

TECHNICAL REPORT

IN-030/2024

**Incident occurred on 12 October 2024
between a BOEING 737-800, with
registration 9H-QBL and BOEING 737-
800 with registration EI-IFS, at the
airport of Las Palmas de Gran Canaria -
GCLP
(Las Palmas, Spain)**

Please note that this report is not presented in its final layout and therefore it could include minor errors or need type corrections but not related to its content. The final layout with its NIPO included (Identification Number for Official Publications) will substitute the present report when available.

NOTICE

This report is a technical document that reflects the point of view of the Civil Aviation Accident and Incident Investigation Commission regarding the circumstances of the accident that is the object of the investigation, its probable causes, and its consequences.

In accordance with Article 5.4.1 of Annex 13 to the Convention on International Civil Aviation; and as provided for in Articles 5.6 of Regulation (EU) No. 996/2010 of the European Parliament and of the Council of 20 October 2010 and Articles 1 and 21.2 of RD 389/1998, this investigation is exclusively of a technical nature, and its objective is the prevention of future aviation accidents and incidents by issuing, if necessary, safety recommendations to prevent their recurrence. The investigation is not intended to attribute any blame or liability, nor to prejudge any decisions that may be taken by the judicial authorities. Therefore, and according to the laws specified above, the investigation was carried out using procedures not necessarily subject to the guarantees and rights by which evidence should be governed in a judicial process.

As a result, the use of this report for any purpose other than the prevention of 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.

CONTENTS

NOTICE	1
CONTENTS	2
ABBREVIATIONS	3
SYNOPSIS	4
1. FACTUAL INFORMATION	6
1.1. History of the flight	6
1.2. Injuries to persons	8
1.3. Damage to the aircraft	9
1.4. Other damage	9
1.5. Crew information	9
1.5.1. Crew of the BOEING 737-800 with registration 9H-QBL	9
1.5.1.1. Captain	9
1.5.1.2. First officer	9
1.5.2. Crew of the BOEING 737-800 with registration EI-IFS	9
1.5.2.1. Captain	9
1.5.2.2. First officer	9
1.5.3. Information on controllers	10
1.5.3.1. Supervising tower controller	10
1.5.3.2. Instructor controller	10
1.5.3.3. Student controller	10
1.6. Aircraft information	10
1.6.1. BOEING 737-800 with registration 9H-QBL	10
1.6.2. Boeing 737-800 with registration EI-IFS	10
1.7. Meteorological information	11
1.8. Aids to navigation	11
1.9. Communications	13
1.10. Information about the aerodrome	18
1.11. Flight recorders	19
1.12. Aircraft wreckage information	20
1.13. Medical and pathological information	20
1.14. Fire	20
1.15. Survival aspects	20
1.16. Tests and research	20
1.17. Organisational and management information	22
1.17.1. Applicable law	22
1.17.2. Procedures to govern operations	22
1.18. Additional information.....	25
1.19. Useful or effective investigation techniques	28
2. ANALYSIS	30
2.1. Analysis of ATC's management	30
2.2. Communications failure study	31
2.3. Conflict resolution	33
3. CONCLUSION	34
3.1. Findings	34
3.2. Causes/Contributing factors	35
4. RECOMMENDATIONS	36

ABBREVIATIONS

° ' "	Degrees, minutes, seconds
°	Sexagesimal Degree
°C	Degrees celsius
AGL	Above Ground Level
AMSL	Above Mean Sea Level
ANAC	Portuguese civil aviation authority (Autoridade Nacional de Aviação civil)
APP	Approach control
ARP	Aerodrome Reference Point
ATPL(A)	Airline Transport Pilots Licence (Aircraft)
ATS	Air Traffic Services
ATZ	Aerodrome Traffic Zone
CLD	Clearance Delivery
GMC	Ground Movement Control
CPL(A)	Commercial Pilot Licence (Aircraft)
ATC	Air Traffic Control
CTR	Control Zone
ENAC	Italian civil aviation authority (Ente Nazionale per l'Aviazione Civile)
FDM	Flight Data Monitoring
FDR	Flight Data Recorder
GCLP	ICAO call sign for Las Palmas de Gran Canaria airport
GCS	Approach sector to Gran Canaria airport, handling arrivals
h	Hour
HGT	Height
IFR	Instrument Flight Rules
IRI (A)	Instrument Rating Instructor (Aircraft)
IAA	Irish Aviation Authority
kg	Kilogram
km	Kilometres
km/h	Kilometres per hour
kt	Knots
LCL	Local
m	Metre
m ²	Square metre
Mb	Millibars
ME IR (MPA)	Multi-engine instrument rating and multi-pilot crew rating
MHz	Megahertz
ME IR (SPA)	Single-pilot instrument rating
MEP (land)	Multi-engine land based aeroplanes rating
N	North
Nm	Nautical miles
W	West
OJTI	On Job Training Instructor
ITCP	Integrated Tower Control Position
s	Second
STCA	Short Term Conflict Alert
TMCAD	Malta Civil Aviation Authority (Transport Malta Civil Aviation Directorate)

TECHNICAL REPORT

IN-030/2024

AIRCRAFT 1

Owner: RYANAIR

Operator: MALTA AIR

Aircraft: BOEING 737-800, registration 9H-QBL, call sign RYR5822

People on board: One hundred and seventy-seven (177). Six (6) crew and one hundred and seventy-one (171) passengers.

Flight phase: Landing - Final

Flight rules: IFR

Type of flight: Commercial air transport - International - Passenger

AIRCRAFT 2

Owner and Operator: RYANAIR

Aircraft: BOEING 737 – 800, registration EI-IFS, call sign RYR2296

People on board: One hundred and twenty-seven (127). Six (6) crew and one hundred and twenty-one (121) passengers.

Flight phase: Take-off – Initial climb

Flight rules: IFR

Type of flight: Commercial air transport - International - Passenger

Date and time of the incident: 12 October 2024 at 09:17 (local time¹) – 08:17 (UTC)

Place of the event: Las Palmas de Gran Canaria Airport (Las Palmas) – GCLP

Date of approval: March, 26, 2025.

SYNOPSIS

Summary:

On Saturday 12 October 2024, the BOEING 737-800 on registration 9H-QBL, call sign RYR5822, coming from Rome airport (LIRF), was on final approach to runway 03R at Gran Canaria airport (GCLP) at a distance of 3 NM from the threshold and on tower frequency (118.300 MHz), when the crew of another BOEING 737-800 on registration EI-IFS and call sign RYR2296 was instructed to enter the same runway 03R and align and subsequently take off.

When the first aircraft (RYR5822) was on final, at an altitude of approximately 350 ft, the second aircraft (RYR2296) started the take-off run, so the crew of RYR5822 decided to abort the approach and

¹ Unless otherwise stated, the reference time of the incident shall be local time. To find UTC time, subtract one (1) unit.

initiate a right turn to separate from RYR2296, which crossed in its initial climb ahead of it, resulting in a loss of separation.

The crews of the two aircraft attempted to contact the control tower, but did not get a response at first and therefore contacted the respective sectors of Canarias control.

RYR5822 contacted the GCS sector on frequency 121.300 MHz, and was instructed to climb to 3,000 ft, and were subsequently given vectors for landing.

RYR2296 contacted the F03 sector on frequency 124.3 MHz and was instructed to continue the climb and proceed on its planned route.

The investigation has determined that the loss of separation occurred as a result of Air Traffic Control authorising a take-off when there was another aircraft on final with insufficient space between the two aircraft.

The crews of the two aircraft involved not receiving to the instructions given to them from the control tower due to the connection pins of the communications device being incorrectly connected for a certain period of time has been considered as a contributing factor, which made it impossible for the messages issued from the tower to be transmitted outside.

The following recommendation will be issued to ENAIRE

REC: XXX / 25. It is recommended that ENAIRE study the possibility of including a section in the checklist for controller relief, in all control units, which includes the obligation to check whether the communications equipment is working correctly.

1. FACTUAL INFORMATION

1.1. Accident review

On Saturday 12 October 2024, the BOEING 737-800 on registration 9H-QBL and call sign RYR5822, coming from Rome airport (LIRF), was approaching runway 03R at Gran Canaria airport (GCLP).

At 09:04:54, the crew contacted the Approach Sector (GCS) on frequency 124.300 MHz and reported that they were descending to 6,000 ft heading to TISCA.

From this GCS sector, they were given different instructions for the approach, until at 09:12:51 they were told to contact the airport tower on frequency 118.300 MHz.

At 09:13:20, the crew of this aircraft contacted the local position (LCL) of the tower, where there were two controllers, one of whom was being instructed by the other, both of whom had started their shift at about 09:00.

The trainee was seated to the left of the instructor and both were communicating using the telephone, not the headset, both to listen to incoming messages and to transmit.² The messages were heard over the loudspeakers.

In the communication they made, the aircraft with call sign RYR5822 indicated that they were established on the localiser of runway 03L ready to move laterally to runway 03R and were authorised to position themselves on the runway 03R.

At 09:13:48, the crew of RYR2296, contacted the tower and communicated that they were proceeding via E to holding point R1 and were instructed to wait at that point, which they read back correctly.

Subsequently, until 09:15:10, there were different conversations between the crew of the aircraft that was going to take off and the controller who was being instructed, in which he gave them several instructions, among them that they were authorised to line up on runway 03R and then to climb to 3000 ft, the latter had to be repeated several times because it was not read back correctly, while the former was not read back.

At 09:15:42, the crew of RYR5822 contacted the tower again and requested instructions in case they had to perform a missed approach, and the reply was to maintain runway heading and an altitude of 2,000 ft, with the crew correctly reading it back.

At 09:16:00, the crew of RYR2296 was cleared for take-off and instructed to take off immediately. They replied to this instruction immediately, and 11 seconds later the crew that they were starting the take-off.

At 09:16:25, a third aircraft with call sign VLG15NL, not involved in the event, which was second in the approach sequence behind RYR5822, contacted the tower, but received no response.

At 09:16:42, RYR5822 communicated, on short final, that it was aborting the approach. After this communication they called up to four (4) times in an interval of 40 seconds without getting any instructions from the tower.

² Communications can be made in two ways. Using a telephone or wearing a headset. Both devices are connected in the same place, so either one device is used or the other is used. If the telephone is used, it can be listened to on the device itself or through speakers in the console and transmitted via a push button on the telephone or by pressing a transmitter button available on the console or by pressing a foot pedal. If the headset is used, the way to transmit is by pressing the button on the headset.

In between these communications, the crew of aircraft VLG15NL also attempted to make contact with no response, even on the international emergency frequency.

From that moment on, the instructor tried to take control, seeing that the distance between the two aircraft was going to be very close, and he was the one giving instructions to the different aircraft, but the instructions were not heard by the aircraft crews because the instructor's telephone was not transmitting, without the controllers being aware of this.

Finally, at 09:17:44, RYR5822 reported that its was going to fly a heading 040° and climb to 2,000 ft without receiving acknowledgement from control.

Between 09:17:45 and 09:18:55, there was coordination between the Tower and the Approach Sector Controller (GCS) in which the latter asked the Tower if RYR5822 had aborted the landing.

The Tower confirmed they had and also said they were turning right and climbing to 2,000 ft through 1,500 ft.

The GCS sector told them that if they wanted they could switch RYR2296 to their frequency and they were asked if they had it on frequency.

The tower asked if they could give a heading to RYR5822 and the GCS sector said they were under RADAR minima, i.e. below 2,500 ft. The tower told them that they were climbing to 3,000 ft and confirmed that they were being handed control of RYR2296.

They were told by the GCS sector to transfer the two aircraft, but the supervisor, who was doing the coordination, was not aware of the transmission problem in the tower and that the communications were not going out and therefore they could not transfer them.

Subsequently the GCS sector (Arrivals Sector, 121.300 MHz) confirmed that RYR5822 was with them, while the crew of RYR2296 changed frequency and contacted the Departures Sector, 124.300 MHz (F03) directly. Between 09:17:59 and 09:18:31, both aircraft kept trying to communicate with the tower without response, as did the crew of aircraft VLG15NL who also made an unsuccessful attempt in that time interval.

At 09:18:44, the GCS sector instructed the crew of RYR5822 to proceed on a heading of 140° and when reading back the crew asked why they had not received an answer from the tower.

At 09:18:49, the crew of VLG15NL reported that they were at the end of runway 03L diverging to 03R on frequency 121.5 MHz on watch and in Spanish, but they did not receive a reply. This message was repeated 31 seconds later on the same frequency.

At 09:19:28, the instructor called the crew of VLG15NL and 2 s later called them again and they made contact. The crew again informed them of their intentions to position themselves at the end of runway 03R and they were authorised to do so.

According to the information provided by the instructor, until that moment he was not aware that there might be a problem with the transmission of his messages and so they disconnected and connected the plugs several times, until they managed to recover communications. He also commented that after the relay the frequency had been blocked once, but they did not give it much importance.

At 09:19:50, the crew of RYR2296 informed sector F03 that they had been unable to communicate with the tower and were told that they were in RADAR contact and instructed to climb unrestricted to FL 120.

The GCS sector continued to instruct the crew of RYR5822 to re-enter the approach sequence at position No. 6. In the airport's application that records a surface-level view of aircraft movements, the relative positions of both aircraft at critical moments can be seen, although RYR5822 did not land.

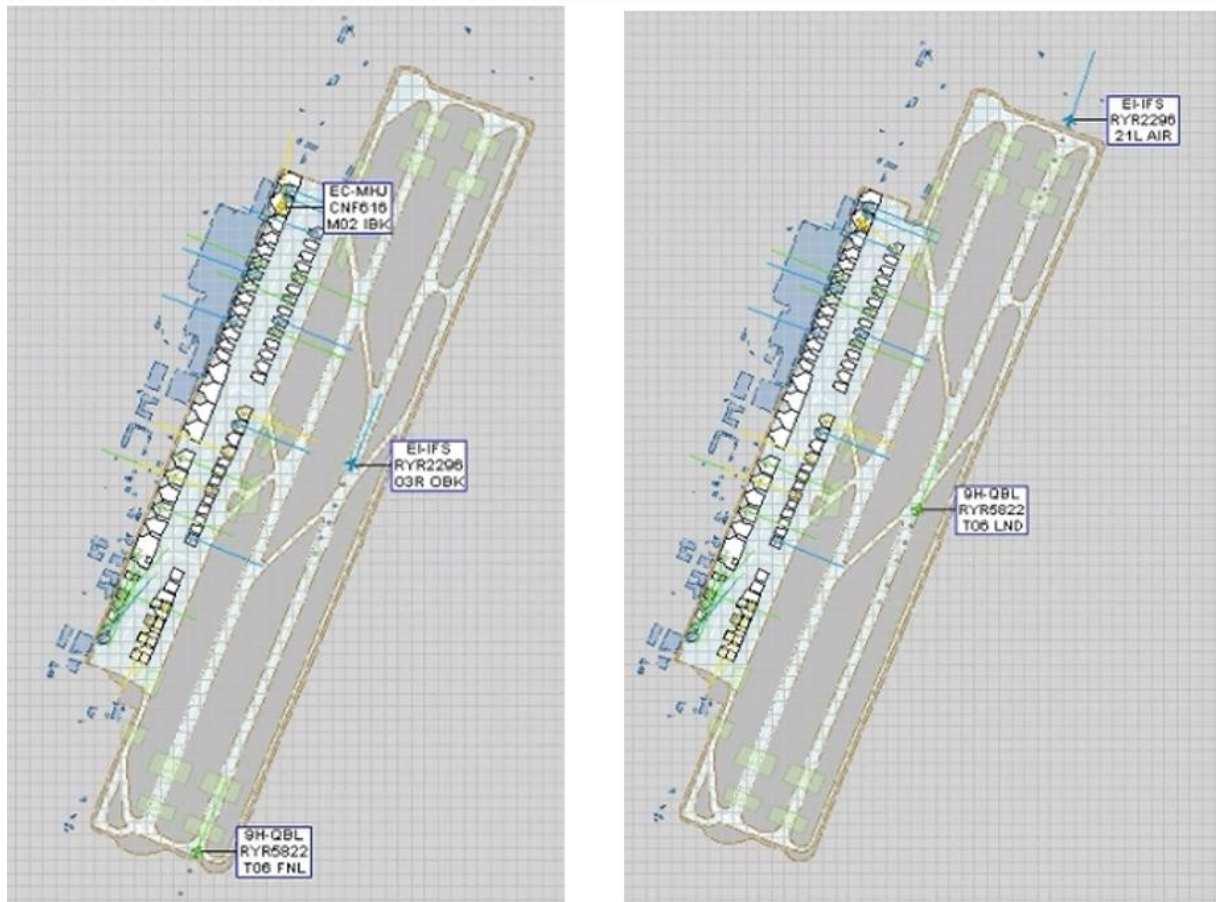


Figure 1. Relative positions of the aircrafts

At 09:17:02, RYR2296 had passed exit S5, while RYR5822 was located at the very short end, at the beginning of the threshold of the runway.

At 09:17:20 h, RYR2296 was located at the end of the paved area flying over the runway at 600 ft, while RYR5822 was at the end of the runway, at the height of exit S5, already climbing, performing the missed approach.

1.2. Injuries to persons

Injuries	Crew		Passengers		Total		Other	
	9H-QBL	EI-IFS	9H-QBL	EI-IFS	9H-QBL	EI-IFS		
Fatal	-	-	-	-	-	-	-	-
Serious	-	-	-	-	-	-	-	-
Minor	-	-	-	-	-	-	-	-
Unhurt	6	6	171	121	177	127	-	-
TOTAL	6	6	171	121	177	127	-	-

1.3. Damage to the aircraft

There was no damage to either aircraft.

1.4. Other damage

There was no other damage

1.5. Staff information

1.5.1. Crew of the BOEING 737 - 800 with registration 9H-QBL (RZR5822)

1.5.1.1. Captain

The captain was 35 years old and an Italian national.

He held an Airline Transport Pilots Licence (Aircraft), ATPL(A) issued by the Irish Aviation Authority (IAA) in 2019, as well as the ratings for the BOEING 737 300-900, for multi-engine instrument flight ME IR (MPA) and multi-pilot crew.

The licence and the corresponding Class 1 medical certificate (the latter issued by the Italian civil aviation authority ENAC) were in force.

His total experience was 5,000 hours, of which 4,500 were on the type.

1.5.1.2. First officer

The first officer was 30 years old and also an Italian national.

He held a commercial airline pilot's licence, CPL(A) issued by the Irish Aviation Authority (IAA) in 2014, as well as ratings for the BOEING 737 300-900 aircraft, for multi-engine instrument flight ME IR (MPA) for multi-pilot crew, for single-pilot instrument flight, ME IR (SPA) and for multi-engine land-based aircraft, MEP (land)

The licence and the corresponding Class 1 medical certificate (the latter issued by the Italian civil aviation authority ENAC) were in force.

His total flight experience was 3,150 hours, of which 2,920 hours were on the type.

1.5.2. Crew of BOEING 737 - 800 with registration EI-IFS (RZR2296)

1.5.2.1. Captain

The captain was 53 years old and a Spanish national.

He held an Airline Transport Pilots Licence (Aircraft), ATPL(A) issued by the Irish Civil Aviation Authority (IAA) in 2013, as well as the ratings for the BOEING 737 300-900, for multi-engine instrument flight ME IR (MPA) and multi-pilot crew.

The licence and the corresponding Class 1 medical certificate (the latter issued by the Spanish civil aviation authority AESA) were in force.

His total experience was 16,000 hours, of which 15,000 were on the type.

1.5.2.2. First officer

The first officer was 25 years old and a Portuguese national.

He held a commercial airline pilot's licence, CPL(A) issued by the Irish Civil Aviation Authority (IAA) in 2014, as well as ratings for the BOEING 737 300-900 aircraft, for multi-engine instrument flight ME IR (MPA) for multi-pilot crew, for single-pilot instrument flight, ME IR (SPA), for multi-engine land-based aircraft, MEP (land) and airline instructor rating FI(A).

The licence and the corresponding Class 1 medical certificate (the latter issued by the Portuguese civil aviation authority ANAC) were in force.

His total flight experience was 1,182 hours, of which 778 were on the type.

1.5.3. Controllers

1.5.3.1. Supervising Tower Controller

The supervisor tower controller was 38 years old and had a Community air traffic controller licence, issued by the Spanish Aviation Safety Agency (AESA) on 29 October 2018, and had the required ratings for the role he was performing.

The licence, the ratings, the class 3 medical examination were in force. His language proficiency in Spanish was six (6) and in English five (5), both current.

He had been stationed at the airport tower for six (6) years, three (3) years as a supervisor and two (2) years as an instructor.

1.5.3.2. Instructor Controller of the local position of runway 03R

The controller who was giving instruction was 48 years old and had a community air traffic controller licence, issued by AESA on 16 May 2013, and had the required ratings for the role he was performing.

The licence, the ratings and the class 3 medical examination were in force. His language proficiency in Spanish was six (6) and in English six (6), both current.

He had been stationed in the airport tower for seven (7) years and had previously spent just over four (4) years in the tower at Seville airport. He had been an instructor for more than five (5) years.

1.5.3.3. Student Controller of the local position of runway 03R

The air traffic controller being trained, aged 27, held a community student air traffic controller licence, issued by AESA on 19 July 2024, and had the required ratings for the role he was performing. The licence, the ratings, the class 3 medical examination were in force. His language proficiency in Spanish was six (6) and in English five (5), both current.

He had been in training at the tower for fifteen (15) days and on the day of the incident he had started work approximately one (1) hour before the incident occurred.

1.6. Aircraft information

1.6.1. BOEING 737 – 800 with registration 9H-QBL (RZR5822)

The Boeing B-737-800 is a transport aircraft with a wingspan of 34.3 m, a length of 39.5 m and an overall height of 12.57 m, with a maximum take-off weight of 71,990 kg.

It was equipped with two C.F.M. CFM56-7B26E engines. The model involved in the incident, with registration 9H-QBL, was manufactured in 2015 with serial number 44,709 and had a valid certificate of airworthiness issued by the Maltese Civil Aviation Authority (TMCAD).

1.6.2. BOEING 737 – 800 with registration EI-IFS (RZR2296)

The Boeing B-737-800 aircraft has the same dimensions as the previous one, with a maximum take-off weight of 74,990 kg.

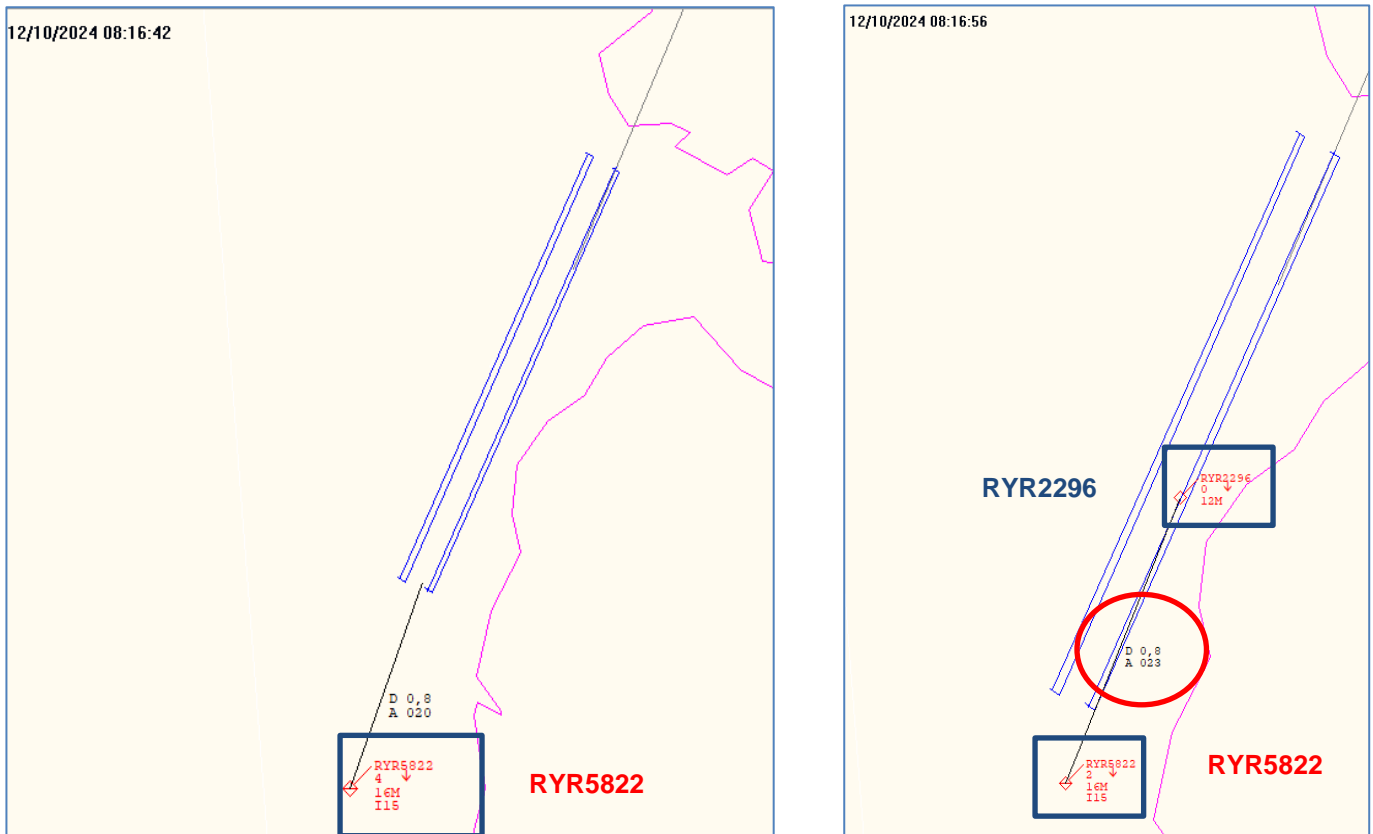


Fig. 3: Position of aircraft at 09:16:42 (left) and 09:16:56 (right)

At 09:16:56, the crew of RYR5822 again reported the missed approach advised that without receiving a response from the control tower, the track placed them 0.2 NM from the threshold of runway 03R and at an altitude of 200 ft, while RYR2296 was on the runway on take-off roll, the distance between them being 0.8 NM horizontally and 200 ft vertically.

Subsequently, at 09:17:18, when the two aircraft were already in the air, they were closest to each other, with a horizontal separation of 0.9 NM while at the same altitude, with no communications with the tower.

At 09:17:44, their trajectories began to diverge. At that time they maintained a horizontal distance of 1 NM and a vertical separation of 199 ft.

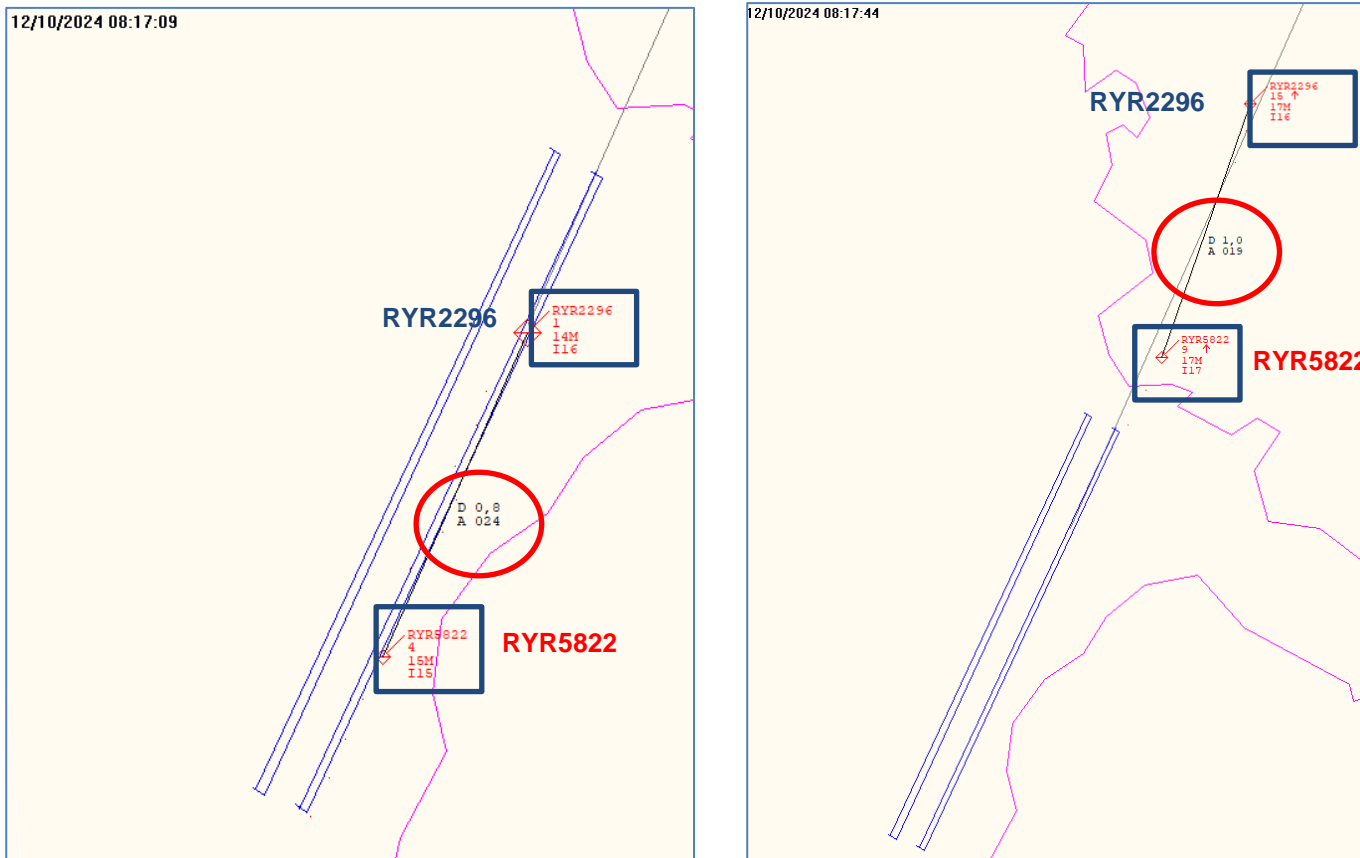


Figure 4. Relative positions of the aircraft at 09:17:09 and 09:17:44 respectively

1.9. Communications

The BOEING B737 with registration 9H-QBL operated by MALTA AIR had call sign RYR5822 and the BOEING B737 800 with registration EI-IFS operated by RYANAIR had call sign RYR2296.

The following is a summary of the most relevant communications that took place, not only between the tower and the two aircraft involved in the event, but also with other interlocutors that have been considered to be important in order to situate the scenario, as well as the workload of the controllers.

Conversations between controllers and aircraft were conducted in English.

COMMUNICATIONS BETWEEN LOCAL TOWER - TWR LCL (118.3 MHz) AND SECTORS F03 (124.3 MHz) AND APPROXIMATION GCS SECTOR (121.3 MHz)

UTC TIME	BROADCAST	SUMMARY OF THE COMMUNICATION
08:05:20	GCS Sector	Cleared the crew of RYR5822 to position on the localiser for the approach to ILS 03L and proceed to 03R and gave them QNH 1016. The crew correctly read this back without mentioning the QNH (which had been read back earlier).

08:12:40	RYR5822	They asked if after the localiser they were cleared for runway 03R and the crew correctly read that back 5 s later.
08:12:51	GCS Sector	They said goodbye to the crew and were transferred to frequency 118.300 MHz (TWR LCL). The crew correctly read back the frequency
08:13:08	LCL trainee	Authorised the crew of the aircraft with call sign NAY91VJ, not involved, to take off from runway 03R. It was immediately read back by the crew correctly (due to this traffic the departure of RYR2296 was subsequently restricted to 3,000 ft and the take-off clearance was also delayed). The crew correctly read back about the positioning
08:13:48	RYR2296	The crew of RYR2296 contacted the Tower and informed them that they were proceeding via E to holding point R1.
08:13:56	LCL trainee	Instructed them to standby in R1 and the crew read it back correctly.
08:14:14	LCL trainee	Contacted the crew of RYR2296 and amended the initial altitude to 3,000 ft giving them the QNH 1016 hPa.
08:14:21	RYR2296	The crew read back 6,000 ft and QNH 1016
08:14:26	LCL trainee	Indicated to them that the read back was correct (He did not detect the incorrect read back).
08:14:32	LCL trainee	Instructed the crew of RYR2296 to line up via Z4 and wait on runway 03R
08:14:39	RYR2296	They asked to confirm the initial altitude to which they should climb.
08:14:45	LCL trainee	Informed the crew of RYR2296 of their company's traffic at 6 NM and asked if they were ready for take-off.
08:14:50	RYR2296	The crew of this indicated that they were ready and asked again the altitude to which they should climb, in order to coordinate the crew and the controller asked them to repeat.
08:14:59	RYR2296	They asked again for the altitude to which they were to climb, to coordinate the crew, and he instructed them to climb to 3,000 ft.
08:15:08	RYR2296	They asked for confirmation of 3,000 ft and replied in the affirmative.
08:15:42	RYR5822	They asked what they should do in case of a missed approach.
08:15:51	LCL trainee	In the background, the instructor can be heard moving forward, indicating to the trainee: 2,000 ft). RYR5822 runway course, 2,000 ft
08:15:54	RYR5822	They requested confirmation of runway heading for 2,000 ft and received an affirmative reply.

08:16:00	LCL trainee	Authorised the crew of RYR2296 to take off from runway 03R. The crew read back the take-off clearance.
08:16:07	LCL trainee	Instructed the crew of RYR2296 to take off immediately
08:16:11	RYR2296	The crew reported that they were in rolling (voice of another pilot).
08:16:25	VLG15NL	The crew of the aircraft with call sign VLG15NL, not involved in the incident, called the Gran Canaria tower. It was second in the approach sequence behind the aircraft with call sign RYR5822, but there was no response from either the trainee or the instructor.
08:16:42	RYR5822	They communicated that they were making a missed approach, but there was no response from either the trainee or the instructor.
08:16:56	RYR5822	They reported a missed approach and asked if they were still straight ahead, but there was no response from either the trainee or the instructor
08:16:58	RYR5822	They communicated that they were making a missed approach and asked where they wanted them to go and what if they turned right, but there was no response from either the trainee or the instructor.
08:17:20	VLG15NL	The crew of the aircraft with call sign VLG15NL, not involved in the incident, tried to communicate with the tower; transmitting in English as they were aware that there were 2 other aircraft communicating in English, but there was no response from either the trainee or the instructor.
08:17:23	RYR5822	RYR5822 reported that it was on a missed approach with traffic ahead of them and insisted on being told where to go but there was no response from either the trainee or the instructor.
08:17:36	RYR5822	They again asked how they should proceed, but there was no response from either the trainee or the instructor.
08:17:44	RYR5822	They reported that they were going to turn to a heading 040° climbing to 2,000 ft, but there was no response from either the trainee or the instructor.
Between 08:17:45 and 08:18:55	Coordination LCL-Sector GCS Planner	<p>During this time interval there was coordination between the Tower supervisor and the Approach sector controller planner in which the latter asked the Tower if the aircraft with call sign RYR5822 had aborted the landing.</p> <p>The Tower confirmed this and also told him that they were turning right and climbing to 1,500 ft.</p> <p>Approach confirmed that they were watching it and asked if it he had been instructed to climb to 1,500 ft, the Tower replied that it had.</p>

		<p>The Approach sector were told that if they wanted they could transfer RYR2296 to their frequency and they were asked if they had it on their frequency.</p> <p>The tower asked if they could give a course to RYR5822 and the Approach sector were told that it was low at 2,500 ft.</p> <p>The tower told them that they were climbing to 3,000 ft and confirmed that they were handing over control of RYR2296.</p> <p>The Approach sector were told to pass the two aircraft. The Tower asked for confirmation and were reconfirmed to pass both aircraft.</p> <p>Finally, the Approach sector confirmed that they had RYR5822 on frequency and the Tower read it back.</p>
08:17:59	RYR5822	The crew of RYR5822 again tried to communicate with the Tower, but there was no response from either the trainee or the instructor.
08:18:10	RYR2296	An attempt was made to communicate with the Tower, but there was no response from either the trainee or the instructor.
08:18:15	RYR5822	<p>Another attempt was made to communicate with the Tower, but there was no response from either the trainee or the instructor.</p> <p>(In the coordination above, the call from RYR5822 at 08:18:15 is heard in the background and then the TWR instructor responded, <u>but he must not have gone on the air, as he does not appear in the audios</u>).</p>
08:18:31	RYR5822	Attempted to contact Approach sector frequency
08:18:31	RYR2296	Communicated to give traffic information to RYR5822 indicating that they were ahead of them and that they would stop at 3,000 ft, but there was no response from either the trainee or the instructor.
08:18:35	GCS Sector	Responded to the crew of RYR5822 and instructed them to initially hold at 3,000 ft and QNH 1016 hPa and read back the two instructions and asked if the heading of 145° was correct.
08:18:40	VLG15NL	The crew of VLG15NL, not involved in the incident, called the Tower to perform a radio check, but there was no response from either the trainee or the instructor.
08:18:44	GCS Sector	Instructed the crew of RYR5822 to proceed to their right on a heading of 140°. Read back and asked why the Tower had not responded to them.
08:18:49	VLG15NL	The crew of VLG15NL, not involved in the incident, broadcast in Spanish on the emergency frequency that they were at the end of runway 03L diverging its positioning towards 03R, but there was no response from either the trainee or the instructor.
08:19:20	VLG15NL	The crew of VLG15NL reported again on the emergency frequency that they were at the end of runway 03R (short final).

08:19:28	LCL instructor	A noise was heard beforehand, which could be an attempt to connect the telephone - transmitter or headset and then how he was calling the crew of VLG15NL in Spanish.
08:19:30	LCL instructor	Called aircraft VLG15NL again, on frequency 121.5 MHz
08:19:33	VLG15NL	The crew of VLG15NL replied in English and reported that they were at the end of runway 03R and were cleared to land.
08:19:40	A different voice	Instructed the crew of VLG15NL, on the emergency frequency, to contact on frequency 118.3 MHz.
08:19:45	VLG15NL	They replied on frequency 121.5 MHz that they were already in contact with the Tower and that there had been a communications failure.
08:19:42	VLG15NL	Read back the clearance to land to the Tower. It sounds as if the push button is being pressed twice.
08:19:50	RYR2296	Informed sector F03 that they had had no communications with the Tower, and then from F03 informed the crew of aircraft RYR2296 of the RADAR contact and they ascended without restrictions to FL 120 and read back to the previous instruction
08:20:01	RYR5822	They reported that they were maintaining 3,000 ft and heading 140°.
08:20:06	GCS Sector	Responded to the crew of RYR5822 that 3,000 ft was correct over 15 NM, asked if they required more altitude and that they were number 6 in the approach sequence.
08:20:15	RYR5822	Requested confirmation that they were number 6 and the GCS Sector confirmed it.
08:20:22	RYR5822	Asked if they could perhaps climb to 5,000 ft.
08:20:24 - 08:21:03	TWR Supervisor Coordination - Sector F03	Between this time interval, a coordination took place, whereby sector F03 wanted to know why RYR5822 had gone into the air, the supervisor could not specify the reason and indicated that it was before the aircraft was authorised to land.
08:20:25	RYR5822	Asked again if they could climb to 5,000 ft.
08:20:28	GCS Sector	Instructed RYR5822 to proceed on a heading of 160° at 4,000 ft and advised of QNH 1017 hPa.
08:20:34	RYR5822	Read back and requested altitude be repeated
08:20:39	GCS Sector	Instructed the crew of RYR5822 to climb to 4,000 ft and set a heading of 160° and read back correctly.

08:21:55	VLG15NL	Asked the Tower if they had had a problem with the radio.
08:22:02	LCL instructor	Replied that the system had indeed been jammed and that they were transmitting with both radios and the crews were not hearing their communications. Commented that they had not realised until they had had to restart (reset) the screen and apologised.
08:22:14	VLG15NL	They informed them that the plane that had aborted had called them several times and the tower replied that they were giving them instructions and that it seemed strange that they did not read back, but that they had realised it too late.

1.10. Aerodrome information

The airport of Las Palmas de Gran Canaria, code number GCLP, has the coordinates 27°55'55" N - 15°23'12" W as its reference point (ARP), its elevation is 24 m (77 ft) and it is located 19 km south of the city.

It has two parallel asphalt runways designated 03R/21L and 03L/21R, which are 3,099 m x 45 m and 3,100 m x 45 m. Their strips are 3,220 m x 280 m and 3,219 m x 280 m respectively.

The elevation of the threshold at end of 03R is 20.95 m and at the end of 21L is 7.78 m.

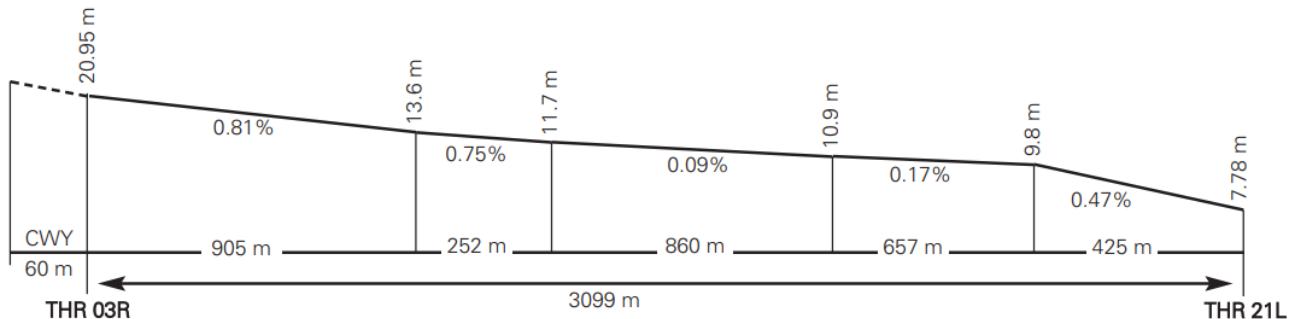


Figure 5. Profile of Las Palmas de Gran Canaria Airport runway 03R/21L

The approach to runway 03R is non-precision instrument. The lighting system is CAT I precision, 900 m (LIH) and the airfield circuit is to the east.

The identification lights are as follows:

- PAPI (MEHT): 3° (20.45 m / 67 ft)

- Threshold: Green.

- Runway axis: it has a length of 3,100 m, with 2,200 m white, 600 m white red and a further 300 m red (LIH) with a distance of 15 m between lights.

- The runway edge has a length of 3,100 m, of which 2,500 m are white and 600 m are yellow (LIH), the distance between lights is 50 m.

- Runway end: Red.



Figure 7. Time at which the aircraft with call sign RYR2296 commenced take-off (09:16:14)

The BOEING 737 - 800 with call sign RYR5822 had a speed of 170 kt, was at an altitude of 350 ft, approaching the runway.



Figure 8. Moment when the minimum separation occurred (09:17:04)

1.12. Information on the aircraft wreckage

Not applicable.

1.13 Medical and pathological information

Not applicable

1.14. Fire

There was no fire.

1.15. Survival aspects

Not applicable

1.16. Tests and investigations

According to the information provided by ENAIRE, of the four control tower positions (ITPC1, ITPC2, ITPC3 and ITPC4), two were active at the time of the incident.

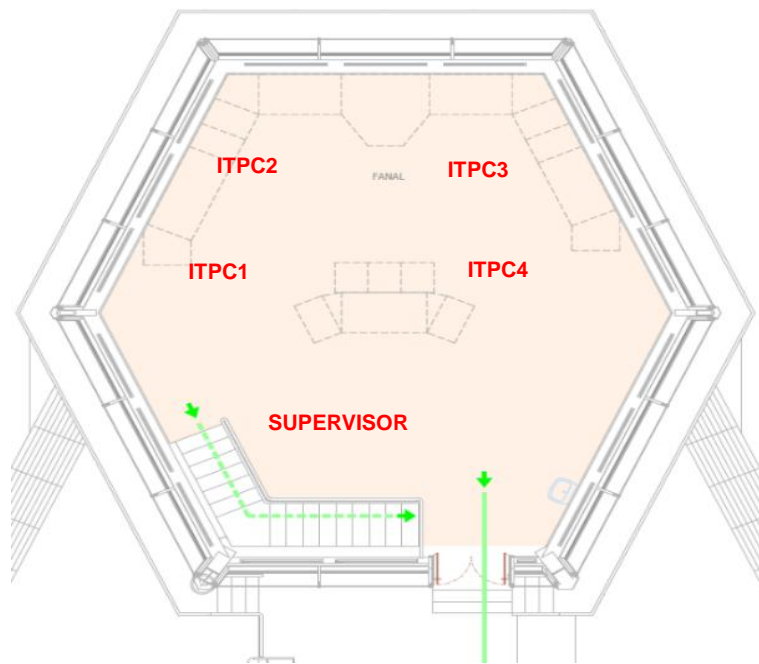


Figure 9. Control tower positions

Clearances and taxiing (CLD + GMC) were concentrated at position ITPC1 and local control of landings and take-offs on runway 03R (LCL) was concentrated at position ITPC2. The ITPC3 position is where the supervisor was placed, momentarily, to coordinate with the APP sectors.

At ITPC2, the trainee was seated to the left of the instructor and both were communicating using their own telephone, not the headset, to listen to the messages they were receiving through the loudspeakers on the console, broadcasting from each controller was using the push button on the telephone, and another possibility was to press the foot pedal or a button on the console to perform the same function.

The workload in the tower at the time of the incident was twenty (20) aircraft, with thirty-five (35) aircraft established as the maximum workload.

The final approach service to Gran Canaria IGC airport was divided into two sectors, the F03 sector, which covered the FGC + GCN positions, i.e. departures, and the GCS sector, which covered the approach for arrivals.

The phone and headset jack has two 6.35 mm stereo jack plugs, which can be plugged into different positions, both of which are underneath the console board and therefore not directly visible, as shown in the figure below.



Figure 10. Connections of the communications equipment

1.17. Organisational and management information

1.17.1. Applicable regulations

Regulation EU 2016/1185 on Rules of the Air, in Article SERA.14087, paragraph a, on "Use of relay communication technique", states the following:

- a) When an ATS unit has been unable to establish contact with an aircraft after calls on the frequencies on which the aircraft is believed to be listening, it shall:
- 1) request other ATS units to render assistance by calling the aircraft and relaying traffic, if necessary; and
 - 2) request aircraft on the route to attempt to establish communication with the aircraft and relay traffic, if necessary.

The unit's Operational Manual, Annex A, section 11.3.1, states:

11.3.1 Single frequency transmission problems

If any of the following situations are detected:

- Lack of response to repeated calls,
- No broadcast lamp illuminates when broadcasting or no broadcast lamp is displayed on the communications panel.
- The aircraft reports that it is not receiving a specific frequency.

The ATC shall check whether the appropriate frequency is selected and, if so, whether the push button or pedal is locked, remembering that a separate push button (PTT) is available on the ITPC which can be used if problems are suspected with those normally used. If this is not the problem, check if the frequency has been locked by any of the users, through the broadcast lights, direction finder, etc. If this does not work, try broadcasting on that frequency from another ITPC.

1.17.2. Procedures to be followed in operations

In the Gran Canaria Airport Tower Operations Manual, Annex B, chapter 5, section 5.2.2 establishes a series of rules on *Single runway operations: separation between approaches and departures authorised for immediate take-off* and establishes the following as general considerations:

- ATCs shall maintain continuous surveillance of aerodrome operations by visual observation of their areas of responsibility, relying as necessary on available ATS surveillance systems.

- The ATC under whose responsibility the runway is located shall carry out a visual check of the runway and final approach area in both directions of the runway before issuing runway entry, take-off or landing clearances. This check shall be carried out by direct visual observation, supported if necessary by available ATS surveillance systems, particularly in conditions of reduced visibility.
- A runway alignment shall not be authorised if the pilot has notified that the aircraft is not ready for take-off or if it is foreseeable that the aircraft will have to wait on the runway for more than 90 seconds before being cleared for take-off.
- Runway alignment or runway crossing shall be authorised only when the aircraft is close to or approaching the runway, and premature issuance of such runway entry clearances shall be avoided.
- The take-off clearance shall be issued when the aircraft is ready and close to the runway holding point, avoiding issuing take-off clearances too early.
- An aircraft shall be granted permission to land only if there is a reasonable degree of certainty that regulatory separation will exist when that aircraft crosses the threshold of the runway in use.
- Except where reduced runway separation applies, no landing aircraft shall be permitted to cross the runway threshold on final approach until the preceding aircraft on take-off has crossed the runway end in use or has commenced a turn.
- Landing clearance shall be granted as far in advance as possible, normally before the approach is 2 NM from the touchdown point.
- As soon as the clearance is expected to be granted later, transit information shall be given and the aircraft shall be instructed to continue its approach.
- If the separation between the two aircraft is expected to be close to the applicable regulatory minimum, the use of immediate take-off clearances is recommended.

Great importance is also attached to the following:

- Continuous monitoring of operations.
- Before clearance: visual check of runway and final approach in both directions.
- Do not align if the aircraft is not ready for take-off or will remain on the runway for more than 90 seconds.
- Authorise to align/take off when the aircraft is close to the runway.
- Clear to land as soon as possible, normally before the approach reaches 2 NM; on final.
- If later landing clearance is to be given, give traffic information and instruct to continue approach.
- An arrival may be cleared to land if it is reasonably certain that the preceding aircraft has cleared the runway when the arrival crosses its threshold.
- Otherwise, unless reduced runway separation applies, do not authorise the arrival to cross the runway threshold and instruct it to go around.
- If take-off - approach separation is expected to be close to the regulatory minimum, use immediate take-off clearance.

Among the factors to be taken into account when establishing the DEPARTURES – ARRIVALS sequence, it must be borne in mind that the management of the separations between an aircraft authorised for immediate departure and an approaching aircraft, the following factors acquire special relevance and must be considered by the LCL ATC in order to establish the most appropriate sequence, taking into account the following:

- Aircraft types and performance on approach and departure (especially those aircraft with specific performance or operating requirements or which differ significantly from normal traffic, such as piston engine, turboprop or military traffic).
- Manoeuvre or type of approach to be developed by the aircraft on arrival. (especially those aircraft with specific performance or operating requirements or which differ significantly from normal traffic, such as piston engine, turboprop or military traffic).
- Position and speed and rate of descent of the approaching aircraft at the time the immediate take-off clearance is issued, so that an estimate of the time available until the arriving aircraft reaches the threshold of the runway in use is available. It is recalled that the estimate of the time to be taken is available on the radar label of that aircraft (in order to obtain a correct indication, it is important to check the correct SACTA configuration of the reference runway at the start of the relay).
- Position of the departing aircraft on the manoeuvring area at the time of being cleared for take-off (geometry of the holding point, runway end, intersection...).
- Departure manoeuvre or route (SID) to be performed by the departing aircraft after take-off.
- Presence of school flights, traffic unfamiliar with the airfield, special events or circumstances such as air shows, military traffic, etc.

On the other hand, in the sequence of actions to manage the DEPARTURES - TAKE-OFFS sequence, it should be considered that, as far in advance as possible, once the above factors have been assessed and the feasibility of the departure – arrival sequence has been determined, the LCL ATC shall carry out the following sequence of actions:

1. Inform the approaching aircraft that a take-off is about to occur, or if applicable, the sequence of runway use that can be expected. If appropriate, an enquiry shall be made as to whether there is departing traffic in sight and the feasibility of being number two in the sequence of operation after take-off shall be confirmed with the pilot.
2. Prior to runway entry, inform the departing aircraft of the approaching aircraft's position and speed, if considered necessary, and confirm that it is ready for immediate take-off.
3. In the event of an affirmative response, and if it is considered that there is sufficient time to make the adjustment, clear the aircraft for immediate take-off.
4. Where take-off clearance has not been complied with, the following phraseology shall be used:

(distintivo de llamada de la aeronave) DESPEGUE INMEDIATO O ABANDONE PISTA [(instrucciones)];	(aircraft call sign) TAKE OFF IMMEDIATELY OR VACATE RUNWAY [(instructions)];
---	--

5. Monitor the progress of both aircraft with available means, both visually and by ATS surveillance system, so that if it is foreseen that the regulatory separation between the two aircraft may be lost, the take-off clearance is preferably cancelled. However, in order to prevent runway excursions, stopping the take-off once the take-off run has commenced shall be avoided as far as possible.

Finally, with regard to the action to be taken in the event of a possible loss of separation DEPARTURES – ARRIVALS, the following should be considered:

In the event that, after giving a take-off clearance or a landing clearance, the ATC becomes aware that the separation between the two aircraft may be close to the applicable regulatory minimum separation, action shall be taken as quickly as possible.

If time is available, actions will be coordinated in advance with APP in the event of a simultaneous take-off and go around, thus allowing time to be saved in the event of such a situation eventually occurring.

In the event that it is finally foreseen that the minimum regulatory separation between the two aircraft is going to be infringed, the following sequence of actions shall be carried out:

1. Cancel or stop take-off, as appropriate:
 - a) to cancel take-off clearance

(distintivo de llamada de la aeronave) MANTENGA POSICIÓN, CANCELE DESPEGUE REPITO CANCELE DESPEGUE (motivo);	(aircraft call sign) HOLD POSITION, CANCEL TAKE-OFF I SAY AGAIN CANCEL TAKE-OFF (reasons);
--	--

- b) to stop a take-off after the aircraft has started the take-off run:

2. Instruct the aircraft on approach to perform a go around

(distintivo de llamada de la aeronave) ABORTE DESPEGUE [(se repite el distintivo de llamada de la aeronave) ABORTE DESPEGUE];	(aircraft call sign) STOP IMMEDIATELY [(repeat aircraft call sign) STOP IMMEDIATELY];
---	---

3. Essential information: Provide essential traffic information using English if necessary for the crews of both aircraft to understand the communication and improve their situational awareness, including direction of manoeuvre execution (left or right relative to manoeuvre track) and, subsequently, additional information or instructions.
4. Implement measures coordinated with APP or if not previously coordinated, coordinate with the affected sector/collateral unit by transmitting relevant information.

When, despite all the above, a take-off and a missed approach or go around occur simultaneously, in order to ensure adequate separation between the two aircraft (especially when the following aircraft is faster than the preceding aircraft), if it has not been possible to coordinate in advance, a course to be assigned to one of the aircraft above the corresponding MVA, as indicated in the ATCSMAC chart, shall be coordinated with APP.

Finally, in the Operational Circular issued by the head of the Gran Canaria tower to the controllers, dated 29 January 2024, a series of recommendations were also given which focused on giving indications on take-off authorisations to avoid loss of separation, but always bearing in mind that communications were correct.

1.18. Additional information

ENAIRE carried out its own internal investigation and set it out in a document in which it highlighted the following relevant facts:

- The traffic flow managed by both the tower and the approach, F03 and GCS sectors were at normal values and no overloads of any kind were detected:
- After the crew of the aircraft with call sign RYR2296 was authorised to take off, while the aircraft with call sign RYR5822 was on final, the ATC personnel at the local position, LCL, warned that the regulatory separation between the aircraft was not guaranteed, so the instructor decided to enter the frequency to resolve the potential conflict by using the telephone to communicate. From this moment on, a situation arose in which aircraft transmissions were received at the beacon, but the instructions given by LCL from the instructor's position were not transmitted.

- This situation lasted approximately 3:18 minutes until the instructor disconnected and reconnected his phone several times and communications were restored.
- ENAIRE's investigation has not been able to clarify whether the problem was actually caused by the phone not being connected properly or whether the foot pedal used to transmit as an alternative to the telephone was stuck when tested at the beginning of the session and this was the reason why communications were not being transmitted. However, the light on the communications panel was illuminated indicating that transmission was taking place.
- In one of the attempts to connect the telephone, the ground-air transmissions were recovered and at that moment, the conflict generated was already in the recovery stage because the crews of both aircraft were in contact with the approach control frequency, APP, and were already executing the respective manoeuvres to which they had been instructed.
- ATC personnel did not consider the use of the last radio resource because they were not aware that they were not transmitting.
- A technical failure of the communications equipment was ruled out.

The document prepared by ENAIRE set out the following conclusions:

- The arrangement in the LOCAL position was the trainee on the left and the instructor on the right. Before starting his session, there was a problem with the pedal used to transmit as an alternative to the telephone, which was stuck (not transmitting) but the light on the communications panel was lit up indicating that it was transmitting, and the resolution of this problem meant that the instructor forgot to carry out the usual check that the telephone type terminal was working properly, which is what they generally use (in this case too).
- The instructor had not read the trainee follow-up reports, which are available to instructors, before the start of the session.
- The instructor had been instructing a different trainee who was at a more advanced stage for many days.
- At the beginning there was a briefing with the trainee to discuss the day's approach, type of traffic and situations, but the instructor took for granted the pre-trial phase the trainee was in, not realising that this was not the same training scenario as the previous days. This is probably why the instructor was slow to take command of the situation.
- The event was triggered by the decision to authorise the take-off of a BOEING B737 - 800 aircraft (with call sign RYR2296) before the landing of another aircraft of the same model (with call sign RYR5822), which was on final approach, with the detected limitation of an ATR - 72 having previously taken off, which is a slower aircraft.
- The situation had already been detected and commented on by the instructor and trainee as "very tight".
- This led them to focus their attention, and they did not notice an incorrect read back from the crew of the aircraft RYR2296 that was taking off with respect to their altitude. They read back 6,000 ft and had been cleared to 3,000 ft. It had to be the crew who asked for confirmation of the authorised altitude when they were already 6 NM from the runway, with the other traffic taxiing, without even having left exit Z2 on their left and while they still had to pass exits R1, Z4 and Z7 before lining up with runway 03R for take-off. At that time it was 09:14:33.
- The crew of RYR5822 asked what they should do in the event of an aborted landing at 09:15:40 and were instructed to take a runway heading and maintain 2,000 ft, which is not the stipulation for these cases, which is to follow the path of the missed runway diverging just 1 NM off the runway threshold and climb to 2,500 ft.

- The approaching traffic was already at this time 3.5 NM from the runway and the aircraft with call sign RYR2296 was taxiing for take-off, but still halfway between the access roads to the runway Z4 and Z7.
- At 09:16:00 the aircraft with the call sign RYR2296 was cleared for take-off, but the crew was not instructed to make an immediate take-off, until after the crew had correctly read it back 2 s later. This instruction was no longer received by the crew of the aircraft with call sign RYR2296 because there was a simultaneous transmission from the aircraft with call sign VLG15NL on approach, behind the aircraft with call sign RYR5822, which was trying to establish the first communication with the tower.
- Two seconds (2 s) later the crew of the Aircraft with call sign RYR2296 indicated that they were initiating take-off, but had not yet started to move, while the aircraft on final (call sign RYR5822) was already at 1.5 NM.
- At 09:16:43, the crew of the aircraft that was landing (RYR5822) reported that they were aborting the landing, but they did not receive a reply from the tower. At that time they were 0.5 NM from the runway and the aircraft taking off was on the first third of the runway.
- Apparently the frequency lockout occurred at 09:16:10, which is when the instructor attempted to take over and conduct communications. That is, none of the communications emitted from the tower could be heard any more.
- From the tower they did not detect that they were not broadcasting correctly and so they did not think of using the last resort radio or even using the instructor's phone, which could transmit.
- The transmission on frequency 121.5 MHz from the crew of aircraft VLG15NL plus the hotline approach notification that they were not being received by the aircraft is what caused them to react and reconnect the pins several times until they regained communications.
 - From all that has happened, together with the aggravating fact of the impossibility of transmitting, there is a moment when the intervention of the instructor was necessary. This happened late, because the trainee was no longer in control of the situation.

Furthermore, at the end of its investigation, the document produced by ENAIRE made a series of recommendations:

- Review with the instructor procedures for aborts, separation of take-off arrivals, time to take-off and possible alternative plan.
- The instructor receives competency training from the unit's head of training in the areas of training planning, debriefing with the trainee and frequency intervention.
- That for his return to his duties as an on-the-job trainer (OJTI), the reinforcement training indicated above has been completed, corroborating that no further action is required.
- Signed record of the aspects reviewed.
- The tower management department should analyse the advantages and disadvantages of using the telephone as a transmission channel, especially during training and with high traffic, also taking into account that the telephone has an omnidirectional microphone that picks up background noise and can make it more complicated for the crews to receive communications, precisely at times when there is already a lot of noise in the cockpit, such as during take-off and landing.
- Check the status of these telephones.

The ENAIRE report also includes the contributing factors that to a greater or lesser extent could have influenced the event.

The most influential was non-compliance with procedures such as not checking equipment at the start of the session or not using the emergency frequency, and secondary factors were the late

detection of the lack of transmission due to being focused on other tasks and the fact that a runway had been closed for some time, which changed the usual way of working.

1.19. Special investigation techniques

During the investigation, the controllers involved in the incident were interviewed, not only to give their views on the incident, but also to try to establish whether there were any factors that may have influenced the course of events.

The instructor commented that he was seated to the right of the trainee and that in that position the CVS (Communications and Voice System) screen is on the left side.

According to the information provided, they had been working in this seated position for 15 to 20 minutes and were going over his latest instructions and asking him questions.

When entering a position, the first thing he always does is a test to check if the headphones are working properly. That day he saw that there was an issue because it was locked and he tried to unlock the phone by putting the instructor's phone to his left and managed to unlock it when he pressed the button.

Regarding the incident he commented that he was sure that it was his phone that was not plugged in properly, without knowing exactly what had happened, but insisted that sometimes the phone gets stuck and what they do is call the maintenance service, who do a reset of the system for a short period of time lasting 15 seconds.

The most relevant part of his statement as to what might have influenced the event is that this small inconvenience that arose at the beginning of his working day probably took him out of his routine and that is why he did not do the headphone test as he always does.

As for the way he works, he indicated that when he is not training, he puts the headphones on his neck, with the microphone close to his mouth, makes the transmissions with a pedal and listens through the loudspeakers so that the rest of the positions in the tower can also hear him. He also said that for the dedicated line coordinations he has to put headphones over his ears to hear clearly.

Finally, as far as the incident is concerned, he confirmed that they detected that something anomalous was happening when they heard the crew of the aircraft with the call sign VLG15NL, on local console 2 (this is the ITPC3 position), which is located behind them, transmitting on the emergency frequency. At that time he called this aircraft on the frequency in use, but acknowledged that it did not occur to him that it was the trainee controller attempting to transmit, nor did it occur to him to call the aircraft on the last resort or emergency frequency.

He also acknowledged that despite looking at the CVS screen, which indicated that they were not transmitting, they did not detect the problem.

He confirmed that he believed they had been off the air for 1 to 1.5 minutes.

The supervisor rose from his position and approached his ITCP when he heard that RYR5822 was aborting the landing.

After the incident they worked for 45 minutes to one (1) hour, during which time the supervisor offered to relieve them, but they declined.

He also pointed out that he had consequently learned the lesson of never skipping the protocol and checking the push button, and that the first communication should be made by the instructor and the second by the trainee.

They have a checklist, but not on this particular case.

Finally, he commented that in his opinion, the fact that runway 03L has been closed for 2 months due to different causes has a considerable influence on the general operation of the control activity.

From the information provided by the Supervisor of the Gran Canaria tower, it is worth noting that, as far as the incident is concerned, he said that a complicated morning was foreseen because it was almost certainly going to be changed to runway 21L due to the change in wind direction.

That runway has less capacity and therefore had to do a lot of coordination.

In addition, this runway has a braking cable, which it is permanently deployed on the surface. It is only withdrawn in the event of maintenance or under certain specific conditions with single runway 21L operating.

At the time of the incident, he was carrying out coordination work and therefore did not become aware of the incident until the crew of the aircraft with the call sign RYR5822 notified him when they were already on final that they had aborted the landing.

As he approached he saw that the instructor was giving directions to the two aircraft, but it was strange that they were not reacting and at the same time both were still asking for instructions.

What happened at the time was that they had the impression that the crews of both aircraft did not understand each other well and did not think that the problem was technical, i.e. that their communications were not being transmitted correctly.

He then moved to local position 2 and began coordinating on the dedicated line with the approach service, but acknowledged that it had not occurred to him to try communicating on the frequency in use from that position either.

They heard aircraft VLG15NL transmitting on the emergency frequency and that is when they realised something was happening.

He also confirmed that the problem was solved when the instructor repeatedly disconnected and reconnected his phone.

Finally he reported that the procedure to be performed in instruction at the beginning of the take over position, is to press a couple of times on the transmit button to check if you are going on air on the frequency.

The executive controller of the GCS sector of the ACC of the Canary Islands confirmed that the aircraft with the call sign RYR5822, which was on approach, contacted on the frequency of the final sector 121.3 MHz, while the aircraft with the call sign RYR2296, which was taking off with a planned departure from KORAL, communicated on the frequency 124.3 MHz (belonging to the GCS sector).

For his part, the planning controller of the GCS sector of the ACC Canary Islands indicated that no early conflict alert (ECA) was activated.

The information provided by the pilots of the two aircraft that lost separation coincided perfectly with the facts found and what could be heard in the communications, but none of them mentioned the fact that they had not tried to contact on the emergency frequency, as the crew of the aircraft with call sign VLG15NL did.

2. ANALYSIS

In this event, we will look at three different issues that led to the loss of separation between two aircraft.

On one hand, how the adjustment was made between both aircraft, analysing how the control sequence was planned and executed,

Secondly, we must analyse the transmission failure.

And finally, the efforts of the crews to resolve the conflict.

In each case, we will look at the latent conditions that could have favoured the event.

We will then look at what the working situation was, i.e. the conditions that could lead to errors or non-compliance, and see what preventive barriers were in place.

Finally, we will analyse whether the operator may have committed any error or non-compliance and whether the recovery barriers prior to the actual event were correctly activated, if any.

2.1. Analysis of ATC management

As far as the action prior to the event was concerned, latent conditions were identified as the fact that they had just started training on that day and, on the other hand, that the instructor had been training a student who was at a more advanced stage of training over the last few weeks and did not take into account that the trainee with whom he was going to work was at a different stage, so this issue was not discussed at the briefing meeting prior to starting work.

The working conditions were those typical of a landing and take-off of two aircraft of the same model in which it must be taken into account that the trajectories will coincide with the same course for a period of time and that the aircraft taking off has to spend more time in positioning itself at a certain altitude and speed than the one on approach, the workload being at normal values.

The trainee had to make several communications with the crew of RYR2296 until they understood that they had to maintain their climb to 3,000 ft.

On the other hand, the trainee authorised RYR2296 to take off without expressly instructing it to do so immediately in the first transmission when the separation between the two aircraft was already compromised, nor did he update the position of RYR5822 on final, when at that moment it was 2.6 NM from the runway contact point.

He did give this information in a second communication, but this could not be heard by the crew because there was a simultaneous transmission from the crew of another aircraft with the call sign VLG15NL.

The authorisations given by control were conflicting and this was what caused the loss of separation between the two aircraft, as one aircraft was authorised to take off when there was another on final, which it finally decided to abort, with both aircraft flying over the runway at the same time.

In addition, the altitudes at which the aircraft were previously instructed caused a closer approach, as the aircraft that was going to land was authorised to maintain a runway heading of 2,000 ft while the aircraft that was taking off had been authorised to climb to 3,000 ft, thus producing a crossover of altitudes.

The barriers that exist in these cases that could have served as mitigation are already set out in the unit's Operations Manual.

On one hand, paragraph 5.2.2.1 states that any aircraft must be asked if it is ready for immediate departure when it is reaching or stopped at the holding point, not when it is authorised to enter and align on the runway in use, but at a distance far away from it.

On the other hand, paragraph 5.2.2.3 already establishes that an approaching aircraft (in this case the one with the call sign RYRY5822) must be informed that another aircraft was about to take off (the one with the call sign RYR2296).

2.2. Communication failure study

In regard to the second of the issues noted above, i.e. the failure of transmission, the latent conditions were noted by the the instructor himself, who said that at the start of the work there was an issue because the phone was locked and he managed to unlock it when he pressed the foot button, after several attempts.

He also commented that he was sure that it was his phone that was not plugged in properly and insisted that sometimes the phone would get stuck and that in such cases they would call the maintenance service, who would usually solve the problem by restarting the computer system. It follows from the above that there is probably either a design or manufacturing problem, or perhaps both, as it does not seem logical that there should be periodic failures in communications, when that is the essential task of the control tower workstations.

The fact that the plugs have to be plugged in every time the control station is accessed can lead to connection errors such as the one that occurred in this case. In addition, the connection point is underneath the workbench, which makes it difficult to visually check whether the plugs are connected correctly.

On the other hand, the use of the classic telephone forces you to keep your hands busy to use it, it is not very ergonomic from the point of view of operation.

As it can also be operated using headphones and a footswitch to broadcast, and there is even the possibility of using both systems at the same time, depending on the controller's preference, this makes it more difficult to detect a failure, as in this case, and to think quickly about a single solution.

The instructor himself acknowledged that he may have been influenced by the fact that there was a communications failure at the beginning and trying to fix it may have taken him out of his routine and that may have been the reason why he omitted the headset test as he always does.

In its internal investigation, ENAIRE recommended that Tower Management analyse the advantages and disadvantages of using the telephone as a transmission channel, especially during training and when there is heavy traffic, given that the telephone has an omnidirectional microphone that picks up background noise, which can make the reception of communications more complicated, precisely at times when there is already more noise in the cockpit, which is during take-off and landing.

It also recommended that the condition of these phones be checked, as it had been noticed that some had more background noise than others.

However, beyond these two measures, it seems reasonable to think that ENAIRE should study whether the design of the communication elements used in airport towers and the way they are operated could favour the commission of errors.

In regard to what the working situation was, i.e. the conditions that could lead to errors or non-compliance

The instructor thought that the transmission failure had lasted about 1:30 minutes, when in fact it was more than twice as long.

He was aware that a loss of separation could occur and therefore took the communications late, but he was not aware of the transmission error at any time. That is why he did not try to transmit from the position of the instructor and missed the indication on the CVS screen.

The supervisor also failed to detect the problem as he was busy with other tasks.

On the other hand, the trainee trusted the instructor and at no time thought that the transmissions were failing.

One of the preventive barriers is that the instructor should have checked the connections when the session started. This action is not included in any ENAIRE document.

For this reason, a recommendation will be issued to study the possibility of including in the controller's relief checklist, in all control units, a section which includes the obligation to check whether the communications equipment is working properly.

As a mitigation barrier after the event has occurred, in the article of the SERA Regulation, on the "Use of relay communication technique", provides guidelines to be followed in cases where communications cannot be established with an aircraft. This issue is also addressed in Annex A of the unit's Operational Manual, but none of the above measures were implemented because neither the instructor, nor the trainee, nor the supervisor were aware that communications were failing.

To mitigate the transmission failure in case they had noticed it, there were several possibilities:

1. Plug and unplug each telephone,
2. Look at the console to see if both positions are transmitting, a green light signal lights up, which means that the transmission is successful.
3. Press the floor pedal.
4. Press the button on the console.
5. Select the frequency 118.3 MHz on the multi-channel selector.
6. Have called on the emergency frequency 121.5 MHz to each of the aircraft
7. Radio check each aircraft on 118.3 MHz and 121.5 MHz from both the instructor's phone, the trainee's phone and the ITPC3 where the supervisor was placed.

On the part of the crews, none of them were initially aware that there might be a communications failure even though the tower did not respond to them and so they did not call on the emergency frequency before the loss of separation occurred.

The crews of the aircraft involved did not apply this mitigation barrier, as they did not contact on the emergency frequency. However, what they did do was to contact the respective frequencies of their assigned approach sector and in this way they managed to regain separation.

Finally, the crew of a third aircraft, not involved in the incident, the one with the call sign VLG15NL, was the one that did apply the procedure and called the tower on the emergency frequency, which alerted the controllers that there was a failure in the transmission of their communications.

2.3. Conflict resolution

The crews of the two aircraft involved adequately managed a solution to the conflict, which, being carried out without communication with the tower, occurred without the involvement of control.

The aircraft that aborted, which had the call sign RYR5822, changed course to avoid a closer approach and reported on the tower frequency the action it was taking, subsequently contacting the GCS Approach Sector, which instructed it to make a new approach.

And the aircraft with call sign RYR2296 that was taking off, also reported its intentions on the tower frequency. It then contacted Approach Sector F03 for instructions regarding the climb and continuation of the flight.

For its part, the Approach sector reacted quickly, both by giving instructions to the aircraft and also by contacting the tower supervisor by telephone to report what had happened and to coordinate the transfer of the two aircraft.

3. CONCLUSIONS

3.1. Findings

- At 09:04:54, the crew of RYR5822 was instructed by the Approach Sector (GCS) to make the final approach to runway 03R at Gran Canaria Airport (GCLP).
- At 09:13:20, the crew of this aircraft was authorised by the tower to continue their approach onto runway 03R.
- At 09:13:48, the crew of RYR2296 contacted the tower and communicated that they were proceeding via E to holding point R1 and were instructed to wait at holding point R1.
- At 09:15:42, the crew of RYR5822 was instructed to maintain runway heading and 2,000 ft altitude, in case of a missed approach.
- At 09:16:00, the crew of RYR2296 was cleared for take-off and instructed to take-off immediately in the following communication.
- At 09:16:25, a third aircraft with call sign VLG15NL, which was following the aircraft with call sign RYR5822, contacted the tower, but received no response.
- At 09:16:42, the crew of RYR5822 reported that they were aborting the approach and then called the Tower up to four (4) times over 40 s without response.
- In the midst of these communications, the crew of aircraft VLG15NL also attempted to make contact without response.
- At 09:17:02, RYR2296 had passed exit S5, while RYR5822, was aborting at the beginning of the tarmac area of the runway.
- At 09:17:09, the minimum separation between the two aircraft was 0.8 NM horizontal distance and 300 ft vertical distance.
- At 09:17:18, a separation of 0.9 NM occurred while both aircraft were at the same altitude.
- At 09:17:18, when the two aircraft were already in the air, they were at the time closest to each other, with a horizontal separation of 0.9 NM while at the same altitude, with no communications with the tower.
- At 09:17:20 h aircraft RYR2296 was located at the end of the paved area at the end of runway 03R at 600 ft, while aircraft RYR5822 was at the height of exit S5, climbing and performing the missed approach..
- Finally, at 09:17:44, the crew of RYR5822 communicated that they were going to fly a heading 040° and climb to 2,000 ft without being answered.
- Between 09:17:59 and 09:18:31, RYR5822, RYR2296 and VLG15NL continued to attempt to communicate with the tower without response.
- At 09:18:44, from sector GCS, the crew of RYR5822 was instructed to proceed on a course 140°. RYR5822 had transferred to that frequency on its own.
- At 09:18:49, the crew of VLG15NL reported that they were at the end of runway 03L diverging to 03R on frequency 121.5 MHz on call and in Spanish, but they did not receive a reply. This message was repeated 31 seconds later on the same frequency.
- At 09:18:28, the Tower contacted the crew of VLG15NL.

- At 09:19:50, approach sector F03 instructed the crew of RYR2296 to climb unrestricted to FL 120, and the crew of RYR5822 to re-enter the approach sequence at position No. 6.
- Both aircraft completed their respective flights normally.

3.2. Causes / Contributing factors

The investigation has determined that the loss of separation occurred as a result of authorising a take-off when there was another aircraft on final with insufficient space between the two aircraft.

The crews of the two aircraft involved not receiving to the instructions given to them from the control tower due to the connection pins of the communications device being incorrectly connected for a certain period of time has been considered as a contributing factor, which made it impossible for the messages issued from the tower to be transmitted outside.

4. RECOMMENDATIONS

REC: 03 / 25. It is recommended that ENAIRE study the possibility of including a section in the checklist for controller relief, in all control units, which includes the obligation to check whether the communications equipment is working correctly.