

DATA SUMMARY

LOCATION

Date and time	Sunday, 1 September 2002; 9:07 h local time
Site	Airport of Barcelona

AIRCRAFT

Registration	G-EZYP	OK-BGQ
Type and model	BOEING B-737-300	BOEING B-737-400

Engines

Type and model	n/A
Number	

CREW

Pilot in command

Age	55 years	33 years
Licence	ATPL	ATPL
Total flight hours	10.500 hours	3.992 hours
Flight hours on the type	1.650 hours	1.568 hours

INJURIES

	Fatal	Serious	Minor
Crew			None
Passengers			None
Third persons			

DAMAGES

Aircraft	None	None
Third parties	None	

FLIGHT DATA

Operation	Commercial Air – Scheduled int. passenger flight
Phase of flight	Approach – Final approach

1. FACTUAL INFORMATION

1.1. History of the flight

At 7:04:11 h UTC¹ of September 1, 2002, the crew of B737 registration OK-BGQ flight number CSA 6656, from Prague to Barcelona with 128 passengers and 8 crew on board, contacted Barcelona Tower stating that they were established on the localizer of runway 25.

The configuration at Barcelona Airport at that time was 4WU, with a single runway (07-25) and four approach sectors. There were five air traffic controllers on duty at Barcelona Airport Tower. One was in charge of clearance, other in charge of ground movements, other in charge of local movements (called «tower» or «air traffic controller, ATC» in this report), other acting as coordinator and other in the role of supervisor.

The METAR of 07:00 h at Barcelona Airport was: «LEBL 35006G16KT CAVOK 21/16 Q1019 NOSIG».

The tower answered the initial contact of aircraft OK-BGQ saying: «CONTINUE APPROACH, WIND 340/12» and, at 7:04:54 advised «CSA6656 EXPECT TRAFFIC DEPARTING RUNWAY 07».

Then, the tower ordered Boeing B737 G-EZYP, flight number EZY820, to line up and wait runway 20 when clear of another flight that was taking off. The departing traffic was flight AEA2153, Barcelona-Madrid. The erroneous mention to runway 20 was immediately corrected by the air traffic controller to «RUNWAY 25». Seven seconds after the crew of EZY820 acknowledged the instruction to line up on runway 25, the tower said: «EZY820, CORRECTION, HOLD SHORT RUNWAY 25».

EZY820 said: «HOLD SHORT 25. WE HAVE CROSSED THE CAT I HOLD, EZY 820». The air traffic controller answered: «OK, IN THAT CASE, LINE UP AND WAIT RUNWAY 25, THANK YOU VERY MUCH», which was acknowledged by EZY820 at 7:05:48 h.

Since the EZY820 was already lined up on the runway, flight CSA6656, which was continuing its approach, was instructed to reduce its indicated airspeed, with the phrase: «CSA6656 PLEASE REDUCE INDICATED SPEED, TRAFFIC LINING UP RUNWAY 25. IN THE EVENT OF MISSED APPROACH, HEADING...» at 7:05:50. This phrase was not finished.

The crew of CSA6656 indicated they were «reducing for minimum speed», and asked again for the heading in the event of go around. Three seconds after that transmission, the crew of EZY820, still waiting and lined on runway 25, stated: «WE ARE READY

¹ All the times of this report are UTC (local time minus 2 h) and are referred to the «Tower ATC communications clock», unless otherwise stated.

IMMEDIATE EZY820». The ATC replied «EZY820 HOLD POSITION, I'LL CALL YOU», which was acknowledged by the crew.

Then, at 7:06:19 h the tower ATC said: «CSA6656 PLEASE GO AROUND HEADING 200 THREE THOUSAND FEET» and the aircraft replied at 7:06:28 h: «OK CLEARED GO AROUND TO HEADING TWO HUNDRED AND GO THREE THOUSAND GO AROUND ALTITUDE, CSA6656».

After that communication, the ATC instructed the aircraft AEA 2153 that had already taken off from runway 25 to maintain runway heading and 3000 feet, and, after that crew had asked for confirmation of the altitude, then to contact the frequency 127,7 (Departure). After that, another aircraft that was approaching runway 25 called tower, but the ATC replied at 7:06:58 «IBERIA 4431, LE LLAMO. BREAK BREAK CSA6656 PLEASE 127,7», meaning that she would call the Iberia flight later on and instructing CSA6656 to contact Departure. The crew of this aircraft answered then: «OK MAKING GO AROUND, CSA6656» at 7:07:05.

At 7:07:09 h, for some reason, the ATC said: «CSA6656 CLEAR TO LAND RUNWAY 25 WIND 340/15», and this instruction was immediately acknowledged by the aircraft («OK CLEAR TO LAND», 7:07:12) but they could not finish the read back because, according to her later statement, the ATC realized then her mistake and, at 7:07:15 h, said: «GO AROUND, SIR, GO AROUND!».

The pilot of flight EZY820, that was still holding position lined up with runway 25, said then: «NEGATIVE CLEARED TO LAND, NEGATIVE CLEARED TO LAND, GO AROUND», at 7:07:17 h.

Another flight called then tower, at 7:07:49, being established in final at 4 miles, and was told to continue the approach with wind 330/13 and to wait for the call back from the tower.

The B737 CSA6656 continued its approach and eventually landed on runway 25, passing over the top of the B737 EZY820 that was still holding on the ground, in the clearway area before runway 25 threshold. The first officer was the pilot flying (PF) for the final approach and manual landing. The autopilot was disconnected when the aircraft reached the decision height, at 250 ft of radio altitude (7:07:06 h).

According to radar track and FDR data, it was estimated that the touchdown occurred at 7:07:32 h, approximately 200 m after the intersection of runway 25-07 with runway 20-02, in which was described by the air traffic controllers that saw the landing as a «long landing» and «slightly past the normal touchdown zone» by the CSA6656 crew.

The aircraft was instructed to contact Ground ATC at 121,7 MHz, at 7:08:04 h («CSA6656 121,7 PLEASE», acknowledged by the crew with the phrase: «121,7 CSA6656»).

At 7:08:13 h the tower ATC started to give the wind information to EZY820, and a male voice saying «No, no, no, no» could be heard in the ATC room background. Anyway, this transmission was interrupted by the pilot in command of EZY820 that stated that he could not believe that the other aircraft landed on the runway they were occupying, or that the ATC cleared them to take off when the other aircraft was still on the runway.

The ATC replied «EZY820 I'M NOT CLEARING YOU FOR TAKE OFF NOW, SIR. I'M NOT CLEARING YOU FOR TAKE OFF. HOLD POSITION» and then instructed the aircraft that was still approaching to runway 25 to make a go around heading 200 and 3000 feet, which was conveniently acknowledged at 7:08:44 h.

The EZY820 pilot said then that he would be making a full safety report for that incident.

The ATC controller was then replaced by the air traffic controller that was acting as tower coordinator. EZY820 was eventually cleared for take off and departed to London Gatwick, where the pilot filed an «Air Safety Report» informing on the incident. According to the information gathered in Barcelona Airport system, the aircraft arrived in Gatwick at 9:28:14 h.

Flight CSA6656 did not file any report at Barcelona Airport. The company carried out the normal ground procedures and the aircraft took off again later that day at 8:42 h and arrived in Prague at 11:05 h.

1.2. Meteorological information

The relevant METARS close to the time at which CSA6656 landed are:

- 0630 LEBL 35008KT 9999 FEW025 19/16 Q1019 NOSIG
- 0700 LEBL 35006G16KT CAVOK 21/16 Q1019 NOSIG
- 0730 LEBL 35011KT CAVOK 22/16 Q1019 NOSI

The wind at the moment of clearance to land was 340 15 kt.

1.3. Personnel information

CSA6656 Flight

— Pilot in command:

Age:	33
Company experience:	3992 FH
Hours on the type:	1568 FH

— Co-pilot:

Age:	30
Company experience:	1276 FH
Hours on the type:	702 FH

The crew was within their duty period at the time of the incident.

EZY Flight

— Pilot in command:

Age:	54
Total flight hours:	10500 FH
Hours on the type:	1650 FH

Start of duty period: 31/8/02 at 18:45 h; scheduled off duty: 1/9/02 at 8:25 h.

The crew was inside their duty period at the time of the incident (7:07:32 h).

Barcelona Tower Air Traffic Controller

Age:	29
Title:	Air Traffic Controller
Licence issued:	2-4-2001, rated for Barcelona Aerodrome on 3-4-2001.
Last medical check:	29-9-2001

The aerodrome air traffic controller had started her duty time that day at 6:00 h. From 6:00 to 7:00 she was working as coordinator. Then, from 7:00 to 7:10 she worked as aerodrome controller («local»), and was replaced by other controller after the incident. Later on the same day, she started working again at 9:00 h with a normal schedule that ended at 12:00 h. During that period, her performance was watched by the Supervisor on duty.

Between 6:00 and 7:10 there were 10 departures from and 23 arrivals to Barcelona Airport. Between 7:00 h and 7:10 h (the period of duty as local controller) there were 2 arrivals to and 3 departures from Barcelona Airport, including landing of CSA6656 and takeoff of EZY820.

1.4. Airport and Air Navigation Information

The airport was in configuration 4WU, which means 4 sectors for a single landing runway (25-07). Standard Instrument Departures for sector Northwest (127,70 MHz) included OKABI 2D, MOPAS 2D, GRAUS 2D, LOBAR 1D, RES 2D, and SENIA 1D.

From 6:00 h to 12:00 h that day there were five positions inside the control tower and, according to the information gathered, the five positions were occupied at the time of the incident.

There was an ATC for delivery («Autorizaciones», 121,8 MHz), other taking care of ground movements («Rodadura», 121,7 MHz), and other controlling the aerodrome traffic («Local», 118,1 MHz). Other position was called «Coordinador de Local» or «Ayudante de Local» and finally there was a supervisor.

Approach control was provided by the frequency 127,7 MHz. There was a letter of agreement between the Approach Control Office (BTMA) and Barcelona Control Tower (BTWR) that established procedures for coordinating the air traffic, providing further guidance to that contained in the «Reglamento de Circulación Aérea» (RCA) and the AIP Spain. This letter was dated 3 October 2001.

The standard instrument departures from runway 25 included a left climbing turn at 500 ft to reach radial 239 from VOR QUV. The departure «SENIA 1D» being used by AEA2153 flight was: *«Climb on runway heading until reaching 500 ft QNH. Turn left to intercept and follow RDL-239 QUV direct to CASTO. Direct to CAMBY. Direct to SENIA.»*

The established go-around procedures for the VOR/DME-ILS instrument approach to runway 25, according to AIP Spain, consisted of climb on runway heading to 600 ft. Then climbing turn left to intercept radial 238 outbound QUV VOR to 3000 ft and await ATC clearance.

The recorded radar vertical trajectory of the aircraft is attached in Figure 1 until the moment the aircraft had 126 kt of ground speed and was below 100 ft of height. The horizontal trajectory of the aircraft is attached in Figure 2.

An estimate of the height of CSA 6656 at the moment it was over the other aircraft was attempted using FDR and radar track data and with the assumption that the aircraft EZY820 was holding behind the threshold line of runway 25. The B737-300 has a total length of 33 m and a height of 11 m.

The height of CSA 6656 at those moments was around 150 ft (49 m) AGL, which means that the lowest point of OK-BGQ was approximately 115 ft (around 38 m) above the top of the vertical tail of G-EZYP when it passed above the other aircraft.

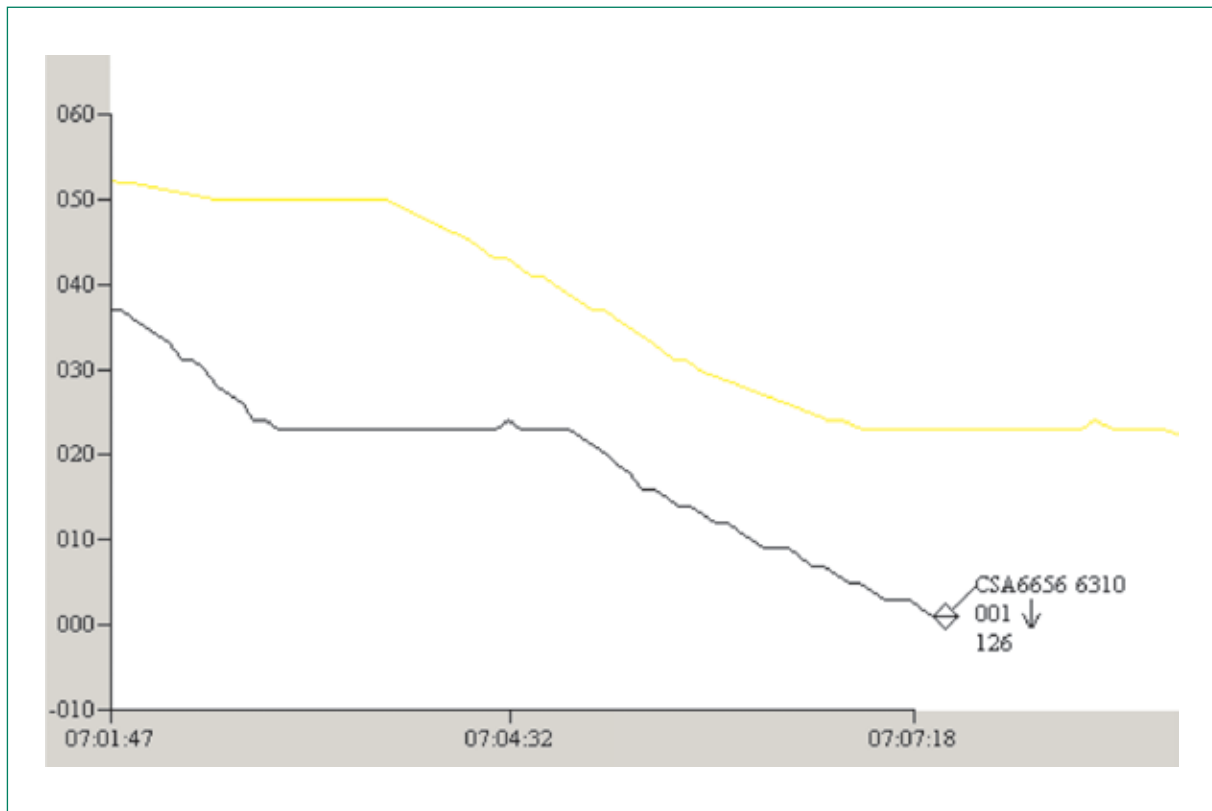


Figure 1. Vertical path of CSA 6656.

A transcription of the air-ground communications between air traffic control (aerodrome) and the involved aircraft is included in the attached Appendix 1.

1.5. Flights recorders

Both aircraft departed after the incident and therefore the CVR information on the event was lost. Information from the FDR of flight CSA 6656 was however retrieved, analysed and provided to the investigators. Small deviations in time were noted between the ATC communications transcription and the FDR timing for the moments at which there were VHF communications transmissions (FDR time was always 1 to 4 seconds later than ATC time).

From that information, it was concluded that an ILS approach was being carried out for runway 25 at Barcelona Airport. At 7:04:12 h (FDR time, equivalent to 7:04:11 h ATC time) there was a transmission from the CSA 6656 for 6 seconds, linked to the moment at which the crew first contacted BCN Tower. The aircraft was at 2136 ft at those moments.

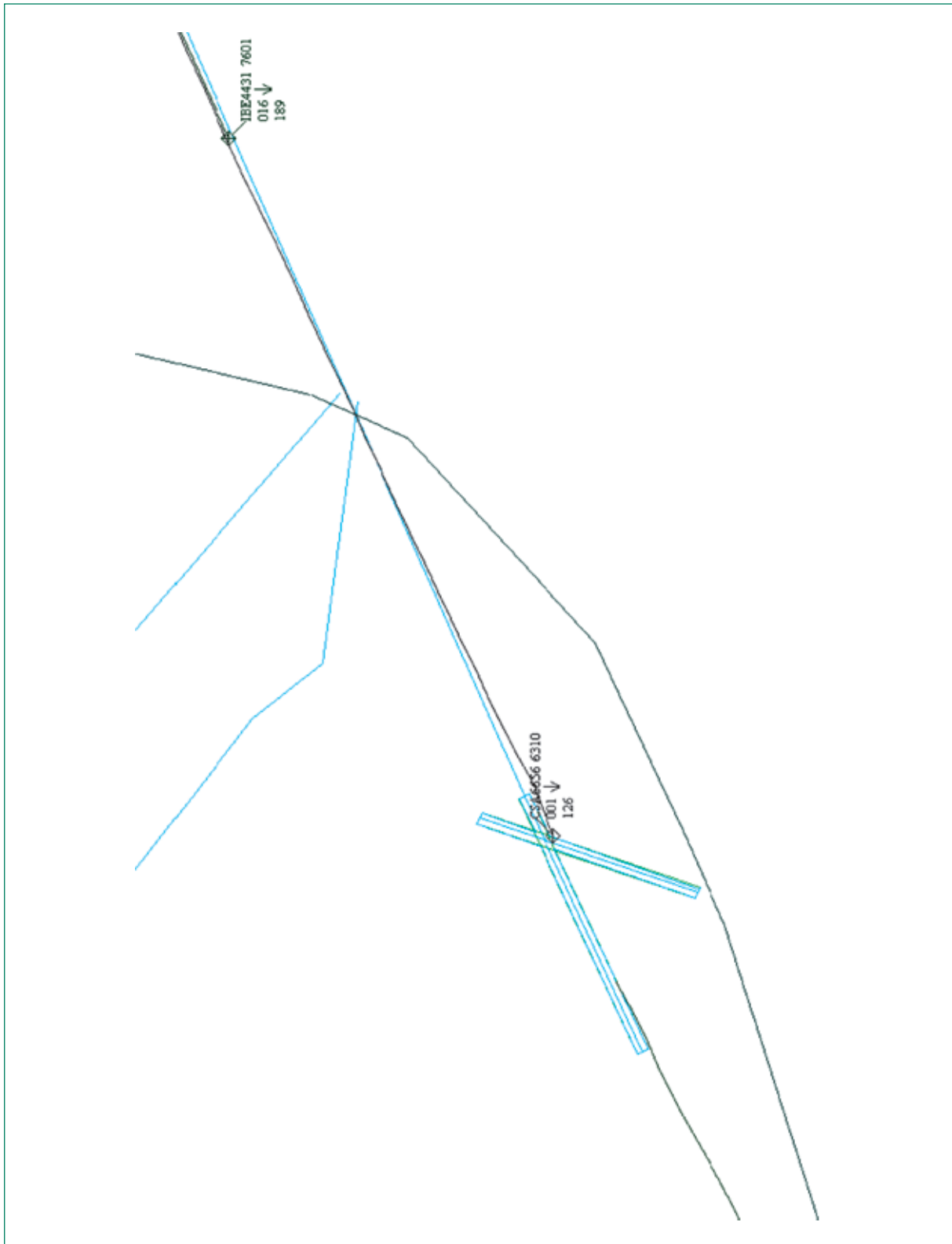


Figure 2. Horizontal trajectory of CSA 6656 as recorded by the radar. The runway marks are not precisely represented. Flight IBE 4431 was later commanded to go-around. Flight EZY820 does not appear on this radar display as it is still on the ground, at the runway clearway.

After other communications, at 7:06:04 h (FDR time) the aircraft transmitted for 5 sec while being at 1115 ft of radio-altitude. This was the moment at which the crew said: «We are reducing for minimum speed, CSA 6656. Say again the heading for go around» (7:06:01 h ATC).

At 7:06:31 h (FDR time) the crew said: «OK cleared go around to heading two hundred and go three thousand go around altitude, CSA 6656». The aircraft was then at 756 ft RA, and 15 sec later it had 142 kt, with landing gear down and flaps 40°. The distance to the runway was 1.2 NM at that moment.

At 7:07:08 h (FDR time) and 272 ft RA, there was a 2-second transmission from the aircraft, identified to be «OK, making go around CSA 6656».

The aircraft continued to descend and at 7:07:10 h (FDR time) the autopilot was disengaged at 250 ft RA. At around 7:07:12 h the aircraft received the instruction «CSA 6656 clear to land runway 25 wind 340 15», while still descending. At 7:07:14 h the radio-altitude was 200 ft and the aircraft was slightly above the glide slope (1 dot above). At 7:07:16 h (FDR time) the crew acknowledged «OK clear to land 25» at 180 ft RA.

The touchdown was recorded at 7:07:36 h (FDR time).

During the whole approach, the N1 of both engines did not increase to a go-around setting at any time. The radio-altitude decreased continuously until touchdown.

1.6. Statements of the personnel

1.6.1. CSA 6656 Pilot in Command

The PIC of OK-BGQ stated that when they were at 4 NM in final, with full landing configuration, an authorization to line up was given to a second aircraft, which entered the clearway area of runway 25. They were then asked by the ATC to reduce their speed to minimum in approach, were informed of the departing aircraft ahead and were given a non-standard go-around procedure in case of a missed approach, that included a left turn to heading 200 and climbing to 4000 ft.

When it became evident that the aircraft standing on the runway was not to depart, the PIC decided to execute a missed approach and informed ATC. But at that moment, they received a landing clearance, while the second aircraft was still occupying the clearway area. At the same time, the PIC realized that the aircraft that had departed previously was turning left following a SID («standard instrument departure») and that their issued non-standard go-around procedure could become a conflict.

The PIC believed that that was the reason for their being cleared to land despite the fact that other aircraft was still on the runway. The PIC changed his decision to execute the missed approach and the first officer landed given consideration to the aircraft still standing on the clearway area. A normal landing was carried out without violating any flight parameters of the aircraft, and they touched down slightly past the normal touchdown zone, using standard auto-brake 2 and reverse.

1.6.2. *EZY 0820 Pilot in Command*

The G-EZJP pilot in command recalled that there was a runway change due to wind, from 20 to 25. Once the preceding aircraft was cleared for take off, they were told to line up and hold, but then they were instructed to hold position. A CSA flight 4 miles in final was told to reduce at minimum speed. The crew of G-EZJP told tower that had already crossed the runway holding, and were instructed to line up. As the preceding B-737 that had taken off was airborne, the PIC told tower that they were ready for immediate and started to spool up. ATC told them to hold position and told the CSA flight to go around, which was acknowledged, the PIC of G-EZJP thought. However, they could see on the TCAS that the other aircraft was descending all the time (300 ft, 200 ft, 100 ft...). Then the tower cleared that aircraft to land and the PIC of G-EZJP immediately transmitted: «negative, go around, go around».

The other aircraft managed to land «just past half way down the runway». Whilst he was still on the runway, the PIC recalled that they were cleared for takeoff. Another aircraft behind them was making a missed approach but was not yet on the sight of G-EZJP crew. The PIC asked then for other controller and advised that they would be making a full report.

1.6.3. *Aerodrome Air Traffic Controller on Duty*

She reported that CSA6656 called when established in the localizer and was told to continue. EZY820 that was holding at the waiting point of runway 25 was then commanded to line up after the runway was clear of a departing traffic.

When she realized that it was possible that insufficient time existed for the takeoff before the arrival, she told EZY820 to hold position. They acknowledged the instruction, but informed that they had crossed the runway holding, and she then told them to continue and line up. She then commanded CSA6656 to reduce the speed. EZY820 notified that they were ready for immediate, but the ATC considered that there was insufficient separation for the takeoff, and therefore told EZY820 to hold position and commanded CSA6656 to go around, and she thought that the approaching aircraft acknowledged that instruction.

The ATC then talked to two other aircraft (the preceding departing aircraft, and another aircraft approaching runway 25). When she transferred CSA6656 to approach frequency, the crew acknowledged again that they were going around.

After a few seconds, the ATC cleared the aircraft to land [in her statement, no clear reason for this instruction was provided to the investigation], and she amended this instruction almost immediately instructing the aircraft again to go around. She heard on the frequency «negative clear to land, negative clear to land, go around» that was possibly transmitted by the EZY crew. In spite of everything, the CSA flight landed on runway 25, in a long landing in front of the EZY aircraft.

After transferring CSA6656 to ground control, she started reading the wind, but she stopped when realized that this flight had not vacated the runway.

The EZY crew showed their surprise with the situation, saying that he could not believe that the traffic had landed on the runway they were occupying, and that they were instructed to takeoff with the other aircraft still on the runway. The ATC answered that she was not clearing them for takeoff and, to highlight that fact, told them to hold position.

After commanding the other approaching aircraft to go around, she asked the tower coordinator to replace her and, from that moment on, he took over the communications.

2. ANALYSIS

2.1. Sequence of the Events

From the information presented under paragraph 1 above, it is clear that several misunderstandings in communications happened during the incident.

At the time of the incident, the ATC was well rested and she was not handling a high work load. The tower positions were occupied by controllers and everything seemed to be in place.

However, the single runway configuration of the airport at that time imposed the potential development of more complex situations. While the same runway is used for departures and arrivals, the difference is that the ATC clearing a departure before an approaching traffic must have in mind, in addition to other factors common to the configuration of two crossing runways, the time to line up of a taxiing aircraft, and the time to take off after the line up.

It is considered that the first event that influenced the outcome of the airprox incident was the decision to command EZY820 to line up while CSA6656 was already establis-

hed in final. This instruction was followed by «be ready» to express the need to expedite the operation.

After that instruction, the ATC considered that might not be enough time for EZY to depart before the arrival of CSA, and 16 seconds after that instruction, said «EZY820, correction, hold short runway 25». Unfortunately, the aircraft had already crossed the holding line, and it was commanded to continue taxiing and line up and the approaching flight was told to reduce speed. This instruction was going to be followed by directions to the CSA flight in the event of missed approach, but the ATC did not finish the sentence at that moment, because she was probably trying to mentally visualize possible conflicts of that manoeuvre with respect to the departing AEA flight that was carrying out a SID that involved a left climbing turn.

After 11 seconds, CSA acknowledged the instruction to reduce for minimum speed and asked for the heading to go around. At those rushing moments, the EZY crew stated that they were ready immediate.

The crew of this later flight was close to the end of their activity period, that was supposed to last until 8:25 h. Anyway, there is an option to extend the duty by up to three hours without penalty if required. However, the flight was already delayed (about 50 minutes) and running behind schedule. Therefore, they were probably trying to expedite their takeoff, but, according to the communications and the information gathered, it is considered that this factor had no influence in the causes of the incident. Their offer: «We are ready immediate» should be considered as an attempt to help the air traffic control at those moments, and the crew, according to the statement of the PIC, actually started to spool up the engines to avoid any delay, probably because they thought that the ATC was going to immediately clear them for take off.

However, the ATC still thought that there was not enough time for the departure before the arrival of CSA, and therefore commanded EZY to hold position and CSA to go around with the phrase: «CSA6656 please go around heading 200 three thousand feet».

This was one of the two main events that led to the incident. The ATC intended to command the CSA flight to go around. However, the crew of this aircraft was still expecting the heading IN THE EVENT of missed approach. Apparently, they understood the instruction as «if I command you to go around, use heading 200 and three thousand feet», and therefore they answered: «Ok, cleared go around heading 200 three thousand feet».

Therefore, the CSA continued its approach as shown in the radar track and FDR data and, in the meanwhile, ATC contacted the departing AEA flight to provide them with amended instructions during their departure («maintain runway heading and 3000 ft») to avoid conflict with the missed approach manoeuvre that, she thought, CSA was already

ady carrying out. It is important to note that those new instructions were provided to the AEA crew in Spanish language. This crew seemed surprised by the new instructions and asked for confirmation, which was provided.

The ATC then concentrated in transferring that flight to approach and yet another approaching aircraft checked in her frequency. In the meanwhile, the CSA crew was probably assessing the feasibility of the go around instructions they had been provided with. According to the statement of the PIC, they thought that the instructions could become in conflict with the departing AEA aircraft, obviously because they had not understood the new instructions provided by ATC to that aircraft in Spanish language.

At some point, the ATC, that still thought that CSA was going around, told that aircraft to contact approach control (127.7).

The crew of CSA stated then «Ok, making go around, CSA6656», maybe as a result of their realising that the ATC had intended to command that go around previously because she was now transferring them to approach, or maybe because, as stated later by the PIC, they realised that EZY was not going to take off before their arrival. The use of the word «Ok» favours the former reason for that decision.

At no moment during the approach the engines of CSA flight spooled as if the thrust levers had been advanced for a go around.

However, four seconds after they acknowledged that were «making go around», the second main event that led to the incident happened, because the ATC provided the conflicting instruction: «CSA6656 clear to land runway 25, wind 340 15».

The ATC probably suffered some kind of mental confusion or other unexplained contingency for a very short period, and that is why she provided that instruction. It seemed that the possible conflict between the departing AEA flight, that was instructed to hold runway heading (240°) while climbing to 3000 ft, and the go around heading provided to CSA (200°), was not comparable to the conflict between the landing CSA and the EZY still holding at the runway. This confusion was unfortunate and one of the most direct contributions to the incident.

The CSA crew started acknowledging this instruction but they could not finish the phrase, because the ATC realised her mistake and, approximately 4 seconds after she cleared the aircraft to land said: «Go around Sir, go around!», when the CSA crew were still saying their flight number in the read back.

However, although the ATC reacted quickly to the communication slip, the new instruction provided («Go around Sir...») did not include any call sign and did not follow standard air traffic control phraseology.

Although the only aircraft in short final was CSA, that phrase probably contributed to increase confusion, as did the communication from EZY aircraft: «Negative cleared to land, negative clear to land, go around» whose crew was aware of the hazard posed over their aircraft. The use of the word «negative» without any call sign referring to the transmitting station or the intended destination, could also lead the whole phrase to be interpreted as «Negative (the instruction to go around). (You are) cleared to land...»

Additionally to all those confusing communications, on board the CSA and according to the later statement of the PIC, they were still considering that carrying out the go around could produce a conflict with the AEA flight. Therefore, even though the PIC acknowledged that they saw perfectly the EZY holding at the clearway area, he decided to land anyway. It is considered that this decision was unfortunate.

An approximate estimate of the proximity of both aircraft was attempted, and the conclusion was that if the EZY aircraft would have been close to the threshold line of runway 25 (most unfavourable case) the distance between the gear of CSA and the top of the vertical tail of EZY could have been as low as 30 m or 91 ft.

For some period there were no further communications to or from those two aircraft. Another flight checked in the frequency and at 7:08:08 h the CSA flight was told to contact ground.

Then, the ATC started saying the wind to the EZY flight and inside the tower the words «no, no, no, no...» could be heard. That meant that the coordinator was already following the situation and warned the ATC that she should not start with the wind information while the CSA was still on the runway.

At that moment, the EZY started complaining about the whole event and the approaching traffic was told to go around. Then the ATC was replaced by the controller that was acting as coordinator until that moment.

The procedure for providing backup to the controller on duty worked from the moment the CSA had landed (that «no, no, no» voice meant that the other controller was already overseeing the operation at that moment). Additionally, it seems that the procedure for replacing the ATC also worked all smoothly because there was no break in the control provided to the aircraft during the take over.

2.2. Phraseology used by the ATC

Some communications made by the ATC were not in compliance with the RCA:

- Communications without identification of the destination station.
- Incomplete communications («In the event of missed approach, heading...end of transmission).

- After the incident, an incorrect read back is not corrected (IBE441 is commanded to go around heading 200 and 3000 ft and reads back heading 220, without further correction by the ATC).

2.3. Phraseology used by CSA6656 crew

Some of the communications made by CSA were not in compliance with the RCA:

- Communication without identification of the transmitting station.
- It seems they did not recognize the difference between «in the event of missed approach...» and «go around», which is a clear and immediate command to discontinue the approach. In this case, the command was not so clear due to the previous confusing communications.

2.4. Phraseology used by EZY820 crew

Some of the communications made by EZY were not in compliance with the RCA:

- Communication without identification of the transmitting station.
- Confusing communication («negative clear to land», using a negative statement followed by the action intended to be avoided).
- Use of the frequency while other traffic was approaching, for complains and issuance of opinions.

3. CONCLUSION

As a summary of the event, it seems that several factors combined with the first decision to tell EZY to line up while CSA was in final to produce the airprox incident.

- Although the workload was not estimated to be high, there were several communications at the critical moments when the EZY was already lined up and consideration was being given to the possibility of commanding go around to CSA. One of those communications was EZY stating that they were ready for immediate takeoff.
- The use of Spanish language for communications with some of the aircraft precluded the CSA crew from having a clearer picture of the situation, specially the departure manoeuvre being performed by the preceding AEA flight.
- The CSA flight realized that they had previously being commanded to go around when they were at 272 ft RA.
- The CSA flight was then cleared to land when they were between 250 ft and 180 ft RA.

- The memory slip of the ATC commanding the aircraft to land after the previous instruction to go around was quickly corrected by her, but no standard phraseology was used.
- The irruption of EZY on the frequency with the words “negative, cleared to land...” probably introduced more confusion on those critical moments, with CSA flight below 180 ft RA.
- Despite any previous instruction, even being confusing, it is considered that the final decision of the pilot in command of CSA flight, in absence of serious or immediate threat to the safety of his aircraft, should have been to go around when they saw the EZY flight standing on the runway. Ever though they received confusing information, the crew of CSA was since the beginning of the approach well aware of the presence of EZY on the runway and had enough time to assess the situation. When the PIC took the decision to go around (according to his statement) that decision should not have been changed even when the ATC told they were cleared to land.
- The EZY crew should not have used the frequency to express their complaint. Any report must be filed in writing, and even though it can be easily understood that they were upset after the situation they were put into, when they felt the hazard when the other aircraft flew over the top of theirs, they should not have introduced more stress to all the parties stating their disagreement and opinions on the frequency in use. Another aircraft was completing the approach at that time and was commanded to go around.
- It is considered that the CSA crew should have filed at Barcelona Airport a written report after the incident. The ATC management talked to the company representatives but the aircraft and crew eventually departed later that day without following any reporting procedure.

During the analysis of this incident, consideration was given to the influence of the use of two languages in the air traffic control of Barcelona Airport, although it is considered that this was not a direct cause of the incident.

Spanish language was used in communications to and from aircraft with native Spanish pilots, except the final read back of IBE4431 flight after the incident, when they were commanded to go around. The pilot of this flight, realising there was a problem on the runway, acknowledged the instruction in English to help the EZY crew with their assessment of the situation.

The communications with foreign pilots were carried out in English. This is the normal practice in Spanish international airports, as well as at the airports of other non-English speaking countries. In other major international airports, like Amsterdam, the normal practice is to talk in English.

The «Rules of the Air» («Reglamento de Circulación Aérea», RCA in this report) in force in Spain, in the edition published on 19 January 2002, state in paragraph 10.5.2.1.1

«Language to be used»: «As a general rule the air-ground communications through radiotelephony shall be made in the language that the ground station normally uses.»

Note.– The language normally used by the ground station does not necessarily have to be the language of the State where it is located.»

It is obvious that using only English language whenever a foreign crew is present would help those aircraft to have a clear picture of the surrounding traffic. However, it has also to be considered that maybe not all the pilots of Spanish aircraft operating at the airport area at that time are fluent in English (for example, domestic general aviation pilots). Therefore, not using Spanish to communicate to those pilots could have a detrimental effect on their situational awareness and responsiveness to air traffic control commands.

The use of English when any of the involved crews is not Spanish fluent has already been recommended in Spain by the DGAC's Commission of Study and Analysis of Air Transit Incidents in year 2000. As stated above, this recommendation was followed to some extent by the IBE4431 flight crew in the present incident when the situation was compromised.

The air traffic control services and the users of those services should start a debate with the participation of regulatory bodies to assess whether English language alone should be used in some major airports where high density of international flights take place and whenever a crew not fluent in Spanish is manoeuvring in the area. The pros and cons of such decision, taking into account the mean profile of pilots using those airports and the past service experience of using both English and Spanish languages, should carefully be considered.

Other countries have also started a similar debate.

See for example, for the case of France, BEA report f-ed000525a/g-wn000525a, with the following safety recommendation:

«In the light of the analysis of this accident and previously acquired experience, the [French] DGAC study the expediency and methods of implementation for the systematic use of the English language for air traffic control at Paris Charles de Gaulle aerodrome, as well as the extension of this measure to other aerodromes with significant international traffic.»

For the case of Switzerland, see final report of the Swiss AAIB A033 (dated 25 March 2002), airprox on 19 November 1999 on the ground, at Geneva airport, with the following safety recommendation:

«It is recommended to use only the English phraseology for transmissions to allow all crews involved to understand the evolution of the situation.»

4. SAFETY RECOMMENDATIONS

- REC 25/03.** It is recommended that a working group is established with participation of the DGAC, AENA and representatives of the operators, pilot professional associations and air traffic controllers professional associations, that studies the possibility of regulating the use of English language only at major international airports whenever a non-Spanish speaking pilot is involved, and the conditions of the corresponding implementation of that regulation.
- REC 26/03.** It is recommended to the flight safety departments of the operators involved in the incident, and to the ATC services provider, that action is taken to make their personnel aware of the fact that the correct and continued use of the standard phraseology in the aeronautical communications increases the safety of the operations.

APPENDIX A
Transcription of ATC Communications

Columns in the transcription

- **ATS Time:** Reference of time as used by Barcelona TWR.
- **Freq.:** Frequency in MHz.
- **Station:** Transmitting stations.
- **Text:** Communications held by the transmitting stations.

Frequencies

Frequencies		
Frequencies of TWR	Clearance	121.8 MHz
	Ground	121.7 MHz
	TWR	118.1 MHz
Frequencies of APP	Approach Sector	119.1 MHz
	Approach Sector	127.7 MHz

Traffic

Arrival Traffic	Departing Traffic
IBE4248	EZY820
IBE0750	AEA2153
IBE1451	IBE1390
IBE0619	JKK0425
IBE2970	Speedbird 477
CSA6656	ANS8300
IBE4623	IBE4431

Aircraft

CSA6656 = OKBGQ (734)

EYZ820 = GEZYP (73G)

CSA6656 FDR data	ATS Time	Freq.	Station	Text
	—	118.1	TWR LCL	2970. Hasta luego.
	—	118.1	IBE2970	21 7 Iberia 2970. Hasta luego.
	—	118.1	AEA2153	Barcelona. Buenos días. Europa2153.

CSA6656 FDR data	ATS Time	Freq.	Station	Text
	—	118.1	TWR LCL	Hola buenas Europa 2153. Entre y mantenga pista 25.
	—	118.1	AEA2153	Entro a mantener 25. Europa2153.
	—	118.1	TWR LCL	Europa2153. Copie nueva autorización para salida estándar Senia1D.
	—	118.1	AEA2153	Senia1D. Nos había dicho su compañero rumbo de pista 4000, ¿lo volvemos a cambiar?
	—	118.1	TWR LCL	Sí, Senia1D 6000'. Europa 2153.
	—	118.1	AEA2153	Senia1D y 6000'. Europa 2153.
	—	118.1	TWR LCL	Autorización correcta. El viento ahora 340/11. Autorizado a despegar pista 25.
	—	118.1	AEA2153	Autorizado a aterrizar, eh, a despegar. Europa2153.
2136 ft, flaps 5° L/G up	07:04:11	118.1	CSA6656	Buenos días Barcelona tower, CSA6656 (<i>unintelligible, similar to «becoming»</i>) established on the localizer runway 25.
	07:04:14	118.1	TWR LCL	Hello CSA6656, continue approach, wind 340/12.
	07:04:20	118.1	CSA6656	Continue approach CSA6656.
	07:04:54	118.1	TWR LCL	CSA6656 expect traffic departing runway 07.
2127 ft RA flaps 10° L/G up	07:05:02	118.1	CSA6656	Ok, copied traffic.
	07:05:18	118.1	TWR LCL	EZY820 when clear of the AirEuropa line up and wait runway 20, correction, runway 25, be ready.
	07:05:27	118.1	EZY820	Behind Air Europa line up 25, EZY 820.
	07:05:34	118.1	TWR LCL	EZY820, correction, hold short runway 25.
	07:05:39	118.1	EZY820	Hold short 25. We have crossed the CAT I hold, EZY820.
	07:05:44	118.1	TWR LCL	Ok, in that case, line up and wait runway 25, thank you very much.
	07:05:48	118.1	EZY820	Line up and wait 25, EZY820.
	07:05:50	118.1	TWR LCL	CSA6656 please reduce indicated speed, traffic lining up runway 25. In the event of missed approach, heading.
1115 ft RA flaps 40° L/G down	07:06:01	118.1	CSA6656	We are reducing for minimum speed, CSA6656. Say again the heading to go around.
	07:06:09	118.1	EZY820	We are ready immediate, EZY820.
	07:06:11	118.1	TWR LCL	EZY820 hold position. I'll call you.
	07:06:17	118.1	EZY0820	Hold position, 820.

CSA6656 FDR data	ATS Time	Freq.	Station	Text
	07:06:19	118.1	TWR LCL	CSA6656 please go around heading 200 three thousand feet.
756 ft RA	07:06:28	118.1	CSA6656	Ok. Cleared go around to heading two hundred and go three thousand go around altitude. CSA6656.
	07:06:35	118.1	TWR LCL	Europa2153, por favor mantenga rumbo de pista, rumbo de pista y tres mil pies.
	07:06:40	118.1	AEA2153	Vale, ¿rumbo de pista tres mil entiendo?
	07:06:43	118.1	TWRLCL	Europa2153 afirma.
500 ft flaps 40° L/G down A/S 142 kt	07:06:45	118.1	AEA2153	Vale pues rumbo de pista tres mil pies.
	07:06:48	118.1	TWR LCL	Muchas gracias y 27 7.
	07:06:50	118.1	AEA2153	27 7 2153.
	07:06:54	118.1	IBE4431	Barcelona, Iberia4431 muy buenas.
	07:06:58	118.1	TWR LCL	Iberia4431, le llamo. Break break CSA6656 please 127 7.
272 ft RA	07:07:05	118.1	CSA6656	Ok, making go around, CSA6656.
	07:07:09	118.1	TWR LCL	CSA6656 clear to land runway 25 wind 340 15.
180 ft RA	07:07:12	118.1	CSA6656	Ok, clear to land runway 25 6 (<i>phrase unfinished because controller starts talking immediately; see below</i>).
	07:07:15	118.1	TWR LCL	Go around, sir, go around!
	07:07:17	118.1	EZY820	Negative cleared to land, negative clear to land, go around.
Landed at 7:07:32 h	07:07:49	118.1	IBE4623	Torre de Barcelona, IBE4623 buenos días. Establecidos en final 4 millas.
	07:07:56	118.1	TWR LCL	IBE4623, continúe aproximación, le llamo enseguida. El viento 330/13.
	07:08:02	118.1	IBE4623	Continuamos.
	07:08:04	118.1	TWR LCL	CSA6656 121 7 please.
	07:08:08	118.1	CSA6656	121 7 CSA6656.
	07:08:13	118.1	TWR LCL	EZ820, wind 340/15 (<i>Male voice inside the ATC room: «no, no, no, no»</i>).
	07:08:15	118.1	EZY820	EZ820, that aircraft landed on the runway we were occupying; that is so dangerous I cannot believe it and you've just cleared me for take off with it still on the runway. Do you have a controller available who knows the job?

CSA6656 FDR data	Hora ATS	Frec.	Estación	Texto
	07:08:28	118.1	TWR LCL	EZY820. I'm not clearing you for take off now, sir. I'm not clearing you for take off. Hold position. Break, break. Iberia4431 wind...34..., go around now heading 200 and three thousand feet, please. <i>(Unidentified sounds, similar to voices, on the background of the ATC room)</i> .
	07:08:44	127,7	IBE4431	Go around heading 220 and three thousand IBE4431.
	07:09:06	118.1	EZY820	EZY820, tell the supervisor we will be making a full safety report for that incident.
	—	118.1	TWR LCL	<i>(Male voice; new air traffic controller)</i> Iberia4431. Llame 21 7.
	—	118.1	IBE4431	Perdone, ¿21 7 no es ground?
	—	118.1	TWR LCL	Eh, negativo 27 7.
	—	118.1	IBE4431	27 7. Hasta luego.
	—	118.1	EZY820	EY820 ready for immediate.
	—	118.1	TWR LCL	OK. 820. The wind north, 17 Knots. Clear for immediate take off 20 on runway on heading 240.
	—	118.1	EZY820	Heading 240 take off runway 25 <i>(unintelligible)</i> .
	—	118.1	TWR LCL	¿Iberia 4623?
	—	118.1	IB4623	Sí, adelante.
	—	118.1	TWR LCL	Está haciendo carrera por la 25, le llamo.
	—	118.1	TWR LCL	Iberia4623 autorizado a aterrizar 25. Viento norte13.
	—	118.1	IB4623	Autorizado a aterrizar 25. Iberia4623.
	—	118.1	TWR LCL	EZ820 heading 240.
	—	118.1	EZY820	Heading 240. Climbing altitude six thousand feet <i>(unintelligible)?</i>
	—	118.1	TWR LCL	It's correct. Call 127 decimal 7. Adiós.
	—	118.1	EZY820	127 7. Thank you, sir.