Handbook of Aviation Accidents and Incidents

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Chapter 1

2001 Japan Airlines Mid-Air Incident

2001 Japan Airlines mid-air incident
(JAL 907 and JAL 958)

Artist's conception of JA8904 (below) diving under JA8546 (above). The planes were less than 100 meters from each other at the moment of the near miss.

Accident summary	
Date	January 31, 2001
Type	Near miss, ATC error
Site	near Yaizu, Shizuoka, Japan
Total injuries	99 (9 serious)
Total fatalities	0
Total survivors	677 (all)
First aircraft	
Type	Boeing 747-446D
Operator	Japan Airlines
Tail number	JA8904
Flight origin	Tokyo Int'l Airport

Destination	Naha Int'l Airport, Okinawa
Passengers	411
Crew	16
Injuries	99 (9 serious)
Survivors	427 (all)

Second aircraft	
Type	Douglas DC-10-40D
Operator	Japan Airlines
Tail number	JA8546
Flight origin	Gimhae International Airport Busan, South Korea
Destination	Narita International Airport
Passengers	237
Crew	13
Injuries	0
Survivors	250 (all)

A Japan Airlines 747-400, similar to this Japan Airlines that nearly collided with JA8546

A Japan Airlines Douglas DC-10-40, similar to this Japan Airlines Douglas DC-10-40D, nearly collided with JA8904.

On Wednesday, January 31, 2001, **Japan Airlines Flight 907**, using a Boeing 747-446 Domestic bound from Tokyo International Airport (Haneda Airport) in Ōta, Tokyo, Japan to Naha International Airport in Naha, Okinawa, Japan and **Japan Airlines Flight 958**, using a Douglas DC-10-40D bound from Gimhae International Airport in Busan, South Korea to Narita International Airport in Narita, Chiba Prefecture, Japan, nearly collided over the Suruga Bay near Yaizu, Shizuoka Prefecture due to human error.

Flight information

Japan Airlines Flight 907, registration JA8904, was a 747-446 Domestic with 411 passengers and 16 crew making a domestic flight from Tokyo Haneda International Airport to Naha Airport. Japan Airlines Flight 958, registration JA8546, was a McDonnell Douglas DC-10-40 with 237 passengers and 13 crew bound from Gimhae International Airport to Narita International Airport. Flight 907, using an aircraft registered as "JA8904," left Haneda at 3:36 PM.

According to the flight plan, JAL907 and JAL958 would pass each other while 2,000 feet apart.

Mid-air incident

JA8904's TCAS sounded 20 minutes after its departure as the jet climbed towards 39,000 feet. The DC-10, JA8546, cruised at 37,000 feet.

The mid-air incident occurred as flight attendants began to serve drinks onboard Flight 907.

The two planes were on a collision course towards each other. The pilots of both planes had received conflicting instructions from their RJAA and the flight controller at the Tokyo Area Control Center in Tokorozawa, Saitama Prefecture. Flight 907, headed by 40-year-old pilot Makoto Watanabe (渡辺 誠 Watanabe Makoto?), followed an order to descend issued by the flight controller while Flight 958, headed by pilot Tatsuyuki Akazawa (赤沢 達幸 Akazawa Tatsuyuki?), descended as instructed by the TCAS, meaning that both planes remained on a collision course. The trainee for the aerospace sector, 26-year-old Hideki Hachitani (蜂谷 秀樹 Hachitani Hideki?), handled ten other flights at the time of the near miss. Hachitani intended to tell Flight 958 to descend. Instead, at 3:54 p.m, he told Flight 907 to descend. When the trainee noticed that JAL 958 cruised at a level altitude instead of descending, the trainee asked JAL 958 to turn right; the message did not get through to the JAL 958 pilot. The trainee's supervisor, Yasuko Momii (籾井 康子 Momii Yasuko?), ordered "JAL 957" to climb, intending to tell JAL 907 to climb. There was no "JAL 957" in the sky.

Watanabe avoided disaster when he abruptly forced the aircraft to dive based on a visual judgment, saving a total of 677 people on the two aircraft. If the collision had occurred, it would have been the deadliest civil aviation accident in history in terms of passenger

lives, surpassing the Tenerife disaster in which two Boeing 747s collided on a runway and killed 583 people in 1977. It also would have been the deadliest mid-air collision, surpassing the 1996 Charkhi Dadri mid-air collision in which 349 people were killed. The aircraft missed each other by less than 100 meters. Watanabe said that the aircraft were 35 feet apart. An unidentified passenger told NHK "I have never seen a plane fly so close. I thought we were going to crash." Alex Turner, a passenger on Flight 907 and a student at Kadena High School, a school for children with parents stationed at Kadena Air Base in Okinawa Prefecture, estimated that the avoidance maneuver lasted for two seconds.

Seven passengers and two crew members of the 747 sustained serious injuries; additionally, 81 passengers and 10 crew members reported minor injuries. Some unbelted passengers, flight attendants, and drink carts hit the ceiling, dislodging some ceiling tiles. The maneuver threw one boy across four rows of seats. Most of the injuries to occupants consisted of bruising. The maneuvers broke the leg of a 54-year-old woman. In addition, a drink cart spilled, scalding some passengers. No passengers on the DC-10 sustained injuries. Flight 907, with the 747's cabin bearing minor damage, returned to Haneda, landing at 4:45 PM.

Thirteen students at Kadena High School had boarded Flight 907 after returning from a school-sanctioned ROTC competition. Two students from Michigan, United States, 15-year-old Meggan Wesche and 14-year-old Allison Ambrose, sustained some minor injuries and became hospitalized for a short time. Wesche, who had slipped out of her seat during the descent and became disoriented from the incident, received an X-ray and other examinations at Toho University Hospital. She said that her body felt like "the plane is going down again" even though she was on land. The following day the students left on another Japan Airlines flight and arrived in Okinawa.

American Airlines Flight 157, traveling from Dallas-Fort Worth International Airport to Kansai International Airport near Osaka, Japan, communicated with the air traffic controller and flew in close proximity to the Japan Airlines planes around the time of the near miss.

Aftermath

By 18:00 on February 1 eight Flight 907 passengers remained hospitalized while 22 injured passengers had been released. Two passengers remained hospitalized at Kamata General Hospital (蒲田総合病院 Kamata Sōgō Byōin?). Two passengers remained hospitalized at Ichikawa No. 2 Hospital (市川第2病院 Ichikawa Daini Byōin?). In addition the following hospitals each had one passenger remaining: Takano Hospital (タカノ病院 Takano Byōin?), Kitasato University, Horinaka Hospital (堀中病院 Horinaka Byōin?), and Tokyo Rosai Hospital (東京労災病院 Tōkyō Rōsai Byōin?). All injured passengers recovered.

JAL sent apology letters to the passengers on the 747; injured passengers directly received messages, and uninjured passengers received messages via the mail.

The International Civil Aviation Organization (ICAO) did not take action based on the occurrence of the near-miss. Japanese authorities called for measures that would prevent similar accidents from happening, but ICAO did not further investigate the incident until after the 2002 Überlingen mid-air collision. The ICAO decided to fulfill Japan's request 18 months after the Japan Airlines incident.

Criminal investigation and trial

Tokyo Metropolitan Police Department and the Ministry of Land, Infrastructure and Transport investigated the incident.

In May 2003 Tokyo police filed an investigative report concerning Hideki Hachitani, Yasuko Momii, and Makoto Watanabe, suspecting them of professional negligence. In March 2004 prosecutors indicted Hachitani and Momii for professional negligence.

Hachitani, then 30 years old, and Momii, then 35 years old, pleaded not guilty to the charges at Tokyo District Court in 2004. During the same year the lawyer for Hachitani and Momii said that the pilots of the aircraft bore the responsibility for the near miss.

By November 16, 2005, 12 trials had been held since the initial hearing on September 9, 2004. The prosecution argued that the two defendants neglected to provide proper separation for the two aircraft, the instructions issued were inappropriate, and that the supervisor failed to correct the trainee. The defense argued that the lack of separation would not immediately have led to a near miss, that the instructions issued were appropriate, that the TCAS procedure was not proper, and that the Computer Navigation Fix (CNF) had faulty data.

In 2006 prosecutors asked for Hachitani, then 31, to be sentenced to one year in prison and for Momii, then 37, to be sentenced to one and one half years. On March 20, 2006 the court ruled that Hachitani and Momii were not guilty of the charge. The court stated that Hachitani could not have foreseen the accident and that the mixup of the flight numbers did not have a causal relationship with the accident. Hisaharu Yasui, the presiding judge, said that prosecuting controllers and pilots would be "unsuitable" in this case. The Tokyo District Public Prosecutor's Office filed an appeal with the Tokyo High Court on March 31. During the same year the Japanese government agreed to pay Japan Airlines and Tokio Marine & Nichido Fire Insurance a total of 82.4 million yen to compensate for the near miss.

On April 11, 2008, on appeal, a higher court overturned the decision and found Hachitani and Momii guilty. The presiding judge, Masaru Suda (須田賢 Suda Masaharu?), sentenced Hachitani, then 33, to confinement for one year, and Momii, then 39, for one year and six months. Both were placed on probation. Each of the two sentences was suspended for three years. Suda described the mixing of the flight numbers as a "rudimentary error." The lawyers representing the controllers planned to file appeals.

Chapter 2

2002 Uberlingen Mid-Air Collision

Bashkirian Airlines Flight 2937 DHL Flight 611	
Accident summary	
Date	1 July 2002
Type	Mid-air collision involving ATC/crew/training error
Site	Überlingen, Germany 47°46′42″N 9°10′26″E / 47.77833°N 9.17389°ECoordinates: 47°46′42″N 9°10′26″E / 47.77833°N 9.17389°E
Total fatalities	71
Total survivors	0
First aircraft	
Type	Tupolev Tu-154M
Operator	Bashkirian Airlines
Tail number	RA-85816
Flight origin	Domodedovo Int Airport Moscow, Russia
Destination	Barcelona Int'l Airport Barcelona, Spain
Passengers	60
Crew	9
Second aircraft	

Type	Boeing 757-23APF
Operator	DHL
Tail number	A9C-DHL
Flight origin	Bahrain Int'l Airport
Stopover	Orio al Serio Airport Bergamo, Italy
Destination	Brussels Airport, Belgium
Passengers	0
Crew	2

Site of the crash
The crash occurred at approximately 47° 46′ 42″ N, 9° 10′ 26″ E

Bashkirian Airlines Flight 2937 was a Tupolev Tu-154M passenger jet en route from Moscow to Barcelona. **DHL Flight 611**, registration A9C-DHL, was a Boeing 757-23APF cargo jet flying from Bergamo, Italy, to Brussels, Belgium. The two aircraft collided in mid-air on 1 July 2002, at 21:35 (UTC) over the towns of Owingen and Überlingen in Germany, (near Lake Constance), killing all 71 aboard both aircraft. The German Federal Bureau of Aircraft Accidents Investigation (BFU) determined on 19 May 2004, that the accident had been caused by problems within the air traffic control system and problems with the use of the collision warning system. On 24 February 2004,

Peter Nielsen, the controller who was on duty at the time of the accident, was stabbed to death by Vitaly Kaloyev who had lost his wife and two children in the accident.

Flights involved

Flight 2937 was a chartered flight carrying 60 passengers and 9 crew. Forty-five passengers were Bashkortostan schoolchildren on a school trip organized by the local UNESCO committee to the Costa Daurada area of Spain. Most of the parents of the children were high-ranking officials in Bashkortostan. The aircraft, a Tupolev Tu-154M with the registration RA-85816, was piloted by a Russian crew. The captain, Alexander Mihailovich Gross, and first officer Oleg Pavlovich Grigoriev, flew the Tupolev. Grigoriev, the chief pilot of Bashkirian Airlines, used the trip to evaluate Gross's performance. Murat Ahatovich Itkulov, normally the first officer, did not officially serve on duty because of this. The crew valued the opinions and guidance of Itkulov, who was slated to be promoted to captain. Sergei Kharlov, a navigator, and a flight engineer joined the three pilots.

Flight 611 of DHL International Aviation ME was carrying a load of air freight and had two Bahrain-based crew members aboard, British Captain Paul Phillips and Canadian First Officer Brant Campioni.

Notable passengers on Flight 2937

Fourteen-year old Kirill Degtyarev created paintings from age 4 to his death and had held two public exhibitions. After his death, Ufa hosted one exhibition and Überlingen hosted another exhibition. The family of future deputy North Ossetian housing minister Vitaly Kaloyev all died. Kaloyev would later go on to murder Neilsen.

Accident

The two aircraft were flying at flight level 360 (approximately 36,000 feet (11,000 m) above Mean Sea Level) on a collision course. Despite being over Germany, the airspace was controlled from Zürich, Switzerland by the private Swiss airspace control company Skyguide. The only air traffic controller handling the airspace, Peter Nielsen, was working two workstations at the same time. He did not realise the problem in time and thus failed to keep the aircraft at a safe distance from each other. Only less than a minute before the accident did he realize the danger and contacted Flight 2937, instructing the pilot to descend by a thousand feet to avoid collision with crossing traffic (Flight 611). Seconds after the Russian crew initiated the descent, however, their Traffic Collision Avoidance System (TCAS) instructed them to climb, while at about the same time the TCAS on Flight 611 instructed the pilots of that aircraft to descend. Had both aircraft followed those automated instructions, it is likely that the collision would not have occurred.

Flight 611's pilots on the Boeing jet initially followed the TCAS instructions and initiated a descent, but could not immediately inform the controller due to the fact that he was

dealing with Flight 2937. About eight seconds before the collision, Flight 611's descent rate was about 2,400 feet per minute (12 m/s), not as rapid as the 2,500 to 3,000 ft/min (13 to 15 m/s) range advised by TCAS. The Russian pilot on the Tupolev disregarded the TCAS instruction to climb and instead began to descend, as instructed by the controller, thus both planes were now descending.

Unaware of the TCAS-issued alerts, Nielsen repeated his instruction to Flight 2937 to descend, giving the Tupolev crew incorrect information as to the position of the DHL plane. Maintenance work was being carried out on the main radar system, which meant that the controllers were forced to use a slower system.

The aircraft collided at almost a right angle at an altitude of 34,890 feet (10,630 m), with the Boeing's vertical stabilizer slicing completely through Flight 2937's fuselage just ahead of the Tupolev's wings. The Tupolev exploded and broke into several pieces, scattering wreckage over a wide area. The nose section of the aircraft fell vertically, while the tail section with the engines continued, stalled, and fell. As the nose section of the Tupolev fell at such speed, the flight deck crew soon lose consciousness. The crippled Boeing, now with 80% of its vertical stabilizer lost, struggled for a further seven kilometres (four miles) before crashing into a wooded area close to the village of Taisersdorf at a 70 degree downward angle. Each engine ended up several hundred metres away from the main wreckage, and the tail section was torn from the fuselage by trees just before impact. All 69 people on the Tupolev, and the two on board the Boeing, died.

Other factors in the crash

Only one air traffic controller, Peter Nielsen of ACC Zurich, was controlling the airspace through which the aircraft were transitioning. The other controller on duty was resting in another room for the night. This was against the regulations, but had been a common practice for years and was known and tolerated by management. Due to maintenance work, Nielsen had a stand-by controller and system manager on call. Nielsen was either unaware of this or he chose not to use either of the two additional air traffic controllers available to him. When Nielsen realised that the situation had subtly increased beyond his span of control, it was too late to summon assistance.

In the minutes before the accident, Nielsen was occupied with an Airbus on a delayed Aero Lloyd Flight 1135 approaching Friedrichshafen Airport. Handling two workstations at once, Nielsen struggled with the malfunctioning phone system that he was trying to use to call the Friedrichshafen airport to announce the approaching Aero Lloyd. The main phone lines at Skyguide were down due to maintenance work, and the backup line was defective. This caused Nielsen to spend more time than he anticipated coordinating the Airbus late arrival into Friedrichshafen, and to miss several calls from aircraft. The faulty phone lines also prevented adjacent air traffic controllers at Karlsruhe from phoning in a warning. Due to these distractions he did not spot the danger until about a minute before impact. Had he been aware of the dangerous situation earlier, he could have kept the

aircraft at a safe distance from each other. They would have been separated and their collision avoidance systems would not have issued instructions.

Additionally, after Nielsen instructed the Russian crew to descend, he returned to the situation with the Airbus bound for Friedrichshafen, and did not hear the DHL aircraft TCAS report of its descent.

Another factor was that the ground-based optical collision warning system, which would have alerted the controller to imminent collisions early, had been switched off for maintenance; Nielsen was unaware of this. There still was an aural STCA warning system, which released a warning addressed to workstation RE SUED at 21:35:00 (32 seconds before the collision); this warning was not heard by anyone present at that time, although no error in this system could be found in a subsequent technical audit; whether this audible warning is turned on or not, is not logged technically. Even if Nielsen had heard this warning, he might have misinterpreted it until the next radar update 12 seconds later became visible or until the TCAS descent notice by the DHL crew came in; at that time finding a useful resolution order by the air traffic controller is difficult to impossible.

Deviating statements in the official report

All countries involved could add additional "deviating" statements to the official report. The Kingdom of Bahrain, Switzerland and the Russian Federation did submit positions that were published with the official report. The USA did not submit deviating positions. The comments were published as an appendix to the report but were not commented upon by the German federal investigators.

The statement by the Kingdom of Bahrain, the home country of the DHL plane, mostly agrees with the findings of the report. It says that the report should have put less emphasis on the actions of individuals and stressed the problems with the organisation and management more. Bahrain's statement also mentions the lack of crew resource management in the Tupolev's cockpit as a factor in the crash.

The Russian Federation states that the Russian pilots were unable to obey the TCAS advisory to climb; the advisory was given when they were already at 35500 feet while the controller wrongly stated there was conflicting traffic above them at 36000 feet. Also, the controller gave the wrong position of the DHL plane (2 o'clock instead of the actual 10 o'clock). Russia asserts that the DHL crew had a "real possibility" to avoid a collision since they were able to hear the conversation between the Russian crew and the controller.

Switzerland notes that the Tupolev was about 33 metres below the flight level ordered by the Swiss controller, and still descending at 1900 feet per minute. The Swiss say that this was also a cause of the accident. The Swiss position also states that in spite of the false information given (position and phraseology) by the Swiss controller the TCAS advisories would have been useful if obeyed immediately.

The change in magnetic bearing of the Russian aircraft by cumulatively 20 degrees (from 254 to 274) during the upcoming conflict is not assessed in the official report.

Consequences

Skyguide memorial to the aviation accident and murder of Peter Nielsen

Nielsen needed medical attention due to traumatic stress caused by the accident. At Skyguide, his former colleagues maintained a vase with a white rose over Nielsen's former workstation. Skyguide, after initially having blamed the Russian pilot for the accident, accepted its share of the responsibility and has paid compensation to some of the Russian families.

On 19 May 2004, the official investigators found that managerial incompetence and systems failures were the main cause for the accident, so that Nielsen was surely not the only one to be blamed for the disaster. As explained above, a series of coincidences of which Kaloyev and Nielsen were unaware precipitated the accident.

On 27 July 2006, a court in Konstanz decided that the Federal Republic of Germany should pay compensation to Bashkirian Airlines. The court found that it was illegal for the state to allow a foreign private company to provide air traffic control in German airspace. The government appealed the ruling, and a final decision is still pending as of 2008.

In another case before the court in Konstanz, Skyguide's liability insurance is suing Bashkirian Airlines for 2.5 million euro in damages. The case was opened in March 2008; the legal questions are expected to be difficult, as the airline has filed for bankruptcy under Russian law.

A criminal investigation of Skyguide began as of May 2004. On 7 August 2006, a Swiss prosecutor filed manslaughter charges against eight employees of Skyguide. The Winterthur prosecutor called for jail terms of 6 to 15 months, alleging "homicide by negligence". The verdict was announced in September 2007. Three of the four managers convicted were given suspended prison terms and the fourth was ordered to pay a fine. Another four employees of the Skyguide firm were cleared of any wrongdoing.

Murder of Peter Nielsen

Grieved by the loss of his family, Vitaly Kaloyev held Peter Nielsen responsible for their deaths. He killed Nielsen at his Kloten home, near Zürich, on 24 February 2004. Police arrested Kaloyev at a local motel not long after the murder, and he was subsequently convicted of the crime in 2005. He was released on 8 November 2007 because his mental condition was not sufficiently considered in the initial sentence. After his release, Kaloyev was infamously dubbed a "hero" in North Ossetia. In January 2008, he was appointed deputy construction minister of North Ossetia.

TCAS and conflicting orders

The accident raised questions on how pilots must react when they receive conflicting orders from the TCAS and from air traffic control (ATC). The TCAS is programmed to assume that both crews will promptly follow the system's instructions. The operations manual clearly states that TCAS should always take precedence over any ATC commands: If an instruction to manoeuvre is received simultaneously from an RA (resolution advisory, the command issued by the TCAS) and from ATC, the advice given by RA should be followed.

It is not required to notify the ATC prior to responding to an RA. This manoeuvre does not require any ATC clearance since TCAS takes into account the position of all other aircraft with transponders in the surrounding area.

Prior incidents

About a year before the Bashkirian-DHL collision there had already been another incident involving confusion conflicting TCAS and ATC commands. During the 2001 Japan Airlines mid-air incident, two Japanese airliners nearly collided with each other in Japanese skies. Both aircraft had received conflicting orders from the TCAS and ATC; one pilot followed the instructions of the TCAS while the other did not. Disaster was only averted because one of the pilots made evasive manoeuvres based on a visual judgement. The aircraft missed each other by less than 100 metres (330 ft), and the abrupt manoeuvre necessary to avert disaster left about 100 occupants hurt on one aircraft, some seriously. As a consequence Japan called for measures to prevent similar incidents. However, the International Civil Aviation Organization (ICAO) did not take action until after the crash over Germany. In addition four near misses in Europe occurred before the German disaster, because one set of pilots obeyed the air traffic controllers while the other obeyed TCAS. The ICAO decided to fulfill Japan's request 18 months after the Japan Airlines incident.

Unclear instructions for the Bashkirian crew

The Bashkirian pilots were using the Tu-154 Flight Operations Manual, which contained a section that emphasizes the role of the ATC and describes the TCAS as an additional aid:

> “For the avoidance of in-flight collisions is the visual control of the situation in the airspace by the crew and the correct execution of all instructions issued by the Air Traffic Controller to be viewed as the most important tool. TCAS is an additional instrument which ensures the timely determination of oncoming traffic, the classification of the risk and, if necessary, planning of an advice for a vertical avoidance manoeuvre.”
>
> —TU154M Flight Operations Manual

The same flight manual, on a different page, also contains a passage that strictly forbids manoeuvers contrary to the TCAS under any circumstances. Nevertheless, the official investigation found that the pilots seemed unaware that the TCAS RA should take precedence.

Technical solutions

Before this accident a change proposal (CP 112) for the TCAS II system had been issued. This proposal would have created a "reversal" of the original warning - asking the DHL plane to climb and the Tupolev crew to descend. According to an analysis by Eurocontrol this would have avoided the collision if the DHL crew had followed the new instructions and the Tupolev had continued to descend.

Additionally, an automatic downlink for the TCAS - which would have alerted the air traffic controller - had not been deployed worldwide at the time of the accident.

Recommendations after the accident

The investigation report contains a number of recommendations concerning TCAS, calling for upgrades and for better training and clearer instructions to the pilots.

Dramatization

The Discovery Channel Canada documentary series Mayday featured this accident in the episode titled Deadly Crossroads, which was released in 2004.

"Flug in die Nacht - Das Unglück von Überlingen" (2009), ("Flight into the night - the accident at Überlingen") produced by German and Swiss TV stations SWR and SF, is a motion picture based on the crash and the subsequent killing of the air traffic controller.

Chapter 3

2007 San Francisco International Airport Runway Incursion

2007 San Francisco International Airport runway incursion	
Incident summary	
Date	May 26, 2007
Type	Runway incursion
Site	San Francisco Int'l Airport California, USA
Total injuries	0
Total survivors	27 (all)
First aircraft	

An Embraer 170 Regional Jet similar to that involved in the incursion.

Type	Embraer 170 Regional Jet
Operator	Republic Airlines (o/a Frontier Airlines)
Tail number	N872RW
Passengers	11
Crew	4

Second aircraft

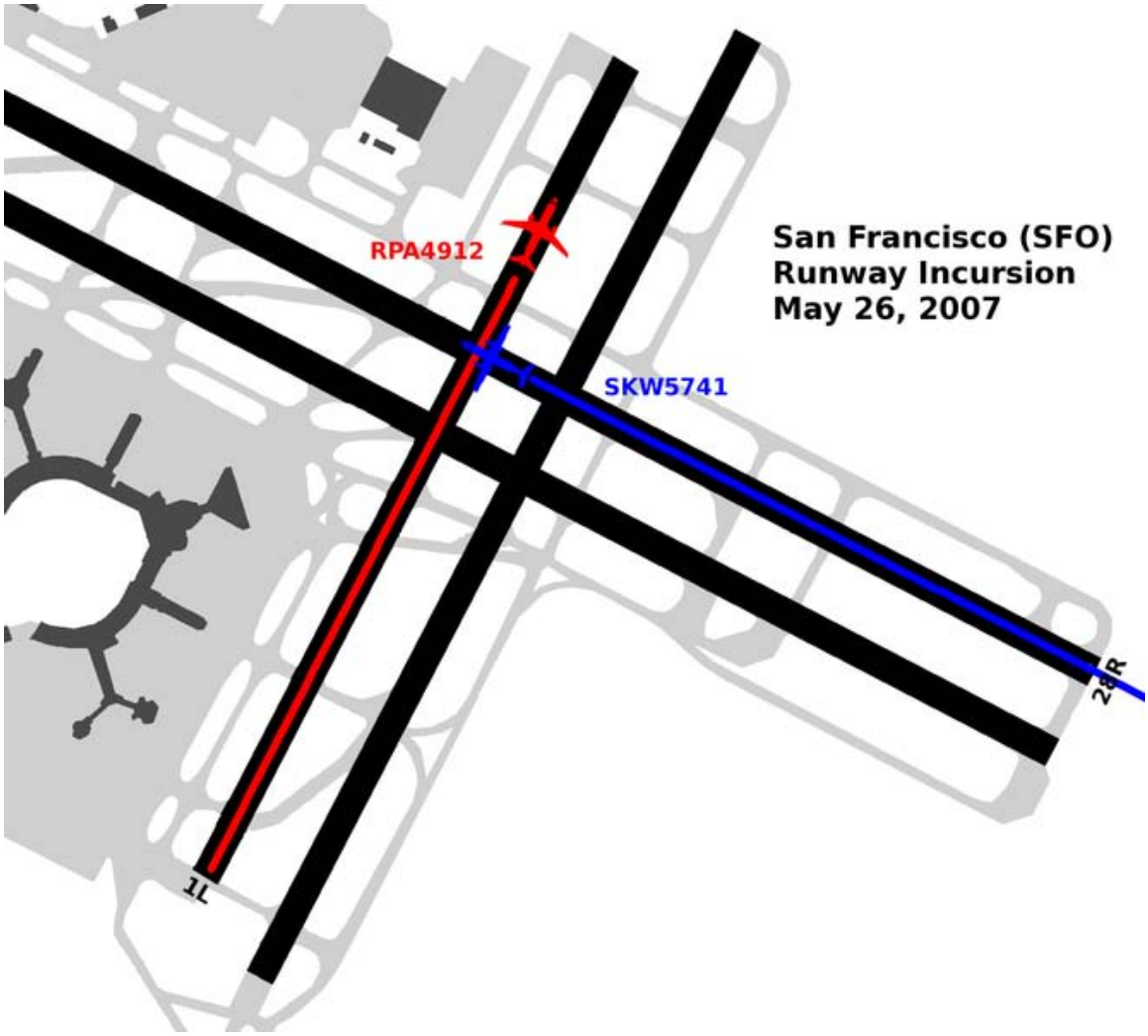
An Embraer EMB 120 Brasilia turboprop aircraft similar to that involved in the incursion.

Type	Embraer EMB 120 Brasilia
Operator	SkyWest Airlines (o/a United Express)
Tail number	N232SW
Passengers	9
Crew	3

The **2007 San Francisco International Airport runway incursion** occurred around 1:30 pm PST on May 26, 2007 when SkyWest Airlines (operating as United Express) Flight 5741 (SKW5741), an Embraer EMB 120 Brasilia turboprop aircraft, nearly collided with Republic Airlines (operating as Frontier Airlines) Flight 4912, an Embraer 170 Regional Jet, at the intersection of runways 1L and 28R at San Francisco International Airport (SFO), South San Francisco, California.

There were no reported injuries to occupants and no reported damage to either aircraft. Federal Aviation Administration (FAA) officials described the runway incursion as the most serious incident of its kind in at least a decade, and the National Transportation Safety Board (NTSB) initiated an investigation into the incident.

Incident



Visual representation of the runway configuration at SFO. The takeoff path of the jet is shown in red, and the landing path of the turboprop is shown in blue.

The SkyWest aircraft was arriving at SFO after a flight from Modesto, California, and was cleared for a visual approach to runway 28R by NorCal approach control. After being switched over to the tower controller, SkyWest was cleared to land on runway 28R. At the same time, the Republic Airlines aircraft, bound for Los Angeles, California was instructed to taxi into position and hold on the intersecting runway 1L. As the landing SkyWest aircraft passed the runway threshold the Republic Airlines aircraft was cleared for takeoff. Local procedures and FAA Order 7110.65 require the local controller to wait until the landing aircraft has passed through the intersection before clearing an aircraft for takeoff on one of the intersecting runways.

Approximately 27 seconds later the Airport Movement Area Safety System (AMASS) issued an aural warning of an imminent collision, and the local controller attempted to instruct the SkyWest aircraft to stop, transmitting, "uh, Skywest HOLD HOLD HOLD".

The SkyWest aircraft came to a stop in the intersection of runways 1L and 28R, while Republic Airlines flight lifted off and overflew it. The initial FAA tower report estimated the aircraft missed colliding by 300 feet; however the Skywest crew estimated the distance as 30 to 50 feet.

Investigation

Runway safety has been a priority concern for both the FAA and NTSB. In a March 23, 2007 press conference on runway safety the FAA Administrator Marion C. Blakey described the Tenerife disaster 30 years earlier as a "wake-up" call. Runway safety has been on the NTSB's annual list of "Most Wanted Improvements" continuously since 1990, and the NTSB held a one-day forum on runway incursions just two months earlier, on March 27, 2007.

In this case, the FAA categorized the incident's severity as "Category A", the most severe; Category A is defined as when "separation decreases and participants take extreme action to narrowly avoid a collision, or the event results in a collision." Of the previous 15 runway incursions at SFO between 2001 and 2007, none of them were more serious than Category C, defined as the situation where "separation decreases but there is ample time and distance to avoid a potential collision".

Commenting on the seriousness of the incident, NTSB spokesman Ted Lopatkiewicz noted that "We investigate probably just a handful (of incursions) a year." The NTSB officials have stated that the investigation could be completed by Fall. However, FAA spokesman Ian Gregor was quoted as saying "This wasn't a procedural issue, this was caused by a good controller with a lot of experience making a mistake", adding that since the incursion the controller had to be recertified for their job. The controller had over 20 years' experience.

SFO and AMASS

SFO was initially selected for the first test installation of the AMASS ground radar system in 1992. AMASS, which can detect and alert controllers to potential runway conflicts, was intended by the FAA to be eventually installed in 40 airports around the country. However much criticism was directed at the project for cost overruns and lengthy delays. The SFO AMASS was finally declared operational on June 18, 2001. According to AMASS technical support personnel, in a scenario such as this conflict, AMASS is designed to provide an alert 15 seconds before the aircraft reach the conflict point, and the system performed as designed.

Chapter 4

Aeroflot Flight 3352

Aeroflot Flight 3352	
Accident summary	
Date	11 October 1984
Type	Runway incursion
Site	Omsk, Russia
Passengers	170
Crew	9
Injuries	5
Fatalities	178 (4 on ground)
Survivors	5
Operator	Aeroflot
Tail number	SSSR-85243
Flight origin	Krasnodar International Airport
Stopover	Omsk Airport
Destination	Novosibirsk Tolmachevo Airport

Aeroflot Flight 3352 was a Tupolev Tu-154 airliner flight on a domestic route in Russia from Krasnodar to Novosibirsk, with an intermediate landing in Omsk. While landing at Omsk Airport on 11 October 1984, the aircraft crashed into maintenance vehicles on the runway killing 174 people on board and 4 on the ground. While a chain of mistakes in the airport operation contributed to the accident, its major cause was a ground controller falling asleep on duty. As of April 2010, this remains the deadliest airplane crash on Russian territory.

The accident

At 5:00 am local time (UTC/GMT + 7 hours), flight 3352 was preparing for its planned intermediate landing in the airport of Omsk, a key Russian city in southwestern Siberia, which has a population of over 1 million and is the administrative center of Omsk Oblast. This was the only aircraft approaching Omsk and was cleared for landing when it contacted the airport.

Tupolev Tu-154M

At 5:20 am, worried that the continuing rain would make landing slippery for the flights of the day, the airport ground maintenance crew requested permission to dry the runway. The ground controller on duty gave the permission and fell asleep right after, forgetting to switch on the "runway occupied" warning. By the airport regulations, such permission should not be given without approval by the Head of the Flights, but he was absent from the airport at the time. The maintenance crew operated following the airport's normal routine, namely three vehicles moved to the runway: a UAZ-469 4×4 with an attached trailer, driver and the crew manager in front, followed by KrAZ and Ural trucks. The latter were equipped with dry air compressors and loaded with fuel, and weighed 16–20 tons each. During the entire time on a runway, the maintenance vehicles should have their top flickering lights on. The lights irritated the eyes of maintenance workers though, so the local practice was to have only the UAZ lights on while moving to and from the runway and switch the lights off during the work.

UAZ-469

Around 5:36 am, the flight requested permission for landing from the approach controller. The request was sent twice because the pilots noticed vague contours on the runway and wanted to double check for obstacles. The controller verified the runway status, which remained unoccupied, contacted the ground controller and received no response, contacted the flight controller on internal radio and received an inaudible reply, which sounded like "..ree" (original, Russian: ..бодна) and was taken as "free" (Russian: свободна; communications were being taped and were analyzed later). The approach controller cleared the landing, unable to see the runway, though the regulations instructed him to keep the flight in the air and double check the runway condition. The ground controller and secondary control post could see the runway, but the former was asleep and the latter was unmanned because of lack of staff. The ground maintenance crew on the runway saw landing lights switch on, contacted the ground controller three times, received no response and ignored the lights thinking they are being tested.

At 5:38 am, the flight passed the lowest height at which the flight crew could abort the landing. The aircraft landed moving at 240 km/h on the runway. The flight crew saw the vehicles and attempted to turn the aircraft, but was unable to avoid the collision. The plane crashed into the Ural truck and then 200 m farther down the runway crashed into the KrAZ, igniting the 7 tons of fuel in each truck and the aircraft fuel tank. The plane overturned and broke into pieces, some of which crashed into the UAZ-469. A catastrophic fracture of the fuel tanks caused burning fuel to leak inside the passenger area, killing all but one passenger. The cockpit section detached and flew past the burning

vehicles. It suffered no major damage and none of the windows were broken. As a result, all four crew members in the cockpit survived and suffered only minor injuries. They escaped from the cabin and ran to the crash site attempting to help the passengers. Four ground maintenance crew were killed instantly inside the vehicles. One person in the passenger seat of the UAZ caught on fire; this was extinguished by the firefighters.

Investigation

The State investigation concluded that the accident was caused by a chain of mistakes made by negligence of the air traffic control and airport maintenance regulations. The ground controller was found directly responsible as he fell asleep on the job and thus did not respond to emergency queries; he also allowed the service trucks to move on the runway and did not mark the runway as occupied. At the hearing, he could not recollect his actions during the flight landing. He did not deny the charges, was sentenced to 15 years and committed suicide in jail.

Investigation also found that the operators of the Omsk airport neglected the essential safety regulations. The head of the airport flights was sentenced to 15 years in prison, the approach controller to 13 years and the head of the airport maintenance to 12 years. All three appealed the decision with negative outcome. The follow-up airport checks found numerous violations of safety regulations which resulted in dismissal of officials at several major airports across the Soviet Union.

No mistake was found in the aircraft operation. The flight mass and centering were within the norms. Because of poor visibility, the crew could not detect the obstruction on the runway. They had reasonable doubts as to whether or not the runways were occupied, but those were dispersed by the approach controller. The crew had only a few seconds to avoid the collision on the ground; they took evasive action, but could not possibly save the aircraft.

The flight controller and approach controller were experienced professionals with at least 10 years of service. The ground controller on duty was a newcomer of 23 years old. He was supposedly having sleep deprivation because of two young children. The hearing of the case occurred as early as 3 months after the accident, supposedly because of the obvious circumstances; most of that time was spent on identifying the victims and locating their relatives. All the prosecuted and their attorneys received threats and were moved to the court hearings under heavy security.

Technical data and statistics

The aircraft Tupolev Tu-154B-1, registration number CCCP-85243, was operated by Aeroflot (later becoming East Siberia). It was equipped with 3 Kuznetsov NK-8-2U engines and had its first flight in 1977. The flight carried 170 passengers, including 8 teenagers and 16 young children; 2700 kg of luggage, 306 kg of post and 1600 kg of cargo. The flight had an experienced crew of 9, the captain was a first-class pilot with 16365 hours in the air including 4303 hours of night flights. The flight was approaching

Omsk in poor weather: light rain, visibility 2 miles, 300 feet ceiling. The crash killed 169 passengers and 5 attendance crew members, as well as 4 airfield service workers. One passenger and 4 pilots survived. This was the deadliest airplane crash in the Russian history, 18th loss of a Tupolev 154, and the highest death toll of any accident involving a Tupolev Tu-154 at that time. It was only surpassed by a Tu-154 flying Aeroflot Flight 7425, which crashed in Uzbekistan on 10 July 1985 with 200 fatalities.

Chapter 5

Avianca Flight 52

Avianca Flight 52

An Avianca Boeing 707 similar to the one involved in the accident

Accident summary	
Date	January 25, 1990
Type	Controlled flight into terrain because of fuel exhaustion
Site	Cove Neck, New York 40°52′48″N 73°29′43″W / 40.88°N 73.49528°WCoordinates: 40°52′48″N 73°29′43″W / 40.88°N 73.49528°W
Passengers	149
Crew	9
Injuries	85
Fatalities	73
Survivors	85
Operator	Avianca
Flight origin	El Dorado International Airport

Stopover	José María Córdova International Airport
Destination	John F. Kennedy International Airport

Avianca Flight 52 was a regularly scheduled flight from Bogotá to New York via Medellín, Colombia. On Thursday, January 25, 1990, the aircraft performing this flight, a Boeing 707-321B registered as HK-2016, crashed into the village of Cove Neck, Long Island, New York after running out of fuel. Eight of the nine crew members and 65 of the 149 passengers on board were killed.

History

The 23-year-old Boeing 707 started its journey in Bogotá, stopping in Medellin at 2:04 pm after flying for half an hour. It then took off at 3:08 pm, a few minutes later than planned.

The flight crew included pilot Laureano Caviedes, first officer Mauricio Klotz and flight engineer Matias Moyano. The flight crew did not change at Medellin.

Flight history

On January 25, 1990, Avianca Flight 52 was much delayed in approaching its destination due to congestion and bad weather. It had been in a holding pattern off the coast near New York for over one hour due to fog and wind interfering with smooth arrivals and departures into John F. Kennedy International Airport. During this hold the aircraft was exhausting its reserve fuel supply, which would have allowed it to divert to its alternate, Boston, in case of an emergency or other critical situation.

When first put on hold, the crew of Flight 52 thought that they would be landing soon, after a few aircraft also on hold in front of them had landed. The bad weather, wind shear and other factors caused the pilots of these aircraft to abort their landings, and the hold time increased.

Seventy-seven minutes after entering the hold, New York air traffic control (ATC) asked the crew how long they could continue to hold, to which the first officer replied, "[A]bout five minutes." The first officer then stated that their alternate was Boston, but since they had been holding for so long they would not be able to make it there anymore. Even though Flight 52 had fuel issues, ATC passed the flight to another person, presumably unaware there was any urgency to landing this airplane. The delay of the handover may have increased the pilots' stress and fear response, which may have led to less than optimal piloting. The new controller then cleared the aircraft for an approach to runway 22L and informed the flight of wind shear at 1,500 feet (460 m).

As Flight 52 flew the ILS approach, they encountered wind shear at an altitude of less than 500 feet (150 m). As a result, the plane descended below the planned glideslope and almost crashed into the ground short of the runway. The pilots were forced to abandon the landing, even though they knew the plane did not have enough fuel to turn around for another attempt. The crew alerted the controller that they were low on fuel, and in a subsequent transmission stated, "We're running out of fuel, sir." The controller then asked the crew to climb, to which the first officer replied, "No, sir, we're running out of fuel."

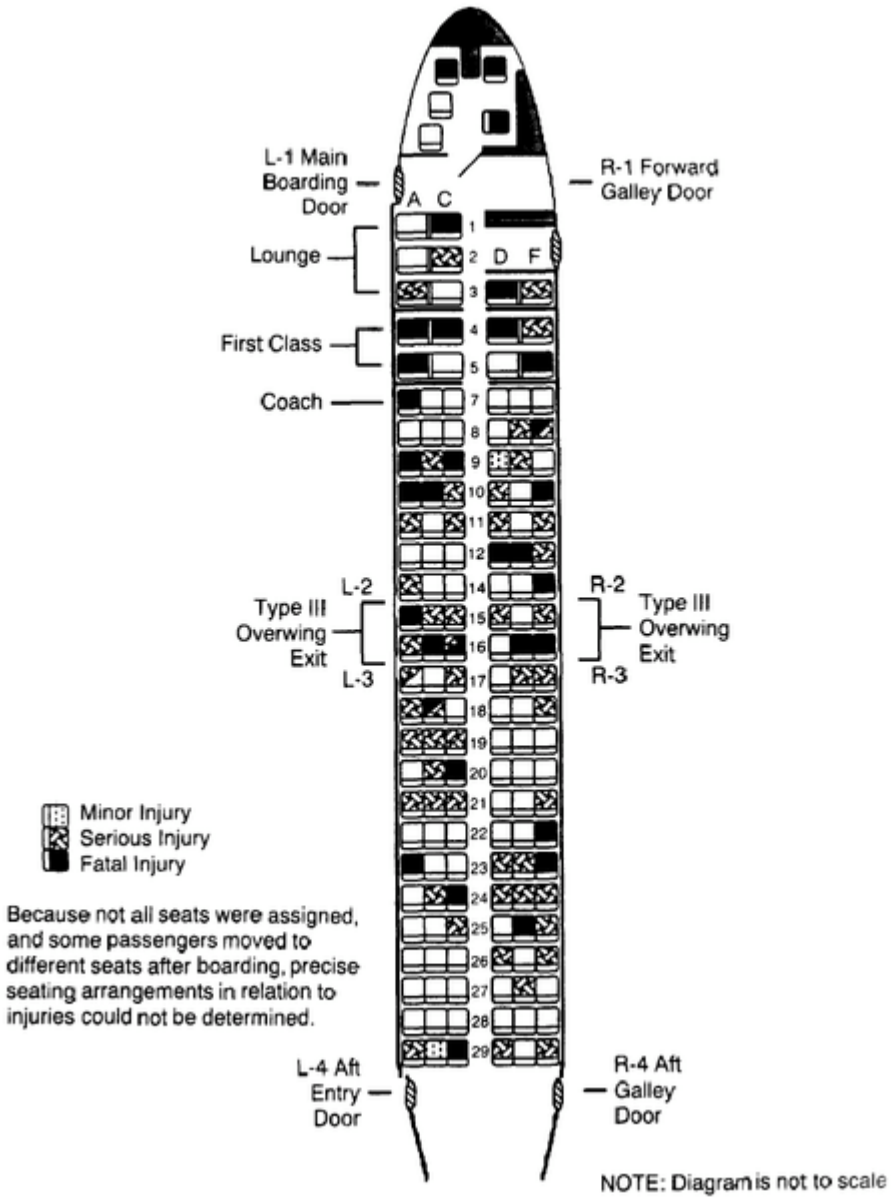
Moments later, with the airplane still very close to the ground, the number four engine flamed out, shortly followed by the other three. With the aircraft's main source of electrical power - generators driven off its engines - now gone, automatic load shedding would have caused many nonessential electrical systems to lose power. The cabin thus would have been plunged into darkness. With no engine thrust, the plane lost height. It plunged into the small village of Cove Neck on northern Long Island in Oyster Bay, 15 miles (24 km) from the airport.

The aircraft struck the ground and slid down a hill in the town, splitting into two pieces as it reached the bottom. The impact snapped off the cockpit, which landed over 100 feet (30 m) away in the side of an unoccupied house. Eighty-five people survived the crash with injuries, while 73 passengers and crew died.

Emergency response

The recovery efforts for Flight 52 proved to be difficult since the aircraft had crashed into the hilly, sparsely populated North Shore, making it difficult for emergency crews to reach. This was compounded by the narrow, winding roads that lead into the hamlet. Rescue squads from all over Long Island responded to the crash. The weather conditions and the darkness of night made the search crews' task even more challenging. The first ambulances to arrive performed triage, selecting the most critically injured passengers for transport to area hospitals. But so many other ambulances had arrived that a traffic jam developed, and some rigs were unable to leave the site immediately. Ambulatory passengers walked to other ambulances and arrived at hospitals sooner than critically injured ones.

Passengers and injuries



The seat map of HK2016, the Boeing 707. The National Transportation Safety Board (NTSB) could not determine a relationship between the locations of passengers and the severity of injuries because some passengers were not assigned seats and because some passengers changed seats.

The senior flight attendant, who sustained serious injuries, was the sole surviving crew member of the disaster.

The adult passengers on the Medellin-New York segment consisted of 61 males and 61 females. Sixteen children between 3 and 15 years of age, including 8 males and 8 females, flew on this segment.

Of the 11 babies (8 males and 3 females, ages ranging from 4 months to 27 months) on the Medellin-New York flight, 10 survived.

Of the surviving passengers, 80 suffered serious injuries and 4 sustained minor injuries. Of the passengers indicated by the NTSB map to have been assigned to first class (Rows 4 and 5), one survived. The NTSB stated that as the airline did not assign all of the filled seats and that some passengers relocated to other seats after boarding, the NTSB could not determine the injuries in relation to precise seating arrangements.

Cause and investigation

The NTSB's report on the accident determined the cause as pilot error due to the crew never declaring a fuel emergency to air traffic control as per International Air Transport Association (IATA) guidelines. The crew asked for a "priority" landing which, because of language differences between English and Spanish, can be interpreted as an emergency to Spanish-speaking pilots but not to English-speaking air traffic controllers. This may have caused some confusion amongst the pilots when ATC confirmed their priority status. Some NTSB board members felt that ATC was negligent in not providing arriving aircraft with the latest wind shear information, which could alert the crew to possible difficulties in landing. Avianca Airlines threatened to sue the Federal Aviation Administration (FAA) for the actions of the air traffic controllers, whom they felt were negligent in misunderstanding the pilots' reports. The FAA countered, stating that the crew never declared a fuel emergency until the final minutes before the crash and had never reported the amount of fuel they had left when asking for a priority landing, making it impossible for air traffic controllers to give them correct priority status.

Further from the NTSB report: "There was no flight following or interaction with the Avianca Airlines dispatcher for AVA052 following takeoff from Medellin ...Contributing to the accident was the flight crew's failure to use an airline operational control dispatch system to assist them during the international flight into a high-density airport in poor weather." This accident, along with Hapag-Lloyd Airlines Flight 3378, has been used as an example of why airlines in different countries should always have proactive flight following by flight dispatchers, as required in the U.S. by Federal Aviation Regulations (FAR) Part 121.

Many passengers were upset when the FAA stated that it had no responsibility in covering the crash.

Aftermath

After some deliberations, a settlement was reached in which the United States paid for around 40% of the settlements with the passengers and their families; the rest was paid by Avianca.

Following Flight 52, air traffic controllers were more conservative in determining if Avianca flights were running low on fuel and required priority landing. On June 22,

1990, a Boeing 727 was immediately cleared to land when the pilot declared a **minimum fuel situation**. In another instance, on August 4, 1990, controllers declared a fuel emergency for the pilot due to confusion over the remaining fuel. The jet landed with 2 more flying hours to spare.

Dramatization

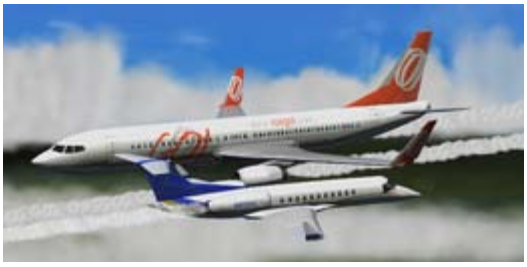
The story of the disaster was featured on the eighth season of Canadian National Geographic Channel show Mayday (known as Air Emergency in the US, Mayday in Ireland and Air Crash Investigation in the UK and the rest of world). The episode is entitled "System Breakdown".

In Malcolm Gladwell's book Outliers, the crash of Flight 52 was discussed in a section on different ethnic groups responses to authority figures.

Chapter 6

Gol Transportes Aereos Flight 1907

Gol Transportes Aéreos Flight 1907



Computer-generated image of Flight 1907 and N600XL about to collide. The Legacy's left winglet sliced off nearly half of the Boeing's left wing.

Accident summary	
Date	September 29, 2006
Type	Mid-air collision
Site	200 km (120 mi) east of Peixoto de Azevedo, Mato Grosso, Brazil 10°29′S 53°15′W / 10.483°S 53.25°W
Total fatalities	154
Total survivors	7
First aircraft	
Type	Boeing 737-8EH
Operator	Gol Transportes Aéreos
Tail number	PR-GTD
Flight origin	Eduardo Gomes Int'l Airport Manaus, Brazil

Stopover	Brasília International Airport
Destination	Galeão Int'l Airport Rio de Janeiro, Brazil
Passengers	148
Crew	6
Fatalities	154 (all)
Second aircraft	
Type	Embraer Legacy 600
Operator	ExcelAire (delivery flight)
Tail number	N600XL
Flight origin	São José dos Campos Regional Airport
Destination	Eduardo Gomes International Airport
Passengers	5
Crew	2
Survivors	7 (all)

Gol Transportes Aéreos Flight 1907 (ICAO: **GLO 1907**) was a Boeing 737-8EH, registration PR-GTD, on a scheduled passenger flight from Manaus, Brazil to Rio de Janeiro. On September 29, 2006, just before 17:00 BST, it collided in mid-air with an Embraer Legacy business jet over the Brazilian state of Mato Grosso. All 154 passengers and crew aboard the Boeing 737 were killed when the aircraft broke up in midair and crashed into an area of dense rainforest, while the Embraer Legacy, despite sustaining serious damage to its left wing and tail, landed safely with its seven occupants uninjured.

The accident, which triggered a crisis in Brazilian civil aviation, was the deadliest in that country's aviation history at the time, surpassing VASP Flight 168, which crashed in 1982 with 137 fatalities near Fortaleza. It was subsequently surpassed by TAM Airlines Flight 3054, which crashed on July 17, 2007 with 199 fatalities.On the other hand, it was also the deadliest aviation accident involving a Boeing 737 (all series) aircraft at that time. It was subsequently surpassed by Air India Express Flight 812, which crashed at Mangalore, India on 22 May 2010 with 158 fatalities.

The accident was investigated by both the Brazilian Air Force Centro de Investigação e Prevenção de Acidentes Aeronáuticos (CENIPA) and the U.S. National Transportation Safety Board (NTSB), with a final report issued on December 10, 2008. CENIPA concluded that the accident was caused by errors committed both by air traffic controllers

and by the American pilots, while the NTSB determined that all pilots acted properly and were placed on a collision course by a variety of "individual and institutional" air traffic control errors.

Boeing aircraft and crew

A similar model of the Gol aircraft

The Gol Transportes Aéreos twin turbofan Boeing 737-8EH aircraft, a new Short Field Performance variant, had been delivered to Gol on September 12, 2006, seventeen days and 234 hours of operation prior to the accident flight. Gol Flight 1907 (ICAO code "GLO 1907") departed Eduardo Gomes International Airport in Manaus on September 29, 2006, at 15:35 Brazil Standard Time (BST), en route to Rio de Janeiro-Galeão International Airport, with a planned intermediate stop at Brasília International Airport.

There were 148 passengers and six crew members on board the Boeing airliner. The crew consisted of Captain Decio Chaves Jr., 44, First Officer Thiago Jordão Cruso, 29, and four flight attendants. The captain, who had also been serving as a Boeing 737 flight instructor for Gol, had 15,498 total flight hours, with 13,521 in Boeing 737 aircraft. The first officer had 3,981 total flight hours, with 3,081 in Boeing 737 aircraft.

Embraer aircraft and crew

The Embraer Legacy at Cachimbo Air Base

The twin turbofan Embraer Legacy 600 business jet, serial number 965 and registration N600XL, newly built by Embraer and purchased by ExcelAire Service Inc. of Ronkonkoma, New York, was on a delivery flight by ExcelAire from the Embraer factory to the U.S.. It departed from São José dos Campos Regional Airport (SJK), near São Paulo, at 14:51 BST, and was on its way to Eduardo Gomes International Airport (MAO) in Manaus as a planned en route stop.

The ExcelAire flight crew consisted of Captain Joseph Lepore, 42, and First Officer Jan Paul Paladino, 34, both U.S. citizens. Lepore had been a commercial pilot for more than 20 years and had logged 9,388 total flight hours, but only 5.5 hours in the Legacy 600. Paladino had been a commercial pilot for a decade and had accumulated more than 6,400 flight hours, including 317 hours flying as captain of Embraer ERJ-145 and ERJ-135 jet aircraft for American Eagle Airlines. Paladino had also served as first officer for American Airlines, flying MD-82 and MD-83 jet aircraft between the U.S. and Canada. Both pilots were legally qualified to fly the Embraer Legacy as captain.

The five passengers consisted of two Embraer employees, two ExcelAire executives, and The New York Times business travel columnist Joe Sharkey, who was writing a special report for Business Jet Traveler.

Collision

Approximate flight paths from flight origins to crash site Boeing southeast bound Embraer northwest bound

Just before 17:00 BST, the Boeing airliner and the Embraer business jet collided in mid-air at 37,000 feet (11,000 m), approximately midway between Brasilia and Manaus, near the town of Matupá, 750 kilometers (470 mi) southeast of Manaus.

The Boeing suffered major structural damage, losing nearly half of its left wing. This caused it to nosedive and enter an uncontrollable spin, which quickly led to an in-flight breakup and crash into an area of dense rainforest, 200 kilometres (120 mi) east of the municipality of Peixoto de Azevedo. All 154 passengers and crew on board were killed and the aircraft was destroyed, with the wreckage scattered in pieces around the crash site.

The Embraer jet, despite serious damage to the left horizontal stabilizer and left winglet, was able to continue flying, though its autopilot disengaged and it required an unusual amount of force on the yoke to keep the wings level.

With radio relay assistance from Polar Air Cargo Flight 71, a Boeing 747 cargo aircraft flying in the area at the time, the Embraer's crew successfully landed the crippled jet at the Cachimbo Air Base (Campo de Provas Brigadeiro Velloso), a Brazilian Air Force (BAF) base about 160 kilometers (100 mi) from the collision point.

Passenger and journalist Joe Sharkey described his experience aboard the Embraer in an article for The New York Times, titled "Colliding With Death at 37,000 Feet, and Living", filed on October 1, 2006:

And it had been a nice ride. Minutes before we were hit, I had wandered up to the cockpit to chat with the pilots, who said the plane was flying beautifully. I saw the readout that showed our altitude: 37,000 feet. I returned to my seat. Minutes later came the strike (it sheared off part of the plane's tail, too, we later learned).

Detention and charging of Embraer crew

Damage to the Legacy's left side

The undamaged right side of the Legacy, for comparison

Immediately after the Embraer's emergency landing at the Cachimbo air base, BAF and Agência Nacional de Aviação Civil (ANAC) officials detained and interviewed its flight crew. The officials also removed the two "black boxes"—Cockpit Voice Recorder (CVR) and Flight Data Recorder (FDR)—from the Embraer, and sent them to São José dos Campos, São Paulo, and from there to Ottawa, Canada for analysis.

In an initial deposition, the Embraer flight crew testified that they were cleared to flight level 370, approximately 37,000 feet (11,000 m) above mean sea level, by Brasilia ATC, and were level at that assigned altitude when the collision occurred. They also asserted that at the time of the collision they had lost contact with Brasilia ATC, and their anti-collision system did not alert them to any oncoming traffic.

On October 2, the Embraer's captain and first officer were ordered by the Mato Grosso Justice Tribunal to surrender their passports pending further investigation. The request, made by the Peixoto de Azevedo prosecutor, was granted by judge Tiago Sousa Nogueira e Abreu, who stated that the possibility of pilot error on the part of the Embraer crew could not be ruled out. The Embraer crew were forced to remain in Brazil until their passports were released to them on December 5, 2006, more than two months after the accident, after federal judge Candido Ribeiro ruled there were no legal grounds for "restricting the freedom of motion of the foreigners."

Prior to their scheduled departure to the United States, the crew were formally charged by Brazilian Federal Police with "endangering an aircraft", which carries a penalty of up to twelve years in prison. Former Justice Minister Jose Carlos Dias, who was acting as a lawyer for the Embraer's crew, criticized the charges against them as being "biased" and "discriminatory". The two pilots were allowed to leave the country after signing a document promising to return to Brazil for their trial or when required by Brazilian authorities. They picked up their passports and flew back to the United States.

Search and recovery operation

The Boeing's Flight Data Recorder

The Brazilian Air Force sent five fixed-wing aircraft and three helicopters to the region for an extensive search and rescue (SAR) operation. As many as 200 personnel were reported to be involved in the operation, among them a group of Kayapo people familiar with the forest. The crash site of Gol Flight 1907 was spotted on September 30 by the BAF, at coordinates 10°29′S 53°15′W / 10.483°S 53.25°WCoordinates: 10°29′S 53°15′W / 10.483°S 53.25°W, 200 km (120 mi) east of Peixoto de Azevedo, near Fazenda Jarinã, a cattle ranch. It was reported that rescue personnel had difficulty reaching the crash site due to the dense forest. The Brazilian airport administrator Infraero at first indicated the possibility of five survivors, but a later statement from the Brazilian Air Force, based on data collected by BAF personnel who rappelled (abseiled) to the crash site and local police who assisted in the SAR effort, confirmed that there were no survivors. Brazilian President Luiz Inácio Lula da Silva declared three days of national mourning.

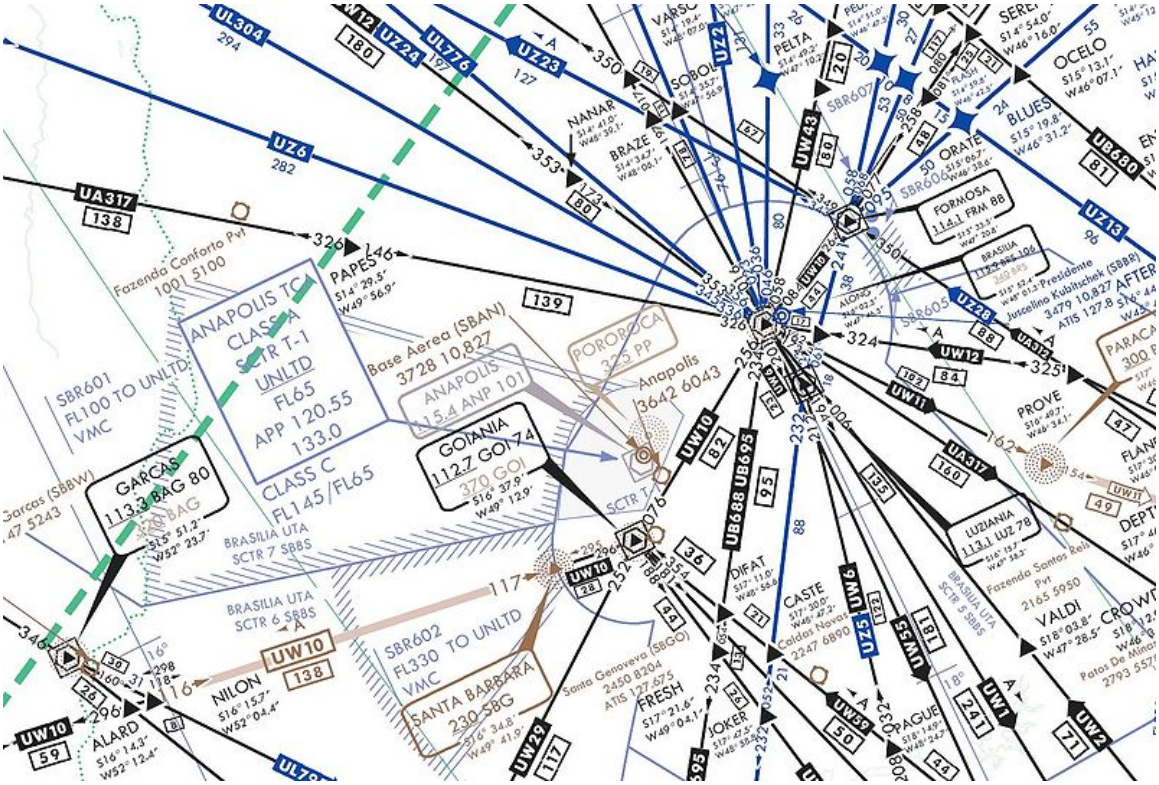
The Boeing's CVR memory module was found embedded in the soil, after four weeks of intensive searching by 200 Army troops.

The Flight Data Recorder and a non-data part of the Cockpit Voice Recorder from the Boeing 737 were found on October 2, 2006 and handed over to the investigators, who sent them to the Transportation Safety Board of Canada (TSB) in Gatineau, Quebec, Canada for analysis. On October 25, 2006, after nearly four weeks of intensive searching in the jungle by about 200 Brazilian Army troops equipped with metal detectors, the memory module of the Boeing's Cockpit Voice Recorder was finally found. The module was discovered intact, separated from other wreckage pieces, embedded in about 20 centimetres (8 in) of soil, and was also sent for analysis by the TSB in Canada.

On October 4, the recovery crews began moving the bodies to the temporary base established at the nearby Jarinã ranch. The BAF deployed a C-115 Buffalo aircraft to transport the bodies to Brasília for identification.

The recovery teams worked intensively for nearly seven weeks in a dense jungle environment, searching for and identifying the victims' remains. The final victim was recovered and identified by DNA testing by November 22, 2006.

Investigation



IFR high altitude en route chart section of Brasilia area, depicting UW2, UZ6 airways

The accident was investigated by the Brazilian Air Force CENIPA and the U.S. NTSB. The NTSB, in accordance with the provisions of ICAO Annex 13, participated in the investigation representing the state of manufacture of the Boeing, state of registry and operator of the Embraer, and state of manufacture of the Honeywell avionics equipment installed in both planes.

Once the black boxes and communication transcripts were obtained, the investigators interviewed the Embraer's flight crew and the air traffic controllers, trying to piece together the scenario which allowed two modern jet aircraft, equipped with the latest anti-collision gear, to collide with each other while on instrument flights in positive control airspace.

The Embraer's flight plan consisted of flying at FL370 up to Brasilia, on airway UW2, followed by a planned descent at Brasilia to FL360, proceeding outbound from Brasilia northwest-bound along airway UZ6 to the Teres fix, an aeronautical waypoint located 282 nm (324 mi, 522 km) northwest of Brasilia, where a climb to FL380 was planned. According to the filed flight plan, the Embraer was scheduled to have been level at FL380, proceeding towards Manaus, while passing the eventual collision point, which was about 307 kilometres (191 mi) northwest of Teres.

The Embraer's crew asserted in their depositions and subsequent interviews that they were cleared by air traffic control (ATC) to FL370 for the entire trip, all the way to Manaus. The actual transcript of the clearance given to the Embraer's crew prior to takeoff at São José dos Campos at 14:41:57 BST, as later released by CENIPA, was:

November Six Zero Zero X-ray Lima, ATC clearance to Eduardo Gomes, flight level three seven zero direct Poços de Caldas, squawk transponder code four five seven four, after take-off perform Oren departure.

The Embraer's crew's altitude clearance to FL370 was further confirmed after their handoff to Brasilia, during which they had the following radio exchange with ATC at 15:51 BST:

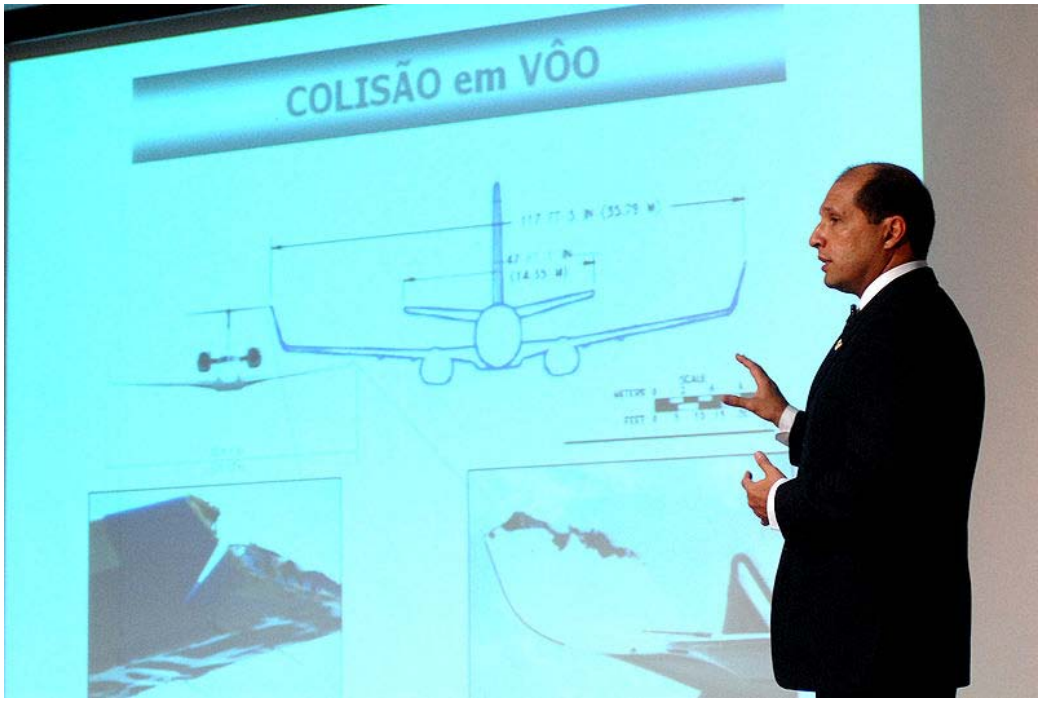
N600XL: Brasilia, November six hundred X-ray Lima, level... flight level three seven zero, good afternoon.

ATC: November six zero zero X-ray Lima, squawk ident, radar surveillance.

N600XL: Roger.

This was the last two-way radio communication between the Embraer's crew and ATC prior to the collision.

Embraer flight and communication sequence



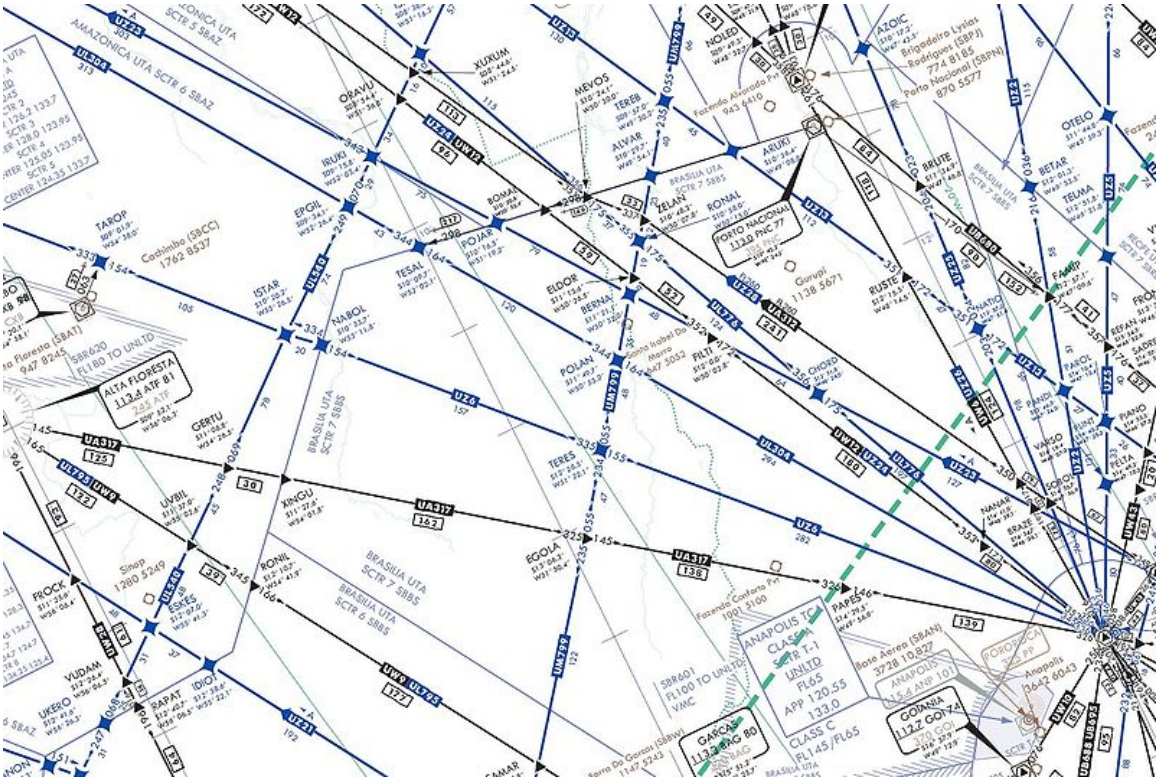
Investigation committee president Col. Rufino Antônio da Silva Ferreira presents the preliminary findings on November 16, 2006.

The Embraer took off from São José dos Campos at 14:51, reaching FL370 at 15:33, 42 minutes later, where it remained until the collision.

ATC maintained normal two-way radio contact with the Embraer up until 15:51, when the last successful radio exchange with the Embraer was made on VHF frequency 125.05 MHz with Brasilia Center. At that point the Embraer was just approaching the Brasilia VOR. The Embraer overflew the Brasilia VOR at 15:55, four minutes later, and proceeded northwest-bound along UZ6. At 16:02, seven minutes after crossing the Brasilia VOR, secondary radar contact was lost with the Embraer, thus stopping the display of the Embraer's reported altitude (Mode C) on the controller's radar screen.

No attempt was made by either the Embraer or Brasilia Center to contact each other from 15:51 until 16:26 when, 24 minutes after the loss of secondary radar contact, Brasilia Center called the Embraer and received no reply.

Brasilia Center then unsuccessfully attempted to contact the Embraer six more times, between 16:30 and 16:34. At 16:30 the Embraer's primary radar target became intermittent, and disappeared completely from the radar screen by 16:38, eight minutes later. Brasilia Center unsuccessfully attempted to effect a handoff of the Embraer to Amazonic Center at 16:53, by calling the Embraer in the blind.



IFR high altitude en route chart section of Teres fix area, depicting UZ6 airway and Cachimbo airbase; crash site is between Nabol and Istar fixes on UZ6

The Embraer, on the other hand, started calling Brasilia Center, also unsuccessfully, from 16:48 and continued with twelve more unsuccessful attempts until 16:53. Some limited contact was made at that point, but the Embraer was unable to copy the Amazonic Center frequencies. The Embraer then continued its attempts to reach Brasilia Center, seven more times until the collision.

The collision occurred at 16:56:54 BST at FL370, and it was confirmed that neither Traffic Collision Avoidance System (TCAS) system had activated or alerted its respective crew, nor did any crew see the oncoming traffic visually or initiate any evasive action prior to the collision. While both planes were equipped with TCAS, it was later determined that the Embraer's transponder had ceased operating almost an hour earlier, at 16:02, rendering both planes unable to automatically detect each other.

At 16:59:50, about three minutes after the collision, Amazonic Center started to receive the Embraer's secondary radar reply, with its correct altitude and last assigned code. At 17:00:30 Amazonic Center unsuccessfully attempted to contact the Embraer by radio.

Polar 71, a Boeing 747 cargo aircraft similar to the one depicted, provided radio relay and translation assistance to the crippled Embraer jet.

The Embraer started calling on the emergency frequency, 121.5 MHz, immediately after the collision, but as it was later determined in the CENIPA report, the emergency

transceivers in the area were not operational and thus the crew was unable to reach ATC on that frequency.

At 17:01:06 the Embraer established contact on the emergency frequency with a Boeing 747 cargo aircraft, Polar 71, which attempted to relay to ATC their request for an emergency landing, and continued to provide relay and translation assistance to the Embraer until its eventual landing.

At 17:18:03 the Embraer contacted the Cachimbo air base (SBCC) tower directly to coordinate its emergency landing there, and landed safely at Cachimbo at 17:23:00.

Gol 1907 flight and communication sequence

Gol 1907 took off from Manaus at 15:35, flying southeast-bound along UZ6 and reaching FL370 at 15:58, 23 minutes later, where it remained until the collision. There were no radio or radar contact problems with the flight until its handoff to Brasilia Center. There were no known attempts by ATC to warn Flight 1907 of the conflicting traffic.

NTSB Safety Recommendation

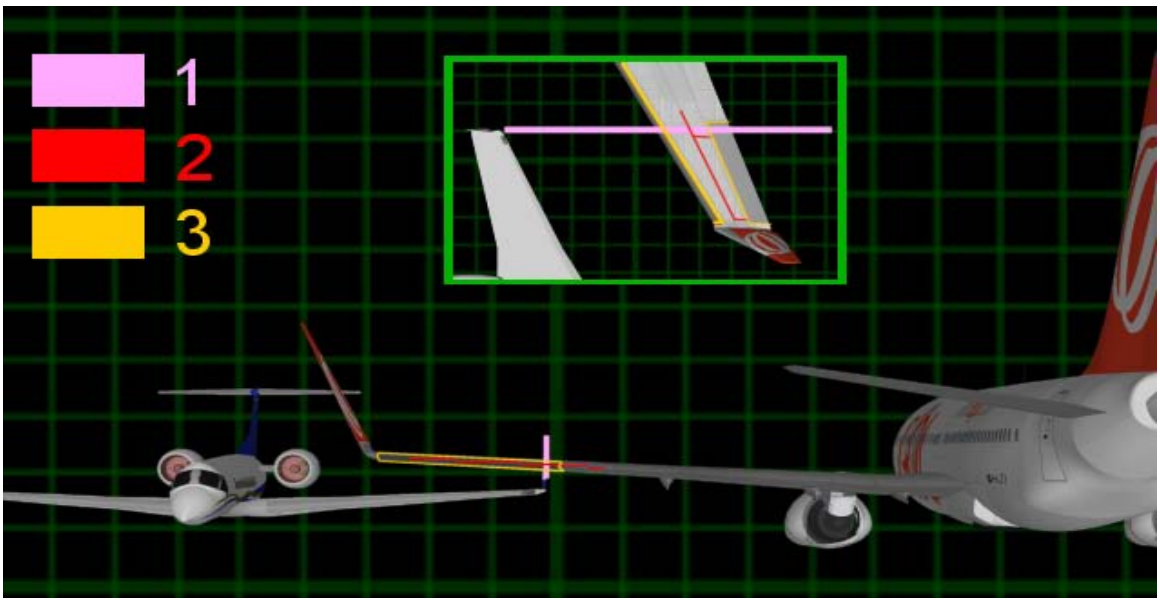


Diagram of impact. 1. Impact, 2. Hydraulic lines, 3. Control surfaces

On May 2, 2007 the National Transportation Safety Board (NTSB) issued a Safety Recommendation document that included an interim summary of the investigation to date, as well as some immediate safety recommendations that the NTSB believes should be implemented by the U.S. Federal Aviation Authority (FAA) to enhance flight safety. The NTSB reported that the Embraer apparently experienced a Traffic Collision Avoidance System (TCAS) outage, unbeknownst to its flight crew prior to the collision, according to the Cockpit Voice Recorder (CVR):

Preliminary findings in the ongoing investigation indicate that, for reasons yet to be determined, the collision avoidance system in the Legacy airplane was not functioning at the time of the accident, thereby disabling the system's ability to detect and be detected by conflicting traffic. In addition, CVR data indicate that the flight crew was unaware that the collision avoidance system was not functioning until after the accident.

The NTSB added that the design of the Embraer's avionics is such that the non-functioning of the TCAS that apparently occurred is annunciated by a small static white text message, which may not be noticeable by the flight crew. The NTSB noted:

Using only static text messages to indicate a loss of collision avoidance system functionality is not a reliable means to capture pilots' attention because these visual warnings can be easily overlooked if pilots' attention is directed elsewhere in the flight environment.

Based on its observations, the NTSB recommended to the FAA that design changes be implemented to improve the noticeability of TCAS annunciation, and that the FAA advise pilots of all aircraft to become more familiar with the details of this accident, potential loss of transponder and/or TCAS function, and how to recognize them.

Final reports

CENIPA

Relatives of Gol 1907 victims react to presentation of CENIPA's final report in Brasilia

On December 10, 2008, more than two years after the accident, Centro de Investigação e Prevenção de Acidentes Aeronáuticos (CENIPA) issued its final report, describing its investigation, findings, conclusions and recommendations. The CENIPA report includes a "Conclusions" section that summarizes the known facts and lists a variety of contributing factors relating to both air traffic controllers and the Embraer's flight crew. According to CENIPA, the air traffic controllers contributed to the accident by originally issuing an improper clearance to the Embraer, and not catching or correcting the mistake during the subsequent handoff to Brasilia Center or later on. CENIPA also found errors in the way the controllers handled the loss of radar and radio contact with the Embraer.

CENIPA concluded that the Embraer pilots also contributed to the accident with, among others, their failure to recognize that their transponder was inadvertently switched off, thereby disabling the collision avoidance system on both aircraft, as well as their overall insufficient training and preparation.

NTSB

The U.S. NTSB issued its own report on the accident, which was also appended to the CENIPA report with the following Probable Cause statement:

The evidence collected during this investigation strongly supports the conclusion that this accident was caused by N600XL and GLO1907 following ATC clearances which directed them to operate in opposite directions on the same airway at the same altitude resulting in a midair collision. The loss of effective air traffic control was not the result of a single error, but of a combination of numerous individual and institutional ATC factors, which reflected systemic shortcomings in emphasis on positive air traffic control concepts.

The NTSB further added the following contributing factors:

Contributing to this accident was the undetected loss of functionality of the airborne collision avoidance system technology as a result of the inadvertent inactivation of the transponder on board N600XL. Further contributing to the accident was inadequate communication between ATC and the N600XL flight crew.

Conflicting CENIPA and NTSB conclusions

While agreeing on most basic facts and findings, CENIPA and NTSB, which collaborated in the accident investigation, arrived at disagreeing interpretations and conclusions. The CENIPA report concludes the accident was caused by mistakes made both by air traffic controllers and by the Embraer pilots, whereas the NTSB focuses on the controllers and the ATC system, concluding that both flight crews acted properly but were placed on a collision course by the air traffic controllers.

According to Aviation Week, "the U.S. National Transportation Safety Board (NTSB) strongly disagreed with the Brazilian conclusions regarding the Legacy pilots' actions as

a causal factor, noting, 'The crew flew the route precisely as cleared and complied with all ATC instructions,' as did the GOL airlines crew." Aviation Week adds that "the Brazilian military operates that country's air traffic control system, conducted the investigation and authored the report."

Aftermath

Aviation crisis

Passengers at Brasília International Airport inquiring about delayed flights

The crash of Flight 1907 precipitated a major crisis of Brazil's civil aviation system, which included massive flight delays and cancellations, air traffic controller work-to-rule slowdowns and strikes, and public safety concerns about Brazil's airport and air traffic infrastructure.

Historically, Brazil was ruled by its armed forces from 1964 until 1985. Since then, a civilian government has taken over, but the country's airways are still (as of 2009) controlled and operated by the Brazilian Air Force (BAF) and run by generals, overseen by a civilian defense minister. Most of Brazil's air traffic controllers are military non-commissioned officers, and all Area Control Centers are run by the BAF.

In October 2006, as details surrounding the crash of Flight 1907 began to emerge, the investigation seemed to be at least partly focused on possible air traffic control errors. This led to increasing resentment by the controllers and exacerbated their already poor labor relations with their military superiors. The controllers complained about being

overworked, underpaid, overstressed, and forced to work with outdated equipment. Many have poor English skills, limiting their ability to communicate with foreign pilots, which played a role in crash of Flight 1907. In addition, the military's complete control of the country's aviation was criticized for its lack of public accountability.

Amid rising tensions, the air traffic controllers began staging a series of work actions, including slowdowns, walkouts, and even a hunger strike. This led to chaos in Brazil's aviation industry: major delays and disruptions in domestic and international air service, stranded passengers, canceled flights, and public demonstrations. Those who blamed various civilian and military officials for the growing crisis called for their resignation.

On July 26, 2007, after an even deadlier crash in Brazil—TAM Airlines Flight 3054—claimed the lives of 199 people, President Luiz Inácio Lula da Silva fired his defense minister, Waldir Pires, who had been in charge of the country's aviation infrastructure and safety since March 2006, and was widely criticized for their failures. On the same day, Lula appointed former Supreme Court president Nelson Jobim to replace Pires, and has vowed to improve Brazil's air traffic control system.

Legal action

Civil litigation

On November 6, 2006, the families of ten of the deceased filed a lawsuit for negligence against ExcelAire and Honeywell, alleging that the Embraer pilots were flying at an "incorrect altitude" and that the Honeywell transponder was not functioning at the time of the collision. Other suits were subsequently filed on behalf of other victims, with similar allegations against ExcelAire and Honeywell. The victims' families also filed suits against other U.S. based defendants, including the two Embraer pilots, as well as Raytheon, Lockheed Martin and Amazon Tech (manufacturers of Brazil's air traffic control equipment), and ACSS (manufacturer of the Embraer's TCAS).

The attorney representing the Embraer crew, Miami-based Robert Torricella, responded to the allegation that the crew was flying at an "incorrect altitude" by stating that according to international regulations, clearances and directives issued by ATC supersede a previously filed flight plan, and in this case:

... the flight plan cleared by air traffic control at the time of departure required the Embraer to fly all the way to Manaus at 37,000 feet and, absent contrary directives from air traffic control, the Embraer was obligated to follow its cleared flight plan. As the findings of the investigation are made public, we are confident that ExcelAire's pilots will be exonerated.

A Honeywell spokesperson stated that "Honeywell is not aware of any evidence that indicates that its transponder on the Embraer Legacy was not functioning as designed or that Honeywell was responsible for the accident."

On July 2, 2008, U.S. District Court judge Brian Cogan of the Eastern District of New York dismissed the families' suits against all the U.S. based defendants under the premise of forum non conveniens. Without ruling on the merits of the cases, and while allowing discovery to continue, Cogan recommended the Brazilian court system as a more appropriate jurisdiction for the dispute.

Criminal proceedings

On June 1, 2007, Brazilian federal judge Murilo Mendes indicted the two Embraer pilots and four Brasilia-based air traffic controllers for their alleged roles in the accident. Mendes, a judge in the small city of Sinop, Mato Grosso, near the crash site of the Boeing, ruled that the two pilots and four controllers should be charged with "exposing an aircraft to danger."

On December 8, 2008, Mendes dismissed charges of negligence against the pilots, but left in place a charge of "imprudence". He also dismissed all charges against two of the four Brasilia-based controllers and reduced the charges against the other two, but supported bringing new charges against a fifth controller, based in São José dos Campos, the Embraer's departure point.

On January 12, 2010, Mendes's ruling was overturned by judge Candido Ribeiro in a federal court in Brasilia, reinstating the negligence charges against the pilots. The pilots may appeal this latest ruling.

Dramatization

Discovery Channel Brazil aired A Tragédia do Vôo 1907 ("The Tragedy of Flight 1907"), a documentary about the disaster. In 2007 some family members of the Gol 1907 victims stated that they believed the documentary exhibited bias.

The crash was the subject of a Season 5 Episode of Mayday (also known as Air Crash Investigation) entitled Phantom Strike (also titled Death Over the Amazon and Radio Silence).

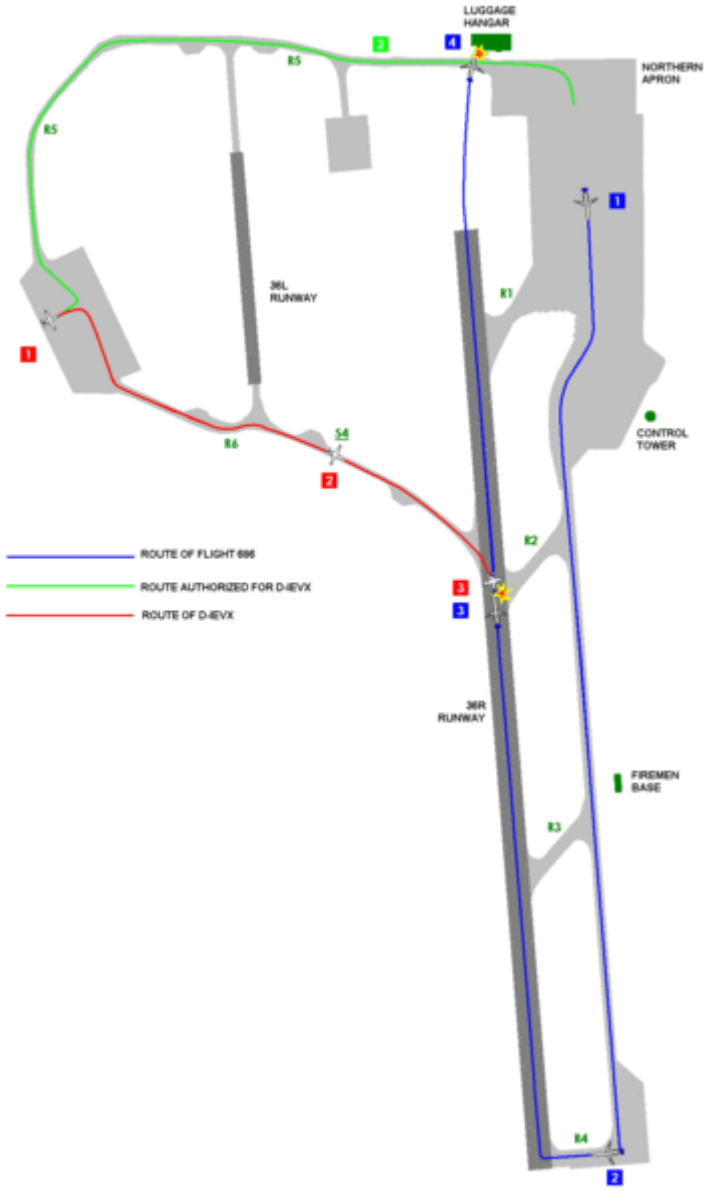
Chapter 7

Linate Airport Disaster

Linate Airport disaster	
Accident summary	
Date	8 October 2001
Type	Runway collision
Site	Linate Airport Milan, Italy
Total injuries	4 (all on ground)
Total fatalities	118 (including 4 on ground)
First aircraft	
Type	McDonnell-Douglas MD-87
Name	Lage Viking
Operator	SAS
Tail number	SE-DMA
Passengers	104
Crew	6
Survivors	0
Second aircraft	
Type	Cessna Citation II
Operator	Private
Tail number	D-IEVX
Passengers	2
Crew	2
Survivors	0

The **Linate Airport disaster** occurred on 8 October 2001 at Linate Airport in Milan, Italy, when **Scandinavian Airlines Flight 686**, a McDonnell Douglas MD-87 airliner carrying 110 people bound for Copenhagen, Denmark, collided on take-off with a Cessna Citation II business jet carrying four people bound for Paris, France. All 114 people on board the two aircraft were killed, as were four on the ground. A further four people on the ground were injured.

Accident



Reconstruction of the disaster

An SAS MD-87 similar to SE-DMA Lage Viking

A Cessna Citation

The accident occurred in thick fog, with visibility reduced to less than 200 metres (656 ft).

The Cessna Citation was instructed to taxi from the western apron along the northern taxiway (taxiway R5), and then via the northern apron to the main taxiway which runs parallel to the main runway, a route that would have kept it clear of the main runway. Instead, the pilot taxied along the **southern** taxi route (taxiway R6), crossing the main runway toward the main taxiway which lay beyond it.

At 08:09:28, the SAS MD-87 was given clearance by a different controller to take off from runway 36R. 53 seconds later, the SAS aircraft, traveling at about 270 kilometres

per hour (150 kn; 170 mph), collided with the Cessna. All four in the Cessna were killed on impact. The MD-87 lost its right engine; the pilot, Joakim Gustafsson from Sweden, attempted to take off, reaching an altitude of approximately 12 metres (39 ft). The remaining engine lost some thrust due to debris ingestion, and the plane, having lost the starboard landing gear, came down. Gustafsson applied thrust reverser and brakes, and tried to guide the plane through its control surfaces. The maneuver was judged so skillful that it is now incorporated into SAS technical manuals. All this was, however, insufficient to halt the jet's momentum, and it crashed into a luggage hangar located near the runway's end, at a speed of approximately 251 kilometres per hour (136 kn; 156 mph). In the impact, all the MD-87's crew and passengers were killed. The crash and subsequent fire killed four Italian ground personnel in the hangar, and injured four more.

Of the occupants of the SAS aircraft, 54 (46%), mainly in the back of the aircraft, suffered severe burns; their bodies were identified using Forensic dentistry or DNA records. Those in the front of the aircraft suffered severe blunt trauma.

Causes

The accident occurred less than a month after the 11 September 2001 attacks and the day after the U.S. invasion of Afghanistan began, but SAS was quick to rule out a terrorist attack as the cause. This was subsequently confirmed by the investigations that followed.

The accident was investigated by the Agenzia Nazionale per la Sicurezza del Volo (ANSV, the italian equivalent of american NTSB). Its final report was published on January 20, 2004, and concluded that the "immediate cause" of the accident was the incursion of the Cessna aircraft on to the active runway. However, the ANSV stopped short of placing the blame unequivocally on the Cessna pilots, its report having identified a number of deficiencies in the airport layout and procedures.

Linate Airport was operating without a functioning ground radar system at the time, despite having had a system delivered some years beforehand, which had not been fully installed. The new system finally came online a few months later. Guidance signs along the taxiways were later found not to meet regulations; after mistakenly turning onto the R6 taxiway that led to the runway, there were no signs by which the Cessna pilots could recognize where they were. When they stopped at a taxiway stop-marking and correctly reported its identifier (S4), the ground controller disregarded this identification because it was not on his maps and was unknown to him. Furthermore, neither pilot of D-IEVX was certified for landings with visibility less than 550 metres (1,804 ft), but had landed at the airport anyway a few minutes before the disaster.

On 16 April 2004, a Milan court found four persons guilty for the disaster. Airport director Vincenzo Fusco and air-traffic controller Paolo Zacchetti were both sentenced to eight years in prison; sentences of six and a half years were given to Sandro Gualano, former head of the air traffic controllers' agency, and Francesco Federico, former head of the airport. In the appeal trial (July 7, 2006), Fusco and Federico were discharged. Another four people were sentenced. The pardon law issued by the Italian Parliament on

July 29, 2006 reduced all convictions by three years. On 20 February 2007 the Corte di Cassazione upheld the decision of the Appeal Court.

Victims

Nationality	SAS 686		Cessna		Ground	Total
	Passengers	Crew	Passengers	Crew		
Denmark	16	3	—	—	—	19
Finland	6	–	—	—	—	6
Germany	—	—	—	2	—	2
Italy	58	—	2	—	4	64
Norway	3	—	—	—	—	3
Romania	1	—	—	—	—	1
South Africa	1	—	—	—	—	1
Sweden	17	3	—	—	—	20
United Kingdom	2	—	—	—	—	2
Total	**104**	**6**	**2**	**2**	**4**	**118**

The victims included nationals of nine different countries. Most of the victims were Italian and Scandinavian. One passenger listed as a Briton by SAS held United Kingdom and United States citizenships.

The Bosco dei Faggi

Four memorial services were held in honor of the SAS victims. On 12 October 2001 three separate ceremonies were held, with one in Denmark, one in Norway, and one in Sweden. On 13 October 2001 a fourth ceremony was held in Italy.

In March 2002 a forest containing 118 beeches called Bosco dei Faggi was inaugurated as a memorial to the victims in the Forlanini Park near the airport. A sculpture by the Swedish artist Christer Bording donated by SAS, called Infinity Pain, was placed in the centre of the forest.

The disaster devastated the Swedish go-kart community as some of the country's most promising young drivers were on the flight after having attended an event in Milan. After the disaster, the Swedish national motorsports club started a memorial fund together with some of the relatives. The fund awards annual stipends to promising Swedish youth in go-kart.

Chapter 8

Aviation Accidents and Incidents in 2003

2003 Iran Ilyushin Il-76 crash

2003 Iran Ilyushin Il-76 crash	
Accident summary	
Date	February 19, 2003
Type	disputed
Site	22 mi SE of Kerman, Iran
Passengers	284
Crew	18
Injuries	0
Fatalities	302 (all)
Survivors	0
Aircraft type	Ilyushin Il-76
Operator	IRGC (Iranian Revolutionary Guard)
Flight origin	Zahedan
Destination	Kerman

The **2003 Iran Ilyushin Il-76 crash** was the deadliest aircraft accident in Iran. The crash, on February 19, 2003, killed 302 people, most of them members of the Iranian Revolutionary Guard. That crash marked the third Il-76 crash in Iran.

Cause

The official report says bad weather brought the aircraft down; high winds and fog were present at the time of the crash. Some sources speculate that the accident may also have

been the result of a mid-air collision, of structural failure, or a terrorist act following a claim of responsibility from the Abu-Bakr Brigades, a terrorist organization.

2003 Baghdad DHL attempted shootdown incident

European Air Transport OO-DLL

Occurrence summary	
Date	22 November 2003
Type	Missile attack, loss of flight controls
Site	Baghdad International Airport, Baghdad, Iraq
Passengers	0
Crew	3
Injuries	0
Fatalities	0
Survivors	3 (all)
Aircraft type	Airbus A300B4-203F
Operator	European Air Transport ("DHL")
Tail number	OO-DLL

On 22 November 2003, shortly after takeoff from Baghdad, Iraq, an Airbus A300 cargo plane owned by European Air Transport ("DHL") was struck on the left wing tip by a surface-to-air missile. Severe wing damage resulted in a fire and complete loss of hydraulic flight control systems. Because outboard left wing fuel tank 1A was full at takeoff, there was no fuel-air vapour explosion. Liquid jet fuel dropped away as 1A disintegrated. Inboard fuel tank 1 was pierced and leaking.

Returning to Baghdad, the 3-man crew made an unprecedented injury-free landing of the crippled aircraft, using differential engine thrust as the only pilot input.

Paris Match Reporter Claudine Vernier-Palliez accompanied a Fedayeen commando unit on their strike mission against the DHL aircraft.

Sara Daniel, a French weekly newsmagazine journalist claimed receipt, from an unknown source, of a video that showed insurgents, faces concealed, firing a missile at the A300. Daniel was researching a feature about Iraqi resistance groups but she disclaimed any specific knowledge of the people who carried out the attack, regardless of being present at the moment of attack.

Destination and crew

The aircraft took off from Baghdad International Airport en route to Bahrain International Airport at 06:30 UTC with an experienced crew of three: two Belgians, Captain Eric Gennotte and First Officer Steeve Michielsen, and a Scot, flight engineer Mario Rofail.

Moments following the strike

To reduce exposure to ground attack, the aircraft was executing a rapid climbout. At about 8,000 feet (2,450 metres), a 9K34 Strela-3 (SA-14 Gremlin) surface-to-air missile struck the left wing tip. The warhead damaged trailing edge surfaces and structure and caused a fire. All three hydraulic systems lost pressure and flight controls were disabled. The aircraft pitched rapidly up and down in a roller-coaster phugoid, oscillating between a nose-up and a nose-down position, trying to re-establish the angle of attack from which it was disturbed.

As in the case of the 1989 United Airlines Flight 232 disaster in the USA, Captain Gennotte could only use thrust to modify pitch, speed and altitude and vary throttles asymmetrically to control yaw and turn the aircraft. Flight engineer Mario Rofail executed a gravity drop to extend the landing gear, a procedure normally accomplished with hydraulic power. Early deployment of the gear was critical to a safe outcome because increased drag helped reduce speed and stabilize the Airbus.

In about 10 minutes of experimentation, the crew learned to manage turns, climbs and descents. After a meandering trajectory, they executed a right turn and initiated a descent path to Baghdad International Airport.

Final approach and emergency landing

The crew applies reverse thrust

Left wing damage from the missile strike

Damaged turbofan front fan blades due to ingestion of debris

Because of left wing damage and fuel loss, Rofail had to monitor the engine closely. If fuel flow was lost from the left side, the flight engineer would have to feed fuel from a right tank without losing thrust. Crew survival was dependent on accurate power control of each jet engine.

Gennotte and Michielsen set up for a final approach to runway 33R. Because the aircraft drifted to the right, away from the intended course, Gennotte decided to use the shorter 33L runway. Visibility was excellent and the pilots managed a controlled descent. They knew that, counter-intuitively, they could not retard throttles before touchdown without risking the nose or a wing smashing disastrously into the ground.

Air Force Tech. Sgt. Steven Klunk

At about 400 feet (120 meters), when the airplane entered ground effect, turbulence upset the aircraft balance and the right wing dipped. With thrust adjustments, the roll was controlled but the aircraft touched down off the runway centerline. Rofail immediately deployed full reverse thrust but the Airbus veered off the paved runway. Running through rough soft ground, throwing up a huge plume of sand and dragging a razor wire barrier, the aircraft stopped after about 1,000 meters.

The crew exited down the left emergency slide. Fearing an explosion, the crew started to move away from the crash site, but US Air Force Security Forces Technical Sergeant Steven Klunk stopped them from doing so as there were mines left by Saddam Hussein's forces that had not been cleared after Operation Iraq Freedom. The crew was later safely evacuated from the runway by TSgt Klunk.

Awards and aftermath

The Guild of Air Pilots and Air Navigators jointly honored crewmembers with the Gordon-Burge Memorial Award. This is awarded to flight crew whose action contributed outstandingly by saving their aircraft or passengers, or made a significant contribution to future air safety. This annual award is made only if a nomination is considered to be of significant merit.

The Flight Safety Foundation's FSF Professionalism Award in Flight Safety was presented to the crewmembers for their “extraordinary piloting skills in flying their aircraft to a safe landing after a missile strike following takeoff from Baghdad, Iraq.

In May 2006, Captain Eric Gennotte, together with Armand Jacob, an Airbus experimental test pilot, gave a presentation to the Toulouse branch of the Royal Aeronautical Society titled “Landing an A300 Successfully Without Flight Controls”.

In addition to severe wing and undercarriage damage, both jet engines suffered ruinous abuse by ingesting debris. The already aging aircraft has not flown again.

The incident became widely discussed. For Mario Rofail, the flight engineer, it was a point on which to retire.

Colgan Air Flight 9446

Colgan Air Flight 9446 was a repositioning flight operated by Colgan Air for US Airways Express. On August 26, 2003 a Beech 1900D on the route hit the water 100 yards off of the shore of Yarmouth, Massachusetts, United States shortly after taking off from Barnstable Municipal Airport in Yarmouth. Captain Scott Knabe and First Officer Steven Dea died. The plane was bound for Albany, New York, U.S.

The U.S. NTSB incident summary is as follows:

> “The accident flight was the first flight after maintenance personnel replaced the forward elevator trim cable. When the flightcrew received the airplane, the captain did not address the recent cable change noted on his maintenance release. The captain also did not perform a first flight of the day checklist, which included an elevator trim check. Shortly after takeoff, the flightcrew reported a runway trim, and manually selected nose-up trim. However, the elevator trim then traveled to the full nose-down position. The control column forces subsequently increased to 250 pounds, and the flightcrew was unable to maintain control of the airplane. During the replacement of the cable, the maintenance personnel skipped a step in the manufacturer's airliner maintenance manual (AMM). They did not use a lead wire to assist with cable orientation. In addition, the AMM incorrectly depicted the elevator trim drum, and the depiction of the orientation of the cable around the drum was ambiguous. The maintenance personnel stated that they had completed an operational check”

of the airplane after maintenance. The Safety Board performed a mis-rigging demonstration on an exemplar airplane, which reversed the elevator trim system. An operational check on that airplane revealed that when the electric trim motor was activated in one direction, the elevator trim tabs moved in the correct direction, but the trim wheel moved opposite of the corresponding correct direction. When the manual trim wheel was moved in one direction, the elevator trim tabs moved opposite of the corresponding correct direction.

—NTSB

The National Transportation Safety Board determines the probable cause(s) of this accident as follows:

> “The improper replacement of the forward elevator trim cable, and subsequent inadequate functional check of the maintenance performed, which resulted in a reversal of the elevator trim system and a loss of control in-flight. Factors were the flightcrew's failure to follow the checklist procedures, and the aircraft manufacturer's erroneous depiction of the elevator trim drum in the maintenance manual.”
>
> —NTSB

FedEx Express Flight 647

FedEx Flight 647

Accident summary	
Date	December 18, 2003
Type	Pilot error
Site	Memphis International Airport, Memphis, TN
Passengers	5
Crew	2
Injuries	2
Fatalities	0
Survivors	7 (all)
Aircraft type	McDonnell Douglas MD-10-10F
Operator	FedEx Express
Tail number	N364FE
Flight origin	Metropolitan Oakland International Airport, Oakland, California
Destination	Memphis International Airport, Memphis, Tennessee

FedEx Express (FedEx) Flight 647 was a flight between Metropolitan Oakland International Airport (OAK), Oakland, California and Memphis International Airport (MEM), Memphis, Tennessee that crashed during landing on December 18, 2003.

Final moments

The flight touched down at about 12:26 central standard time on runway 36R, and almost immediately the right landing gear collapsed. The plane veered off the right side of the runway, catching fire as it did so. The co-pilot received minor injuries as she evacuated the aircraft, as did one of the five non-revenue FedEx pilots who were on board as passengers. It was later discovered that the non-revenue pilot who activated the slide for the emergency exit had not been adequately trained in its operation, and so accidentally pulled the handle that released the slide as a raft in the event of a landing on water, so that the slide detached from the airplane.

Investigation

The NTSB conducted a full investigation of the accident. It found that although the aircraft had encountered a crosswind during landing, the conditions were well within the safe capabilities of the aircraft. However, it was discovered that the first officer did not properly line up the plane before touchdown, nor did she slow the plane adequately before touchdown, so that the plane came down excessively hard. As the plane came down, due to the crosswind, the right wing suddenly lowered approximately six degrees. This was beyond the design capabilities for the right main landing gear, and it snapped as a result. The NTSB also cited the captain for failing to check the work of the first officer.

The NTSB further found that FAA Order 8400.10 (Air Transportation Aviation Inspector's Handbook) was deficient in the section addressing assurance of evacuation training for the flight crew.

Chapter 9

Aviation Accidents and Incidents in 2004

2004 Martinsville plane crash

2004 Martinsville plane crash

Flight path taken by the plane.

Accident summary	
Date	October 24, 2004
Type	Pilot error
Site	Bull Mountain near Stuart, Virginia, USA
Passengers	8
Crew	2
Survivors	0
Aircraft type	Beechcraft Super King Air 200
Operator	Hendrick Motorsports

Tail number	N501RH
Flight origin	Concord, North Carolina
Destination	Blue Ridge Airport Martinsville, Virginia

The **October 2004 Martinsville plane crash** occurred on 24 October 2004 when a Beechcraft Super King Air 200 aircraft owned by Hendrick Motorsports crashed into Bull Mountain, seven miles from Blue Ridge Airport, Martinsville, Virginia. All ten aboard the plane were killed, among them members of the Hendrick family including John Hendrick, president of Hendrick Motorsports; and former NASCAR Busch Series driver and owner Ricky Hendrick.

Crash

The King Air took off from Concord, North Carolina at 12 pm EST, carrying ten passengers. Among them were several key Hendrick Motorsports staff, including team president John Hendrick and his twin daughters, Kimberly and Jennifer Hendrick; Ricky Hendrick, son of Rick Hendrick; general manager Jeff Turner; and chief engine builder Randy Dorton. The other people on board were Joe Jackson, a DuPont executive; Scott Lathram, a pilot for driver Tony Stewart; and pilots Richard Tracy and Elizabeth Morrison. The plane was en route to the Subway 500 Nextel Cup Series race at Martinsville, Virginia when it was reported missing at 3:00 pm. After an extensive search, the wreckage of the plane was found at Bull Mountain at 11 pm. No one on board survived.

NASCAR received word of the plane crash during the 2004 Subway 500 in Martinsville. After the race was over, NASCAR immediately summoned all the Hendrick Motorsports drivers– including race winner Jimmie Johnson– to the NASCAR hauler and all victory lane ceremonies were cancelled.

Investigation

An investigation conducted by the National Transportation Safety Board (NTSB) followed soon after the crash.

Weather

There were foggy conditions at the time of the plane crash.

Pilot error as a cause

The NTSB suggested that pilot error was the cause of the crash, partly by:

- the plane missing its first landing attempt before veering off course and crashing;

- the plane not climbing to its temporarily assigned altitude of 2,600 feet; it instead descended to 1,800 feet before crashing.

The NTSB concluded its investigation by suggesting that the pilots failed to execute an instrument approach procedure and that both failed to use all navigational aids to confirm the airplane's position during its approach.

Aftermath

Lawsuit

On February 7, 2006 a lawsuit was filed against Hendrick Motorsports by the widows of two men killed in the plane crash. Dianne Dorton claimed "conscious and intentional disregard" for the life of her husband, Randy Dorton, the head engine builder for Hendrick Motorsports. The lawsuit places partial blame on John Hendrick, the President of Hendrick Motorsports. Her claim is based on a conversation with her husband shortly before the crash, as well as a conversation between John Hendrick and pilot Richard Tracy.

Dorton called his wife the morning of the crash. He told his wife that they were supposed to fly in a helicopter but the helicopter was delayed due to bad weather, and that they were going to fly in a Hendrick Motorsports plane instead. Dorton waited in the Hendrick Hangar for over an hour. He called Dianne and told her he didn't think they would go, only to call back 47 minutes later to tell her "we're going".

Pilot Richard Tracy allegedly suggested flying into Danville instead of Blue Ridge Airport, but Hendrick refused because Danville was further away and he didn't want to be late for the race. The grounded helicopter pilot witnessed the conversation and could be called to testify.

In a separate lawsuit, Scott Lathram's widow Tracy claims that at least 27 other aircraft scratched plans to land at Blue Ridge Airport on October 24 due to bad weather. Lathram was a helicopter pilot for NASCAR driver Tony Stewart.

Impact on Hendrick Motorsports

On February 18, 2005, Marshall Carlson, Rick Hendrick's son in law, signed on as new general manager.

Memorials

The week following the crash, officials at the Atlanta Motor Speedway held a moment of silence before both the Busch and Nextel Cup races and lowered the flags to half staff. All the Hendrick Motorsports cars carried tributes on the hoods for those who were lost the week before. Jimmie Johnson (who won the Bass Pro Shops MBNA 500 race) and the rest of his teammates and crew wore their caps backwards in victory lane as a tribute to

Ricky Hendrick, who had a habit of doing the same. At the Hendrick museum in Concord, North Carolina, 300 people showed up for a candlelight vigil in honor of the ten victims.

The Randy Dorton Trophy now goes to the winner of the Mahle Engine Builders Challenge.

Northwest Airlines Flight 327

Northwest Airlines Flight 327 was a flight on June 29, 2004 from the Detroit Metropolitan Wayne County Airport in Romulus, Michigan to the Los Angeles International Airport in Los Angeles, California. This event happened aboard N543US, a Boeing 757-200. The suspicious behaviour of a party of 13 Syrian musicians, on their way to an engagement in San Diego, alarmed flight attendants and passengers. One passenger, journalist Annie Jacobsen, wrote a series of articles about the incident, bringing it to national attention. A redacted version of the Department of Homeland Security Inspector General's report was released in May 2007 as a result of a Freedom of Information Act request made by the Washington Times.

The incident

Before takeoff, 14 men of Middle Eastern descent boarded the aircraft. Thirteen of the 14 men were Syrian nationals in the USA on short-term visas, using one-way tickets which they had paid for in cash. Their visas had expired on June 10, but they had filed for extensions, which were eventually granted.

During the flight, Annie Jacobsen, a writer for WomensWallStreet, believed that the men were acting suspiciously. She claimed that one of the flight attendants had previously notified an air marshal on board the flight that she thought the men were acting suspiciously, but the air marshals later said that a flight attendant had merely passed on Jacobsen's concerns. Jacobsen and her husband became increasingly vocal when they believed that their concerns were not being taken seriously, to the point that air marshals believed that the couple might themselves be terrorists, trying to draw them out to reveal their identities.

In a series of articles for WomensWallStreet titled "Terror in the Skies, Again?," Jacobsen claimed that several other Flight 327 passengers have corroborated her story. One was so frightened by what she witnessed that she no longer travels by air. Others said they were convinced they were about to die. One such passenger confirmed the story to the Washington Times.

Debate over what happened on the flight became an Internet phenomenon, according to CNN's Aaron Brown. Jacobsen's articles were translated into many languages including Chinese, Swahili and German as it circulated around the globe.

In the WomensWallStreet articles, Jacobsen detailed the activity she took to be suspicious. She claimed that before boarding, the men did not interact or seem to be part of a group. Further, she claimed that during boarding, each man made eye contact with each of the others and nodded as if in agreement. One man, who wore an orthopedic shoe, complained loudly, just before takeoff, that he needed to switch seats. Once in flight, one of the men took a large McDonald's bag to a lavatory, exiting with the bag nearly empty, and giving the thumbs up sign as he passed two others suspicious men. Some of the other men also took objects with them to the lavatory, such as a mass of cloth, a camera, and a cell phone. Throughout the flight, the men would get up in unison, walk to the lavatories, and congregate in the aisles in groups of two and three. One of the men, wearing a suit and sunglasses, stood a foot or so away from the cockpit door. When the captain announced clearance for landing, seven of the men stood in unison and went to the lavatory, each taking about four minutes. The last man to exit the lavatory supposedly dragged his forefinger across his neck as he passed one of the other men, mouthing the word "No."

Upon arriving in Los Angeles, the 14 men that Jacobsen saw were detained for questioning and identity verification. The Federal Air Marshal Service concluded that they were Syrian band members en route to a San Diego casino to perform. Jacobsen claims, however, that only two of the men were briefly investigated and nobody has determined where the men went after leaving the airport. The Sycuan Casino & Resort confirmed that Syrian singer Nour Mhanna performed there two days later, and that he brought his own backup band.

Reaction to reports

In a later interview to TIME magazine, the lead air marshal aboard the flight stated, "there was never a time when my main partner or I felt there was an imminent threat to that airplane or the passengers." and "I understand why the passenger felt some anxiety about activity on Flight 327 but that kind of activity was unusual but not a security incident. There was never a threat to the plane." The Homeland Security report produced by the Inspector General revealed that this air marshal had noticed that the Syrians' travel visas were expired but the air marshal failed to report this information to his supervisors, claiming it was out of his jurisdiction.

Furthermore, the federal air marshals believed that Jacobsen "over-reacted" at the presence of persons of Middle Eastern appearance on the flight and "was in danger of panicking other passengers and creating a larger problem". They were also concerned that Jacobsen's actions were part of a terrorist plot to create a disturbance in order that the marshals be identified and that she "could have put the entire flight in danger".

The Department of Homeland Security, Office of the Inspector General, spent twenty-two months investigating flight 327; the report has been classified, but a redacted version reveals that the musical group's promoter, who was on the plane, had been involved in a similar incident in January 2004.

A Washington Times story claimed that some air marshals believed that Northwest flight 327 was a "dry run" for a future terrorist attack involving commercial planes, but did not quote any air marshal making that claim, either with attribution or anonymously. A followup story revealed the Freedom of Information Act request and promised more details to come.

Gary Boettcher, president of the Coalition of Airline Pilots Associations, however, said that Jacobsen had likely witnessed a dry run, and that he had many similar experiences himself. Federal Air Marshal P. Jeffrey Black confirmed that in his opinion, flight 327 was a terrorist probe or dry run. Mark Bogosian, An American Airlines pilot, said that incidents like the one Jacobsen described were a "dirty little secret" that airline crew members had known for some time.

Jacobsen's original article was distributed widely through emails, and the veracity of her claims was discussed and dismissed on the Snopes urban legend website.

After the August 2006 thwarted terrorist attack in England, one which allegedly involved ten commercial airplanes being blown up by bombs built in the aircraft bathroom, talk radio shows across the country referenced Northwest Flight 327 as likely being a dry run, in spite of differences between the two: The accused in the August 2006 case were British nationals with Pakistani connections, not Syrians (or band members), and no one was prosecuted due to events involving Flight 327.

Chapter 10

Aviation Accidents and Incidents in 2005

Lockhart River Air Disaster

The **Lockhart River Air Disaster** refers to the Controlled flight into terrain (CFIT) in Northern Australia of a Fairchild Swearingen Metroliner commuter aircraft at 1144 on 07 May 2005. The aircraft VH TFU, owned by Transair Ltd and operated by Aerotropics, struck the ridge known as South Pap, 11 km on approach in bad weather to Lockhart River Airport, Far North Queensland Australia. All fifteen on board died as the aircraft was completely destroyed by impact forces and subsequent fire. The flight was on the return run from Bamaga on Cape York to the regional centre of Cairns. It was the worst air crash in Australia in 36 years.

Those who lost their lives were: Brett Hotchin 40 (Pilot), Tim Down 21 (Co-Pilot), Constable Sally Urquhart 28 (Queensland Police Service Bamaga), Frank Billy 21 (Injinoo), Fred Bowie 25 (Injinoo), Gordon Kris 37 (Injinoo), Arden Sonter 44 (Bamaga), Mardie Bowie 30 (Bamaga), Helena Woosup 25 (Bamaga), Paul Norris 34 (Main Island), Dr David Banks 56 (Canberra), Noel Lewis 46 (Sunshine Coast), Edward Green, Rob Brady 36 (Cairns) Kenneth Hurst 55 (Brookwater.)

Investigation

The Queensland Coroner's Inquest in 2007, found that, despite evidence that there were a number of issues leading up to the crash, pilot error was the prime cause. Families of those who lost their lives in the disaster have been highly critical of the Coroner's findings and the deficiencies in the operations of the regulator CASA, (Civil Aviation Safety Authority) and the poor company structure and practices of Transair Ltd. These issues are clearly and extensively explained in the report delivered by the Australian Transport Safety Bureau (ATSB) on 04 April 2007 and summarised in Appendix M. As the Cockpit Voice Recorder was inoperable, and had been for some time, the events and conversations occurring between the flight crew will never be known.

Senate Inquiry

As a result of intense lobbying by the father of one of the victims, Constable Sally Urquhart, and others, the Australian Senate's Rural and Regional Affairs and Transport

Committee resolved to conduct an inquiry into the Civil Aviation Safety Authority, its operations and other matters. The Inquiry was convened on 02 and 03 July 2008 at Parliament House, Canberra. As well as Mr Shane Urquhart's submission, there were sixty others which were considered by the Inquiry. The vast majority of the submissions were highly critical of most aspects of CASA's operations. Several people and organisations, including Mr Urquhart, supported their submissions in person at the Inquiry. In September 2008, the Committee Chair, Senator Glenn Sterle, released the report of the inquiry to the Transport Minister Mr Anthony Albanese and the public.

The recommendations from the report are: 1. That the Australian Government strengthens CASA's governance framework and administrative capability by: a. introducing a small board of up to five members to provide enhanced oversight and strategic direction for CASA; and b. undertaking a review of CASA's funding arrangements to ensure CASA is equipped to deal with new regulatory challenges. 2. In accordance with the findings of the Hawke Taskforce, that CASA's Regulatory Reform Program be brought to a conclusion as quickly as possible to provide certainty to industry and to ensure CASA and industry are ready to address future safety challenges. 3.That the Australian National Audit Office audit CASA's implementation and administration of its Safety Management Systems approach.

Further incidents: Following the Lockhart River crash, Transair in Australia went into liquidation in late 2005. Aerotropics also no longer operates as the Civil Aviation Safety Authority cancelled its AOC due to ongoing safety breaches. Transair continued to operate its PNG business until 31 August 2010 when the company's Cessna Citation ran off the runway on landing at Misima Island near Milne Bay, Nuigini. The previous owner of Transair in Australia, Les Wright, died along with three others in the ensuing inferno. There was one survivor.

2005 Baney plane crash

2005 Baney plane crash

A Antonov 24 like tha accident aircraft.

Accident summary

Date	16 July 2005
Type	Overloaded
Site	Near Baney, Equatorial Guinea
Passengers	54
Crew	6
Injuries	2
Fatalities	60
Survivors	0
Aircraft type	Antonov 24
Operator	Equatorial Express Airlines now Equatair
Tail number	3C-VQR
Flight origin	Malabo International Airport
Destination	Bata Airport

The **2005 Baney plane crash** happened on the 16 July 2005 after a Equatorial Express Airlines Antonov 24 crashed into a side of a mountain near Baney. The accident killed all 60 passengers and crew on board the flight.

Aircraft

The aircraft that was used on this flight was a Antonov 24 registration 3C-VQR that had its first flight back in 1967.

Accident

The flight took off from Malabo International Airport on a short haul flight to Bata Airport with 54 passengers and 6 crew on board. Just minutes into the flight the aircraft tilted and fell, skidded over trees for a distance of about half a mile and crashed into a side of mountainous jungle area near Baney at 10:00pm. An hour later the wreck of the aircraft was found and there were some conflicting reports regarding the number of persons on board. According to the airline, the flight manifest shows 10 crew and 35 passengers. Government sources reported 60 people were on the plane, after first reports of 55 occupants. The total bodies found at the crash site were 60 passengers and crew.

Cause

A witness saw flames coming from the side of the plane shortly after take-off. The cause of the accident was that the aircraft was overloaded and the aircraft was only built to accommodate a maximum of 48 passengers and crew.

Airwork Flight 23

Airwork Flight 23	
Accident summary	
Date	May 3, 2005
Type	Pilot error
Site	Stratford, New Zealand
Passengers	0
Crew	2
Injuries	0
Fatalities	2
Survivors	0
Aircraft type	Fairchild SA227-AC Metro III
Operator	Airwork
Tail number	ZK-POA

Airwork Flight 23 was a New Zealand Post cargo flight between Auckland International Airport (AKL/NZAA) and Woodbourne Airport (BHE/NZWB) that disintegrated on 3 May 2005.

History of the flight

The aircraft was scheduled for take off at 9:00 P.M. local time, but it was delayed while cargo was being loaded. During the delay the pilots ordered an extra 570 L (about 1,000 pounds) of fuel and told the person refueling to put all the fuel in the left wing fuel tank, instead of splitting the fuel exactly between the two tanks, as was company procedure. The flight eventually took off at 9:36 P.M. local time.

Immediately after take off the autopilot was engaged and it controlled the aircraft during its climb to flight level 220. The flight was continued at full power instead of cruise setting to make up for lost time for the next fifteen minutes. On powering down to cruise power, the captain noticed imbalance between the fuel tanks and initiated cross flow procedures. Shortly after, at 10:13 P.M. local time, the plane entered a spiral descent and broke up, killing both pilots.

Investigation

The accident was investigated by the New Zealand Transport Accident Investigation Commission (TAIC). It found that when the captain noted the fuel imbalance, he said, "We'll just open the cross flow again… sit on left ball and trim it accordingly." He repeated the instruction five times in the next 19 seconds, to which the co-pilot replied, "I was being a bit cautious". The captain said, "Don't be cautious mate, it'll do it good".

This resulted in the plane being flown at a large sideslip angle while still under autopilot control, by means of the rudder trim mechanism. Forty-seven seconds after the cross flow was opened, the captain said, "Doesn't like that one mate… you'd better grab it." One second later they received a "bank angle" warning, followed by a warning chime that was presumably a warning they were straying from their correct altitude.

The investigation came to the conclusion that this was due to the autopilot disengaging, probably due to a servo reaching its torque limit. This meant that there was no compensation applied for the rudder trim input, and the plane entered a roll and steep descent, disintegrating around flight level 199. The investigation found poor visibility at night in low cloud was a factor in preventing the pilots realizing sooner.

Aftermath

The following improvements were implemented as a result:

- On 30 May 2005, the operator issued a Notice to Pilots advising that forthwith the SOP was to give the refueled the volume of fuel to be put into each wing tank to achieve a balanced load prior to engine start, in accordance with the Pre-Start checklist, Metro Training Manual and AFM.
- On 30 June 2006 the operator amended the Metro checklist to add to the Line-up and Approach checklists the item "cross flow closed".
- On 4 July 2006 the operator amended the autopilot Standard Operating Procedures section of the company Metro Training Manual to include two cautions on the use of the fuel cross flow switch.
- On 27 February 2006 the TAIC recommended to the Director of Civil Aviation to amend the AFM, in concert with the United States Federal Aviation Administration, to include a limitation and caution that the autopilot and yaw damper must be disconnected while in-flight fuel balancing is done.

Chapter 11

Aviation Accidents and Incidents in 2006

2006 Iran Air Tours crash

2006 Iran Air Tours crash	
Accident summary	
Date	September 1, 2006
Type	Runway overrun
Site	Mashad, Iran
Passengers	137
Crew	11
Injuries	?
Fatalities	28
Survivors	120
Aircraft type	Tupolev 154M
Operator	Iran Air Tours
Tail number	EP-MCF

On September 1, 2006, Iran Air Tours Tu-154 aircraft traveling from Bandar Abbas with 11 crew and 137 passengers on board burst into flames upon landing in Mashhad, Iran at 13.45 local time killing 28 of those onboard.

Possible Causes

Immediately after the accident, Iranian state television reported that one of the tires had blown out upon landing, but this was soon discredited. No additional information is currently available.

Aircraft

The aircraft had been in active service since 1988 and had approximately 19,000 hours of flight time over about 2,200 flights. It was originally owned by Aeroflot. The plane was leased by Iran Air Tours in August 2005 after having been operated by a number of other carriers.

2006 Morecambe Bay helicopter crash

CHC offshore transport flight	
Accident summary	
Date	27th December 2006
Type	Descent into sea due to pilot error
Site	Morecambe Bay, Irish Sea
Passengers	5
Crew	2
Injuries	0
Fatalities	6 (6 confirmed, 1 missing)
Survivors	0
Aircraft type	Eurocopter SA-365N Dauphin 2
Operator	CHC Helicopter
Tail number	G-BLUN
Flight origin	Blackpool Airport
Destination	Morecambe Bay gas platforms

The **2006 Morecambe Bay Helicopter Crash** was a fatal air incident that occurred on 27 December 2006 at approximately 18:40 GMT, whilst transporting replacement crew between the Millom and Morecambe gas platforms situated approximately 24 miles from the shoreline of Morecambe Bay, Lancashire, England.

Rescue efforts recovered the bodies of six men, including those of the two pilots. A seventh passenger is still recorded as missing. The search for the missing man was called off on 24 January 2007.

The helicopter involved was a Eurocopter AS365N, registration G-BLUN, owned by CHC. The aircraft was contracted by Centrica, the company who manage the gas platform to which the helicopter was travelling.

Initial rescue was undertaken by a volunteer team of the local Royal National Lifeboat Institution (RNLI) rescue service, operating out of nearby Lytham St Annes and was co-ordinated by HM Coastguard.

Investigation

The investigation into the crash started the same night as the accident. The flight data recorders were eventually recovered on 17 January 2007 after severe weather hampered recovery attempts. The storms also hampered efforts to find and recover those lost in the incident. A lot of speculation started to appear into the possible causes for the tragic crash. Because offshore helicopter operations are so crucial to the day to day running of offshore platforms, the AAIB felt it necessary to release a preliminary bulletin as soon as possible. A special bulletin released by the UK Air Accident Investigation Branch (AAIB) (S1/2007) stated "The conclusion of this preliminary examination is that there are no signs of pre-impact malfunction of any major mechanical components, including the tail rotor and its drive shaft"

The formal report into the accident, released in October 2008, stated that "human factors" were the cause of the crash. The co-pilot, who was the handling pilot at the time, complained he felt unwell and that he was running into difficulties. He asked the commander for assistance, whereupon the commander took control of the helicopter. However, the transfer of control from co-pilot to commander was roughly four seconds after the co-pilot had asked for assistance. The report found that the transfer of control wasn't smooth enough and that the commander wasn't "mentally primed to take control of the helicopter." The report concludes that:

"During the attempted recovery of the helicopter from its unusual attitude the commander was devoid of any external visual cues and was possibly distracted over concerns for the well-being of his co-pilot. Concerns for his co-pilot and some degree of disorientation possibly distracted the commander from his usual instrument scan to the extent that he did not notice the increasing angle of bank to the right and the helicopter's continuing descent into the sea."
—AAIB Report No: 7/2008

2006 Falsterbo Swedish Coast Guard crash

2006 Falsterbo Swedish Coast Guard crash	
Accident summary	
Date	26 October 2006
Type	Wing failure caused by metal fatigue
Site	Falsterbo, Sweden
Passengers	0
Crew	4
Fatalities	4
Survivors	0
Aircraft type	CASA C-212 Aviocar
Operator	Swedish Coast Guard
Tail number	SE-IVF, s/n KBV 585
Flight origin	Ronneby Airport
Destination	Malmö Airport

The **2006 Falsterbo Swedish Coast Guard crash** was the crash of a CASA C-212 Aviocar turboprop airplane belonging to the Swedish Coast Guard in Falsterbo Canal, Sweden, on 26 October 2006.

Background

The accident aircraft was one of three CASA C-212s to be operated by the Swedish Coast Guard. They were based at Stockholm-Skavsta Airport and regularly flew excursions to other parts of Sweden.

Accident

The accident aircraft was performing a low-level fly-by of the Skanör-Falsterbo Coast Guard Station while en route from Ronneby Airport to Malmö Airport.

The accident was observed by a group of schoolchildren who reported that the port wing fell off during a turn, making the aircraft fall into the sea. All four crewmembers died. The wreckage was subsequently recovered.

The Swedish Coast Guard grounded its remaining fleet of CASA C-212s within days after the accident. The remaining aircraft were sold to Uruguay.

Cause

The Swedish Accident Investigation Board determined the cause to be metal fatigue. The Swedish Coast Guard later replaced the aircraft with Bombardier Dash-8 Q300s because the remaining two aircraft were found to have the same issue.

Chapter 12

Aviation Accidents and Incidents in 2007

2007 Bangalore plane crash

2007 Bangalore plane crash

Partenavia p.68 aircraft.

Accident summary	
Date	September 8, 2007
Type	wrong fuel
Site	Gowdanapalya Lake near Bangalore, INDIA
Passengers	0
Crew	4
Survivors	0
Aircraft type	Partenavia P.68C
Operator	Joy Alukkas Group
Tail number	VT-JOY
Flight origin	Jakkur Airfield Bangalore

Destination Cochin International Airport

The **2007 Bangalore plane crash** occurred on September 8, 2007, when a Partenavia P.68C aircraft, owned by Joy Alukkas Group, crashed into Gowdanapalya Lake, near Bangalore, INDIA. All four aboard the plane were killed. including three pilots: flying officer Santosh Kumar, Sunil Joseph and Mohammed Shabbeer who died instantaneously, and Co-pilot K Shanmugam who died in NIMHANS hospital.

Crash

Partenavia P.68C aircraft took off from Jakkur Flying Club hangar to the HAL Airport for fueling. At 3.35 p.m(IST), the aircraft departed to Cochin International Airport.The six-seater Vulcanair Partenavia plane was coming to Kochi to pick Joy Alukkas, a Kerala based businessman and take him to Thiruvananthapuram for his business purposes. Five minutes after the take-off, the pilot reported the ATC about a technical snag and wanted to return immediately. The aircraft was flying low in bad weather conditions and hit a coconut palm before it nosedived into the lake bed.

Investigation

ATC and Directorate-General of Civil Aviation (DGCA) officials inspected the crash site to procure the black box to determine the cause of the crash. The preliminary findings of the Director General of Civil Aviation (DGCA) team inquiring into the crash of the six-seater plane have revealed that an engine seizure was the cause of the crash. Avgas 100LL is the fuel for this twin-engine aircraft but investigation team found traces of Aviation Turbine Fuel from the wreckage. While ATF is used for turbine-powered aircraft, Avgas is the gasoline meant for reciprocating piston engine aircraft like this plane. The Aviation Turbine Fuel (ATF) is colourless while the Avgas 100LL is blue dyed. The aircraft was not equipped with a Flight Data Recorder.

The investigating team also inspected the Indian Oil Corporation (IOC) records at the HAL Airport. IOC supplies aviation fuel to the HAL airport.

This tragedy raised concerns regarding the absence of a proper safety culture and safety mentality of Indian aviation.

Dash 8 landing gear incidents

Scandinavian Airlines Flight 1209

Accident summary

Date	September 9, 2007
Type	Landing gear failure
Site	Aalborg, Denmark
Passengers	69
Crew	4
Injuries	5
Fatalities	0
Survivors	73
Aircraft type	Dash 8-400 (Q400)
Aircraft name	Ingrid Viking
Operator	Scandinavian Airlines (SAS)
Tail number	LN-RDK
Flight origin	Copenhagen Airport
Destination	Aalborg Airport

Scandinavian Airlines Flight 2748

Accident summary

Date	September 12, 2007
Type	Landing gear failure
Site	Vilnius Airport, Lithuania
Passengers	48
Crew	4
Injuries	0
Fatalities	0
Survivors	52
Aircraft type	Dash 8-400 (Q400)
Aircraft name	Göte Viking

Operator	Scandinavian Airlines (SAS)
Tail number	LN-RDS
Flight origin	Copenhagen Airport
Destination	Palanga International Airport

Scandinavian Airlines Flight 2867

Accident summary

Date	October 27, 2007
Type	Landing gear failure
Site	Copenhagen Airport, Denmark
Passengers	40
Crew	4
Injuries	0
Fatalities	0
Survivors	44
Aircraft type	Dash 8-400 (Q400)
Aircraft name	Asta Viking
Operator	Scandinavian Airlines (SAS)
Tail number	LN-RDI
Flight origin	Bergen Airport, Norway
Destination	Copenhagen Airport, Denmark

SAS Dash 8-400 (Q400)

SAS Dash-8-400 after crash-landing in Vilnius airport

In September 2007, two separate incidents of similar landing gear failures occurred within four days of each other on Bombardier Dash 8-Q400 aircraft, all operated by

Scandinavian Airlines (SAS). A third incident, again with an SAS aircraft, occurred in October 2007, leading to the withdrawal of the type from the airline's fleet.

Scandinavian Airlines Flight 1209

de Havilland Canada Dash-8-400 LN-RDK

Scandinavian Airlines Flight 1209, a de Havilland Canada Dash-8-400 (LN-RDK), took off from Copenhagen Airport, Denmark, on September 9, 2007. It was headed to Aalborg Airport, Denmark. SK1209 is a code-shared flight with Spanair flight JK9101, BMI flight BD3923 and Lufthansa flight LH6002.

Prior to landing, the right main landing gear failed to lock and the crew circled for an hour before attempting a prepared emergency landing. Upon touchdown, the right landing gear collapsed, the right wing touched ground, and a fire broke out. The fire went out before the aircraft came to rest and all passengers and crew were evacuated. Five people suffered minor injuries, some from propeller parts entering the cabin and others from the evacuation.

Investigation

When the handle for lowering the landing gear was activated, the indicator showed two green and one red light. The red light indicated that the right main gear was not locked in position. The landing was aborted. Attempts at lowering the gear manually were also

unsuccessful. Investigation into the cause of the failure to deploy revealed that the right main gear hydraulics actuator top eyebolt was separated from the actuator. A further analysis of the actuator showed corrosion on the inside leading to reduced mechanical strength of the actuator and eventual failure.

On September 19, 2007, the prosecutor of Stockholm commenced a preliminary investigation regarding suspicion of creating danger to another person.

Maintenance procedures

Scandinavian Airlines System (SAS) has been accused of cutting corners for maintenance. As the Swedish Civil Aviation Authority began an investigation of the accident, it brought renewed focus on SAS maintenance procedures. Only two weeks previously, Swedish authorities had levelled a scathing critique at the airline after an aircraft of the same model nearly crashed because its engine accelerated unexpectedly during landing. The airline reportedly made 2,300 flights in which safety equipment was not up to standard, although the airline has denied this.

Radio Sweden International reports that a security analyst for the Norweigian Civil Aviation Authority has sent a warning to other Scandinavian aviation bureaus concerning sub-standard SAS maintenance procedures, including one instance where an aircraft took off after the pilot reported a fuel leak. This warning, while just publicized, was apparently written before the recent spate of SAS accidents.

Scandinavian Airlines Flight 2748

Scandinavian Airlines Flight 2748, a de Havilland Canada Dash-8-400 (LN-RDS), took off from Copenhagen Airport, Denmark, on September 12, 2007. It was headed to Palanga, Lithuania, but was diverted to Vilnius Airport when landing gear problems were discovered before landing. Upon touchdown, the right landing gear collapsed. All passengers and crew were evacuated safely. The local officials at the Vilnius International Airport noted that this was the most serious incident in recent years.

Scandinavian Airlines Flight 2867

On October 27, 2007, a Dash 8-400 (LN-RDI), SAS flight SK2867 from Bergen, Norway, with 40 passengers and 4 crew members was enroute to Copenhagen, Denmark, when problems with the main landing gear were discovered. After waiting about two hours in the air to burn fuel and troubleshoot, the pilots attempted a prepared emergency landing. The pilots were forced to land the aircraft with the right main landing gear up. The right engine was shut off for the landing, because in the previous landings the propeller had hit the ground and shards of it ripped into the fuselage. This was not on the emergency checklist, rather it was the pilots making a smart quick decision. The aircraft stopped on the runway with the right wing touching the runway at 16.53 local time. It did not catch fire and the passengers and the crew were evacuated quickly. There were no serious injuries. The aircraft in question was one of six that had been cleared to fly just a

month before, following the grounding of the entire Scandinavian Airlines Dash 8-400 fleet due to similar landing gear issues. The entire fleet was grounded again following the incident.

The preliminary Danish investigation determined this latest Q400 incident is unrelated to the airline's earlier corrosion problems, in this particular case caused by a misplaced O-ring found blocking the orifice in the restrictor valve. Accordingly EASA announced that "...the Scandinavian airworthiness authorities will reissue the Certificates of Airworthiness relevant to this aircraft type in the coming days."

Aftermath

After the second incident, Scandinavian Airlines System (SAS) grounded their entire Dash-8-400 fleet consisting of 27 aircraft, and a few hours later the manufacturer Bombardier Aerospace recommended that all the Dash-8-400 aircraft with more than 10,000 flights stay grounded until further notice, affecting about 60 of the 160 Q400 aircraft used worldwide. As a result, several hundred flights were cancelled around the world. Horizon Airlines grounded 19 of their aircraft and Austrian Airlines grounded eight.

On September 13, 2007, Transport Canada issued an Airworthiness Directive applicable to Bombardier Q400 turboprop aircraft instructing all Q400 aircraft operators to conduct a general visual inspection of the left and right main landing gear system and main landing gear retract actuator jam nut. This effectively grounded all Q400 aircraft until the inspection had been carried out.

On September 14, 2007, Bombardier issued an All-Operators Message (AOM) recommending new procedures concerning the landing gear inspection for all aircraft with more than 8,000 flights. Bombardier acknowledged the likelihood of corrosion developing inside the retract actuator.

Previous maintenance procedures mandated checking this component after 15,000 landings. The new maintenance schedule affects about 85 of the 165 Q400 aircraft worldwide. Some operators have found that spare parts for this unexpected actuator replacement program are not available, grounding their aircraft indefinitely.

Skandinavisk Tilsynskontor investigators detected corrosion inside the actuator on 25 of 27 aircraft they checked. Accordingly, SAS decided to continue the grounding of its Dash-8-400 fleet until all the affected parts have been replaced.

On October 28, 2007, SAS announced that it will remove all Dash-8-Q400 aircraft from service permanently.

On March 10, 2008, a multi-party agreement was announced, attempting to finalize the roles of maintenance and manufacture in causing the SAS incidents; as settlement the

airline and its partners ordered a replacement set of short-haul planes from Bombardier, and in turn received a US $164 million discount.

It has been speculated that a November 2007 shakeup of Bombardier management has been spurred by the Dash-8-Q400 issues.

Similar incidents with Dash 8s

- On 9 June 1995, Ansett New Zealand Flight 703 from Auckland Airport to Palmerston North crashed west of the Tararua Ranges and 16 km east of Palmerston North airport during an instrument approach in inclement weather. A landing gear failure distracted the pilot and co-pilot, failing to notice the aircraft had descended into danger. This was complicated by a ground proximity warning not sounding until immediately before the crash. Four people were killed and most other passengers injured. The official investigation by Air Transport regulators found that the pilot and co-pilot should have abandoned the approach and dealt with the gear failure before attempting a new approach.
- 17 April 2005 Tobago Express 534 made an emergency landing at Piarco International Airport Trinidad following a failure of the nose gear.
- On 28 January 2002, a wheel detached from the starboard side of the undercarriage at an aircraft owned by Tyrolean Airways while taxiing before takeoff from Frankfurt Airport. The missing wheel was detected by visual inspection of the aircraft after landing in Salzburg Airport, and the wheel was later recovered. A probable cause was a displaced outer bearing grease seal, causing overheating.
- In 2004, an All Nippon Airways flight made an emergency landing with a failure of the right landing gear at Kōchi Ryōma Airport.
- On 13 March 2007, All Nippon Airways Flight 1603, a Q400 nose-landed safely at Kōchi Ryōma Airport after the front wheel of the aircraft failed to deploy. Bombardier advised all operators to inspect the nose landing-gear mechanism of the aircraft. On November 11, it was reported that the Japanese Transport Ministry is preparing to blame Bombardier for improper assembly procedures, in this case forgetting a necessary bolt. In Japan, this incident was followed only a week later when a Dash-8-100 made an emergency landing at Kumamoto Airport after extending its gear manually.
- 20 April 2007: a Dash 8 operated by Bahamasair suffered a port side landing gear collapse on landing at Governor's Harbour Airport, Bahamas; no injuries were reported but inquiries continue. The aircraft suffered left wing and propeller damage, and was dismantled and shipped off-site.
- In August 2007 A previously repaired Dash-8 had to return to Copenhagen 10 minutes after departure due to problems with the indicator lights of the landing gear.
- On 12 August 2007, at 9:37 local time, a Dash 8 Q400 aircraft skidded off the runway at Gimhae International Airport, Busan, South Korea, injuring 6 people and damaging the aircraft, particularly the left propeller.

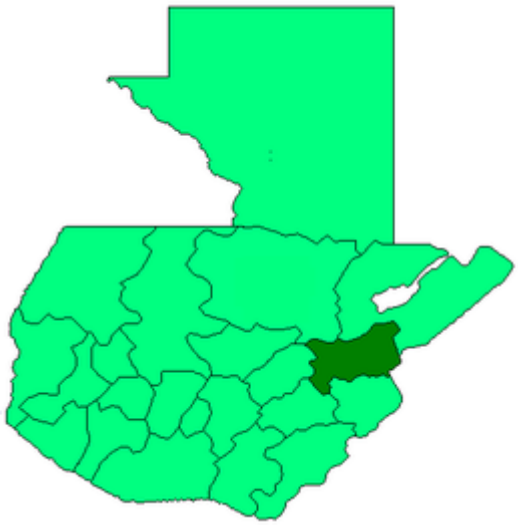
- On September 21, 2007, Lufthansa Flight LH4076 (tail number D-ADHA) with 68 passengers and four crew members was on flight to Florence, Italy when problems with the front landing gear were identified. The pilots were forced to make an emergency landing at Munich Airport. The aircraft landed with its front landing gear up. There were no injuries. The aircraft is owned by Augsburg Airways.
- 10 October 2007: A SAS Denmark Q400 headed for Poland returned to Copenhagen when the pilots got problems with the indicator lights of the front landing gear. The pilots got a yellow indication that the front landing gear hatch didn't close after taking off. Then they heard the hatch closing, then opening and closing again.
- On 12 October 2007, a Scandinavian Airlines flight scheduled for Copenhagen returns to Warsaw due to problems with the landing gear.
- On 15 November 2008, Flight PR272, operated by PAL Express, landed at its destination, Davao International Airport, from Zamboanga International Airport after declaring an emergency due to a problem with the aircraft's left main landing gear. No one onboard was injured and the aircraft landed safely.
- On 16 November 2008, Flight 4551, a Dash 8-300 operated by Piedmont Airlines landed at Philadelphia International Airport without its nosegear. There were no reported injuries.
- On 13 February 2009, Austrian Airlines Flight OS780, operated by Tyrolean Airways, a scheduled flight from Skopje to Vienna failed to retract landing gear after take-off and performed an emergency landing on Skopje Airport.
- On 12 May 2009, Colgan Air Flight 3268 reported tyre detachment after landing at Buffalo Niagara International Airport. It was discovered that a wheel bearing Overheated and snapped, leading to the detachment.
- On 30 September 2010, Air New Zealand subsidiary Air Nelson Flight 8841 was flying from Wellington International Airport to Nelson Airport but was diverted to Blenheim due to bad weather in Nelson. On landing, the nosegear on the Dash 8 Series 300 collaped. No passengers or crew were injured.

Chapter 13

Aviation Accidents and Incidents in 2008

2008 Aéreo Ruta Maya crash

2008 Aéreo Ruta Maya crash



Accident summary	
Date	2008-08-24
Type	Engine failure in midair
Site	Near Cabañas, Zacapa, 115 km east of Guatemala City
Passengers	12
Crew	2
Injuries	3
Fatalities	11 (incl. pilot and copilot)
Survivors	3 passengers

Aircraft type	Cessna Caravan 208
Operator	Aéreo Ruta Maya
Tail number	TG-JCS
Flight origin	La Aurora International Airport
Destination	El Estor

On August 24, 2008, an Aéreo Ruta Maya Cessna Caravan 208 carrying 10 American aid workers, two Guatemalan aid agency representatives, pilot and copilot en route from La Aurora International Airport, Guatemala City to El Estor, crashed 45 minutes after take off. The crash killed seven aid workers, two aid agency representatives, the pilot and the copilot and injured three aid workers. The source of the crash was engine failure, as was called in by the pilot, who attempted to make an emergency landing according to the Guatemalan civil aviation director Jose Carlos. The aid workers were members of Choice Humanitarian, a West Jordan, Utah based humanitarian group on their way to the village of Sepamac.

Crash Casualties and Survivors

Injured

- April Marie Jensen and daughter Sarah Jensen (19).
- Dan Lilljenquist (president and chief operating officer of Focus Services of Roy, Utah a company that handles customer service calls for other companies).

Deceased

- Pilot Monica Bonilla and co-pilot Fernando Estrada.
- Guatemalan CHOICE Humanitarian representatives; Javier Rabanales and Walfred de Rabanales.
- Liz Johnson, (wife of CHOICE Humanitarian Chief Executive, Chris Johnson).
- Roger Jensen (48), maintenance manager of Smyth Companies and son, Zachary, (from Amery, Wisconsin).
- Four employees of Focus Services company, two from Utah and two from another call center in Cedar Falls, Iowa.
    - Cody Odekirk.
    - John Carter.
    - Jeff Reppe.
    - Lydia Silvia.

2008 Chelyabinsk Antonov An-12 crash

2008 Chelyabinsk An-12 crash	
Accident summary	
Date	2008-05-26 13:15 GMT
Site	Chelyabinsk Balandino Airport approach 55°24′N 061°30′E / 55.4°N 61.5°E
Passengers	0
Crew	9
Fatalities	9 (all)
Survivors	0
Aircraft type	Antonov An-12
Operator	Moskovia Airlines
Tail number	RA-12957
Flight origin	Chelyabinsk
Destination	Perm

On 26 May 2008, **a Moskovia Airlines An-12 cargo aircraft crashed** near Chelyabinsk, Russia, killing all nine crew members when after departure to Perm it turned back and crashed near the airfield.

The aircraft transported cash money to Chelyabinsk , and was returning back to Perm without any cargo. It took off only after a second attempt at 18:02 (local time). On 18:09, the crew reported smoke in the cabin (probably resulted by short circuit) and decided to return to the airport. The first attempt to approach the runway was unsuccessful and the plane had to go around. Flying too low, it accidentally hit a power transmission line and crashed near the airfield at 18:15. The fire broke out after the crash; there were no survivors.

One of the flight recorders is severely damaged, it could make the investigation of disaster's causes more difficult. The aircraft was built in 1968.

Iran Aseman Airlines Flight 6895

Iran Aseman Airlines Flight 6895	
Accident summary	
Date	24 August 2008
Type	Controlled flight into terrain
Site	Manas International Airport, Bishkek, Kyrgyzstan 43°3′28″N 74°28′43″E / 43.05778°N 74.47861°E
Passengers	83
Crew	7
Injuries	18
Fatalities	65
Survivors	25
Aircraft type	Boeing 737-219 Advanced
Operator	Itek Air
Tail number	EX-009
Flight origin	Manas International Airport, Bishkek, Kyrgyzstan
Destination	Tehran Imam Khomeini International Airport, Tehran, Iran

Iran Aseman Airlines Flight 6895, an Itek Air Boeing 737-219 Advanced (registered as EX-009), was a charter flight operated on behalf of Iran Aseman Airlines which crashed on 24 August 2008 (at 20:30 local time) near Manas International Airport in Kyrgyzstan while en route to Imam Khomeini International Airport, Tehran, Iran. It crashed while returning to the airport of origin after experiencing technical difficulties.

Reports state that members of the crew reported "technical issues" with the plane shortly after take off. Within 10 minutes the crew reported a severe loss of cabin pressure. When they attempted to make an emergency landing, the aircraft crashed approximately 2 kilometres (1.2 mi) from the airport runway and burst into flames. The United States Air Force sent ambulances and fire apparatus with firefighters and medical personnel from its base at the airport in response to a request for assistance. The victims included ten members of a Bishkek high school sports team (AKA Kyrgyzstan National U18 Basketball Team).

Casualties

There were 90 people on board (83 passengers and 7 crew) of whom 68 died. At least 22 are reported to have survived, including 2 crew members. The victims included ten members of a Bishkek high school sports team (AKA Kyrgyzstan National U18 Basketball Team).

Nationality	Passengers	Crew	Total	Survivors
Canada	2	0	2	1
Iran	52	1	53	10
Kazakhstan	3	0	3	0
Kyrgyzstan	24	6	30	11
People's Republic of China	1	0	1	0
Turkey	1	0	1	0
Total	**83**	**7**	**90**	**22**

Investigation

The Interstate Aviation Committee (MAK) attempted to retrieve data from the flight-data and cockpit voice-recorders, which were badly damaged in the fire which destroyed most of the aircraft. While disassembling the casing, both the mechanisms of the tape recorder and the tape media in the voice recorder were found in damaged condition, but the MAK attempted to read the data from the damaged media.

The MAK has drawn final conclusions. The report claims that the forward left cabin door was not closed completely, and that the person who closed it was an engineer who was not listed among those (in the Cabin Attendant Manual) who were supposed to close the door. The report concludes that the aircraft originally lost cabin pressure due to this error, but that it was just a contributing factor to the crash. The plane could have landed with reduced pressure, but the pilot failed to maintain visual contact with the runway, failed to properly monitor altitude and ignored automated warnings about terrain proximity (TAWS).

It has been reported that both the captain and co-pilot have been sentenced to five years and five years and two months respectively in a penal colony for the crash.

Aircraft

The crashed plane first flew on June 16, 1980 and was delivered on July 1 of the same year to Air New Zealand as ZK-NAS. In 1995, it changed hands to Copa Airlines, and in 2003 again changed hands to Phoenix Aviation. In 2005, Phoenix Aviation was rebranded as AVE.com, and in April 2006, it changed hands to Itek Air.

Itek Air, along with all air carriers certified by the authorities with responsibility for regulatory oversight of Kyrgyzstan, is included in a European Union list of banned airlines for safety concerns and is therefore not permitted to fly over the territory of the EU. In May 2008, EX-009 passed a full technical inspection.

2008 Mexico City plane crash

2008 Mexico City Interior Ministry plane crash

Cordoned-off crash site with burned buildings in background, with Mexican Police guarding the area

Accident summary	
Date	November 4, 2008
Site	Las Lomas, Mexico City
Passengers	5
Crew	3
Injuries	40 bystanders seriously injured 1,200 residents evacuated 30 cars destroyed
Fatalities	16 (all 9 on board plus 7 on ground)
Survivors	0

Aircraft type	Learjet 45
Operator	Secretaría de Gobernación
Tail number	XC-VMC
Flight origin	Ponciano Arriaga International Airport, San Luis Potosí, S.L.P.
Destination	Mexico City International Airport

An official Mexican Interior Ministry aircraft **crashed in central Mexico City** at around 18:45 local time on November 4, 2008. Mexican Secretary of the Interior Juan Camilo Mouriño, who was aboard the plane, was killed in the crash, along with the other seven people on board and at least six people on the ground.

The plane crashed in rush-hour traffic close to the intersection of Paseo de la Reforma and the Anillo Periférico, in the upscale Las Lomas residential and business district.

Details

A picture of Reforma Avenue, the area in which the crash occurred

The Interior Secretariat-owned Learjet 45 (registration XC-VMC) left Ponciano Arriaga International Airport in San Luis Potosí, S.L.P., and was 12 km (7.5 mi) short of landing at Mexico City International Airport when it crashed amidst rush hour traffic into the ground in the heart of the financial district at approximately 18:45 due to currently unknown reasons, causing an explosion that "reached higher than the buildings." According to Secretary of Communications and Transport Luis Téllez, there were no survivors. Téllez also stated that the crash appeared to be an accident.

The crash heavily damaged the surrounding area, setting multiple cars and a newsstand on fire and injuring at least 40 people. Body parts were reported to be scattered around the wreckage.

A Canadian-built LearJet-45

A joint investigation between Mexican and American experts is currently taking place. Audio and video transcripts show that the aircraft was instructed to reduce speed three miles (5 km) before entering the approach, and later show that it complied with instructions a minute and 12 seconds later. The aircraft dove into the ground without having given any sort of distress call. Hence, dialogue with air control was brief, and the pilot's possibilities to react to the emergency are thought to have been quite limited. Mexican air traffic officers have published that wake turbulence, left behind by a Mexicana Boeing 767 ahead of the Learjet, possibly affected the crashed aircraft. At 12 km from touchdown on a common approach slope, the aircraft should have been about 630 meters above the terrain.

Deaths

Among the dead was Secretary of the Interior Juan Camilo Mouriño, top aide to President Felipe Calderón. Mouriño was in charge of the fight against the drug trade in Mexico.

Also on the plane were:

- José Luis Santiago Vasconcelos, former assistant attorney general and current head of the federal technical secretariat for implementing the recent constitutional reforms on criminal justice and public security.
- Miguel Monterrubio, director general of social communications with the Interior Secretariat.
- Arcadio Echeverría, coordinator of special events, office of the Interior Secretary.
- Norma Díaz, director in the communications department of the Interior Secretariat.
- Julio César Ramírez Dávalos, pilot.
- Álvaro Sánchez, co-pilot.
- Gisel Carrillo, stewardess.

Government response

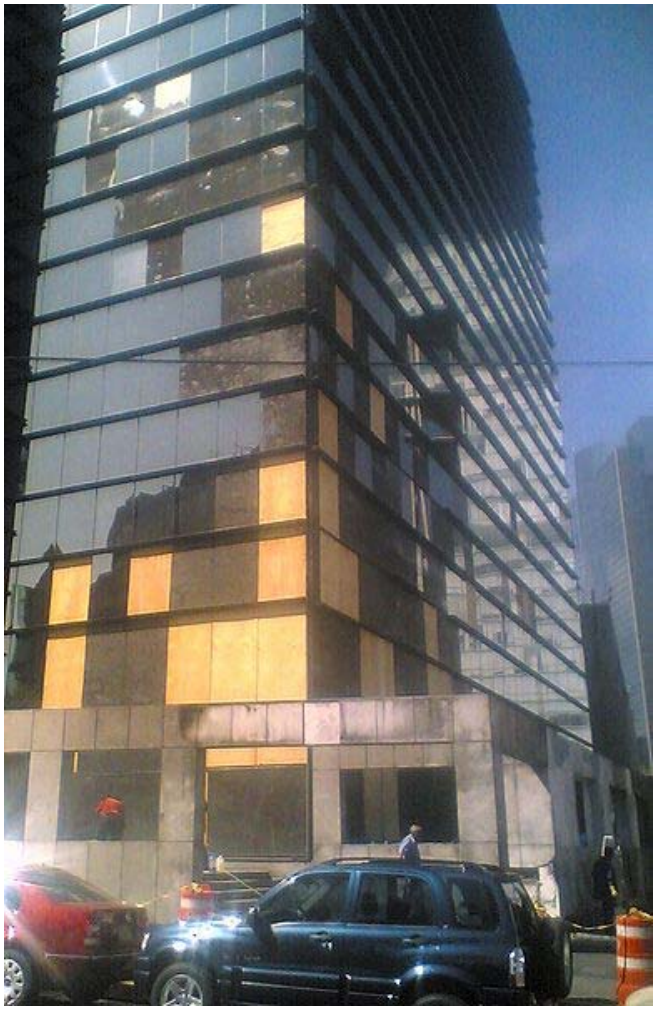
Police guard the crash site, with burned cars visible behind them.

President Felipe Calderón addressed the nation live on national television. He spoke of Mouriño as "one of his closest friends and collaborators" and conveyed his condolences to the family. He stated that Mouriño was a man "who always fought to make Mexico a better country" and he guaranteed the nation that there would be an investigation on the causes behind the plane crash. Calderón encouraged Mexican men and women to continue fighting for a better country, "no matter how difficult or painful any rising event may be".

Marcelo Ebrard, Head of Government of the Federal District, also conveyed his condolences to the family of the Secretary of Interior and assured that Mexico City's government would issue a statement to the nation regarding the issue. Ebrard later said that the Mexico City government would give financial aid to all of the injured receiving medical care, irrespective of whether they had been admitted to private or public hospitals, and he stated that the local authorities had handed over all recordings taken by surveillance video cameras to the federal attorney general (PGR), along with all witness accounts that local police were able to gather.

Several other political figures have made statements regarding the crash, including various senators from the Institutional Revolutionary Party (PRI) and Germán Martínez, leader of the ruling National Action Party (PAN).

A group of senators – from different political parties – have asked the Procuraduría General de la República (PGR) to investigate the accident so that all doubts and inquiries on the event may be cleared.



Building under repair, two weeks after the crash

Results of investigation

The black boxes were sent to the United States for analysis. Information gathered from 38 minutes of cabin conversations, along with video footage from a security camera on top of the Omega Office Building, provided evidence for an official statement by the Mexican Government that the crash was the result of pilot error. The Learjet was ruled to have been following too close to a Boeing 767-300 jet operated by Mexicana Airlines, and therefore suffered violent wake turbulence caused by the larger jet. The minimum allowable distance for a lighter plane to follow behind a heavier plane is 5 nautical miles (9.3 km); the Learjet 45 was only 4.1 nautical miles (7.6 km) behind the Mexicana Airplane.

Investigations into the accident have discovered several issues with the Mexican Government's use of private contractors as pilots of government aircraft, especially important in cases such as this, when the passengers are high level officials. Aviación Ejecutiva SA de CV is a company out of Toluca Mexico, which currently holds the

contract with the Mexican Federal government to provide services of maintenance and pilots for the Federal airline fleet.

Benito Juarez Airport restricts light general aviation, which typically flies from Toluca International Airport. Only some government areas handle small and medium planes from facilities in Mexico City's Benito Juarez International Airport.

Several key elements of the accident have emerged during the investigation:

- The flight crew appears to have had little experience in operation of the LearJet 45, and an investigation concerning how they received their certification is currently underway.
- Conversation among the flight crew indicates they had little familiarity with the operation of the plane, failing on several occasions to enter the proper information into the cockpit instruments; they did not follow a proper flight plan, and had navigational difficulties, missing their original arrival to San Luis Potosi by over 250 nautical miles (460 km). Further it was stated that their in flight conversations were more of the nature of 2 people driving a car, not of trained pilots following a proper flight plan.
- The flight crew waited over 1.3 minutes to follow the order from air traffic control to reduce their velocity. The Learjet 45 had been traveling at 262 knots (485 km/h), while the Mexicana 767-300 was flying at 185 knots (343 km/h), which caused the Learjet 45 to get too close to the 767-300. The accident happened during peak hour at the airport with heavy air traffic; this has brought criticism from top government officials as to their handling and scheduling of risky flight plans for top government officials.
- The accident happened just at the point where aircraft entering Mexico City traveling on a 160º course (south-southeast) make a sharp left turn to align with the runways of Benito Juarez International Airport, at 52º (northeast). When the Learjet 45 reached the turning point, too close behind the Mexicana 767-300, it encountered violent wake turbulence, causing the plane to invert into a nose down attitude. At this point, the plane would have been flying at 9,000 feet (2,700 m) MSL, which is about 1700 ft (500 m) over the ground.
- The flight crew was unable regain control due to airspeed, inverted nose-down position, and insufficient altitude. The flight crew did manage to reduce the angle of descent from 45 to 40 degrees before hitting the ground at over 300 miles per hour (480 km/h).

Chapter 14

Aviation Accidents and Incidents in 2009

2009 Andhra Pradesh Chief Minister helicopter crash

2009 Andhra Pradesh helicopter crash

A Bell 430 similar to the helicopter involved in the accident

Occurrence summary	
Date	September 2, 2009
Type	Spatial disorientation resulting from a mechanical failure, pilot error
Site	Kurnool, Andhra Pradesh, India
Fatalities	5
Survivors	0
Aircraft type	Bell 430
Operator	Andhra Pradesh Government
Tail number	VT-APG

The **2009 Andhra Pradesh helicopter crash** occurred on September 2, 2009 near Rudrakonda Hill, 40 nautical miles (74 km) from Kurnool, Andhra Pradesh, India. The helicopter was a Bell 430 helicopter owned by the Andhra Pradesh Government, and registered VT-APG. Fatalities included Y. S. Rajasekhara Reddy, the Chief Minister of the Indian state of Andhra Pradesh.

Accident

The Bell 430 helicopter took off from Begumpet Airport, Hyderabad, and soon encountered bad weather. The official accident report states that the aircraft's weather radar was red, meaning that the weather was extreme. The flight crew decided to fly slightly left of their planned route. The pilots soon noticed that the weather was getting worse, and agreed that they would turn left after crossing Krishna River. Begumpet and Shamshabad Air Traffic controllers lost contact with the aircraft at 9:02 am while it was passing through the dense Nallamala forest area.

However, shortly after 09:20 IST, the flight crew encountered a problem with the transmission oil pressure. The pilots became engaged in finding out emergency checklist procedures for the transmission oil pressure, but they were unable to locate them.

Soon after, the co-pilot continually called out "go around", likely indicating that he thought the aircraft would soon crash into something. During the last 14 seconds the rate of descent was extremely high. Thereafter helicopter crashed due to loss of control resulting in high rate of descent in down draught. The helicopter impacted the ground in a steep left bank and all occupants on board died due to crash injuries.

Aftermath

The state government of Andhra Pradesh and the Government of India launched one of the largest search and rescue operations in the history of the country. The state's security officials mentioned that bad weather was hindering the search and rescue efforts. The Home Ministry of India dispatched 5000 CRPF soldiers for the operation while the Defence Ministry of India ordered the Indian Air Force to comb the area using low altitude planes and the Sukhoi-30MKI equipped with thermal imaging systems. In addition, police personnel from six districts were involved in the ground search. Andhra Pradesh's anti-Naxal forces were also deployed in the area, owing to their familiarity with the jungle terrain there. Local tribal residents from this part of the state assisted with the search mission. Patrol parties also combed the Krishna river for the remains of the helicopter. ISRO's RISAT-2 satellite was also deployed to search the area, but the 41 high-resolution images of the area were unable to trace the helicopter. The wreckage of the helicopter was finally spotted by an IAF Mi-8 helicopter at 0820h within less than 24 hours after contact was lost with the aircraft.

Death of Y. S. Rajasekhara Reddy

The Indian Prime Minister's Office confirmed the helicopter's crash on the morning of 3 September and the death of all aboard, including that of Y. S. Rajasekhara Reddy The Director General of Police said that the bodies of Reddy and others were charred beyond recognition and had to be identified on the basis of clothing. The autopsy of all the bodies was carried out at Kurnool Medical College.

Reddy was the Chief Minister of the Indian state of Andhra Pradesh. He represented the Indian National Congress party. He was elected to the 9th, 10th, 11th and 12th Lok Sabha from the Kadapa constituency for four terms and to the Andhra Pradesh Assembly for five terms from the Pulivendula constituency. He also holds the record of not losing any election throughout his political career. In 2003 he undertook a three-month-long paadayaatra, or walking tour, across several districts in Andhra Pradesh. He led his party to victory in the next general and assembly elections held in 2004 and also the next election in 2009. He is the only chief minister of AP to have come back to power after being in office for a full term.

Investigation

Although the sparsely populated forest area is considered to be stronghold of the outlawed Naxal communist insurgents, the National Security Advisor of India ruled out the possibility of the Naxals bringing down the helicopter.

The investigation eventually concluded that the factors that caused that crash included the fact that the crew became fixated for more than six minutes in trying to find out what was behind the problem with their transmission oil pressure system, and they became distracted from the worsening weather. They also noted that the flight crew was flying in Instrument Meteorological Conditions whereas the flight plan was cleared for VFR flying, and the flight crew never discussed the bad weather, diverting, or returning to base.

2009 Aéro-Frêt Antonov An-12 crash

2009 Aéro-Frêt Antonov An-12 crash

An Antonov AN-12, similar to the accident aircraft

Accident summary	
Date	26 August 2009
Type	In-flight fire and mid-air break up
Passengers	1
Crew	5
Fatalities	6
Aircraft type	Antonov An-12BK
Tail number	TN-AIA
Flight origin	Pointe Noire Airport
Destination	Maya-Maya Airport, Brazzaville

The **2009 Aéro-Frêt Antonov An-12 crash** was the crash of an Antonov An-12 into a cemetery at Brazzaville, Congo on 26 August 2009.

Aircraft

The aircraft involved was an Antonov An-12BK of Aéro-Frêt, registration TN-AIA. The aircraft was manufactured in 1966, msn 6344607.

Accident

The aircraft crashed into a cemetery at Nganga Lingolo on the outskirts of Brazzaville while on a flight from Pointe Noir Airport. The accident happened at 06:00 local time. The five Ukrainian crew and the Congolese passenger died in the accident. The accident site is 11 kilometres (6.8 mi) south east of Maya-Maya airport. The aircraft was due to land on runway 05, it was carrying a cargo of food, a minibus and three other vehicles. The METAR in force at the time of the accident was METAR FCBB 260600Z 27006KT

7000 SCT016 OVC130 21/20 Q1015 NOSIG (translation: Metar for Maya-Maya airport, issued at 06:00 UTC on the 26th of the month. Wind direction 270° at 6 knots (11 km/h), visibility 7 kilometres (4.3 mi), scattered clouds at 1,600 feet (490 m), overcast at 13,000 feet (4,000 m), temperature 21°C, dewpoint 20°C, QNH 1013 millibars, no significant change expected in next few hours). At the time of the accident it was drizzling and visibility was 3.5 kilometres (2.2 mi). Eyewitnesses reported that one of the wings was on fire before the crash, and that the aircraft broke up in mid-air. The carriage of the passenger was in contravention of the law in the Congo which bans AN-24s from use as passenger aircraft.

Investigation

The accident is being investigated by the Congolese National Agency for Civil Aviation.

2009 Iranian Air Force mid-air collision

2009 Iranian Air Force mid-air collision	
Mid-air collision summary	
Date	22 September 2009
Total fatalities	7
First aircraft	
Type	Ilyushin IL-76MD
Name	Simorgh
Operator	Iranian Air Force
Tail number	5-8208
Crew	7
Fatalities	7
Survivors	0
Second aircraft	
Type	Northrop F-5E Tiger II
Operator	Iranian Air Force
Crew	2
Injuries	2

The **2009 Iranian Air Force mid-air collision** on September 22, 2009 involved an Ilyushin IL-76MD and a Northrop F-5E Tiger II aircraft. The accident resulted in the destruction of Iran's only functional aircraft equipped with an Airborne Warning and Control System (AWACS).

Accident

A military parade was held in Tehran on September 22, 2009 to mark the anniversary of the start of the 1980–1988 Iran–Iraq War, and was a send-off for President Mahmoud Ahmadinejad who was to give a speech at the United Nations General Assembly in New York on September 23. A fly-past by the Iranian Air Force was part of the parade. An AWACS-equipped Ilyushin-76MD was to be escorted by several Northrop F-5E Tiger II aircraft. The Il-76MD and one of the escorts collided in mid-air, with the Ilyushin subsequently crashing in flames at Varamin—on the site of the tomb of former Iranian leader Ayatollah Khomeni—killing all seven crew members on board. According to Western observers, no mayday call was made by either aircraft indicating a sudden event. The accident was initially reported on the Islamic Republic News Agency website, but was withdrawn 5 hours later. A video of burning wreckage from the military aircraft surrounded by fire trucks was also shown on state TV. However, president Ahmadinejad made no mention of it during his speech at the parade.

Aircraft involved

The escort aircraft was a US-made Northrop F-5E Tiger II. The other aircraft involved was an Ilyushin Il-76MD, a Soviet-built transport aircraft, fitted with AWACS system for the Iraqi Air Force. It was evacuated to Iran in 1991 during the First Gulf War, given serial number 5-8209 and renamed from "Baghdad" to "Simorgh" (a flying creature of Iranian fable which performs wonders in mid-flight). Russian technicians reportedly upgraded the aircraft and installed a newer Iranian-made radar, which could trace flying objects within 1,000 km from Iranian borders. The aircraft came into service in April 2008 and was the only AWACS-equipped Iranian aircraft.

Bangkok Airways Flight 266

Bangkok Airways Plane Crash - Flight 266

An ATR 72 of Bangkok Airways

Runway Overrun summary	
Type	Runway overrun
Passengers	68
Crew	4
Injuries	41
Fatalities	1 (pilot)
Survivors	71
Aircraft type	ATR 72-212A
Aircraft name	Pha Ngan
Operator	Bangkok Airways
Tail number	HS-PGL
Flight origin	Krabi Airport, Thailand
Destination	Samui Airport, Thailand

Bangkok Airways Flight 266 was a scheduled domestic service to Samui Airport, Thailand, which overran the runway on landing and crashed into an old and unmanned control tower on 4 August 2009.

Aircraft

The aircraft involved was an ATR 72-212A, registration HS-PGL, msn 670. The aircraft made its first flight on 6 June 2001 with French registration F-WWER. It entered service with Bangkok Airways on 16 July 2001 re-registered HS-PGL. On 29 May 2006 it

entered service with Siem Reap Airways International, returning to Bangkok Airways on 7 January 2009 after Siem Reap Airways International ceased trading. The aircraft was named Pha Ngan, and has been in service for approx. 20,000 hrs.

Accident

The aircraft is reported to have skidded off the runway and hit an old and unmanned control tower which was used as part of a fire-fighting stations. The accident happened at around 14:15 local time (07:15 UTC). One pilot was reported to have been killed. The co-pilot, who was stuck in the aircraft for more than two hours, was among the last evacuated from the stricken plane. Serious injuries included four passengers — two Britons, one Italian and one Swiss suffered broken legs, while two other Britons suffered less severe injuries. The co-pilot also had leg injuries. A total of 41 people were injured. The METAR in force at the time of the accident was METAR VTSM 040700Z 29015KT 9000 FEW020TCU SCT120 BKN300 31/25 Q1007 A2974 TCU-NW. This translates as METAR for Samui Airport, issued on the 4th of the month at 07:00 UTC, wind at 15 knots, direction 290° visibility 9 km, few clouds at 2,000 ft, scattered clouds at 12,000 ft, broken clouds at 30,000 ft, temperature 31°C, dewpoint 25°C, altimeter 1007 millibars or 29.74 inches, towering cumulonimbus to north west.

Chapter 15

Aviation Accidents and Incidents in 2010

2010 Air Service Berlin Douglas C-47 crash

2010 Air Service Berlin C-47 crash

D-CXXX, the aircraft involved

Accident summary	
Date	19 June 2010
Type	Under investigation by BFU
Site	Near Berlin Schönefeld Airport
Passengers	25
Crew	3
Injuries	7
Fatalities	0
Survivors	28
Aircraft type	Douglas C-47 Skytrain
Aircraft name	Rosinenbomber
Operator	Air Service Berlin
Tail number	D-CXXX

Flight origin	Berlin Schönefeld Airport
Destination	Berlin Schönefeld Airport

On 19 June 2010, a vintage Douglas C-47 Skytrain aircraft crashed shortly after take-off from Berlin Schönefeld Airport to a sightseeing flight over Berlin, which was operated by **Air Service Berlin**, a provider of event flights. There were no fatalties, but seven out of the 28 passengers and crew were injured.

Aircraft

The aircraft involved was a Douglas C-47 Skytrain (registered D-CXXX, serial number 16124/32872), a preserved Rosinenbomber (English: Raisin bomber). It had been built in 1944 and was powered by two Pratt & Whitney R-1830-92 engines. It had participated in the 1947–49 Berlin Airlift, and because of the importance of this event for the city of Berlin it was acquired for sightseeing flights in 2000, as the last surviving aircraft of its type in Europe. Also, the airframe was used as one of the last two aircraft to take off from Berlin Tempelhof Airport (one of the Airlift airports) when it was closed on 30 October 2008.

Accident

Shortly after take-off at around 15:00 local time from Berlin Schönefeld Airport for a sightseeing flight over the city centre of Berlin, the left engine failed and the aircraft was unable to gain height. The pilots went into a left turn and set down the aircraft into a field near the construction site for the new Berlin-Brandenburg International Airport. There were three crew members and 25 passengers onboard (among them Stefan Kaufmann, a member of Bundestag), all of which were able to leave the aircraft unassisted. Reports claimed that there had been seven injured people, four of which were taken to hospital. A smaller fire that arose from spilled fuel was put out by firefighters who had rushed to the accident scene from the nearby airport. Due to the subsequent lack of emergeny services, Schönefeld Airport had to be closed for 15 minutes.

Aftermath

The C-47 aircraft suffered substantial damage to its tail and left wing. Nevertheless, due to its historic significance (and because it was the signature airframe of the company), Air Service Berlin stated that it intended a complete repair and restoration. Donations towards the cost of the restoration had been received from across the world, including a symbolic 100 USD from Gail Halvorsen, the pilot who is attributed to having started the dropping of sweets for children from aircraft participating in the Berlin Airlift.

2010 Okhaldhunga aircraft crash

2010 Okhaldhunga aircraft crash

A Tara Air de Havilland Canada DHC-6 Twin Otter, similar to the aircraft involved in the accident

Accident summary	
Date	December 15, 2010
Type	Under investigation
Site	Bilandu Forest, Shreechaur, Okhaldhunga District, Nepal
Passengers	19
Crew	3
Fatalities	22 (all)
Survivors	0
Aircraft type	de Havilland Canada DHC-6 Twin Otter
Operator	Tara Air
Tail number	9N-AFX
Flight origin	Lamidanda Airport, Lamidanda, Nepal
Destination	Tribhuvan International Airport, Kathmandu, Nepal

On December 15, 2010, a Tara Air de Havilland Canada DHC-6 Twin Otter crashed in Nepal shortly after take-off on a domestic passenger flight between Lamidanda Airport, Lamidanda, and Tribhuvan International Airport, Kathmandu. The wreckage of the aircraft, registration 9N-AFX, was found in Bilandu forest near the village of Shreechaur,

Okhaldhunga District, Nepal, the morning after the crash. All 19 passengers and three crew aboard were killed in the crash. There was initial speculation that bad weather or the overloading of the aircraft might have caused the crash. An investigation into the crash was launched by Nepalese authorities after the accident site was located.

Flight

Five minutes after taking off from Lamidanda Airport, Lamidanda, at 15:08 local time, the left wing of the aircraft impacted land and the DHC-6 crashed. The aircraft was reportedly scheduled to land in Kathmandu at around 15:35, 35 minutes after departing Lamidanda, but it did not. All 19 passengers and three crew members aboard were killed in the crash.

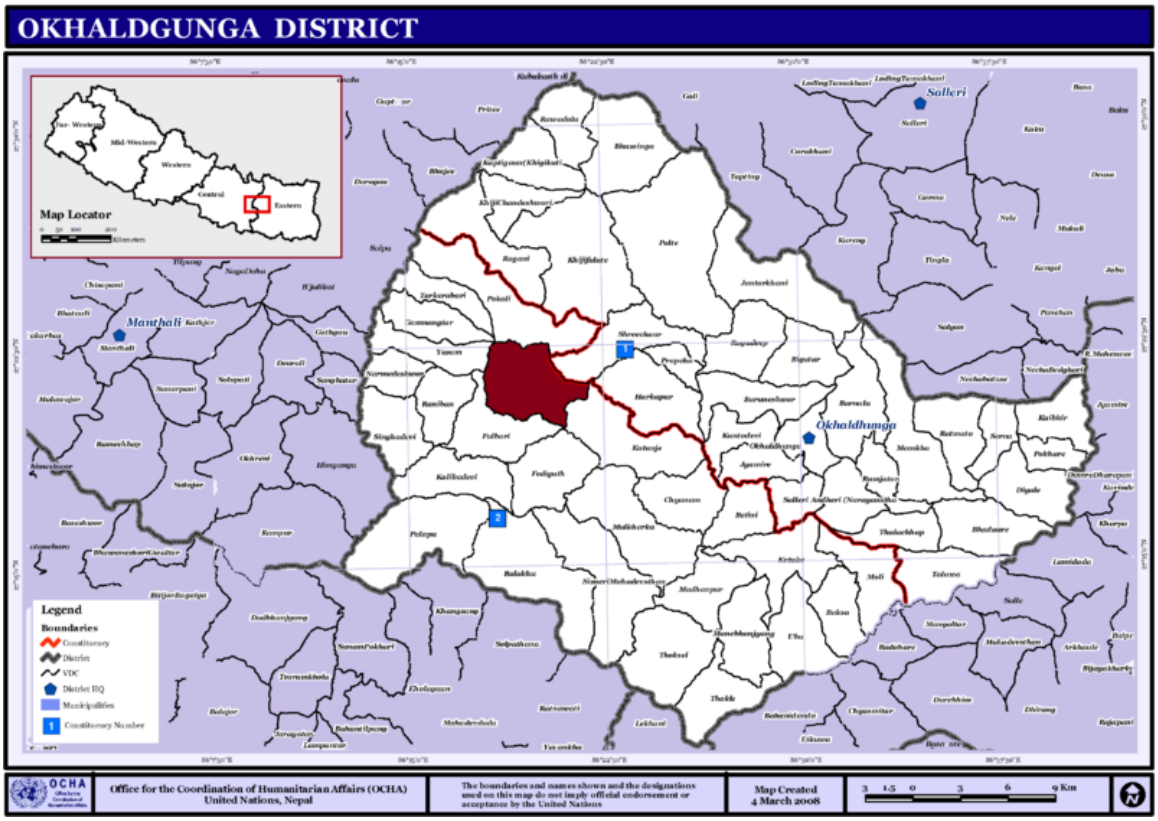
Search operation

Helicopters searched for the wreckage of the aircraft on the day of the crash, but was called off during the night because of poor visibility, even though night vision equipment was installed on the helicopters. The day after the crash, the Nepalese Army located the wreckage in Okhaldhunga, Nepal, at an altitude of approximately 2,700 metres (8,900 ft). All 22 bodies were recovered by rescuers. The wreckage of the aircraft reportedly covered 200 square metres (2,200 sq ft), and, according to a police spokesperson, had "broken up completely".

Initial speculation

There was initial speculation that bad weather caused the crash. The chief executive of Tara Air, Vijay Shrestha, said: “It showed poor visibility at different levels of the atmosphere. Thick haze at lower levels and as thick a cloud higher up could have caused poor visibility." There was also speculation that the aircraft could have been overloaded, but Shrestha refuted these allegations. “The aircraft’s maximum take-off weight is 12,500 pounds, while the Twin Otter’s take-off weight that crashed killing all 22 on board was 12,280 pounds,” he said. “So it was underweight by 220 pounds, the allegation is wrong.”

Investigation



The location of the crash in Shreechaur/Bilandu, Okhaldhunga District, Nepal

An investigation into the crash was launched after the accident site was located. Nepal's Ministry of Tourism and Civil Aviation formed a group of five investigators to find the cause of the crash. The five were ordered to present a report on the accident by 90 days after the crash occurred. The cockpit voice recorder was recovered from the scene of the accident, and, as of December 24, 2010, was to be sent to India or Europe for analysis.

A separate investigation was also started into alleged irregularities, which, according to The Himalayan Times included "carrying passengers by issuing tickets in other's name, not verifying identity while checking-in passengers and the process of immigration of the foreign nationals who lost their lives in the crash." Police arrested the general manager of a travel agent based in Kathmandu over suspicions of tax evasion during the sale of tickets for the flight.

Chapter 16

Aviation Accidents and Incidents in 2011

Iran Air Flight 277

Iran Air Flight 277

Iran Air Boeing 727 EP-IRR, similar to the aircraft involved in the accident

Accident summary	
Date	January 9, 2011
Type	Under investigation
Site	Iran
Passengers	93
Crew	12
Injuries	26
Fatalities	77
Survivors	28
Aircraft type	Boeing 727-286Adv
Operator	Iran Air
Tail number	EP-IRP
Flight origin	Mehrabad International Airport, Tehran, Iran

Destination	Urmia Airport, West Azarbaijan province, Iran

Iran Air Flight 277 was a domestic scheduled passenger flight which, on January 9, 2011, crashed after a go-around was initiated during final approach in poor weather conditions to Urmia Airport, West Azarbaijan province, Iran. The aircraft operating the flight, between Mehrabad International Airport, Tehran, Iran, and Urmia, was an Iran Air Boeing 727-286Adv, registration EP-IRP.

Aircraft

The aircraft involved in the accident was a Boeing 727-286Adv, registration EP-IRP, built in 1974. The aircraft spent a long time out of service, being impounded at Baghdad, Iraq from 1984-90, and then stored from 1991-2002, following which it was overhauled and returned to service.

Accident

The flight was travelling between Tehran and Urmia and crashed on its final approach near Urmia Airport near a lake. The accident occurred at around 19:45 local time (16:15 UTC), and was reportedly caused by poor weather. The aircraft had missed its first attempt at landing, it either crashed during a go-around, or while attempting to return to Tehran. The weather conditions at the time of the accident included snow and low visibility. Upon impact, the aircraft broke into multiple pieces, though there was no fire or explosion. There were differing initial reports as to the type of aircraft that crashed, with either a Fokker 100 or a Boeing 727 claimed to have crashed, although the aircraft was later confirmed to be a 727.

The number of people on board was unclear; according to RIA Novosti 95 passengers were on the aircraft, while Reuters reported 156 passengers and the Associated Press claimed 105 passengers. Later reports put the total at either 105 or 106 people on board, with between 10 and 12 crew and either 95 or 94 passengers. The Iran Civil Aviation Organization stated the day after the crash that a total of 93 passengers and 12 crew were on board, according to the manifest of the flight.

Casualties

At least 77 people were killed and 26 were injured. Rescue efforts were complicated by heavy snow in the area. A local official stated that "[the] problem at the moment for rescue work is the heavy snow," which he said was around 70 cm (28 in) deep at the site of the crash. In the aftermath of the crash, 36 ambulances and 11 hospitals were utilized in the rescue operations.

Passengers

Nationalities of passengers

Nationality	Fatalities		Total
	Passengers	Crew	
Iraq	4	0	4
Iran	63	10	73
	Total Fatalities:		**77**

Investigation

Iran ordered an inquiry into the crash. A day after the accident, searchers at the location had obtained both the flight's cockpit voice recorder and the flight data recorder. Iran's Transport Ministry stated that the investigation will comprise several working groups which will include specialists in various areas, including aircraft structure, engine parameter recordings and pilot operations. The investigation will be overseen by the Iran Civil Aviation Organization. The flight data recorder and cockpit voice recorder were recovered from the wreckage and taken to Tehran for analysis.

Kolavia Flight 348

Kolavia Flight 348

A Kogalymavia Airlines Tupolev Tu-154M, similar to the aircraft involved in the accident

Accident summary	
Date	1 January 2011
Type	Under investigation
Site	Surgut International Airport, Surgut,

	Russia 61°20′30″N 73°24′10″E / 61.34167°N 73.40278°ECoordinates: 61°20′30″N 73°24′10″E / 61.34167°N 73.40278°E
Passengers	116
Crew	8 (+10 off-duty crew)
Injuries	43
Fatalities	3
Aircraft type	Tupolev Tu-154B-2
Operator	Kogalymavia
Tail number	RA-85588
Flight origin	Surgut International Airport
Destination	Domodedovo International Airport

Kolavia Flight was a domestic scheduled passenger flight from Surgut International Airport, Surgut, Russia, to Domodedovo International Airport, Moscow, Russia. On 1 January 2011, the Kogalymavia Tupolev Tu-154-B2 operating the flight caught fire while taxiing for take-off from Surgut. Three people were killed, and 43 were injured, four seriously. The aircraft was destroyed in the fire.

Aircraft

The aircraft involved was a Tupolev Tu-154B-2, registration RA-85588, msn 83A/588. The aircraft first flew in 1983. It entered service with Aeroflot as CCCP-85588 and was re-registered RA-85588 in June 1993. It then served with Mavial Magadan Airlines between October 1994 and August 1999, when it began service with Vladivostok Air. Kogalymavia acquired the aircraft in April 2007.

Accident

Flight 348 was carrying eight crew, 116 passengers and 10 off-duty employees of Kogalymavia. As the aircraft was taxiing for take-off from Surgut International Airport, a fire developed in one of the engines and an emergency evacuation was ordered. It was initially reported that the aircraft had made an emergency landing following an engine flame-out on take-off. The accident occurred at 13:12 local time (08:12 UTC). The METAR in force at the time of the accident was METAR USRR 010800Z 16002MPS 5000 BR FEW006 BKN100 M30/M33 Q1052 TEMPO 2000 BR SCT003 RMK QBB200 QFE784 07////45. Four people were killed, and 43 people were injured, from smoke inhalation or burns. The aircraft was operating a domestic scheduled flight from Surgut to

Moscow. The aircraft was burnt out by the fire, which was extinguished by 13:45 local time. Members of the 1990s Russian pop group Na Na were onboard the plane at the time. A statement by the Russia's Ministry of Health and Social Development gave figures of 117 passengers and 18 crew.

Aftermath

Following the accident, Russia's Federal Transport Oversight Agency advised airlines that they should stop using the Tu-154B until the accident had been investigated. This would affect 14 aircraft, all other Tu-154s in service are Tu-154Ms. Kogalymavia pledged to pay compensation of руб 20,000 to those passengers involved in the accident. The Russian insurance company Sogaz stated that those injured in the accident would receive between руб 20,000 and руб 2,000,000 compensation. The families of those killed would receive руб 2,000,000 compensation. Authorities in the Khanty-Mansi Autonomous Okrug — Yugra had allocated руб 10,000,000 to assist the families of those injured in the accident. It was reported on 6 January that all three bodies had been recovered from the wreckage.

Investigation

Russia's Interstate Aviation Committee (MAK) opened an investigation into the accident. A separate criminal investigation was opened to investigate allegations of breaching transport and fire safety rules. The Flight Data Recorder and Cockpit Voice Recorder were recovered from the wreckage of the aircraft. Russia's Ministry of Emergency Situations stated that the initial investigations pointed towards an electrical short circuit being the cause of the fire, which started in the central area of the fuselage, ahead of the rear-mounted engines. The fire started between frames 65 and 68. In a statement issued on 4 January, the MAK ruled out the engines or auxiliary power unit as the cause of the fire.