

# Technical report

## IN-034/2021

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Incident on 04 July 2021 involving a Vulcanair P.68TC Observer aircraft operated by SAETA, registration EC-KQV, at Seville Airport (Seville, Spain)

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## **Notice**

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

In accordance with the provisions in Article 5.4.1 of Annex 13 of the International Civil Aviation Convention; and with articles 5.6 of Regulation (UE) nº 996/2010, of the European Parliament and the Council, of 20 October 2010; Article 15 of Law 21/2003 on Air Safety and articles 1 and 21.2 of Regulation 389/1998, this investigation is exclusively of a technical nature, and its objective is the prevention of future civil aviation accidents and incidents by issuing, if necessary, safety recommendations to prevent from their reoccurrence. The investigation is not pointed to establish blame or liability whatsoever, and it's not prejudging the possible decision taken by the judicial authorities. Therefore, and according to above norms and regulations, the investigation was carried out using procedures not necessarily subject to the guarantees and rights usually used for the evidences in a judicial process.

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

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

# CONTENTS

Notice .....	ii
CONTENTS.....	iii
ABBREVIATIONS.....	iv
Synopsis.....	v
1. THE FACTS OF THE INCIDENT .....	7
1.1. Summary of the incident .....	7
1.2. Injuries to persons .....	7
1.3. Damage to the aircraft .....	7
1.4. Other damage.....	7
1.5. Information about the personnel .....	8
1.6. Information about the aircraft .....	8
1.7. Meteorological information.....	15
1.8. Aids to navigation .....	15
1.9. Communications.....	15
1.10. Information about the aerodrome .....	16
1.11. Flight recorders .....	19
1.12. Aircraft wreckage and impact information.....	19
1.13. Medical and pathological information .....	19
1.14. Fire.....	19
1.15. Survival aspects .....	20
1.16. Tests and research .....	20
1.17. Organisational and management information .....	20
1.18. Additional information.....	21
1.19. Special investigation techniques .....	22
2. ANALYSIS .....	23
2.1. Analysis of the tyre pressure on the day of the incident .....	23
2.2. Analysis of the origin of the main landing gear wheel fire.....	23
2.3. Analysis of the pilot's actions during the emergency .....	24
3. CONCLUSIONS.....	24
3.1. Findings.....	24
3.2. Causes/contributing factors .....	24
4. OPERATIONAL SAFETY RECOMMENDATIONS .....	25

## ABBREVIATIONS

° ‘ “	Sexagesimal degrees, minutes and seconds
°C	Degrees Celsius
AESA	Spain's National Aviation Safety Agency
AFM	Aircraft flight manual
CCAA	Autonomous Community
CECOA	Airport Coordination and Operations Centre
CEOPS	Airport Operations Command Centre
CPL(A)	Commercial pilot license (aircraft)
CRI	Class rating instructor
EASA	European Aviation Safety Agency
ELT	Emergency location transmitter
ENAC	Italian Civil Aviation Authority
FI	Flight instructor rating
h	Hours
hPa	Hectopascals
ICDS	Integrated cockpit display system
INFOCA	Forest fire combat plan of the Autonomous Community of Andalusia
IR	Instrument rating
kg	Kilogrammes
km	Kilometres
FF	Fire fighting
LEUT	ICAO code for AMR (Martínez Ridao Aerodrome)
LEZL	ICAO code for Seville Airport
m	Metres
MEP	Multi-engine piston rating
METAR	Aviation routine weather report (in aeronautical meteorological code)
MP	Multi-pilot
ICAO	International Civil Aviation Organisation
p/n	Part number
PIC	Pilot-in-command
PPL	Private pilot license
SAR	Search and rescue
SEI	Rescue and Firefighting Service
SEP	Single-engine piston rating
SPP	Airfield maintenance service
UTC	Coordinated universal time
VFR	Visual flight rules
XPDR	Transponder

# Technical report

## IN-034/2021

<b>Owner</b>	Airalt
<b>Operator:</b>	SAETA
<b>Aircraft:</b>	Vulcanair P.68TC Observer, registration EC-KQV (Spain)
<b>Date and time of incident:</b>	04 July 2021, 16:30 h <sup>1</sup>
<b>Site of incident:</b>	Seville Airport (Seville)
<b>Persons on board:</b>	1 (crew member) and 3 (passengers)
<b>Type of flight:</b>	Aerial works – Commercial – Fire fighting
<b>Phase of flight:</b>	Taxi – Taxi to runway
<b>Type of operation:</b>	VFR
<b>Date of approval:</b>	<b>25 May 2022</b>

## Synopsis

### Summary:

On Sunday, 04 July 2021, at 16:00 h, the Vulcanair P68TC Observer aircraft, registration EC-KQV, was mobilised to carry out fire-fighting coordination work in the town of Aljaraque (Huelva).

In the aircraft, along with the pilot, were two INFOCA<sup>2</sup> technicians and a camera operator.

The aircraft taxied to holding point HP4 to await clearance to enter runway 27 at Seville airport (LEZL). Approximately 50 seconds after arriving at the holding point, the pilot heard a loud explosion and surmised that one of the main landing gear tyres had burst. The pilot contacted the control tower controller to request help to move the aircraft and then waited on board with the engines running, along with the passengers.

After a minute and a half, the pilot and his companions noticed a burning smell and realised that the right main gear tyre was on fire. The pilot informed the control tower controller of the situation, secured the aircraft according to procedure, and gave the order to evacuate. He then attempted to control the fire until the fire brigade arrived with short, repeated discharges from the fire extinguisher.

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<sup>1</sup> All times referenced in this report are local time. UTC is 2 hours behind.

<sup>2</sup> Forest fire combat plan of the Autonomous Community of Andalusia

Once the fire was extinguished, it was agreed the aircraft could not be moved with a telescopic crane due to the risk of the slings damaging the expensive camera equipment in the underside of the fuselage. However, as the aircraft operator had a mechanic at Seville Airport, the tyre was replaced at the incident site, and the aircraft was made airworthy that same day.

The people on board the aircraft were unharmed.

The damage to the aircraft was limited to the right main gear tyre.

The investigation has not been able to determine what caused the right main gear tyre to burst and subsequently catch fire. However, the possibility that inadequate tyre pressure and/or excessive braking could have contributed to the incident has not been ruled out.

A recommendation has been issued to the aircraft operator.

## 1. THE FACTS OF THE INCIDENT

### 1.1. Summary of the incident

On Sunday, 04 July 2021, the Vulcanair P.68TC Observer aircraft, registration EC-KQV, was preparing to take off from Seville Airport to carry out fire-fighting coordination work in the town of Aljaraque (Huelva).

After taxiing to the holding point prior to entering the runway, the tyre on the aircraft's right main landing gear wheel burst and subsequently caught fire.

The people on board the aircraft were unharmed.

The damage was limited to the right main gear tyre, which was replaced by the aircraft's mechanic that same day.

Subsequently, on 05 July 2021, the aircraft was transferred from Seville to the AMR aerodrome owned by the aircraft operator in Utrera. As the pilot reported that the left-hand brake was outperforming the right, the operator's maintenance organisation changed the right and left brake linings on the main landing gear.

On the same day, the aircraft operator issued a Safety Bulletin to its crews, No. 05/2021: "*Use of brakes in the Vulcanair fleet*".

By the time the CIAIAC opened an official investigation into the incident on 22 July, the replaced tyre and brake linings were no longer available to be studied as part of the investigation into the incident.

### 1.2. Injuries to persons

<i>Injuries</i>	<i>Crew</i>	<i>Passengers</i>	<i>Total in the aircraft</i>	<i>Others</i>
Fatal				
Serious				
Minor				
Unharmed	1	3	4	
TOTAL	1	3	4	

### 1.3. Damage to the aircraft

Damage to the aircraft was limited to the right main gear tyre.

### 1.4. Other damage

There was no other damage.

## **1.5. Information about the personnel**

### **1.5.1. Information about the pilot**

The 46-year-old pilot held a commercial airline pilot licence (CPL(A)), first issued on 11 December 2001, with the following ratings:

- MEP (land), valid until 30 September 2021
- SEP (land), valid until 28 February 2022
- SA226/227/MP, valid until 30 November 2021
- IR(A), valid until 30 November 2021

In addition, the pilot had the following instructor ratings:

- Class Instructor Rating -CRI(A)- for MEP (land), valid until 30 April 2022
- Flight Instructor Rating -FI(A)- for PPL, CPL, SEP, MEP, IR, FI, valid until 28 February 2022

He had a Class 1 medical certificate (single-pilot commercial operations transporting passengers) valid until 02 December 2021.

He held the Certificate of Aptitude, issued on May 31, 2021, to perform observation and patrolling and coordination activities with Vulcanair P.68 Series aircraft.

His total flight experience was 1,850 h, of which 1,400 h were as PIC, and 39:05 h were in type.

During the investigation, the pilot indicated that, although this was his first fire-fighting campaign with this operator, he had previously worked with other operators on fire-fighting campaigns and flown other Vulcanair aircraft.

## **1.6. Information about the aircraft**

- Make: Vulcanair
- Model: P.68TC Observer
- Year of manufacture: 2008
- Serial number: 481
- Registration: EC-KQV
- Maximum take-off weight: 1,990 Kg
- Number of engines: 2
- Type of engines: Lycoming, model TIO-360-C1A6D
- Information about the owner and operator: The aircraft was registered with the Spanish Aircraft Registry on 22 September 2008 in the name of Airalt.



The aircraft has an Airworthiness Certificate issued by AESA on 11 November 2019 and an Airworthiness Review Certificate valid until 14 July 2022<sup>3</sup>.

A photograph of the aircraft is included:



Illustration 1: Aircraft involved in the occurrence

### 1.6.1. Aircraft flight hours.

The last flight before the incident took place on 24 June. It was a local coordination flight from Seville Airport. At that time, the aircraft had accumulated 996:25 h of flight time. The pilot who made this last flight was not the pilot involved in this incident.

After the incident, the aircraft continued to fly. The table shows the next five flights made by the aircraft:

Flight type	Date	Departure airport	Arrival airport
Transfer	05/07/2021	LEZL	LEVT
Transfer	06/07/2021	LEVT	LEZL
Coordination	09/07/2021	LEZL	LEZL
Coordination	09/07/2021	LEZL	LEZL
Coordination	09/07/2021	LEZL	LEZL

### 1.6.2. Description of the aircraft's wheels and brake system

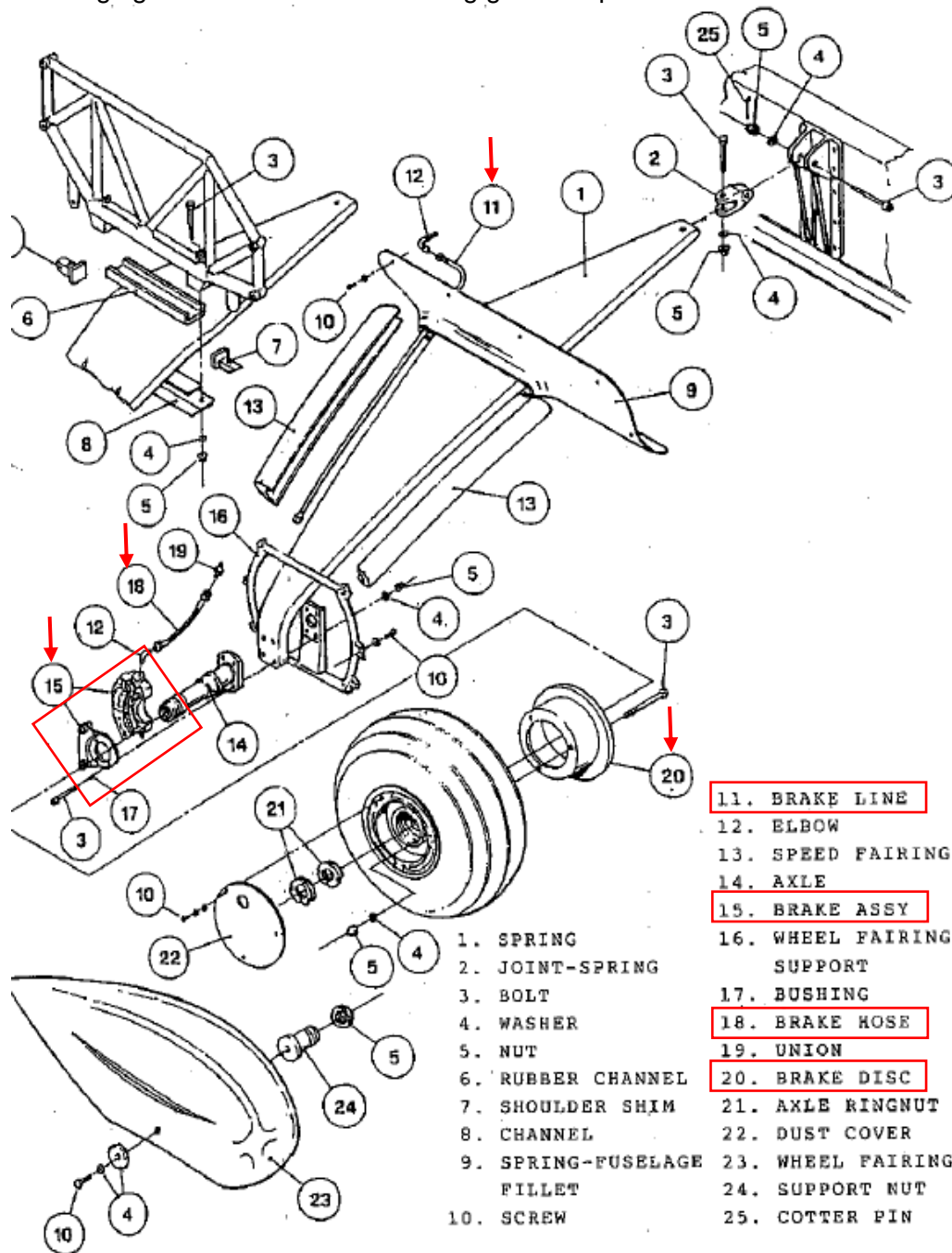
The information contained in this section has been extracted from the Vulcanair P.68TC Observer aircraft Maintenance Manual.

<sup>3</sup> The Airworthiness Review Certificate was issued on 07 July 2021, after the date of the incident. Martínez Ridaó, as CAMO of the aircraft, certified the airworthiness review. Martínez Ridaó, which is the ES. CAMO.034, appears in the list of Continuous Airworthiness Maintenance Organizations, of AESA updated in April 2022.

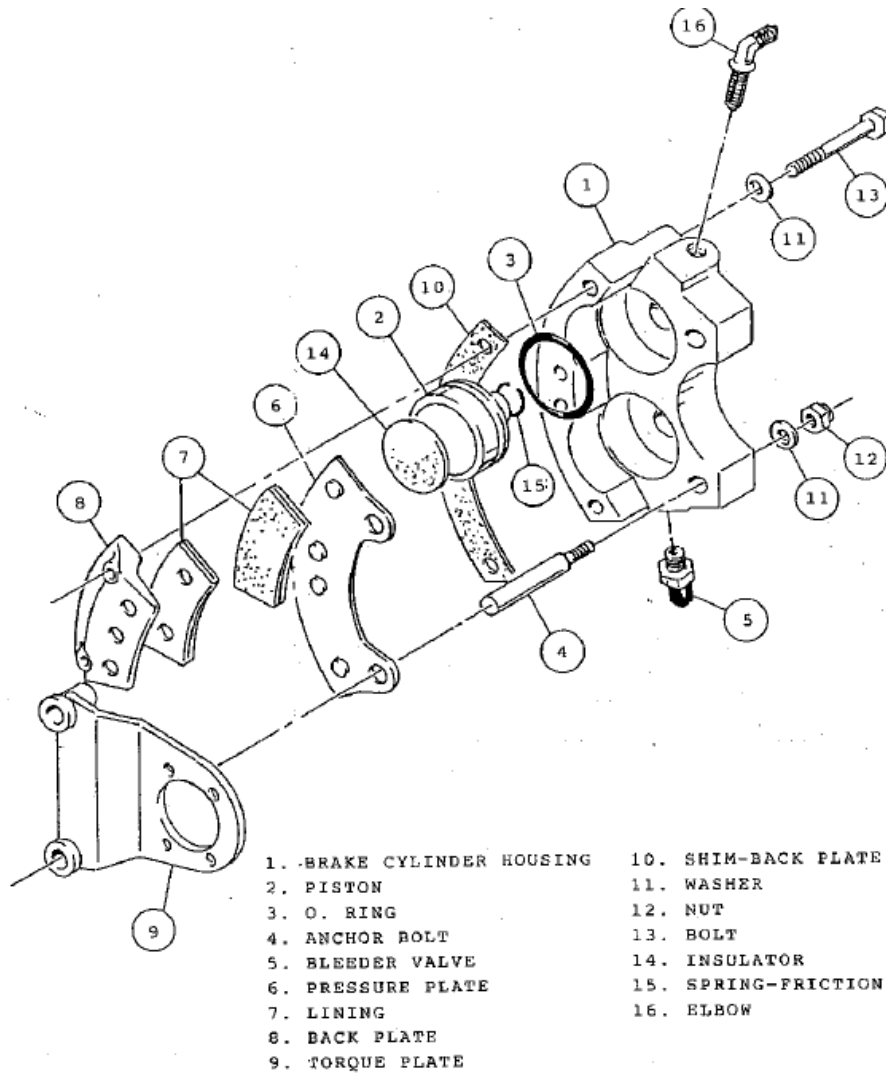
The aircraft's main landing gear wheels are fitted with 7.00 - 6/8 ply tyres and disc brakes that are hydraulically actuated by cylinders connected to the brake pedals.

A hydraulic reservoir supplies fluid to the brake system. The reservoir's fluid level must be checked and topped up when necessary, at least every 200 hours.

The following figure shows the main landing gear components.



The following figure shows the brake system components (number 15 in the previous figure):



The aircraft does not have brake temperature indicators. Nor are there any charts on brake limitations or cool-down times in the Flight Manual.

### 1.6.3. Scheduled landing gear checks specified by aircraft manufacturer

The scheduled landing gear checks detailed in the Maintenance Manual are shown in the following table:

Landing gear	100 H	200 H	SPL
1.- Torque links – Check for wear and condition.....		X	
2.- Shock strut and servicing – Check for proper servicing.....		X	
3.- Shimmy dampener – Check for condition.....	X		
4.- Nose wheel steering system – Check travel....		X	
5.- Wheel bearings – Check and repack.....			F <sup>4</sup>
6.- Clamping spring, leg ties, rubber spacer, bolts – Check for locking and wear.....		X	

<sup>4</sup> The special F overhaul is carried out when required.

7.- Central fuselage/leg attachment bolts – Check for deformation or corrosion.....			B <sup>5</sup>
8.- Brake linings – Check for wear.....	X		
9.- Brake disc – Check for warpage.....		X	
10.- Brake system plumbing – Check for leaks, hoses for bulges and deterioration.....		X	
11.- Wheel alignment – Check.....			B
12.- Lubricate as per lubrication charts .....	X		
13.- Nose wheel steering disconnect and self-centring – Check			

**1.6.4. Tyre pressure checks specified by aircraft manufacturer**

With regard to tyre maintenance, the Maintenance Manual of the aircraft manufacturer indicates that tyres must have the specified pressure, be free from any cuts due to wear or deformation and that any grease and oil must be removed. Specifically, it says:

During the pre-flight inspection before every flight, check:

- that the tyres are correctly inflated<sup>6</sup> and free from cuts or excessive wear.
- that the brakes function correctly and
- there are no visible leaks in the hydraulic lines.

In addition, during the 50 H overhaul, the following must be checked:

- The condition of the landing gear assembly and
- The condition, wear and pressure of the tyres on the landing gear wheels.

Also, reference is made to Cleveland’s *Component Maintenance Manual* p/n AWBCMM0001 which contains additional maintenance information. The Cleveland manual specifies that tyres should be visually inspected for cuts, flattening or sidewall damage and that tyre pressure should be checked daily when the tyres are cold.

**1.6.5. Maintenance tasks performed on the aircraft prior to the incident by aircraft operator**

On 01 February 2021, when the aircraft had 975:55 h of flight time, the SAETA maintenance organisation issued the certificate of release to service after performing the following tasks:

1. Overhaul A 50 h/6 months, B 100 h/12 months and C 200 h
2. Overhaul E1 400 h
3. Overhaul E4 1500 h/60 months
4. Overhaul E8 200 h/12 months (SL23)
5. Overhaul E9 500 h (magnetos)

<sup>5</sup> The special B overhaul is carried out every 12 months.

<sup>6</sup> During the investigation, we consulted with the manufacturer on the correct way to check the tyre pressure, and they confirmed that it should be checked using a pressure gauge.

6. Implementation of ENAC directive 2002-415 B/S113 to inspect the fuel selector control system.
7. Implementation of ENAC directive 92-155<sup>7</sup>,
8. Implementation of ENAC directive 91-453<sup>8</sup>
9. Implementation of EASA directive 2020-0262, the purpose of which is to inspect/replace the stabiliser compensator control cable.
10. Implementation of ENAC-PA-96-337, the purpose of which is to detect frayed flight control cables.
11. Implementation of FAA directive 2015-19-07 regarding the fuel injectors in Lycoming engines.
12. STBY (E5) altimeter calibration.
13. 100 h/annual inspection of the ELT and battery change.
14. 100 h/200 h/annual inspection of air conditioning.
15. 100 h/200 h/annual inspection - B43 of the horizontal stabiliser.
16. 200 h/annual inspection of the window defogging system.
17. 100 h/200 h/annual inspection of the autopilot.
18. 100 h/200 h/annual inspection of the display system (ICDS).
19. XPDR calibration. Garmin GTX330 installed.
20. OT01-10, this AESA technical order mandates an inspection of the safety seat belts.
21. Annual inspection of the fire extinguisher.
22. Annual inspection of the first aid kit.
23. Inspection of signs as per AFM
24. Rectification of defects/anomalies

During this inspection, no anomalies were detected in the aircraft's landing gear, nor were any parts of the landing gear replaced.

Subsequently, on 11 June 2021, the SAETA maintenance organisation issued the certificate of release to service after performing the following tasks:

1. Overhaul A 50 h/6 months
2. Implementation of EASA directive 2020-0262
3. Replacement of the right engine starter.

As part of the 50 h/6 months overhaul, the following tasks were performed on the aircraft's landing gear:

- Inspection of the general condition of the landing gear (main and nose).
- Inspection of the wear, general condition and pressure of the main and nose landing gear wheels.

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<sup>7</sup> This directive, which must be implemented at intervals not exceeding 200 flight hours, mandates an inspection of the condition of the stabiliser torque tube.

<sup>8</sup> This directive, to be implemented every 2 years or 500 flight hours, whichever comes first, stipulates that the attachment points between the engine and the wing structure must be checked for cracks and corrosion.

- Lubrication of different components of the main landing gear using MIL-G-81322D lubricant. As stated in the work order, all areas to be lubricated must be thoroughly cleaned beforehand to remove remains of old grease, oil, dirt, etc.

Diagram of the points to be lubricated on the main landing gear:

No.	LUBRICATION POINTS	FREQUENCY	INSTRUCTION
1	Main gear attachment bracket	500 HRS	Hand Lubrication
2	Main gear wheel bearings	100 HRS	Hand Lubrication
3	Nose gear steering lever	100 HRS	Grease gun Lubrication
4	Shimmy dampener	100 HRS	Hand Lubrication
5	Torque link	100 HRS	Grease gun Lubrication
6	Nose gear wheel bearings	100 HRS	Hand Lubrication
7	Nose gear strut filler point	Asrequired	Filling
8	Brake cylinders	200 HRS	Check and refill if necessary
9	Steering disconnect	100 HRS	Grease gun Lubrication

Illustration 2: Points to lubricate on the main landing gear

### 1.6.6. Tyre pressure check by the aircraft operator

Therefore, the last time the aircraft operator measured tire pressure was on June 11, 2021. That is, 34 days before the event.

During subsequent pre-flight inspections, the operator's pilots visually checked the condition of the tires without measuring their pressure with a pressure gauge.

#### **1.6.7. Maintenance tasks performed on the aircraft after the incident**

According to the flight log, on 04 July, after the incident, a mechanic from the operator's maintenance organisation inspected the aircraft's landing gear, brake assembly and piping. Finding no anomalies, the mechanic simply replaced the damaged tyre.

Subsequently, on 05 July 2021, the aircraft was transferred from Seville to the AMR aerodrome owned by the aircraft operator in Utrera. The pilot reported to maintenance that the braking of the left brake was higher than that of the right brake. The maintenance technician, according to his testimony, observed that the right and left brake linings of the main landing gear were still in good condition and the degree of wear was similar; however, it changed both.

#### **1.7. Meteorological information**

The aerodrome reports (METAR) for Seville Airport (LEZL) on 04 July at 14:00 UTC (16:00 h local time) and 14:30 UTC (16:30 h local time) were as follows:

*METAR LEZL 041400Z 24006KT 150V300 CAVOK 34/07 Q1016 NOSIG=  
METAR LEZL 041430Z 24005KT CAVOK 34/10 Q1016 NOSIG=*

The METAR for Seville on 04 July at 14:00 UTC reported a temperature of 34°C. Half an hour later, at 14:30 UTC, the temperature had not changed.

#### **1.8. Aids to navigation**

N/A.

#### **1.9. Communications**

The relevant communications between the pilot and the control tower controller at Seville Airport are outlined below.

At 16:19:57 h (14:19:57 UTC), the pilot contacted the control tower controller to request clearance to taxi from parking stand 43. The controller first cleared him to taxi to gate 1 and hold short of alpha, and then to continue to holding point HP4 for runway 27 via gate 1.

Subsequently, at 16:30:23 h (14:30:23 UTC), the pilot contacted the control tower controller to report that they were stopped at the HP4 holding point for runway 27 and that they had just blown a tyre on the aircraft's right main gear and would need assistance as they were unable to move.

Moments later, at 16:32:29 h (14:32:29 UTC), the pilot contacted the tower controller again to report that the wheel was on fire and they were evacuating the aircraft.

The fire brigade was mobilised via the alarm button at 16:32:36 h (14:32:36 UTC) and arrived at the holding point where the aircraft was located at 16:33:31 h (14:33:31 UTC).

#### **1.10. Information about the aerodrome**

The aircraft was about to take off from Seville Airport (ICAO code LEZL). Seville Airport is located 10 km northeast of the city of Seville. It has an elevation of 34 m, and its runway 09/27 is 3,364 m long and 45 m wide.

On the aerodrome ground movements map, the HP4 holding point for runway 27, where the aircraft was located when the right main gear wheel caught fire, and parking stand 43, where the aircraft commenced taxiing, are marked with yellow circles:

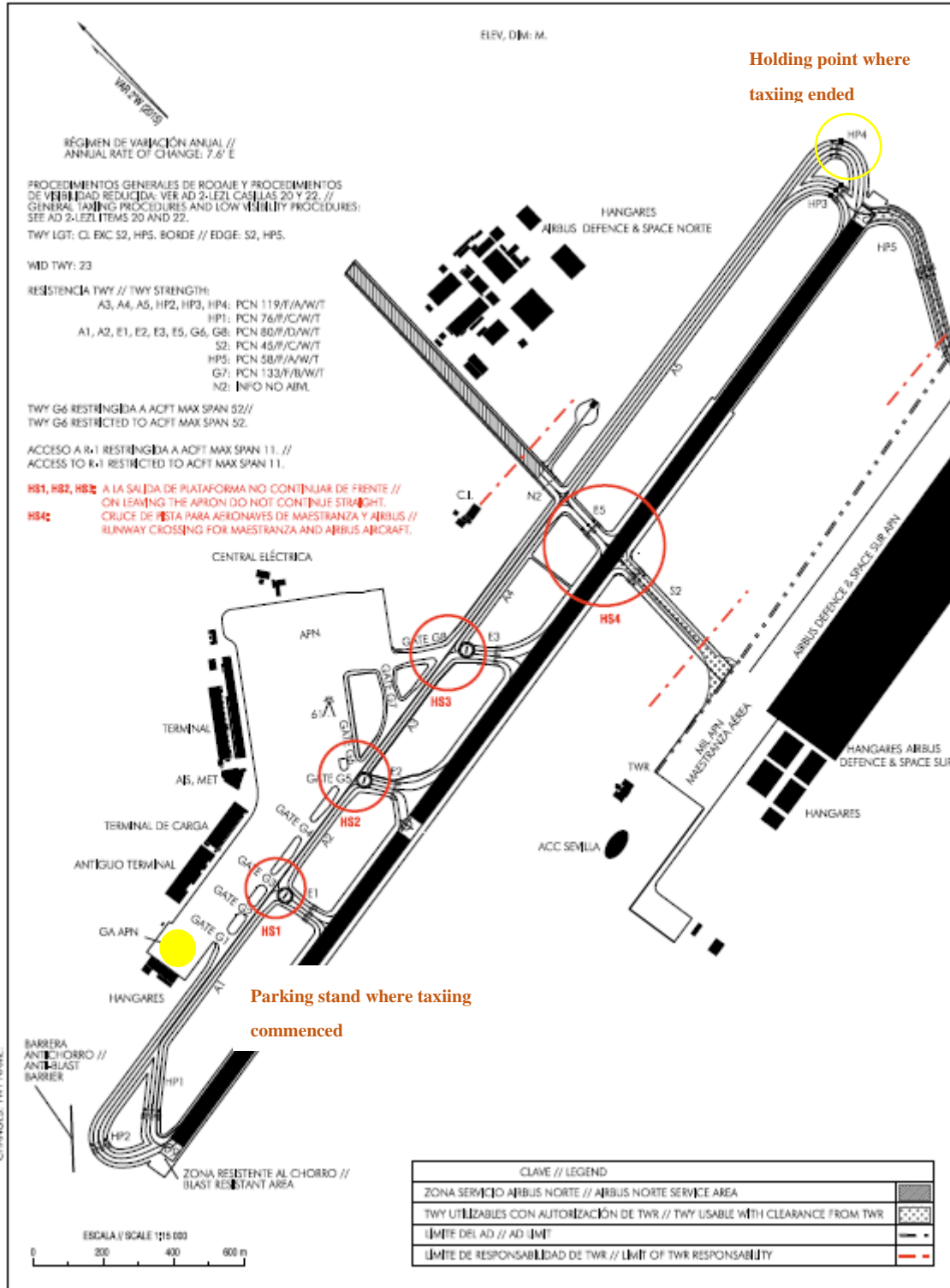


PLANO DE AERÓDROMO PARA MOVIMIENTOS EN TIERRA-OACI

ELEV APN 26

TWR 118.100  
GMC 121.700

SEVILLA



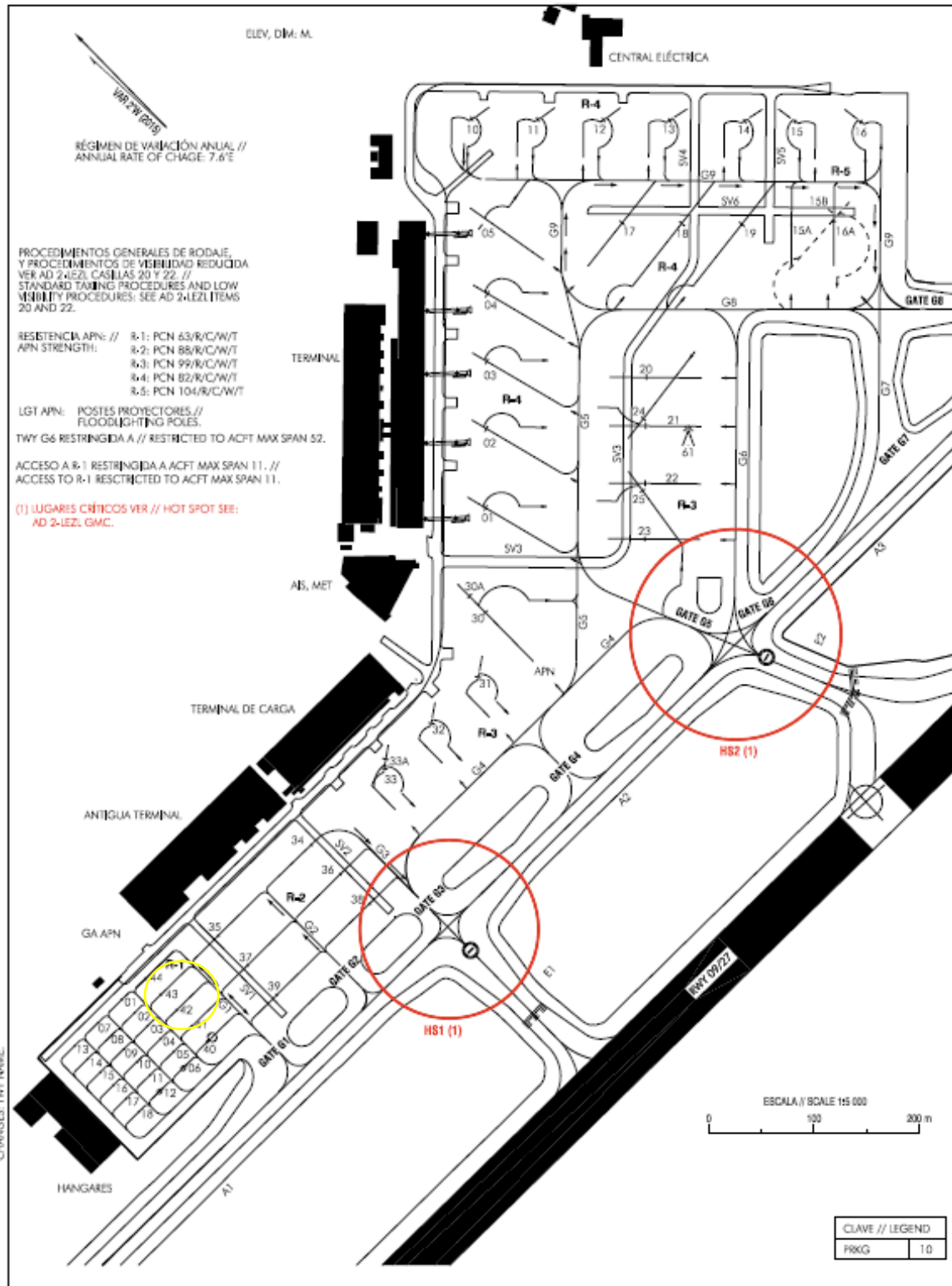
A plan of the parking area showing stand number 43 (from where the aircraft commenced taxiing) has also been provided:

PLANO DE ESTACIONAMIENTO  
Y ATRAQUE DE AERONAVES-OACI

ELEV  
APN  
26

TWR 118.100  
GMC 121.700

SEVILLA



During the investigation, the Seville Airport manager indicated that no contamination had been reported on the taxiways, which, according to the airfield inspection records, were checked for the second time that day at 10:30 UTC.

Moreover, the airport's fire brigade visually inspected the tyre after extinguishing the fire and found no evidence of contamination on the tyre or the surrounding asphalt.

### 1.11. Flight recorders

The aircraft was not equipped with a flight data or cockpit voice recorder because they are not a regulatory requirement for this type of aircraft.

### 1.12. Aircraft wreckage and impact information

During the investigation, photographs of the state of the aircraft's brake system at the time of the incident were requested. However, the only photograph that is available is how the tire and wheel rim were after the event:



*Illustration 3: Tyre on the incident aircraft*

### 1.13. Medical and pathological information

We have found no evidence to suggest the flight crew were affected by any physiological or disabling factors.

### 1.14. Fire

According to the pilot, after realising the right main gear tyre was on fire, he informed the control tower controller of the situation, secured the aircraft according to procedure, and gave the order to evacuate. He then attempted to control the fire until the fire brigade arrived with short, repeated discharges from the fire extinguisher.

### **1.14.1. Chronological description of the actions taken by the SEI according to Seville Airport's CEOPS/CECOA.**

Seville Airport's CEOPS/CECOA provided the following chronological description of the action taken by the SEI (Rescue and Fire Fighting Service):

- At 16:27 h,<sup>9</sup> they were informed that the aircraft with registration EC-KQV, which was waiting to take off for a fire-fighting mission at HP4, had burst a tyre. They deployed the SEI to assess the situation.
- At 16:31 h,<sup>10</sup> the airport control tower activated the alarm when it was informed that the tyre in question was on fire. They initiated the Local Alert phase, notifying the various departments. The SEI proceeded to the area of the incident.
- At 16:35 h, the SEI reported that the fire had been extinguished.

### **1.14.2. Chronological description of the actions taken by the SEI according to its intervention report.**

The following chronological information has been extracted from the SEI (Rescue and Fire Fighting Service) intervention report:

- At 16:28 h<sup>11</sup>, the CECOA informed them, at the same time as the airport control tower, that a wheel had burst on a light aircraft located at HP4.
- Four minutes later, at 16:32 h, the aircraft fire alarm sounded after being activated by the airport control tower. They boarded the vehicles and proceeded to the scene, arriving at 16:34 h.
- At 16:35 h, the fire was under control and extinguished. They continued to work at the scene until 16:46 h to fully secure the aircraft.

### **1.15. Survival aspects**

The harnesses and restraint systems worked adequately, and the cabin interior maintained its structural integrity.

### **1.16. Tests and research**

N/A.

### **1.17. Organisational and management information**

SAETA, trading name of the operator Servicios Aéreos Europeos y Tratamientos Agrícolas, holds a Special Operator Certificate for fire-fighting operations issued by AESA on 30 May 2019. Specifically, it is authorised to carry out observation, patrol and coordination activities

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<sup>9</sup> This time is not consistent with the communications recorded by ENAIRE, which show that the pilot informed the control tower controller that he had just blown a tyre on the aircraft's right main gear at 16:30:23 h.

<sup>10</sup> This time does not coincide with the information provided by ENAIRE, which shows that the fire brigade was mobilised by means of the alarm button at 16:32:36 h.

<sup>11</sup> See comment 9.

with the Vulcanair P.68TC Observer aircraft. In addition, the COE registration list, signed on June 30, 2021, includes the registration involved in this incident.

## **1.18. Additional information**

### **1.18.1. The operator's Operating Manual. Emergency and safety equipment training.**

The operator's Operating Manual (LCI/SAR) part D sets out, in section D.2.1.9, the *Emergency and Safety Equipment Training* for its flight crews.

The purpose of the training is: *to familiarise crews with the location and operation of all onboard emergency and safety equipment, including training and equipment for personnel conducting operations over water.*

The content of the annual course includes, among other aspects, the *handling of fire extinguishers of the class used*. The initial and tri-annual course content includes, but is not limited to, *extinguishing a real fire using equipment similar to that carried on the aircraft (an alternative method to halon extinguishers may be used), training on the effects of smoke in an enclosed area and the use of all relevant equipment in a simulated smoke environment.*

### **1.18.2. Safety Bulletin issued by Servicios Aéreos Europeos y Tratamientos Agrícolas**

On 05 July, following the incident, the operator's operations department issued a Safety Bulletin to crews regarding the use of brakes on the Vulcanair fleet.

In the bulletin, the operator alerted its crews to issues around the misuse of the brakes. It noted that the continual braking, combined with high runway temperatures and long taxi distances prior to take-off, can cause the brake disc to overheat on these aircraft.

According to the operator, brake heating can lead to:

- a) Reduced braking capacity
- b) Accelerated brake linings wear
- c) Loss of brake fluid due to deterioration of the brake assembly o-rings
- d) Tyre blow-outs; and
- e) Brake disc deformation

In the bulletin, the operator made a number of recommendations to its crews to prevent brake misuse.

### **1.18.3. Previous similar incidents involving the Vulcanair P.68 aircraft**

The manufacturer's database contained three previous similar incidents involving the Vulcanair P.68 aircraft. In all three cases, it was found that the brake system configuration differed from the original design of the aircraft:

- Aircraft P.68C-TC s/n 485 (date 22/08/2015). The shim back plate was found missing). The result was the overheating of brake cylinder system due to contact between lining and disk without pressure.
- Aircraft P.68TC s/n 481 (16/12/2017). The rubber hoses fixed to the flexible tube linked to brake assembly by means of plastic ties. The result was that the altered configuration stiffened the flexible tube causing a pressure on the cylinder body such as to trigger a constant contact of the linings on the disc.
- Aircraft P.68C s/n 499 (date 20/10/2018). The shim back plate was found missing). And, the result was the overheating of brake cylinder system due to contact between lining and disk without pressure.

During the investigation, the aircraft maintenance organization was consulted about the configuration of the brake system and assured that on the day of the incident the aircraft had installed the shim back plate.

#### **1.19. Special investigation techniques**

N/A

## 2. ANALYSIS

The investigation analysed the tyre pressure on the day of the incident, the possible causes of the main landing gear wheel fire and the pilot's actions during the incident.

### 2.1. Analysis of the tyre pressure on the day of the incident

The aircraft manufacturer's Maintenance Manual specifies that the tyres must be checked during the pre-flight inspection to ensure that they are "correctly inflated"<sup>12</sup>, without cuts and without excessive wear. In addition, the maintenance manual refers to the *Component Maintenance Manual* p/n AWBCMM0001 from Cleveland, the tire manufacturer. Cleveland, for its part, recommends that tires be inspected visually for cuts, flattening or lateral damage and also that tire pressure should be checked daily, with these colds

As per its Maintenance Programme, the operator's maintenance organisation checked the main and nose gear tyre pressures every 50 hours. Thus, 34 days had passed since the tyre pressures were last measured on 11 June 2021.

During the pre-flight inspection before the incident flight, the pilot visually checked, without using a tyre pressure gauge, that the tyres were "correctly inflated". According to his testimony, he found no anomalies.

The aircraft operator should measure the tire pressure as specified by the aircraft manufacturer. Therefore, a recommendation will be issued in this regard.

### 2.2. Analysis of the origin of the main landing gear wheel fire

The braking system converts the aircraft's kinetic energy into heat. This heat is generated by friction between the rotating and stationary brake components and between the wheel's tyres and the runway or taxiway. A fire may occur if excessive heat is generated or flammable contaminants such as hydraulic fluid or grease are present.

The amount of heat generated can be excessive for several reasons:

- Excessive brake usage while taxiing can lead to extreme brake temperatures. The aircraft's operator identified this as the source of the heat in this incident and, as a preventive measure, issued a circular to all pilots to raise awareness of the need to avoid excessive brake usage while taxiing.
- During the investigation, the manufacturer of the aircraft pointed out as a possible cause of the heating of the brakes the absence of the shim back plate. However, the maintenance organization of the aircraft ruled out that this had been the origin of the overheating of the brakes since the aircraft at the time of the incident had such a shim black plate.

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<sup>12</sup> During the investigation, the manufacturer clarified that this check should be carried out using a tyre pressure gauge.

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- Furthermore, the Flight Safety Foundation's document "Monitoring Aircraft-tire Pressure Helps Prevent Hazardous Failures" notes that tyre pressures below the manufacturer's specifications could lead to tyre overheating.

During the investigation of the event, it has not been possible to determine what could have caused this excessive heat.

### **2.3. Analysis of the pilot's actions during the emergency**

Should they become aware of a landing gear fire, pilots must carry out various actions such as declaring an emergency, shutting down all the aircraft's systems and evacuating everyone on board.

In this case, according to the pilot, when they realised the right main gear tyre was on fire, he alerted the airport control tower controller, who deployed the SEI, and then secured the aircraft and gave the order to evacuate. The investigation has found, therefore, that the pilot acted diligently once the emergency had been declared, preventing injury to persons.

The pilot then attempted to control the fire until the fire brigade arrived with short, repeated discharges from the fire extinguisher. The fire brigade arrived 1 minute after being deployed, according to the information provided by ENAIRE, and 2 minutes, according to the SEI intervention report. Therefore, the pilot spent 1 or 2 minutes trying to control the fire. Although neither the aircraft operator nor the manufacturer's Flight Manual provide a specific procedure to follow in the event of a landing gear fire, the aircraft operator did provide training in this ambit to its crews. The investigation, therefore, has found that the pilot acted in accordance with his training.

Once the Rescue and Fire Fighting Service arrived at the scene, it took them just 1 minute to control and extinguish the fire. The investigation, therefore, has found that the pilot's action was effective in preventing the fire from spreading to other areas of the aircraft.

## **3. CONCLUSIONS**

### **3.1. Findings**

- More than one month had elapsed since the operator last measured the tyre pressure.
- No contamination was detected on the tyre or the taxiways used by the aircraft prior to the incident.
- The tyre that burst and caught fire during the incident was not retained and could not be analysed during the investigation.

### **3.2. Causes/contributing factors**

The investigation has not been able to determine what caused the right main gear tyre to burst and subsequently catch fire. However, the possibility that inadequate tyre pressure and/or excessive braking could have contributed to the incident has not been ruled out.



#### **4. OPERATIONAL SAFETY RECOMMENDATIONS**

The tire that burst and burned during the incident was not preserved and could not be analyzed during the investigation. However, the CIAIAC has ruled out issuing a recommendation in this regard since Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 establishes in its Article 13 the obligation to preserve evidence of an incident or an accident.

On the other hand, the CIAIAC has considered it appropriate to issue the following recommendation to the aircraft operator:

REC 11/22: The aircraft operator is recommended to review and update its procedures according to the aircraft manufacturer's requirements for tire pressure measurement.