

DATA SUMMARY

LOCATION

Date and time	Friday, 21 September 2012; 19:16 UTC ¹
Site	On approach to runway 06 at the Ibiza Airport (LEIB) (Spain)

AIRCRAFT

Registration	EC-JIL	CS-DNP
Type and model	BOMBARDIER Inc. BD-700-1A10	DASSAULT FALCON 2000
Operator	Punto-FA, S.L.	Netjets Europe

Engines

Type and model	ROLLS & ROYCE BR700-710A2-20	HONEYWELL CFE 738-1-1B
Number	2	2

CREW

	Captain	First officer	Captain	First officer
Age	38	46	48	38
Licence	ATPL	CPL	ATPL	CPL
Total flight hours	6,600 h	3,600 h	7,570 h	5,000 h
Flight hours on the type	2,900 h	1,900 h	1,767 h	1,000 h

INJURIES

	Fatal	Serious	Minor/None	Fatal	Serious	Minor/None
Crew			2			3
Passengers			9			7
Third persons						

DAMAGE

Aircraft	None	None
Third parties	None	None

FLIGHT DATA

Tipo de operación	General aviation – Business	Commercial Air Transport – Charter – International – Passenger
Phase of flight	Approach	Approach

REPORT

Date of approval	27 February 2014
------------------	------------------

¹ All times in this report are in UTC unless otherwise specified. To obtain local time, add 2 hours to UTC.

1. FACTUAL INFORMATION

1.1. History of the flight

On 21 September 2012, a Bombardier BD-700 aircraft, registration EC-JIL and call sign MGO758, was making a flight from Nice (LFMN) to Ibiza (LEIB).

At the same time, a Dassault Falcon 2000, registration CS-DNP and call sign NJE599U, was flying to Ibiza from Porto (LPPR).

Aircraft EC-JIL was in radio and radar contact with the Palma ACC², Ibiza Approach (APP) Sector, and was receiving vectors to intercept the runway 06 localizer (LLZ) at LEIB. It was on a course of 240° to the southeast descending to FL³ 080.

Aircraft CS-DNP was on a southeasterly course direct to the IAF⁴ TILNO on the ILS⁵ approach to runway 06 at LEIB. It was under the control of TACC⁶ Levante. Later, once in contact with Ibiza APP, it was cleared to continue its descent to FL 090.

At 19:12:24, Ibiza APP cleared aircraft EC-JIL to descend to 2,500 ft, and at 19:13:36, it instructed aircraft CS-DNP to reduce speed to 250 kt and cleared it to descend to 3,000 ft.

At 19:14:58, aircraft CS-DNP reached the IAF TILNO. After passing it the aircraft turned left toward the localizer. Seconds later, at 19:15:35, aircraft CS-DNP requested to intercept the ILS glide slope for runway 06. Ibiza APP instructed it to turn right to 160° and cross the localizer. After several requests made by aircraft CS-DNP to confirm the instruction to cross the localizer, at 19:16:06, Ibiza APP, after instructing a turn to 160° on two occasions, instructed the crew to turn immediately heading 180°. Aircraft CS-DNP started the turn when it was over the localizer, placing it on a course toward EC-JIL, which had previously been cleared to turn right heading 270°.

At 19:16:38, both aircraft notified ATC⁷ that they had received a TCAS RA⁸. Aircraft CS-DNP was established at 3,000 ft and had passed the runway 06 localizer, on a heading opposite that being flown by EC-JIL, which was descending to 2,500 ft as authorized. The two aircraft flew within 1.2 NM horizontally and 300 ft vertically of each other.

Both aircraft completed their flights without further incident. There were no injuries and there was no damage to either aircraft.

² ACC – Area Control Center.

³ FL – Flight Level.

⁴ IAF – Initial Approach Fix.

⁵ ILS – Instrumental Landing System.

⁶ TACC – Terminal Area Control Center.

⁷ ATC – Air Traffic Control.

⁸ TCAS RA – Traffic Collision Avoidance System Resolution Advisory.

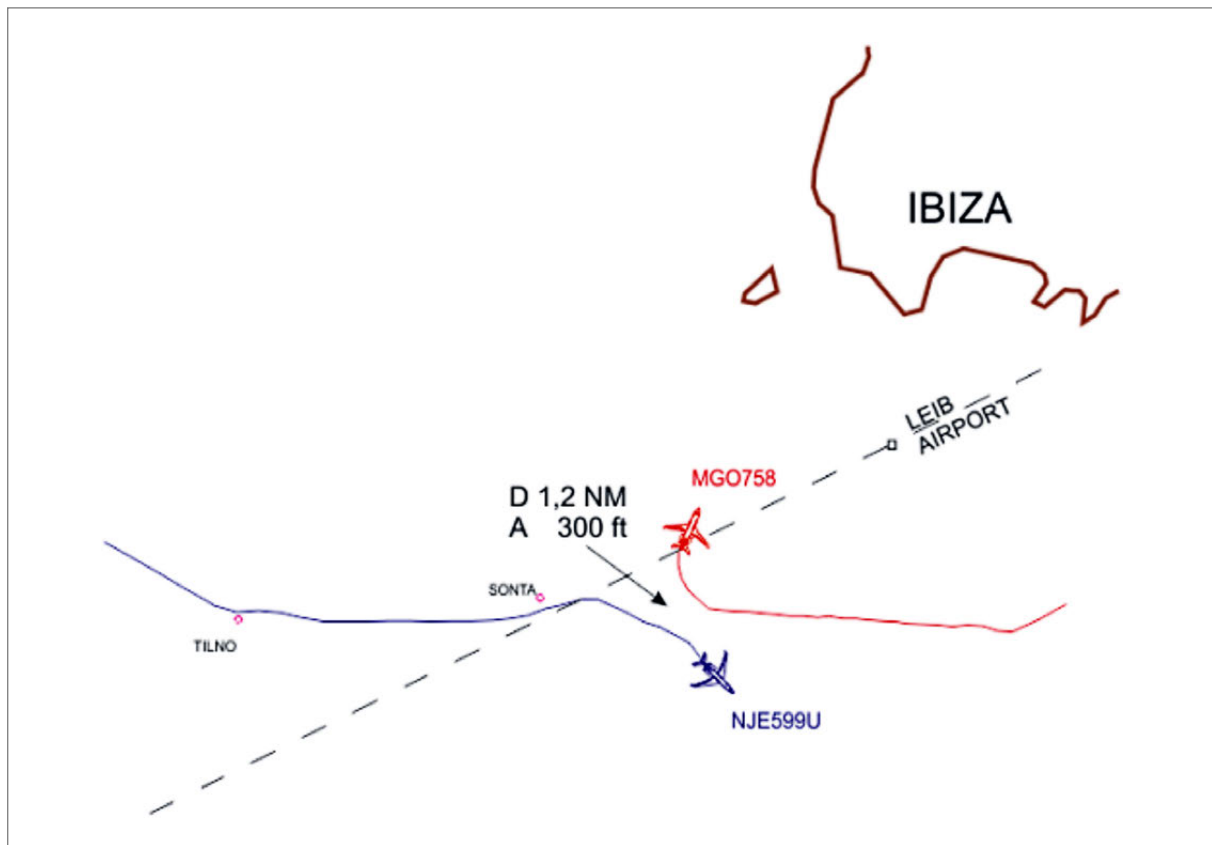


Figure 1. Aircraft flight paths

1.2. Personnel information

1.2.1. Information on the crew of aircraft EC-JIL

The captain of the aircraft, a 38-year old Spanish national, had an airline transport pilot license and a class 1 medical certificate, both valid and in force at the time of the incident. He had a total experience of 6,600 flight hours, of which 2,900 had been on the type. He had an English proficiency level of 5.

The aircraft's first officer, a 46-year old Spanish national, had a commercial pilot license and class 1 and 2 medical certificates, all valid and in force at the time of the incident. He had a total experience of 3,600 flight hours, of which 1,900 had been on the type. He had an English proficiency level of 5.

1.2.2. Information on the crew of aircraft CS-DNP

The captain of the aircraft, a 48-year old Dutch national, had an airline transport pilot license and a class 1 medical certificate, both valid and in force at the time of the

incident. He had a total experience of 7,570 flight hours, of which 1,767 had been on the type. He had an English proficiency level of 6.

The first officer of aircraft CS-DNP, a 38-year old Dutch national, had a commercial pilot license and a class 1 medical certificate, both valid and in force at the time of the incident. He had a total experience of 5,000 flight hours, of which 1,000 had been on the type. He had an English proficiency level of 6.

1.2.3. *Information on ATC personnel*

The Ibiza APP Sector controller was a Spanish national. He had the necessary air traffic controller license and control ratings, all valid and issued by the Spanish authority in June 1989. He also had the endorsement of the LECP⁹ unit, issued in September 2011. He had a Spanish proficiency level of 6 and an English level of 5.

1.3. Aircraft information

Both aircraft are medium-sized twin engine jet business airplanes with maximum takeoff weights in excess of 5,700 kg.

Both had valid and in force Airworthiness Certificates.

Both aircraft were equipped with an ACAS II (Airborne Collision Avoidance System). The Dassault Falcon 2000 had a TCAS-4000 unit made by Rockwell Collins, while the Bombardier had a TCAS 2000 made by ACSS (Aviation Communication & Surveillance Systems).

1.4. Meteorological information

According to data supplied by the National Weather Agency, weather conditions at 19:00 at the Ibiza Airport were as follows: wind from the northeast at 7 kt, visibility in excess of 9,999 m, scattered clouds at 4,500 ft, temperature 24 °C, dew point 21 °C, QNH 1,015 and no significant changes.

1.5. Communications

Communications during the incident were handled on the Ibiza APP frequency of the Palma ACC control station. Conversations between Ibiza APP and aircraft CS-DNP were

⁹ LECP – Palma Area Control Center.

handled all in English, while with EC-JIL they were conducted in Spanish except during the close approach with aircraft CS-DNP, when English was used. The recordings of the communications revealed some noise on the frequency that did not impede understanding the messages. The full conversations are included in Appendix I, so only the most relevant exchanges are considered in this section.

At 19:07:03, aircraft CS-DNP made contact on the Ibiza APP frequency. From then on both aircraft were in radio and radar contact with Ibiza APP. Aircraft CS-DNP was proceeding from the NW direct to the IAF TILNO and descending to FL 090, cleared by the previous ATC station (TACC Levante) after coordinating it with Ibiza APP. Aircraft EC-JIL was flying S to the RWY 06 localizer on a heading of 240° and descending to FL 080.

Between 19:07:51 and 19:10:30, Ibiza APP instructed aircraft CS-DNP to reduce its speed and descend to 4,000 ft. In the meantime, it cleared aircraft EC-JIL to descend to 3000 ft and instructed it to descend to 2,500 ft at 19:12:24. Subsequently, at 19:13:36, it cleared aircraft CS-DNP to descend to 3,000 ft and reduce speed to 250 kt.

At 19:14:12, aircraft EC-JIL reported having the preceding traffic on approach in sight (this aircraft was not involved in the near miss), and requested to adjust visually. Ibiza APP instructed it to turn right heading 270°. A minute later, Ibiza APP asked LEIB TWR if aircraft EC-JIL could adjust visually to the preceding traffic, to which LEIB TWR replied no since there was an aircraft ready for takeoff and if EC-JIL adjusted too much it would be unable to pass through. Later, at 19:15:25, aircraft EC-JIL reported it was ready to turn, to which Ibiza APP replied an aircraft was ready for takeoff and he would have to ensure an 8 NM separation with it.

At 19:15:35, aircraft CS-DNP reported reaching 3000 ft and requested to intercept the glide slope. Ibiza APP instructed it to turn right to heading 160° and cross the localizer. After this exchange, aircraft CS-DNP requested confirmation that the 160° heading was to intercept the localizer, and Ibiza APP instructed it to cross the localizer. The aircraft then asked that the message be repeated, and Ibiza APP instructed it to fly HDG¹⁰ 160° through the localizer, repeating this last instruction. Aircraft CS-DNP then stated that it was crossing the localizer at that time and that it should be on heading 060° to intercept the localizer. Ibiza APP then instructed aircraft CS-DNP to immediately turn right to heading 180°. The aircraft acknowledged and requested that Ibiza APP state its intentions, but the controller did not reply.

Immediately afterward, at 19:16:14, Ibiza APP instructed aircraft EC-JIL (in the first exchange in English with this aircraft) to turn right heading 030° on final vector to intercept the runway 06 localizer at LEIB, and cleared it for an ILS approach to this runway. The aircraft did not acknowledge. Ibiza APP then instructed aircraft CS-DNP to once more turn immediately to HDG 180°, after which the aircraft reported a TCAS RA.

¹⁰ HDG – Heading.

Two seconds, later, the LEIB TWR called Ibiza APP to report that aircraft CS-DNP and EC-JIL were both at almost 3,000 ft.

Finally, at 19:16:39, Ibiza APP called aircraft EC-JIL, which reported it had received a TCAS RA and that it was turning to heading 020° to intercept and complete the ILS approach to runway 06.

1.6. Aerodrome information

1.6.1. STAR – Standard Instrument Arrival

As indicated on the flight plan for aircraft CS-DNP, the standard arrival (STAR) planned for the day of the incident was STAR VARUT1V, published in the AIP Spain in chart AD2-LEIB STAR 1.2. Onboard the aircraft was the Jeppesen 10-02G chart for Ibiza, corresponding to the instrumental standard terminal arrival route for runway 06 at the Ibiza Airport. This chart warns not to proceed beyond the IAF without ATC clearance. It also lists the minimum hold altitude over IAF TILNO as 4,000 ft.

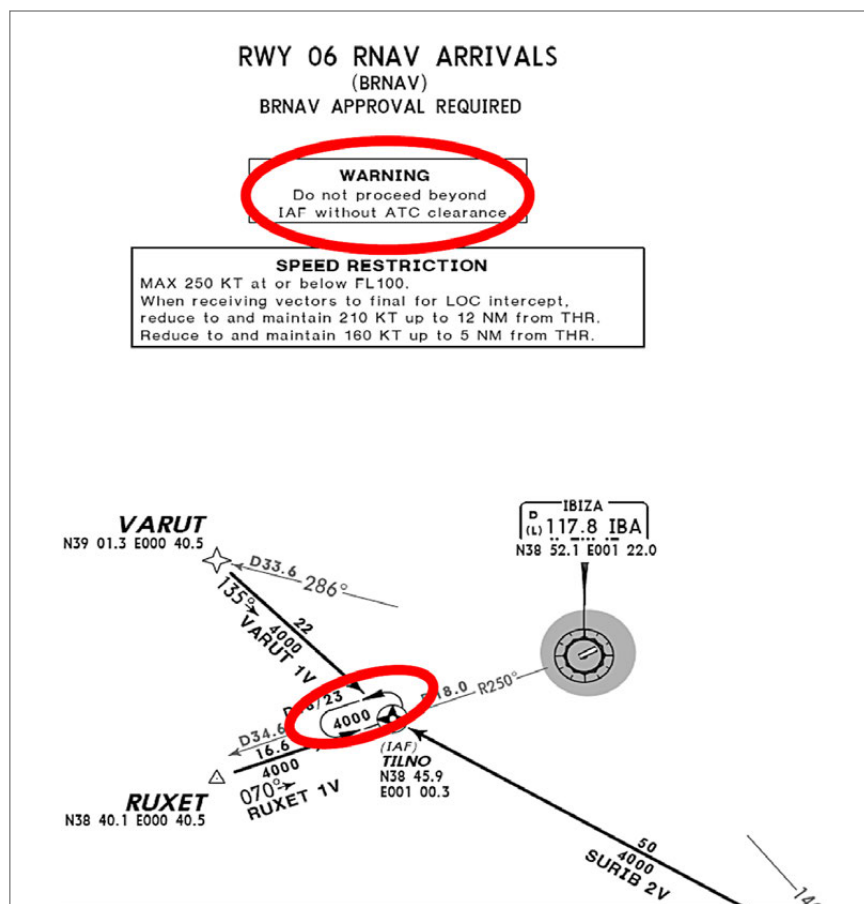


Figure 2. Portion of Jeppesen chart 10-2G

1.6.2. *IAC*¹¹

The ILS instrument approach procedure for runway 06 at LEIB is published in chart AD 2-LEIB IAC/1 of the AIP Spain. Aircraft CS-DNP had onboard Jeppesen chart 11-1, corresponding to the IAC for runway 06 at Ibiza. Both charts establish the heading to fly after leaving the IAF TILNO as 088° until the intermediate fix (IF) is reached.

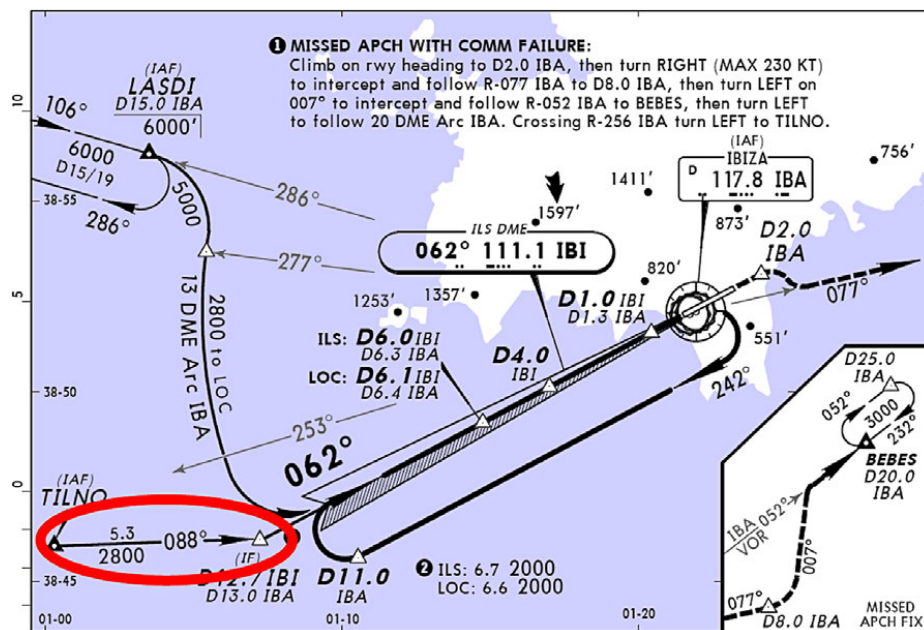


Figure 3. Portion of Jeppesen chart 11-1

1.7. Tests and research

1.7.1. Statement from crew of aircraft EC-JIL

The pilot of aircraft EC-JIL stated that as they were flying on a heading of 240°, they had visual contact with the traffic ahead of them on the approach, so they asked ATC if they could continue visually and adjust to the traffic. ATC denied the request because they had to be 8 NM back from the preceding traffic to give another aircraft room to take off on runway 06.

They were then instructed to turn right heading 270° toward the localizer. This heading placed them on a path opposite that of CS-DNP, which was heading toward the localizer from the west at almost the same altitude. The pilot stated that they saw the situation on the TCAS screen and started to become concerned when the other traffic

¹¹ IAC – Instrument Approach Chart.

was within 10 NM of their position and closing. He added they could see their lights. In light of their concern, the pilot informed ATC that they were ready to turn toward the localizer, but the controller, instead of clearing them to do so, instructed aircraft CS-DNP to turn HDG 160°. When they were some 5 NM away from the other aircraft, there were several misunderstandings on the frequency between the controller and aircraft CS-DNP, with several incorrect acknowledgments from the other crew, which did not seem to understand the intentions of ATC's instructions.

He finally stated that aircraft CS-DNP reported a TCAS RA, immediately after which they also had a descent RA. They followed the TCAS instructions and descended and turned right. During the TCAS warning the controller instructed them to turn heading 030° as the final intercept vector and cleared them for an ILS approach to runway 06, an instruction they did not acknowledge as they were carrying out the evasive maneuver.

1.7.2. *Statement from crew of aircraft CS-DNP*

The crew of aircraft CS-DNP stated that they were proceeding direct to the IAF TILNO, as cleared by ATC. Upon reaching it, they requested instructions, but the controller was speaking at the moment with another aircraft in Spanish. They kept flying on a more or less easterly heading. The autopilot was engaged and following the FMS¹², which had a turn to the runway 06 FAF¹³ programmed into it. The controller then gave them an instruction that they could not quite understand due to the controller's heavy Spanish accent. They were unsure whether it was "060° to intercept the ILS" or "160° to intercept ILS". Since they did not understand the clearance, they asked the controller, who instructed them to turn heading 160°. When they started the turn, ATC instructed them to turn to 180°, at which time they received a TCAS RA to climb, disengaged the autopilot and complied with the RA.

The crew also stated that they were in visual contact with the other aircraft throughout the entire incident, from the time they passed the IAF TILNO until they completed the maneuver indicated by the TCAS.

1.7.3. *Statement from the Ibiza APP controller*

The Ibiza APP controller stated that the locations of the aircraft before the incident took place were as follows: there was a third aircraft established on the localizer and cleared for an ILS approach to RWY 06, aircraft EC-JIL was on the base leg cleared to 2,500 ft, and aircraft CS-DNP had been cleared by the Levante TACC to proceed direct to the IAF TILNO. He stated that the priority was to turn aircraft EC-JIL and establish it on the localizer

¹² FMS – Flight Management System.

¹³ FAF – Final Approach Fix.

to clear it for the approach. His intention was to have aircraft CS-DNP cross the LLZ and then give it radar vectors to intercept the localizer and adjust it to aircraft EC-JIL.

As the situation progressed, aircraft EC-JIL requested to do a visual approach, but this was denied because the LEIB Tower had requested a 10 NM separation between the traffic already established on the localizer. Aircraft CS-DNP called to report it was arriving at the IAF TILNO and requested to follow the localizer, which was denied, being instructed instead to cross the localizer on heading 160°. Since the aircraft did not understand the instruction, he had to repeat it three times, which kept him from clearing aircraft EC-JIL to turn onto final earlier. He pointed to this as the origin of the conflict.

The controller further pointed out that aircraft CS-DNP had not been cleared for an ILS approach, meaning the limit of its clearance was TILNO, which it should not have proceeded past without clearance.

Lastly, the controller noted that on the day of the incident, he was responsible for the Ibiza route and Ibiza approach sectors, which meant his radar display was not ideally suited to work the approach since said display was too broad and distorted the view of the approach.

1.7.4. *Radar Information*

The radar data provided by the Air Navigation Office of the Balearic Islands show aircraft CS-DNP on a constant descent from 4,700 ft at a rate in excess of 1,800 ft/min that gradually decreased to 1,000 ft/min as it approached its cleared altitude of 3,000 ft. Thirty-five seconds later the close approach with aircraft EC-JIL occurred.

The radar data also show that once aircraft CS-DNP was past the IAF TILNO, it turned left and proceeded toward the runway 06 localizer at LEIB, apparently in keeping with the standard procedure published in the IAC¹³ for the runway 06 ILS approach (AIP Spain AD2-LEIB IAC/1).

In the meantime, aircraft EC-JIL was descending at a constant rate of about 900 ft/min heading west to an altitude of 2,700 ft, where the near miss with aircraft CS-DNP took place.

The closest point of approach was at 19:16:38, with the two aircraft closing to within 1.2 NM horizontally and 300 ft vertically of each other. Aircraft CS-DNP was at an altitude of 3,000 ft on an easterly heading while turning to HDG 160° as instructed, and aircraft EC-JIL was descending through 2,700 ft heading west.

Five seconds later, aircraft EC-JIL was turning right and descending through 2,600 ft, while aircraft CS-DNP was climbing through 3,100 ft.

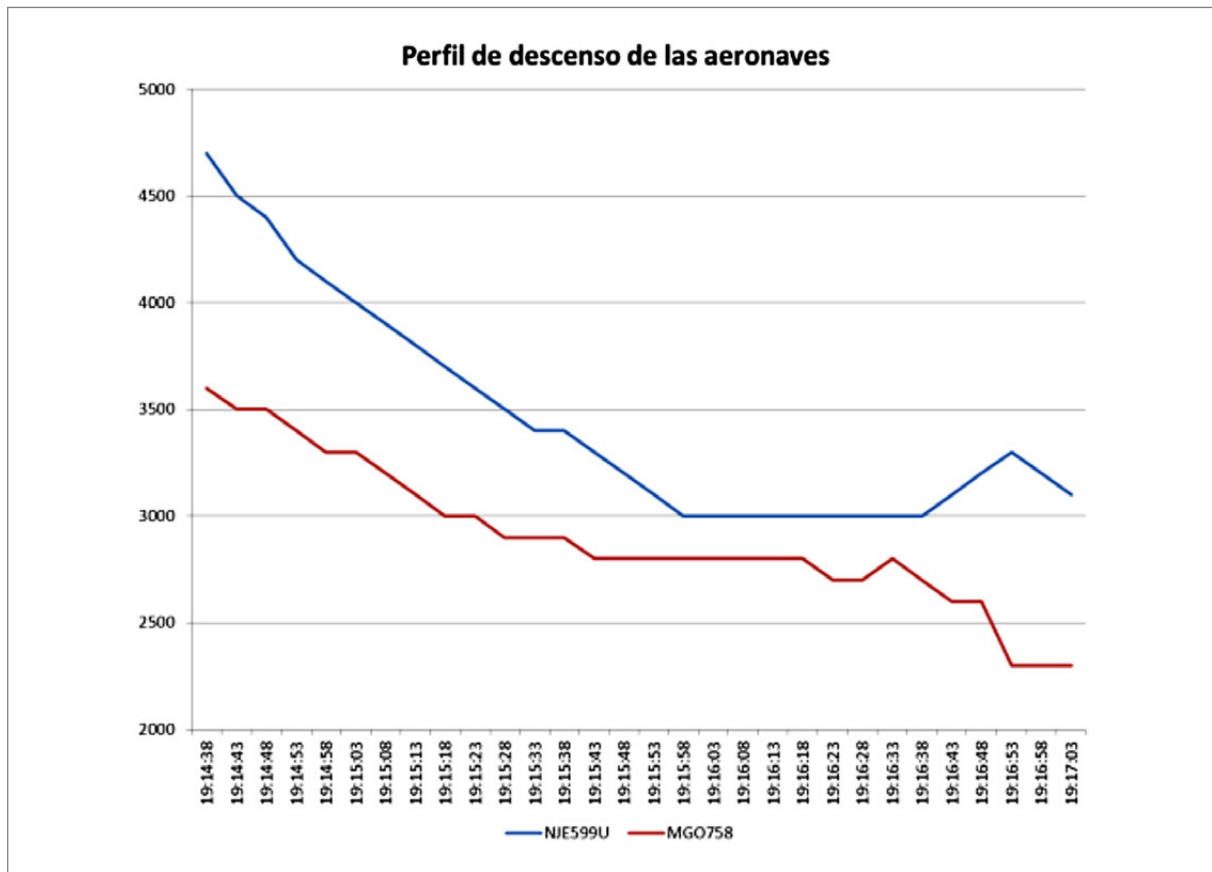


Figure 4. Descent profiles of aircraft NIE599U and MGO758

The vertical and horizontal distances between the aircraft, as well as their altitudes, are given below in Table 1.

UTC time	Altitude (ft) CS-DNP	Altitude (ft) EC-JIL	Vertical dist. (ft)	Horizontal dist. (NM)
19:16:18	3,000	2,800	200	3.2
19:16:23	3,000	2,700	300	2.7
19:16:28	3,000	2,800	200	2.2
19:16:33	3,000	2,700	300	1.7
19:16:38	3,000	2,700	300	1.2
19:16:43	3,100	2,600	500	1
19:16:48	3,200	2,600	600	0.9
19:16:53	3,300	2,300	1,000	1.2
19:16:58	3,200	2,300	900	1.6

Table 1. Horizontal and vertical distances during the incident

1.8. Organizational and management information

1.8.1. *Operations Manual of the Palma Control Center (LECP)*

Section 9.4, "Operational Organization of the Station" of the LECP's Operations Manual states that the number of open positions or sectors and their groupings depends on the traffic demand and on the number of controllers on duty.

On the day of the incident, the Ibiza Approach Sector was grouped with the Route Sector. This grouping is called IXX. The main responsibilities of each sector are as follows:

The *Ibiza Route Sector (IRX)* controls traffic departing from or arriving at Ibiza and all flights between FL 115 and FL 225. In the winter, when the Ibiza Airport is closed, this sector handles the traffic in the Ibiza Approach Sector. The collateral sectors are Barcelona ACC, Valencia TACC and other sectors of the Palma ACC (Section 9.5.2.3).

The *Ibiza Approach Sector (IAX)* handles sequencing, approach and takeoff operations involving the Ibiza airport, in addition to any aircraft operating between MSL-GML¹⁴ and FL 115 within its airspace. The collateral sectors are Barcelona ACC, Valencia TACC, Ibiza TWR and other sectors of the Palma ACC (Section 9.5.2.4).

1.8.2. *Letter of Agreement (LOA) between Ibiza Approach Control (Ibiza APP) and the Ibiza Airport Control Tower (Ibiza TWR)*

Section D.2.1, *Flights from Ibiza APP to Ibiza TWR*, in Annex D of the LOA between the two stations states that the separation between successive aircraft shall be 8 NM in visual meteorological conditions (VMC). This separation is to be established as soon as the first aircraft is at the ATZ¹⁵ limit, 5 NM away from landing.

Section E.3 in Annex E, *Transfer of Control and Transfer of Communications*, indicates that Ibiza APP will transfer aircraft to Ibiza TWR between 15 and 6 NM out on final or coordinate the transfer on a segment of the circuit.

1.8.3. *Operations Manual of the company Netjets*

Section 8.3.22.7 of the Part A Operations Manual, *Descent to Cleared Altitudes on Approach*, states that the altitudes specified in instrument approach procedures must be strictly adhered to. It also notes that the descent to the next lower cleared altitude is to be made only after passing the associated fix and only if the aircraft is following the flight path specified in the procedure.

¹⁴ MSL-GML – Mean Sea Level.

¹⁵ ATZ – Aerodrome Traffic Zone.

It then notes that these instructions do not apply when the aircraft is cleared to descend when receiving radar vectors or when executing a visual approach.

Section 8.3.1.10 of the same manual, *ATC Clearances*, specifies that any concerns from any member of the crew regarding the contents of a clearance must be clarified with ATC, and gives the following example: "Say again clearance for Fraction 123".

1.9. Additional information

1.9.1. ACAS Airborne Collision Avoidance System

The purpose of the Airborne Collision Avoidance System (ACAS) is to warn pilots of possible collisions. According to Regulation (EU) No. 1332/2011 of the Commission of 16 December 2011, laying down common airspace usage requirements and operating procedures for airborne collision avoidance, all turbine-powered airplanes with a maximum certified takeoff weight in excess of 5,700 kg, or that are authorized to transport more than 19 passengers, and that fly in the air space of European Union Member states, are required to be equipped with the ACAS II system. Additionally, this requirement is applicable internationally pursuant to Annex 6, Aircraft Operations, Part I, International Commercial Air Transport – Airplanes, of the International Civil Aviation Organization.

ACAS equipment can provide two types of advisories:

- **TA – Traffic Advisory**, the purpose of which is to alert the flight crew sufficiently far in advance of possible threat aircraft. Its aim is, on the one hand, to encourage crews to visually locate those aircraft that could pose a threat (a TA indicates distance, altitude, speed, change in altitude and bearing), and on the other, to act as a precursor to a RA.
- **RA – Resolution Advisory**, provides vertical maneuvers or restrictions to said maneuvers so as to ensure sufficient vertical separation within the restrictions imposed by the two aircraft's abilities in terms of climb rate and proximity to the ground. If the ACAS system's threat detection logic determines that an encounter with a nearby aircraft could lead to a collision or quasi-collision, the threat resolution logic will determine the appropriate maneuver so as to ensure vertical separation between the two aircraft.

1.9.2. Spain's Air Traffic Regulations (RCA)

Spain's Air Traffic Regulations specify the following in terms of the contents and phraseology of an instruction given by ATC when providing radar vectors to an aircraft on approach:

4.3.11. Content of air traffic control clearances.

4.3.11.1. Clearances shall contain verified and concise information and, insofar as possible, shall follow a standard format.

4.6.9.3.7. When an aircraft is assigned a vector that passes through the final approach bearing, the aircraft shall be duly informed of this along with the reasons for using said vectoring.

4.10.4.2.2. Vectoring for ILS and other aids interpreted by the pilot.

h) PREVEA GUIA VECTORIAL PARA CRUZAR (rumbo del localizador o ayuda) (motivo);	h) EXPECT VECTOR ACROSS (localizer course or aid) (reason);
i) ESTE VIRAJE LE HARA PASAR POR (ayuda) [motivo];	i) THIS TURN WILL TAKE YOU THROUGH (aid) [reason];
i) LE LLEVAMOS A PASAR POR (ayuda) [motivo];	i) TAKING YOUR THROUGH (aid) [reason];

And the reason shall be stated as follows:

NOTE: When a reason for the radar vectoring or for the stated maneuvers must be given, the following phraseology should be used:

NOTA.- Cuando sea necesario especificar un motivo para la guía vectorial radar o para las maniobras mencionadas debería utilizarse la fraseología siguiente:

a) DEBIDO A TRÁFICO;	a) DUE TO TRAFFIC;
b) PARA SEPARACIÓN DE TRÁFICO;	b) FOR TRAFFIC SEPARATION;
c) PARA SECUENCIA DE TRÁFICO (POSICIÓN);	c) FOR TRAFFIC SECUENCY;
d) PARA PROCEDER A TRAMO VIENTO EN COLA (BASE o FINAL).	d) FOR DOWNWIND (BASE, or FINAL).

The RCA specifies the following regarding clearance limits:

Clearance limit.

Point to which an aircraft is granted an air traffic control clearance.

4.3.12.1. Clearance limit.

4.3.12.1.1. The clearance limit shall be described by specifying the name of the corresponding reporting point, aerodrome or controlled air space limit.

4.3.12.1.3. If an aircraft is cleared to an intermediate point in an adjacent control area, the corresponding area control center shall then be responsible for issuing an amended clearance to the destination aerodrome as soon as possible.

As regards the general radar procedures for approach and for vectoring to intercept a final approach aid interpreted by the pilot, such as an ILS, the RCA states that:

4.6.9.3.6. Aircraft being vectored to final approach shall be given a heading or series of headings calculated such that they are directed toward the final approach bearing. The final vector shall allow the aircraft to remain firmly established, in level flight, on the final approach bearing before intercepting the specified or nominal glide slope if the approach is to be made using MLS, ILS or radar. The final vector shall also provide an angle for intercepting the final approach bearing that is 45° or less.

4.6.9.4.1. An aircraft being vectored to intercept an aid interpreted by the pilot for final approach shall be given instructions to report when established on the final approach bearing. The approach clearance shall be expedited before the aircraft reports being established on the bearing, unless circumstances impede issuing the clearance at that time. Normally, radar vectoring will terminate when the aircraft departs from the last assigned heading and proceeds to intercept the final approach bearing.

As for the information to be provided when two controlled aircraft are no longer separated by radar separation minima:

4.3.14.1. Essential traffic is that controlled traffic to which the provision of separation by ATC is applicable, but which, in relation to a particular controlled flight is not separated from other controlled traffic by the minima established in Sections 4.3.2 to 4.3.9 inclusive, Section 4.4.3 and Section 4.6.6.6.

4.3.14.2. Essential traffic information shall be given to controlled flights concerned whenever they constitute essential traffic to each other. This information will inevitably relate to controlled flights cleared subject to maintaining own separation and remaining in visual meteorological conditions (See 4.3.13.1.).

As regards the actions that a pilot can carry out to avoid a traffic conflict, the RCA states the following:

2.3.2.2.8.2. Nothing specified in the procedures in 2.3.2.2.8.3 shall impede the pilot in command from using his own judgment and exercising full authority in selecting those actions deemed most appropriate for resolving a traffic conflict or preventing a possible collision.

Note: The ability of ACAS to fulfill its function of aiding pilots avoid possible collisions depends on the correct and prompt response by pilots to the ACAS instructions.

Aircraft CS-DNP was flying in class A air space, meaning it was subject to ATC control, as indicated in RCA 3.2.6.3.

3.2.6.3. The requirements for flights within each class of air space shall be as indicated in the table below_

Class	Type of flight	Separation provided	Service provided	Speed limitation	Radio communications requirements	Subject to ATC clearance
A	IFR only	All aircraft	ATC	Not applicable	Continuous two ways	Yes

1.9.3. Information from the air traffic service

The incident took place in class A air space, in which air traffic control service is provided to all IFR flights within the Ibiza APP Sector. Specifically, ATC provides radar-based approach control service, whose functions include:

- a) Vector incoming traffic to final approach aids or to a point from which a precision radar approach, a surveillance radar approach or a visual approach can be made.
- b) Provide radar assistance for approaches made to facilities not equipped with radar and notify aircraft of deviations from normal approach trajectories.
- c) Provide radar separation between:
 - i. Successive departing aircraft,
 - ii. Successive arriving aircraft and,
 - iii. A departing aircraft and the next arriving aircraft.

2. ANALYSIS

2.1. Flight path of aircraft CS-DNP

Aircraft CS-DNP had been cleared by the Levante TACC to proceed direct to the IAF TILNO, the initial approach fix for runway 06 at LEIB. This meant it was receiving radar vectors and was therefore not following a standard approach procedure. Once in radio and radar contact with Ibiza APP, it was cleared to descend to 3,000 ft without amending its clearance limit, meaning said limit was still the IAF TILNO. After reaching said point, aircraft CS-DNP, as revealed by radar data and confirmed by the pilot's statement, turned toward the localizer, following the RWY 06 approach procedure that was programmed into the FMS.

The communications do not indicate that aircraft CS-DNP was cleared by Ibiza APP to cross point TILNO, nor that the aircraft called to inform ATC that it was reaching its clearance limit. Since the aircraft was flying in class A air space, IFR flights were subject

to ATC clearance, meaning aircraft CS-DNP should have received a new instruction to proceed beyond the IAF. The pilot stated that he tried to report on the frequency that they had passed TILNO, but it was not possible because the controller was guiding another aircraft at that moment.

According to the radar data, the aircraft crossed the IAF at 19:14:58. The transcript of the oral communications does not reveal any exchanges between 19:14:24 and 19:15:10. A minute after turning left once past the IAF TILNO, aircraft CS-DNP turned left again to line up with the final approach bearing without being cleared to do so.

The clearance to descend to 3,000 ft given to aircraft CS-DNP before reaching the IAF TILNO, a thousand feet below the minimum altitude specified in the STAR for the IAF, could have made the crew think that they were cleared to continue with the IAC procedure, as shown by the radar trajectory. The aircraft did not descend below 4,000 ft until it was past the IAF, as instructed in the company's Flight Manual (see Section 1.9.4) for descents following an approach procedure. In this case, however, the aircraft was receiving radar vectors, meaning it was not necessary to maintain that altitude.

2.2. Flight path of aircraft EC-JIL

At 19:14:12, aircraft EC-JIL requested from Ibiza APP to adjust visually to the preceding traffic on the approach sequence, which was already established at the RWY 06 LLZ. Ibiza APP denied the request citing the need to establish an 8 NM separation between aircraft EC-JIL and an aircraft that was going to take off from LEIB. According to the LOA between the LEIB TWR and Ibiza APP, the minimum separation between successive aircraft is 8 NM. Providing this separation with the departing aircraft meant increasing the separation between aircraft EC-JIL and the one preceding it in the approach sequence. This is why ATC kept aircraft EC-JIL on its heading of 270°.

The decision to maintain aircraft EC-JIL on heading 270°, convergent with the heading being flown by CS-DNP, caused the horizontal separation between the two aircraft to decrease. This, along with the fact that Ibiza APP had cleared EC-JIL to descend to 2,500 ft first (at 19:12:28) and then aircraft CS-DNP to descend to 3,000 ft (at 19:13:13), resulted in the minimum vertical radar separation (1,000 ft) not being maintained at the closest point of approach. The vertical distance was also less than the 500 ft guaranteed by the clearances because aircraft EC-JIL had not yet reached its cleared altitude (2,500 ft) when it crossed the path of aircraft CS-DNP.

2.3. Clearances for aircraft CS-DNP to cross the LLZ

At 19:15:42, the Ibiza AP controller instructed aircraft CS-DNP to turn heading 160° for the first time and cross the runway 06 localizer after aircraft CS-DNP requested

clearance to follow the ILS glide slope for runway 06. Based on the approach sequence the controller had planned, aircraft CS-DNP was second behind aircraft EC-JIL. At that time, the aircraft was proceeding to the localizer after leaving the IAF TILNO, despite not having been cleared to do so. Aircraft CS-DNP, having failed to understand ATC's instruction, requested confirmation that the heading being given was to intercept the LLZ, since it is possible that the aircraft was expecting a heading to intercept the localizer and make the approach to runway 06. The controller, without replying negatively, instructed it once more to cross the localizer, a communication that did not clarify the aircraft's situation, which again asked that the instruction be repeated. Fifteen seconds after the initial instruction, ATC again instructed aircraft CS-DNP to turn heading 160° and cross the localizer. Aircraft CS-DNP replied they were crossing the localizer at that moment and further stated that the intercept heading should be 060°, which seems to indicate they did not understand the controller's intentions. ATC then ordered aircraft CS-DNP to turn immediately heading 180°. The aircraft acknowledge, requesting the intentions behind said instruction, but the Ibiza APP controller did not reply.

Almost thirty seconds elapsed between the first instruction from the Ibiza APP controller to aircraft CS-DNP to turn HDG 160° and cross the localizer and the aircraft's acknowledgment to turn heading south following the instruction to turn immediately. During this time, ATC sent two messages, providing a radar vector and informing the aircraft to cross the LLZ, but the controller did not inform the aircraft of the reason for doing so. This is in violation of Spain's Air Traffic Regulations (see Section 1.10.1), which states that when an aircraft is given a vector that involves crossing the final approach bearing, a reason shall be given for providing said vectoring.

Aircraft CS-DNP requested that the instruction be clarified on several occasions since the crew came to believe that given the time and their location in the approach, the next instruction they would receive would be to turn to the final approach bearing. ATC, however, continued providing only the vector and the instruction to cross the localizer, which did nothing to clarify the confusion onboard aircraft CS-DNP. Only once did aircraft CS-DNP use the phraseology indicated in its Operations Manual to request clarification of a clearance, "Say again clearance for Fraction 123" (see Section 1.8.3).

2.4. Language of the communications between ATC and the aircraft

All the communications between aircraft CS-DP and the Ibiza APP controller before and after the incident were in English. The communications between ATC and aircraft EC-JIL, however, were in Spanish, except for one exchange that was made in English, at 19:16:23, during the close approach between the two aircraft.

The fact that ATC did not use English with aircraft EC-JIL while it was providing vector guidance to both to intercept the localizer on the same runway prevented the crew of

aircraft CS-DNP from having a clear picture of the approach sequence, since they were unaware that the preceding aircraft in the approach sequence was aircraft EC-JIL, information that was conveyed in Spanish. This lack of a clear situational awareness by the crew of aircraft CS-DNP could have contributed to its crew's misunderstanding of the instruction to cross the LLZ.

One of the contributing factors has thus been identified as the use of Spanish in a situation involving an aircraft whose crew did not master this language.

This problem has been addressed before by the CIAIAC, which issued safety recommendation REC 25/03 in its report IN-060/2002 regarding the use of English on frequency:

REC 25/03 (IN-060/2002). It is recommended that the DGAC create a working group with the participation of AENA and representatives from operators, professional pilot associations and professional controller associations to study the possibility of regulating the sole use of English in ATC communications in situations involving a pilot who does not speak Spanish, and the conditions under which said regulation is to be implemented.

In reference to said recommendation, on 10 February 2012 AESA reported the creation of a working group for the Madrid TMA consisting of AESA and AENA representatives, the main purpose of which is to identify, propose and monitor improvement measures related to safety incidents and complaints from the various groups.

The first meeting was held on 11 February 2011, where one of the primary areas of concern was identified as the implementation of English as the sole language to be used in all ATC communications in the Madrid TMA. In this regard, the group deemed it necessary to make a series of inquiries to determine the acceptance of the measure by users and the possible negative effects it could have on operational safety. In response to this concern, in May 2011 AESA requested information from ENAC (Italy) on their experience in the exclusive use of English in aviation communications.

On 31 May, the CIAIAC closed out the recommendation, deeming the response satisfactory.

2.5. Conflict management

During all the time that ATC was instructing aircraft CS-DNP to cross the runway 06 LLZ, said aircraft was closing in on aircraft EC-JIL. The Ibiza APP controller, on seeing that aircraft CS-DNP did not understand or obey the instruction to turn heading 160° (twenty-four seconds after the initial clearance), ended up instructing it to turn immediately heading south to resolve the conflict situation that had resulted between

the two aircraft. This did not remedy the situation since aircraft CS-DNP was over the runway 06 localizer, a horizontal distance of 2.7 NM and a vertical distance of 300 ft away from EC-JIL, when it acknowledged the turn to heading 180°.

During the turn to heading south of aircraft CS-DNP, the horizontal separation between the aircraft decreased, causing the anti-collision systems on both aircraft to issue resolution advisories. The ACAS on EC-JIL instructed its crew to descend. This was complemented by the pilot's action to turn right to increase the horizontal separation with aircraft CS-DNP, which was executing the climb maneuver indicated by its ACAS. While the two aircraft were carrying out the RA maneuvers, the controller instructed aircraft EC-JIL to turn heading 030°, the final vector to intercept the localizer. This measure did not prevent the conflict, since by then the minimum separation distances between the aircraft had already been breached.

Ibiza APP did not provide essential traffic information to either of the two aircraft in terms of maintaining own separation and remaining in visual meteorological conditions, as specified in Section 4.3.13.1 of the RCA.

The Ibiza APP controller stated that the display on the radar screen was not ideal for working approaches since it was too broad and gave a distorted view of the approaches. According to the station's document, *Sectors, Operating Configurations and Stated Capacities of the Balearic Island Region*, the sizes of the Ibiza Approach and the Ibiza Route sectors are the same, the main difference between the two being the flight levels handled by each.

3. CONCLUSIONS

Both aircraft were equipped with airborne anti-collision systems (ACAS II), as required by Regulation (EU) no. 1332/2011.

The aircraft with registration CS-DNP went past the IAF TILNO without being cleared by Ibiza APP to do so.

Ibiza APP only realized that aircraft CS-DNP had gone past the IAF when said aircraft called requesting clearance to follow the localizer.

The subsequent instructions by Ibiza APP to aircraft CS-DNP led to a series of explanatory messages due to the lack of situational awareness on the part of aircraft CS-DNP.

Ibiza APP did not explain to aircraft CS-DNP the reasons for its instruction to cross the localizer.

The communications between Ibiza APP and aircraft EC-JIL were held in Spanish.

Neither aircraft was cleared to altitudes that ensured the minimum vertical radar separation of 1,000 ft, a separation that fell to under 500 ft by the time the aircraft reached their cleared altitudes (3,000 ft and 2,500 ft).

The incident, then, can be deemed to have been caused when the flight paths of EC-JIL and CS-DNP converged as Ibiza APP was vectoring them for the approach to runway 06 at LEIB, resulting in a violation of the prescribed minimum radar separation distances.

This happened because aircraft CS-DNP crossed the IAF TILNO without the relevant clearance due to not having a clear picture of the approach sequence. Contributing to this was the failure of Ibiza APP to indicate the reason for its instructions and the fact that the communications between Ibiza APP and aircraft EC-JIL were in Spanish.

4. SAFETY RECOMMENDATIONS

This problem had already been addressed previously by the CIAIAC with the issuance of Safety Recommendation REC 25/03 directed at the DGAC. The actions to be taken were subsequently reported and the recommendation closed out, with the response being considered satisfactory.

Given the time elapsed since and in light of the persistent problem, the CIAIAC considers it necessary to issue a new recommendation along the same lines as 25/03 regarding the exclusive use of English in communications:

REC 08/14. It is recommended that AESA promote the implementation of the necessary actions in order to minimize the problems caused by the use of Spanish in situations involving crews that do not master the language.

APPENDIX I

HORA	DEP/AERO	MENSAJE
190404	LECP	SI
190406	LECL	HOLA BUENAS EL NJE PARA IBIZA ME PIDE DIRECTO A TILNO
190409	LECP	MANDALE
190410	LECL	ESO....DONDE LO ABRO HACIA LA IZQUIERDA O HACIA LA DERECHA?
190413	LECP	ESO ME PREGUNTO ESPERATE.....TILNO COMO QUE SE FUESE A FINAL COMO SI FUESE A FINAL
190419	LECL	O SEA LO ABRO HACIA LA DERECHA
190421	LECP	HACIA LA DERECHA CORRECTO
190422	LECL	MUY BIEN HASTA LUEGO
190929	LECP	IBIZA COMO TIENES AL DESPEGUE PARA IR BAJANDO AL MGO
190935	LEIB	AUN NO HA RODADO BAJALO A LO QUE QUIERAS
190938	LECP	VALE
191450	LECP	EL MGO ME PIDE AJUSTAR AL RYR PUEDE?
191455	LEIB	REPITE POR FAVOR
191456	LECP	EL MGO ME PIDE AJUSTAR AL RYR QUE SI PUEDE?
191459	LEIB	NO NEGATIVO TENGO AL ANE PREPARADO PARA SALIR SI SE ECHA MUCHO ENCIMA NO VOY A TENER SITIO PARA EL ANE
191502	LECP	VALE
191630	LEIB	PALMA EL MGO Y EL NJE ESTAN CASI A 3000 LOS DOS
191909	LEIB	EL MGO NO ME LLAMA

HORA	DEP/AERO	MENSAJE
190157	MGO758	PALMA BUENAS NOCHES MGO758 DESCENSO A NIVEL 150 EN CURSO A IBA POS2B
190206	ACC	MGO758 BUENAS NOCHES EN CONTACTO RADAR DESCENSO A NIVEL 130
190211	MGO758	AUTORIZADOS A NIVEL 130 MGO758
190216	RYP2084	
190221	ACC	
190228	RYP2084	
190312	MGO758	PALMA MGO758 REQUERIMOS RUMBO 230 POR LA IZQUIERDA PARA EVITAR
190320	ACC	RECIBIDO VUELE EN RUMBO 230 MGO758
190323	MGO758	ASI LO HACEMOS
190328	ACC	MGO758 Y DESCENSO PARA NIVEL DE VUELO 90
190332	MGO758	90 MGO758
190412	MGO758	PALMA MGO758 PODRIAMOS REASUMIR YA PROPIA NAVEGACION A IBA
190425	ACC	SORRY STATION CALLING?
190426	MGO758	SI EL MGO758 PODRIAMOS REASUMIR PROPIA NAVEGACION A IBA ESTAMOS LIBRES YA DEL TIEMPO
190433	ACC	RECIBIDO VUELE EN RUMBO 2....3....240
190441	MGO758	CONFIRME RUMBO 240 PARA EL MGO758
190444	ACC	CORRECTO RUMBO 240
190446	MGO758	COPIADO RUMBO 240 GRACIAS
190458	ACC	
190504	IBS2507	
190519	ACC	
190530	RYP2084	
190614	MGO758	PROXIMOS A 90 MGO758
190618	ACC	MGO758 RECIBIDO DESCENSO A NIVEL 80
190622	MGO758	80 MGO758
170703	NJE599U	PALMA GOOD EVENING NJE599U DESCENDING TO FL190 INBOUND TILNO
190708	ACC	NJE599U MUY BUENAS RADAR CONTACT DESCEND FL090
190714	NJE599U	CLEARED FL90 NJE599U
190718	MGO758	MGO758 PROXIMOS A 80
190721	ACC	RECIBIDO MANTENGA LE LLAMO
190723	MGO758	MANTENEMOS MGO758

190751	ACC	NJE599U REDUCE SPEED 270KTS
190755	NJE599U	REDUCING 270 NJE599U
190939	ACC	MGO758 DESCENSO A ALTITUD DE 3000FT 1014
190943	MGO758	3000FT 1014 MGO758
191025	ACC	NJE599U DESCEND ALTITUDE 4000FT QNH1014
191030	NJE599U	YES 4000FT 1014 NJE599U
101045	ACC	
191047	RJR2084	
191214	RJR2084	
191217	ACC	
191219	RJR2084	
191224	ACC	MGO758 DESCENSO A ALTITUD DE 2500
191228	MGO758	DESCENSO A 2500FT MGO758
191233	EZY967Q	
191240	ACC	
191249	EZY679Q	
191336	ACC	NJE599U SPEED 250 DESCEND 3000FT
191341	NJE599U	DESCEND 3000FT 250 NJE599U
191412	MGO758	PALMA MGO758 TENEMOS AL RJR EL PRECEDENTE COMPLETAMENTE A LA VISTA YA PASADO EL ABEAM PODRIAMOS AJUSTAR VISUALMENTE?
191420	ACC	MGO758 VUELE POR SU DERECHA RUMBO 270
191424	MGO758	270 MGO758
191510	NIM01	
191516	ACC	
191522	NIM01	
191525	MGO758	MGO758 ESTAMOS LISTOS YA PARA VIRAJE
191528	ACC	SI RECIBIDO PERO HAY UN DESPEGUE LISTO Y TENGO QUE DARLE 8 MILLAS CON EL DESPEGUE
191533	MGO758	COPIADO
191535	NJE599U	NJE599U APPROACHING 3000FT CAN WE INTERCEPT THE GLIDE OF THE LOCALIZER FROM HERE
191542	ACC	NJE599U TURN RIGHT ON HEADING 160 AND CROSS THE LOCALIZER
191547	NJE599U	CONFIRM HEADING 160 TO INTERCEPT THE LOCALIZER
191551	ACC	YES CROSS THE LOCALIZER
191554	NJE599U	SAY AGAIN PLEASE FOR NJE599U
191557	ACC	FLY ON HEADING 160 THROUGH THE LOCALIZER THROUGH THE LOCALIZER
191601	NJE599U	WE ARE GOING THROUGH THE LOCALIZER AND GLIDE NOW AND IT SHOULD BE HEADING 060 TO INTERCEPT THE LOCALIZER
191606	ACC	TURN IMMEDIATELY TURN RIGHT HEADING 180
191610	NJE599U	TURNING RIGHT HEADING 180 NJE599U SAY INTENTIONS PLEASE
191614	ACC	MGO758 TURN RIGHT ON HEADING 030 FINAL VECTOR CLEARED ILS RWY06
191623	ACC	NJE599U IMMEDIATELY RIGHT HEADING 180
191628	NJE599U	TCAS RA NJE599U
191639	ACC	MGO758

191641	MGO758	MGO758 HEMOS TENIDO UN TCAS RA ESTAMOS VIRANDO A RUMBO 020 PARA INTERCEPTAR Y COMPLETAR ILS PISTA 06 NJE MGO758 CLEAR OF TRAFFIC NOW
191654	ACC	SI RECIBIDO HA TENIDO UN TCAS PORQUE NO HA SEGUIDO MIS INSTRUCCIONES
191657	MGO758	NEGATIVO SEÑORITA HEMOS SEGUIDO SUS INSTRUCCIONES CUANDO HA ORDENADO RUMBO 020 YA HEMOS TENIDO EL TRAFICO EL NJE NO LE HA RESPONDIDO NO LE HA COLACIONADO A TIEMPO Y ESTABAMOS VIENDO QUE ESTABA POR DEBAJO DE 3 MILLAS Y NOS DABA UN TCAS RA
191710	ACC	RECIBIDO MGO758 AUTORIZADO ILS PISTA 06
191714	MGO758	PARA SU INSTRUCCIÓN VOY A EJECUTAR EL 3...???...RI ESTO HAY QUE DENUNCIARLO
191719	ACC	RECIBIDO YO TAMBIEN HARE UN INFORME GRACIAS
191722	RJR5025	
191729	ACC	
191734	ACC	NJE599U TURN RIGHT HEADING 290
191743	ACC	NJE599U TURN RIGHT HEADING 290
191746	NJU599U	COPIED YOUR CLEARANCE TURNING NOW AND IN A FUTURE IF YOU ARE TALKING ABOUT US TO ANOTHER AIRCRAFT I WILL APPRECIATE EVERYBODY WOULD SPEAK IN ENGLISH PLEASE AFTER TCAS
191757	ACC	ROGER THANK YOU BUT THE OTHER TRAFFIC WAS NOT RESPONDED ME IN ENGLISH AND THIS IS WHY I RESPONDED IN SPANISH WE WERE TALKING ABOUT THE TCAS ADVISORY AND HE WAS SAYING THAT HE IS GOING TO DO A REPORT
191808	NJE599U	SORRY I CAN'T HEARD IN...???...PLEASE SPEAK SLOWLY TURNING NOW TO HEADING 290 DESCENDING 3000FT READY FOR VECTORS TO JOIN THE ILS AGAIN
191820	ACC	
191824	EZY697Q	
191827	MGO758	NJE THE PROBLEM IS NOT TALKING IN SPANISH OR ENGLISH THE PROBLEM IS TO COMPLY WITH THE INSTRUCTIONS OF THE CONTROLLER AND HE TOLD YOU ONE MINUTE AGO HEADING 160 THROUGH THE LOCALIZER AND YOU DIDN'T DO THAT AND THAT'S WHY WE HAD THE RA
191841	ACC	I SAID THROUGH THE LOCALIZER THROUGH THE LOCALIZER
191844	NJE599U	FOR CLARIFICATION AS YOU PROBABLY HEARD AS WELL BUT IS NOT MY ...???... SIR
191850	MGO758	I HEARD THE INSTRUCTION
191853	ACC	NJE599U TURN RIGHT ON HEADING 320
191858	NJE599U	RIGHT HEADING 320 599U
191903	ANE8117	
191906	ACC	
191912	ANE8117	
191915	ACC	MGO758 IBIZA 118,5 HASTA LUEGO
191918	MGO758	118,5 MGO758
191925	ACC	NJE599U TURN RIGHT ON HEADING NORTH
191928	NJE599U	RIGHT HEADING NORTH NJE399U
191934	ACC	
191940	ACC	

191947	ACC	NJE599U TURN RIGHT ON HEADING 030 FINAL VECTOR CLEARED FOR ILS APPROACH RWY06
191953	NJE559U	RIGHT HEADING 030 CLEARED FOR ILS APPROACH RWY06 NJE599U
192007	RYR5025	
192011	ACC	
192012	RYR5025	
192019	ACC	
192024	RYR5025	
192107	ACC	
192112	ANE8117	
192117	ACC	
192123	ANE8117	
192125	ACC	
192126	ANE8117	
192133	ACC	
192138	ANE8117	
192143	ACC	
192144	ANE8117	
192147	ACC	NJE599U CALL IBIZA 118,5 BYE
192151	NJE599U	118,5 BYE