CIAIAC

Comisión de
Investigación de
Accidentes e
Incidentes de
Aviación
Civil

2015-2016
Positive Taxonomy Report

GOBIERNO DE ESPAÑA
MINISTERIO DE FOMENTO

CIAIAC

POSITIVE

TAXONOMY REPORT
2015 - 2016

NIPO Línea: 161-18-125-6

NIPO Papel: 161-18-124-0

Depósito legal: M-16717-2018

Maquetación: David García Arcos

Impresión: Centro de Publicaciones

COMISIÓN DE INVESTIGACIÓN DE ACCIDENTES E INCIDENTES DE AVIACIÓN CIVIL

Tel.: +34 91 597 89 63
Fax: +34 91 463 55 35

E-mail: ciaiac@fomento.es
http://www.ciaiac.es

C/ Fruela, 6
28011 Madrid (España)

CONTENTS

1. Introduction

Spain's Civil Aviation Accident and Incident Investigation Commission (CIAIAC) is pleased to present its second Positive Taxonomy report.

The CIAIAC is a specialized collegial body within the Ministry of Development that is fully independent from aeronautic, airport, air traffic and other authorities whose interests could conflict with its own mission.

As we noted in the first edition, the severity of accidents and incidents can be minimized through the proper practices of the agents involved in civil aviation operations, as evidenced by the reports published by the CIAIAC.

As a result, the CIAIAC has analyzed the reports published in 2015 and 2016 in order to identify those positive factors that reduced the severity of the events in each case, with the conviction that this approach will yield improved operational safety and enhance the safety culture.

2. Executive Summary

This study was created in an effort to contribute to improving the operational safety of civil aviation and is grounded in the belief that identifying the positive factors identified in the investigation of accidents and incidents can be useful for this purpose.

Historically, published safety studies have focused on the element that failed (badly designed or improperly executed procedures, systems that malfunction), the goal being to provide the aviation community and the public in general with examples of what things to avoid. This report, however, aims to disseminate the idea that through their actions (during or prior to the event), professionals, organizations and systems can avoid events of greater severity, even on those flights that involve an accident or incident.

The information contained in this report was taken from an analysis of 99 technical reports published by the Commission in 2015 and 2016. In 2015, a total of 53 final reports were published (44 involving events from previous years), while the year 2016 saw the publication of 46 final reports (36 involving events from previous years).

Most of these reports, 78 to be exact, identified actions that helped to minimize the severity of the events. Only 21 reports failed to yield a specific action that helped to reduce the negative consequences of the events. Of these, 16 involved accidents and 5 serious incidents.

Figure 1 shows that more than half of the accident reports, and practically all

of the serious incident reports, identified positive actions, a trend that mirrors that observed in 2013-2014.

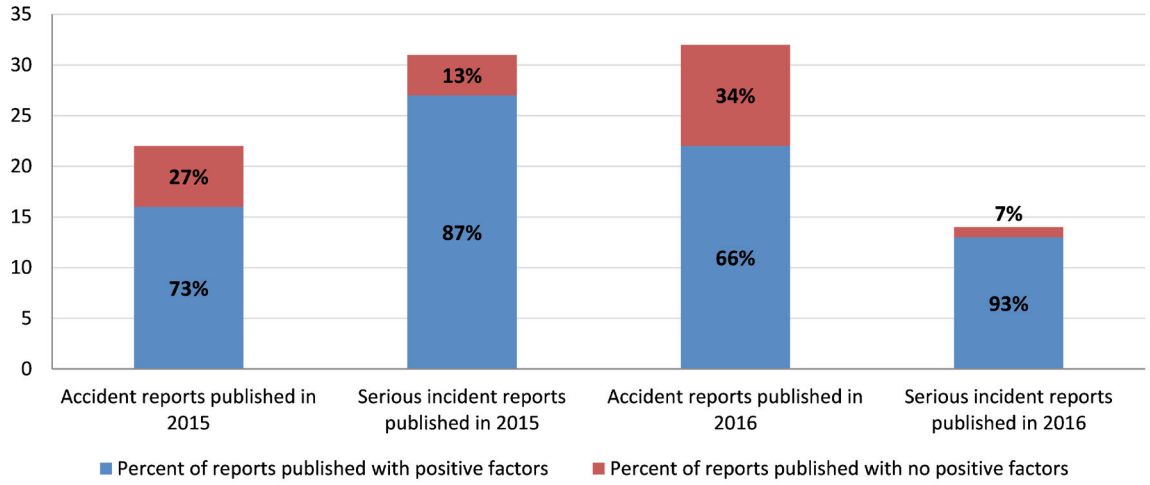


Figure 1. Listing of reports published in 2015-2016 with positive factors

These factors were initially classified using the taxonomy defined by the Common Taxonomy Team , created by the International Civil Aviation Organization (ICAO) and the Commercial Aviation Safety Team (CAST), which includes government officials and leaders from the international aviation industry. This taxonomy contains 20 positive factors.

However, after writing the first edition of this report, positive factors were identified that did not fit into any of these definitions. As a result, five additional positive factors were included for a total of 25 different factors, 22 of which were identified at least once in the reports contained in this study.

The 99 reports published by the CIAIAC in 2015 and 2016 were analyzed one by one, with each positive action described in the reports being related to a positive factor in the expanded taxonomy.

The positive factors that stand out above the rest by the number of times they helped to reduce the consequences of an event are “Use of training instructions/SOPs” (37 times) and “Threat identification” (31 times).

Also appearing a significant number of times were the positive factors “ATC intervention/assistance” (25 times), “Aerodrome intervention/assistance” (21 times), “Design requirements” (21 times) and “Hardware safety net” (20 times).

Also analyzed due to its interest is the distribution of positive factors by the

type of operation. Specifically, of the 78 reports in which positive factors were found, if we analyze the operations being conducted by the aircraft involved, 37 correspond to commercial air transport events, 36 involve general aviation, 7 concern events in which the aircraft in question was doing aerial work and 3 involve state flights. Figure 2 shows the frequency for each positive factor in the reports for the various operations.

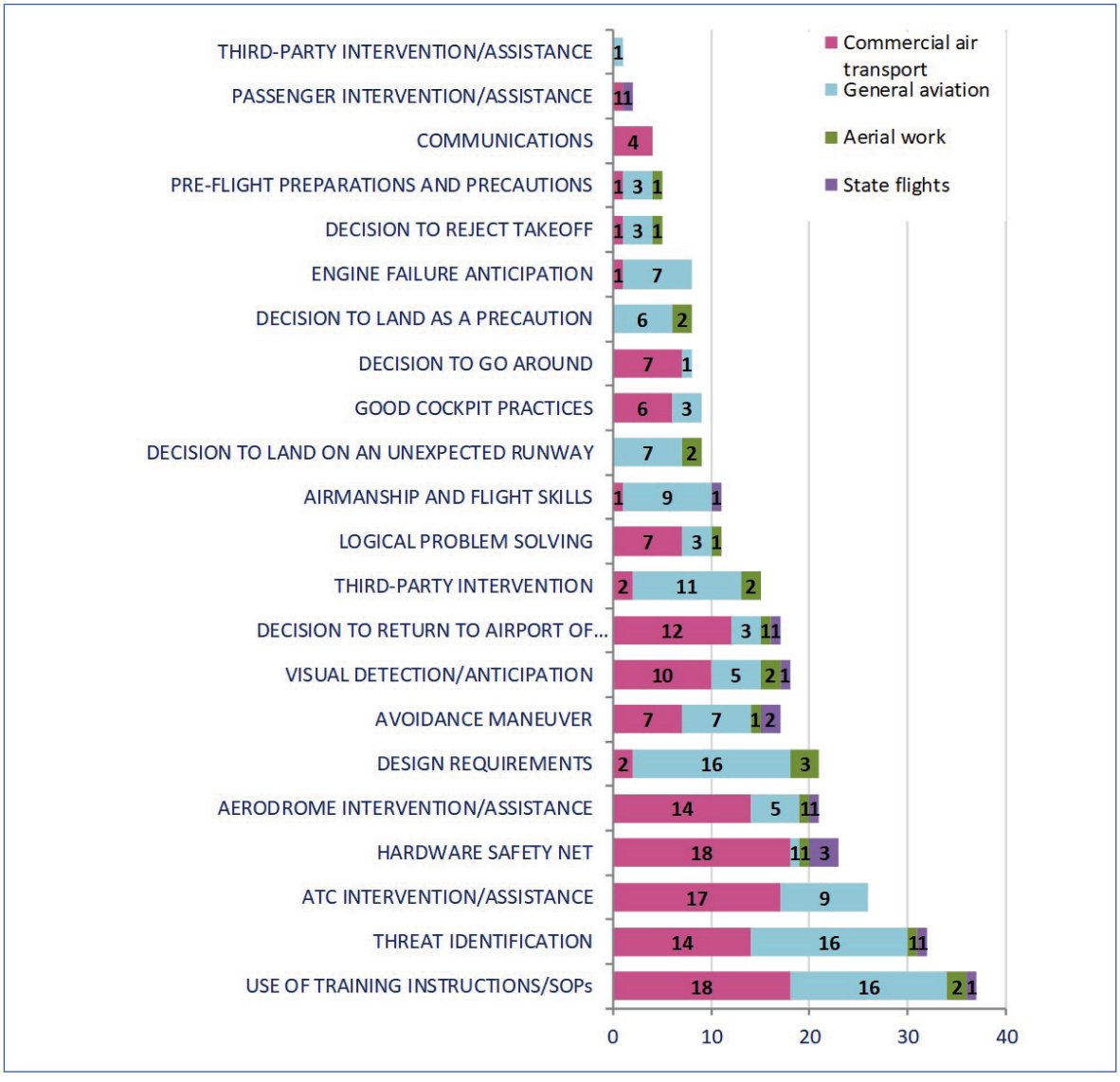


Figure 2. Positive factors classified by the type of flight operation in 2015-2016

Analyzing each of these operations separately shows that:

- In approximately 50% of the reports involving commercial air transport

events, the positive factors "Hardware safety net", "Use of training instructions" and "ATC intervention" stand out.

- As concerns general aviation, around 50% of the reports feature the "Design requirements", "Use of training instructions" and "Threat identification".
- In the case of aerial work, the determining positive factors are "Design requirements", "Decision to land as precaution", "Decision to land on unexpected runway", "Use of training instructions", "Visual detection" and "Third-party intervention".
- Only nine positive factors were identified in events involving state aircraft. The most frequent lessons were "Hardware safety net" and "Avoidance maneuver".

This result shows that not every factor affects all operation types equally, and it is likely that some positive factors will not appear in any of the operations. For example, it is improbable that a commercial air transport aircraft will make a "landing on an unexpected runway".

We should note that the "Use of training instructions/SOPs" is an essential factor when confronting an accident or serious incident, regardless of the operation in which it is engaged.

In conclusion, we note that beyond the statistical data and the frequencies at which the positive factors defined in the taxonomy appear, it is because of the professionalism, training, ability, proper design or imagination needed to face unforeseen circumstances. It also offers an opportunity for individuals and professionals to continue striving for operational safety.

The Positive Taxonomy provides a useful tool for encouraging a safety culture through positive actions and outcomes, while setting aside the image of failure and mistakes.

3. Positive Taxonomy

3.1. Introduction

A Positive Taxonomy is a high-level classification of positive concepts. When analyzing an event, the Positive Factors are used to record those actions that were effective in minimizing the damage. Multiple positive factors may be identified within the same event.

Below are the definitions of each of the positive factors that comprise the ICAO Positive Taxonomy, and of each of the positive factors included by the CIAIAC.

It should be noted that the CIAIAC has assigned an icon to each positive factor so they are easily recognizable in Section 4, "Safety Events with Positive Factors in Spain."

In Annex A, the CIAIAC provides a handbook for using this taxonomy that explains the CIAIAC's interpretation of each of the positive factors.

Figure 3. Diagram of the positive taxonomy employed in this report

Lastly, it is important to note that once each of the positive factors is defined, no distinction will be made over the course of the study between the positive factors in the ICAO Taxonomy and those defined by the CIAIAC.

3.2. ICAO Positive Taxonomy

Avoidance Maneuver

Decision to carry out an avoidance maneuver on the ground or in flight after detecting another aircraft visually or on ACAS. For example, this category includes the decision to exit the taxiway to avoid another aircraft.

Decision to go around

The pilot/controller decides to go around and land safely

Decision to land as a precaution

This factor includes decisions to land beyond the limits of the aerodrome as a precaution, with or without an emergency condition. An example would be interrupting a flight due to adverse environmental conditions.

Decision to land on an unexpected runway

This factor includes decisions to land on unexpected runways, such as a secondary runway, a grass runway or some other surface within the limits of the aerodrome.

Decision to reject takeoff

This factor includes decisions to reject a takeoff either before or after starting the takeoff run. It also applies to flights that are canceled, postponed or delayed for safety reasons.

Decision to return to airport of departure or divert to another

This factor includes the decision to interrupt the planned flight (often during the initial climb) and return to the departure airport or divert to an alternate.

Aerodrome intervention/assistance

Application of the aerodrome's emergency plan. Information provided by the aerodrome's Rescue and Firefighting Service to the crew by radio, verbally or using visual signals to help the aircraft's occupants during an emergency on the ground

ATC intervention/assistance

Information from an ATS station (tower, AFIS, etc.) received via radio that increases the level of safety for the rest of the flight.

Assistance of an instructor/Supervisor

The instructor or supervisor intervenes to give key information to the trainee. This may take place using radio communications when the individuals are not physically in the same place.

Passenger intervention/assistance

A person on board who is not part of the crew spontaneously helps the pilot with an action or decision so that the flight can continue safely.

Third-party intervention/assistance

A person outside the aircraft spontaneously helps the pilot with an action or decision so that the flight can continue safely.

Hardware safety net

The activation of a notification system on board the aircraft or on the ground alerts the flight crew or ATC personnel of a possible safety violation (e.g. TAWS or ACAS warnings in aircraft or MSAW warning for ATC).

Accurate usage of documentation

Reading, and especially interpreting the documents (such as maps or charts) helps the pilots improve their situational awareness.

Communications

Radio messages are transmitted that help break a chain of events that would probably have led to an accident, with or without standard phraseology..

Design requirements

Design requirements such that the relevant part of the aviation system (aerodrome, aircraft, ATC, ground equipment, etc.) is able to work as planned, thus preventing a worse outcome.

Engine failure anticipation

The pilot takes actions to land safely in the event of an engine failure, especially during takeoff. By extension, this factor is used to include the risk of an in-flight engine failure (e.g. uncertified aircraft) or an approach with engine problems.

Environment observation

Observing and interpreting the surroundings (such as marks on the ground) helps the operator on the front line to improve his situational awareness.

Logical problem solving

Applying empirical reasoning that is not necessarily based on an aviation context or on specific instructions. An example of this atypical thinking would be calling on the previous frequency to deal with a radiocommunications problem.

Use of training instructions/Standard operating procedures

In unusual conditions, the operator on the front line acts automatically and follows the standard operating procedures learned during initial or refresher training.

Visual detection/anticipation

Scanning the environment helps the pilot avoid another aircraft, an obstacle, elevated terrain, clouds, etc.

The ICAO also regards providence as a positive factor, though that will not be considered in the analysis contained in this report.

3.3. Positive Taxonomy Expanded By ThE CIAIAC

Pre-flight preparations and precautions

Includes checking the flight plan, weather, equipment for the planned operation, etc.

Threat identification

Awareness by the crew or the controller of the threats that could affect flight safety.

Good cockpit practices

Includes those factors that demonstrate good coordination in the cockpit.

Airmanship and flight skills

Good pilot practices while flying the aircraft in non-standard situations.

Third-party intervention

Person inside or outside the aircraft who witnesses the event or is aware of it, and whose intervention is important to the survival of the crew. This intervention must never jeopardize the physical integrity of the person doing it.

3.4. Methodology Used In This Document

The CIAIAC has evaluated every report published in 2015 and 2016 and focused on the positive factors identified by the Investigator in Charge in the associated technical report. No factors were identified that were not mentioned explicitly in the text of the report.

For each report, the factors, which may be repeated in the same event, are indicated one by one in chronological order (listing shown in detail in Annex B).

If any of the actors or systems involved made a previous mistake, if the subsequent actions were able to diminish the effects of the event, said actions or interventions by the systems were identified as positive factors.

4. Relevant Investigations With Positive Factors

What follows is a selection of the more notable accidents and serious incidents published in 2015 and 2016. These events were selected from all those that occurred in keeping with the following criteria:

- The aircraft exhibits a large number of positive factors (IN-013/2011)
- The event exhibits at least one correct decision that avoided an outcome of greater severity (A-010/2013, IN-008/2014)

- The event was resolved imaginatively (IN-041/2013)
- The on-board systems minimized the consequences (IN-020/2014)

Also, Annex B includes summaries of all the reports published in 2015 and 2016 in which positive factors were identified.

IN-013/2011 INCIDENT INVOLVING AN AIRBUS A-320-211 AIRCRAFT, REGISTRATION EC-GRH, OPERATED BY VUELING, AT THE SEVILLE AIRPORT (LEZL) ON 20 APRIL 2011. REPORT APPROVED ON 27 MAY 2015.

With the aircraft at FL350, an amber caution (Master Caution) appeared in the cockpit, accompanied by an ILS FAULT message on the ECAM (Electronic Centralized Aircraft Monitor). At the same time, the captain's primary flight display (PFD) went completely blank. Seconds later, with no corrective action taken, the caution cleared, the PFD was recovered and a new caution appeared, WHEEL NWS FAULT. At that point, the captain instructed the qualified copilot to sit in the RH seat and relieve the copilot under instruction.

The aircraft made initial contact with Seville approach and declared an urgency (PAN-PAN PAN-PAN PAN-PAN), informing of the possibility that they might block the runway. A Local Alert was then declared at the Seville Airport, and all other arrival and departure operations were suspended.

While on final approach, a second warning, L/G SHOCK ABSORBER FAULT, was received when the landing gear was lowered. At that time, the crew lost the autopilot (A/P), auto-thrust (A/T) and the flight director (FD) and had to take manual control of the aircraft when they were unable to regain any automatic functions. In the emergency procedure for the WHEEL N. W. STEER FAULT caution there is a note stating that if the L/G SHOCK ABSORBER FAULT is also received, there is a possibility that the nosewheels will be turned perpendicular to the airplane's longitudinal axis. This situation was confirmed from the control tower when the airplane made a low flyover for this purpose.

The crew requested to circle to the south so as not to fly over the city of Seville and to avoid storm clouds they had sighted to the north. The crew once more contacted Seville approach and declared an emergency (MAYDAY MAYDAY MAYDAY), inquiring about the possibility of using foam on the runway to lessen any potential damage. They also held the relevant briefing.

After declaring the emergency, the crew evaluated the situation based on the documentation available on board and their own experience, and decided to land in what they deemed to be the most appropriate way.

During the landing, the aircraft stayed on the center line and decelerated normally, coming to a stop by rapid exit taxiway E3. The nose wheel had blown out. The crew turned off the engines once the airplane came to a stop. They read the evacuation list as a precaution. In contact with the tower and firefighters, who confirmed there was no fire, they decided to disembark the passengers normally.

In her statement, the purser wanted to make special mention of the excellent CRM involving both the cabin crew and the passengers.

The CIAIAC determined that the incident occurred due to the irreversible rotation of the aircraft's nose landing wheels to their physical limit of 95° with respect to the longitudinal axis while the aircraft was in the air and the nose landing gear was down and locked.

As a result of the investigation into the incident, a safety recommendation was issued to the aircraft manufacturer, Airbus S.A.S.

The positive factors in this case were:

	1. HARDWARE SAFETY NET An amber caution (Master Caution) appeared in the cockpit, accompanied by an ILS FAULT message on the ECAM (Electronic Centralized Aircraft Monitor).
	2. THREAT IDENTIFICATION The captain's primary flight display (PFD) went completely blank.
	3. GOOD COCKPIT PRACTICES The captain instructed the qualified copilot to sit in the RH seat and relieve the copilot under instruction.
	4. USE OF TRAINING INSTRUCTIONS The aircraft declared an urgency (PAN-PAN PAN-PAN PAN-PAN).
	5. ATC INTERVENTION/ASSISTANCE A Local Alert was then declared at the Seville Airport, and all other arrival and departure operations were suspended.
	6. HARDWARE SAFETY NET While on final approach, a second warning, L/G SHOCK ABSORBER FAULT, was received when the landing gear was lowered.
	7. THREAT IDENTIFICATION The crew lost the autopilot, auto-thrust and the flight director (FD) and had to take manual control of the aircraft.
	8. VISUAL DETECTION/ANTICIPATION The crew requested to circle to the south so as not to fly over the city of Seville and to avoid storm clouds they had sighted to the north.

	9.USE OF TRAINING INSTRUCTIONS The crew declared an emergency (MAYDAY MAYDAY MAYDAY), inquiring about the possibility of using foam on the runway to lessen any potential damage. They also held the relevant briefings.
	10. LOGICAL PROBLEM SOLVING After declaring the emergency, the crew evaluated the situation based on the documentation available on board and their own experience, and decided to land in what they deemed to be the most appropriate way.
	11. AIRMANSHIP AND FLIGHT SKILLS During the landing, the aircraft stayed on the center line and decelerated normally.
	12. AERODROME INTERVENTION/ASSISTANCE In contact with the tower and firefighters, they confirmed there was no fire.
	13. GOOD COCKPIT PRACTICES In her statement, the purser wanted to make special mention of the excellent CRM involving both the cabin crew and the passengers.

A-010/2013 ACCIDENT INVOLVING A BOEING B-767-200 AIRCRAFT, REGISTRATION XA-TOJ, OPERATED BY AEROMÉXICO, WHILE TAKING OFF FROM THE ADOLFO SUÁREZ MADRID-BARAJAS AIRPORT (LEMD) ON 16 APRIL 2013. REPORT APPROVED ON 24 JUNE 2015.

The aircraft, with callsign AMX002, was cleared to take off from runway 36L at the Adolfo Suárez Madrid-Barajas Airport. According to the account given by the three FA who were at the rear of the aircraft, there was a strange noise during the takeoff run. By the time they alerted the flight crew, the latter had already identified pressurization problems.

During the climb the Cabin Altitude Warning light came on and upon reaching a cabin altitude of 14 000 ft, the passenger oxygen masks were deployed. As a result, the flight crew informed the control center that they were returning to the airport due to pressurization problems.

Aircraft AEA071, which took off behind AMX002, informed the tower after taking off that they thought some debris on the left runway had impacted their aircraft's nosewheel and damaged the tire, so they decided to return. As a result of this call, the local alarm was activated and the control tower requested an inspection of runway 18R/36L, which revealed the presence of metal debris. The crew of another aircraft, which had taken off in sixth place, also reported seeing debris on the runway.

Aircraft AMX002 landed heavy on runway 18L at the airport. Due to the temperature reached by the brakes while landing and then taxiing to parking, the main gear thermal fuses were activated and, once the airplane came to a stop, released the pressure in the main gear tires. The firefighting service set up fans at both landing gear legs to lower the temperature and reduce the risk of fire.

After the investigation, it was concluded that the accident occurred because the aircraft rotated at a speed that much lower than that needed to take off. As a result of the investigation, four recommendations were issued (REC 28/15 - REC 31/15) to the operator intended to enhance the training of its crews.

The positive factors in this case were:

	1. THREAT IDENTIFICATION According to the account given by the three FA, there was a strange noise during the takeoff run. By the time they alerted the flight crew, the latter had already identified pressurization problems.
	2. HARDWARE SAFETY NET During the climb the "Cabin Altitude Warning" light came on.
	3. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER The flight crew informed the control center that they were returning to the airport due to pressurization problems.
	4. COMMUNICATIONS Aircraft AEA071 informed the tower after taking off that they thought some debris on the left runway had impacted their aircraft's nosewheel. The crew of another aircraft also reported seeing debris on the runway.
	5. ATC INTERVENTION/ASSISTANCE As a result of this call, the local alarm was activated and the control tower requested an inspection of runway 18R/36L, which revealed the presence of metal debris.
	6. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER Aircraft AEA071 decided to return.
	7. AERODROME INTERVENTION/ASSISTANCE The firefighting service set up fans at both landing gear legs to lower the temperature and reduce the risk of fire.

IN-041/2013 INCIDENT INVOLVING A CESSNA 172-H «REIMS» AIRCRAFT, REGISTRATION EC-CXP, IN THE VICINITY OF TOLEDO ON 24 NOVEMBER 2013. REPORT APPROVED ON 27 MAY 2015.

The pilot and two passengers departed from the Madrid Cuatro Vientos Airport (LECU) to make a local flight. It was the aircraft's second flight that day, but the first by the pilot.

Fifty minutes into the flight, while near Toledo, the pilot heard a different noise in the engine and checked the engine parameters, which were all normal. He then heard a loud noise and the power fell to 2 000 RPM. The speed dropped if he tried to maintain the altitude, so he decided to land. Before making the emergency landing, he chose a flat, plowed field. He reported the emergency on 121.50 MHz and set code 7700 on the transponder.

During the landing, he correctly lowered the flaps and secured the cabin. He landed at the lowest possible speed and made a good landing, parallel to the furrows, which is the correct way to perform such a landing, and managed to bring the aircraft to a stop in a short distance. The engine did not stop. The occupants were wearing their seat belts, which worked properly. The occupants were not injured. The aircraft sustained no damage, except that limited to the engine.

The loss of engine power was determined to have been caused by a static overload fracture of the no. 6 cylinder due to a fatigue crack that was not detected in either of the two maintenance checks conducted prior to the event. After the investigation, a safety recommendation was issued to the manufacturer of the aircraft, Cessna, to have it incorporate into the maintenance manual the contents of SB96-12.

The positive factors in this case were:

	1. ENGINE FAILURE ANTICIPATION While near Toledo, the pilot heard a different noise in the engine and checked the engine parameters, which were all normal. He then heard a loud noise and the power fell to 2 000 RPM.
	2. DECISION TO LAND AS A PRECAUTION The speed dropped if he tried to maintain the altitude, so he decided to land.

	3. DECISION TO LAND ON AN UNEXPECTED RUNWAY Before making the emergency landing, he chose a flat, plowed field.
	4. USE OF TRAINING INSTRUCTIONS He reported the emergency on 121.50 MHz and set code 7700 on the transponder.
	5. AIRMANSHIP AND FLIGHT SKILLS He landed at the lowest possible speed and made a good landing, parallel to the furrows, which is the correct way to perform such a landing, and managed to bring the aircraft to a stop in a short distance.
	6. DESIGN REQUIREMENTS The occupants were wearing their seat belts.

IN-008/2014 INCIDENT INVOLVING A SWEARINGEN MERLIN III AIRCRAFT, REGISTRATION N125WG, OPERATED BY MEDELAIR, AND A CESSNA 152 AIRCRAFT, REGISTRATION EC-JNL, OPERATED BY THE AEROCLUB DE SEVILLA, IN THE PATTERN AT THE SEVILLE AIRPORT (LEZL) ON 27 MARCH 2014. REPORT APPROVED ON 29 MARCH 2016.

Aircraft EC-JNL was doing takeoffs and landings on runway 27 at the Seville Airport. Aircraft N125WG was cleared to enter the pattern from point N and circle in front of the tower, and decided to do so at 1 500 ft without reporting its altitude at any point due to a lack of knowledge of the airport's Visual Approach Chart, which specifies a maximum altitude above ground level of 1 000 ft.

The controller instructed aircraft EC-JNL to circle in the first third of the downwind leg of runway 27 and reported the presence of another VFR traffic circling in front of the tower. The crew of EC-JNL did not fully acknowledge the instruction, and continued on the downwind leg, as it had done during the previous takeoffs and landings. The controller instructed N125WG to circle at 1 000 ft to separate it from possible interference with an IFR traffic departing on SID HIJ2G.

The instructor in EC-JNL stated seeing N125WG approaching faster than expected and thought the safety of both aircraft could be compromised, so he ordered the student to release the controls and he took control, commencing a descent to avoid a collision and informing the controller that he had N125WG in sight and very close. The pilot of N125WG confirmed the information he had given to EC-JNL. Both aircraft landed some 15 minutes later after being cleared to do so.

The aircraft came within 0.7 NM and 0 ft of each other, when aircraft EC-JNL had visual contact with the other aircraft and initiated an evasive maneuver. The separation between them was subsequently reduced to 0.1 NM horizontally and 200 ft vertically.

The incident was caused by a faulty acknowledgment by the crew of aircraft EC-JNL to circle in the first third of the downwind leg of the aerodrome's pattern, which was not identified or corrected by the tower controller.

In the wake of the investigation, three recommendations were issued (REC 07/16 - REC 09/16), one to FerroNATS, to have it improve the personnel of its control personnel in terms of VFR traffic, and two to the Aeroclub de Sevilla, to have it instruct its pilots on following and acknowledging instructions and to have it distribute the final report of this incident among its pilots for training purposes.

The positive factors in this case were:

	1. THREAT IDENTIFICATION The instructor in EC-JNL saw N125WG approaching faster than expected.
	2. GOOD COCKPIT PRACTICES He ordered the student to release the controls and he took control.
	3. AVOIDANCE MANEUVER Aircraft EC-JNL had visual contact with the other aircraft and initiated an evasive maneuver.

IN-020/2014 INCIDENT INVOLVING AN AIRBUS A-320 AIRCRAFT, REGISTRATION EC-IZD, AND AN AIRBUS A-320 AIRCRAFT, REGISTRATION EC-LZZ, BOTH OPERATED BY VUELING, WHILE ON APPROACH TO THE BARCELONA-EL PRAT AIRPORT (LEBL) ON 11 JULY 2014. REPORT APPROVED ON 26 NOVEMBER 2015.

While on approach to the Barcelona-El Prat Airport, the two aircraft, which were 12 NM away from runway 02, came within 1.1 NM horizontally and 200 ft vertically of one another.

Aircraft 1 had been cleared for the ILS approach to runway 02 and had been given a course to intercept the localizer. This clearance was acknowledged by the preceding aircraft, even though it had already been cleared for the ILS approach, and aircraft 1 did not alter its course and crossed the localizer instead of joining it, as a result of which it flew a converging course toward aircraft 2.

The controller realized that the situation of aircraft 1 was not as expected, and he instructed both aircraft to alter their courses (each to its right) to avoid closing any further. Both aircraft received simultaneous conflict resolution advisories from the traffic alert and collision avoidance system (TCAS RA), which their crews carried out.

During the separation turns, the two aircraft came within 1.1 NM and 200 ft of one another, and the aircraft were quickly instructed again by ATC to alter their headings to continue the approach. The rest of the approach and the landing on runway 02 at the Barcelona-El Prat Airport was completed normally.

The incident between aircraft EC-IZD and EC-LZZ occurred due to the failure of the crew of EC-IZD to carry out an ATC instruction, which happened because:

- The crew of aircraft EC-IZD did not hear the instruction.
- The instruction was acknowledged by another aircraft.
- The error in acknowledging the instruction (the content and recipient) was not identified by ATC or by the crew of either aircraft.

No safety recommendations were issued after the investigation into the accident.

The positive factors in this case were:

	1. HARDWARE SAFETY NET Both aircraft received simultaneous conflict resolution advisories from the traffic alert and collision avoidance system (TCAS RA).
	2. AVOIDANCE MANEUVER Both aircraft carried out the TCAS instructions.

5. Evaluation And Analysis Of The Positive Factors

5.1. Frequency Of Occurrence Of Positive Factors

An analysis of the 99 technical reports published in 2015 and 2016 revealed a total of 22 positive lessons that were sufficiently sound to be presented in reports for coming years, since most of them contributed as a positive factor in more than one event, as shown in Figure 4, except for the "Third-party intervention/assistance" factor.

The positive factors "Assistance of an instructor/Supervisor", "Environment observation" and "Accurate usage of documentation" were not identified in the events, or at least the Investigator in Charge did not specify them in the technical report.

Only in 21 reports were no positive factors identified, primarily because they involved accidents with fatal consequences for both the occupants of the aircraft and for the aircraft themselves.

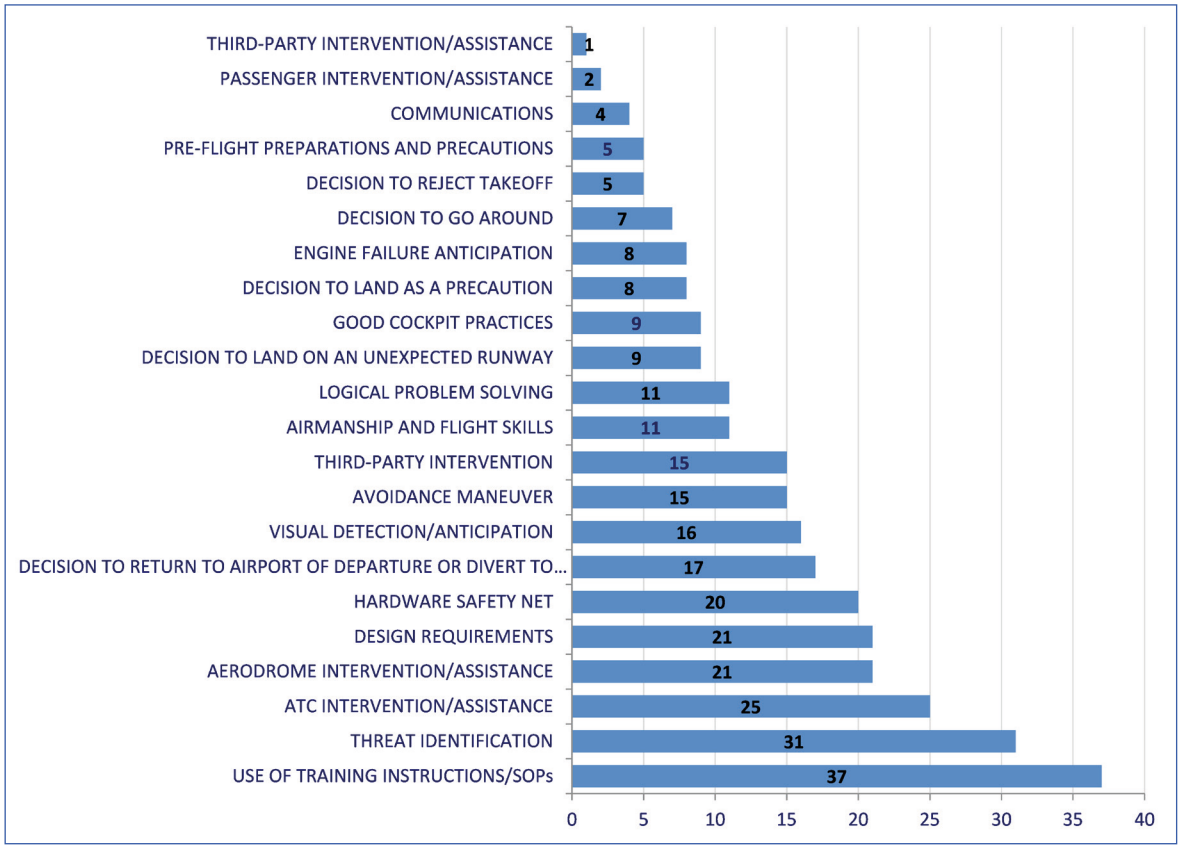


Figure 4. No. of times each positive factor helped mitigate the severity of the event (events published in 2015-2016)

This report highlights the ability of the parties involved to end a chain of unforeseen circumstances that if not stopped, could have given rise to a more severe event or one with greater consequences.

This report also shows that the technical investigations conducted by the CIAIAC not only determine the causes of accidents or serious incidents, they also reveal the positive actions that were carried out and that managed to offset some of the consequences of the event. The positive actions contained in this report were taken directly from the published reports; in other words, the information was already present in said reports (no new positive factors are identified that were not already noted by the investigators in Charge). The added value of this study has been to classify and group the positive actions, arranging them based on the party involved and the operation type, and to provide the lessons learned from the events. A Positive Taxonomy offers a useful tool for promoting a culture of safety through positive actions and outcomes, and setting aside the image of failure and mistakes.

This CIAIAC document has opted for a positive attitude based on presenting practical cases, and shows that we can learn from both the unexpected and from the good decisions and successes that resolved those cases. The lessons drawn seek to promote good habits and highlight those behaviors that can put an end to these mishaps.

5.2. Positive Lessons And Effect On Outcome Of Events

The lessons derived from these events are summarized below:

5.2.1. AVOIDANCE MANEUVER

The pilot's ability to react when faced with an imminent collision against another aircraft, obstacle or terrain is vitally important to ensure the continued safe operation of the flight, or at least to minimize personal injury and material harm.

This report identifies fifteen events that illustrate this lesson:

- In six of the events, the crews followed the TCAS instructions and avoided a dangerous reduction in separation minimums.
- On five occasions, the crews altered some flight parameters to avoid colliding with the terrain, trees or power lines they were unaware of.
- In the four remaining events, the crews carried out an evasive maneuver to avoid a conflict with another aircraft after visually detecting it and with no prior warning from the TCAS system on the aircraft.

5.2.2. DECISION TO GO AROUND

Regardless of the reason, if the crew think that the requirements needed to ensure a safe operation are not satisfied during the approach maneuver, the decision to go around is deemed to be correct.

This document mentions seven events in which going around is considered to have been the right decision.

- In four of the events, the reasons that forced this decision are the presence of adverse weather conditions (variable winds or reduced visibility).
- In the three remaining events, the decision to go around stems from the presence of another aircraft in or near the runway.

In all seven events, the aircraft landed safely, resulting in no significant personal injuries or material damage.

5.2.3. DECISION TO LAND AS A PRECAUTION

The decision to land as a precaution is the other side of the decision to go around, since the crew decide to land early outside the confines of the aerodrome to avoid an even worse outcome.

This report details eight events in which the crew decided to land as a precautionary measure in reaction to a situation that compromised flight safety:

- In four of the events, the pilot decided to land early following a loss of power or engine failure.
- In two events, the aircraft involved are gliders. During the flight, the wind conditions changed suddenly, making normal flight impossible, resulting in the pilot deciding to make an off-field landing.
- In another event, the pilot of a hot-air balloon decided to land when he identified storm clouds in the flight path.
- Lastly, this category concludes with an incident in which a pilot, after evaluating the damage caused by impacting a power line, decided to continue flying and land as soon as possible in a safe area.

5.2.4. DECISION TO LAND ON AN UNEXPECTED RUNWAY

Whenever possible, once the decision is made to land on an unexpected runway or surface within the aerodrome limits (which will often follow the positive factor of deciding to land as a precaution), or whenever there is simply no option other than to land, the various options available should be analyzed and the most suitable terrain chosen, since this could mean the difference between landing safely and having the aircraft flip, impact objects, fall down a slope and so on.

Nine of the events discussed in this report illustrate this lesson:

- In five of the cases analyzed, the engine malfunctioned. The crews had sufficient time to weigh the pros and cons of the various landing zones, eventually opting to land on two crop fields, a river bank and a bay (there were people on the beach).
- In two events, due to changing wind conditions and to the appearance of a storm cell, the pilots of a glider and a hot air balloon, respectively, opted to land in a crop field and in a clear area by the side of a river.
- In another event, the pilot, after assessing the damage caused by impacting a power line, decided to continue flying and land in a crop field.
- Lastly, an accident is included in which the pilot, after losing control of the rudder pedals, decided to land on a river bed. In this case, a violent landing could not be avoided, which caused injuries and structural damage, but prevented fatalities.

5.2.5. DECISION TO REJECT TAKEOFF

If the safe conditions to take off are not reached during the takeoff run, or if the pilot notices a loss of power or controllability in the aircraft, the decision to reject the takeoff is correct.

Similarly, when an aircraft is damaged prior to a flight or the proper operation of any of its systems is called into question, it will be necessary to inspect it and repair it if necessary before flying it, even if that means delaying or canceling the flight.

This lesson is illustrated in five events in which the crew decided to reject the takeoff for various reasons:

- In two of these events, the aircraft did not reach the minimum speed or altitude to ensure a safe takeoff.
- In another event, the aircraft veered from the runway centerline and pilot was not able to correct this motion.
- In one of the events, the aircraft was damaged before the flight, forcing its cancellation. Lastly, in one of the events, the next flight was canceled due to problems with the air conditioning system detected by the crew during the flight planning phase.

5.2.6. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER

Occasionally, crews will decide that the flight characteristics are such that they can compromise flight safety, so they decide to land early at an aerodrome, whether it is the aerodrome of departure or an alternate aerodrome.

This document mentions 17 events in which the crews decided that the best option was to return to the aerodrome or divert to another:

- Of these, on ten occasions, the decision was preceded by a fault or malfunction in the aircraft. Four problems involved the engine, two the air conditioning system, two the cabin pressure and two the landing gear (preceded by a discharge from a high-voltage power line).
- Also contained in this study are five cases in which due to the prevailing weather conditions (wind and cloud ceiling), either en route or on approach, the crew decided to return or divert to the alternate airport. In four of them, the decision to divert elsewhere was preceded by the decision to go around.
- Finally, there are two events in which, faced with unforeseen in-flight conditions that were not easy to correct but that did not require an immediate emergency landing, the crew opted to return to the airport of departure or to divert to a closer airport as a preventive measure. In one case, the pilot, fearing that he might suffer from heat stroke due to the temperature in the cockpit, decided to divert to a familiar aerodrome. On another case, because the aircraft taking part in an aerial tour were not observing the altitudes or reporting their positions, the pilot decided to end the aerial work early and return.

5.2.7. AERODROME INTERVENTION/ASSISTANCE

The readiness and efficiency of firefighting and emergency personnel is essential, since on many occasions they are the first to arrive at the scene whenever an event occurs within the airport boundaries. They can minimize the consequences of an accident or serious incident and can prevent any knock-on effects.

This report contains examples of this, such as a touching down with the landing gear retracted, an engine fire or a problem controlling the temperature in the landing gear, all of which required the presence of emergency services (firefighters) to ensure that the aircraft were able to reach the parking apron and the passengers disembarked safely. Likewise, if the passengers or crew exhibit discomfort or injuries, the presence of the airport's medical services will be required.

This report contains 21 events in which the airport's emergency services provided assistance.

Of these, the services of the firefighting service were requested 14 times, the crew or passengers required medical assistance five times, and both firefighters and medical services were dispatched on two occasions.

5.2.8. ATC INTERVENTION/ASSISTANCE

Air traffic controllers play a crucial role in preventing aviation accidents or serious incidents, notifying crews of the presence of other aircraft or of changing weather conditions. When necessary, they can even reroute air traffic to increase safety. Moreover, due to their vantage point in the Control Towers, their access to communications and to their constant contact with all the parties, they are the first to learn about the emergency situation and to initiate local emergency procedures at the airport or activate search and rescue efforts in the case of route controllers.

There are 25 events in which the assistance provided by air traffic control services was deemed to be positive.

In nine of them, the tower activated the local alert, and in another four, they dispatched search and rescue units.

5.2.9. PASSENGER INTERVENTION/ASSISTANCE

On given occasions, someone aboard who is not part of the flight crew can spontaneously help the crew by reporting some type of threat such that the crew can address a real or potential conflict.

This factor is reflected in two of the incidents analyzed, in which assistance from passengers is deemed to have helped increase the safety of the operation:

- One of the events involved a hot air balloon, in which one of the passengers warned the pilot of a fire in the gondola, which the pilot then put out with an extinguisher.
- In the other case, the passengers were alert to what was happening inside the cockpit and helped the pilot by informing him of potential obstacles that could have affected the flight.

5.2.10. THIRD-PARTY INTERVENTION/ASSISTANCE

This factor is similar to "Passenger intervention/assistance", the difference being that the person who aids the pilot to act or decide is someone outside the aircraft.

This lesson is reflected in just one event in this report.

In that event, one of the persons at the destination aerodrome provided certain information on the traffic at the airfield via telephone. After this call, and after verifying that there was no traffic in the maneuvering area, the pilot proceeded to land.

5.2.11. HARDWARE SAFETY NET

So far, the positive actions listed have all been based on the human factor; however, on-board systems and safety nets deployed on the ground alert and assist the human element to make decisions when faced with potentially dangerous situations.

This report identifies 20 events in which the hardware safety net worked properly to alert the crew to the existence of a malfunction or of a potentially dangerous situation.

- In seven of these events, the on-board TCAS alerted the crews (of either one or both aircraft involved) of a dangerous situation due to the excessive proximity of the aircraft.

- In three other events, the EGPWS alerted the crew to the proximity of the terrain so that action could be taken to correct the situation.
- And in eight cases, the ECAM system alerted the crew to a fault or malfunction in an aircraft system. In three of these cases, the fault involved an engine (ENGINE FAIL or Engine Fire), in two cases it was related with the landing gear, and in the three remaining cases there was a pressurization, air conditioning and fuel level problem.
- Lastly, in the two remaining events, other visual or aural alert systems played an important role. In one of the events, after impacting a medium-voltage power line, a light turned on in the cockpit of an Agusta Bell 206-B helicopter warning of low rotor RPM and a warning horn sounded. In the other, an indicator in the chip detector for the right engine turned on, alerting the pilot to a possible engine failure.

Every case mentioned, except for three accidents with no serious injuries, was classified as an incident with no major consequences.

5.2.12. COMMUNICATIONS

Radio communications allow hazards that endanger flight safety to be handled and solved, thus avoiding greater problems.

These communications, which usually take place between ATC and crews, often make all the difference between a serious incident and an accident, which is why proper communications are so important.

Four events in this report illustrate the value of quick communications between controllers and crews.

- In one of them, two aircraft reported to the tower the potential presence of debris on the runway from an accident aircraft.
- In another case, one aircraft, which had moved past the holding point with another aircraft on short final, reported its position from the centerline to the controller.
- In the third example, a crew from another operator provided information on the condition of the gear (there was a problem with the left gear door), which led the crew to request a nearby parking stand from the control tower.
- Lastly, in another event the preceding traffic warned of the existence of heavy rain and very reduced visibility just before landing.

5.2.13. DESIGN REQUIREMENTS

The safe conduct of operations is not just the responsibility of pilots, maintenance technicians or air traffic services; rather, it relies on the interactions between every actor involved in air transport, including the manufacturers of aviation systems (aircraft, aerodromes, ground equipment, etc.). The latter aim to guarantee the maximum reliability of their products, since the safety they provide during their service life will depend on it.

If the systems are able to work as they should during a serious incident or accident, they can avoid a more severe outcome. The proper operation of retention systems or the robustness of the cockpit structure are some examples.

This report contains 21 events in which the correct operation of systems avoided a more severe outcome:

- In nine of them, the aircraft cabin was not deformed, allowing the persons aboard from suffering more serious injuries.
- In fourteen cases, the use of safety belts aided in the survival of the occupants.
- Lastly, in another event, the top and bottom wire cutters installed in the aircraft's fuselage satisfied their function and allowed the flight to continue.

None of the cases resulted in fatalities and in ten events classified as accidents, those involved sustained no serious injuries.

5.2.14. ENGINE FAILURE ANTICIPATION

This factor involves identifying threats specific to the engines, with no prior warning from alerting systems, which allows the pilot to take action and land safely.

This lesson is highlighted in eight events in this report.

- In four of them, the pilot identified a loss of engine power and failure of this system to respond to the pilot's inputs to adjust it.
- In three other events, the engine failure is identified based on a loud noise or knocking sound originating in the engine. These signs are usually accompanied by abnormal readings in the cockpit (oil pressure and temperature, engine RPM, volt meter, etc.).

- Lastly, in one of the reports analyzed, the pilot warned of the possibility of a subsequent engine failure after identifying a drop in the volt meter reading.

It should be noted that none of these cases resulted in fatalities, and in five of them there were no serious injuries.

5.2.15. LOGICAL PROBLEM SOLVING

When an aviation professional has no clear instruction on how to proceed when faced with a complication or problem, it has been shown that taking action based on reasoning, experience and knowledge can be of great help in minimizing the consequences of the situation.

There are eleven events that underscore this lesson, in which the crew took a measure not described in the procedures that contributed to the survival of the aircraft's occupants.

Since these solutions are specific to each situation, there are no clear similarities between the various events. As a result, only the examples of most interest are presented.

- In one of the events, the crew assessed the situation based on their experience and on the documentation available aboard, and despite being in a situation not described in the procedures, they managed to land the airplane safely.

- In another event, even though ATS recommended that the pilot parachute out, the pilot decided not to, both because he had never done so before and because he thought the height above the terrain was insufficient.

- In another event, the crew decided to test the air conditioning system, even though the aircraft had already been checked by the maintenance service. The situation that eventually unfolded highlights the correct nature of this decision.

- In another event, a balloon got caught in some power lines. The pilot, expecting the power to be restored, decided to activate the FDS to descend as quickly as possible.

5.2.16. USE OF TRAINING INSTRUCTIONS/STANDARD OPERATING PROCEDURES

In many of the events included in this report, the use of training instructions after an unusual situation helped to minimize the outcome of the event.

The situations that are deemed positive in this report include the correct application of the procedure by the pilot, allowing for the aircraft to be recovered, the reporting of emergencies to the airport to ready the relevant personnel, the preparation of the passengers in the event of an emergency landing to avoid injuries, and powering down the aircraft after an emergency landing to avoid potential complications due to fire.

This report identifies 37 events that illustrate this lesson:

- In nine of the events, the situation was triggered by an engine failure or malfunction.
- In seven other events, the spark was a mechanical fault, with the landing gear being involved in five of the cases.
- In three events, the fault had to do with the air conditioning system.
- In another nine events, the cause was the impact itself, after which the crew correctly applied the relevant procedures.
- Three of the events involve a shortage of fuel.
- Two events are related to encountering turbulence during the flight.
- In one of the events, the pilot acted in keeping with procedures, releasing the tow cable when he felt he as going to lose control of the aircraft.
- One of the events involves a balloon in changing weather conditions.
- In one event, the crew stopped ahead of a stop bar that was on, thus helping to limit the event to an incident.
- Lastly, in one event, the causes that led to the emergency and to the subsequent application of the relevant procedures could not be determined.

5.2.17. VISUAL DETECTION/ANTICIPATION

Scanning the environment helps pilots detect a potential conflict sufficiently far in advance and before any alarms are triggered so they can act accordingly and carry out a planned action.

Both the scanning and detection are usually visual, but they can also result from knowledge of a special situation or from any other input. It is also important to note that the detection can be carried out both by the crew and by air traffic control personnel.

This lesson is illustrated in 16 events in this report:

- In six of these events, the detection involved the presence of clouds.
- In another eight events, this lesson comes into play when two aircraft come into conflict inside the airspace, this conflict being detected on one occasion by the air traffic control service and on seven occasions by the crew of the aircraft. Of these eight events, seven took place in the airport airspace, with only one taking place outside of it. We should also note that in one of these events, the detection was not visual, but rather resulted from listening to a clearance given to another aircraft.
- In one event, the presence of a power line was detected early enough to take deliberate action.
- Lastly, in one event, the pilot decided to divert upon realizing he would not be able to fly over a mountainous area.

5.2.18. PRE-FLIGHT PREPARATIONS AND PRECAUTIONS

Pre-flight planning is one of the pillars of prevention, as it sets the stage for a safe flight.

Five events were identified where this lesson comes into play:

- Two of the events reflect the relevance of checking the weather and airspace conditions before starting the flight. In one of them, the airplane's captain decided to add extra fuel as a contingency due to the weather at the destination airport. In the other event, the information gathered prior to the flight alerted the pilot to the presence of an aerial tour and to be on the lookout for it.
- In one of the events, having an informative meeting with the passengers

contributed to their survival.

- In one of the events, the pilot properly equipped the aircraft, allowing him to survive after an accident.
- Lastly, in one of the events, detailed planning of the flight resulted in an excellent support network when an emergency arose.

5.2.19. THREAT IDENTIFICATION

The correct identification of behavior by the aircraft or one of its systems that is non-standard behavior or outside normal parameters is essential to applying the correct procedure and solving the conflict.

This identification may be preceded by an alarm of the aircraft's alert system. This lesson encompasses every correct interpretation of the aircraft's alert system that warns of threats related to the aircraft itself (the identification of TCAS alerts is not included in this category).

On the other hand, not all the damage that may occur during a flight has an associated alarm, and not all aircraft have every alert system. For this reason, this category also includes the identification of threats related to the aircraft itself with no prior alert. This category, however, does not include the identification of an engine malfunction.

This category also includes the identification of a potential collision with the terrain, an obstacle or another aircraft, forcing an early reaction, without the activation of any alert system. The detection of an impact or strike is also included in this category.

It should also be noted that a threat can be identified either by the crew or by the air traffic control service.

This report contains 31 events in which this factor is present:

- Of them, three are related to the detection by air traffic control of a conflict between aircraft that requires an immediate reaction.
- There are 14 events in which the crew were able to identify and correctly interpret an abnormal operation or an alert on the aircraft. Within these 14 events, six times a loud noise was heard or vibrations were felt; on four occasions a strange odor or the presence of smoke was identified; and in three occasions an alert system was correctly interpreted
- There are nine events in which a potential collision of the aircraft was

identified. In four of them, the potential collision was against an obstacle or the ground, in three against an aircraft, and in one against a glider.

- In two other events, the crew identified an impact, one of them on the ground and the other in the air.
- Lastly, of the three remaining events, one involved the physical discomfort of the pilot, another the lifting of the aircraft off the ground and the other a loss of control.

5.2.20. GOOD COCKPIT PRACTICES

Having a command hierarchy in the cockpit, where every member of the crew knows their place, is essential. Specifically, it is important to be able to delegate and manage the workload, for the first officer to recognize problems during the flight and in those cases where the first officer is the pilot flying, to turn the controls over to the captain whenever the situation calls for the captain's more extensive experience

Therefore, in emergency or unusual situations, crews must keep these factors in mind and apply them to avoid conflicts in the cockpit that worsen a situation or impede its resolution.

These good practices are also applicable to instructors and student pilots during training flights. This category also includes teamwork and coordination among both flight crew and cabin crew members.

This report contains nine examples of this lesson:

- In three of the events, the instructor took control of the aircraft once the emergency occurred in an effort to regain control of it.
- In two of the events, the captain decided to change roles in the cockpit after an emergency appeared. In one of them, it was the captain who took over as the pilot flying, and in another the captain decided to let the qualified copilot relieve the copilot under instruction.
- The four remaining events showcase the coordination, teamwork and/or cordiality among the members of either the flight crew, the cabin crew or both.

5.2.21. AIRMANSHIP AND FLIGHT SKILLS

If a pilot ever encounters an unforeseen obstacle or is faced with an aircraft that is difficult to control, proper training and good knowledge and control of the aircraft will allow the pilot to avoid a conflict and safely resolve the situation.

This document presents 11 such cases. Some of the examples contained in this report in which airmanship or flight skills were key to the successful outcome of an operation were:

- situations in which the presence of a crosswind or high wind speeds diverted the aircraft from its flight path,
- events in which some kind of impact between the aircraft and some external object during flight led to a loss of control,
- unforeseen situations that arose while engaged in firefighting duties that required the pilot's skills to resolve.

5.2.22. THIRD-PARTY INTERVENTION

When an event occurs beyond airport boundaries, it is people who are unrelated to the flight or the operation and eyewitnesses who may be the first on the scene to help and alert emergency services. This assistance is extremely important since otherwise emergency services would not be notified in time to save the life of the occupants or the integrity of the aircraft.

In any event, the help provided by eyewitnesses should not, under any circumstances, compromise their physical safety, as it could raise the seriousness of the event by increasing the number of fatalities/injuries.

This factor also includes the assistance provided by non-airport emergency services (firefighters, police, Civil Guard, ambulances, 112).

This factor is present in 15 events contained in this report, all of which were classified as accidents.

5.3. Lessons Learned By Party Involved

The positive factors have been classified based on the party involved, specifying the report in which the positive factor may be located:

PARTY INVOLVED	POSITIVE FACTOR	SAFETY EVENTS
Pilot/Crew	AVOIDANCE MANEUVER	A-006/2014, IN-008/2014, IN-020/2014, IN-023/2014, IN-027/2014, A-030/2014, IN-031/2014, IN-032/2014, A-002/2015, A-006/2015, IN-011/2015, IN-019/2015, IN-021/2015, A-038/2015, IN-007/2016
	DECISION TO GO AROUND	IN-015/2013, IN-021/2013, IN-036/2013, IN-045/2013, IN-015/2014, IN-013/2014, IN-027/2014
	DECISION TO LAND AS A PRECAUTION	A-025/2013, IN-041/2013, A-006/2014, IN-021/2014, A-025/2014, A-029/2014, A-030/2015, A-032/2015
	DECISION TO LAND ON AN UNEXPECTED RUNWAY	A-006/2012, A-025/2013, IN-041/2013, A-006/2014, IN-021/2014, A-024/2014, A-029/2014, A-030/2015, A-032/2015
	DECISION TO REJECT TAKEOFF	A-008/2013, IN-012/2015, A-022/2015, A-038/2015, A-003/2016
	DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER	IN-003/2011, IN-036/2012, IN-004/2013, A-010/2013, IN-017/2013, IN-021/2013, IN-036/2013, IN-039/2013, A-043/2013, IN-045/2013, IN-005/2014, IN-013/2014, IN-003/2015, A-006/2015, A-008/2015, IN-011/2015, A-017/2015
	COMMUNICATIONS	IN-016/2014
	ENGINE FAILURE ANTICIPATION	A-006/2012, A-004/2015, A-025/2013, IN-041/2013, IN-005/2014, A-006/2014, A-030/2014, A-032/2015

PARTY INVOLVED	POSITIVE FACTOR	SAFETY EVENTS
Pilot/Crew	USE OF TRAINING INSTRUCTIONS/ STANDARD OPERATING PROCEDURES	IN-003/2011, IN-013/2011, A-006/2012, IN-036/2012, IN-004/2013, A-008/2013, A-013/2013, IN-017/2013, IN-021/2013, IN-020/2013, A-025/2013, IN-036/2013, IN-039/2013, IN-041/2013, A-043/2013, IN-044/2013, A-004/2014, IN-005/2014, A-006/2014, A-012/2014, IN-013/2014, A-024/2014, A-029/2014, A-028/2014, IN-005/2015, A-006/2015, A-008/2015, A-010/2015, IN-012/2015, IN-013/2015, A-014/2015, A-018/2015, A-017/2015, A-028/2015, A-032/2015, A-002/2016, A-003/2016
	VISUAL DETECTION/ ANTICIPATION	IN-013/2011, IN-015/2013, IN-021/2013, IN-045/2013, IN-011/2014, IN-014/2014, A-012/2014, IN-017/2014, IN-015/2014, IN-027/2014, A-029/2014, IN-003/2015, A-008/2015, A-010/2015, IN-011/2015
	PRE-FLIGHT PREPARATIONS AND PRECAUTIONS	A-006/2012, A-004/2015, IN-045/2013, A-012/2014, IN-011/2015
	THREAT IDENTIFICATION	IN-003/2011, IN-013/2011, IN-004/2013, A-008/2013, A-010/2013, A-013/2013, IN-017/2013, IN-039/2013, A-043/2013, A-006/2014, IN-008/2014, A-012/2014, IN-021/2014, A-024/2014, IN-031/2014, A-030/2014, A-002/2015, IN-005/2015, A-006/2015, A-008/2015, A-038/2015, IN-012/2015, A-014/2015, IN-019/2015, A-017/2015, IN-035/2015, A-003/2016, IN-007/2016
	GOOD COCKPIT PRACTICES	IN-003/2011, IN-013/2011, IN-036/2012, IN-004/2013, IN-005/2014, IN-008/2014, A-006/2015, A-010/2015, A-015/2015
	AIRMANSHIP AND FLIGHT SKILLS	IN-013/2011, A-006/2012, A-004/2015, A-025/2013, IN-041/2013, A-006/2014, A-012/2014, A-024/2014, A-006/2015, A-008/2015, A-014/2015
	LOGICAL PROBLEM SOLVING	IN-013/2011, A-008/2013, IN-039/2013, IN-011/2014, IN-017/2014, A-024/2014, A-010/2015, A-015/2015, A-018/2015, IN-035/2015, A-018/2016

PARTY INVOLVED	POSITIVE FACTOR	SAFETY EVENTS
Air traffic control services	ATC INTERVENTION/ ASSISTANCE	IN-003/2011, IN-013/2011, IN-036/2012, IN-004/2013, A-010/2013, A-004/2015, IN-012/2013, IN-017/2013, IN-021/2013, A-025/2013, IN-039/2013, IN-042/2013, A-043/2013, IN-044/2013, IN-005/2014, IN-007/2014, IN-013/2014, IN-016/2014, A-024/2014, IN-005/2015, A-006/2015, A-010/2015, A-014/2015, IN-034/2015, A-013/2016
	VISUAL DETECTION/ ANTICIPATION	IN-017/2013
	THREAT IDENTIFICATION	IN-042/2013, IN-016/2014, IN-034/2015
Aerodrome services	AERODROME INTERVENTION/ ASSISTANCE	IN-003/2011, IN-013/2011, IN-036/2012, IN-004/2013, A-008/2013, A-010/2013, IN-012/2013, IN-020/2013, IN-039/2013, A-043/2013, A-004/2014, IN-005/2014, EXT A-006/2014, A-028/2014, IN-003/2015, A-006/2015, A-008/2015, A-010/2015, A-022/2015, IN-035/2015, A-013/2016
System aboard the aircraft or on the ground	HARDWARE SAFETY NET	IN-003/2011, IN-013/2011, IN-004/2013, A-010/2013, IN-017/2013, IN-021/2013, IN-036/2013, A-043/2013, IN-044/2013, IN-045/2013, IN-005/2014, IN-014/2014, IN-020/2014, IN-021/2014, IN-023/2014, IN-027/2014, IN-031/2014, IN-032/2014, A-008/2015, IN-021/2015
	DESIGN REQUIREMENTS	A-006/2012, A-013/2013, A-025/2013, A-029/2013, IN-041/2013, A-006/2014, A-012/2014, A-018/2014, A-019/2014, IN-021/2014, A-024/2014, A-025/2014, A-030/2014, A-007/2015, IN-013/2015, A-014/2015, A-017/2015, A-025/2015, A-028/2015, A-030/2015, A-018/2016
Passengers	PASSENGER INTERVENTION/ ASSISTANCE	A-008/2015, A-018/2015
Third parties	THIRD-PARTY INTERVENTION/ ASSISTANCE	IN-017/2014
	COMMUNICATIONS	A-010/2013, IN-044/2013, IN-005/2015

PARTY INVOLVED	POSITIVE FACTOR	SAFETY EVENTS
	THIRD-PARTY INTERVENTION	A-006/2012, A-004/2015, A-029/2013, A-018/2014, A-019/2014, A-024/2014, A-029/2014, A-030/2014, A-002/2015, A-014/2015, A-018/2015, A-017/2015, A-025/2015, A-030/2015, A-032/2015

Table 1. Positive factors and related events

5.4. Positive Factors Based On The Type Of Operation

We must keep in mind, however, that in civil aviation there are three types of operations: commercial aviation, general aviation and aerial work. Each of these has its own characteristics, and as such it is to be expected that certain positive factors will occur more frequently in one type or the other Likewise, there are differences in the lessons learned drawn from those events in which state aircraft are involved.

Two or more aircraft were involved in 18 of the 78 reports in which positive factors were identified. In five of the cases, the aircraft were engaged in different types of flights (commercial aviation/general aviation or commercial aviation/state flight).

Of the reports with positive factors, 37 involve aircraft conducting commercial air transport operations, 36 general aviation, 7 aerial work and 3 state flights. Figure 5 shows how many times each positive factor is present based on the operation type:

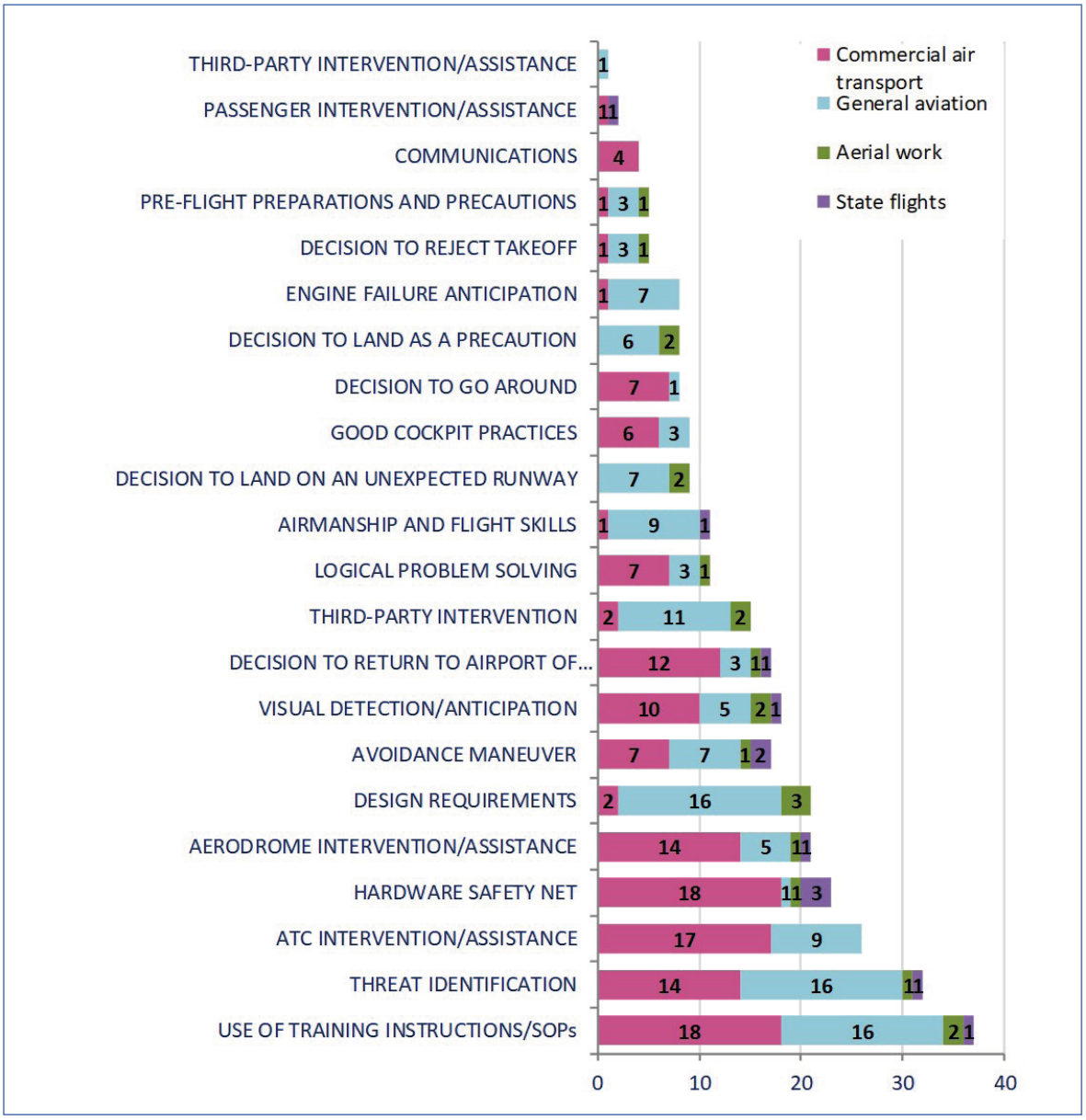


Figure 5. Positive factors classified by type of flight operation in 2015-2016

Analyzing each of these operations separately:

- In approximately 50% of the reports involving commercial air transport events, the positive factors "Hardware safety net", "Use of training instructions" and "ATC intervention" stand out.

- As concerns general aviation, around 50% of the reports feature the "Design requirements", "Use of training instructions" and "Threat identification".

- In the case of aerial work, the determining positive factors are “Design requirements”, “Decision to land as precaution”, “Decision to land on unexpected runway”, “Use of training instructions”, “Visual detection” and “Third-party intervention”.
- Only nine positive factors were identified in events involving state aircraft. The most frequent lessons were “Hardware safety net” and “Avoidance maneuver”.

Note that not every factor affects all operation types equally, and that certain positive factors are very unlikely to be involved in some of the operations.

Therefore, in order to make it easier to understand the above figure, Figure 6, Figure 7, Figure 8 and Figure 9 show each of these flight operations, the positive factors affecting them and the frequency.

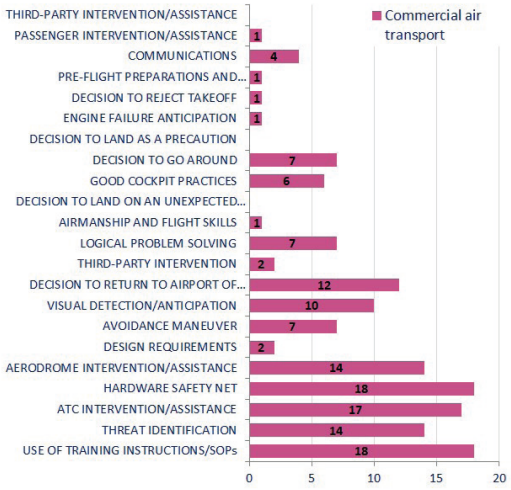


Figure 6. Positive factors associated with commercial air transport

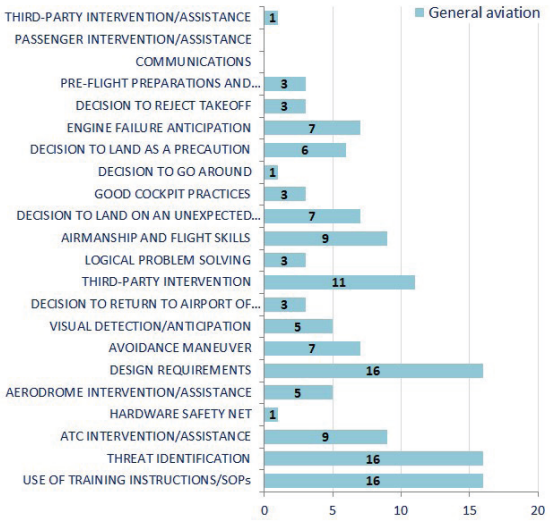


Figure 7. Positive factors associated with general aviation

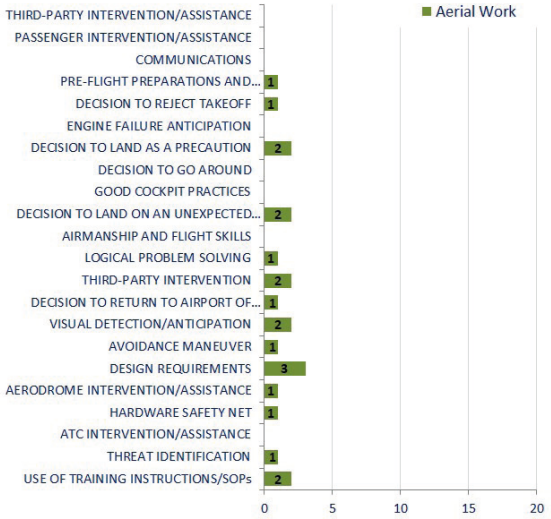


Figure 8. Positive factors associated with aerial work

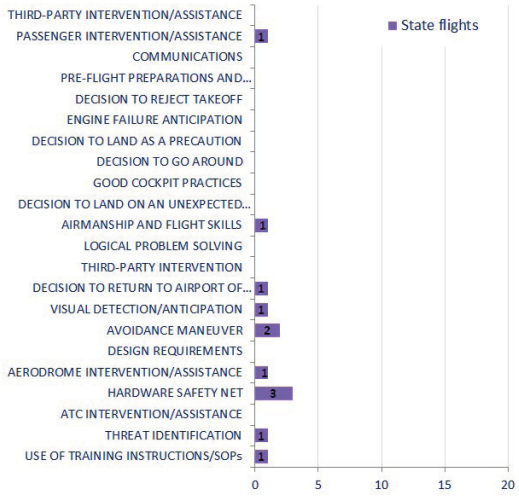


Figure 9. Positive factors associated with state flights

By way of summary, the table below shows the positive factors that were identified in each operation type.

LESSONS LEARNED	Commercial air transport	General aviation	Aerial work	State flights
USE OF TRAINING INSTRUCTIONS/SOPs	✓	✓	✓	✓
THREAT IDENTIFICATION	✓	✓	✓	✓
ATC INTERVENTION/ASSISTANCE	✓	✓	–	–
AERODROME INTERVENTION/ASSISTANCE	✓	✓	✓	✓
DESIGN REQUIREMENTS	✓	✓	✓	–
HARDWARE SAFETY NET	✓	✓	✓	✓
DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER	✓	✓	✓	✓
AVOIDANCE MANEUVER	✓	✓	✓	✓
VISUAL DETECTION/ANTICIPATION	✓	✓	✓	✓
THIRD-PARTY INTERVENTION	✓	✓	✓	–
LOGICAL PROBLEM SOLVING	✓	✓	✓	–
AIRMANSHIP AND FLIGHT SKILLS	✓	✓	–	✓
DECISION TO LAND ON AN UNEXPECTED RUNWAY	–	✓	✓	–
GOOD COCKPIT PRACTICES	✓	✓	–	–
DECISION TO LAND AS A PRECAUTION	–	✓	✓	–
ENGINE FAILURE ANTICIPATION	✓	✓	–	–
DECISION TO GO AROUND	✓	✓	–	–
DECISION TO REJECT TAKEOFF	✓	✓	✓	–
PRE-FLIGHT PREPARATIONS AND PRECAUTIONS	✓	✓	✓	–
COMMUNICATIONS	✓	–	–	–
PASSENGER INTERVENTION/ASSISTANCE	✓	–	–	✓
THIRD-PARTY INTERVENTION/ASSISTANCE	–	✓	–	–

Table 2. Factors identified by flight type

As Table 2 shows, the following positive factors were not identified in the commercial air transport reports:

- Decision to land on an unexpected runway
- Decision to land as a precaution

- Third-party intervention/assistance

In the case of general aviation, the following factors were not identified:

- Communications
- Passenger intervention/assistance

And in the events involving aerial work, the following factors were not identified:

- ATC intervention/assistance
- Airmanship and flight skills
- Decision to go around
- Good cockpit practices
- Communications
- Passenger intervention/assistance
- Third-party intervention/assistance

Finally, the following factors were not identified in events involving state flights:

- ATC intervention/assistance
- Decision to land on an unexpected runway
- Decision to go around
- Design requirements
- Third-party intervention
- Good cockpit practices
- Decision to land as a precaution
- Decision to reject takeoff
- Pre-flight preparations and precautions
- Communications
- Third-party intervention/assistance

In this regard, we note that the "ATC intervention/assistance" factor was not present in aerial work operations, as these are not usually conducted in controlled airspace. Similarly, the "Engine failure anticipation" factor is not likely to appear in commercial air transport because of the warning systems available on those aircraft, and neither is the "Third-party intervention/assistance" factor, since in the event of an accident or serious incident, assistance will be provided by air traffic services, another aircraft or a passenger.

Some factors common to civil operations appear at a low rate. Such is the case with "Pre-flight preparations and precautions". Still, better application of their lessons learned could result in improved safety.

Since the data on lessons learned by operation type are available for the reports published in 2013 and 2014, an aggregate statistical analysis was conducted for the 2013-2016 period, the results of which are given in Annex E. The most notable finding is that of the 25 factors that currently comprise the positive taxonomy, 24 factors were identified in the 137 reports analyzed containing positive factors. The only factor that has yet to be identified is "Accurate usage of documentation". The most frequent factors were "Use of training instructions" and "Threat identification", appearing in 52% and 40% of the cases.

In conclusion, we have that, along with subsequent studies, the utility of each of these positive factors can be reinforced so as to heighten the safety culture and reduce the number of accidents.

6. Conclusions

An analysis of the technical reports published in 2015 and 2016 identified a total of 22 different positive factors that are sufficiently solid that they can be presented in reports in coming years, since most of them contributed as a positive factor in more than one event, save for the "Third-party intervention/assistance" factor, which was only identified in one occasion.

This report also shows that the technical investigations conducted by the CIAIAC not only determine the causes of accidents or serious incidents, they also reveal the positive actions that were carried out and that managed to offset some of the consequences of the event. The positive actions contained in this report were taken directly from the published reports; in other words, the information was already present in said reports (no new positive factors are identified that were not already noted by the investigators in Charge). The added value of this study has been to classify and group the positive actions, arranging them based on the party involved and the operation type, and to

provide the lessons learned from the events. A Positive Taxonomy offers a useful tool for promoting a culture of safety through positive actions and outcomes, and setting aside the image of failure and mistakes.

This CIAIAC document has opted for a positive attitude based on presenting practical cases, and shows that we can learn from both the unexpected and from the good decisions and successes that resolved those cases. The lessons drawn seek to promote good habits and highlight those behaviors that can put an end to these mishaps.

ANNEX A

User Manual

AVOIDANCE MANEUVER

Decision to carry out an avoidance maneuver on the ground or in flight after detecting another aircraft visually or on ACAS. For example, this category includes the decision to exit the taxiway to avoid another aircraft.

How it is used in this report:

- Fast decisions made by the crew to change some flight parameters to avoid colliding with the ground, another aircraft or an object.
- Execution of instructions received from ATC or TCAS to avoid conflicts with another aircraft.

DECISION TO GO AROUND

The pilot/controller decides to go around and land safely.

How it is used in this report:

- Regardless of the reason, the crew think that the landing characteristics are not sufficient to ensure a safe landing and they decide to go around.

DECISION TO LAND AS A PRECAUTION

This factor includes decisions to land beyond the limits of the aerodrome as a precaution, with or without an emergency condition. An example would be interrupting a flight due to adverse environmental conditions.

How it is used in this report:

- Decision to land controllably as a preventive measure in response to a fault or abnormal operation of the aircraft despite not being close to an aerodrome.
- Decision to land as the best solution to an external hazard, such as an unforeseen obstacle or a change in the weather conditions.
- It does not have to be an emergency landing.

DECISION TO LAND ON AN UNEXPECTED RUNWAY

This factor includes decisions to land on unexpected runways, such as a secondary runway, a grass runway or some other surface within the limits of the aerodrome.

How it is used in this report:

- Once the pilot decides that the safest option is to land, the different options available are considered and a suitable terrain is chosen on which to land.

Cross-references to/from other positive factors:

- The decision to land on an unexpected runway is preceded by the decision to land as a precaution or to return to the departure point or divert.

DECISION TO REJECT TAKEOFF

This factor includes decisions to reject a takeoff either before or after starting the takeoff run. It also applies to flights that are canceled, postponed or delayed for safety reasons.

How it is used in this report:

- Decision to reject the takeoff during the takeoff run due to a fault or malfunction in some aircraft system or component.
- Meteorological conditions.
- Decision to reject the takeoff due to material damage to the aircraft before or after the start of the takeoff run.

DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER

This factor includes the decision to interrupt the planned flight (often during the initial climb) and return to the departure airport or divert to an alternate.

How it is used in this report:

- Independently of the operation type, decision to return to the aerodrome or to divert to an alternative due to a failure, damage or malfunction of the aircraft.
- In the case of commercial aviation, the decision to land as an emergency measure must take place at an aerodrome. As a result, this factor includes the decision to interrupt the flight due to a malfunction, failure or damage in the aircraft and to return to the departure aerodrome or go to an alternate.
- When it is impossible to land safely at the planned aerodrome, the decision is made to divert to another.

AERODROME INTERVENTION/ASSISTANCE

Application of the aerodrome's emergency plan. Information provided by the aerodrome's Rescue and Firefighting Service to the crew by radio, verbally or using visual signals to help the aircraft's occupants during an emergency on the ground.

How it is used in this report:

- Assistance from firefighters or any other airport emergency personnel to ensure the safety of anyone inside the aircraft or otherwise involved in the flight.
- Does not include services sent by the local controller, such as dispatching a marshaller after two aircraft impact each other on the apron.

ATC INTERVENTION/ASSISTANCE

Information from an ATS station (tower, AFIS, etc.) received via radio that increases the level of safety for the rest of the flight.

How it is used in this report:

- Intervention by ATC to rearrange traffic and increase flight safety when required by an emergency.
- Change in airport configuration to facilitate aircraft landings and informing the crews of the new conditions.
- Broadcasting messages on weather changes that can affect operations.
- Communications with aircraft under its control about the presence of unauthorized aircraft or other hazards.
- Declaring a local alarm.

ASSISTANCE OF AN INSTRUCTOR OR SUPERVISOR

The instructor or supervisor intervenes to give key information to the trainee. This may take place using radio communications when the individuals are not physically in the same place.

How it is used in this report:

- Instructions or guidance that the instructor gives to the student pilot or controller to solve a real or potential conflict and that allows the flight to continue safely.

PASSENGER INTERVENTION/ASSISTANCE

A person on board who is not part of the crew spontaneously helps the pilot with an action or decision so that the flight can continue safely.

How it is used in this report:

- Instruction that a passenger gives to the pilot to help resolve a real or potential conflict and that allows the flight to continue safely.

THIRD-PARTY INTERVENTION/ASSISTANCE

A person outside the aircraft spontaneously helps the pilot with an action or decision so that the flight can continue safely.

How it is used in this report:

- Instruction that a person outside the aircraft gives to the pilot to help resolve a real or potential conflict and that allows the flight to continue safely.

HARDWARE SAFETY NET

The activation of a notification system on board the aircraft or on the ground alerts the flight crew or ATC personnel of a possible safety violation (e.g. TAWS or ACAS advisories in aircraft or MSAW warning for ATC).

How it is used in this report:

- Correct operation of alerts in the aircraft's warning systems or in ATC systems.
- Correct operation of the TCAS.

ACCURATE USAGE OF DOCUMENTATION

Reading, and especially interpreting the documents (such as maps or charts) helps the pilots improve their situational awareness.

How it is used in this report:

- Use in flight of documentation related to the operation and available at that moment in the aircraft.

COMMUNICATIONS

Radio messages are transmitted that help break a chain of events that would probably have led to an accident, with or without standard phraseology.

How it is used in this report:

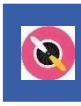
- Radio transmission of instructions that allow resolving a real or potential conflict.
- Transmission of messages from a crew to ATC to report a potential conflict inside the airspace.

DESIGN REQUIREMENTS

Design requirements such that the relevant part of the aviation system (aerodrome, aircraft, ATC, ground equipment, etc.) is able to work as planned, thus preventing a worse outcome.

How it is used in this report:

- Not to be confused with the proper design of an alert system. Involves assessing the positive effect that the design of a given component has on reducing the damage resulting from an accident or serious incident.
- Examples: operation of the seat belts, cockpit maintaining its integrity so that the pilot is not crushed, etc.
- Correct operation of some aviation system thanks to which the consequences of an event are lessened.



ENGINE FAILURE ANTICIPATION

The pilot takes actions to land safely in the event of an engine failure, especially during takeoff. By extension, this factor is used to include the risk of an in-flight engine failure (e.g. uncertified aircraft) or an approach with engine problems.

How it is used in this report:

- Landing safely after an engine failure, taking into account the emergency situation and with no serious injuries.
- This involves identifying a specific threat, meaning both factors (Threat identification) must noe be used when describing this type of event.
- Identifying a potential engine failure with no prior warning from the airplane's alert systems.

ENVIRONMENT OBSERVATION

Observing and interpreting the surroundings (such as marks on the ground) helps the operator on the front line to improve his situational awareness.

How it is used in this report:

- Analysis of the surroundings that help operators on the front line to orient themselves and make the best decision to resolve the conflict.

LOGICAL PROBLEM SOLVING

Applying empirical reasoning that is not necessarily based on an aviation context or on specific instructions. An example of this atypical thinking would be calling on the previous frequency to deal with a radiocommunications problem.

How it is used in this report:

- Actions that are not part of the standard operating procedures or that are not included in training but that offer a plausible and valuable solution to mitigate the effects of the event.
- Reasonable actions based on experience.

USE OF TRAINING INSTRUCTIONS/STANDARD OPERATING PROCEDURES

In unusual conditions, the operator on the front line acts automatically and follows the standard operating procedures learned during initial or refresher training.

How it is used in this report:

- In unusual situations or in tense and/or stressful moments, the operator on the front line effectively uses the procedures learned in training.
- Urgency or emergency declaration.
- Operators on the front line may refer to crews, controllers, ground personnel, handling personnel, etc.
- Commonly accepted practices by industry professionals.

VISUAL DETECTION/ANTICIPATION

Scanning the environment helps the pilot avoid another aircraft, an obstacle, elevated terrain, clouds, etc.

How it is used in this report:

- Visual contact with the conflicting object during flight operations.
- Visual contact early enough and before any alarms are triggered. Allows acting accordingly and in a planned manner.
- Not to be confused with an abrupt maneuver in which the action is performed suddenly.
- Decision to increase scanning of the environment due to knowledge of a special situation or any other external factor.

PRE-FLIGHT PREPARATIONS AND PRECAUTIONS

Includes checking the flight plan, weather, equipment for the planned operation, etc.

How it is used in this report:

- Checking weather conditions, using the right protection equipment for the operation, checking the aircraft and any other pre-flight action that helps verify the safety of the flight.

THREAT IDENTIFICATION

Awareness by the crew or the controller of threats involving the aircraft itself that could affect flight safety.

How it is used in this report:

- Correct interpretation of alerting systems.
- Detection of unusual performance in the aircraft or one of its systems.
- Detection of a system failing to confirm an action taken.
- Detection of an impact or strike.
- Visual detection of smoke or fire.
- Detection of an unauthorized runway or airspace incursion.
- Not to be confused with visual detection/anticipation. This factor entails an early reaction that is not prolonged.

GOOD COCKPIT PRACTICES

Includes those factors that demonstrate coordination in the cockpit.

How it is used in this report:

- The person with more operating experience takes the controls even if he/she was not the pilot flying initially.
- The effective use by the flight crew of all available resources (e.g. equipment and personnel) to improve operational safety.

AIRMANSHIP AND FLIGHT SKILLS

Good pilot practices while flying the aircraft in non-standard situations that allow for a safe landing.

How it is used in this report:

- Landings on unexpected runways, such as small fields.
- Landings where great precision and airmanship are exhibited.
- Actions taken that aid in controlling the aircraft.
- Emergency landings with no material damage or injuries.

THIRD-PARTY INTERVENTION

Person inside or outside the aircraft who witnesses the event or is aware of it, and whose intervention is relevant to the survival of the crew or to warn of a danger/threat. This intervention must never jeopardize the physical integrity of the person doing it.

How it is used in this report:

- Action carried out by someone who witnesses or is aware of the event and that voluntarily and spontaneously helps the crew to survive by notifying rescue and emergency services and/or by securing the aircraft to avoid more serious consequences.
- Actions taken by law enforcement agencies, search and emergency services outside the airport.

ANNEX B

Safety events with positive factors

IN-003/2011 INCIDENT INVOLVING AN AIRBUS A-330, REGISTRATION EC-LKE, OPERATED BY AIR EUROPA, AT FL240 IN THE VICINITY OF THE TOLEDO VOR/DME ON 13 FEBRUARY 2011. REPORT APPROVED ON 24 JUNE 2015.

On Sunday, 13 February 2011, aircraft EC-LKE, an Airbus A-330 operated by Air Europa, was on a flight from Madrid (Spain) to Cancún (Mexico). Aboard were 333 passengers, 8 cabin crew and 3 flight crew (one captain and two copilots).

Fourteen minutes after starting the takeoff run, an FBO (fan blade off) event occurred in the right engine. The noise was heard in the cabin and the entire aircraft shook and continued to vibrate for the rest of the flight. The ECAM (Electronic Centralized Aircraft Monitoring) showed ENGINE STALL and ENGINE FAIL warnings. The crew reacted immediately, declaring an emergency (MAYDAY MAYDAY MAYDAY) and their intention to return to Madrid ATC gave priority to the aircraft over all others to facilitate its return to Madrid, and activated the local alarm.

Following the engine failure, the aircraft made an overweight landing without further problems. The aircraft exited the runway intending to go to the assigned parking stand. While taxiing, however, the temperature of the tires started to increase and the crew decided to stop the airplane. The firefighters, who were alongside the aircraft, applied water and quickly brought the fire under control. As a preventive measure they cooled down the entire landing gear.

There was no emergency evacuation and the passengers deplaned normally. The passengers were boarded on another flight that same evening.

Throughout the flight, the crew showed they were in control of the situation, good situational awareness and teamwork.

The investigation determined that the incident of aircraft EC-LKE was caused when a blade detached from the #4 fan on the right engine.

After the investigation, a safety recommendation (REC 32/15) was issued to EASA to have it review the current certification specifications for the fan fairing module and to modify them if necessary.

The positive factors in this case were:

	1. THREAT IDENTIFICATION A noise was heard in the cockpit and there was a strong vibration throughout the aircraft that remained for the remainder of the flight.
	2. HARDWARE SAFETY NET The ECAM provided the ENGINE STALL and ENGINE FAIL warnings.
	3. USE OF TRAINING INSTRUCTIONS The crew reacted immediately by declaring an emergency (MAYDAY MAYDAY MAYDAY).
	4. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER The crew declared their intention to return to Madrid.
	5. ATC INTERVENTION/ASSISTANCE ATC gave priority to the aircraft over all others and activated the local alarm.
	6. USE OF TRAINING INSTRUCTIONS While taxiing, the temperature of the tires started to increase and the crew decided to stop the airplane.
	7. AERODROME INTERVENTION/ASSISTANCE The firefighters applied water and brought the fire under control. As a preventive measure they cooled down the entire landing gear.
	8. GOOD COCKPIT PRACTICES Throughout the flight, the crew showed they were in control of the situation and good situational awareness.

IN-013/2011 INCIDENT INVOLVING AN AIRBUS A-320-211 AIRCRAFT, REGISTRATION EC-GRH, OPERATED BY VUELING, AT THE SEVILLE AIRPORT (LEZL) ON 20 APRIL 2011. REPORT APPROVED ON 27 MAY 2015.

With the aircraft at FL350, an amber caution (Master Caution) appeared in the cockpit, accompanied by an ILS FAULT message on the ECAM (Electronic Centralized Aircraft Monitor). At the same time, the captain's primary flight display (PFD) went completely blank. Seconds later, with no corrective action taken, the caution cleared, the PFD was recovered and a new caution appeared, WHEEL NWS FAULT. At that point, the captain instructed the qualified copilot to sit in the RH seat and relieve the copilot under instruction.

The aircraft made initial contact with Seville approach and declared an urgency (PAN-PAN PAN-PAN PAN-PAN), informing of the possibility that they might block the runway A Local Alert was then declared at the Seville Airport, and all other arrival and departure operations were suspended.

While on final approach, a second warning, L/G SHOCK ABSORBER FAULT, was received when the landing gear was lowered. At that time, the crew lost the autopilot (A/P), auto-thrust (A/T) and the flight director (FD) and had to take manual control of the aircraft when they were unable to regain any automatic functions. In the emergency procedure for the WHEEL N. W. STEER FAULT caution there is a note stating that if the L/G SHOCK ABSORBER FAULT is also received, there is a possibility that the nosewheels will be turned perpendicular to the airplane's longitudinal axis. This situation was confirmed from the control tower when the airplane made a low flyover for this purpose.

The crew requested to circle to the south so as not to fly over the city of Seville and to avoid storm clouds they had sighted to the north. The crew once more contacted Seville approach and declared an emergency (MAYDAY MAYDAY MAYDAY), inquiring about the possibility of using foam on the runway to lessen any potential damage. They also held the relevant briefing.

After declaring the emergency, the crew evaluated the situation based on the documentation available on board and their own experience, and decided to land in what they deemed to be the most appropriate way.

During the landing, the aircraft stayed on the center line and decelerated normally, coming to a stop by rapid exit taxiway E3. The nose wheel had blown out. The crew turned off the engines once the airplane came to a stop. They read the evacuation list as a precaution. In contact with the tower and firefighters, who confirmed there was no fire, they decided to disembark the passengers normally.

In her statement, the purser wanted to make special mention of the excellent CRM involving both the cabin crew and the passengers.

The CIAIAC determined that the incident occurred due to the irreversible rotation of the aircraft's nose landing wheels to their physical limit of 95° with respect to the longitudinal axis while the aircraft was in the air and the nose landing gear was down and locked.

As a result of the investigation into the incident, a safety recommendation was issued to the aircraft manufacturer, Airbus S.A.S..

The positive factors in this case were:

	1. HARDWARE SAFETY NET An amber caution (Master Caution) appeared in the cockpit, accompanied by an ILS FAULT message on the ECAM (Electronic Centralized Aircraft Monitor).
	2. THREAT IDENTIFICATION The captain's primary flight display (PFD) went completely blank.
	3.GOOD COCKPIT PRACTICES The captain instructed the qualified copilot to sit in the RH seat and relieve the copilot under instruction.
	4. USE OF TRAINING INSTRUCTIONS The crew declared an urgency (PAN-PAN PAN-PAN PAN-PAN).
	5. ATC INTERVENTION/ASSISTANCE A Local Alert was declared at the Seville Airport, and all other arrival and departure operations were suspended.
	6. HARDWARE SAFETY NET While on final approach, a second warning, L/G SHOCK ABSORBER FAULT, was received when the landing gear was lowered.
	7. THREAT IDENTIFICATION The crew lost the autopilot, auto-thrust and the flight director (FD) and had to take manual control of the aircraft.
	8. VISUAL DETECTION/ANTICIPATION The crew requested to circle to the south so as not to fly over the city of Seville and to avoid storm clouds they had sighted to the north.
	9. USE OF TRAINING INSTRUCTIONS The crew declared an emergency (MAYDAY MAYDAY MAYDAY), requesting the possibility of using foam on the runway to cushion any potential damage, and holding the relevant briefings.
	10. LOGICAL PROBLEM SOLVING The crew evaluated the situation based on the documentation available on board and their own experience, and decided to land in what they deemed to be the most appropriate way.
	11. AIRMANSHIP AND FLIGHT SKILLS During the landing, the aircraft stayed on the center line and decelerated normally.
	12. AERODROME INTERVENTION/ASSISTANCE In contact with the tower and firefighters, they confirmed there was no fire.

13. GOOD COCKPIT PRACTICES

In her statement, the purser wanted to make special mention of the excellent CRM involving both the cabin crew and the passengers.

A-006/2012 ACCIDENT INVOLVING A CESSNA T-210-N AIRCRAFT, REGISTRATION EC-EKV, IN CORTEGANA (HUELVA) ON 8 FEBRUARY 2012. REPORT APPROVED ON 28 SEPTEMBER 2015.

The crew began the flight from the farming track in Utrera, where the aircraft was based. The flight path from Utrera to Cascais took it northwest on a heading that flew over the Sierra de Aracena, at an altitude of 5 000 ft.

Twenty minutes into the flight, the pilot felt the engine misfire, so he swapped the fuel tanks to the right tank, after which power seemed to stabilize. A short time later he felt the same change in engine power, and the temperature reading rose above the maximum. Suddenly the engine started to shake violently and the oil pressure fell below the minimum, after which the engine stopped. The pilot kept the aircraft under control and since he was sufficiently high above the ground, he reported the emergency over the radio. During the unpowered descent, he configured the aircraft with full flaps and the gear up, a configuration that is appropriate for the terrain selected and in keeping with the emergency landing procedure in the Flight Manual, but he was unable to locate a flat, clear field within gliding range. Along with the passenger, he decided to make an emergency landing on the banks of a river due to the uniform aspect of its vegetation and based on his experience as a pilot.

The presence of these trees on the final descent path and landing run caused severe damage to the airplane, but the cockpit was not affected. The landing was performed with great piloting skill, which increased their chances of survival.

The flight preparation was exhaustive and detailed, which was of great use when the emergency occurred. The eyewitnesses who had seen the airplane fall reported to the scene immediately, and the emergency services were quickly dispatched, since upon reaching the road with the pilots, they ran into the police officers and the ambulance.

The investigation resulted in two

recommendations (REC 27/15 and REC 46/15), the former directed at the light aircraft engine manufacturer, Continental Motors Inc., and the latter at AESA, to have it provide more effective supervision of continuing airworthiness management organizations (CAMO), and by extension, of owners and operators.

The positive factors in this case were:

	1. PRE-FLIGHT PREPARATIONS The flight preparation was exhaustive and detailed, which was of great use when the emergency occurred.
	2. ENGINE FAILURE ANTICIPATION He felt the engine misfire and switched fuel tanks. He saw the oil temperature climb above the maximum.
	3. USE OF TRAINING INSTRUCTIONS The pilot kept the aircraft under control and reported the emergency over the radio. Aircraft configured as per the emergency landing procedure in the airplane Flight Manual.
	4. DECISION TO LAND ON AN UNEXPECTED RUNWAY The pilot, along with the passenger, decided to make an emergency landing on the banks of a river due to the uniform aspect and based on his experience.
	5. AIRMANSHIP AND FLIGHT SKILLS The landing was performed with great piloting skill, which increased their chances of survival.
	6. DESIGN REQUIREMENTS The cockpit was not affected.
	7. THIRD-PARTY INTERVENTION The eyewitnesses who had seen the airplane fall reported to the scene immediately, and the emergency services were quickly dispatched.

IN-036/2012 INCIDENT INVOLVING A BOEING B-737-800 AIRCRAFT, REGISTRATION EI-EKV, OPERATED BY RYANAIR, WHILE CLIMBING TO FL220 FROM THE ADOLFO SUÁREZ MADRID-BARAJAS AIRPORT (LEMD) ON 7 SEPTEMBER 2012. REPORT APPROVED ON 24 JUNE 2015.

Before starting the flight, the crew went over the emergencies, among which the captain reviewed cabin depressurization, and they made all the necessary preparations, requesting a mechanic to change the weight to solve a problem with the TAKEOFF WARNING SYSTEM. Once this problem was properly solved, the crew continued with the flight preparations and took off.

While climbing to FL220, and without any prior contact between the cabin and cockpit, the purser call the captain to inform him that the cabin crew were feeling unwell. This call confirmed how he himself was feeling. After the purser's call to the cockpit, the captain decided to declare an emergency, stop the climb, start the CABIN ALTITUDE WARNING procedure, even though the associated warning had not been received, and return to the Adolfo Suárez Madrid-Barajas Airport. As a result of performing the CABIN ALTITUDE WARNING checklist, the outflow valve remained closed until the end of the flight, causing the cabin to overpressurize and then depressurize.

Throughout the flight, and especially after the emergency declaration, the crew exhibited excellent discipline and rigor in the application of all the procedures, in managing the flight and in coordinating with ATC. Likewise, following the captain's emergency declaration, ATC's intention was to give them landing priority, accommodating the performance of holding maneuvers for as long as required by the aircraft.

When the aircraft landed, the rescue and firefighting service was waiting for the aircraft. There was no emergency evacuation and the passengers disembarked normally. Of the 160 passengers, four were treated on the airplane by the airport's medical service and two were taken to the Ramón y Cajal Hospital.

The CIAIAC did not issue any recommendations and determined that the pressurization system on the aircraft worked correctly during the incident flight. The investigation was unable to determine the cause of the symptoms reported by several members of the crew.

The positive factors in this case were:

	1. USE OF TRAINING INSTRUCTIONS After the call from the purser, the captain decided to declare an emergency.
	2. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER The captain decided to return to the Adolfo Suárez Madrid-Barajas Airport.
	3. ATC INTERVENTION/ASSISTANCE The intention of ATC was to give them landing priority, accommodating the operation at all times.
	4. AERODROME INTERVENTION/ASSISTANCE When the aircraft landed, the RFFS was waiting for it. Four of the passengers were treated by the airport's medical service.
	5. GOOD COCKPIT PRACTICES The crew exhibited discipline and rigor in the application of procedures and in managing the flight.

IN-004/2013 INCIDENT INVOLVING AN AIRBUS A-340-313 AIRCRAFT, REGISTRATION CC-CQE, OPERATED BY LAN AIRLINES, AT THE ADOLFO SUÁREZ MADRID-BARAJAS AIRPORT (LEMD) ON 6 FEBRUARY 2013. REPORT APPROVED ON 24 JUNE 2015.

The aircraft, operated by LAN, was flying from Frankfurt to Santiago (Chile) with a stop-over at the Adolfo Suárez Madrid-Barajas Airport. After the stop-over in Madrid, during the climb phase, the flight crew smelled an odor similar to tear gas and smoke rapidly appeared in the aircraft's cockpit. The crew donned their oxygen masks, declared an emergency and requested to return immediately to the Adolfo Suárez Madrid-Barajas Airport.

They alerted both the flight attendants and the relief crew, and confirmed the presence of smoke in the passenger cabin. It should be noted that the coordination between the flight and cabin crews was excellent, keeping in constant contact , which allowed the captain to correctly assess the situation.

The ECAM "AIR PACK 1 REGULATOR FAULT. PACK 1 IN BYPASS MODE" alert was received, indicating that the aircraft had automatically isolated the #1 air pack. This action allowed the smoke to dissipate, after which the crewmembers removed their masks. Due to a fault in the #2 FCMC, the aircraft's weight could not be reduced by jettisoning fuel, so the crew were forced to make an overweight landing. They performed all the normal and abnormal checklists associated with smoke in the cockpit and an overweight landing. The landing was uneventful and the aircraft taxied to parking escorted by the firefighters,

who were monitoring the landing gear.

Air traffic control (ATC) gave priority to the aircraft, allowing for a fast resolution of the emergency. Also, given the possibility that the aircraft could be stuck on the runway after the overweight landing, the parallel runway was checked and readied. The airport also declared a local alarm, which remained in effect until the passengers were disembarked.

The CIAIAC did not issue any recommendations after its investigation. It was determined that the incident occurred due to a fault in the #1 air pack.

The positive factors in this case were:

	1. THREAT IDENTIFICATION The flight crew smelled an odor similar to tear gas and smoke rapidly appeared in the aircraft's cockpit.
	2. USE OF TRAINING INSTRUCTIONS The crew donned their oxygen masks and declared an emergency
	3. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER The crew requested to return immediately to the Adolfo Suárez Madrid-Barajas Airport.
	4. HARDWARE SAFETY NET The ECAM "AIR PACK 1 REGULATOR FAULT. PACK 1 IN BYPASS MODE" alert was received.
	5. USE OF TRAINING INSTRUCTIONS They performed all the normal and abnormal checklists associated with smoke in the cockpit and an overweight landing.
	6. ATC INTERVENTION/ASSISTANCE ATC gave priority to the aircraft and anticipated the potential blocking of the runway in use due to the incident aircraft's overweight landing.
	7. AERODROME INTERVENTION/ASSISTANCE The firefighters escorted the aircraft as it taxied to monitor the landing gear.
	8. GOOD COCKPIT PRACTICES The coordination between the flight and cabin crews was excellent, keeping in constant contact, which allowed the captain to correctly assess the situation.

A-008/2013 ACCIDENT INVOLVING A BOEING B-757-300 AIRCRAFT, REGISTRATION D-ABOC, OPERATED BY CONDOR FLUGDIENST GMBH, AT THE GRAN CANARIA AIRPORT (GCLP) ON 22 MARCH 2013. REPORT APPROVED ON 31 MAY 2016.

The Boeing B-757-300 aircraft took off from the Hamburg Airport (EDDH) on flight DE5944, en route to the Gran Canaria Airport. Aboard were 8 crewmembers and 242 passengers.

During the approach, a strong odor was present in the cockpit and passenger cabin. Coinciding with this odor, several crewmembers experienced physical symptoms. The aircraft completed the approach and landed normally. The passengers were disembarked and preparations for the aircraft's next flight were started. The crew contacted the airline's maintenance department to have it inspect the aircraft. Nothing unusual was found. The crew then decided to run a test of the air conditioning system.

As soon as they started the test, a strong odor appeared, and seconds later the cabin crew reported that two flight attendants in the 2L/R positions had physical symptoms. The crew proceeded to immediately disconnect the air conditioning pack and APU bleed and all of the aircraft's doors were opened to ventilate it. Oxygen was administered to the two flight attendants and the control tower was asked to send an ambulance, which evacuated the two flight attendants to the airport's medical service, where they were treated before being transferred to a hospital.

The scheduled return flight to Hamburg had to be canceled and a new one was scheduled for the next day with a different aircraft that was dispatched from Germany.

The investigation determined that there was circumstantial evidence suggesting that several crewmembers had been affected by a contaminant in the cabin air that was being supplied by the aircraft's air conditioning system. One safety recommendation was issued (REC 15/16) to have the ICAO monitor studies to determine the real impact on human health of exposure to contaminated cabin air.

The positive factors in this case were:

	1. THREAT IDENTIFICATION A strong odor was present in the cockpit and passenger cabin.
	2. LOGICAL PROBLEM SOLVING The crew decided to run a test of the air conditioning system.

	3. THREAT IDENTIFICATION As soon as they started the test, a strong odor appeared.
	4. USE OF TRAINING INSTRUCTIONS The crew proceeded to immediately disconnect the air conditioning pack and APU bleed and all of the aircraft's doors were opened to ventilate it.
	5. AERODROME INTERVENTION/ASSISTANCE The control tower dispatched an ambulance, which evacuated both flight attendants to the airport's medical service.
	6. DECISION TO REJECT TAKEOFF The scheduled return flight to Hamburg had to be canceled.

A-010/2013 ACCIDENT INVOLVING A BOEING B-767-200, REGISTRATION XA-TOJ, OPERATED BY AEROMÉXICO, DURING TAKEOFF FROM THE ADOLFO SUÁREZ MADRID-BARAJAS AIRPORT (LEMD) ON 16 APRIL 2013. REPORT APPROVED ON 24 JUNE 2015.

The aircraft, with callsign AMX002, was cleared to take off from runway 36L at the Adolfo Suárez Madrid-Barajas Airport. According to the account given by the three FA who were at the rear of the aircraft, there was a strange noise during the takeoff run. By the time they alerted the flight crew, the latter had already identified pressurization problems.

During the climb the Cabin Altitude Warning light came on and upon reaching a cabin altitude of 14 000 ft, the passenger oxygen masks were deployed. As a result, the flight crew informed the control center that they were returning to the airport due to pressurization problems.

Aircraft AEA071, which took off behind AMX002, informed the tower after taking off that they thought some debris on the left runway had impacted their aircraft's nosewheel and damaged the tire, so they decided to return. As a result of this call, the local alarm was activated and the control tower requested an inspection of runway 18R/36L, which revealed the presence of metal debris. The crew of another aircraft, which had taken off in sixth place, also reported seeing debris on the runway.

Aircraft AMX002 landed heavy on runway 18L at the airport. Due to the temperature reached by the brakes while landing and then taxiing to parking, the main gear thermal fuses were activated and, once the airplane came to a stop, released the pressure in the main gear tires. The firefighting service set up fans at both landing gear legs to lower the temperature and reduce the risk of fire.

After the investigation, it was concluded that the accident occurred because the aircraft rotated at a speed that much lower than that needed to take off. As a result of the investigation, four recommendations were issued (REC 28/15 - REC 31/15) to the operator intended to enhance the training of its crews.

The positive factors in this case were:

	1. THREAT IDENTIFICATION According to the account given by the three FA, there was a strange noise during the takeoff run. By the time they alerted the flight crew, the latter had already identified pressurization problems.
	2. HARDWARE SAFETY NET During the climb the "Cabin Altitude Warning" was received.
	3. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER The aircraft's flight crew informed the control center that they were returning to the airport due to pressurization problems.
	4. COMMUNICATIONS Aircraft AEA071 informed the tower after taking off that they thought some debris on the left runway had impacted their aircraft's nosewheel. The crew of another aircraft also reported seeing debris on the runway.
	5. ATC INTERVENTION/ASSISTANCE The local alarm was activated and the control tower requested an inspection of runway 18R/36L, which revealed the presence of metal debris.
	6. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER Aircraft AEA071 decided to return.
	7. AERODROME INTERVENTION/ASSISTANCE The firefighting service set up fans at both landing gear legs to lower the temperature and reduce the risk of fire.

IN-012/2013 INCIDENT INVOLVING A RUTAN LONG - EZ AIRCRAFT, REGISTRATION N742TJ, AT THE JEREZ AIRPORT (LEJR) ON 19 MAY 2013. REPORT APPROVED ON 25 MARCH 2015.

The pilot was making a ferry flight from the La Axarquia aerodrome (LEAX) to the Jerez Airport on behalf of the aircraft's new owner so that it could undergo subsequent training and maintenance tasks. During the flight, the pilot was planning to carry out several tests to record performance parameters for the aircraft with a view to the owner's future type rating and solo flight.

Because it interfered with the tests he was planning to do, he opened the breaker for the landing gear, which would lower automatically when approaching stall conditions. While on approach to runway 20 at Jerez, the wind was gusting from 13 to 26 kt, varying from a headwind to an 80º-right crosswind. The pilot stated that he checked the light next to the "Gear Down" label several times, seeing it green.

The landing was soft, the nose remained high for the first part of the landing run until it dropped suddenly when the aircraft's speed diminished. The aircraft only sustained minor scrapes to the underside of the nose due to the contact with the runway surface.

The pilot informed the tower controller that he could not move from the runway. The firefighters were dispatched to assist the aircraft, and inbound aircraft were informed of potential delays or diversions. The firefighters assisted the pilot, who decided to lower the gear electrically, after which the airplane lifted up without problems. The aircraft then taxied under its own power to the parking apron.

The CIAIAC did not issue any recommendations after its investigation. It was determined that the pilot landed without the nose gear extended because he forgot about the position of the 10A breaker powering it. Contributing to the incident were the unfamiliarity with the operation of the landing gear, operating in violation of standard operating procedures and the presence of a green indicator for another system on the gear panel in the pedestal.

The positive factors in this case were:

	1. ATC INTERVENTION/ASSISTANCE The firefighters were dispatched to assist the aircraft, and inbound aircraft were informed of potential delays or diversions.
	2. AERODROME INTERVENTION/ASSISTANCE The firefighters were dispatched to assist the aircraft.

A-013/2013 ACCIDENT INVOLVING A PIPER PA-28RT-201T AIRCRAFT, REGISTRATION EC-KQL, OPERATED BY FLYBAI, AT THE BILBAO AIRPORT (LEBB) ON 21 MAY 2013. REPORT APPROVED ON 27 MAY 2015.

The Piper PA-28RT-201T aircraft, registration EC-KQL, took off from the Bilbao Airport at 09:15 on a planned one-hour local flight to renew its certificate of airworthiness. Aboard were the pilot and an AESA inspector to carry out the tasks required for said renewal.

After completing the relevant maneuvers, the aircraft returned to the airport to land. Once established in the traffic pattern, the pilot saw that the green down and locked light for the right main gear was not on. The pilot asked to fly over the runway so tower personnel could confirm if all three landing gear legs were down. Both the tower and another aircraft on the ground confirmed that all three landing gear legs seemed to be down.

The pilot raised the landing gear, re-joined the traffic pattern and lined up on final once more. Upon lowering the gear, the right main gear leg did not lock in the down position and gave way upon touching down, causing the right wingtip to impact the runway. The pilot proceeded to stop the engine and disconnect the electrical system, after which the aircraft's two occupants exited it under their own power and without any injuries.

The right wing, fuselage and right landing gear leg on the aircraft were damaged, but the cockpit was not deformed. A runway edge light was broken by the right wing as it dragged along the runway.

The cause of the accident was the failure to execute the emergency procedure for lowering the landing gear when the pilot could not confirm that the gear was down and locked, which was in turn caused by a severed electrical wire that kept the gear from lowering and fully locking. This resulted in the aircraft landing with the gear neither down nor locked.

After the investigation a recommendation was issued (REC 36/15) to FLYBAI to have it adapt the emergency procedures in the aircraft's Operations Manual, as well as its aircraft manuals, to the reality of the systems actually installed.

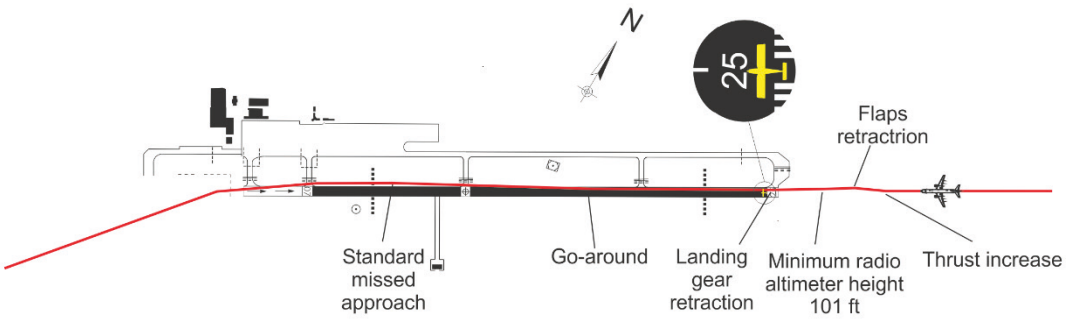
The positive factors in this case were:

	1. THREAT IDENTIFICATION The pilot saw that the right main gear light was not on.
	2. USE OF TRAINING INSTRUCTIONS The pilot asked to fly over the runway so tower personnel could confirm if all three landing gear legs were down.
	3. DESIGN REQUIREMENTS The cockpit was not deformed.
	4. USE OF TRAINING INSTRUCTIONS/STANDARD OPERATING PROCEDURES The pilot proceeded to stop the engine and disconnect the electrical system.

IN-015/2013 INCIDENT INVOLVING A BOEING B-757-200, REGISTRATION G-OOBE, OPERATED BY THOMSON AIRWAYS, AND A DIAMOND DA-20 A1, REGISTRATION EC-IIT, OPERATED BY THE FUNDACIÓN REGO, AT THE REUS AIRPORT (LERS) ON 17 MAY 2013. REPORT APPROVED ON 23 JULY 2015.

On Friday, 17 May 2013, a Boeing B-757-200 aircraft, registration G-OOBE, operated by Thomson Airways, executed a missed approach at the Reus Airport due to a runway incursion by a Diamond DA-20 A1 aircraft, registration EC-IIT, operated by the Fundación Rego.

Aircraft G-OOBE was lined up on the ILS for runway 25 at the Reus Airport, having been cleared to land. Some 6 NM out and 2 000 ft AGL, it went around after noticing an aircraft in the vicinity of the threshold. Said aircraft, registration EC-IIT, was lined up in preparation for taking off. As a result, the incident occurred because an aircraft entered the runway without being authorized to do so.



Subsequently, and in keeping with ATC instructions, the aircraft completed their maneuvers normally. There were no injuries or damage.

The investigation determined that the incident occurred because an aircraft entered the runway without being authorized to do so. Contributing to the incident was the lack of visual surveillance by the controller and the use of improper phraseology.

After the investigation, the CIAIAC issued one recommendation (REC 41/15) to ENAIRE to have if check if the visibility conditions of the runway 25 threshold from the control tower at the Reus Airport are sufficient to ensure that control functions can be performed safely and in keeping with the applicable regulations.

The positive factors in this case were:

	1. VISUAL DETECTION/ANTICIPATION Some 6 NM out and 2 000 ft AGL, the pilot noticed an aircraft in the vicinity of the threshold.
	2. DECISION TO GO AROUND The pilot went around after noticing an aircraft in the vicinity of the threshold.

IN-017/2013 INCIDENT INVOLVING AN ATR 72-212A AIRCRAFT, REGISTRATION EC-KKQ, OPERATED BY SWIFTAIR, IN THE VICINITY OF THE ADOLFO SUÁREZ MADRID-BARAJAS AIRPORT (LEMD) ON 24 JUNE 2013. REPORT APPROVED ON 27 MAY 2015.

The aircraft took off from the Adolfo Suárez Madrid-Barajas Airport en route to Vigo on scheduled flight AEA7306, operated by Air Europa, with 74 persons aboard.

A few minutes after taking off, an alarm was received in the cockpit indicating a fire in the #1 engine, and there was a smell of burning oil. The crew performed the procedure for putting out a fire in the engine and reported the engine failure to ATC, along with their intention to return to the airport.

Control personnel were surprised by the aircraft's courses and flight paths, alerting them to the abnormal situation facing the aircraft, which had been cleared to fly the approach to runway 32L. So they reacted preventively by halting all takeoffs from runway 36L.

In a subsequent contact with ATC, the crew declared an emergency and stated

their intention to land on runway 36L, which, in the airport's current configuration, was being used only for takeoffs. A local alarm was declared. The Airport Management Center dispatched the relevant services in the event of a possible accident/incident.

The aircraft landed and taxied normally. The passengers disembarked in an orderly manner. There was no emergency evacuation.

The investigation determined that the incident involving EC-KKQ occurred due a fan-blade off event affecting the #2 power turbine on the left engine.

As a result of the investigation in this incident, one safety recommendation (REC 45/15) was issued to the operator, Swiftair, to have it draw up a specific training and oversight plan that would allow it to ensure that its crews are executing the emergency procedures in strict accordance with their instruction.

The positive factors in this case were:

	1. HARDWARE SAFETY NET An alarm was received in the cockpit indicating a fire in the #1 engine.
	2. THREAT IDENTIFICATION There was a smell of burning oil.
	3. USE OF TRAINING INSTRUCTIONS The crew performed the procedure for putting out a fire in the engine and reported the engine failure to ATC.
	4. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER The crew informed the ATC station of their intention to return to the airport.
	5. VISUAL DETECTION/ANTICIPATION Control personnel were surprised by the aircraft's courses and flight paths, alerting them to the abnormal situation facing the aircraft.
	6. ATC INTERVENTION/ASSISTANCE Control personnel reacted preventively by halting all takeoffs from runway 36L.
	7. USE OF TRAINING INSTRUCTIONS In a subsequent contact with ATC, the crew declared an emergency and stated their intention to land on runway 36L.
	8. ATC INTERVENTION/ASSISTANCE A local alarm was declared.

IN-020/2013 INCIDENT INVOLVING A PIPER PA-28-140 AIRCRAFT, REGISTRATION EC-CCM, OPERATED BY THE TAS FLIGHT CLUB, AT THE MADRID CUATRO VIENTOS AIRPORT (LECU) ON 21 JULY 2013. REPORT APPROVED ON 25 FEBRUARY 2015.

The Piper PA-28-140 aircraft, registration EC-CCM, took off from runway 10 at the Madrid Cuatro Vientos Airport on a local two-hour flight with the instructor and a pilot aboard. The flight was to be the aircraft pilot's solo flight, so permission was requested from the tower to practice takeoffs and landings.

After doing four takeoffs and landings, the controller asked them to adjust to a departing aircraft, so they decided to prolong the downwind segment to allow the other aircraft to take off. The pattern was longer than usual and the aircraft lined up on long final.

The aircraft touched down 70 m before the threshold. Upon entering the paved part of that end of the runway, it lost the nosewheel and the left wing root hit a light. The aircraft slid down the runway supported on its nose, stopping 210 m away from the threshold.

The pilot cut the fuel and power, turned off the avionics master switch and asked the other pilot to place the fuel selector in OFF. The occupants then exited the aircraft under their own power. They were not injured, but the aircraft sustained significant damage. Emergency services responded immediately.

After its investigation, the CIAIAC did not issue any recommendations. It was determined that the incident was caused by improper piloting technique, namely, the pilot tried to reach the runway by raising the nose without applying more power, which caused the aircraft to stall.

The positive factors in this case were:

	1. USE OF TRAINING INSTRUCTIONS The pilot cut the fuel and power, turned off the avionics master switch and asked the other pilot to place the fuel selector in OFF.
	2. AERODROME INTERVENTION/ASSISTANCE Emergency services responded immediately.

IN-021/2013 INCIDENT INVOLVING AN AIRBUS A-320 AIRCRAFT, REGISTRATION G-OZBW, OPERATED BY MONARCH AIRLINES, ON APPROACH TO THE MÁLAGA-COSTA DEL SOL AIRPORT (LEMG) ON 4 JULY 2013. REPORT APPROVED ON 28 SEPTEMBER 2015.

Aircraft O-OZBW, operated by Monarch Airlines, with 173 persons aboard, took off from the Birmingham Airport (EGBB) en route to the Gibraltar Airport (LXGB). Although the weather conditions were within the operational minimums at the airport, the presence of clouds prevented the crew from establishing visual contact with the runway upon reaching the decision height while on approach to runway 09 at the Gibraltar Airport.

The aircraft went around and even though the fuel planning had been carried out considering the Tangier Airport (GMTT) as the alternate, the aircraft headed toward the Málaga-Costa del Sol Airport. The crew expected to be able to make a direct approach to Málaga, in which case it would arrive with its reserve fuel. While diverting to Málaga, they received a low fuel warning in the cockpit for the left tank (L WING TK LOW FUEL), which shortly afterward included the right tank as well. Associated with these warnings was the indication to land as soon as possible (LAND ASAP).

The traffic situation in Málaga prevented the crew from being able to fly in the expected conditions, so the crew declared a fuel emergency. After obtaining landing priority, the aircraft landed at the Málaga-Costa del Sol Airport with 20 kg in excess of its reserve fuel. There were no injuries or damage and the aircraft did not require assistance from any emergency service.

The investigation determined that the incident of aircraft G-OZBW took place due to the crew's decision to proceed to the Málaga-Costa del Sol Airport as the alternate instead of the Tangier Airport. The final technical report contained four safety recommendations (REC 52/15 – REC 55/15), three of them for the operator, Monarch Airlines, to have it review its operational documentation and upgrade its Operations Manual, and one for the CAA to have it audit the content of the Operations Manual of the operator, Monarch Airlines.

The positive factors in this case were:

	1. VISUAL DETECTION/ANTICIPATION The presence of clouds prevented the crew from establishing visual contact with the runway.
	2. DECISION TO GO AROUND The aircraft executed a go-around.
	3. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER The aircraft proceeded to the Málaga-Costa del Sol Airport.
	4. HARDWARE SAFETY NET While diverting to Málaga, the low-level warnings were received in the cockpit for the left and right fuel tanks. The indication to land as soon as possible (LAND ASAP) also appeared.
	5. USE OF TRAINING INSTRUCTIONS The crew declared a fuel emergency.
	6. ATC INTERVENTION/ASSISTANCE After obtaining landing priority, the aircraft landed at the Málaga-Costa del Sol Airport.

A-025/2013 ACCIDENT INVOLVING A SOCATA TB-10 AIRCRAFT, REGISTRATION EC-FPN, OPERATED BY ADVENTIA, IN VALLESA DE GUAREÑA (ZAMORA) ON 9 AUGUST 2013. REPORT APPROVED ON 24 JUNE 2015.

The Socata TB-10 aircraft took off from the Salamanca Airport (LESA) with a sole occupant aboard, a student who was on a local training flight. Prior to the flight, the walkaround and engine test had not revealed anything unusual.

Twenty minutes into the flight, some 40 km away from the airport, the engine's operation became irregular, not responding to the inputs being made by the pilot to adjust its power. Despite this, the oil pressure and temperature, fuel pressure and level and voltmeter readings were all normal.

Upon confirming he could not maintain his current 3 600 ft altitude, the pilot decided to make an emergency landing, reporting this to ATC, which activated an alert.

Then, even though the engine did not stop completely, the pilot performed the emergency procedure and landed the aircraft on a harvested grain field.

During the landing run, the aircraft ran into the perimeter fence which, despite not stopping it entirely, did drop its speed enough that it stopped on the bank of a stream bed. The pilot was not injured, thanks to the proper execution of the landing and emergency procedure, to the landing terrain selected and to the use of the safety harness. The aircraft, however, was damaged practically beyond repair.

No safety recommendations were issued after the investigation, which determined that the accident was caused by the loss of engine power due to a lack of lubrication of the cam, resulting from a temporary overheating of the magneto, the source of which could not be determined.

The positive factors in this case were:

	1. ENGINE FAILURE ANTICIPATION The engine's operation became irregular, not responding to the inputs being made by the pilot to adjust its power.
	2. DECISION TO LAND AS A PRECAUTION The pilot decided to make an emergency landing.
	3. USE OF TRAINING INSTRUCTIONS The pilot informed ATC of his intention to make an emergency landing.
	4. ATC INTERVENTION/ASSISTANCE An alert was activated.
	5. DECISION TO LAND ON AN UNEXPECTED RUNWAY The pilot performed the emergency procedure and landed the aircraft on a harvested grain field.
	6. DESIGN REQUIREMENTS The pilot was uninjured thanks to using the safety harness.
	7. AIRMANSHIP AND FLIGHT SKILLS The pilot was uninjured thanks to the proper execution of the landing.

A-029/2013 ACCIDENT INVOLVING A ROBINSON R-22 BETA II HELICOPTER, REGISTRATION EC-LAY, OPERATED BY INTERCOPTERS, S.L., IN THE VICINITY OF VILANANT ON 14 SEPTEMBER 2013. REPORT APPROVED ON 28 SEPTEMBER 2015.

A Robinson R-22 Beta II helicopter was on a local introductory flight from and to a field near Vilanant (Girona), with a pilot and one passenger aboard. The flight was part of an activity that entailed a 30 minute theoretical part to prepare the passenger for the flight, and a 10 minute flight, during which the passenger is invited to take control of the helicopter under the pilot's supervision.

Two videos were available, one each for the start and end of the flight, recorded with the passenger's mobile phone. The video from the start of the flight is recorded from the front of the helicopter with the engine running. It shows the pilot and passenger seated in the cockpit with their helmets on and the seat belts fastened.

The flight proceeded as planned until, while returning to the takeoff area and starting a left turn, the helicopter banked sharply to that side and lost altitude, impacting the cables and support structure of a high-voltage power line, catching fire and crashing to the ground.

Some people who witnessed the accident notified emergency services, provided assistance to the helicopter's two occupants and controlled the fire. A few minutes later, officers from the regional police force reached the accident site and secured the area. They were followed by firefighting units, which put out the fire, and medical services.

The accident was likely caused by performing the flight in conditions that did not specifically correspond to any of the activities that the operator was authorized to conduct, in which the passenger momentarily lost control of his actions and froze, causing the pilot to lose control of the helicopter.

After its investigation, the CIAIAC issued one recommendation (REC 62/16) to

AESA to have it increase its oversight of operators that may be advertising operations not considered under the regulation.

The positive factors in this case were:

	1. DESIGN REQUIREMENTS The video shows the pilot and passenger from the front, seated in the cockpit with their helmets on and the seat belts fastened.
	2. THIRD-PARTY INTERVENTION It shows the pilot and passenger seated in the cockpit with their helmets on and the seat belts fastened. Shortly afterward, the police, firefighters and medical personnel arrived.

IN-036/2013 INCIDENT INVOLVING A BOEING B-737-800 AIRCRAFT, REGISTRATION G-FDZG, OPERATED BY THOMSON AIRWAYS, DURING THE APPROACH PHASE TO THE FUERTEVENTURA AIRPORT (GCFV) ON 22 AUGUST 2013. REPORT APPROVED ON 25 NOVEMBER 2015.

The aircraft, operated by Thomson Airways and with callsign TOM85Y, was making its approach to the destination airport on the island of Lanzarote (GCRR), inbound from the London Gatwick Airport (EGKK).

After planning the approach to runway 03, the crew were instructed to proceed to the VOR LTE and make the VOR approach to runway 21 due to changing wind conditions. Once on final approach, a sudden change in wind destabilized the maneuver, as a result of which the crew executed a go-around. The quick access recorder (QAR) data indicated that when at 370 ft, the descent rate reached 1 470 ft/min, which caused the EGPWS to issue a "sink rate" warning.

In light of the problems being experienced by approaching traffic, the crew decided to proceed to the alternate airport on the island of Fuerteventura, where they were cleared for a visual approach, in strict compliance with the requirements of its Operations Manual. Since the fuel remaining was close to final reserve, the crew declared an emergency (MAYDAY MAYDAY MAYDAY). The aircraft landed normally and the passengers were disembarked in an orderly fashion. There was no emergency evacuation.

The CIAIAC concluded that the incident was caused by the execution of a non-precision maneuver at a high descent rate with a tailwind component, which resulted in a go-around maneuver with a subsequent diversion to the alternate

airport, and caused a fuel emergency declaration (MAYDAY MAYDAY MAYDAY).

After the investigation one recommendation (REC 61/15) was issued to SAERCO, the control services provider at the Lanzarote Airport, to have it conduct an in-depth study of the meteorological and operational conditions that require operations on runway 21 in order to make it easier for controllers to make decisions that allow for stable operations.

The positive factors in this case were:

	1. HARDWARE SAFETY NET The EGPWS alerted of a high sink rate condition.
	2. DECISION TO GO AROUND The crew executed a go-around maneuver.
	3. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER In light of the problems being experienced by approaching traffic, the crew decided to proceed to the alternate airport on the island of Fuerteventura.
	4. USE OF TRAINING INSTRUCTIONS Since the fuel remaining was close to final reserve, the crew declared an emergency (MAYDAY MAYDAY MAYDAY).

IN-039/2013 INCIDENT INVOLVING A BOEING B-737-800, REGISTRATION EI-DPF, OPERATED BY RYANAIR, WHILE CLIMBING OUT OF THE TANGIER AIRPORT (GMTT) ON 8 NOVEMBER 2013. REPORT APPROVED ON 28 SEPTEMBER 2015.

After taking off from the Tangier Airport, Morocco, en route to the Niederrhein Airport (EDLV), Germany, aircraft EI-DPF, with 181 persons aboard, experienced an in-flight emergency when smoke appeared above the baggage compartment.

The cabin crew evaluated and characterized the type of smoke and provided complete and proper information to the flight crew, which declared an emergency due to smoke in the cabin and diverted to the Seville Airport (LEZL). Air traffic services gave landing priority to the aircraft and activated the emergency plan at the Seville Airport.

The aircraft exited the runway by exit taxiway E3, where it stopped. The firefighters entered the aircraft, where they determined there were no apparent signs of smoke or fire. Despite this, the captain decided to disembark the passengers in the taxiway, lest any problems arise while taxiing. The

passengers disembarked normally and were taken to the terminal. They were boarded onto another aircraft to their destination four hours later. There were no injuries to the passengers or damage to the aircraft.

The investigation determined that the incident was caused by poor condition of the fire-retardant adhesive strips in three of the joints between the overhead distribution ducts and the flex hoses that channel the air to the lateral vents in the passenger cabin

The technical report included two recommendations (REC 56/15 and 57/15), the former for the operator, Ryanair, and the latter for AENA-Seville Airport.

The positive factors in this case were:

	1. THREAT IDENTIFICATION The cabin crew evaluated and characterized the type of smoke.
	2. USE OF TRAINING INSTRUCTIONS The cabin crew reported the presence of smoke to the flight crew. The crew declared an emergency due to smoke in the cabin.
	3. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER The aircraft diverted to the Seville Airport.
	4. ATC INTERVENTION/ASSISTANCE Air traffic services gave landing priority to the aircraft and activated the emergency plan at the Seville Airport.
	5. AERODROME INTERVENTION/ASSISTANCE The firefighters entered the aircraft, where they determined there were no apparent signs of smoke or fire.
	6. LOGICAL PROBLEM SOLVING The captain decided to disembark the passengers in the taxiway, lest any problems arise while taxiing.

IN-041/2013 INCIDENT INVOLVING A CESSNA 172-H "REIMS" AIRCRAFT, REGISTRATION EC-CXP, IN THE VICINITY OF TOLEDO ON 24 NOVEMBER 2013. REPORT APPROVED ON 8 JUNE 2015.

The pilot and two passengers departed from the Madrid Cuatro Vientos Airport (LECU) to make a local flight. It was the aircraft's second flight that day, but the first by the pilot.

Fifty minutes into the flight, while near Toledo, the pilot heard a different noise in the engine and checked the engine parameters, which were all normal. He then heard a loud noise and the power fell to 2 000 RPM. The speed dropped if he tried to maintain the altitude, so he decided to land. Before making the emergency landing, he chose a flat, plowed field. He reported the emergency on 121.50 MHz and set code 7700 on the transponder.

During the landing, he correctly lowered the flaps and secured the cabin. He landed at the lowest possible speed and made a good landing, parallel to the furrows, which is the correct way to perform such a landing, and managed to bring the aircraft to a stop in a short distance. The engine did not stop. The occupants were wearing their seat belts, which worked properly. The occupants were not injured. The aircraft sustained no damage, except that limited to the engine.

The loss of engine power was determined to have been caused by a static overload fracture of the no. 6 cylinder due to a fatigue crack that was not detected in either of the two maintenance checks conducted prior to the event. After the investigation, a safety recommendation was issued to the manufacturer of the aircraft, Cessna, to have it incorporate into the maintenance manual the contents of SB96-12.

The positive factors in this case were:

	1. ENGINE FAILURE ANTICIPATION While near Toledo, the pilot heard a different noise in the engine and checked the engine parameters, which were all normal. He then heard a loud noise and the power fell to 2 000 RPM.
	2. DECISION TO LAND AS A PRECAUTION The speed dropped if he tried to maintain the altitude, so he decided to land.
	3. DECISION TO LAND ON AN UNEXPECTED RUNWAY Before making the emergency landing, he chose a flat, plowed field.
	4. USE OF TRAINING INSTRUCTIONS He reported the emergency on 121.50 MHz and set code 7700 on the transponder.

	5. AIRMANSHIP AND FLIGHT SKILLS He landed at the lowest possible speed and made a good landing, parallel to the furrows, which is the correct way to perform such a landing, and managed to bring the aircraft to a stop in a short distance.
	6. DESIGN REQUIREMENTS The occupants were wearing their respective seat belts.

IN-042/2013 INCIDENT INVOLVING A PIPER PA-28-161, REGISTRATION EC-IKG, OPERATED BY FLIGHT TRAINING EUROPE, AND AN AIRBUS A-320-214, REGISTRATION EI-DEA, OPERATED BY AER LINGUS, IN THE VICINITY OF THE MÁLAGA-COSTA DEL SOL AIRPORT (LEMG) ON 7 NOVEMBER 2013. REPORT APPROVED ON 27 MAY 2015.

On 7 November 2013, a Piper PA-28-161 aircraft was on a training flight with callsign AYR52A from the Málaga-Costa del Sol Airport to the Jerez Airport (LEJR). Another aircraft, an Airbus A-320-214, was on a flight with callsign EIN58Y from the Málaga-Costa del Sol Airport to the Dublin Airport (EIDW).

Aircraft AYR52A, which had standard instrument departure (SID) JRZ1M assigned to it, was ahead in the takeoff sequence from runway 31 of aircraft EIN58Y, which was assigned SID BLN1M.

Aircraft AYR52A was cleared by the controller in the Málaga tower to take off. It delayed its departure one minute for separation with the preceding traffic and then reported it was on its takeoff run. A few seconds later, it was transferred to Málaga Approach.

Aircraft EIN58Y was cleared to take off by the Málaga TWR and then transferred to Málaga APP.

A few minutes later, aircraft EIN58Y was slowly approaching AYR52A. Málaga APP identified the conflict and instructed AYR52A to turn left immediately, taking it out of the SID it was flying. Málaga APP also contacted the LEMG TWR several times to have it instruct EIN58Y to stop climbing. This action resulted in the aircraft crossing further apart horizontally without EIN58Y receiving an advisory from its on-board TCAS.

The main cause of the incident was the Málaga TWR's breach of the procedure for separating traffic on consecutive takeoffs and the superior performance of the second aircraft to that of the preceding traffic.

	1. THREAT IDENTIFICATION Málaga APP identified the conflict.
	2. ATC INTERVENTION/ASSISTANCE Málaga APP identified the conflict and instructed AYR52A to turn left immediately.

A-043/2013 ACCIDENT INVOLVING A BOEING B-767-332 AIRCRAFT, REGISTRATION N182DN, OPERATED BY DELTA AIR LINES, AT THE ADOLFO SUÁREZ MADRID-BARAJAS AIRPORT (LEMD) ON 5 DECEMBER 2013. REPORT APPROVED ON 31 MAY 2016.

The Boeing B-767-332 aircraft took off from runway 36L at the Adolfo Suárez Madrid-Barajas Airport en route to the JFK Airport (KJFK) in New York with 192 passengers, 3 pilots and 8 flight attendants aboard.

During the takeoff run, a tire on the right main gear blew out, the debris from which struck the lower surface of the wing, creating a hole in it and also fracturing important components in the hydraulic system. These, in turn, detached and struck the upper surface of the wing, causing the loss of one of the cover panels.

When at an altitude of approximately 400 ft, the Master Caution indication turned on, informing of a practically simultaneous "R&C Hyd Low" fault. The fault in the hydraulic system made it impossible to retract the landing gear. The crew detected this immediately while climbing and declared an emergency (MAYDAY MAYDAY MAYDAY).

The Control Center asked the crew to confirm if they wanted to return to the airport, to which the crew replied that they did. A local alarm was declared and the control room asked the tower to close runway 36L. It should be noted that the controllers involved in the emergency had ample experience and followed procedures and used standard phraseology at all times, guiding the aircraft in an orderly manner without bogging down the crew with unnecessary interruptions.

The aircraft returned to the airport as per the instructions received from ATS, landing on runway 32L. Once on the ground, the crew realized they had lost braking capacity, and before entering the grassy area where they came to a stop, they secured the engines by stopping them and turning off

the reversers.

There was no fire during the landing. However, the airport's firefighters, who were the first to identify the tire blow-out as they heard a loud noise when the aircraft passed in front of the station located north of the airport, escorted the aircraft during its landing run and, once stopped, took steps to cool down the gear.

The cause of the incident was the blow-out of one of the main gear tires, which was in turn caused by a metal part that had been lodged inside it during a retreading process.

In the wake of the investigation, five recommendations were issued (REC 10/16-REC 14/16), one to Delta Air Lines to ensure that its crews are knowledgeable of the AIP information for the Adolfo Suárez Madrid-Barajas Airport, one to ENAIRE to have it review the Emergency Manual, two to Boeing to have it change the QRH and evaluate the development of mitigating measures to minimize damage to areas that could be affected by a tire blow-out, and one to Goodyear to have it check its quality system.

The positive factors in this case were:

	1. HARDWARE SAFETY NET The Master Caution was energized, indicating a "R&C Hyd Low" fault.
	2. THREAT IDENTIFICATION The fault in the hydraulic system made it impossible to retract the landing gear. The crew detected this immediately.
	3. USE OF TRAINING INSTRUCTIONS The crew declared an emergency (MAYDAY MAYDAY MAYDAY).
	4. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER ATC asked the crew to confirm if they wanted to return to the airport, to which the crew replied that they did.
	5. ATC INTERVENTION/ASSISTANCE A local alarm was declared and the control room asked the tower to close runway 36L.
	6. USE OF TRAINING INSTRUCTIONS Before entering the grassy area , they secured the engines by stopping them and turning off the reversers.

7. AERODROME INTERVENTION/ASSISTANCE

The airport's firefighters, who were the first to identify the tire blow-out, escorted the aircraft during its landing run and, once stopped, took steps to cool down the gear.

IN-044/2013 INCIDENT INVOLVING AN ATR 72-212 AIRCRAFT, REGISTRATION EC-LFA, OPERATED BY NAYSA, AT THE TENERIFE NORTH-LOS RODEOS AIRPORT (GCXO) ON 11 DECEMBER 2013. REPORT APPROVED ON 24 JUNE 2015.

The aircraft, operated by Naysa, took off from the Gran Canaria Airport (GCLP) on a commercial passenger flight en route to the Tenerife North-Los Rodeos Airport on the island of Tenerife.

Once on approach and on the tower frequency, the crew were cleared to continue the approach after inquiring about the status of the preceding traffic on final and whether it was still on the runway or not.

Later, after the preceding traffic cleared the runway, they were cleared to land on runway 12 and told of the prevailing wind conditions. Just as the crew finished its acknowledgment, the preceding aircraft warned of the presence of heavy rain.

As the crew were close to touching down at the point on the runway near the E1 taxiway, their vertical speed was excessive, causing the aircraft to bounce several times and to divert to the left by the time they reached the E2 taxiway. Eventually the nose wheel departed the runway and rolled onto the grassy area to the left of runway 12.

The captain then reported "runway excursion" to the tower and informed they would require assistance to move and that they were evacuating.

The airport's Emergency Plan was activated and the passengers were evacuated and the aircraft was towed. The runway remained closed, forcing various aircraft to be diverted to their alternate airports.

The incident occurred as a result of a hard landing with the aircraft in an incorrect attitude. Contributing to this was a faulty perception of distance due to the optical illusions generated by the adverse meteorological conditions

that prevailed at the time of the landing. No safety recommendations were issued.

The positive factors in this case were:

	1. COMMUNICATIONS The preceding aircraft warned of the presence of heavy rain.
	2. HARDWARE SAFETY NET The EGPWS issued the relevant warnings.
	3. USE OF TRAINING INSTRUCTIONS The captain reported "runway excursion" to the tower and informed they would require assistance to move.
	4. ATC INTERVENTION/ASSISTANCE The airport's Emergency Plan was activated and the passengers were evacuated and the aircraft was towed.

IN-045/2013 INCIDENT INVOLVING AN AIRBUS A-320-200, REGISTRATION D-AICE, OPERATED BY CONDOR FLUGDIENST GMBH, IN THE VICINITY OF THE TENERIFE SOUTH-REINA SOFÍA AIRPORT (GCTS) ON 11 DECEMBER 2013. REPORT APPROVED ON 29 APRIL 2015.

The Airbus A-320-200 was inbound from Hamburg and entered the Canaries FIR some five hours into its flight. In light of the forecast, the crew were anticipating complicated weather conditions upon reaching their destination, which is why they had decided to take on additional fuel. The aircraft was diverted from the initially assigned STAR to go around a storm cell and continue its approach in an effort to capture the runway localizer.

ATC then informed the crew that the glide path on the ILS was inoperative, so the crew prepared to do a non-precision (LOC DME) approach. The crew, which was not informed that the DME on the runway's ILS was also inoperative, erroneously used as its reference distance to the touchdown point the VOR DME, callsign TFS, located along the coastline and 5.7 NM before the runway. With that reference distance, the crew started the final descent early with neither the crew nor ATC detecting the vertical deviation in the flight path.

In the final phase of the approach, the EGPWS unit issued a terrain conflict warning. The crew reacted by aborting the approach and, in light of the bad weather, opted to divert to Fuerteventura, where they landed without incident.

Following its investigation the CIAIAC concluded that the cause of the incident was the erroneous use of the distance to the TFS VOR/DME as the reference for the distance to the runway, and continuing the approach below the minimum descent altitude without acquiring clear visual references of the runway

As a result of the investigation, seven recommendations (REC 19/15 – REC 25/15) were issued. Three of them were directed at the operator, Condor Flugdienst GmbH, to have it clarify its approach charts and to raise awareness in its crews on the usefulness of the EGPWS to improve situational awareness and on the importance of call-outs. The other four were directed at ENAIRE to have it review the callsign and configuration of its ILS installations, to enhance communications between ATC and maintenance personnel, and to provide training to its controllers.

The positive factors in this case were:

	1. PRE-FLIGHT PREPARATIONS AND PRECAUTIONS In light of the weather forecast, the crew had loaded additional fuel.
	2. HARDWARE SAFETY NET In the final phase of the approach, the EGPWS unit issued a terrain conflict warning.
	3. DECISION TO GO AROUND The crew reacted by aborting the approach.
	4. VISUAL DETECTION/ANTICIPATION In light of the bad weather, the crew opted to divert to Fuerteventura.
	5. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER The crew diverted to the Fuerteventura Airport.

A-004/2014 ACCIDENT INVOLVING A EUROCOPTER AS-355-N AIRCRAFT, REGISTRATION EC-FTX, OPERATED BY COYOTAIR, AT THE CASARRUBIOS DEL MONTE AERODROME (LEMT) ON 24 FEBRUARY 2014. REPORT APPROVED ON 28 JANUARY 2015.

The flight on which the accident occurred was intended to satisfy the operator's proficiency check, line check and refresher training requirements. Aboard the aircraft were an instructor pilot and the pilot being checked. They had also planned to film the maneuvers flown and to use the footage as part

of the operator's training programs.

After completing part of the planned maneuvers, the pilot being checked, who was the pilot flying, began the maneuvers associated with a rolling landing with a simulated fault of the tail rotor. He attempted two rolling landings without completing the maneuver, and asked the check pilot to try the maneuver. On the third rolling landing, the check pilot took the controls and started the maneuver with a shallow approach. The helicopter's right skid contacted the ground and started sliding on it, but a short time later it began to sink. The skid dug deeper into the ground, eventually causing the aircraft to turn over. As it turned over, the main rotor blades impacted the ground, causing them to break. The aft part of the tail cone also broke and detached. The front of the helicopter ended up impacting the ground, and the helicopter finally fell on its left side.

After the accident, as the pilots tried to shut off the helicopter engines, and since the fuel shut-off control levers did not work, they positioned the engine start switches to off. After this, the aircraft's occupants were able to exit it under their own power. A small fire broke out that was put out by the personnel present at the location using extinguishers.

The accident occurred due to the incorrect execution of a training maneuver. Contributing to the accident were the insufficient preparation prior to the training flight and the execution of a rolling landing at excessive speed, to the side opposite that indicated in the flight manual, on soft ground.

No safety recommendations were issued after the accident due to the measures taken by the operator, which included the immediate step to do away with this type of maneuver.

The positive factors in this case were:

	1. USE OF TRAINING INSTRUCTIONS After the accident, the pilots placed the start switches in "off".
	2. AERODROME INTERVENTION/ASSISTANCE A small fire broke out that was put out by the personnel present at the location using extinguishers.

IN-005/2014 INCIDENT INVOLVING A BOEING MD-11 AIRCRAFT, REGISTRATION PH-MCU, OPERATED BY MARTINAIR CARGO, AT THE TENERIFE SOUTH-REINA SOFÍA AIRPORT (GCXO) ON 9 MARCH 2014. REPORT APPROVED ON 28 SEPTEMBER 2016.

The Boeing MD-11 aircraft was flying from the Amsterdam Airport Schiphol (EHAM), Holland, to the Viracopos International Airport (SBKP), Brazil, which included a stopover at the Tenerife South-Reina Sofía Airport.

While taking off from Tenerife South, during the initial climb, the crew heard a loud sound, similar to an explosion, and felt the aircraft yaw to the right. Shortly afterward they felt vibrations and, looking at the engine readings, noticed that the parameters for the #3 engine were not normal. After discussing it, they concluded that the right engine had been severely damaged. The called ATC and declared an emergency (MAYDAY MAYDAY MAYDAY).

In keeping with the operator's procedures, the captain took over as the pilot flying (PF). The crew correctly applied the procedure for severe engine damage, immediately after which the fire warning for the #3 engine was activated. The crew applied the relevant procedure, which is the same as that for severe engine damage. The fire alarm for the engine then cleared. They decided to return to the airport of departure. They assessed the situation and decided to jettison fuel to lower their landing weight.

The supervisor coordinated with the airport to stop all departing and arriving traffic until the incident aircraft could land. The controller provided vectors to the crew for the duration of the fuel jettison procedure. Once the necessary amount of fuel was jettisoned, they proceeded to return to the Tenerife South-Reina Sofía Airport, where they landed normally. The firefighters escorted the aircraft during the landing, noticing nothing abnormal. A short time later, they reported that a temperature reading of the brakes gave a value in excess of 200° C.

The investigation determined that the failure of the #3 engine was the result of the detachment of one of the guide vanes in group #22 of the stator in the 4th stage of the low-pressure turbine (LPT).

The investigation produced two recommendations (REC 33/16 and REC 34/16), issued to the engine manufacturer, Pratt & Whitney, to have it take immediate measures for quantifying the risk of 2E excitation and to have it conduct additional inspections of those engines that were deemed to be "safe" against 2E excitation.

The positive factors in this case were:

	1. ENGINE FAILURE ANTICIPATION The crew heard a loud sound and felt the aircraft yaw to the right. They felt vibrations and noticed that the parameters for the #3 engine were not normal.
	2. USE OF TRAINING INSTRUCTIONS They called ATC and declared an emergency (MAYDAY MAYDAY MAYDAY).
	3. GOOD COCKPIT PRACTICES In keeping with the operator's procedures, the captain took over as the pilot flying (PF).
	4. USE OF TRAINING INSTRUCTIONS The crew correctly applied the procedure for severe engine damage.
	5. HARDWARE SAFETY NET The fire warning for the #3 engine was received.
	6. USE OF TRAINING INSTRUCTIONS The crew applied the relevant procedure, which is the same as that for severe engine damage.
	7. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER They decided to return to the airport of departure.
	8. USE OF TRAINING INSTRUCTIONS They assessed the situation and decided to jettison fuel to lower their landing weight.
	9. ATC INTERVENTION/ASSISTANCE The supervisor coordinated with the airport to stop all departing and arriving traffic and provided vectors to the crew for the duration of the fuel jettison procedure.
	10. AERODROME INTERVENTION/ASSISTANCE The firefighters escorted the aircraft during the landing and measured the brake temperature.

A-006/2014 ACCIDENT INVOLVING A CESSNA 205 AIRCRAFT, REGISTRATION EC-GQB, IN LA DONAL, YESTE (ALBACETE), AT 17:30 LOCAL TIME ON 22 MARCH 2014. REPORT APPROVED ON 15 NOVEMBER 2015.

The aircraft, a Cessna 205, took off from the runway at the Aeronáutica Delgado maintenance center in Villarrubia (Cordoba). One hour into the flight, the engine lost power and the oil pressure dropped. The pilot changed the fuel selector, enriched the mixture, opened the alternate air intake and turned on the fuel pumps. A few seconds later, smoke entered the cockpit, so the pilot opened the window to let the smoke out.

The pilot decided he had to make an emergency landing, so he cut the mixture, closed the fuel selector and turned off the pumps and electrical system. He found a crop field and while flying the downwind leg, the propeller froze. He secured the airplane by closing the fuel tank valves and turning off the fuel pumps. He left the master switch on in case he needed to use the flaps.

He flew the pattern and during the base leg, after seeing a power line, lowered the flaps to avoid striking it. He executed a three-point landing, since he had lost speed to fly over the lines, managing to complete a satisfactory emergency landing in complicated terrain. The airplane turned over during the landing run. Once stopped, the occupants unfastened their harnesses and exited the aircraft under their own power.

No recommendations were issued after the investigation, which determined that the accident had been caused by the lack of suitable lubrication of the #2 crank arm-crankpin bottom-end bearing, possibly due to wear of the bottom-end bearing.

The positive factors in this case were:

	1. ENGINE FAILURE ANTICIPATION The engine lost power and the oil pressure dropped.
	2. DECISION TO LAND AS A PRECAUTION The pilot decided he had to make an emergency landing.
	3. DECISION TO LAND ON AN UNEXPECTED RUNWAY He found a crop field.

	4. USE OF TRAINING INSTRUCTIONS He secured the airplane by closing the fuel tank valves and turning off the fuel pumps. He left the master switch on in case he needed to use the flaps.
	5. THREAT IDENTIFICATION He saw a power line on the base leg.
	6. AVOIDANCE MANEUVER He lowered the flaps to avoid striking the power line.
	7. AIRMANSHIP AND FLIGHT SKILLS He managed to complete a satisfactory emergency landing in complicated terrain.
	8. DESIGN REQUIREMENTS Once stopped, the occupants unfastened their harnesses and exited the aircraft under their own power.

EXT A-006/2014 ACCIDENT INVOLVING A BOEING B-737-800 AIRCRAFT, REGISTRATION EI-ENB, OPERATED BY RYANAIR, IN THE VICINITY OF TOULOUSE ON 23 JUNE 2014. REPORT APPROVED ON 27 APRIL 2016.

The Boeing B-737-800, operated by Ryanair, was on flight RYR4398 between the airports of Dublin (EIDW) and Reus (LERS).

Some 7 NM before reaching Toulouse, the crew began a right turn in an effort to avoid a storm cell that was developing over Toulouse. However, the crew were unable to keep the aircraft from flying through the side of the storm, which resulted in the turbulence that is typical of this kind of atmospheric phenomena, and which lasted 29 s.

Due to the violent motion of the aircraft, two passengers were hurt, one of them seriously. Three flight attendants were also injured.

The rest of the flight was uneventful, and the airport landed at its destination airport normally. The passengers were disembarked via the front door to allow medical personnel to enter by the back.

Two of the injured passengers were evacuated immediately by ambulance to a hospital. The three flight attendants were later taken by a second hospital to a hospital.

The investigation determined that the accident was caused by the flight crew's failure to detect a developing convective cloud, the severe turbulence associated

with which affected the aircraft and caused several crewmembers and passengers who had not been alerted to the presence of the turbulence to be injured.

The investigators considered issuing a safety recommendation to the operator to provide enhanced crew resource management training. However, during the investigation, the operator provided evidence that it had improved its training of the areas identified as lacking. These measures were deemed to be effective and, as a result, no safety recommendations were issued.

The positive factors in this case were:

1. AERODROME INTERVENTION/ASSISTANCE

The injured passengers were evacuated by ambulance.

IN-007/2014 INCIDENT INVOLVING A PIERRE ROBIN DR.400-120 AIRCRAFT, REGISTRATION G-OYIO, AT THE BURGOS AIRPORT (LEBG) ON 27 MARCH 2014. REPORT APPROVED ON 27 MAY 2015.

On 27 March 2014, a Pierre Robin DR.400-120 aircraft, registration G-OYIO, with two persons aboard took off from the Evora Airport (LPEV), Portugal, en route to the Burgos Airport. It was part of a group of airplanes that was on a flying tour of Europe and north Africa.

While on approach to the Burgos Airport, the pilot tuned into the aerodrome flight information service (AFIS) and joined the right downwind leg for runway 22. He continued toward the base leg before finally landing on taxiway C. At the same time another aircraft, as instructed by the AFIS operator, had to stop taxiing at the other end of the same taxiway.

After the analysis of the event, its most likely cause was deemed to be the faulty interpretation by the pilot during the landing maneuver of the non-luminous marking on the runway and taxiway at the airport.

A contributing factor was the condition of the marking on the date of the event, which was subject to misinterpretation by pilots, causing them to land on the wrong surface.

No safety recommendations were issued after the investigation.

The positive factors in this case were:

1. ATC INTERVENTION/ASSISTANCE

At the same time another aircraft, as instructed by the AFIS operator, had to stop taxiing.

IN-008/2014 INCIDENT INVOLVING A SWEARINGEN MERLIN III AIRCRAFT, REGISTRATION N125WG, OPERATED BY MEDELAIR, AND A CESSNA 152 AIRCRAFT, REGISTRATION EC-JNL, OPERATED BY THE AEROCLUB DE SEVILLA, IN THE PATTERN AT THE SEVILLE AIRPORT (LEZL) ON 27 MARCH 2014. REPORT APPROVED ON 29 MARCH 2016.

Aircraft EC-JNL was doing takeoffs and landings on runway 27 at the Seville Airport. Aircraft N125WG was cleared to enter the pattern from point N and circle in front of the tower, and decided to do so at 1 500 ft without reporting its altitude at any point due to a lack of knowledge of the airport's Visual Approach Chart, which specifies a maximum altitude above ground level of 1 000 ft.

The controller instructed aircraft EC-JNL to circle in the first third of the downwind leg of runway 27 and reported the presence of another VFR traffic circling in front of the tower. The crew of EC-JNL did not fully acknowledge the instruction, and continued on the downwind leg, as it had done during the previous takeoffs and landings. The controller instructed N125WG to circle at 1 000 ft to separate it from possible interference with an IFR traffic departing on SID HIJ2G.

The instructor in EC-JNL stated seeing N125WG approaching faster than expected and thought the safety of both aircraft could be compromised, so he ordered the student to release the controls and he took control, commencing a descent to avoid a collision and informing the controller that he had N125WG in sight and very close. The pilot of N125WG confirmed the information he had given to EC-JNL. Both aircraft landed some 15 minutes later after being cleared to do so.

The aircraft came within 0.7 NM and 0 ft of each other, when aircraft EC-JNL had visual contact with the other aircraft and initiated an evasive maneuver. The separation between them was subsequently reduced to 0.1 NM horizontally and 200 ft vertically.

The incident was caused by a faulty acknowledgment by the crew of aircraft EC-JNL to circle in the first third of the downwind leg of the aerodrome's

pattern, which was not identified or corrected by the tower controller.

In the wake of the investigation, three recommendations were issued (REC 07/16 - REC 09/16), one to FerroNATS, to have it improve the personnel of its control personnel in terms of VFR traffic, and two to the Aeroclub de Sevilla, to have it instruct its pilots on following and acknowledging instructions and to have it distribute the final report of this incident among its pilots for training purposes.

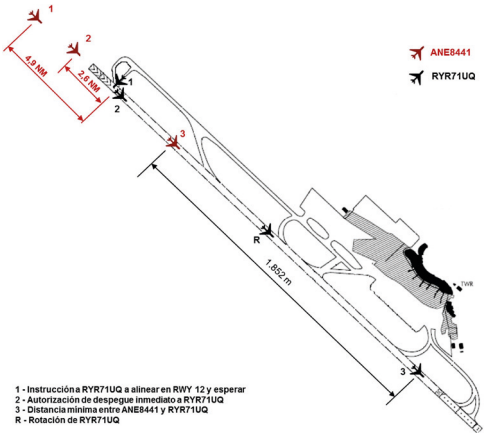
The positive factors in this case were:

	1. THREAT IDENTIFICATION The instructor on EC-JNL saw N125WG approaching at a speed that was higher than expected.
	2. GOOD COCKPIT PRACTICES He ordered the student to let go of the controls and he took control.
	3. AVOIDANCE MANEUVER Aircraft EC-JNL was in visual contact with the other aircraft and started an evasive maneuver.

IN-011/2014 INCIDENT INVOLVING A CANADAIR CL-600-2B19 AIRCRAFT, REGISTRATION EC-HPR, OPERATED BY AIR NOSTRUM, AND A BOEING B-737-800 AIRCRAFT, REGISTRATION EI-EBG, OPERATED BY RYANAIR, AT THE VALENCIA AIRPORT (LEVC) ON 27 APRIL 2014. REPORT APPROVED ON 24 FEBRUARY 2016.

The Air Nostrum aircraft with callsigns ANE8976 and ANE8441 were sequenced for approach to runway 12 at the Valencia Airport. The tower controller thought that the Ryanair flight RYR71UQ would be able to take off between the landings of ANE8976 and ANE8441.

As ANE8976 was landing, the tower cleared RYR71UQ to line up and wait on runway 12, after its crew had confirmed they were ready for immediate takeoff. The controller then informed ANE8441 to expect a late landing clearance. At the same time he instructed ANE8976 to expedite leaving the runway. Once notified by the crew of said aircraft that the runway was clear, he cleared RYR71UQ to take off.



The crew of ANE8441 stated they were surprised when they heard the takeoff clearance for RYR71UQ. They eventually received the late landing clearance, but thought that the sequence was very tight. They decided to land despite not meeting the required separation criteria. In this situation, the decision to land is deemed to have been the safest option, since the preceding aircraft, RYR71UQ, was on the final phase of the takeoff maneuver, and had ANE8411 executed a go-around, it could have compromised the safety of both aircraft. The aircraft were able to complete their maneuvers with no further consequences.

After its investigation, the CIAIAC did not issue any safety recommendations. The incident was deemed to have been caused by improper handling of the landing and takeoff sequence at the Valencia Airport, which violated the traffic separation procedures laid out in the applicable regulations, including Spain's Air Traffic Regulations. Contributing to the incident is the failure of the crew of ANE8976 to acknowledge its inability to comply with the instruction to clear the runway.

The positive factors in this case were:

	1. VISUAL DETECTION/ANTICIPATION The crew of ANE8441 stated they were surprised when they heard the takeoff clearance for RYR71UQ. They received the late landing clearance, but thought that the sequence was very tight.
	2. LOGICAL PROBLEM SOLVING They decided to land despite not satisfying the required separation criteria. In this situation, the decision to land is deemed to have been the safest option.

A-012/2014 ACCIDENT INVOLVING A ROBINSON R-44 II AIRCRAFT, REGISTRATION EC-JTC, IN A LOXA-CORNAZO, VILAGARCÍA DE AROUSA (PONTEVEDRA) ON 31 MAY 2014. REPORT APPROVED ON 27 MAY 2015.

The helicopter took off from Sanxenxo (Pontevedra) en route to Caldas de Reis (Pontevedra). Aboard were the pilot, seated in the front RH seat, and two passengers, one seated in the front LH seat and the other in the aft LH seat so as to balance the weight as much as possible.

Before starting the flight, the pilot held a briefing with the two passengers, instructing them how to open and close the doors, fasten and unfasten their seatbelts, etc.

Over the course of the flight, while flying over a forest, a loud noise was heard emanating from the rear of the aircraft. At that point the aircraft yawed hard to the right, not reaching 90º. The pilot thought that the tail rotor had broken and took the corresponding actions. He reduced power and throttled down the gas. Upon seeing a power line ahead of them and realizing they would not clear it, he decided to look for another path on his side, to the right.

The pilot, cognizant of the emergency, redirected the flight to an area as clear as possible despite not having directional control of the aircraft, thus managing to minimize the damage. This area was a small inclined clearing surrounded by trees, where the aircraft touched down and turned on its left side. Hanging by his seatbelt, he cut the mixture to turn off the engine, put the battery switch in "off" and closed the fuel valve to the engine. The persons aboard, who were flying with their seatbelts fastened, exited the aircraft under their own power.

No safety recommendations were issued after the investigation. The CIAIAC deemed that the accident likely occurred when one of the tail rotor blades and the bottom of the vertical stabilizer impacted a wooden object, possibly a tree branch.

The positive factors in this case were:

	1. PRE-FLIGHT PREPARATIONS AND PRECAUTIONS The pilot held a briefing with the two passengers, instructing them how to open and close the doors, fasten and unfasten their seatbelts, etc.
	2. THREAT IDENTIFICATION A loud noise was heard emanating from the rear of the aircraft.
	3. USE OF TRAINING INSTRUCTIONS The pilot thought that the tail rotor had broken and took the corresponding actions. He reduced power and throttled down the gas.
	4. VISUAL DETECTION/ANTICIPATION Upon seeing a power line ahead of them and realizing they would not clear it, he decided to look for another path to the right.
	5. AIRMANSHIP AND FLIGHT SKILLS The pilot redirected the flight to an area as clear as possible despite not having directional control of the aircraft, thus managing to minimize the damage.

	6. DESIGN REQUIREMENTS The persons aboard were flying with their seatbelts fastened.
	7. USE OF TRAINING INSTRUCTIONS He cut the mixture to turn off the engine, put the battery switch in "off" and closed the fuel valve to the engine.

IN-013/2014 INCIDENT INVOLVING AN AIRBUS A-320 AIRCRAFT, REGISTRATION G-EZTD, OPERATED BY EASYJET, AT THE TENERIFE NORTH-LOS RODEOS AIRPORT (GCXO) ON 2 JUNE 2014. REPORT APPROVED ON 28 SEPTEMBER 2015.

The Airbus A-320-200 aircraft, registration G-EZTD and callsign EZY27FB, was flying from London Gatwick Airport (EGKK) to Tenerife South-Reina Sofía Airport (GCTS) with a total of 190 persons aboard.

Due to windshear during the approach maneuver to runway 08 at the Tenerife South-Reina Sofía Airport (GCTS), the crew executed a go-around. Since the airline's policy allows crews to make two approaches to a runway in the same conditions, the crew decided to attempt another approach to the same runway, but since the stabilization criteria were not satisfied, the crew went around again and proceeded to the first alternate. ATC shortened the approach maneuver to Tenerife North to give priority to the flight.

The aircraft reported its minimum fuel condition to Tenerife North Approach but received no reply, since the controller was answering a call from the Canaries ACC. Three minutes later, they were cleared to land on runway 30 at said airport, but since changing wind conditions destabilized the approach, the crew aborted the landing and immediately declared an emergency (MAYDAY MAYDAY MAYDAY) due to fuel and requested radar vectors to attempt a new approach.

The aircraft eventually landed normally and taxied to its parking stand.

No safety recommendations were issued after the investigation, which determined that the incident was caused by weather conditions in excess of the limits specified by the operator that forced the crew to go around on three separate occasions.

The positive factors in this case were:

	1. DECISION TO GO AROUND The crew went around twice at Tenerife South due to windshear and to not satisfying the stabilized approach criteria.
	2. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER The crew proceeded to their first alternate.
	3. ATC INTERVENTION/ASSISTANCE ATC shortened the approach maneuver to Tenerife North to give priority to the flight.
	4. DECISION TO GO AROUND Changing wind conditions destabilized the approach and the crew aborted the landing.
	5. USE OF TRAINING INSTRUCTIONS They declared an emergency (MAYDAY MAYDAY MAYDAY) due to fuel.

IN-014/2014 INCIDENT INVOLVING AN AIRBUS A-319 AIRCRAFT, REGISTRATION G-EZDM, OPERATED BY EASYJET, AND A CESSNA 150 AIRCRAFT, REGISTRATION EC-CPT, OPERATED BY PANAMEDIA, IN THE CTR OF THE PALMA DE MALLORCA AIRPORT (LEPA) ON 21 MAY 2014. REPORT APPROVED ON 27 MAY 2015.

The Cessna 150 aircraft, registration EC-CPT, took off from the aerodrome of Son Bonet (LESB), Mallorca, on a navigation training flight with a student pilot as the sole occupant. On the way back, the student became disoriented and did not check the heading indicator against the compass, so he continued on course south from entrance point E to San Bonet. This caused him to inadvertently enter the Palma airport CTR without the proper clearance.

At the same time, an EasyJet Airbus A-319, registration G-EZDM, was established on the runway 24L ILS localizer. The crew received a TACS advisory with no information altitude and noticed there was an aircraft slightly above them on the same course. The pilot ruled out going around due to the proximity of the other aircraft and continued the approach while maintaining visual contact with the Cessna 150. The Airbus A-319 eventually landed on runway 24L at the airport without further incident.

The tower controller was unaware of the presence of the Cessna 150 in the CTR until it was reported by the crew of the Airbus A-319. When he learned of the presence of the aircraft, he tried to contact it on several occasions but

was unable to do so.

The student left the Mallorca CTR and proceeded to Son Bonet, where he landed.

The CIAIAC deemed that the probable cause of the incident was a visual navigation error by the student pilot, who diverted from his planned route and inadvertently entered the Palma de Mallorca Airport CTR and invaded the final approach area.

The technical report did not contain any safety recommendations.

The positive factors in this case were:

	1. HARDWARE SAFETY NET The crew received a TCAS advisory.
	2. VISUAL DETECTION/ANTICIPATION The pilot ruled out going around due to the proximity of the other aircraft and continued the approach while maintaining visual contact with the Cessna 150.

IN-015/2014 INCIDENT INVOLVING AN AIRBUS A-340-300 AIRCRAFT, REGISTRATION LV-FPV, OPERATED BY AEROLÍNEAS ARGENTINAS, AND A BOEING B-767-300 AIRCRAFT, REGISTRATION VQ-BSX, OPERATED BY UTAIR, AT THE BARCELONA-EL PRAT AIRPORT (LEBL) ON 5 JULY 2014. REPORT APPROVED ON 26 OCTOBER 2015.

The Boeing B-767-300 aircraft, operated by Utair, was on the final approach to land on runway 02 at the Barcelona-El Prat Airport. At the same time, an Airbus A-340-300 aircraft, operated by Aerolíneas Argentinas, was crossing runway 02 where it intersects taxiway M while proceeding to the runway 25R holding point to take off.

When the crew of the Boeing B-767-300 noticed the presence of the other aircraft, they decided to go around, as this was the action that least compromised the safety of the operation. The Airbus A-340-300 took off normally a short time later and reached its destination without incident, and the Boeing B-767-300 landed after circling around the aerodrome.

It should be noted that the crew of the Airbus A-340-300 also took the appropriate action by expediting the crossing of the runway upon seeing an aircraft on short final, as they did not know what the crew of the Boeing B-767-300 would do.

After its investigation, the CIAIAC concluded that the incident was caused by a series of mistakes made at the various control positions that were not detected in time due to a lack of coordination. They also occurred at the same time that the runway configuration was being changed, an event that normally takes place at the airport at 07:00, when the configuration is changed from nighttime to daytime.

In the end, no recommendations were issued since over the course of the investigation, both AENA and ENAIRE showed they had already implemented the measures that had been requested in previous recommendations.

The positive factors in this case were:

	1. VISUAL DETECTION/ANTICIPATION The crew of the Boeing B-767-300 noticed the presence of another aircraft.
	2. DECISION TO GO AROUND The crew of the Boeing B-767-300 decided to go around.
	3. VISUAL DETECTION/ANTICIPATION The crew of the Airbus A-340-300 took the appropriate action by expediting the crossing of the runway upon seeing an aircraft on short final.

IN-016/2014 INCIDENT INVOLVING A BOEING B-737-800 AIRCRAFT, REGISTRATION OO-JLO, OPERATED BY JETAIRFLY, AND A BOEING B-737-800 AIRCRAFT, REGISTRATION D-AHFH, OPERATED BY TUIFLY, AT THE PALMA DE MALLORCA AIRPORT (LEPA) ON 13 JUNE 2014. REPORT APPROVED ON 29 MARCH 2016.

On Friday, 13 June 2014 at 09:24:54, aircraft OO-JLO (callsign JAF7WJ), inbound from Brussels (Belgium), landed on runway 24L at the Palma de Mallorca Airport with aircraft D-AHFH (callsign TUI1FX) having taxied past the H10 holding point for runway 24L.

Operations at the airport had been relying on a single runway following the temporary closure of runway 24R due to a fuel spill. Traffic control measures had been put in place as a result, but there was considerable traffic and both

arrivals and departures were being handled on runway 24L.

Aircraft TUI1FX, which was taxiing, was stopped at holding point H10 for runway 24L. There were ten inbound aircraft in the approach sequence and the intention of the local controller at the Palma de Mallorca Airport tower was to allow the aircraft holding at H10 to take off between the 4th and 5th (JAF7WJ) arrivals. When the 4th aircraft was on short final, the waiting aircraft was cleared to enter and hold after said aircraft landed. This clearance was canceled a few seconds afterward, however, since separation with the 5th aircraft (JAF7WJ) was not guaranteed.

By the time the clearance to enter and hold was canceled, the waiting aircraft (TUI1FX) had already started moving toward the threshold and had crossed the H10 holding point. Even though it had not entered the runway proper, it was 60 m away from the runway centerline, which the crew reported to the controller.

The controller informed the aircraft on approach (JAF7WJ) that it would have to go around due to the position of the aircraft on the ground. The crew assessed the situation and proposed a visual landing to the controller. The controller confirmed the approaching crew's appraisal of the situation, that they had the aircraft on the ground in sight and that they accepted landing under those conditions. In light of the crew's acceptance, the controller cleared them to land, which they did without incident.

The likely cause of the runway incursion involving aircraft JAF7WJ and TUI1FX was the failure to establish a longer separation between arriving aircraft so as to allow TUI1FX to take off before the arrival of JAF7WJ

Following its investigation, the CIAIAC did not issue any safety recommendations.

	1. THREAT IDENTIFICATION Separation with the 5th aircraft (JAF7WJ) was not assured.
	2. ATC INTERVENTION/ASSISTANCE This clearance was canceled a few seconds later.
	3. COMMUNICATIONS The holding aircraft was 60 m from the runway centerline, which it reported to the controller.

IN-017/2014 INCIDENT INVOLVING A SOCATA RALLYE 100S AIRCRAFT, REGISTRATION EC-CLY, OPERATED BY THE REAL AEROCLUB DE LA CORUÑA, AT THE BURGOS AIRPORT (LEBG) ON 14 JUNE 2014. REPORT APPROVED ON 25 MARCH 2015.

The aircraft, with two persons aboard, took off from the La Coruña Airport (LECO) en route to the Burgos Airport, where the occupants were planning to take part in aviation workshops organized by the Aeroclub de Burgos.

The flight was uneventful until they reached the vicinity of entry point W to the Burgos FIZ, where they called Vitoria approach control via radio and did not receive a response. They called the Burgos Airport AFIS on several occasions and were unable to establish contact.

They called on the telephone the number that the organizer of the aviation workshops had given them and managed to speak with someone who gave them some information on traffic at the field.

After making sure there was no inbound traffic at the airport or in its maneuvering area, they proceeded to land on runway 04 at the airport. They had not established contact with the AFIS station.

The investigation determined that this incident was caused by deficient flight planning and by a failure to adhere to the communications failure procedure. The following were deemed to have contributed to this incident: the stress to which the crew were subjected due to the communications failure in an area with a potentially high traffic volume, along with the need to land quickly due to the physiological needs of one of them.

No safety recommendations were issued after the investigation into the accident.

	1. LOGICAL PROBLEM SOLVING They called on the telephone the number that the organizer of the aviation workshops had given them and received information on traffic at the field.
	2. THIRD-PARTY INTERVENTION/ASSISTANCE They managed to speak with someone who gave them some information on traffic at the field.
	3. VISUAL DETECTION/ANTICIPATION After making sure there was no inbound traffic at the airport or in its maneuvering area, they proceeded to land.

A-018/2014 ACCIDENT INVOLVING A CESSNA 172-R AIRCRAFT, REGISTRATION EC-JTI, OPERATED BY THE AEROCLUB BARCELONA SABADELL, AT THE AERODROME OF LA CERDANYA (LECD) ON 17 JULY 2014. REPORT APPROVED ON 25 JANUARY 2016.

The pilot, accompanied by a friend, had planned and was conducting a visual flight from the Sabadell Airport (LELL), the base of operations of the aviation club and of the pilot's training, to the aerodrome of La Cerdanya in the Pyrenees of Girona, which had been frequented by both the Aeroclub Barcelona Sabadell and by the pilot on his previous flights.

Upon reaching the destination area, the pilot established contact on the aerodrome's control frequency and joined the pattern. Based on the wind en route and on the windsock at the runway, the pilot decided to land on runway 25. The pilot then lengthened the downwind leg of the pattern, with an ensuing long final, and prepared to land.

The aircraft landed long, touching down past the halfway point of the 1 150 m long runway. At the end of the runway, the aircraft became airborne due to the slope of the runway extension. During the slow flight, and without gaining altitude, the aircraft descended rolling to the left until it impacted the tops of some trees. The aircraft fell to the ground some 15 m further forward. After the nosewheel impacted the ground, the propeller also impacted the grass and the aircraft flipped over. It came to rest upside down 100 m away from the end of runway 25.

The activation of the front seat airbags protected both occupants from potential impacts to the front and sides, complementing the action of the seatbelts and reducing the physical injuries to the occupants.

Both occupants exited the aircraft under their own power and within half an hour they were treated by emergency medical personnel. After this first aid, they were transferred to the Puigcerda hospital.

No safety recommendations were issued after the investigation, which determined that the runway excursion was caused by a long landing at excessive speed due to the pilot's lack of proficiency and to the pilot's decision not to go around.

The positive factors in this case were:

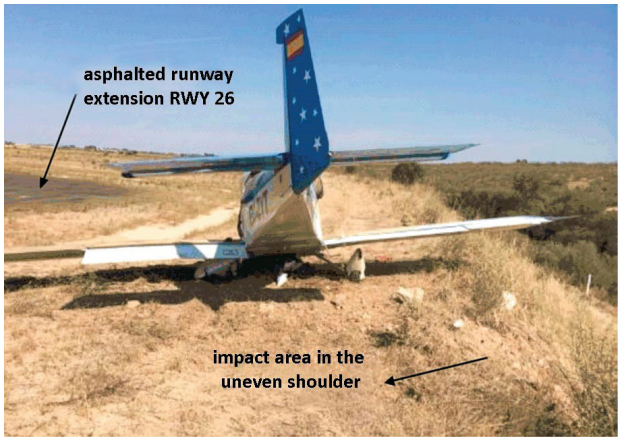
	1. DESIGN REQUIREMENTS The activation of the airbags protected both occupants from potential impacts to the front and sides, complementing the action of the seatbelts and reducing the physical injuries to the occupants.
	2. THIRD-PARTY INTERVENTION Both occupants were treated by emergency medical personnel.

A-019/2014 ACCIDENT INVOLVING A VANS RV-9A AIRCRAFT, REGISTRATION EC-ZYT, AT THE AERODROME OF CASARRUBIOS DEL MONTE (LEMT), TOLEDO, ON 24 JULY 2014. REPORT APPROVED ON 24 JUNE 2015.

While descending to land on runway 26 at the Casarrubios del Monte aerodrome in Toledo, the Vans RV-9A aircraft, registration EC-ZYT, with two persons aboard, impacted the ground 65 m away from the runway threshold.

The amateur-built aircraft was owned by the person who was seated in the RH seat during the flight. The pilot flying, seated in the LH seat, was testing the aircraft prior to purchasing it. They had planned to make several landings and takeoffs before going on a 55 minute flight. The owner had prepared an operational flight plan. The weather conditions were good.

After flying the first pattern and making the first landing, the continued with the second pattern, at the end of which the aircraft's landing gear impacted the sloped terrain along the extended runway centerline. The impact caused the aircraft to come to a stop on level ground 65 m before the runway threshold marking.



The aircraft came to rest on the propeller, the right gear and the bottom of the forward fuselage. The areas of the fuselage with the most damage were the front, left and bottom parts. The cockpit retained its integrity, however. The seats had not moved from their position and the seatbelts had not broken.

A few seconds after the impact, two individuals who were at the aerodrome

and who had witnessed the accident reported to the crash site. The occupants were injured and were taken to a hospital in Toledo, where they were admitted.

No safety recommendations were issued after the investigation, which determined that the accident of aircraft EC-ZYT was likely caused by the improper execution of the final leg of the pattern at a low altitude, which did not allow the aircraft to clear the ground before the threshold, which it impacted with its landing gear.

The positive factors in this case were:

	1. DESIGN REQUIREMENTS The cockpit retained its integrity, the seats had not moved from their position and the seatbelts had not broken.
	2. THIRD-PARTY INTERVENTION A few seconds after the impact, two individuals who were at the aerodrome reported to the crash site. The occupants were taken to a hospital in Toledo.

IN-020/2014 INCIDENT INVOLVING AN AIRBUS A-320 AIRCRAFT, REGISTRATION EC-IZD, AND AN AIRBUS A-320 AIRCRAFT, REGISTRATION EC-LZZ, BOTH OPERATED BY VUELING, WHILE ON APPROACH TO THE BARCELONA-EL PRAT AIRPORT (LEBL) ON 11 JULY 2014. REPORT APPROVED ON 26 NOVEMBER 2015.

While on approach to the Barcelona-El Prat Airport, the two aircraft, which were 12 NM away from runway 02, came within 1.1 NM horizontally and 200 ft vertically of one another.

Aircraft 1 had been cleared for the ILS approach to runway 02 and had been given a course to intercept the localizer. This clearance was acknowledged by the preceding aircraft, even though it had already been cleared for the ILS approach, and aircraft 1 did not alter its course and crossed the localizer instead of joining it, as a result of which it flew a converging course toward aircraft 2.

The controller realized that the situation of aircraft 1 was not as expected, and he instructed both aircraft to alter their courses (each to its right) to avoid closing any further. Both aircraft received simultaneous conflict resolution advisories from the traffic alert and collision avoidance system (TCAS RA), which their crews carried out.

During the separation turns, the two aircraft came within 1.1 NM and 200 ft

of one another, and the aircraft were quickly instructed again by ATC to alter their headings to continue the approach. The rest of the approach and the landing on runway 02 at the Barcelona-El Prat Airport was completed normally.

The incident between aircraft EC-IZD and EC-LZZ occurred due to the failure of the crew of EC-IZD to carry out an ATC instruction, which happened because:

- The crew of aircraft EC-IZD did not hear the instruction.
- The instruction was acknowledged by another aircraft.
- The error in acknowledging the instruction (the content and recipient) was not identified by ATC or by the crew of either aircraft.

No safety recommendations were issued after the investigation into the accident.

The positive factors in this case were:

	1. HARDWARE SAFETY NET Both aircraft received simultaneous conflict resolution advisories from the traffic alert and collision avoidance system (TCAS RA).
	2. AVOIDANCE MANEUVER Both aircraft carried out the TCAS instructions.

IN-021/2014 INCIDENT INVOLVING AN AGUSTA BELL 206-B AIRCRAFT, REGISTRATION EC-JFP, OPERATED BY THE COMPANY ROTORSUN, IN CULLERA (VALENCIA) ON 11 AUGUST 2014. REPORT APPROVED ON 25 MARCH 2015.

The Agusta Bell 206-B aircraft, operated by Rotorsun, suffered an accident while spraying rice fields in Cullera (Valencia).

After taking off, and while maneuvering to find the plot to be sprayed, the aircraft impacted a medium-voltage power line, severing the three lines with the top and bottom cable cutters that were installed on the aircraft's fuselage. The low engine RPM light turned on in the cockpit and the warning horn sounded.

After the impact, the pilot assessed the damage and checked the flight parameters to verify everything was correct. He decided to continue flying and land as quickly as possible in a safe area, returning to the initial landing point.

Once on the ground, and after a detailed check by the mechanic, they decided not to fly the helicopter and to transfer it over land to the hangar.

The CIAIAC deemed that the cause of the impact with the power line was the momentary distraction of the pilot's attention from the visual flight with external references to check the GPS unit so as to locate the plot to be sprayed.

No safety recommendations were issued after the investigation into the accident.

The positive factors in this case were:

	1. DESIGN REQUIREMENTS The aircraft impacted a medium-voltage power line, severing the three lines with the top and bottom cable cutters that were installed on the aircraft's fuselage.
	2. HARDWARE SAFETY NET The low engine RPM light turned on in the cockpit and the warning horn sounded.
	3. THREAT IDENTIFICATION After the impact, the pilot checked the parameters to verify everything was correct.
	4. DECISION TO LAND AS A PRECAUTION After assessing the damage, he decided to continue flying and land as quickly as possible in a safe area.
	5. DECISION TO LAND ON AN UNEXPECTED RUNWAY He decided to return to the initial landing point.

IN-023/2014 INCIDENT INVOLVING AN EMBRAER ERJ-190-200LR AIRCRAFT, EC-LEK, AND A CANADAIR CL-215T AIRCRAFT, REGISTRATION UD, OPERATED BY AIR EUROPA AND THE SPANISH AIR FORCE, IN THE MADRID TMA ON 29 JULY 2014.

The joint civil and military investigation team concluded its investigation and the final report was approved by both the CITAAM and the CIAIAC. In light of the characteristics involved in processing military information and of the civil

duty to inform, it was agreed to restrict the distribution of the final published report.

The positive factors in this case were:

	1. HARDWARE SAFETY NET
	2. AVOIDANCE MANEUVER

A-024/2014 ACCIDENT INVOLVING A GLASFLÜGEL SD LIBELLE 201B AIRCRAFT, REGISTRATION EC-HJY, IN JACA (HUESCA) ON 23 AUGUST 2014. REPORT APPROVED ON 28 SEPTEMBER 2015.

The aircraft had been airborne a little over two hours and was 400 m AGL when it suddenly experienced a mechanical problem involving the rudder that jammed it hard to the right. The pilot heard a metallic bang, followed by a noise as if something was bouncing around inside the aircraft. He felt that the rudder pedals were no longer against his feet, as they had traveled full forward and he could not make them go back to their position.

The pilot considered his options and decided to make an emergency landing in a river bed that he could reach without barely turning, since the aircraft became very unstable whenever he turned it. He ruled out parachuting from the aircraft, which he had never done before. Moreover, he was too close to the ground and he thought that he could make a successful emergency landing. The pilot established contact with the aerodrome of Santa Cilia (LECI) and reported his emergency and position.

The pilot tried to offset the induced right yaw by banking left and managed to keep the aircraft on course that way, but the descent rate was very high and he could not safely turn. Before reaching the ground, the left wingtip hit a tree trunk and detached. The rest of the aircraft impacted the ground out of control a few meters further forward.

The pilot released his safety harness and he dragged himself out from underneath the cockpit. After the accident, the aircraft wreckage and the pilot were quickly located, since he had reported his situation and location, and also

because an aircraft from the aerodrome of Santa Cilia had been dispatched to find him, which it quickly did.

The quick medical treatment he received was essential to helping the pilot survive the accident.

The CIAIAC determined that the accident occurred when the fiber base to which the pedals are anchored detached. This base is attached to the fuselage with an epoxy resin, and detached due to the force exerted by the pilot's feet, which shifted the entire assembly forward until it hit the end of the cockpit (nose of the airplane from the inside), jamming the right pedal in the depressed position.

No safety recommendations were issued after the investigation into the accident.

The positive factors in this case were:

	1. THREAT IDENTIFICATION He felt that the rudder pedals were no longer against his feet, as they had traveled full forward and he could not make them go back to their position.
	2. DECISION TO LAND ON AN UNEXPECTED RUNWAY The pilot considered his options and decided to make an emergency landing in a river bed.
	3. LOGICAL SOLUTION He ruled out parachuting from the aircraft, which he had never done before. Moreover, he was too close to the ground.
	4. USE OF TRAINING INSTRUCTIONS The pilot established contact with the aerodrome of Santa Cilia and reported his emergency and position.
	5. AIRMANSHIP AND FLIGHT SKILLS The pilot tried to offset the induced right yaw by banking left and managed to keep the aircraft on course that way.
	6. DESIGN REQUIREMENTS The pilot released his safety harness.
	7. ATC INTERVENTION/ASSISTANCE After the accident, the aircraft wreckage and the pilot were quickly located, since he had reported his situation and location.

	8. THIRD-PARTY INTERVENTION The quick medical treatment he received was essential to helping the pilot survive the accident.

A-025/2014 ACCIDENT INVOLVING A GLASER DIRKS DG-300 ELAN AIRCRAFT, REGISTRATION D-1969, IN TORLA (HUESCA) ON 23 AUGUST 2014. REPORT APPROVED ON 29 APRIL 2015.

The Glaser Dirks DG-300 Elan aircraft suffered an accident in Torla (Huesca) while taking part in the 14th Pyrenees Cup.

As the aircraft approached a hillside 7.5 km west of the town of Torla, it was caught in a downdraft that made it lose altitude suddenly. Since it was impossible to climb and regain altitude, the pilot decided to make an emergency landing on a hillside covered by dense vegetation.

Although the resulting damage was significant, with fractures along the fuselage and wings, the aircraft's cockpit was not seriously warped and the safety harness worked correctly, serving its function of restraining the occupants.

The CIAIAC concluded that the accident occurred because the aircraft was caught in a downdraft as it was flying close to a hillside, which forced the pilot to make an emergency landing due to not having sufficient room to regain altitude.

No safety recommendations were issued after the investigation into the accident.

The positive factors in this case were:

	1. DECISION TO LAND AS A PRECAUTION Since it was impossible to climb and regain altitude, the pilot decided to make an emergency landing.
	2. DESIGN REQUIREMENTS The aircraft's cockpit was not seriously warped and the safety harness worked correctly, serving its function of restraining the occupants.

IN-027/2014 INCIDENT INVOLVING A BOEING B-737 AIRCRAFT, REGISTRATION EI-EBC, OPERATED BY RYANAIR, AND A BOEING B-737 AIRCRAFT, REGISTRATION G-GDFR, OPERATED BY JET2.COM, AT THE MÁLAGA-COSTA DEL SOL AIRPORT (LEMG) ON 17 SEPTEMBER 2014. REPORT APPROVED ON 25 JANUARY 2016.

Aircraft RYR57BQ was flying from the Leeds Bradford International Airport (EGNM) to the Málaga-Costa del Sol Airport. At the same time, aircraft EXS21PM was flying from the Málaga-Costa del Sol Airport to the Glasgow Airport (EGPF). Both aircraft were in contact with the local control station (LCL).

The controller decided that after the landing of another aircraft, and before the landing of aircraft RYR57BQ, aircraft EXS21PM would take off. The LCL thus cleared EXS21PM to first enter the runway and subsequently to take off, while aircraft RYR57BQ was instructed to expect a late landing clearance.

The crew of RYR57BQ saw EXS21PM start to take off, and it was still on the runway by the time they were 50 ft above the runway, so they went around. After commencing the maneuver, they were cleared to land while EXS21PM was still on the runway. During this maneuver, it veered slightly to the north (left) to separate from and maintain visual contact with the departing aircraft.

For their part, during the climb, the crew of EXS21PM were instructed to turn left and head north by LCL. They were alerted by the TCAS of the presence of another aircraft, so they immediately disengaged the autopilot and turned south (right). While executing this maneuver, the two aircraft came within 0.5 NM horizontally and 100 ft vertically of one another.

The incident is deemed to have occurred for two reasons: the initial decision to issue an aircraft a clearance to land on an occupied runway, which caused the separation between the two aircraft to diminish, thus jeopardizing their safety. This latter situation was a consequence of the improper handling of the separation between the two aircraft by the LCL controller.

Two recommendations (REC 38/16 and REC 39/16) were issued in the wake of the investigation, one for ENAIRE, to have it adopt the required changes in its procedures, and another for AESA, to have it inform those companies certified by it to provide training to ATCOs.

The positive factors in this case were:

1. VISUAL DETECTION/ANTICIPATION

The crew of RYR57BQ saw EXS21PM begin its takeoff.

	2. DECISION TO GO AROUND When they reached 50 ft, it was still on the runway so they went around.
	3. HARDWARE SAFETY NET The crew of EXS21PM were alerted by the TCAS to the presence of another aircraft.
	4. AVOIDANCE MANEUVER They immediately disengaged the autopilot to turn south (right).

A-028/2014 ACCIDENT INVOLVING AN AIRBUS A-319-111 AIRCRAFT, REGISTRATION G-EZIX, OPERATED BY EASYJET, IN THE MADRID FIR AT FL150 ON 21 SEPTEMBER 2014. REPORT APPROVED ON 31 MAY 2016.

The Airbus A-319-111 aircraft, registration G-EZIX, operated by EasyJet Airlines, was on a scheduled commercial passenger transport flight between the Liverpool John Lennon (EGGP) and the Adolfo Suárez-Madrid-Barajas (LEMD) airports.

During the descent before landing, and after passing through FL150, it crossed a layer of cumulus clouds some 2 000 ft thick that caused the aircraft to fall and shake sharply. As a result, the four flight attendants, who were securing the passenger cabin, fell to the floor, receiving bruises in the process. One of the flight attendants broke the scaphoid bone in her wrist while standing about halfway down the aisle that runs through the passenger cabin.

The flight procedure used after entering the area of turbulence reflected the procedure contained in the flight manual. The flight continued and landed without further incident.

When the flight landed, the flight attendant was treated by the medical service and transferred to her base on the return flight that same day.

Following its investigation, the CIAIAC did not issue any safety recommendations and the report indicated the cause of the incident as encountering strong turbulence that had not been detected by the flight crew.

The positive factors in this case were:

	1. USE OF TRAINING INSTRUCTIONS The flight procedure used after entering the area of turbulence reflected the procedure contained in the flight manual.
	2. AERODROME INTERVENTION/ASSISTANCE When the flight landed, the flight attendant was treated by the medical service.

A-029/2014 ACCIDENT INVOLVING A CAMERON A-250 BALLOON, REGISTRATION EC-JUK, OPERATED BY FLYING CIRCUS, S.L., IN THE ARRIBES DEL DUERO NATURAL PARK (ZAMORA) ON 21 SEPTEMBER 2014. REPORT APPROVED ON 27 JULY 2016.

The Cameron A-250 balloon took off from Villalcampo (Zamora) planning to conduct a panoramic flight of the Arribes del Duero Natural Park toward the area of Miranda do Douro in Portugal. Aboard were the pilot and 11 passengers.

The flight was proceeding normally until the pilot saw a developing storm cloud in their flight path near the Duero River. In light of the weather situation, and because the terrain over the natural park, still ahead of them, was more rugged and had more vegetation, the pilot decided to land. The pilot's decision to land upon seeing the storm cell that had formed ahead of them is deemed to have been correct.

The landing site chosen was a clearing on the banks of the Las Azureras stream, with low vegetation. During the approach, the pilot encountered a surface wind that, combined with the descend speed, resulted in a hard landing. At the moment of contact, the gondola was facing such that its long side took the impact to keep the passengers from being thrown out, as indicated in the aircraft's Flight Manual.

The occupants who were injured were taken to a medical center for an evaluation. Two of the passengers were seriously injured. The gondola sustained minor damage as a result of the impact.

The investigation determined that the accident occurred due to the high speed at which the gondola impacted the ground, which was partly made of granite, and due to the strong surface wind and the balloon's high descent rate.

In the wake of the investigation, two safety recommendations were issued (REC 56/16 and REC 57/16), one for Cameron Balloons and the other for Flying Circus, S.L.

The positive factors in this case were:

	1. VISUAL DETECTION/ANTICIPATION The pilot saw a developing storm cloud in their flight path.
	2. DECISION TO LAND AS A PRECAUTION The pilot's decision to land upon seeing the storm cell that had formed ahead of them is deemed to have been correct.
	3. DECISION TO LAND ON AN UNEXPECTED RUNWAY The landing site chosen was a clearing on the banks of the Las Azureras stream, with low vegetation.
	4. USE OF TRAINING INSTRUCTIONS At the moment of contact, the gondola was facing such that its long side took the impact to keep the passengers from being thrown out, as indicated in the aircraft's Flight Manual.
	5. THIRD-PARTY INTERVENTION The occupants who were injured were taken to a medical center for an evaluation.

A-030/2014 ACCIDENT INVOLVING A PIPER PA-28R-180 AIRCRAFT, REGISTRATION EC-FRL, IN BARRO (PONTEVEDRA) ON 26 OCTOBER 2014. REPORT APPROVED ON 28 JANUARY 2015.

The aircraft had taken off from the Vigo-Peinador Airport (LEVX) to go on a local flight around the inlets of Vigo and Pontevedra.

The flight was proceeding normally until, approximately 36 minutes into the flight, the pilot felt the engine lose power and stop. After unsuccessfully attempting to restart the engine, he configured the airplane to land in an industrial park under construction, but after a short landing run, it bounced off a mound and fell down an incline, coming to rest on a streambed. Seeing the trees ahead of him, the pilot applied right rudder to head toward an opening in the trees.

The airframe structure adequately withstood the impact forces, and the use of the seatbelts was sufficient to restrain the occupants in place. Emergency services were alerted by eyewitnesses and the aircraft was immediately located.

The investigation determined that the accident had resulted from improper fuel management during the flight, which led to the emptying of the tank that was being used to supply the engine, causing it to stop.

No safety recommendations were issued after the investigation into the accident.

The positive factors in this case were:

	1. ENGINE FAILURE ANTICIPATION The pilot felt the engine lose power and stop.
	2. THREAT IDENTIFICATION The pilot saw trees ahead of him.
	3. AVOIDANCE MANEUVER The pilot applied right rudder to head toward an opening in the trees.
	4. DESIGN REQUIREMENTS The airframe structure adequately withstood the impact forces. The use of the seatbelts was sufficient to restrain the occupants in place.
	5. THIRD-PARTY INTERVENTION Emergency services were alerted by eyewitnesses and the aircraft was immediately located.

IN-031/2014 INCIDENT INVOLVING AN AIRBUS A-320 AIRCRAFT, REGISTRATION HA-LPL, OPERATED BY WIZZ AIR, AND AN AIRBUS A-320 AIRCRAFT, REGISTRATION EC-LZF, OPERATED BY VUELING, IN THE BARCELONA TMA ON 24 SEPTEMBER 2014. REPORT APPROVED ON 27 MAY 2015.

The aircraft operated by Wizz Air was flying from the Poznan Lawica Airport (EPPO), Poland, to the Barcelona-El Prat Airport (LEBL), while the aircraft operated by Vueling was flying from Barcelona to Amsterdam.

The first of these aircraft was flying standard terminal arrival route BISBA4S, while the second was flying standard instrument departure OKABI2R. These two routes intersect at a point located northeast of the Sabadell VOR (SLL).

The sector T1 controller at the Barcelona control center instructed aircraft WZZ951 to make a "three sixty" to the right due to traffic over the SLL DVOR/DME, without adhering to standard phraseology. The crew of the aircraft acknowledged incorrectly and was not corrected by the controller, which resulted in the separation between WZZ951 and VLG8306 to drop during the maneuver.

It was the crew of WZZ951 that, after receiving a TCAS traffic advisory and

seeing the position of VLG8306 on the ND, stopped executing the 360° and turned to the left to separate from the path of VLG8306, and reporting this on the frequency to the T1 controller. While they were talking on the frequency, the separation between the aircraft continued to drop, reaching a minimum of 1.3 NM horizontally and 400 ft vertically.

Finally, it was the crew of WZZ951 that requested vectors to resume its approach. The controller gave instructions to WZZ951 to turn left and proceed direct to the SLL DVOR/DME.

The CIAIAC investigation determined that the main cause of the accident was the lack of adherence to standard phraseology by the ATC controller in terms of its maneuvering instructions, which caused the crew of WZZ951 to think that they should execute the maneuver at that time and not upon reaching the SLL DVOR/DME.

No safety recommendations were issued after the investigation into the accident.

The positive factors in this case were:

	1. HARDWARE SAFETY NET The crew of WZZ951 received a TCAS traffic advisory.
	2. THREAT IDENTIFICATION The crew of WZZ951 identified the position of VLG8306.
	3. AVOIDANCE MANEUVER The crew of WZZ951 turned to the left to open up its path with respect to VLG8306.

IN-032/2014 INCIDENT INVOLVING AN AIRBUS A-320-216 AIRCRAFT, REGISTRATION EC-KCU (OPERATED BY VUELING), AND A BOEING B-737-800, REGISTRATION EI-EKS (OPERATED BY RYANAIR), IN THE VICINITY OF REPORTING POINT VULPE IN THE SEVILLE (LEZL) TMA ON 30 OCTOBER 2014. REPORT APPROVED ON 29 MARCH 2016.

RYR314Q was flying between the airports of Shanon (EINN), Ireland, and Málaga-Costa del Sol (LEMG). VLG2226 was flying between the airports of Barcelona-El Prat (LEBL) and Seville (LEZL).

VLG2226 asked Seville air traffic control (LECS) to land on runway 27. The aircraft was cleared to descend first to FL310 and then to FL250, at a maximum

descent rate of 2 000 ft/min. At the same time, RYR314Q was cleared by Seville Control to descend from FL410 to FL150 at a minimum descent rate of 2 000 ft/min. This way, the LECS controller guaranteed the vertical separation between the aircraft, which were on converging flight paths.

After coordinating the change in runways, the Seville ACC controller cleared VLG2226 to descend to FL170, at which point the crew selected a descent rate of 5 000 ft/min. In this last exchange, the controller did not explicitly include the instruction that the same descent rate restrictions continued to apply to it.

The vertical and horizontal separation between the aircraft began to decrease. Both aircraft received TCAS traffic advisories, and seconds later, resolution advisories. The crew of RYR314Q descended as instructed by the advisory. The crew of VLG2226 followed instructions contrary to those initially issued by the TCAS RA - "Adjust Vertical Speed, Adjust", until the TCAS RA reversed its instruction to "Climb, Climb", which the crew executed correctly. No occupants on either aircraft were injured and the aircraft did not sustain damage.

The investigation concluded that the incident occurred because the crew of VLG2226 did not comply with the descent rate instructions provided by the LECS controller.

The investigation resulted in three recommendations (REC 63/16 - REC 65/16). One was directed at AESA, to have it take the regulatory initiative to include in Spain's Air Traffic Regulations (RCA) that controllers repeat climb/descend instructions whenever an aircraft is cleared to another level or is transferred; another to DGAC, to have it take the relevant regulatory steps to include the aforementioned article in the RCA; and the last one to the ICAO, to have it consider the need to include the aforementioned article in Document 4444.

The positive factors in this case were:

	1. HARDWARE SAFETY NET Both aircraft received TCAS traffic advisories, and seconds later, resolution advisories.
	2. AVOIDANCE MANEUVER The crew of RYR314Q descended, as instructed by the advisory.

A-002/2015 ACCIDENT INVOLVING A HOAC H-36 AMATEUR-BUILT AIRCRAFT, REGISTRATION EC-XGD, AT THE AIRFIELD IN ORGAZ (TOLEDO) ON 17 JANUARY 2015. REPORT APPROVED ON 31 MAY 2016.

The powered glider EC-XGD landed on the morning of 17 January 2015 at the airfield for ultralights in Orgaz from the aerodrome of Ocaña (LEOC). Aboard the aircraft were two occupants. At 13:30 local time that same day, the aircraft took off from runway 09 at Orgaz with the same occupants with the intention of returning to Ocaña.

Instead of commencing the takeoff run at the runway threshold, it lined up behind the threshold so as to have more room in which to take off. The aircraft traveled the entire runway, went past it and onto the adjacent terrain without lifting any of its wheels off the ground.

At the end of the field there was a line of tires that separated it from the access road. The aircraft moved several of those tires and as it was crossing the road, its wheels lifted off the ground and got caught up with the top of a metal, 40 cm fence that was on the other side of the road, breaking it. The aircraft barely flew a couple of meters above the ground in a straight line.

Upon seeing they would not clear some trees further ahead, the pilot turned left. The left wingtip touched the ground, turning the aircraft further in the counterclockwise direction and causing it to immediately impact the ground. The fuselage broke aft of the cockpit.

Several people at the airfield who had witnessed the event rushed to help the aircraft's occupants and notified emergency services.

The CIAIAC did not issue any safety recommendations after its investigation, which determined that the accident occurred because the takeoff distance needed by the aircraft exceeded that available on the runway at the airfield.

The positive factors in this case were:

	1. THREAT IDENTIFICATION The pilot realized they would not clear the trees that were ahead of them.
	2. AVOIDANCE MANEUVER Upon seeing they would not clear some trees further ahead, the pilot turned left.
	3. THIRD-PARTY INTERVENTION Several people at the airfield who had witnessed the event rushed to help the aircraft's occupants and notified emergency services.

IN-003/2015 INCIDENT INVOLVING A PIPER PA-28R-200 AIRCRAFT, REGISTRATION EC-HUU, OPERATED BY AEROTEC ESCUELA DE PILOTOS, AT THE TENERIFE NORTH-LOS RODEOS AIRPORT (GCXO) ON 3 FEBRUARY 2015. REPORT APPROVED ON 25 MARCH 2015.

The aircraft, which was owned by Aerotec Escuela de Pilotos, had taken off from the Tenerife North-Los Rodeos Airport to conduct an instructor training flight. Aboard were two pilots, the student in the RH seat and the instructor in the LH seat.

They took off from runway 30 and flew the CTR in the clockwise direction. The flight was uneventful until, upon reaching point S, the instructor noticed that the cloud ceiling was dropping rapidly. They decided to return to the airport as quickly as possible before it closed and they were forced to go to Tenerife South. They knew the airport and knew that conditions changed very quickly. ATC reported that the airfield was under IMC (instrument meteorological conditions) and that they would have to land as a special VFR.

When they touched down on runway 30, the crew felt a slight impact with the runway and realized the gear was not lowered. The aircraft slid slightly to the left before coming to a stop opposite the E3 taxiway, facing in the same direction as it had landed.

The crew first informed the TWR controller of the aircraft after they had come to a stop. The TWR then informed the RFFS, CEOPS and COAM/TOAM17. Four RFFS and one TOAM vehicles reported to the site of the incident. The aircraft was removed from the runway, which

was inspected before being reopened for operations.

The CIAIAC determined that the incident of aircraft EC-HUU was caused by the failure to actuate the landing gear lever before the aircraft landed on the runway.

The investigation resulted in one safety recommendation (REC 06/15) directed at the Aerotec Escuela de Pilotos to ensure that its personnel adhere to standard operating procedures.

The positive factors in this case were:

	1. VISUAL DETECTION/ANTICIPATION The instructor noticed that the cloud ceiling was dropping rapidly.
	2. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER They decided to return to the airport as soon as possible.
	3. AERODROME INTERVENTION/ASSISTANCE Four RFFS and one TOAM vehicles reported to the site of the incident. The runway was inspected before being reopened for operations.

A-004/2015 ACCIDENT INVOLVING A RANS S-10 SAKOTA AIRCRAFT, REGISTRATION EC-YGJ, IN THE MEDITERRANEAN SEA, 40 NM AWAY FROM THE REUS AIRPORT (LERS), ON 17 MAY 2013. REPORT APPROVED ON 28 JANUARY 2015.

The RANS S-10 Sakota aircraft took off, along with two other aircraft, from the airfield in Petra (Mallorca) on a flight to the Lleida-Alguaire Airport (LEDA) with the pilot as the sole occupant. The purpose of the flight was to take part in an acrobatic competition.

During the flight, the pilot of the accident aircraft reported a drop in the voltmeter reading, alerting to a potential subsequent engine failure, as eventually happened, which forced the pilot to make an emergency landing in the Mediterranean Sea.

The pilot exited the aircraft, which had not capsized, under his own power, and onto a raft he had aboard, which he had stowed next to a parachute on the same morning of the flight. He remained on the raft until he was recovered by search and rescue services personnel, who took him to a medical center.

The two other aircraft landed normally, one at the Reus Airport (Tarragona)

after circling over the survivor until he was found by SAR, which had been dispatched by RCC3 Palma, and the other at the Lleida-Alguaire Airport.

The CIAIAC concluded that the accident occurred because the aircraft's engine stopped mid-flight for reasons that could not be determined. The correct actions of the pilot and rescue services, as well as the presence of an aircraft in the area, led to the satisfactory resolution of the emergency.

No safety recommendations were issued after the investigation into the accident.

The positive factors in this case were:

	1. PRE-FLIGHT PREPARATIONS AND PRECAUTIONS The pilot boarded a raft he had aboard, which he had stowed next to a parachute on the same morning of the flight.
	2. ENGINE FAILURE ANTICIPATION The pilot reported a drop in the voltmeter reading, alerting to a potential subsequent engine failure.
	3. AIRMANSHIP AND FLIGHT SKILLS The pilot exited the aircraft, which had not capsized, under his own power.
	4. THIRD-PARTY INTERVENTION One of the aircraft stayed circling over the survivor until he was located.
	5. ATC INTERVENTION/ASSISTANCE SAR was dispatched by RCC3 Palma.
	6. THIRD-PARTY INTERVENTION The pilot was rescued by SAR personnel, who took him to a medical center.

IN-005/2015 INCIDENT INVOLVING A BOMBARDIER CRJ-1000 AIRCRAFT, REGISTRATION EC-LPG, OPERATED BY AIR NOSTRUM, AT THE ADOLFO SUÁREZ MADRID-BARAJAS AIRPORT (LEMD) ON 1 FEBRUARY 2015. REPORT APPROVED ON 28 SEPTEMBER 2016.

The aircraft had spent the night prior to the incident at the Pamplona Airport (LEPP). It had been snowing all night and it was still snowing intermittently. The snow plows had been working to clear the runway. Once the aircraft was de-iced, the crew taxied to the threshold and took off normally from runway 33, which had standing sleet.

The flight was uneventful but upon landing at the destination airport, the crew felt vibrations in the main landing gear, which they identified as a blow-out. The crew asked the tower controller to visually check the landing gear, and a crew from another operator informed them that there was something wrong with the left gear door. The crew requested a nearby parking stand from the control tower. Once at the stand, the crew confirmed that the outboard left tire (#1) had blown out. There was a flat spot just before the blowout, and the right outboard tire (#4) also had a flat spot. They found white ice attached to the main gear legs.

The tower controller requested that the runway be cleaned and checked and removed it from service until it was free from FOD (foreign object debris). Debris from the tire and the landing gear door, as well as bits of white ice, were found in the touchdown zone of the runway.

The main cause of the incident was that some of the sleet encountered while taxiing and during the subsequent takeoff run could have entered the landing gear bays, attaching to the structure. In their retracted positions, the #1 and #4 gear tires are in a lower position that is less protected against cold temperatures during flight, meaning that the sleet could have fallen due to gravity to the brake assemblies on these wheels and then frozen.

After its investigation, the CIAIAC issued five recommendations (REC 73/16 - REC 77/16). The first was directed at Bombardier, to have it include in its procedures the features and hazards of carbon brakes, and the second was directed at Air Nostrum, to distribute the new procedures to any potentially affected crews. The third recommendation directed Air Nostrum to adapt its cold weather and/or contaminated runway operating procedures to the characteristics of the Pamplona Airport. The other two recommendations were directed at the Pamplona Airport, the first to have it train the personnel involved in measuring contaminant depth and the friction coefficient, and in cleaning the movement area; and the second to include the above tasks in its procedures.

The positive factors in this case were:

	1. THREAT IDENTIFICATION The crew felt vibrations in the main landing gear, which they identified as a blow-out.
	2. USE OF TRAINING INSTRUCTIONS The crew requested a visual check of the landing gear.
	3. COMMUNICATIONS A crew from another operator informed them that there was something wrong with the left gear door.
	4. ATC INTERVENTION/ASSISTANCE The tower controller requested that the runway be cleaned and checked and removed it from service until it was free from FOD.

A-006/2015 ACCIDENT INVOLVING A CESSNA 172-RG AIRCRAFT, REGISTRATION EC-HYT, OPERATED BY GAIR, AT THE MADRID CUATRO VIENTOS AIRPORT (LECU) ON 23 FEBRUARY 2015. REPORT APPROVED ON 24 JUNE 2015.

The aircraft left from Madrid Cuatro Vientos on a training flight with an instructor and a student aboard.

During the approach, on a southerly heading, they encountered a high-voltage power line, which they avoided by going underneath it. When they did so, they experienced a high intensity electrical discharge, which entered via the left wingtip and exited via the housing for the right main gear wheel, which was damaged. Following the emergency, the instructor took over the controls and the communications.

They returned to the airport of departure with the gear up, and reported the emergency during the approach. They were cleared to fly between the tower and runway 10 so the controller could confirm the condition of the gear. The tower informed them that the right leg was not in the correct position and they cleared to land on runway 28. At the same time, the controller declared an emergency and notified the RFFS, giving the aircraft top priority.

The landing was properly executed, coming down first on the left leg and then, with practically no speed left, letting the airplane's weight drop on the right leg. A short time later two RFFS vehicles arrived and the pilot was instructed to disconnect the electrical system in the aircraft.

The CIAIAC concluded that the immediate or final cause of the accident was landing with the right main gear leg not fully lowered, as it had been damaged by an electrical arc from a high-voltage power line that affected the aircraft when it flew very close to the power line.

As a result of the investigation, four recommendations were issued (REC 37/15 - REC 40/15) to GAir, the first three to have it modify its Operations Manual and include a simulated engine failure as an additional failure that is likely to cause a loss of altitude. The fourth recommendation was intended to have it come up with specific actions to ensure that its instructors closely observe the altitude limits specified when conducting training maneuvers.

The positive factors in this case were:

	1. THREAT IDENTIFICATION While heading south, they encountered a high-voltage power line.
	2. AVOIDANCE MANEUVER They avoided the high-voltage power line by flying underneath it.
	3. GOOD COCKPIT PRACTICES Following the emergency, the instructor took over the controls and the communications.
	4. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER They returned to the airport of departure with the gear up.
	5. USE OF TRAINING INSTRUCTIONS They reported the emergency during the approach, and were cleared to fly between the tower and runway 10 so the controller could confirm the condition of the gear.
	6. ATC INTERVENTION/ASSISTANCE The controller declared an emergency and notified the RFFS, giving the aircraft top priority.
	7. AIRMANSHIP AND FLIGHT SKILLS The landing was properly executed, coming down first on the left leg and then, with practically no speed left, letting the airplane's weight drop on the right leg.
	8. AERODROME INTERVENTION/ASSISTANCE A short time later two RFFS vehicles arrived and the pilot was instructed to disconnect the electrical system in the aircraft.

A-007/2015 ACCIDENT INVOLVING A SOCATA TB-10 AIRCRAFT, REGISTRATION EC-DQB, ON A PRIVATE FLIGHT IN THE VICINITY OF THE AERODROME OF LA JULIANA (LEJU), SEVILLA, ON 9 MARCH 2015. REPORT APPROVED ON 28 SEPTEMBER 2016.

The pilot had planned to go on a local flight from the aerodrome of La Juliana, where the owners routinely parked the aircraft, late in the morning of Monday, 9 March 2015.

After refueling, the pilot did the engine test, which was satisfactory, and taxied to the runway 09 threshold to take off. The takeoff run was normal, with the aircraft reaching takeoff speed and commencing the climb. Above the 27 threshold, and as he was preparing to turn right, the pilot saw smoke over the instrument panel and felt the engine lose power.

While turning, the aircraft descended until it struck one of the wires in a set of medium-voltage power lines, which got caught up in the right landing gear leg. The airplane fell onto a plot with mostly small olive trees, and a few large ones, where it traveled for 80 m before coming to a stop.

The fuselage barely sustained any damage, and thus the cockpit retained its integrity. This space was not affected by any external elements, and as a result the pilot's survival was not compromised.

The investigation concluded that the accident was caused by a piloting error when reacting to the appearance of smoke issuing from the engine cover, which allowed the aircraft to descend to the height of a power line, which it impacted.

The investigation yielded recommendation REC 46/16, directed at AESA, to have it present the findings from the investigation at meetings with professionals from light aviation associations in an effort to reinforce good practices and improve the safety culture in the sector.

The positive factors in this case were:

1. DESIGN REQUIREMENTS

The fuselage barely sustained any damage, and thus the cockpit retained its integrity. This space was not affected by any external elements, and as a result the pilot's survival was not compromised.

A-008/2015 ACCIDENT INVOLVING A EUROCOPTER AS-355-NP AIRCRAFT, REGISTRATION EC-KYJ, OPERATED BY TAF HELICOPTERS AT THE HELIPAD ON THE CATALONIA RACE TRACK (MONTMELO, BARCELONA) ON 26 MARCH 2015 REPORT APPROVED ON 28 SEPTEMBER 2016.

On Thursday, 26 March 2015, a Eurocopter AS-355-NP helicopter operated by TAF Helicopters for the Catalonia Regional Police took off from the Sabadell Airport (LELL), Barcelona, with a pilot and two officers on board.

While in cruise flight on the way back in the Montnegre Valley, a reading was received in the cockpit indicating metal particles in the right engine (CHIP 2). This reading warned the pilot that the right engine was not working normally and that the emergency procedure for the particle warning (CHIP 2) had to be applied, as detailed in the flight manual. The pilot, however, did not follow this procedure.

The pilot decided to proceed to the helipad located in the firefighting base in the town of Dosrius (Barcelona), and to fly in from the south. However, to reach this helipad, he had to go over a mountainous area, which would have required a climb. Since the engine conditions did not allow for such a climb, he decided to keep turning and head instead to the helipad located at the Montmelo race track (Barcelona).

The two agents, despite having no formal training, were alert and aware of what was happening in the cockpit and made the pilot's job easier by informing him of potential obstacles that could affect the flight. The cooperation between the officers and the pilot is deemed to have been beneficial during the emergency.

As they were flying over the final approach and takeoff area (FATO), the helicopter started to shake and the pedals became unresponsive (yaw control). As for the final landing, it was performed correctly considering that the pilot had no control over the yaw movement. The pilot let the helicopter slide on its skids without making any motions that could have compromised the safety of the occupants.

Once on the ground and with the helicopter stopped, he closed the two fuel valves by placing the start switch for both engines in OFF, disconnected all the systems and set the master switch to OFF.

The damaged engine then caught fire, which the occupants kept from spreading to the rest of the aircraft by using two hand-held fire extinguishers. The fire was eventually put out with help from a truck that was on the track that was equipped with a tank and a pump.

The pilot and passengers were not injured. The helicopter sustained significant damage to its engines and tail cone.

The investigation concluded that the accident was caused when the turbine drive shaft on the right engine fractured due to fatigue on the thread of the clamping screw at the front of the shaft. Also, the CHIP 2 warning procedure was not handled as described in the flight manual.

No recommendations were issued after the investigation since both Airbus Helicopters and EASA had taken measures to clarify the emergency procedure for a CHIP warning.

The positive factors in this case were:

	1. HARDWARE SAFETY NET A reading was received in the cockpit indicating metal particles in the right engine (CHIP 2).
	2. THREAT IDENTIFICATION This reading warned the pilot that the right engine was not working normally.
	3. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER The pilot decided to proceed to the helipad located in the firefighting base in Dosrius.
	4. VISUAL DETECTION/ANTICIPATION To reach this helipad, he had to go over a mountainous area, which would have required a climb that was impossible given the condition of the engine.
	5. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER The pilot decided to proceed to the helipad located at the Montmelo race track.
	6. PASSENGER INTERVENTION/ASSISTANCE The cooperation between the officers and the pilot is deemed to have been beneficial during the emergency.
	7. AIRMANSHIP AND FLIGHT SKILLS As for the final landing, it was performed correctly considering that the pilot had no control over the yaw movement.

	8. USE OF TRAINING INSTRUCTIONS Once on the ground, he closed the two fuel valves, disconnected all the systems and placed the master switch in OFF.
	9. AERODROME INTERVENTION/ASSISTANCE The fire was eventually put out with help from a truck that was on the track.

A-010/2015 ACCIDENT INVOLVING AN ATR 72-212A AIRCRAFT, REGISTRATION EC-KGJ, OPERATED BY NAYSA, IN CRUISE FLIGHT AT FL130 BETWEEN TENERIFE AND GRAN CANARIA ON 22 MARCH 2015. REPORT APPROVED ON 23 JULY 2015.

The aircraft, in stable cruise flight between the Tenerife North-Los Rodeos (GCXO) and Gran Canaria (GCLP) Airports, experienced turbulence that subjected the aircraft to vertical acceleration that was not anticipated by the crew. The "Fasten seatbelts" sign was off when the turbulence hit, and as a result there were three persons standing in the passenger cabin.

The crew's reaction was immediate, turning on the seatbelt sign, notifying the cabin crew one second before the maximum turbulence, turning on anti-ice systems and descending to leave the area in case there was more turbulence at that level. There were a few clouds south of the GDV VOR/DME, so to avoid more problems, they diverted left. The crew informed ATC of the event and requested medical assistance upon reaching the Gran Canaria Airport.

ATC gave priority to the aircraft so as not to delay the medical treatment of the passengers. Actions with other ATC units and the airport were coordinated quickly and correctly. When the aircraft landed in Gran Canaria, the necessary units were dispatched.

The communications and the flight data showed that the pilot flying was the captain, and that the mood in the cockpit was cordial and there was excellent communication between both pilots.

The CIAIAC determined that the accident occurred due to the appearance of convective turbulence mid-flight that could not be foreseen by the crew. One recommendation (REC 26/15) was issued after the investigation directed at the operator, Naysa, to have it use the significant low-level maps issued by AEMET for flights at low altitudes, like those conducted between islands.

The positive factors in this case were:

	1. LOGICAL PROBLEM SOLVING The crew's reaction was immediate, turning on the seatbelt sign, notifying the cabin crew one second before the maximum turbulence, turning on anti-ice systems and descending to leave the area in case there was more turbulence at that level.
	2. VISUAL DETECTION/ANTICIPATION There were a few clouds south of the GDV VOR/DME, so to avoid more problems, they diverted left.
	3. USE OF TRAINING INSTRUCTIONS The crew informed ATC of the event and requested medical assistance.
	4. ATC INTERVENTION/ASSISTANCE ATC gave priority to the aircraft so as not to delay the medical treatment of the passengers. Actions with other ATC units and the airport were coordinated quickly and correctly.
	5. AERODROME INTERVENTION/ASSISTANCE When the aircraft landed in Gran Canaria, the necessary units were dispatched.
	6. GOOD COCKPIT PRACTICES The pilot flying was the captain, the mood in the cockpit was cordial and there was excellent communication between both pilots.

IN-011/2015 INCIDENT INVOLVING A CESSNA U-206-F AIRCRAFT, REGISTRATION EC-LKR, 10 MILES SOUTHWEST OF CASTELLÓN ON 11 APRIL 2015. REPORT APPROVED ON 27 MAY 2015.

The Cessna U-206-F took off from the Valencia Airport (LEVC) to perform aerial spraying for flies in the province of Castellón. A stage of the Aerial Tour of the Costa de Azahar, departing from the aerodrome of Castellón, was taking place that same day.

The pilot had gathered all the information necessary for the flight (NOTAM) and was aware of the Aerial Tour of the Costa de Azahar stage, and he planned his work so as not to interfere with the aircraft participating in the tour.

Once the aircraft taking part in the tour took off from the aerodrome of Castellón, both he and his colleague, in another spraying airplane, noticed that some aircraft were not adhering to the altitudes published in the NOTAM.

In an effort to avoid coming across other aircraft, he increased his altitude to 1 800 ft AGL, but this measure was not sufficient, since moments later, he

came across another aircraft at the same altitude, which he had to avoid by making an evasive maneuver.

He continued his spraying for a few minutes more and evaluated the risk, since there were around 12 aircraft in the area engaged in the "touring activity". Since they were not observing the altitudes or reporting their positions or flight levels on the radio, he decided to finish his aerial work early and proceed directly to the Valencia Airport.

The CIAIAC deemed that the most probable cause of the incident involving the loss of vertical and horizontal separation between the aircraft that were flying in the vicinity of Castellón was the fact that several of the aircraft that were flying in the area did not observe the vertical limits specified in the NOTAM published for this purpose.

No safety recommendations were issued after the investigation into the accident.

The positive factors in this case were:

	1. PRE-FLIGHT PREPARATIONS AND PRECAUTIONS The pilot had gathered all the information necessary for the flight (NOTAM) and was aware of the Aerial Tour of the Costa de Azahar.
	2. VISUAL DETECTION/ANTICIPATION They noticed that some aircraft were not adhering to the altitudes published in the NOTAM.
	3. AVOIDANCE MANEUVER He came across another aircraft at the same altitude, which he had to avoid by making an evasive maneuver.
	4. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER After assessing the risk, he decided to finish his aerial work early and proceed directly to the Valencia Airport.

IN-012/2015 INCIDENT INVOLVING A PIPER PA-28R-180 AIRCRAFT, REGISTRATION EC-HNN, OPERATED BY THE AEROTEC ESCUELA DE PILOTOS, AND A PIPER PA-28-161 AIRCRAFT, REGISTRATION EC-JCI, OF THE AEROCLUB DE SEVILLA, AT THE SEVILLE AIRPORT (LEZL) ON 27 APRIL 2015. REPORT APPROVED ON 26 OCTOBER 2015.

On Monday, 27 April 2015, aircraft EC-HNN was being prepared for a training flight with an instructor and a student pilot aboard. The aircraft taxied to the runway 27 hold point on taxiway HP4, where it held at the centerline of the taxiway.

At the same time, aircraft EC-JCI was preparing to make a private flight with only the pilot aboard. The aircraft taxied to the runway 27 hold point, where it waited in second place behind aircraft EC-HNN.

The pilot of the second aircraft reported "ready for takeoff", after which the controller cleared it to line up and wait on runway 27. When maneuvering into the runway, the left wingtip of the aircraft struck the aircraft that was in the first position. The crew of EC-HNN informed the tower that they had felt an impact on the right wingtip when the other aircraft passed it. The tower controller asked the pilot of EC-JCI if he had struck the preceding aircraft at the hold point. The pilot said he had not felt anything and took off.

The crew of EC-HNN requested to return to the stand to evaluate the damage.

The report determined that the cause of the incident was the failure of the pilot of EC-JCI to gauge the distance separating him from EC-HNN, which was ahead of him at the hold point on taxiway HP4. Contributing to the incident was the haste of the pilot of aircraft EC-JCI to start the flight.

No safety recommendations were issued after the investigation into the accident.

The positive factors in this case were:

	1. THREAT IDENTIFICATION The crew of EC-HNN felt an impact on the right wingtip.
	2. USE OF TRAINING INSTRUCTIONS The crew of EC-HNN informed the tower that they had felt an impact on the right wingtip.
	3. DECISION TO REJECT TAKEOFF The crew of EC-HNN requested to return to the stand to evaluate the damage.

IN-013/2015 ACCIDENT INVOLVING AN AIRBUS A-321-212 AND A BOEING B-737-400, REGISTRATIONS F-GTAZ AND OE-IAP, OPERATED BY AIR FRANCE AND TNT AIRWAYS, AT THE BARCELONA-EL PRAT AIRPORT (LEBL) ON 28 APRIL 2015. REPORT APPROVED ON 25 NOVEMBER 2015.

The aircraft operated by Air France, with callsign AFR1449, started taxiing from parking stand 221 at the Barcelona-El Prat Airport to the 25L threshold. While it was on the taxiway, it was cleared by ATC to cross runway 02.

At that time the airport had not yet changed from its preferred nighttime configuration, which uses runway 07R for takeoffs and runway 02 for landings, to its preferred daytime configuration, which uses runway 25L for takeoffs and 25R for landings.

AFR1449 reached the intersection of the taxiway with runway 02, and it stopped upon seeing the stop bar lights energized. The crew asked ATC to confirm they were cleared to cross the runway. ATC instructed them to hold their position.

One minute earlier, a Boeing B-737-400 with callsign TAY421J had been cleared by ATC to land on runway 02. It was on the last segment of the approach. Aircraft TAY421 continued its approach and landed normally, passing in front of the other aircraft.

It should be noted that the stop bar lighting system worked perfectly and that the crew of the aircraft with callsign AFR1449 reacted as expected. Their actions helped ensure that the event remained no more than an incident.

The investigation concluded that the incident occurred because the airplane with callsign AFR1449 was cleared to cross the runway due to an oversight by the central ground controller.

Three preliminary recommendations (REC 16/15 - REC 18/15) were issued and published, two for ENAIRE and another for AESA.

The positive factors in this case were:

	1. DESIGN REQUIREMENTS The stop bar lighting system worked correctly.
	2. USE OF TRAINING INSTRUCTIONS The crew asked ATC to confirm they were cleared to cross the runway.

A-014/2015 ACCIDENT INVOLVING A HUGHES 369D AIRCRAFT, REGISTRATION EC-LXF, OPERATED BY HELITRANS PYRINEES, IN THE OCEAN 3 NM EAST OF PINEDO (VALENCIA) ON 19 MAY 2015. REPORT APPROVED ON 27 JUNE 2016.

Helicopter EC-LXF took off from the temporary heliport in Huércal-Overa (Almería) on a positioning flight to La Seu d'Urgell (Lleida). Aboard the aircraft were the pilot and another occupant who was also a helicopter pilot but who had no flight duties in the cockpit.

While flying over the sea, they heard a loud noise in the helicopter, which started rotating violently left while banking right. The pilot issued an emergency (MAYDAY MAYDAY MAYDAY) on the radio while he started the autorotation maneuver.

The maneuver to decelerate the autorotation was effective and reduced the impact force with the water. This, along with the fact that both occupants were wearing their harnesses and seat belts, allowed them to survive the crash landing into the water. The occupants managed to exit the aircraft under their own power and started to swim toward the shore. The helicopter sank in the sea and the wreckage was not found.

An aircraft flying in the area received the emergency call and notified Valencia approach control. Upon verifying that they had lost the radar signal from the aircraft, they activated the search and rescue services.

A SASEMAR aircraft that was flying in a nearby area was instructed to aid in searching for the helicopter. This SASEMAR aircraft located an oil slick in the water. A short time later, a SASEMAR vessel was dispatched, which located and rescued the helicopter's occupants.

The most probable cause of the accident was an interruption in the transmission of power from the engine to the main gearbox through the shaft that joins them.

Four recommendations (REC 42/16 - REC 45/16) were issued in the wake of the investigation. Two of them were directed at AESA to have it consider taking the regulatory initiative in order to regulate the need to have life vests aboard and to regulate the need to have water survival training. The other two were for the DGAC to gave it regulate the contents of the recommendations directed at AESA.

The positive factors in this case were:

	1. THREAT IDENTIFICATION While flying over the sea, they heard a loud noise in the helicopter.
	2. USE OF TRAINING INSTRUCTIONS The pilot issued an emergency (MAYDAY MAYDAY MAYDAY) on the radio.
	3. THIRD-PARTY INTERVENTION An aircraft flying in the area received the emergency call and notified Valencia approach control.
	4. AIRMANSHIP AND FLIGHT SKILLS The maneuver to decelerate the autorotation was effective and reduced the impact force with the water.
	5. DESIGN REQUIREMENTS Both occupants were wearing their harnesses and seat belts, which contributed to their survival.
	6. ATC INTERVENTION/ASSISTANCE Upon verifying that they had lost the radar signal from the aircraft, ATC activated the search and rescue services.
	7. THIRD-PARTY INTERVENTION A SASEMAR vessel was dispatched, which located and rescued the helicopter's occupants.

A-015/2015 INCIDENT INVOLVING A CESSNA 172-P AIRCRAFT, REGISTRATION EC-FQD, AT THE AERODROME OF SON BONET (LESB) ON 11 MAY 2015. REPORT APPROVED ON 28 SEPTEMBER 2015.

The Cessna 172-P took off from the aerodrome of Son Bonet on a local training flight to practice navigation over the island. Aboard were an instructor and a student, the latter being the pilot in command.

Fifty-five minutes into the flight, the crew returned to the Son Bonet aerodrome, where they reported they were lined up on the runway 23 approach. The crew configured the aircraft with the flaps fully lowered and maintained a speed of 65 kt. While attempting to land, the student impacted the runway hard, which caused the aircraft to bounce. At this point, the instructor took control of the aircraft ("I have control") and upon taking the controls, realized they were stuck and unable to move whatsoever, so he did not apply power and did not go around. The aircraft began to bounce ("porpoising"). Unable to control the aircraft, he kept it on the runway until it

stopped.

The instructor's decision not to go around was completely correct, since the airplane would have been difficult to control once airborne, possibly leading to a more serious incident.

After its investigation, the CIAIAC concluded that the accident was likely caused by a hard impact between the nose gear and the runway during landing.

No safety recommendations were issued after the investigation into the accident.

The positive factors in this case were:

	1. GOOD COCKPIT PRACTICES The student impacted the runway hard, which caused the aircraft to bounce, at which point the instructor took control of the aircraft.
	2. LOGICAL PROBLEM SOLVING The instructor's decision not to go around was completely correct, since the airplane would have been difficult to control once airborne, possibly leading to a more serious incident.

A-017/2015 ACCIDENT INVOLVING A TECNAM P-2002-JR AIRCRAFT, REGISTRATION EC-KQG, AT THE GRIÑÓN AIRFIELD (MADRID) ON 30 JUNE 2015. REPORT APPROVED ON 28 SEPTEMBER 2016.

The pilot was going to fly from the Madrid Cuatro Vientos aerodrome (LECU) to the Casarrubios aerodrome (LEMT), a flight estimated to last 20 minutes.

It was a June afternoon, it was hot and the aircraft had been parked out in the sun at the aerodrome. As a result, after a few minutes in the air, the pilot started to sweat and to feel hot. The pilot, fearing he might succumb to heatstroke due to the temperature in the cockpit, decided to divert and land at the Griñón airfield, which he knew.

During the landing run he overshot the runway and the aircraft ran into the

perimeter fence and turned over, coming to a stop on an embankment next to the M-407 road. After the accident, the pilot unbuckled his safety harness, turned off the master switch (main electricity) and broke the right side of the acrylic ceiling, climbing out under his own power. He sustained minor injuries. The aircraft sustained heavy damage. The local police officer who first reported to the scene stated that two officers went to the accident site.

The CIAIAC did not issue any safety recommendations after its investigation. The investigation concluded that the accident occurred as a result of an improperly executed approach and landing maneuver by the pilot at an airfield other than the destination aerodrome specified in the flight plan, with a runway much shorter than those normally used by the pilot. Contributing to the accident was the shortage of fuel in the tanks, the high temperature and turbulence and the stress and concern generated by these two factors.

The positive factors in this case were:

	1. THREAT IDENTIFICATION The pilot started to sweat and to feel hot, and feared he might succumb to heatstroke due to the temperature in the cockpit.
	2. DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER He decided to divert and land at the Griñón airfield, which he knew.
	3. DESIGN REQUIREMENTS After the accident, the pilot unbuckled his safety harness.
	4. USE OF TRAINING INSTRUCTIONS He turned off the master switch (main electricity).
	5. THIRD-PARTY INTERVENTION The local police officer who first reported to the scene stated that two officers went to the accident site.

A-018/2015 ACCIDENT INVOLVING AN ULTRAMAGIC T-180 AIRCRAFT, REGISTRATION EC-LKP, OPERATED BY BALLOONING, S. L., IN VIC (BARCELONA) ON 24 MAY 2015. REPORT APPROVED ON 26 OCTOBER 2015.

The hot-air balloon took off from a sports area in Vic (Barcelona), along with another balloon from the same operator, with the intention of doing a tourism flight.

Ten minutes into the flight, both balloons descended to make a low-altitude flight. The pilot thought that the other balloon was descending too quickly to the ground. Concerned by this, the pilot radioed the pilot in the other balloon. This distracted him for a couple of minutes.

The pilot did not realize that his low altitude and flight path were taking him directly to some power lines until he was within some 10 m of the lines. So he activated the dual burner in an effort to climb quickly and clear the power lines, but the balloon did not rise quickly enough to pass over the lines.

Just before making contact with the lines, when the pilot saw that the contact was inevitable, he shut off the flames in the burners and closed the tank valves. The gondola impacted the power line, cutting one of the cables and causing an arc that melted two of the 16 cables that attach the gondola to the skirt of the balloon. The gondola got caught in one of the electric lines, though by then there was no current flowing through it. The pilot opened the FDS to descend as quickly as possible out of fear that the electricity would be restored. The balloon descended quickly and landed gently without further incident.

Once on the ground, the pilot ensured everyone was alright and moved them away from the severed wires. He then notified emergency services and contacted the company's rescue team on the radio. One of the passengers informed him of a fire in the gondola. He saw a small fire on the protective sleeve of a fuel tank, which he put out with the on-board extinguisher.

They moved away from the balloon and waited for the emergency personnel. The urban police, ambulances and ground units reported to the site.

No safety recommendations were issued after the investigation, which concluded that the accident resulted from not maintaining a safe altitude, not following the company's Operations Manual and flying part of the way at an altitude below that of obstacles in the area, giving priority to the tourist appeal over flight safety.

The positive factors in this case were:

	1. USE OF TRAINING INSTRUCTIONS When the pilot saw that the contact was inevitable, he shut off the flames in the burners and closed the tank valves.
	2. LOGICAL PROBLEM SOLVING The pilot opened the FDS to descend as quickly as possible out of fear that the electricity would be restored.
	3. USE OF TRAINING INSTRUCTIONS The pilot notified emergency services and contacted the company's rescue team on the radio.
	4. PASSENGER INTERVENTION/ASSISTANCE One of the passengers informed him of a fire in the gondola.
	5. THIRD-PARTY INTERVENTION The urban police, ambulances and ground units reported to the site.

IN-019/2015 INCIDENT INVOLVING TWO AIR TRACTOR AT-802A AMPHIBIOUS AIRCRAFT, REGISTRATIONS Z3-BGV AND Z3-BGU, OPERATED BY THE MACEDONIAN PROTECTION AND RESCUE DEPARTMENT, AND AN AGUSTAWESTLAND AW109E HELICOPTER, REGISTRATION EC-ILA, OPERATED BY INAER HELICÓPTEROS, 3.4 NM NORTH OF PUIG (VALENCIA) ON 13 JUNE 2015. REPORT APPROVED ON 29 MARCH 2016.

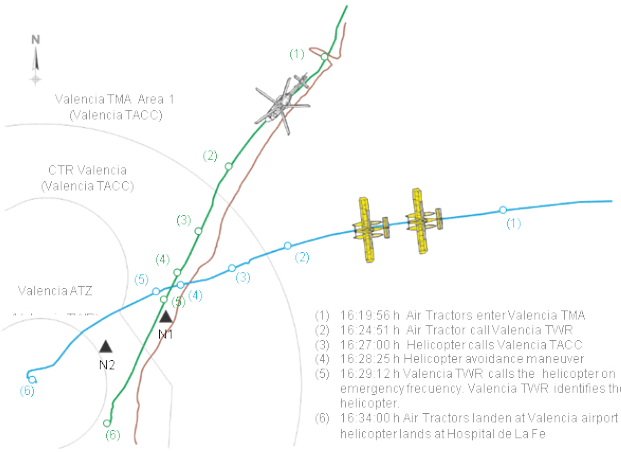
The two Air Tractor AT-802A amphibious aircraft, registrations Z3-BGU and Z3-BGV, were flying in formation with a single flight plan and a single transponder in service. They had taken off from the Menorca Airport (LEMH) en route to the Valencia Airport (LEVL). They were owned by the government of the Republic of Macedonia.

The AW109E helicopter was a medical helicopter operated by the regional government of Valencia. It was on an urgent medical flight from the Hospital de Vinarós (Castellón) to the Hospital de La Fe (Valencia).

The helicopter pilot saw the formation of two amphibian aircraft to his left at a distance of less than 1 NM on an approximate heading of 250°, at the same apparent altitude as his or at most 100 ft higher. He was flying faster. They were con convergent flight paths at the same altitude and speed, so the helicopter had to execute an evasive maneuver to avoid the two aircraft. They came within 0.3 NM horizontally and 300 ft vertically.

After crossing, the three aircraft continued en route and landed at their

destinations without incident.



The investigation determined that the incident was caused by a lack of communication and coordination between the aircraft, which resulted in them continuing their converging flight paths until the conflict occurred.

Seven safety recommendations (REC 17/16 - REC 23/16) were issued in the wake of the investigation: Five were directed at ENAIRE, one at FerroNATS and another at AESA. Even though the incident took place in G airspace, where the pilots are responsible for their own separation, and none of the crews requested flight information, several aspects related with the provision of this service were identified and addressed in the recommendations.

The positive factors in this case were:

	1. THREAT IDENTIFICATION The helicopter pilot saw the formation of two amphibian aircraft to his left and realized they were on convergent flight paths, at the same altitude and speed.
	2. AVOIDANCE MANEUVER The helicopter had to execute an evasive maneuver to avoid the two aircraft.

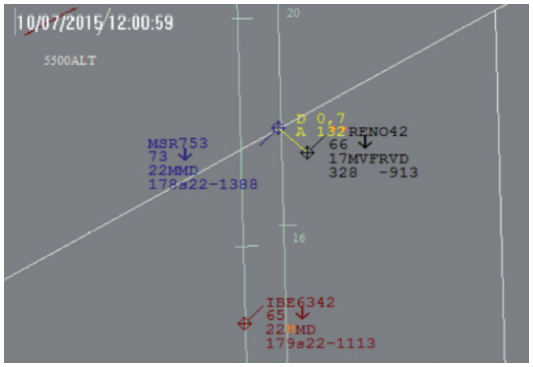
IN-021/2015 INCIDENT INVOLVING A BOEING B-737-800 AIRCRAFT, REGISTRATION SU-GCO, OPERATED BY EGYPTAIR, AND A CASA C-212 AIRCRAFT, REGISTRATION T12B65, OPERATED BY THE SPANISH AIR FORCE, IN THE MADRID TMA ON 10 JULY 2015. REPORT APPROVED ON 29 MARCH 2016.

The Egyptair Boeing B-737-800 was flying from the El Cairo Airport (HECA) to the Adolfo Suárez Madrid-Barajas Airport (LEMD). At the time of the incident, it was making the approach to runway 18L at Adolfo Suárez Madrid-Barajas.

As for the Air Force aircraft, flight RENO42 was flying from the aerodrome of Torrejon (LETO) to Valladolid (LEVD). It had taken off from runway 22 at Torrejon and was flying north through the corridor in place in the Madrid TMA for state aircraft that are flying under VFR. In the vicinity of Torrelaguna, the crew of RENO42 were surprised by a flock of birds and had to climb and turn left to

evade it. As a result, it left the visual corridor while it climbed above the altitudes specified for VFR flights.

The crew of the Egyptian aircraft received a TCAS RA when its separation with the military aircraft fell. The crew followed the TCAS instructions and stopped descending at 7 300 ft. The minimum separation was 0.3 NM horizontally and 800 ft vertically.



The Egyptair aircraft subsequently resumed its approach without further incident. The military aircraft also continued on its route to LEVD. No occupants on either aircraft were injured and the aircraft were undamaged.

The incident occurred because the aircraft with callsign RENO42 left the north corridor in the Madrid CTR and climbed above the altitudes specified for VFR flights, causing it to approach flight MSR753, which resulted in a resolution advisory on the TCAS of the Egyptair flight.

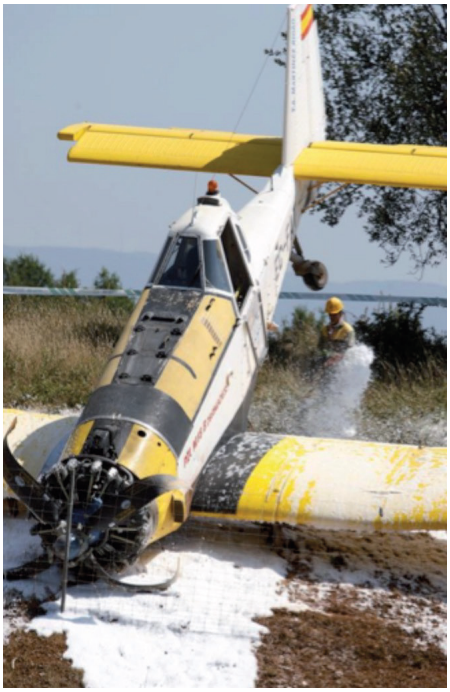
In the wake of the investigation, recommendation REC 16/16 was issued to the Air Force Staff to have it provide information on the incident to the pilots involved.

The positive factors in this case were:

	1. HARDWARE SAFETY NET The crew of the Egyptian aircraft received a TCAS RA when its separation with the military aircraft dropped.
	2. AVOIDANCE MANEUVER The crew followed the TCAS instructions and stopped descending at 7 300 ft.

A-022/2015 ACCIDENT INVOLVING A WSK PZL-M18B AIRCRAFT, REGISTRATION EC-FAT, OPERATED BY SAETA, AT THE AERODROME OF DOADE (LUGO) ON 15 JULY 2015. REPORT APPROVED ON 31 MAY 2016.

On Wednesday, 15 July, a single-engine WSK PZL-M18B aircraft, registration EC-FAT, which had been mobilized to fight a fire in the vicinity of the forest firefighting base in Doade (Lugo), was preparing to make its first flight of the day.



According to the pilot's statement, during the takeoff run he noticed that the aircraft was shifted left of the runway centerline. He proceeded to correct the deviation, but due to the inertia of the airplane, it continued moving to the left. Finding it impossible to correct said deviation, he applied the right brake and reduced power to abort the takeoff maneuver. It was not possible to brake the airplane inside the runway, and it departed the runway via the left side, colliding against the fence protecting the runway and then crashing into the surrounding terrain.

Following the incident, a fire truck applied foam to prevent a possible fire. The pilot was not injured. The aircraft sustained damage to its landing gear, wings and propeller.

After its investigation, the CIAIAC did not issue any safety recommendations. The investigation determined that the accident was likely caused by the pilot's loss of control of the aircraft.

The positive factors in this case were:

	1. DECISION TO REJECT TAKEOFF Finding it impossible to correct the deviation, the pilot applied the right brake and reduced power to abort the takeoff maneuver.
	2. AERODROME INTERVENTION/ASSISTANCE Following the incident, a fire truck applied foam to prevent a possible fire.

A-025/2015 ACCIDENT INVOLVING A WSK PZL-M18B AIRCRAFT, REGISTRATION EC-FBJ, OPERATED BY SAETA, IN CASTRO CALDELAS (OURENSE) ON 27 AUGUST 2015. REPORT APPROVED ON 28 SEPTEMBER 2016.

The WSK PZL-M18B aircraft, operated by the company SAETA for the 2015 forest firefighting campaign of the government of Galicia, was based at the base in Doade (Lugo), along with two of the company's other aircraft. On Thursday, 27 August 2015, resources were requested from the base to aid in fighting a fire that had broken out 18 km southeast of the base in Chandrexa de Queixa (Ourense). All three aircraft were mobilized.

During the ferry flight to the fire, the WSK PZL-M18B aircraft suffered an uncontrolled impact against the side of a mountain in the vicinity of Castro Caldelas following a potential stall while turning to avoid impacting the mountains. During the turn, the aircraft reached a bank angle of nearly 90º, during which the pilot dropped the water.

The aircraft was destroyed by the impact. The cockpit, however, retained its integrity, which limited the extent of the pilot's injuries. The pilot was wearing a harness and both it and the seat withstood the impact, serving their safety purpose.

The emergency locator (ELT) also activated as a result of the impact, and its signal was received. This, along with the fact that the aircraft was flying in formation and that an eyewitness who took two photographs of the accident called 112 to report what he had seen, aided in the process to search for and locate the aircraft.

The investigation concluded that the accident occurred due to the loss of control of aircraft EC-FBJ due to stalling while turning at low altitude to avoid impacting a mountain. During the turn, the aircraft's bank angle reached almost 90º.

As a result of the investigation, two recommendations were issued (REC 78/16 and REC 79/16) to the operator, SAETA. One was issued in an effort to enhance the pre-flight planning phase and the assertiveness of the pilots. The other focused on having the operator include in its training and procedures those situations in which water drops are either beneficial or detrimental to the situation.

The positive factors in this case were:

	1. DESIGN REQUIREMENTS The cockpit retained its integrity, which limited the extent of the pilot's injuries. The pilot was wearing a harness and both it and the seat withstood the impact, serving their safety purpose. The emergency locator (ELT) also activated as a result of the impact.
	2. THIRD-PARTY INTERVENTION The eyewitness who took two photographs of the accident called 112 to report what he had seen.

A-028/2015 ACCIDENT INVOLVING A PIPER PA-28-140 AIRCRAFT, REGISTRATION EC-CLU, OPERATED BY AIRPULL AVIATION S.L., AT THE AERODROME OF REQUENA (LERE), VALENCIA, ON 13 SEPTEMBER 2015. REPORT APPROVED ON 30 NOVEMBER 2016.

An instructor and student were returning to the airfield from the east and initiated a direct approach for final landing on runway 30 at the aerodrome of Requena.

During the final approach and very close to the runway surface, the pilot lost control of the aircraft, causing it to fall to the runway and bounce. The pilot applied power in an effort to take off, but the aircraft veered off the left side of the runway. The aircraft traveled 110 m through a vineyard from the edge of the runway, perpendicular to it, and stopped 500 m away from the threshold.

The cockpit was not affected by the impact with the ground, and the accelerations produced by the impact were dampened in the cockpit because they occurred away from the cockpit, like the left wingtip and the front of the airplane's nose. Both occupants exited the aircraft under their own power.

Once the aircraft came to a stop after the impact with the ground, they closed

all the valves and turned off all the switches.

The accident was caused by an improperly controlled approach and final landing on runway 30 in variable (gusting) wind conditions of moderate intensity from 270º.

After its investigation, the CIAIAC issued one safety recommendation (REC 82/16) to the Airpull Aviation, S.L flight academy, which operated the aircraft.

The positive factors in this case were:

	1. DESIGN REQUIREMENTS The cockpit was not affected by the impact with the ground.
	2. USE OF TRAINING INSTRUCTIONS Once the aircraft came to a stop after the impact with the ground, they closed all the valves and turned off all the switches.

A-030/2015 ACCIDENT INVOLVING A SCHEMPP-HIRTH DUO DISCUS T AIRCRAFT, REGISTRATION OH-888, IN BERDÚN (HUESCA) ON 22 SEPTEMBER 2015. REPORT APPROVED ON 25 JANUARY 2016.

On Tuesday, 22 September 2015, a Schempp-Hirth Duo Discus T glider, registration OH-888, suffered an accident when making an off-field landing in the vicinity of Berdún (Huesca).

The aircraft had been towed from the aerodrome of Santa Cilia (LECI), Huesca, to make a flight that relied on thermals. During the flight, it gradually lost altitude, so the pilot decided to make an off-field landing. To this end, he selected a crop field 11 km west of the aerodrome, near the N-240 road.

During the landing, the right wing struck a tree, causing the pilot to lose control of the airplane, which impacted the ground.

The aircraft sustained heavy damage but the cockpit maintained its integrity, which helped limit the severity of the occupants' injuries. The seatbelts were in perfect condition, and

served to properly restrain the occupants.

The pilot walked to the road and flagged down a motorist for help.

The CIAIAC did not issue any safety recommendations after its investigation. The accident occurred when the pilot lost control of the aircraft during the final leg of the landing due to the right wing impacting a tree. A contributing factor to the loss of altitude was the aerodynamic drag produced by the engine, which was deployed but not running.

The positive factors in this case were:

	1. DECISION TO LAND AS A PRECAUTION The aircraft gradually lost altitude, so the pilot decided to make an off-field landing.
	2. DECISION TO LAND ON AN UNEXPECTED RUNWAY He selected a crop field 11 km west of the aerodrome.
	3. DESIGN REQUIREMENTS The cockpit was not deformed in a way that endangered the occupants' lives. The seatbelts were in perfect condition, and served to properly restrain the occupants.
	4. THIRD-PARTY INTERVENTION The pilot walked to the road and flagged down a motorist for help.

A-032/2015 ACCIDENT INVOLVING A CESSNA 172-N AIRCRAFT, REGISTRATION EC-HKH, IN GÓRLIZ (BIZKAIA) ON 14 NOVEMBER 2015. REPORT APPROVED ON 30 NOVEMBER 2016.

On Saturday, 14 November 2015, a Cessna 172-N aircraft, registration EC-HKH, took off from the Bilbao Airport (LEBB) on a local flight scheduled to last one hour. Aboard were the pilot and two other occupants.

As per the pilot's statement, the flight was uneventful until, when returning to the airport along the coastline, there was a loss of power that limited the engine's RPM. At this point, the pilot declared an emergency (MAYDAY MAYDAY MAYDAY) due to an engine failure.

The pilot tried to restore power by carrying out the specified procedure, but to no avail. He instructed the other occupants and prepared the aircraft for an emergency landing. Since there were people on the beach, he decided to ditch

the airplane in Astondo Point. As they were about to make contact, the pilot instructed the occupants and released the aircraft's doors so they could be opened during the evacuation.

The pilot and the two other occupants were able to evacuate the aircraft with help from eyewitnesses. They were eventually rescued by the regional police's Maritime Rescue Service. The aircraft sank in water 10 to 15 m deep.

The CIAIAC did not issue any safety recommendations after its investigation. The most likely cause of the loss of engine power was the formation of ice in the carburetor. Contributing to the accident was the pilot's incorrect assessment of the prevailing weather conditions.

The positive factors in this case were:

	1. ENGINE FAILURE ANTICIPATION There was a loss of power that limited the engine's RPM.
	2. USE OF TRAINING INSTRUCTIONS The pilot declared an emergency (MAYDAY MAYDAY MAYDAY) due to an engine failure.
	3. DECISION TO LAND AS A PRECAUTION When he could not correct the loss of power, he prepared the aircraft for an emergency landing.
	4. DECISION TO LAND ON AN UNEXPECTED RUNWAY Since there were people on the beach, he decided to ditch the airplane.
	5. USE OF TRAINING INSTRUCTIONS The pilot released the aircraft's doors so they could be opened during the evacuation.
	6. THIRD-PARTY INTERVENTION The pilot and the two other occupants were able to evacuate the aircraft with help from eyewitnesses. They were eventually rescued by the regional police's Maritime Rescue Service.

IN-034/2015 INCIDENT INVOLVING TWO CESSNA 172-S AIRCRAFT, REGISTRATIONS LY-BCF AND D-EXAH, BOTH OPERATED BY AEROJET BALTIC, IN THE VICINITY OF THE VALENCIA AIRPORT (LEVL) ON 9 NOVEMBER 2015. REPORT APPROVED ON 27 JUNE 2016.

On Monday, 9 November, aircraft LY-BBF, LY-BCF, D-EXAH and LY-BCG, all of them operated by Aerojet Baltic, left from the aerodrome of Requena (LERE) on a training flight to practice instrument approached at the Valencia Airport. The training involved doing a low approach to the Valencia Airport, and then a right turn direct to the SGO NDB at an altitude of 4 000 ft.

The aircraft with registrations LY-BBF and LY-BCF made the low approach to the Valencia Airport. The aircraft with registration D-EXAH, however, was unable to do so. It was instructed by the controller in the Valencia tower to turn right to the SGO NDB so as not to delay a commercial air transport airplane (ENT592), which was cleared to take off two minutes later.

The controller in the Valencia TACC, after noticing the takeoff of commercial air transport aircraft ENT592, which was much faster than the training aircraft, and anticipating that it would catch up to LY-BCF, instructed the latter to remain at an altitude of 3 000 ft. He further requested the Valencia tower controller to instruct D-EXAH to hold at 2 500 ft, which he noticed was closing horizontally on LY-BCF. The aircraft came within 0.3 NM horizontally and 500 ft vertically of one another.

The investigation determined that this incident occurred because the Valencia tower controller cleared commercial transport aircraft ENT592 to take off and instructed D-EXAH to abort its low approach maneuver without coordinating with the controller in the Valencia TACC and without observing the procedures laid out in the Letter of Agreement between FerroNATS and ENAIRE. In the wake of the investigation two recommendations were issued (REC 29/16 and REC 30/16), one of them for ENAIRE and the other for FerroNATS, to have them agree on a change to the Letter of Agreement.

The positive factors in this case were:

	1. THREAT IDENTIFICATION The controller in the Valencia TACC, after noticing the takeoff of commercial air transport aircraft ENT592, which was much faster than the training aircraft, anticipated that it would catch up to LY-BCF
	2. ATC INTERVENTION/ASSISTANCE The Valencia TACC instructed LY-BCF to hold at 3 000 ft.

	3. THREAT IDENTIFICATION The Valencia TACC identified a loss of horizontal separation between LY-BCF and D-EXAH.
	4. ATC INTERVENTION/ASSISTANCE The Valencia TACC controller requested the Valencia tower controller to instruct D-EXAH to hold at 2 500 ft.

IN-035/2015 INCIDENT INVOLVING A BOEING B-737-800, REGISTRATION EI-DLR, OPERATED BY RYANAIR, AT THE BARCELONA-EL PRAT AIRPORT (LEBL) ON 12 DECEMBER 2015. REPORT APPROVED ON 2 NOVEMBER 2016.

The aircraft, inbound from Seville with callsign FR6399, was parked at stand 101 and disembarking passengers using the jet bridge.

During this process, a flight attendant noticed the airplane's unusual nose-up attitude and notified the flight crew that was completing the checklists. The crew confirmed that the aircraft was being raised by the jet bridge and gave instructions to the passengers still remain aboard to take their seats and fasten their seatbelts.

A few seconds later, the L1 door gave way and the airplane's nose fell approximately 2 m to the ground, coming to rest on the nose leg. The remaining passengers still on the airplane were disembarked via the aft door. One passenger complained of an injured knee and another had a panic attack.

The crew requested the airport's medical service and an ambulance,which arrived in two minutes and treated the two affected or injured passengers.

The investigation determined that the uncontrolled raising of the jet bridge was caused by the combination of a faulty servovalve in the hydraulic lifting system and a modification of the activation time of the pump in the self-leveling system, which had been carried out when the jet bridge was refurbished a few months earlier.

Two recommendations (REC 80/16 and 81/16) were issued in the wake of the

investigation. One was directed at the Barcelona-El Prat Airport to have it ensure the preventive maintenance before and after the jet bridge refurbishment process. The other was directed at the TJV Adelte&Ports Maritime, S.L. – Luis Pares, S.L., to have it assess all the possible failure modes for jet bridges.

The positive factors in this case were:

	1. THREAT IDENTIFICATION A flight attendant noticed the airplane's unusual nose-up attitude and notified the flight crew.
	2. LOGICAL PROBLEM SOLVING The crew gave instructions to the passengers still aboard to take their seats and fasten their seatbelts.
	3. AERODROME INTERVENTION/ASSISTANCE The crew requested the airport's medical service and an ambulance,which arrived in two minutes and treated the two affected or injured passengers.

A-038/2015 ACCIDENT INVOLVING AN AEROPRO EUROFOX 912 (S) AIRCRAFT, REGISTRATION G-UIRI, AT THE AERODROME OF ONTUR (LEOT), ALBACETE, ON 5 APRIL 2015. REPORT APPROVED ON 29 MARCH 2016.

The aircraft started its takeoff run 290 m away from the end of runway 13 at the aerodrome of Ontur (Albacete) and took off after having traveled approximately 120 m, as in a normal maneuver.

During the initial climb, the aircraft failed to attain a high enough altitude to ensure optimal safety conditions for takeoff, so the pilot decided to abort the takeoff and make an emergency landing. At the last moment, seeing he would not clear the road embankment, diverted slightly toward a field of olive trees located at the end of the runway, between it and the embankment, to avoid impacting said embankment head-on.

The investigation determined that the accident occurred as a result of a lack of in-flight control when the aircraft was unable to gain sufficient altitude to perform a safe takeoff. Contributing to this was a tailwind and the associated rotor presence, caused by an improper

runway selection by the pilot and resulting from a non-existent prior consideration of the weather conditions at the moment of takeoff.

No safety recommendations were issued after the accident.

The positive factors in this case were:

	1. DECISION TO REJECT TAKEOFF The aircraft failed to attain a high enough altitude to ensure optimal safety conditions for takeoff, so the pilot decided to abort the takeoff.
	2. THREAT IDENTIFICATION At the last moment, he saw he would not clear the road embankment.
	3. AVOIDANCE MANEUVER He diverted slightly toward a field of olive trees located at the end of the runway, between it and the embankment, to avoid impacting said embankment head-on.

A-002/2016 ACCIDENT INVOLVING A CESSNA L-19-A AIRCRAFT, REGISTRATION EC-DRN, OPERATED BY THE IGUALADA-ÓDENA GLIDING CLUB, AT THE AERODROME OF IGUALADA-ÓDENA (LEIG), BARCELONA, ON 16 JANUARY 2016. REPORT APPROVED ON 27 APRIL 2016.

The aircraft took off from the aerodrome of Igualada-Ódena towing a glider and landed normally.

While taxiing on the ground, it made a 180° counter-clockwise turn to return to the runway 35 asphalt threshold and, based on the information provided by the pilot, a gust of wind raised the rear of the airplane, causing its nose to impact the runway. After the accident, the pilot shut off the electricity and exited the aircraft under his own power. He was not injured.

The investigation concluded that the accident was the result of the combined forces resulting from the high-speed turn and the effect of a gust of wind that impacted the airplane from behind.

No safety recommendations were issued after the accident.

The positive factors in this case were:

1. USE OF TRAINING INSTRUCTIONS

The pilot shut off the electricity and exited the aircraft under his own power. He was not injured.

A-003/2016 ACCIDENT INVOLVING AN ALEXANDER SCHLEICHER KA 6 CR AIRCRAFT, REGISTRATION EC-DVF, OPERATED BY THE IGUALADA-ÓDENA GLIDING CLUB, AT THE AERODROME OF IGUALADA-ÓDENA (LEIG), BARCELONA, ON 17 JANUARY 2016. REPORT APPROVED ON 29 APRIL 2016.

The glider began its takeoff run on runway 17 at the aerodrome of Igualada-Ódena, towed by a Socata Rallye MS-893E airplane.

At the start of the run, the aircraft started to veer to the right of the path being taken by the towing airplane due to a wind gust, which made the pilot abort the takeoff before going airborne.

The pilot released the tow cable upon noticing he was losing control of the aircraft, the wingtip of which impacted the left main gear wheel of a Cessna 172 airplane that was parked to the right of runway 17. The pilot, however, reacted correctly by releasing the tow cable.

The weather information provided by AEMET confirmed that the wind would have impinged on the glider's left during takeoff, tending to divert it to the right. Although the wind was weak and the maximum gusts expected were not high, everything seems to indicate that it surprised the pilot, who was not highly experienced, making him abort the takeoff before going airborne.

The CIAIAC determined that the accident was caused by the destabilization of

the aircraft during the takeoff run due to the effect of a gust of wind from the left, which forced the pilot to abort the takeoff after the aircraft veered to the right of the centerline, striking another aircraft that was parked too close to the runway. No safety recommendations were issued after the investigation.

The positive factors in this case were:

	1. THREAT IDENTIFICATION The pilot released the tow cable upon noticing he was losing control of the aircraft.
	2. USE OF TRAINING INSTRUCTIONS The pilot released the tow cable upon noticing he was losing control of the aircraft.
	3. DECISION TO REJECT TAKEOFF A gust of wind made the pilot abort the takeoff before going airborne.

IN-007/2016 INCIDENT INVOLVING A BOEING B-737-800 AIRCRAFT, REGISTRATION LN-NHG, OPERATED BY NORWEGIAN, AND A PARAGLIDER ON THE APPROACH TO THE MÁLAGA-COSTA DEL SOL AIRPORT (LEMG) ON 12 MARCH 2016. REPORT APPROVED ON 27 JULY 2016.

On Saturday, 12 March 2016, a Boeing B-737-800 aircraft, registration LN-NHG, operated by Norwegian, was flying from London (United Kingdom) to Málaga (Spain).

While on approach to runway 13 at the Málaga-Costa del Sol Airport, at an altitude of 6 800 ft, the crew of the aircraft saw a paraglider in their flight path. They had to turn right to avoid it. The paraglider in turn also turned right to avoid the aircraft.

After the incident, the aircraft continued descending and landed normally on runway 13. There were no injuries on the airplane and no damage.

The investigation concluded that the incident was caused by the presence of a paraglider in the aircraft's flight path inside an area that was off limits to the paraglider. It occurred as the aircraft was on approach to runway 13 at the Málaga-Costa del Sol Airport and forced the crew to make an evasive maneuver by turning right

As a result of the investigation, two recommendations were issued (REC 54/16 and REC 55/16) directed at AESA. One of them recommends that it take mitigative measures as part of the National Operational Safety Program, and

the other that it increase its oversight of the Valle de Abdalajís area.

The positive factors in this case were:

	1. THREAT IDENTIFICATION The crew of the aircraft saw a paraglider in their flight path.
	2. AVOIDANCE MANEUVER They had to turn right to avoid the paraglider. The paraglider in turn also turned right to avoid the aircraft.

A-013/2016 ACCIDENT INVOLVING A FAIRCHILD SA-226-AT AIRCRAFT, REGISTRATION EC-GFK, OPERATED BY FLIGHTLINE, AT THE GIRONA-COSTA BRAVA AIRPORT (LEGE) ON 24 APRIL 2016. REPORT APPROVED ON 2 NOVEMBER 2016.

On Sunday, 24 April 2016, a Fairchild SA-226-AT aircraft, registration EC-GFK, took off from the Girona-Costa Brava Airport on a local training and check flight. Aboard were the pilot, seated in the LH seat, who was acting as the instructor and captain, and the copilot, seated in the RH seat, who was being trained and checked.

After practicing four landings in different configurations, the airplane made a fifth and last landing, during which the landing gear did not lower.

The aircraft slid on the runway on the bottom of its fuselage until it came to a stop. At that point, the tower at the airport activated the local alarm. The RFFS reported to the aircraft, extinguished the small fire that had broken out in the left engine and dowsed the area in foam to prevent further fires from breaking out.

The investigation concluded that the accident occurred because the crew did not actuate the lever that is used to lower the landing gear.

Three safety recommendations were issued (REC 66/16 – REC 68/16), directedat the operator, Flightline. In them, it is recommended that it modify the Operator's Standard Procedures Manual for the SA226/227 fleet, that it revise its Operations Manual and that it consider standardizing the execution of visual traffic patterns.

The positive factors in this case were:

	1. ATC INTERVENTION/ASSISTANCE The airport tower activated the local alarm.
	2. AERODROME INTERVENTION/ASSISTANCE The RFFS reported to the aircraft, extinguished the small fire that had broken out in the left engine and dowsed the area in foam to prevent further fires from breaking out.

A-018/2016 ACCIDENT INVOLVING AN AIR TRACTOR AT-301 AIRCRAFT, REGISTRATION EC-IOL, OPERATED BY ADEFA, IN ISLA MAYOR (SEVILLE) ON 7 JUNE 2016. REPORT APPROVED ON 30 NOVEMBER 2016.

The Air Tractor AT-301 aircraft, registration EC-IOL, was engaged in rice plowing activities in Isla Mayor (Seville) at 07:25 in an area with flooded fields divided by dirt paths that are used for landing and taking off.

During the day's first landing, made on an easterly heading and once the airplane was already on the ground, the airplane veered to the right, reaching the edge of the plot. The landing gear entered the water, causing the aircraft to turn over and end up in an inverted position with the cockpit under water.

The pilot opened the cockpit window before the airplane turned over, released the harness once upside down and exited the aircraft under his own power. He had serious injuries but none to the head because he was wearing a helmet and because the aircraft had cushioning over the pilot's head.

The positive factors in this case were:

	1. LOGICAL PROBLEM SOLVING The pilot opened the cockpit window before the airplane turned over and released the harness once upside down.
	2. DESIGN REQUIREMENTS The pilot did not sustain any head injuries because he was wearing a helmet and because the aircraft had cushioning over the pilot's head.

ANNEX C
List of events

EVENT	IN-003/2011	IN-013/2011	A-034/2011	A-006/2012	A-029/2012	IN-036/2012	IN-004/2013	A-008/2013	A-010/2013	A-004/2015	IN-015/2013	IN-012/2013	A-013/2013	IN-017/2013	IN-021/2013	IN-020/2013	A-025/2013	A-026/2013	IN-036/2013	IN-034/2013
Type of operation	CA	CA	GA	GA	CA	CA	CA	CA	CA	GA	GA - CA	GA	GA	CA	CA	GA	GA	GA	CA	GA
AVOIDANCE MANEUVER																				
DECISION TO GO AROUND											X				X				X	
DECISION TO LAND AS A PRECAUTION																	X			
DECISION TO LAND ON AN UNEXPECTED RUNWAY				X													X			
DECISION TO REJECT TAKEOFF								X												
DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER	X					X	X		X					X	X				X	
AERODROME INTERVENTION/ ASSISTANCE	X	X				X	X	X	X			X				X				
ATC INTERVENTION/ ASSISTANCE	X	X				X	X		X	X		X		X	X		X			
ASSISTANCE OF AN INSTRUCTOR OR SUPERVISOR																				
PASSENGER INTERVENTION/ ASSISTANCE																				
THIRD-PARTY INTERVENTION/ ASSISTANCE																				
HARDWARE SAFETY NET	X	X					X		X					X	X				X	
ACCURATE USAGE OF DOCUMENTATION																				
COMMUNICATIONS									X											
DESIGN REQUIREMENTS				X									X				X			

EVENT	IN-003/2011	IN-013/2011	A-034/2011	A-006/2012	A-029/2012	IN-036/2012	IN-004/2013	A-008/2013	A-010/2013	A-004/2015	IN-015/2013	IN-012/2013	A-013/2013	IN-017/2013	IN-021/2013	IN-020/2013	A-025/2013	A-026/2013	IN-036/2013	IN-034/2013
Type of operation	CA	CA	GA	GA	CA	CA	CA	CA	CA	GA	GA - CA	GA	GA	CA	CA	GA	GA	GA	CA	GA
ENGINE FAILURE ANTICIPATION				X						X							X			
ENVIRONMENT OBSERVATION																				
LOGICAL PROBLEM SOLVING		X						X												
USE OF TRAINING INSTRUCTIONS/SOPs	X	X		X		X	X	X					X	X	X	X	X		X	
VISUAL DETECTION/ ANTICIPATION		X									X			X	X					
PRE-FLIGHT PREPARATIONS AND PRECAUTIONS				X						X										
THREAT IDENTIFICATION	X	X					X	X	X				X	X						
GOOD COCKPIT PRACTICES	X	X				X	X													
AIRMANSHIP AND FLIGHT SKILLS		X		X						X							X			
THIRD-PARTY INTERVENTION				X						X										

*Types of operation CA - Commercial air transport, GA - General aviation, AW - Aerial work, SF - State flight

EVENT	A-029/2013	IN-032/2013	A-035/2013	IN-038/2013	IN-042/2013	IN-039/2013	IN-041/2013	A-043/2013	IN-044/2013	IN-045/2013	A-046/2013	IN-003/2014	A-004/2014	IN-005/2014	A-006/2014	IN-007/2014	IN-008/2014	IN-011/2014	IN-014/2014	A-009/2014
Type of operation	CA	CA	GA	CA	GA - CA	CA	GA	CA	CA	CA	GA	GA	GA	CA	GA	GA	GA - GA	CA - CA	GA - CA	AW
AVOIDANCE MANEUVER															X		X			
DECISION TO GO AROUND										X										
DECISION TO LAND AS A PRECAUTION							X								X					
DECISION TO LAND ON AN UNEXPECTED RUNWAY							X								X					
DECISION TO REJECT TAKEOFF																				
DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER						X		X		X				X						
AERODROME INTERVENTION/ ASSISTANCE						X		X					X	X						
ATC INTERVENTION/ ASSISTANCE					X	X		X	X					X		X				
ASSISTANCE OF AN INSTRUCTOR OR SUPERVISOR																				
PASSENGER INTERVENTION/ ASSISTANCE																				
THIRD-PARTY INTERVENTION/ ASSISTANCE																				
HARDWARE SAFETY NET								X	X	X				X					X	
ACCURATE USAGE OF DOCUMENTATION																				
COMMUNICATIONS									X											
DESIGN REQUIREMENTS	X						X								X					

EVENT	A-029/2013	IN-032/2013	A-035/2013	IN-038/2013	IN-042/2013	IN-039/2013	IN-041/2013	A-043/2013	IN-044/2013	IN-045/2013	A-046/2013	IN-003/2014	A-004/2014	IN-005/2014	A-006/2014	IN-007/2014	IN-008/2014	IN-011/2014	IN-014/2014	A-009/2014
Type of operation	CA	CA	GA	CA	GA - CA	CA	GA	CA	CA	CA	GA	GA	GA	CA	GA	GA	GA - GA	CA - CA	GA - CA	AW
ENGINE FAILURE ANTICIPATION							X							X	X					
ENVIRONMENT OBSERVATION																				
LOGICAL PROBLEM SOLVING						X												X		
USE OF TRAINING INSTRUCTIONS/SOPs						X	X	X	X				X	X	X					
VISUAL DETECTION/ ANTICIPATION										X								X	X	
PRE-FLIGHT PREPARATIONS AND PRECAUTIONS										X										
THREAT IDENTIFICATION					X	X		X							X		X			
GOOD COCKPIT PRACTICES														X			X			
AIRMANSHIP AND FLIGHT SKILLS							X								X					
THIRD-PARTY INTERVENTION	X																			

*Types of operation CA - Commercial air transport, GA - General aviation, AW - Aerial work, SF - State flight

EVENT	A-012/2014	IN-013/2014	IN-016/2014	IN-017/2014	EXT A-006/2014	IN-015/2014	IN-020/2014	A-018/2014	A-019/2014	IN-023/2014	IN-021/2014	A-024/2014	A-025/2014	IN-027/2014	A-028/2014	A-029/2014	IN-031/2014	A-030/2014	IN-032/2014	A-001/2015
Type of operation	GA	CA	CA - CA	GA	CA	CA - CA	CA - CA	GA	GA	SF - CA	AW	GA	GA	CA - CA	CA	AW	CA - CA	GA	CA - CA	GA
AVOIDANCE MANEUVER							X			X				X			X	X	X	
DECISION TO GO AROUND		X				X								X						
DECISION TO LAND AS A PRECAUTION											X		X			X				
DECISION TO LAND ON AN UNEXPECTED RUNWAY											X	X				X				
DECISION TO REJECT TAKEOFF																				
DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER		X																		
AERODROME INTERVENTION/ ASSISTANCE					X										X					
ATC INTERVENTION/ ASSISTANCE		X	X									X								
ASSISTANCE OF AN INSTRUCTOR OR SUPERVISOR																				
PASSENGER INTERVENTION/ ASSISTANCE																				
THIRD-PARTY INTERVENTION/ ASSISTANCE				X																
HARDWARE SAFETY NET							X			X	X			X			X		X	
ACCURATE USAGE OF DOCUMENTATION																				
COMMUNICATIONS			X																	
DESIGN REQUIREMENTS	X							X	X		X	X	X					X		

EVENT	A-012/2014	IN-013/2014	IN-016/2014	IN-017/2014	EXT A-006/2014	IN-015/2014	IN-020/2014	A-018/2014	A-019/2014	IN-023/2014	IN-021/2014	A-024/2014	A-025/2014	IN-027/2014	A-028/2014	A-029/2014	IN-031/2014	A-030/2014	IN-032/2014	A-001/2015
Type of operation	GA	CA	CA - CA	GA	CA	CA - CA	CA - CA	GA	GA	SF - CA	AW	GA	GA	CA - CA	CA	AW	CA - CA	GA	CA - CA	GA
ENGINE FAILURE ANTICIPATION																		X		
ENVIRONMENT OBSERVATION																				
LOGICAL PROBLEM SOLVING				X								X								
USE OF TRAINING INSTRUCTIONS/SOPs	X	X										X			X	X				
VISUAL DETECTION/ ANTICIPATION	X			X		X								X		X				
PRE-FLIGHT PREPARATIONS AND PRECAUTIONS	X																			
THREAT IDENTIFICATION	X		X								X	X					X	X		
GOOD COCKPIT PRACTICES																				
AIRMANSHIP AND FLIGHT SKILLS	X											X								
THIRD-PARTY INTERVENTION								X	X			X				X		X		

*Types of operation CA - Commercial air transport, GA - General aviation, AW - Aerial work, SF - State flight

EVENT	A-002/2015	IN-005/2015	IN-003/2015	A-006/2015	A-007/2015	A-010/2015	A-008/2015	A-038/2015	IN-011/2015	IN-012/2015	IN-013/2015	A-015/2015	A-014/2015	A-018/2015	IN-019/2015	A-016/2015	A-017/2015	IN-021/2015	A-020/2015	A-022/2015
Type of operation	GA	CA	GA	GA	GA	CA	SF	GA	AW	GA - GA	CA - CA	GA	GA	CA	GA - GA - GA	GA	GA	SF - CA	GA	AW
AVOIDANCE MANEUVER	X			X				X	X						X			X		
DECISION TO GO AROUND																				
DECISION TO LAND AS A PRECAUTION																				
DECISION TO LAND ON AN UNEXPECTED RUNWAY																				
DECISION TO REJECT TAKEOFF								X		X										X
DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER			X	X			X		X								X			
AERODROME INTERVENTION/ ASSISTANCE			X	X		X	X													X
ATC INTERVENTION/ ASSISTANCE		X		X		X							X							
ASSISTANCE OF AN INSTRUCTOR OR SUPERVISOR																				
PASSENGER INTERVENTION/ ASSISTANCE							X							X						
THIRD-PARTY INTERVENTION/ ASSISTANCE																				
HARDWARE SAFETY NET							X				X							X		
ACCURATE USAGE OF DOCUMENTATION																				
COMMUNICATIONS		X																		
DESIGN REQUIREMENTS					X								X				X			

EVENT	A-002/2015	IN-005/2015	IN-003/2015	A-006/2015	A-007/2015	A-010/2015	A-008/2015	A-038/2015	IN-011/2015	IN-012/2015	IN-013/2015	A-015/2015	A-014/2015	A-018/2015	IN-019/2015	A-016/2015	A-017/2015	IN-021/2015	A-020/2015	A-022/2015
Type of operation	GA	CA	GA	GA	GA	CA	SF	GA	AW	GA - GA	CA - CA	GA	GA	CA	GA - GA - GA	GA	GA	SF - CA	GA	AW
ANTICIPACIÓN A UN FALLO DE MOTOR																				
OBSERVACIÓN DEL ENTORNO																				
SOLUCIÓN LÓGICA DE PROBLEMAS						X						X		X						
USO DE LO APRENDIDO EN ENTRENAMIENTO / SOPs		X		X		X	X			X	X		X	X			X			
DETECCIÓN VISUAL / ANTICIPACIÓN			X			X	X		X											
PREPARACIÓN Y PRECAUCIÓN PREVIA AL VUELO									X											
IDENTIFICACIÓN DE AMENAZAS	X	X		X			X	X		X			X		X		X			
BUENA PRAXIS EN CABINA				X		X						X								
DOMINIO Y DESTREZA EN VUELO				X			X						X							
INTERVENCIÓN DE TERCERAS PARTES	X												X	X			X			

* Tipos de operación: AC - Transporte aéreo comercial, AG - Aviación General, TA - Trabajos aéreos, VE - Vuelo de estado

EVENT	A-024/2015	A-025/2015	A-027/2015	A-028/2015	A-030/2015	IN-034/2015	A-032/2015	IN-035/2015	A-037/2015	IN-005/2016	A-001/2016	A-002/2016	A-003/2016	A-006/2016	IN-007/2016	A-010/2016	A-011/2016	A-013/2016	A-018/2016
Type of operation	GA	AW	GA	GA	GA	GA - GA	GA	CA	GA	CA	GA	AW	GA	GA	CA	GA	GA	CA	AW
AVOIDANCE MANEUVER															X				
DECISION TO GO AROUND																			
DECISION TO LAND AS A PRECAUTION					X		X												
DECISION TO LAND ON AN UNEXPECTED RUNWAY					X		X												
DECISION TO REJECT TAKEOFF													X						
DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER																			
AERODROME INTERVENTION/ ASSISTANCE								X										X	
ATC INTERVENTION/ ASSISTANCE						X												X	
ASSISTANCE OF AN INSTRUCTOR OR SUPERVISOR																			
PASSENGER INTERVENTION/ ASSISTANCE																			
THIRD-PARTY INTERVENTION/ ASSISTANCE																			
HARDWARE SAFETY NET																			
ACCURATE USAGE OF DOCUMENTATION																			
COMMUNICATIONS																			
DESIGN REQUIREMENTS		X		X	X														X

EVENT	A-024/2015	A-025/2015	A-027/2015	A-028/2015	A-030/2015	IN-034/2015	A-032/2015	IN-035/2015	A-037/2015	IN-005/2016	A-001/2016	A-002/2016	A-003/2016	A-006/2016	IN-007/2016	A-010/2016	A-011/2016	A-013/2016	A-018/2016
ENGINE FAILURE ANTICIPATION							X												
ENVIRONMENT OBSERVATION																			
LOGICAL PROBLEM SOLVING								X											X
USE OF TRAINING INSTRUCTIONS/SOPs				X			X					X	X						
VISUAL DETECTION/ ANTICIPATION																			
PRE-FLIGHT PREPARATIONS AND PRECAUTIONS																			
THREAT IDENTIFICATION						X		X					X		X				
GOOD COCKPIT PRACTICES																			
AIRMANSHIP AND FLIGHT SKILLS																			
THIRD-PARTY INTERVENTION		X			X		X												

* Tipos de operación: AC - Transporte aéreo comercial, AG - Aviación General, TA - Trabajos aéreos, VE - Vuelo de estado

ANNEX D

Listing of Positive Factors by Type of Operation from 2013 to 2016

LESSONS LEARNED	Commercial air transport	General aviation	Aerial work	State flights	No. of reports
USE OF TRAINING INSTRUCTIONS/SOPs	✓	✓	✓	✓	72
THREAT IDENTIFICATION	✓	✓	✓	✓	55
HARDWARE SAFETY NET	✓	✓	✓	✓	32
ATC INTERVENTION/ASSISTANCE	✓	✓	-	-	29
AERODROME INTERVENTION/ ASSISTANCE	✓	✓	✓	✓	24
DECISION TO RETURN TO AIRPORT OF DEPARTURE OR DIVERT TO ANOTHER	✓	✓	✓	✓	24
AVOIDANCE MANEUVER	✓	✓	✓	✓	22
AIRMANSHIP AND FLIGHT SKILLS	✓	✓	✓	✓	22
DESIGN REQUIREMENTS	✓	✓	✓	-	21
DECISION TO LAND AS A PRECAUTION	✓	✓	✓	-	21
VISUAL DETECTION/ANTICIPATION	✓	✓	✓	✓	19
THIRD-PARTY INTERVENTION	✓	✓	✓	-	19
DECISION TO LAND ON AN UNEXPECTED RUNWAY	✓	✓	✓	-	17
LOGICAL PROBLEM SOLVING	✓	✓	✓	-	15
GOOD COCKPIT PRACTICES	✓	✓	-	-	14
DECISION TO GO AROUND	✓	✓	-	-	11
DECISION TO REJECT TAKEOFF	✓	✓	✓	-	11
PRE-FLIGHT PREPARATIONS AND PRECAUTIONS	✓	✓	✓		10
ENGINE FAILURE ANTICIPATION	✓	✓	-	-	8
COMMUNICATIONS	✓	✓	-	-	6
PASSENGER INTERVENTION/ASSISTANCE	✓	-	-	✓	2
THIRD-PARTY INTERVENTION/ ASSISTANCE	-	✓	-	-	1
ASSISTANCE OF AN INSTRUCTOR OR SUPERVISOR	-	✓	-	-	1

LESSONS LEARNED	Commercial air transport	General aviation	Aerial work	State flights	No. of reports
ENVIRONMENT OBSERVATION	-	✓	-	-	1
ACCURATE USAGE OF DOCUMENTATION	-	-	-	-	0

ANNEX E
Definitions and Abbreviations

DEFINITIONS

Below is a list and description of the terms used in this report. Included in parentheses with each definition is the regulatory source from which it was taken.

Accident

An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which

- a person is fatally or seriously injured as a result of: being in the aircraft, or direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or direct exposure to jet blast, except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or
- the aircraft sustains damage or structural failure which: adversely affects the structural strength, performance or flight characteristics of the aircraft, and would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to the engine, its cowlings or accessories; or for damage limited to propellers, wing tips, antennas, tires, brakes, fairings, small dents or puncture holes in the aircraft skin; or
- the aircraft is missing or is completely inaccessible. (ICAO Annex 13, 11th Edition)

Aircraft

Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface. (ICAO Annex 13, 11th Edition)

Causes

Actions, omissions, events, conditions, or a combination thereof, which led to the accident or incident; the identification of causes does not imply the assignment of fault or the determination of administrative, civil or criminal liability. [Regulation (EU) 996/2010]

Incident	Any occurrence associated with the use of an aircraft that is not an accident and that affects or could affect the safety of operations. (RD 389/1998)
Serious incident	Any incident involving circumstances indicating that there was a high probability of an accident. (RD 389/1998)
Investigation	Any activities undertaken for the purpose of preventing accidents and incidents. These activities include gathering and analyzing information, drafting conclusions, determining causes and, when applicable, issuing safety recommendations. (RD 389/1998)
Serious Injury	An injury that is sustained by a person in an accident and which requires hospitalization for more than 48 hours, commencing within seven days from the date the injury was received, or which results in: a bone fracture (except for simple fractures of fingers, toes or nose); or lacerations that cause severe hemorrhaging or nerve, muscle or tendon damage; or injury to any internal organ; or second- or third-degree burns affecting more than 5% of the body surface; or verified exposure to infectious substances or harmful radiation. (RD 389/1998)
Fatal Injury	Any injury sustained by a person in an accident and which results in his or her death within 30 days of the date of the accident. (RD 389/1998)
Operator	Any natural or legal person, operating or proposing to operate one or more aircraft. [Regulation (EU) 996/2010]
Event	In this document, term used to refer to an Accident or Serious Incident.
Safety Recommendation	A proposal from the State's accident investigation authority, based on information derived from said safety investigation, made with the intention of preventing accidents and incidents. (RD 389/1998)

ABBREVIATIONS

112	Emergency number
00.00:00	Hours, minutes and seconds
00º	Degrees
ACAS	Airborne Collision Avoidance System
ACC	Area Control Center
ADEFA	Asociación de Fábricas de Automotores
AEMET	Spain's National Weather Agency
AENA	Spanish Airports and Air Navigation
AESA	National Aviation Safety Agency
AFIS	Aerodrome Flight Information Service
AGL	Above Ground Level
AIP	Aeronautical Information Publication
ALERFA	Alert phase
APP	Approach
APU	Auxiliary Power Unit
ASAP	As soon as possible
ATC	Air Traffic Control
ATS	Air Traffic Service
AW	Aerial work
CA	Commercial air transport
CAA	Civil Aviation Authority (UK)
CAST	Commercial Aviation Safety Team
CEOPS	Operations center
CGA	Airport Management Center

Chip	Small piece of semiconducting material with multiple integrated circuits
CIAIAC	Spain's Civil Aviation Accident and Incident Investigation Commission
CICTT	CAST/ICAO Common Taxonomy Team
CITAAM	Spain's Military Aviation Accident and Incident Investigation Commission
cm	Centimeters
COAM	Movement Area Operations Coordinator
CRM	Crew Resource Management
DGAC	Civil Aviation General Directorate
DME	Distance Measuring Equipment
DVOR	Doppler VOR (Doppler Very High Frequency Omni-Directional Range)
E	East
ECAM	Electronic Centralized Aircraft Monitoring
EGPWS	Enhanced Ground Proximity Warning System
ELT	Emergency Locator Transmitter
EU	European Union
FA	Flight attendant
FCMC	Fuel Control and Monitoring Computer
FDS	Fast Deflation System
FerroNATS	Ferrovial Servicios y NATS
FIZ	Flight Information Zone
FL	Flight level
FOD	Foreign Object Debris

ft	Feet
ft/min	Feet per minute
GA	General aviation
GPS	Global Positioning System
GPWS	Ground Proximity Warning System
h	Hours
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
IN	Incident
km	Kilometers
kt	Knots
L	Left
L/G	Landing gear
LCL	Local
LOC	Instrument landing system localizer
LTD	Limited company
m	Meters
MAYDAY	Distress call
MHz	Megahertz
MSAW	Minimum Safe Altitude Warning
NW	Northwest
ND	Navigation Display
NDB	Non-Directional Beacon

NM	Nautical Miles
No.	Number
NOTAM	Notice to Airmen
NWS	Nose Wheel Steering
PAN-PAN	Urgency call
PESO	National Operational Safety Program
PF	Pilot flying
QAR	Quick Access Recorder
QRH	Quick Reference Handbook
R	Right
R&C	Right & Center
RA	Resolution Advisory
RCA	Spain's Air Traffic Regulations
RCC	Rescue Coordination Center
RD	Royal Decree
REC	Safety Recommendation
RPM	Revolutions per minute
S.L.	Limited liability company
SAERCO	Servicios aeronáuticos control y navegación S.L
SAETA	Servicios Aéreos y Tratamientos Agrícolas S.L.
SAR	Search and Rescue
SASEMAR	Maritime Search and Rescue Society
SF	State flight
SID	Standard Instrument Departure
SOP	Standard Operating Procedures

STAR	Standard Terminal Arrival Route
TACC	Terminal Area Control Center
TAWS	Terrain awareness and warning system
TCAS	Traffic alert and collision avoidance system
TK	Tank
TMA	Terminal Control Area
TOAM	Movement Area Operations Technician
TWR	Control tower
VFR	Visual Flight Rules
VOR	Very High Frequency Omnidirectional Range

ANNEX F
List of Figures

ANNEX G
List of Tables

If you have any questions about the contents of this publication, please contact:

COMISIÓN DE INVESTIGACIÓN DE ACCIDENTES E INCIDENTES DE AVIACIÓN CIVIL

Tel.: +34 91 597 89 63

Fax: +34 91 463 55 35

E-mail: ciaiac@fomento.es

C/ Fruela, 6 - 28011 Madrid (España)