged and destroyed. It was removed from the sea the next day.

The investigation has concluded that the accident was caused by a failure to adhere to visual flight rules, which led to the pilot becoming spatially disorientated when he lost visual references after entering a layer of cloud.

[1] Unless otherwise indicated, the report refers to local time. UTC can be calculated by subtracting two units.
[2] Cala Reona is the last beach between Cabo de Palos and the Calblanque Natural Park

Insufficient flight preparation and, in particular, an inadequate assessment of the meteorological conditions in the area of the accident are considered to be contributing factors.

The investigation also detected the lack of an updated protocol for action in the event of a civil aircraft accident within the area of responsibility of the San Javier Air Base. For this reason, a recommendation that the Air Force should devise a protocol for action in these circumstances will be issued to the Air Force Staff.

1. FACTUAL INFORMATION

1.1. History of the flight

The amateur built STORM FURY XL RG aircraft, on registration EC-XSB, took off at 10:40 h from runway 03 of La Totana Aerodrome - LETX (Murcia), to carry out a local flight with the pilot as the sole occupant on board.

A few moments before, at 10:35 h, another aircraft, model MB AIRCRAFT VL3, on registration EC-XRC, had taken off with two people on board, the pilot and a passenger.

According to the information provided by the pilot of this second aircraft, both pilots met at the aerodrome at 9:30 h to jointly prepare for a local recreational flight.

Their intention was to fly one behind the other to the coastal area around the town of Mazarrón and then to the Sierra reporting point (S) of the San Javier Air Base (LELC) traffic control zone (CTR) to later take the visual corridor to the west of the Manga del Mar Menor. However, they had not programmed a specific route for the flight.

He also commented that his aircraft is equipped with a traffic alert and collision avoidance system (TCAS) so that throughout the entire journey, he could see a point on the TCAS display that represented the STORM FURY aircraft behind him.

After take-off, they headed southeast towards the coast of Mazarrón, flying at an altitude of 1,500 ft with an average speed of between 90 and 100 kt. The two pilots selected the transponder code assigned by the controller, and both had one radio tuned to the La Totana Aerodrome frequency (123.325 MHz), which they used to communicate with each other, and another tuned to the San Javier Air Base approach frequency (130.300 MHz).

It took them around 15’ to reach the Mazarrón coastal area. Then, on reaching the Sierra compulsory reporting point (S) for the San Javier Air Base VFR corridor, which is located south of the island of Escombreras at 37º 32 '33” N - 0º 55' 48” W, they flew a further 8 km to the Sierra 1 compulsory reporting point (S1) south of Cabo de Palos, the coordinates for which are 37º 36 '53” N - 0º 40' 31” W.

When they got close to the Sierra waypoint (S), both pilots contacted the approach control unit at San Javier Air Base (LELC APP) to inform the controllers of the route they intended to take.

Once they reached the S1 point, the two aircraft turned north and, according to the account of the pilot of the EC-XRC aircraft flying in front, they suddenly saw a layer of clouds approximately 1 km ahead of them.

The pilot of the EC-XRC aircraft pointed out that about 2 minutes before seeing the cloud bank, he had spoken with the pilot of the EC-XSB aircraft and that at that point, he could still see it on his TCAS screen, confirming that it was still flying behind him.

The pilot of the EC-XRC aircraft saw the cloud bank ahead of him and tried to circumvent it by descending to 500 ft. However, when he found the bank extended below that altitude, he climbed to 1,000 ft to fly over it. He then made a 180º turn to his left, which positioned him at a distance of 500 ft from the coast, and started the flight back to the departure aerodrome.

Immediately afterwards, he radioed the pilot of the other aircraft but didn’t get a reply. He then called him by phone, and the passenger who was with him sent him a text message, but there was no reply.

The STORM FURY RG aircraft was spotted by a witness in a boat. He described the aircraft making a sharp turn to the left and plunging into the sea with a steep pitch angle.

The pilot was thrown out on impact.

The witness notified the emergency services by calling 112 and approached the area where he had seen the aircraft crash.

When he reached the crash site, he saw the pilot's body, recovered it immediately and waited for the rescue services to arrive.

The aircraft was submerged at a depth of 17 m, 700 m in front of Cala Reona beach, at a location with the GPS coordinates 37º 37 ’12” 'N - 0º 42 ’0” W.

The next day, at the request of the Cartagena Maritime Authority, it was removed from the sea by a private company that employed a highly qualified team of five people, including four divers. After recovering the aircraft, they transferred it to the nearest port.

They used three balloons to refloat the aircraft to the surface. One of the balloons used can hold an air mass of 2.5 mt, and the other two can carry 1 mt.

The aircraft was then transferred from the port to a hangar at La Totana Aerodrome.

1.2. Injuries to persons

Injuries	Crew	Passengers	Total in the aircraft	Others
Fatal	1		1	
Serious				
Minor				
Unharmed				
TOTAL	1		1	

1.3. Damage to the aircraft

The aircraft was destroyed.

1.4. Other damage

There was no other damage.

1.5. Personnel information

1.5.1. Pilot

The pilot was a 67-year-old and British national. He had a private pilot license for aeroplanes PPL(A) issued by Spanish National Aviation Safety Agency (AESA) on 1 March 2021. He had previously obtained a PPL(A) license in the UK on 25 October 2017.

The two licenses and the corresponding Class 2 medical certificate issued by AESA were valid and in force.

He had 1,334:25 h of flight experience, of which 65:05 h were in type, all flown in Spain. Of those, 20:30 h had been flown under the UK license and the remainder under the Spanish license.

1.5.2. Controller

At San Javier Air Base, one air traffic controller was managing both the aerodrome and approach.

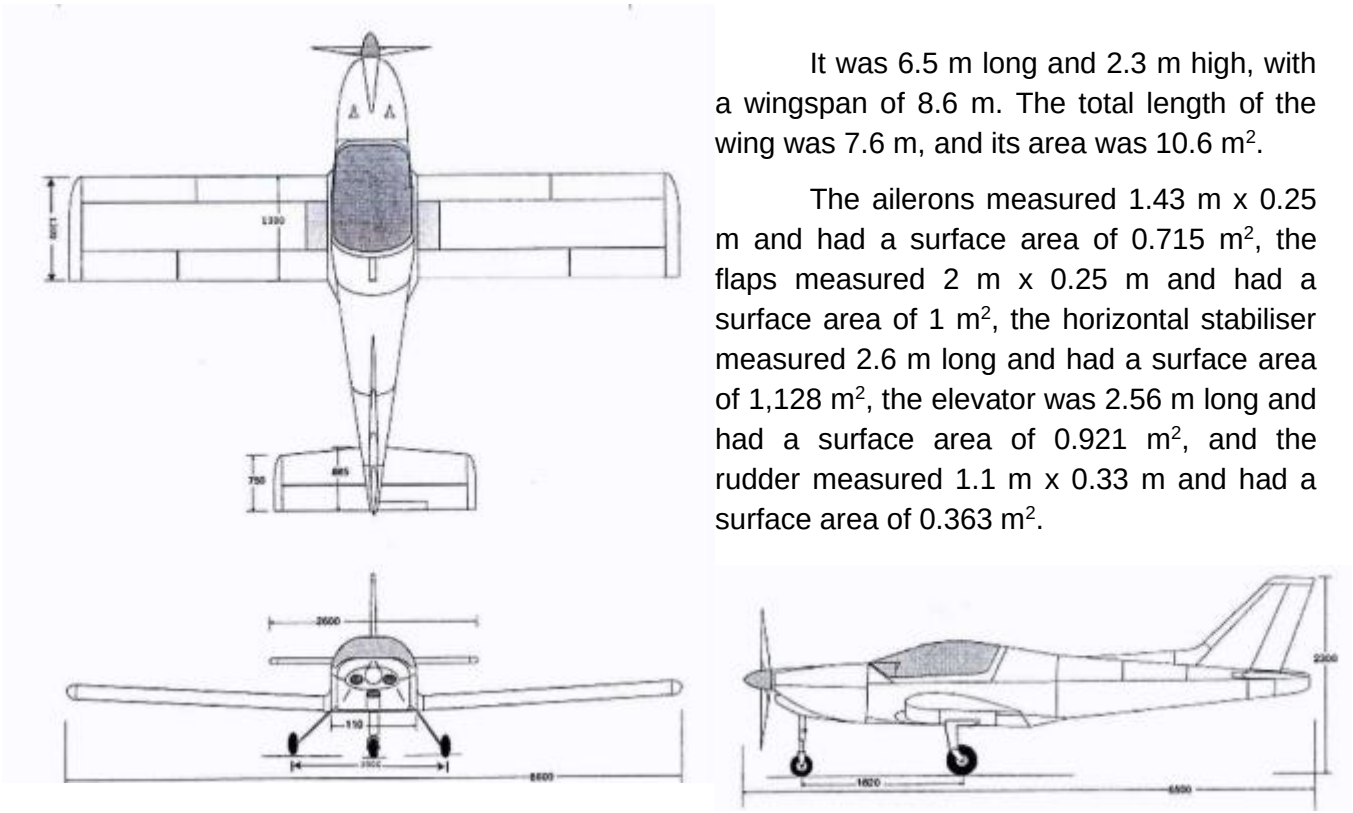
This 27-year-old controller had the community air traffic controller license issued by the Air Force Staff and the required ratings for the tasks he was carrying out.

The military controller license, ratings, medical examination and certificate of aptitude were in force.

1.6. Aircraft information

The STORM FURY XL RG amateur-built aircraft, with registration EC-XSB, was owned by the pilot himself, who acquired it in Spain.

According to AESA's record of registrations, it was manufactured in 2018, with serial number 18034-2862. Its empty mass was 352 kg, and its maximum take-off mass was 650 kg.



It was 6.5 m long and 2.3 m high, with a wingspan of 8.6 m. The total length of the wing was 7.6 m, and its area was 10.6 m^2.

The ailerons measured 1.43 m x 0.25 m and had a surface area of 0.715 m^2, the flaps measured 2 m x 0.25 m and had a surface area of 1 m^2, the horizontal stabiliser measured 2.6 m long and had a surface area of 1,128 m^2, the elevator was 2.56 m long and had a surface area of 0.921 m^2, and the rudder measured 1.1 m x 0.33 m and had a surface area of 0.363 m^2.

Figure 1. Images of the aircraft

It was equipped with a 2018 ROTAX 912 ULS3-01 engine with serial number 957.1040, which provided 100 hp/N of thrust and had 65:55 h of flight time. The propeller was a tri-bladed wooden WOODOMP measuring 1.74 m in diameter.

It had a retractable tricycle type landing gear with a front steering wheel and two main wheels under each wing. Its axle track measured 1.9 m and the wheelbase 1.82 m.

It had a valid special restricted airworthiness certificate, which was issued after the corresponding "Final Amateur Construction Report" by AESA on 20 September 2019.

At the time of the accident, the aircraft had accumulated 65:10 h of flight.

The aircraft was equipped with a Ballistic Parachute Recovery System an electronic flight instrument system, known by its acronym, EFIS, which is an instrumentation system cockpit in which the display technology is electronic instead of electromechanical. This kit includes one Primary Flight Display (PFD), a Multi-Function Display (MFD) and one screen for the Engine Indicating and Crew

Alerting System (EICAS). It also had an Autopilot (AP) with basic functions for automatic control of roll angle, pitch angle and heading and a satellite Global Positioning System (GPS).

1.7. Meteorological information

The meteorological conditions in the area of Cala Reona (Murcia) were obtained from the three nearest meteorological stations, located at San Javier - La Manga (37 ° 41 '45.60" N - 0 ° 44' 20.40" W at 4 m of altitude), Cartagena (37 ° 36 '3.60" N - 0 ° 59' 16.80" W at 17 m of altitude) and San Javier Air Base (37º 46 '30" N - 0º 48 '45" W at 9 m of altitude), being the three practically equal.

According to the METAR, SPECI, and TAF reports prepared at San Javier Air Base (LELC), the cloud cover and visibility in the area was as follows:

METAR LELC 080900Z 05010KT 020V090 6000 FEW006 21/18 Q1018 NOSIG=

At 09:00 h UTC, visibility: 6,000 m, few clouds (1 to 2 oktas), with the height of the cloud base at 600 ft.

SPECI LELC 080922Z 05012KT 020V080 6000 BKN006 21/17 Q1018 NOSIG=

At 09:22 h UTC, the visibility was 6,000 m, very cloudy (5 to 7 oktas), with the height of the cloud base at 600 ft

METAR LELC 080930Z 04011KT 010V070 5000 BR BKN006 21/17 Q1018 NOSIG=

At 09:30 h UTC, the visibility was 5,000 m, it was misty and very cloudy (5 to 7 oktas), with the height of the cloud base at 600 ft

TAF AMD LELC 080931Z 0809/0906 07010KT 9999 FEW010 X24/0813Z TN14/0906Z PROB30 TEMPO 0809/0811 3000 BR BKN005 BECMG 0819/0822 01008KT=

The amended forecast for the 8th at 9:31 UTC is valid from 09:00 UTC on the 8th until 6:00 UTC on the 9th. Wind direction 70º and wind speed 10 kt. Visibility 10 km. Few clouds at 1,000 ft. Maximum daytime temperature of 24º C on the 8th at 13:00 UTC. Minimum night-time temperature of 14º C on the 9th at 6:00 UTC. Slight chance (30%) of temporary fluctuations in forecasted weather conditions that could occur any time between 9:00 and 11:00 UTC on the 8th. 3,000 m visibility due to mist. Very cloudy skies at 500 ft. Change in the forecasted meteorological conditions on the 8th between 19:00 and 22:00 UTC wind direction 10º and wind speed 8 kt.

METAR LELC 081000Z 05011KT 010V090 7000 BKN004 20/17 Q1018 NOSIG=

At 10:00 h UTC, visibility: 7,000 m, very cloudy (5 to 7 oktas), with the height of the cloud base at 400 ft

METAR LELC 081030Z 05011KT 020V090 9999 BKN010 21/17 Q1018 NOSIG=

At 10:30 h UTC, visibility: 10 km or more, very cloudy (5 to 7 oktas), with the height of the cloud base at 1,000 ft

1.8. Aids to navigation

At 11:13:24 h (figure 2), the two aircraft appeared for the first time on the RADAR display, and aircraft EC-XSB can be seen on the SACTA display travelling through 1,400 ft AGL with a ground speed (GS) of 70 kt. A duplication of the transponder also appears due to some kind of problem relating to the reception of the SSR code signal. At that time, both aircraft were above the corridor's permitted altitude.

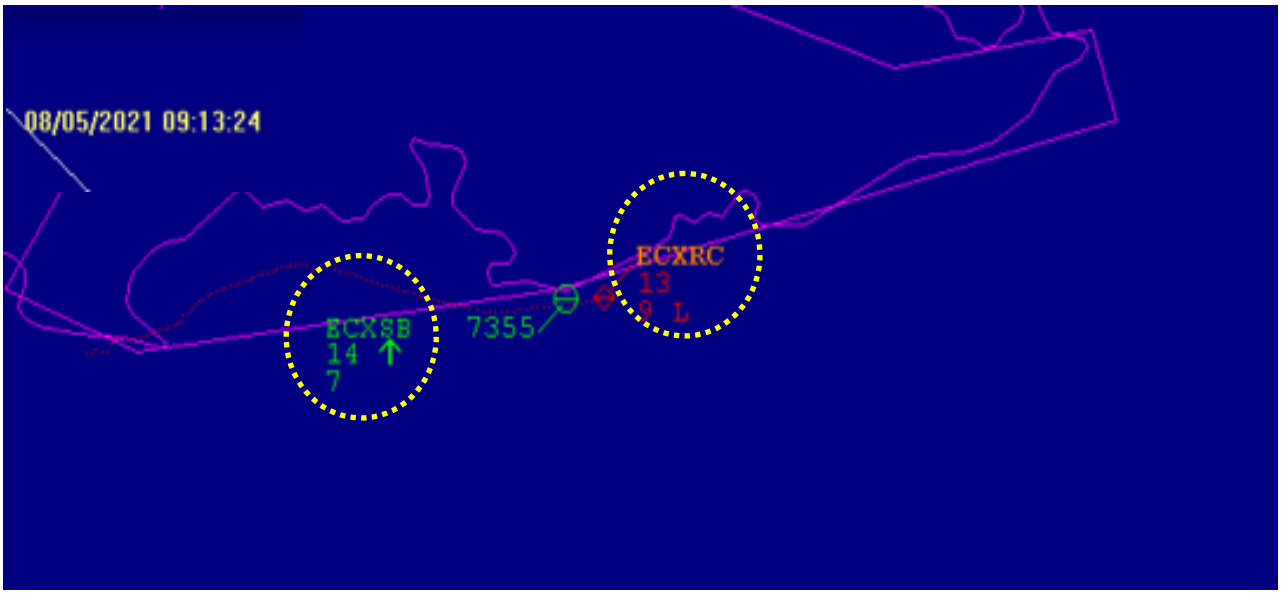


Figure 2. The two aircraft on the RADAR lay for the first time

At 11:17:49 (figure 3), the trace shows the EC-XSB aircraft established at 1,200 ft AGL with a speed of 100 kt (GS). In front of it, the EC-XRC aircraft is descending through 800 ft. The first aircraft is still above the corridor's permitted altitude.

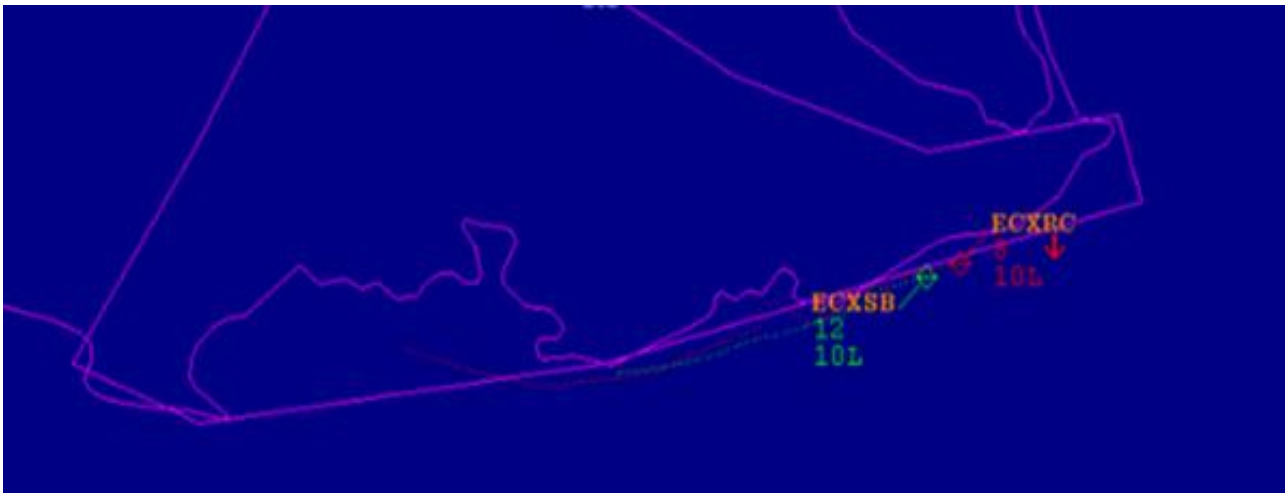


Figure 3. Position of the two aircraft on the RADAR display at 11:17:49 h

At 11:21:42 h (figure 4), the trace shows the EC-XSB aircraft maintaining 200 ft AGL flying over Cabo de Palos at a speed of 100 Kt (GS). In front of it, the EC-XRC aircraft is at 1,200 ft.

Figure 4. Position of the two aircraft on the RADAR display at 11:21:22 h

At 11:22:54 h (figure 5), the trace shows the EC-XSB aircraft at 300 ft AGL flying out to sea above Cabo de Palos with a speed of 80 Kt (GS). Ahead of it, the EC-XRC aircraft is descending through 900 ft.

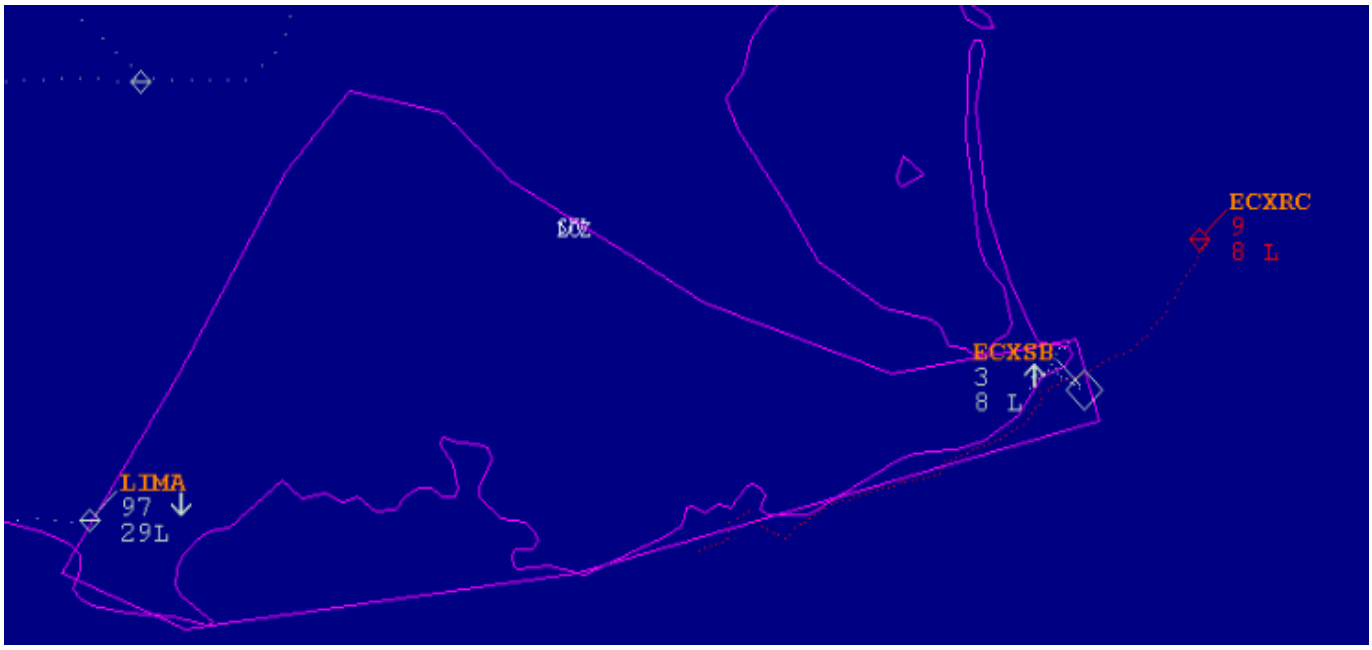


Figure 5. Position of the two aircraft on the RADAR display at 11:22:54 h

At 11:23:05 h, the EC-XSB aircraft disappears from the RADAR display

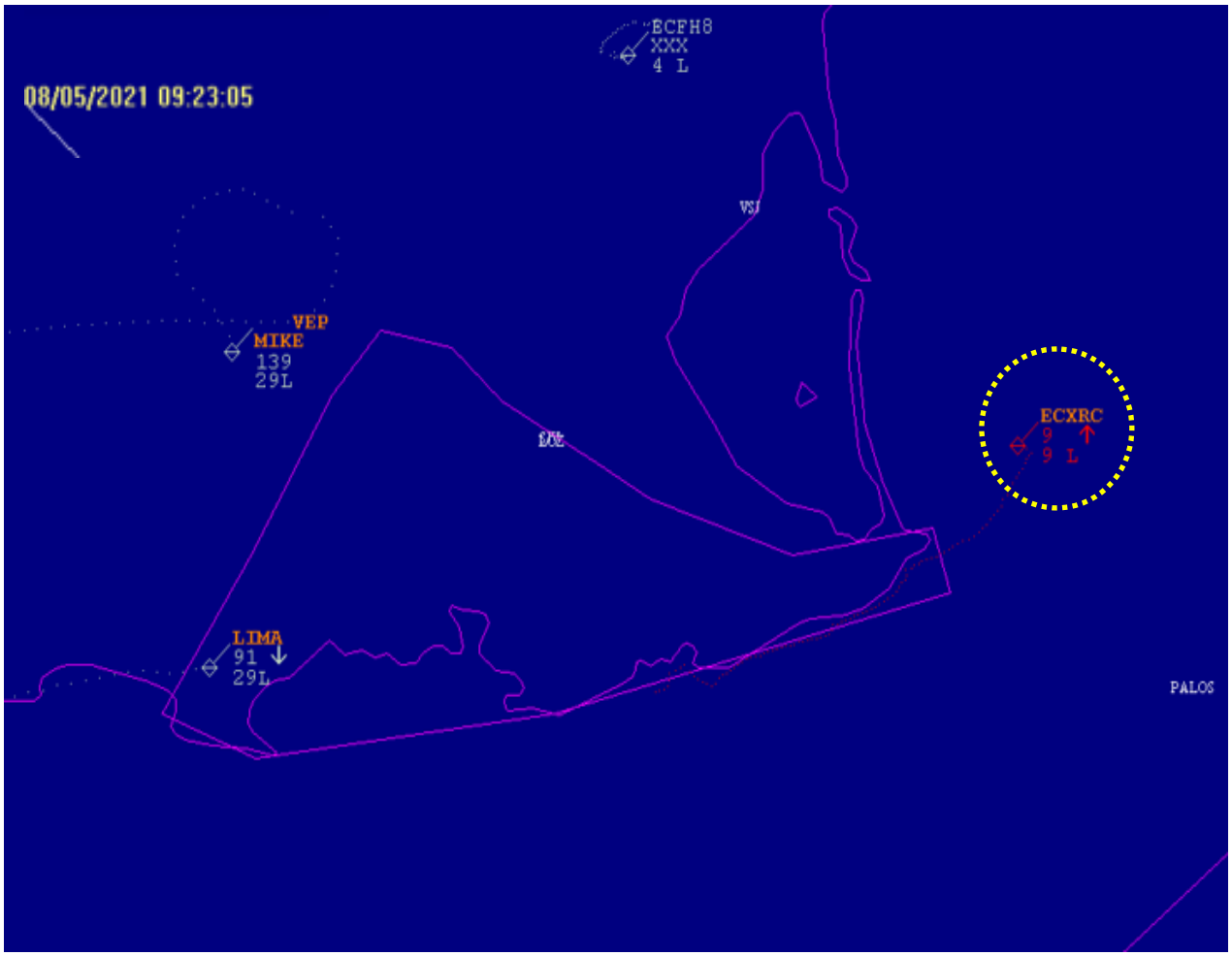


Figure 6. Aircraft EC-XSB disappears from the RADAR display

1.9. Communications

Both the pilot of the accident aircraft and the one flying the aircraft ahead were in radio contact with the San Javier Air Base tower on the approach frequency, 130.300 MHz.

Some of the coordinating communications were made by telephone.

The following table contains a summary of the communications between the aircraft with registrations EC-XSB and EC-XRC and the controller:

TIME	COMMUNICATION
10:58:27	The San Javier LELC APP controller called aircraft EC-XRC without getting a response.
11:00:34	The San Javier LELC APP controller called the same aircraft again without getting a response.
11:09:50	The pilot of aircraft EC-XRC called the approach service in San Javier to notify that he was approaching point "S
11:10:00	San Javier LELC APP responded.
11:10:05	The pilot notified his intention to proceed through the visual corridor to point "N"
11:10:14	The controller acknowledged and asked if he was flying a general aviation aircraft
11:10:15	The pilot responded affirmatively
11:10:15	The controller provided him with a QNH of 1,018 HPa, informed him that there was no traffic, instructed him to maintain 1,000 ft or below and requested he make contact when he reached point “S1”. The pilot acknowledged all the information
11:10:28	The pilot of the EC-XSB aircraft called LELC APP at San Javier
11:10:35	The controller asked him to repeat his callsign
11:10:37	The pilot of the EC-XSB aircraft repeated his callsign
11:10:39	The controller acknowledged
11:10:41	The pilot of the EC-XSB aircraft reported that he was approaching the "S" waypoint following the same route as the EC-XRC aircraft
11:10:56	The controller confirmed they were flying together and said he couldn’t see him on the RADAR display.
11:11:00	The pilot of the EC-XSB aircraft reported that he was 500 m behind the EC-XRC aircraft
11:11:12	The controller asked him if he had visual contact with the other aircraft and if it was a general aviation flight

11:11:18	The pilot of the EC-XSB aircraft answered in the affirmative
11:11:21	The controller instructed him to follow the EC-XRC aircraft to point "S1" and gave him a QNH of 1,018 HPa
11:11:28	The pilot of the EC-XSB aircraft acknowledged correctly
11:11:35	The controller called the pilot of the EC-XSB aircraft to inform him that he would have to solve the problem of his transponder and recycle code 7355 to proceed via the visual corridor
11:11:52	The pilot of the EC-XSB aircraft acknowledged correctly
11:23:49	The meteorological office contacted the controller to inform him that a special meteorological report (SPECI) had been published due to cloud at 600 ft (BKN006).
11:25:00	The controller informed all stations that the weather service had issued a SPECI report for broken clouds at 600 ft (BKN 006). Two military aircraft formations subsequently acknowledged the communication.
11:25:30	The pilot of the EC-XRC aircraft reported that he was returning to the "S" waypoint due to visibility issues
11:25:38	The controller acknowledged and asked if both aircraft were returning to the "S" waypoint
11:25:43	The pilot of the EC-XRC aircraft told the controller that he had just lost the other aircraft in the clouds
11:25:43	The controller acknowledged and instructed him to proceed to "S", notify him when he reached it and keep listening. He also gave him a QNH of 1,018 HPa
11:25:55	The pilot of the EC-XRC aircraft acknowledged correctly
11:25:57	The controller called the pilot of the EC-XSB aircraft
11:30:31	The Operations Centre of the Civil Guard Headquarters (COS) called the tower by phone and informed them that an aircraft had crashed at Playa Descargador in Cala Reona. The controller replied that he didn't know anything for sure but that he had two aircraft in the visual corridor, one had disappeared from his RADAR screen, and he was trying to contact its pilot. The controller asked the Civil Guard speaking to him what time they had received the call notifying the accident, and he replied 11:28 h
11:32:20	The pilot of the EC-XRC aircraft notified his arrival at the point S, and the controller asked him to contact his friend because he had disappeared from the RADAR display. He replied that he was trying to do so by both radio and telephone
11:32:36	The controller asked the pilot of the EC-XRC aircraft if he had heard anything, and he answered in the negative

11:37:26	The control tower used the ground-to-ground frequency to contact the services at San Javier Air Base and inform them that there had been a civil aircraft accident in the area of Cala Reona
11:43:28	The controller called the pilot of the EC-XRC aircraft and asked him how many people and how much fuel the EC-XSB had on board, to which he replied that there was one person on board and that he had enough fuel for three (3) to four (4) hours. He also told him he was asking the La Totana Aerodrome if he had landed there
11:43:53	The pilot of the EC-XRC aircraft contacted La Totana Aerodrome on its frequency to ask if anyone knew if the EC-XSB aircraft had arrived
11:57:43	The pilot of the EC-XRC aircraft informed to the controller that the EC-XSB aircraft had not returned to La Totana, and the controller asked him if he was going to land there himself, to which the pilot replied affirmatively

The following is a summary of the conversations that took place in relation to the internal coordination procedure and coordination with other services:

TIME	COMMUNICATION
11:39:34	AENA's Airport Coordination Centre (CECOA) asks the controller why he has activated the airport alarm, and he tells them that he has done so to implement the procedure because there has been an aircraft accident
11:55:47	One of the senior officials at the air base calls the controller and asks him if he has started the applicable procedure and what type of aircraft was involved. The controller provides the requested data. He also informs him that SASEMAR had called to say a recreational craft had found a body floating in the water.
12:06:07	Another senior official at the base calls the controller and tells him to preserve the audio tapes, collect the weather information and the information from the SACTA system (video with the RADAR trace). The official also asks if the aircraft's transponder was activated. The controller replies that he disappeared from the RADAR screen at 11:28 h and provides information on where the aircraft was at that time.
12:08:33	The controller informs another third official that the pilot of the EC-XRC aircraft has already landed at La Totana Aerodrome and was asking about the EC-XSB aircraft. He explains that they had been informed by 062 (the Civil Guard) and later spoke to SASEMAR, and also that a recreational craft had found a body floating in the water. In addition, he explains that the military had sent a boat to the area of the accident and that it must have happened on the coastline at relatively shallow depths. He confirms that the aircraft disappeared from the RADAR screen. He explains that both aircraft requested the visual corridor, that the EC-XSB registration

	did not respond to communications and that a cloud bank had formed in the Cabo de Palos area. He then explains that the aircraft in front had climbed from 600 ft, and its pilot had told him he was going to turn around because there were too many clouds. He also confirmed that the EC-XSB aircraft following it had disappeared from the TCAS screen as he entered into the cloud zone.
12:15:06	The controller tells the third official about all the calls he had made or received and how he had received the information, to which the official replies that he will need to write a report. The controller says that he couldn't tell him what condition the pilot was in when the recreational craft found him. The official asks if they have activated the emergency phases and the controller answers no.
12:17:52	The official asks if they know the procedure to follow and what to do, and the controller tells him that he has already spoken to another official and been reminded of everything they were procedurally required to do. The official reminds him to remove the video and radio recordings and asks if he knows the time limits for submitting the required reports. The controller repeats all the information and tells him that the two officials who contacted him previously (one of them the flight officer) are coordinating with him.
12:21:44	The official reminds him of everything he is procedurally required to do. The controller confirms that the pilot was a civilian and that he had departed from La Totana Aerodrome. He also confirms that the pilot has been picked up. He explains that a radiotelephone expert is on the way to the Tower to secure all the information.
12:27:40	Lastly, the official asks if they have communicated with any civilians. The controller says not yet, and adds that neither have they called the control tower at Murcia Airport nor the ENAIRE Air Control Centre. He also confirms that he had not wanted to say anything to the victim's friend. The official asks what kind of aircraft it was and the controller tells him that the flight plan uses the acronym FRTM and that he's reviewing the procedure and isn't sure if he should call anyone else.

1.10. Aerodrome information

1.10.1. La Totana Aerodrome

La Totana Aerodrome (LETX) is located 1.2 km north of the RM-3 highway that connects the towns of La Totana and Mazarrón, being 4 km southeast of the first and 21 km northwest of the second.

It is a non-controlled aerodrome whose reference point has the coordinates 37º 45 ’13” N - 1º 26 ’50” W and an elevation of 195 m. It has an asphalt runway designated 03 - 21, with 450 m of usable length.

The aerodrome’s circuit is located to its east, i.e., to the right of runway 03 and the left of runway 21. The aerodrome’s radio frequency is 123.325 MHz.

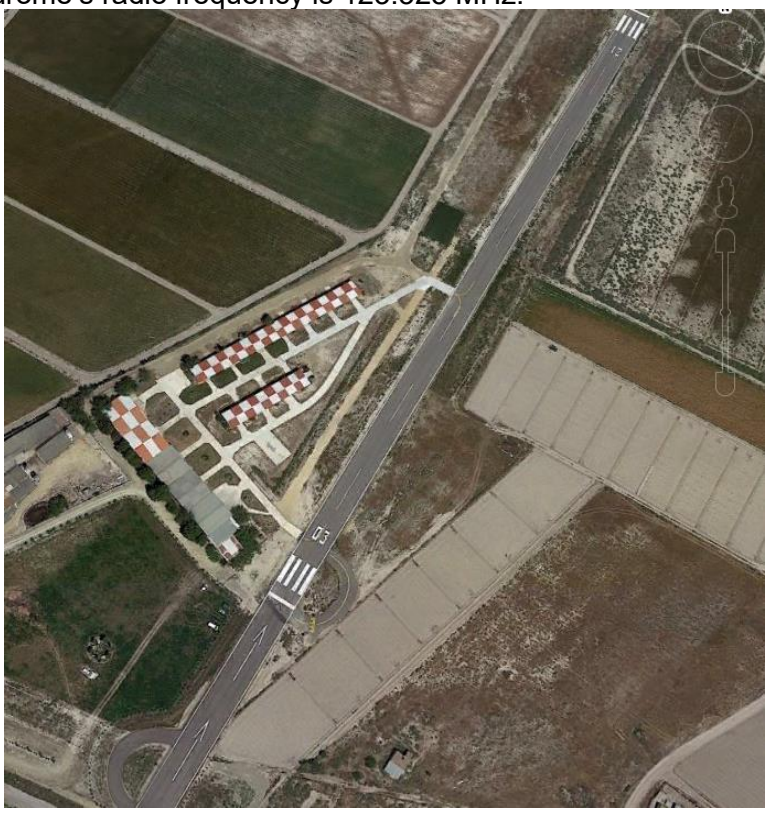


Figure 7. Aerial view of La Totana Aerodrome

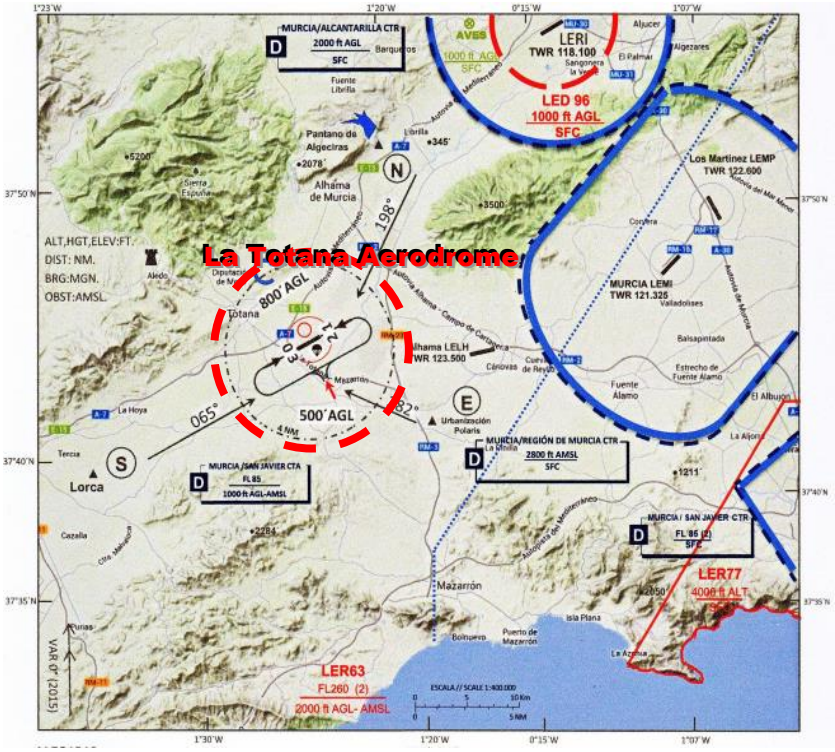


Figure 8. Map of the visual approach to La Totana

1.10.2. San Javier Air Base

According to ENAIRE's Aeronautical Information Publication (AIP), San Javier Air Base (LELC) is located in Santiago de la Ribera (Murcia). It simultaneously serves as a military air base and a civil airport, although civil flights are restricted to certain authorised regular airlines.

It's a controlled aerodrome that admits traffic under both visual flight rules (VFR) and instrumental flight rules (IFR), its reference point has the coordinates are 37º 46' 30" N - 0º 48' 45" W, and it has an elevation of 9 m.

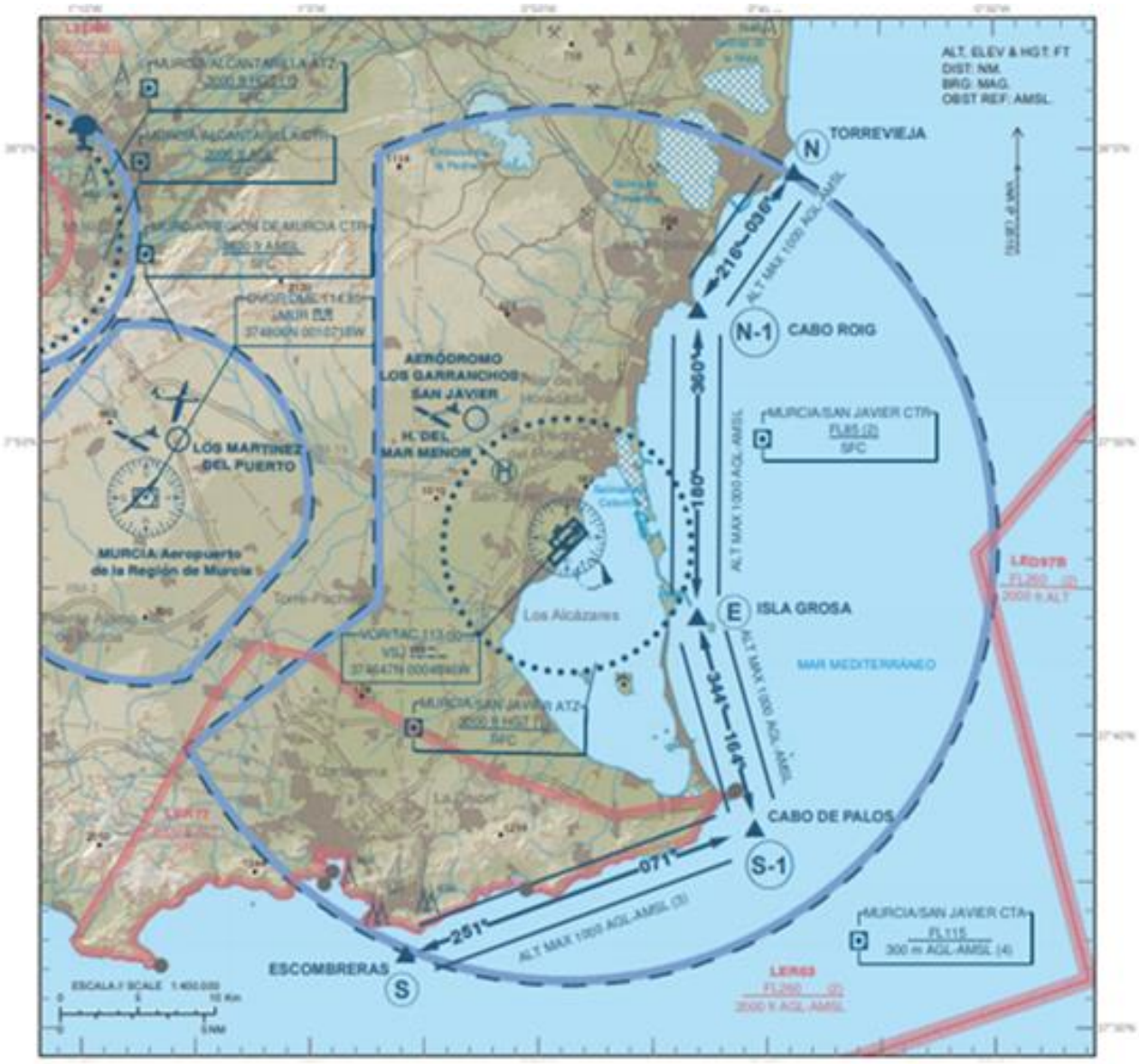


Figure 11. ICAO visual approach chart for San Javier Air Base.

VFR aircraft with destination Murcia/San Javier will request clearance to enter the CTR, and will establish radio contact with the TWR before reaching the reporting points N (Torrevieja) and S (Escombreras), and proceed by the VFR routes (MAX ALT 1,000 ft AGL-AMSL), until N-1 (Cabo Roig) or S-1 (Cabo de Palos).

From these points, if appropriate, they will be cleared to enter the aerodrome traffic circuit by point E (Isla Grosa).

VFR aircraft wanting to leave the CTR will receive instructions from TWR before take-off.

Pilots shall inform TWR over the reporting points E, S or N, as required.

In the VFR routes the maximum altitude will be 1,000 ft AGL-AMSL.

VFR aircraft may cross the CTR by the VFR routes with the appropriate clearance from Murcia/San Javier TWR.

As shown in the ICAO Visual Approach Chart to San Javier Air Base, a visual corridor runs along the coast in four sections.

The first section runs from point S (Escombreras, GPS coordinates 37º 32 '33" N - 0º 55' 48" W) to point S-1 (Cabo de Palos, GPS coordinates 37º 36 '53" N - 0º 40 '31 "W), with a heading of 71º - 251º depending on the direction of travel.

The second section goes from point S-1 to point E (Isla Grosa at 37º 44 '04" N - 0º 43 '02" W), with a heading of 164º - 344º depending on the direction of travel.

The third section goes from point E to point N-1 (Cabo Roig, GPS coordinates 37º 54 '35" N - 0º 43 '01" W), with a heading of 180º - 360º depending on the direction of travel.

The fourth section goes from point N-1 to point N (Torrevieja, GPS coordinates 37º 59 '16" N - 0º 38 '47" W), heading 36º - 216º depending on the direction of travel.

1.11. Flight recorders

The aircraft did not have flight recorders. It is not a regulatory requirement for the aircraft type.

However, the electronic flight instrument system (EFIS) was recovered and sent to the manufacturer, who was able to extract information about several flights from it, including data on the accident flight[3].

The information extracted showed that the autopilot was disconnected throughout the accident flight. However, it also revealed that most of the other flights recorded on the device were made with the autopilot connected.

The data on the accident flight begins at 10:40:34 h, and the last recording was at 11:22:11 h, which is when we can assume the accident occurred. Therefore, the flight duration was 41:37 minutes.

The take-off run was initiated at 10:51:31 h. The aircraft then climbed to approximately 1,900 ft and maintained that altitude during the initial part of the flight with a speed of around 110 km/h.

The data did not show any variations in the roll angle and only slight variations in the heading, which tells us the aircraft kept its wings level.

At 10:59:51 h, it descended slightly to 1,800 ft and, for the next 8 minutes, it did not maintain a fixed altitude but varied between 1,800 ft and 1,300 ft.

In this leg, it maintained a speed of almost 110 km/h with level wings and slight variations in the heading.

At 11:08:01 h, the aircraft stabilised at 1,200 ft and remained at that altitude until 11:13:01 h, at which point it began a series of ascents and descents ranging from 1,300 ft to 1,600 ft, with the aircraft not maintaining a fixed altitude. In this leg, it flew at 90 km/h for most of the time, increasing its

[3]The device records the flight data at 11-second intervals.

speed to 110 km/h towards the end of the section and making some turns with slight variations in heading before stabilising on an easterly course, with minor corrections.

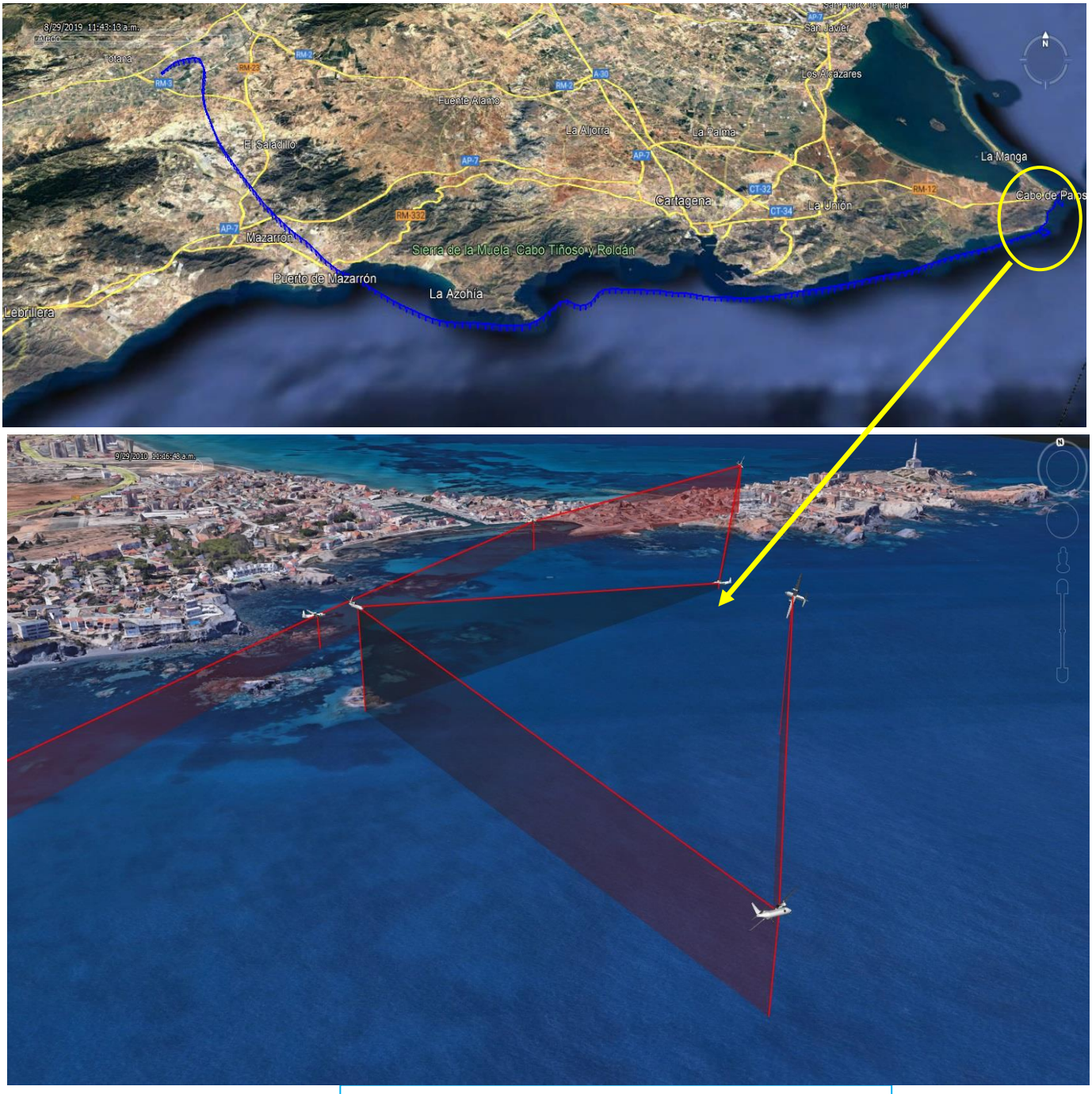


Figure 12. Flightpath of the EC-XSB aircraft

At 11:16:31 h, it began a gentle descent at 1,508 ft and, according to the data recorded by the EFIS, continued to descend at a rate of around 300 ft/min until 11:19:51 h, when the rate of descent increased to 1,098 ft/min.

At that moment, when the aircraft was at 625 ft and flying at 118 km/h, it made a sharp turn to the right, followed by another to the left.

Then, at an altitude of 465 ft, its speed increased to 128 km/h, and it began to descend at a rate of 734 ft/min. At this point, the aircraft was pitched 5.88º downwards, and its roll angle was 44.75º to the left. These high values, entirely outside of the standard range, would indicate that this was the moment he entered IMC conditions.

From that moment on, the aircraft continued to descend until it hit the sea, making several turns with high roll angles to both sides in the moments prior to impact. The last turn before the impact was recorded had a roll angle of 71.5º to the left, as shown in figure 12. In the last recording, made at 11:21:11 h, the aircraft's flight profile shows a steep descent before the recording ends.

For its part, the aircraft that had departed with and was flying ahead of the accident aircraft, an MB AIRCRAFT VL3 with registration EC-XRC, also had a GPS device[4] that provided the following information on its flightpath:

Figure 13. Flightpath of the EC-XRC aircraft

The following figure shows the moment the EC-XRC aircraft turned around. The figure of the Anexx 2 is the flight profile, which shows that it made a very steep descent and subsequent climb. On both the outbound and inbound legs, it changes its altitude numerous times.

1.12. Aircraft wreckage and impact information

The aircraft eventually settled at a depth of 17 m, on the seabed in front of Cala Reona, at 37 º 37´25.0´´ N 0º 42´08.0´´ W.

It was resting in an upright position, with the right main gear wheel supported by the seabed.

Pieces of fuselage debris were scattered within a 30 m radius from the main wreckage of the aircraft.

A specialist company removed the aircraft from the sea and transferred it to a hangar at La Totana Aerodrome for a detailed inspection that found the following:

The tail was intact and undamaged.

The rudder was locked to the left, and both the rudder and elevator control cables had continuity.

[4]The device records the flight data at 1-second intervals.

The fuselage had a deformation that extended from the top to the left side area, on a level with where the license plate letters began.

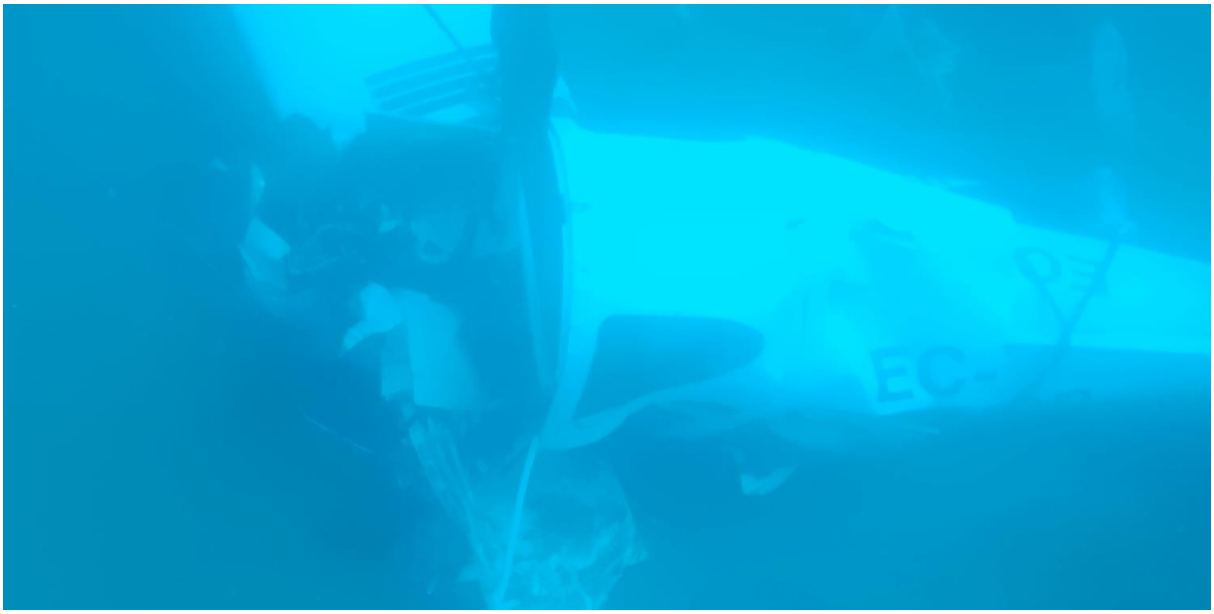


Figure 14. Aircraft on the seabed

The right wing was also practically intact apart from a minor impact to the flap that caused a small downward deformation near the external hinge and attachment point.

There was a small dent to the underside leading edge of the wingtip.

The right main gear housed in that wing was deployed and locked.

The left wing showed signs of a significant impact and was missing practically all the cladding on both its upper and underside, although its entire internal structure was intact.

.

Figure 15. Photograph of the aircraft in the hanger

The leading edge spar was almost intact but showed signs of a severe impact. .

No separated structural elements were found, but all the deformities were due to the impact.

The left main gear had broken off and was never found

Both the front end and the engine had also detached in the crash.

The engine and the area where it was attached, including the front leg in the locked and lowered position, were recovered.

The engine was anchored to its mount, and the entire assembly had separated from the rest of the aircraft on impact.

The roots of the three propeller blades were attached to the hub but had broken off after the attachment point. All but the remains of one of the blades, which was found on the seabed, disappeared.

The ballistic parachute was found outside its metal housing but inside its cover.

In the cockpit, the safety seat belt was unbuckled, and the landing gear lever was in the “gear down” position.

Figure 16. Left wing

1.13 Medical and pathological information

No evidence was found to suggest the pilot's performance was affected by physiological or disabling factors

1.14. Fire

No fire broke out.

1.15. Survival aspects

During the inspection of the wreckage in the hangar, the safety seat belts were proven to be working correctly.

With regard to the emergency and rescue services, the investigation found that from the moment the witness called them on the emergency 112 number, they acted according to the established protocols and went to the scene of the accident immediately.

1.16. Tests and research

Not applicable.

1.17 Organisational and management information

The following section outlines the regulations applicable to the event and the specific relevant areas within them.

1.17.1. Commission Implementing Regulation (EU) No 923/2012, on common rules of the air (SERA)

-SERA.5001, on VMC visibility and distance from cloud minima, which establishes that below 3,050 m (10,000 ft) above sea level (AMSL) and above 900 m (3,000 ft) AMSL or above 300 m (1,000 ft) above ground level, whichever is the higher, in class A[5], B, C, D, E, F and G airspaces, flight visibility must be 5 km and distance from cloud must be 1,500 m horizontally and 300 m (1,000 ft) vertically.

- SERA.5005, a), on visual flight rules:

a) Except when operating as a special VFR flight, VFR flights shall be conducted so that the aircraft is flown in conditions of visibility and distance from clouds equal to or greater than those specified in Table S5-1 (see previous paragraph).

- SERA 9001, which contains the following provisions:

a) Flight information service shall be provided by the appropriate air traffic services units to all aircraft which are likely to be affected by the information and which are:

1) provided with air traffic control service; or

2) otherwise known to the relevant air traffic services units.

b) The reception of flight information service does not relieve the pilot-in-command of an aircraft of any responsibilities and the pilot-in-command shall make the final decision regarding any suggested alteration of flight plan.

- SERA 9005, which says the following:

c) in regard to the scope of the information service, it establishes that the information provided to VFR flights shall include, in addition to that outlined in (a), the provision of available information concerning traffic and weather conditions along the route of flight that are likely to make operation under the visual flight rules impracticable.

1.17.2. 2017 Emergency Plan for San Javier Air Base (Murcia) when open to civil traffic

Point 1.3 of this document (page 8) establishes that the scope of application in regard to the information contained in point 2.1 (page 10) and Annexe 1 is limited to San Javier Air Base (Zone A) and an external area, called Zone E, which encompasses an 8 km radius stretching from San Javier's ARP.

1.17.3. 2017 Response Plan for Accidents and Emergencies at San Javier Air Base or within its area of responsibility

Point 2.1 of this document establishes, in relation to point 1 (p. 3), that the area of responsibility is defined by the territorial limits of the provinces of Murcia, Alicante and Almería for all national or foreign military aircraft, including those belonging to the Civil Guard but not those belonging to the Alcantarilla Air Base (Murcia) and the Manoeuvre II Helicopter Base in Bétera (Valencia).

1.17.4. Air Traffic Regulations, approved by Royal Decree 1180/2018

[5] The VMC minima in Class A airspace are included for guidance to pilots and do not imply acceptance of VFR flights in Class A airspace.

Section 3.5 on the Alert Service, which indicates in point 3.5.1.3 that “In the event that an aircraft experiences an emergency while under the control of an aerodrome tower or an approach control office, the corresponding unit will immediately notify the event to the corresponding flight information centre or area control centre, which, in turn, will notify the rescue coordination centre.

However, if the nature of the emergency is such that notification is superfluous, it will not be necessary”.

1.18. Additional information

In regard to their flight preparation, the investigation was unable to determine whether they had sufficiently studied the meteorological information. On the one hand, it seems that based on the predictions of the previous night, they were expecting magnificent meteorological flying conditions, i.e. clear skies without a cloud in sight and calm winds. On the other hand, however, it seems the pilot who was flying ahead checked the weather conditions on a specialist online website the day before, verifying only that the day was expected to be clear enough for a local flight and little else. We cannot know with any certainty how or if the pilot of the accident aircraft had checked the forecasted weather conditions.

It does appear that both were clear on the route they planned to take, which consisted of flying to the coast at Mazarrón and then heading towards point Sierra (S) of the San Javier Air Base CTR area, to subsequently fly over the Manga del Mar Menor along the visual corridor of said CTR until reaching point November (N) and returning to the La Totana aerodrome. The flight altitude was 1,500 ft, and it took them 15 minutes to reach the coastline.

He commented that they were both in contact with the tower at San Javier Air Base, reporting their flight intentions. He also said that while he communicated in Spanish, the other pilot communicated in English, although he could have done it in Spanish because he had sufficient command of the language. He had spent three (3) to four (4) years flying in Spain at La Totana Aerodrome.

He said the controller they spoke with approved their plans "but did not give them a code for the transponder”.

In his account, he said they suddenly encountered the vertically ascending cloud bank when they reached point Sierra 1 (S1), that it was approximately 1 km in front of him and that when he climbed, he found that it extended horizontally along the entire Manga del Mar Menor area.

By the time he reached 1,000 ft while turning over the sea, he had come out of the cloud bank at a distance of 500m from the coast.

When asked if they had ever flown through clouds before, he replied that he had encountered fog a couple of times and managed to get out by looking at the artificial horizon.

1.19. Special investigation techniques

Not applicable to this investigation.

2. ANALYSIS

To understand what caused this accident, several issues must be analysed. The first is whether the two pilots who decided to make a joint flight with one following the other prepared adequately for the flight and followed the established procedures when they entered the San Javier Air Base control zone (CTR).

Secondly, a specific study of the accident flight is required, particularly during the final moments when he entered the cloud layer and lost visual references.

And lastly, there is the issue of whether the air control services at the San Javier base acted in line with the regulations.

2.1. Preparation and development of the flight

Regarding the first issue, having analysed the data obtained from the EFIS on the accident aircraft and the GPS device on the aircraft flying ahead, and taking into account the precision discrepancy between the two (the first records every 11 s and the second every 1 s), it's clear that rather than maintaining a stable altitude or heading with any regularity, the pilots constantly varied the two parameters throughout the flight. In the case of the accident aircraft, the other parameters recorded in the EFIS, such as speed and pitch attitude, show the same irregular pattern.

This behaviour suggests they did not pre-plan the flight by programming the route they intended to follow with the necessary headings, altitudes and speeds.

Everything indicates that they decided nothing beyond which area to head to without going into more detail.

In the area they planned to fly through, they encountered a dense vertical cloud formation that extended from near the surface of the water to an altitude above the height of the two aircraft, impeding their visibility. Rather than appearing suddenly, these adverse conditions were predicted in the meteorological information that the pilots could have accessed in multiple ways. This fact demonstrates that their planning in this regard was also insufficient.

The meteorological forecasts coincided precisely with the information provided by the pilot of the aircraft in front, who said the cloud could be seen from 1 km away. Therefore, the available meteorological information was correct and accurate. If they had looked at the meteorological information, they would have known that it was impossible to carry out a VFR flight in the area they were planning to fly through.

Once they saw the cloud formation ahead of them, the pilot in front had time to descend to see if he could fly beneath it, and when he realised that he couldn't, he had time to climb to an altitude that was sufficient to keep him in visual flight conditions at all times and avoid entering the cloud formation by turning left.

However, even though he managed to avoid entering IMC conditions, his actions were inadequate because he failed to adhere to the visual flight procedures that stipulate that flight visibility must be 5 km and distance from cloud must be 1,500 m horizontally and 300 m vertically.

According to the information provided by the pilot in front, when he first descended to see if he could fly beneath the clouds, the other aircraft was still behind him because he could see it on his TCAS screen. However, when he subsequently ascended to avoid the cloud formation, he could no longer see it. This data is fully coherent with the information recorded by the EFIS device on the accident aircraft.

It would confirm that the second aircraft did indeed descend to follow the first but failed to notice the cloud ahead and became instantly disoriented on entering the area with zero visibility.

If he had kept to the visual flight procedures outlined above, it's improbable that he wouldn't have noticed the meteorological conditions, and he would almost certainly have detected the cloud ahead and been able to take action to avoid it.

If he had programmed an altitude and heading into the autopilot, it would have been sufficient to guide him out of the adverse situation he found himself in when he entered the clouds, without even touching the aircraft's controls.

The fact that he didn't use the autopilot suggests that because he simply followed the aircraft preceding him and entered the clouds, he completely lost situational awareness, and this left him unable to make any type of decision that would help him resolve the adverse situation.

According to the analysis of the EFIS data, the descent rate of the aircraft moments before the accident, i.e., when it was already in IMC conditions, was erratic, with frequent changes in altitude, high rates of climb and descent, constant heading changes and high pitch and roll angles.

All of the above suggests that the pilot lost situational awareness before entering IMC conditions and that, in addition to the above, when he entered the front, he became instantly disoriented and lost control of the aircraft.

According to the data recorded by the EFIS, when the aircraft hit the water, it had a downward pitch attitude of 5.88º and a left-hand roll angle of 71.5º, which was undoubtedly commanded by the pilot in the probable belief that he was performing another type of movement that was less pronounced and more appropriate to the flight, for example, a coordinated bank to the left that would allow him to turn around and leave the area of low visibility, just as the other pilot who did not penetrate the cloud was able to do.

When the aircraft crashed into the water, the pilot was ejected on impact because he was not wearing a seat belt. This does not necessarily imply that he carried out the entire flight without wearing it; he may have unfastened it at the last minute to avoid being trapped in the aircraft if it was submerged in the water. The investigation has not been able to determine whether he carried out the flight with his seat belt fastened or not.

Finally, the fact that the parachute was out of its housing but still inside its cover would indicate that it was ejected during the impact and not deployed by activating the corresponding cockpit control.

2.2. Actions taken by the control services

Once they were made aware of the accident, three different people in positions of responsibility at the base contacted the controller to ensure the protocol for action in such an event was being followed and that the authority responsible for investigating it had been informed. These conversations suggest that either the controller did not seem sufficiently aware of the actions to be taken or that he was overwhelmed by the situation.

2.3. Applicable emergency procedures in force at San Javier Air Base.

On the date of the accident, San Javier Air Base had two applicable emergency procedures in force:

The 2017 4th edition of the San Javier (Murcia) Air Base Emergency Plan (open to civil traffic) does not apply to this accident because it took place approximately 20 km away and was, therefore, outside its area of responsibility.

The 2017 Response Plan for Accidents and Emergencies at San Javier Air Base or within its area of responsibility did not apply to this accident because it involved a civilian aircraft.

Therefore, on the date the accident occurred, San Javier Air Base did not have an action plan that would have applied to an event involving a civilian aircraft beyond the 8 km radius stretching from the San Javier Aerodrome reference point (ARP).

For this reason, a safety recommendation, recommending the Air Force develop a protocol for action in the event of a civil aviation accident within the area of responsibility of San Javier Air Base, will be issued to the Ministry of Defence.

3. CONCLUSIONS

3.1. Findings

- The STORM FURY XL RG aircraft, registration EC-XSB, and the MB AIRCRAFT VL3 aircraft, registration EC-XRC, took off from La Totana Aerodrome (Murcia) for a flight in VFR conditions without prior planning.

- When they were close to Cabo de Palos, off the coast of Cala Reona (Murcia), they encountered a cloud bank that extended almost from sea level to an altitude of 1,500 ft. The aircraft with registration EC-XSB entered IMC conditions and crashed into the sea due to pilot error.

- The pilot was ejected from the aircraft on impact and killed.

3.2. Causes/contributing factors

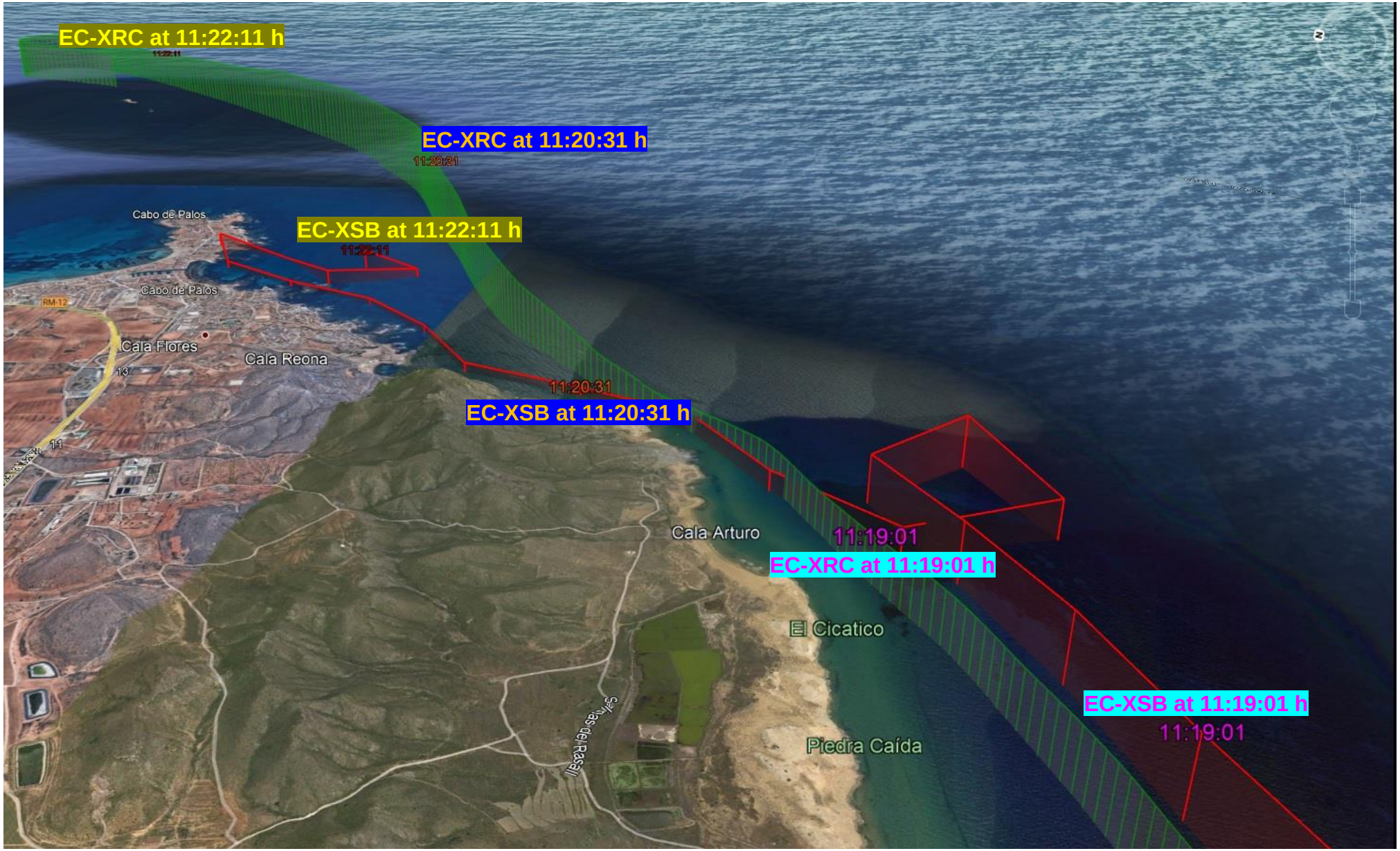
The investigation has concluded that the accident was caused by inadvertent entry into IMC conditions, resulting in spatial disorientation of the pilot.

Has been considered as contributing factor the lack of preparation for the flight, and in particular, the assessment of the weather conditions in the area where the accident took place.

4. RECOMMENDATIONS

REC. 03/22. It is recommended that the Air Force Staff update a protocol for action in the event of a civil aviation accident within the area of responsibility of the San Javier Air Base CTR zone.

ANNEXE 1. RELATIVE POSITION OF BOTH AIRCRAFT IN THE MOMENTS BEFORE THE ACCIDENT



ANNEXE 2. FLIGHT PROFILE OF AIRCRAFT EC-XSB

ANNEXE 3. FLIGHT PROFILE OF AIRCRAFT EC-XRC