Flywise

Issue 169

British Airways Corporate Safety & Quality

Oops!

A FLIGHT to Glasgow diverted after a mid-air drama in which a Scots holidaymaker went berserk and had to be restrained by crew members and passengers.

The flight from Lanzarote made an unscheduled landing in Oporto, Portugal where the man was arrested by police.
Police in Oporto were unavailable for comment, but it is not thought the man was drunk during the incident.

Suspicions were raised when the man claimed to be a nervous flyer and wanted to hold the hand of another man seated next to him during take-off.

According to witnesses, the passenger squeezed the other man's hand so hard that he required medical treatment. He then continued talking to himself, making other passengers nervous.

Another passenger said: "He wouldn't calm down and had to be restrained by the cabin crew." The crew quickly had the situation under control, but other passengers helped keep him subdued for about 40 minutes until we were on the ground. He was saying he had the keys to the Mona Lisa and other weird stuff."

After a delay of two hours, the flight continued to Glasgow. An airline spokesman said: "We are awaiting a report to determine what caused the passenger to act this way."

Debris from a cargo plane fell from the sky and smashed into a Toronto-area woman's car, minutes after she left her vehicle to attend a dance class.

"A piece of an airplane fell on my car," she told her insurance company, to their disbelief.

The Mississauga resident was alerted to the incident by witnesses in the parking lot.

"At first I thought they said 'Sombody just smashed into your car'." she told reporters in Toronto. But when she was told that it was debris from an aircraft she had a hard time believing what had happened.

The wing flap is a one-by-three metre piece which could have proved more deadly if her three children had been with her.

Peel Region Police said Transport Canada confirmed the wing flap fell from a U.S-based A300 cargo jet.

Looking back, the woman said she is grateful for one thing. "Thank God I'm not in that airplane, honestly," she said.

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Editorial Policy

It is British Airways policy that the substance of any report following the investigation of any incident should be disseminated where possible in the interest of flight safety.

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It Is Expensive If You Don't Learn From Previous Incidents 50

Every Air Safety Report raised by a member of British Airways flight crew is stored in the incident database know as **e-BASIS** (British Airways Safety Information System).

Any reported safety incident with a **risk** assessment of "Medium" or higher will be featured in this digest. some incidents with a **risk** assessment of "Low" or "Minimal" will also be included.

Information about further progress or closure of investigations can be obtained direct from **Corporate Safety & Quality.**

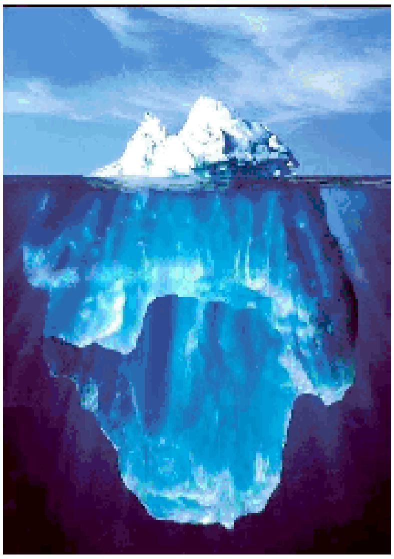
The Accident Is Just "The Tip Of The Iceberg"

Steve Hull, Editor

First a quote from an Accident Investigation Report:

… Managers believed that the company had a strong safety culture, but it was found that they had conflicting goals, schedule concerns, production pressures, cost-cutting and a drive for ever-greater efficiency – all the signs of an 'operational enterprise' – that had eroded their ability to assure safety. Their belief in a safety culture had even less credibility in light of repeated cuts in safety personnel and budgets…..

Accidents are clearly preventable, they are caused by a series of organisational failures; the failure to respond to clear warning signs, communication errors, lack of attention to major hazards and most importantly failure to learn from previous events.



Most, if not all, types of accidents have happened before and a number have happened on several occasions; it is the inability to learn from the first accident that is the biggest crime in aviation safety.

An accident is the 'tip of the iceberg' the 'what you can see'. More of the iceberg is visible and there are clues but then nothing is done. It is what happens beforehand that is crucial in the prevention of accidents and serious incidents. That is the hidden part below the waters surface. The unknown latent risks that are yet to be discovered. These need to be recognized, understood, challenged, addressed and prevented.

Air safety professionals spend their careers investigating serious incidents and accidents, in an attempt to try to understand the logical or illogical process that led to it. In an ideal world, no mistake would ever be repeated, as lessons learned (especially those ending in tragic circumstances) would be immediately and permanently applied to correct the deficiency in the operating procedure. This is clearly not the case.

The conventional understanding in aviation is that safety is paramount and will never be compromised. This results in the belief that human behaviour and decisions taken in airline operations are completely without risk and totally safe. This ideal is flawed and a more realistic approach is to consider the operational decisions made in aircraft operations as a compromise between the airlines operational requirements and safety behaviour. More simply, managing the operational risk or reducing the risk to an acceptable level.

Passengers are allowed to believe that airline safety is a 'given', but airlines must never take safety for granted. An important step forward in aviation safety would be for airlines to appreciate that accidents do happen and they don't always happen to someone else.

Good safety management is not necessarily having all the answers but asking the right questions

Sharing the Skies

Steve Hull
Senior Air Safety Investigator/Editor Flywise

Introduction

The risk of bird strike damage to aircraft has been present since the early days of aviation. Each year the world's airlines lose approximately $1-2 billion dollars due wildlife strikes to aircraft. This is roughly the same level of loss as the carriers pay out each year for lost luggage. One US airline cites its loses at $2 million a month due to engine ingestion alone.

Nature of the Problem

The potential for damage to an aircraft is dependant on the number and size of the birds. A sparrow weighing 0.5lb would do little damage to an aircraft compared to a Canada Goose weighing 15lb. (A Canada Goose at this weight striking an aircraft at a speed of 250kt has an impact force of 57,000lb.) FAA/USDA data shows that 64% of jet engines struck by geese are damaged.

Should current trends continue, the probability of a major goose strike incident resulting in severe engine damage will double in the next ten years.

Bird Habits

The majority of bird flight movements are between 30 feet to 300 feet above ground level (AGL). There is little regular bird activity above 1000 feet AGL, (over 80 percent of reported bird strikes are when aircraft is below that level). The majority of strikes are in fact below 30 feet AGL.

One of the highest altitude bird strikes on record involved a B747 that struck a large bird while flying over West Africa at an altitude of 37,000 feet. High altitude bird activity is generally only seen during migration. A pilot reported a flock of swans migrating from Iceland to Western Europe at 27,000 feet ASL.

The Problem at Heathrow

Many species of bird have adapted to the human environment. Their presence has increased in suburban

and urban areas where they find new feeding and nesting opportunities.

Despite improved bird management efforts at Heathrow, bird strikes are still a risk. There have been several high-profile incidents involving airliners in the last five years that highlight many of the issues to be tackled. In September 1998 a B767 arriving at Heathrow was hit by at least 30 geese, causing damage to the aircraft's left wing, nose and left engine. In 1997 a British Airways B747 suffered an engine failure on take-off when it ingested a Grey Heron. A recent survey indicates that there are between 2000 and 3000 geese in the area and numbers are increasing, attracted by the landfill sites, sewage works and reservoirs. An area of concern to the CAA is the increase in incidents involving large waterfowl. Better airfield bird management and safeguarding has seen a reduction in the threat from other, smaller birds, however, the waterfowl population and number of wetlands around airports poses a significant risk.

Bird Strike totals at London Heathrow and Gatwick

There has been a concerning increase from 1994 to the present. For the last three years, the figures remain constant and this may be due to improved bird scaring techniques at airfields, dealing effectively with the rising bird problem. Other airlines have reported an increase in bird strike numbers, particularly at Gatwick.

Table 1

Year	Total	LHR	LGW
2002	462	78	20
2003	387	83	21
2004	477	105	18
2005	507	112	22

Aircraft in Service

With the increasing bird population around airfields and as Table 2 illustrates the projected increase in aircraft numbers, the problem will not go away.

Table 2

Year	Aircraft numbers
1995	12343
2015	23100

Cost to Airlines as a result of damage from a bird strike

Radome replacement	£5000	($9200)
Fuselage/Panels/Aerials/ Windows	£3500	($6400)
Engine/Pylon	£5000	($9200)
Engine Fan Blades	£10000	($18000)
Landing gear doors	£3000	($5500)

BA Monitoring

Since the introduction of BASIS and the improved reporting rates of incidents within the flying community, the number of bird strike events is recorded below in Table 1:

Table 3

1991 - 14	**1992** - 16	**1993** - 68
1994 - 204	**1995** - 257	**1996** - 319
1997 - 305	**1998** - 432	**1999** - 426
2000 - 475	**2001** - 476	**2002** - 476

Airfield bird scaring and control is a relatively mature science, however some airports do not take full responsibility for the management of the hazard off site. The control, management and auditing of bird populations around airports is just as important as control activities on the airport. Operations at Heathrow were suspended on several occasions last summer whilst Canada Geese transited from the west between the runways. These decisions were taken on the intelligence provided by the off-airport bird-monitoring scheme.

Do airlines consider birds to be a problem

The problem that safety officers face when trying to convince airlines that birds are a real and constant threat to aviation, a threat and hazard that can result in expensive repair cost to airframes and engines is, when reviewing the top ten reasons for recent aircraft accidents, bird strikes do not figure, so it appears to be a weak or inconclusive argument.

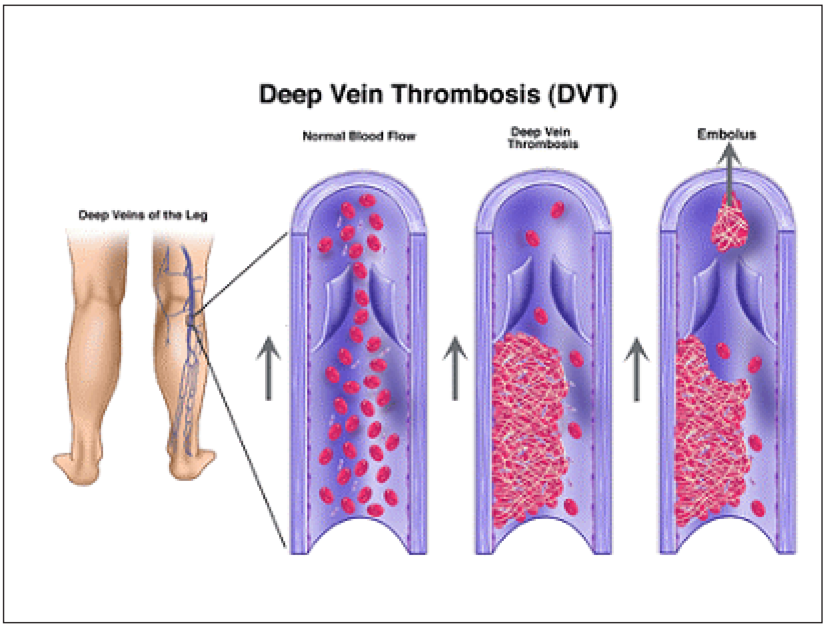
It is important that airlines continue to encourage the reporting of events to ensure that airports maintain their focus not only on the effectiveness of current processes, but to seek improvement in risk reduction techniques. Also that it is understood that this is not a UK or USA phenomenon but the threat is worldwide.

And You Thought Flying Was Dangerous!!!

An Overview of Deep Vein Thrombosis

Deep vein thrombosis (DVT) is the formation of a blood clot, known as a thrombus, in a deep leg vein. It is a serious condition that can lead to a life-threatening pulmonary embolism or cause permanent damage to the veins. About 1 in 5000 of the general population will be diagnosed with a DVT each year, although the incidence is higher in those with specific risk factors. Without treatment, about 1 in 10 people with a DVT of the veins in the calf will develop a pulmonary embolus, which may be fatal in up to 30% of cases.

Powerful muscles surround the deep veins that lie near the centre of the leg and when the muscles contract they help to push blood along the veins and back to the heart. One-way valves prevent the back-flow of blood between the contractions. When the circulation of the blood slows down due to inactivity, blood can accumulate or 'pool' which increases the likelihood of clot formation.



Long distance travel (greater than 4 hours) is one cause of immobility and has been found to cause a three-fold increase in the risk of DVT, although the individual risk is still small. Travel-related DVT is particularly associated with those who have additional risk factors. In the past it has erroneously been referred to as 'economy class syndrome' – not only is the incidence the same for travellers in the premium cabins, but the condition is equally associated with other forms of transport, such as cars, buses and trains.

Risk Factors

- Previous DVT or family history of DVT
- Immobility, such as bed rest or sitting for long periods of time
- Recent surgery
- Above the age of 40
- Hormone therapy or oral contraceptives
- Pregnancy or post-partum
- Previous or current cancer
- Limb trauma and/or orthopaedic procedures
- Abnormalities of blood clotting
- Obesity

Symptoms

- Discolouration of the legs
- Calf or leg pain or tenderness
- Swelling of the leg or lower limb
- Warm skin
- Surface veins become more visible

Pulmonary Embolism

If left untreated, all or part of a DVT can break off to form an embolus, which travels up the vein and through the heart, before becoming stuck in the blood vessels in the lung. Small emboli may not cause any symptoms, or result in mild breathlessness, chest pain and haemoptysis (coughing up blood). However, larger emboli may block the large blood vessels, leading to severe illness including heart failure, collapse and death.

Symptoms of Pulmonary Embolism

The symptoms are frequently non-specific and can mimic many other cardiopulmonary events.

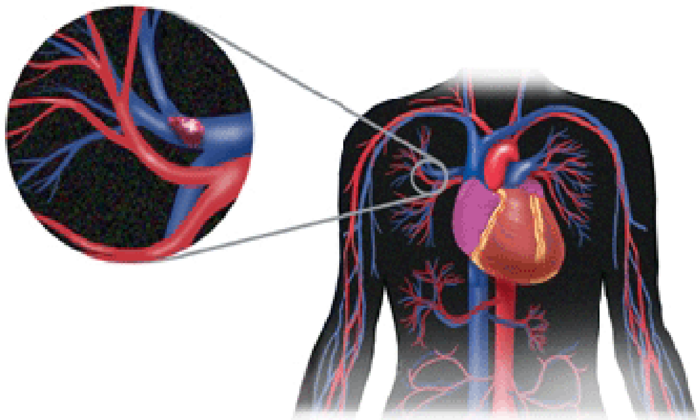
- Shortness of breath
- Rapid pulse
- Sweating
- Sharp chest pain
- Bloody sputum (coughing up blood)
- Fainting

Diagnosis and treatment

Diagnosis of DVT may be difficult, but early treatment can reduce the chances of developing a life threatening pulmonary embolism to less than one percent. Similarly, early diagnosis and treatment of pulmonary embolism can reduce mortality from approximately 30 percent to less than 10 per cent.

The treatment of both conditions involves the use of anticoagulants (blood 'thinners') such as warfarin and heparin. These drugs prevent the clot enlarging and reduce the risk of emboli or of further clots developing, allowing the body's normal control mechanisms to break down the clot that has formed.

Site of Pulmonary Embolus



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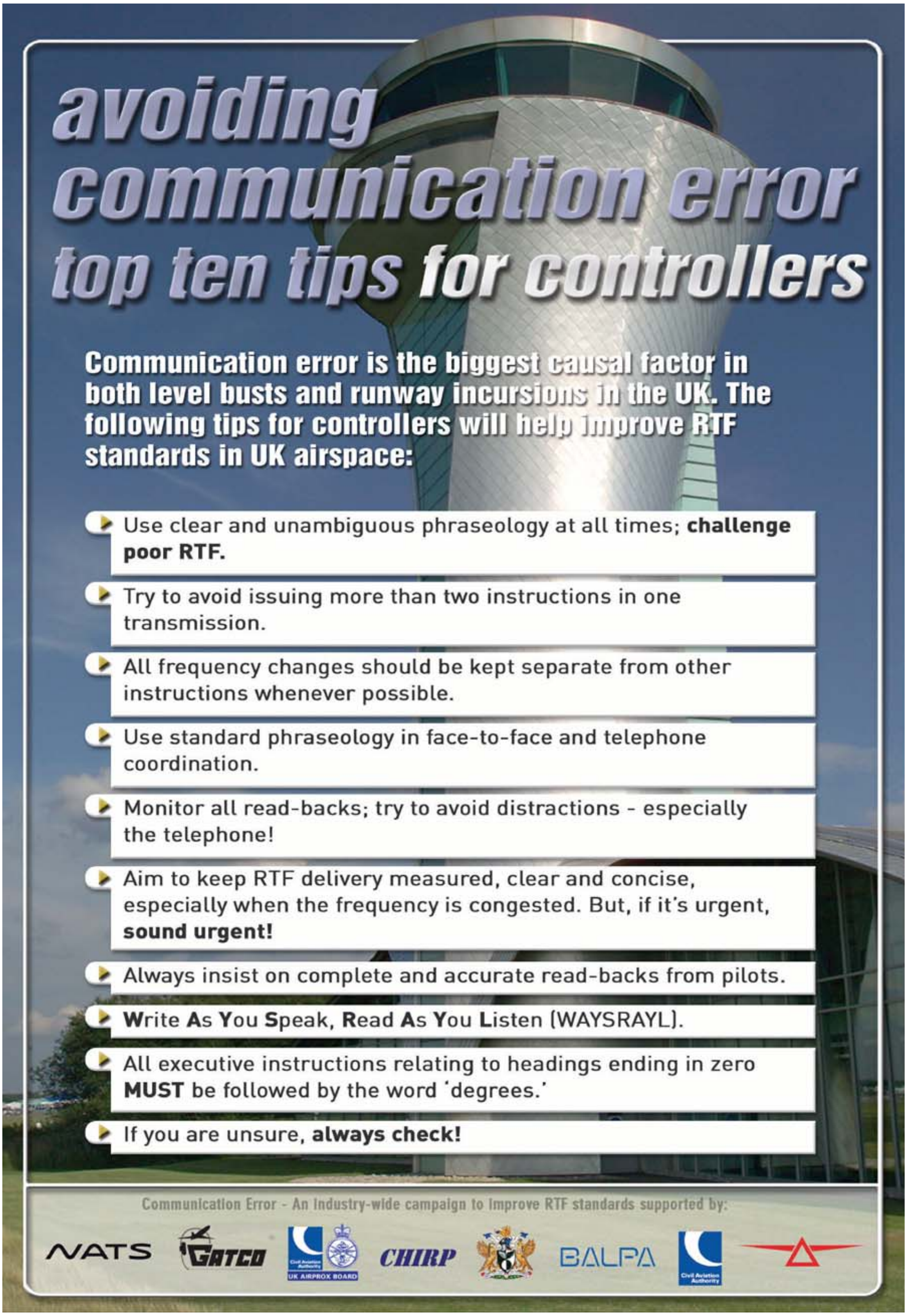
Thought for the Day

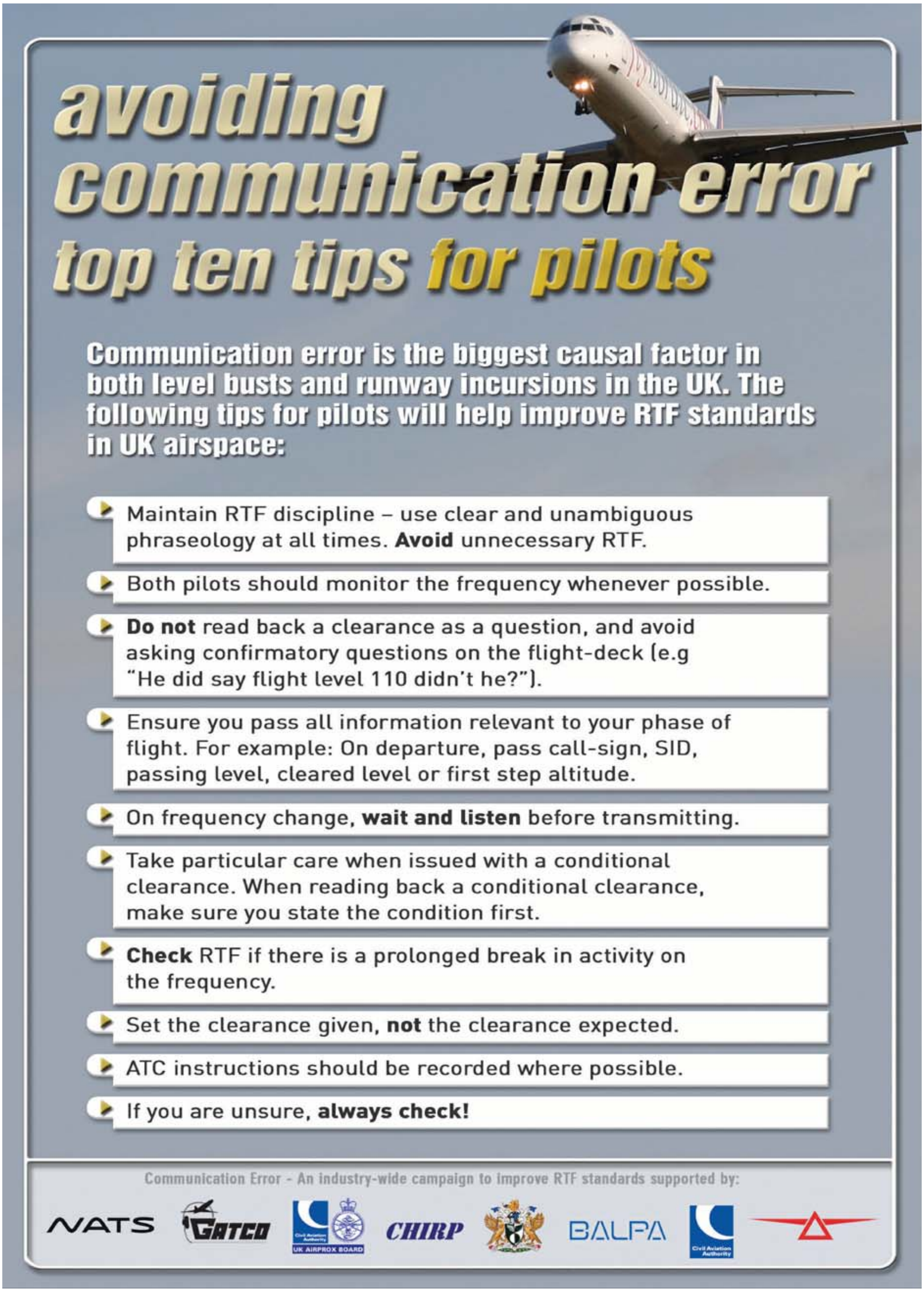
When promoting Officers, Napolean followed a simple rule:-

For obvious reasons promote first those who are intelligent and hard working. Next, promote the intelligent and lazy, for they will find ways to ensure others carry out their duties efficiently. Next, promote the stupid and lazy for they will have no energy to inflict their stupidity on others. But never promote those who are hard working and stupid, for they will rush around non-stop, creating unnecessary work for others and will soon bring the entire Army to chaos.

NATS Message



NATS Message



British Airways Significant Events

B747-400 G-CIVL LHR-CPT
Runway Incursion

The incident occurred at night in good visibility was good with no precipitation. The controller, who had validated 11 weeks previously, was on duty as the AIR Departures controller on the second afternoon shift (4th day) of his 6-day cycle. He reported for duty at 1330 hours and he had been in position for 10 minutes when the incident occurred. The selectable taxiway lighting system was in use when R/W09R AIR Departures controller instructed BAW352N to hold at N8 which the pilot readback. As another aircraft started its take-off roll from N8, the controller instructed BAW59 to line-up at S11 and selected the lead-on lights. Shortly thereafter, the controller cleared BAW59 for departure and the pilot acknowledged the clearance. The pilot of BAW352N, who had incorrectly entered the runway at N8, then alerted the controller to his presence and BAW59's take-off clearance was cancelled.

Description of the event

At the time of the incident, work in progress meant that the furthest westerly point that aircraft could enter R/W09R from the north side of the runway was at N8. The GMC2 controller had been providing the AIR Departures controller with a sequence of aircraft by instructing them to taxi along one of the two parallel taxiways (ALPHA and BRAVO) that lead to the intermediate holding points HORKA (on taxiway ALPHA) or OSTER (on taxiway BRAVO). The hourly departure rate was:

1800 – 1900 hours 46 departures
1900 – 2000 hours 40 departures

In order to ensure that pilots do not attempt to establish contact with the AIR Departures controller at an inopportune moment, pilots are instructed to monitor the Departures frequency 118.5 MHz. The flight progress strip is then physically transferred from GMC2 to AIR Departures and upon receipt of the flight progress strip, the AIR Departures controller assimilates the information on the strip to assess how best to incorporate the aircraft into the departure sequence.

In addition to the sequence of aircraft waiting for departure, there were a number of aircraft (including towed aircraft) that required crossing R/W09R, further adding to the controller's workload. One of these aircraft was UAE4, a departing aircraft that had requested to cross to the south side of the runway in order to have a longer take-off run available than was available from N8. UAE4 was cleared to cross R/W09R at N7 and then taxied along taxiway SIERRA.

As part of the process of producing an expeditious departure sequence, the controller issued BAW972 (taxiing via OSTER) with a conditional line-up clearance subject to VIR17. As VIR17 entered the runway at N8, BAW972 taxied towards N8 and then lined-up as instructed, using the green lead-on lights as selected by the controller.

UAE4 had taxied along taxiway SIERRA and was holding behind BAW59. At 19:50 hours, the controller instructed UAE4 to line-up as follows:

'Emirates 4, after the British Airways 747 ahead of you departs, line-up and wait 9 right.'

The pilot replied:

'Line-up behind British Airways 747, Emirates 4.'

This is an example of a common practice whereby controllers issue a conditional line-up clearance when the subject aircraft itself has not yet been cleared to enter the runway. Approximately one minute later, BAW59 asked for his position in the departure sequence. The controller informed him that he was number 6 but that he could not give him a line-up clearance yet and instructed him to hold short of the runway. The pilot acknowledged this.

The controller then cleared three more aircraft for departure, the last of which was BAW916. As this aircraft started to roll, VIR17 entered the runway at N8. This permitted BAW972 to taxi towards N8 from OSTER.

The controller then issued the following instruction to BAW352N (B752) who was holding at the red stop bar at HORKA:

'BAW352N, you're giving way to a company from the right and then hold at N8 short of 9 right.'

The pilot replied:

'OK give way to the Airbus on the right then hold short N8, BAW352N.'

The controller then issued a conditional crossing clearance to two aircraft (one under its own power and one under tow) to cross R/W09R after the departing Virgin A340.

When BAW972 had passed across the front of BAW352N, the controller selected a green taxiway route from HORKA towards N8, which extinguished the red stop bar at HORKA. BAW352N then taxied around the corner towards N8, proceeded a short distance beyond N8 and stopped as shown below.

BAW352N then remained in this position for 40 seconds until BAW972 was issued with a take-off clearance, which was timed to achieve the required 2-minute wake vortex interval behind VIR17, the previous Heavy departure.

Immediately after issuing this take-off clearance, the controller cleared BAW59 to line-up at S11 and selected the appropriate green lead-on curve. This automatically illuminated the red runway guard bar at N8 and extinguished the green lead-on curve from N8. As soon as BAW972 started to roll, BAW352N moved slowly forward to complete the line-up manoeuvre without the assistance of a green lead-on curve. The pilot did not notify ATC that the green lead-on lights had been extinguished.

When the controller observed that BAW972 was airborne, he issued a take-off clearance to BAW59. By this time, BAW352N had completed his line-up manoeuvre and the aircraft were in the positions as shown below.

Very shortly after BAW59 acknowledged the clearance, the following dialogue ensued:

BAW352N	'*BAW352N, just confirm we're lined-up N8.*'
AIR	*'BAW59 take-off clearance cancelled, hold position, I say again hold position acknowledge.'*
BAW59	*'Hold position BAW59 roger.'*
AIR	*'BAW352N you were instructed to hold short of 9 right at N8 sir.'*
BAW352N	*'I beg your pardon. I thought we were cleared line-up after the Airbus.'*
AIR	*'Ok we'll have to go with that now so from N8, clear take-off, surface wind easterly at 6.'*

BAW 59 then departed 2 minutes later.

Information received from other NATS departments or external agencies:

British Airways has provided an ASR and the captain has been sent a copy of a NATS Runway Safety Focal Group Runway Incursion questionnaire. The captain reported in his ASR that when he turned left at HORKA, the line of green taxiway lights continued onto the runway at N8. This was because the lead-on curve that had been recently used by BAW972 had not been extinguished and as a result the red runway guard bar at N8 was not illuminated. The captain stated that these green lights leading onto the runway reinforced their incorrect assumption that they had been instructed to line-up behind BAW972. He also confirmed that in accordance with Company SOPs he had selected the aircraft's strobe lights as they entered the runway.

RIMCAS had been withdrawn from service due to a high number of false alerts.

Investigation Findings

The controller commented on the difficulty in suppressing green routes. This refers to the situation, which arises when an aircraft is instructed to taxi towards a holding point and is provided with an appropriate green route. If the green lead-on lights from this holding point onto the runway are still selected, the red guard bar will not be illuminated. BAW352N passed the position of the runway guard bar at N8 approximately 25 seconds after BAW972 had completed his line-up manoeuvre.

The controller reported that he had checked his strip display before issuing the take-off clearance to BAW59 but he confirmed that he did not refer to the A-SMGCS display until BAW352N alerted him to their presence on the runway. This is not unusual as controllers are not mandated to use the A-SMGCS and are encouraged to spend as much time as possible looking out of the VCR window at their traffic.

The controller did not detect the presence of BAW352N when he conducted a visual scan before issuing take-off clearance to BAW59. However, the direct line of sight from the VCR towards the R/W09R threshold is at a shallow angle to the runway centreline and the lights from the aircraft in this area would have blended into a confusing visual picture.

This incident was caused by a correct read back to hold at N8 followed by an incorrect action when the pilot entered the runway. A contributing factor was the failure of the controller to detect the presence of BAW352N on the runway.

Event	Task/System Problem	Root Cause/ Factor	Causal/Aggravating/ Situational
Interaction with environment	Pilot actions	Correct pilot read back followed by incorrect action	Causal
NATS personnel	Perception	Not see	Causal

Recommendations for future action

Detailed recommendation
It is recommended that British Airways discusses this report with the crew of BAW352N and promulgates a summary to their pilot fraternity.

It is recommended that ATC Operations consider whether it is practicable to prevent a situation when an aircraft that has not been cleared to enter a runway, approaches a runway whilst the AGL system is in use and is presented with green lead-on lights leading onto the runway.

It is recommended that ATC Operations in conjunction with ATC Training examines the visual scan methods that are used by controllers when issuing take-off and landing clearances. In addition, they should examine how A-SMGCS might be used in such circumstances.

It is recommended that ATC Engineering and ATC Operations examine how to introduce RIMCAS back into service as soon as practicable

Actions already taken

The controller was provided with the support of an LCE colleague for the first two days of his next shift cycle.
As part of a broader campaign to prevent runway incursions, TOI 118/05 has been published which mandates some practices, which were previously issued as advice to controllers.

NOTAC 001/05 has been issued which notifies controllers of the procedures for the use of the Runway Guard Bar (RGB) as follows:

Re-activation of the RGB

Unless a following aircraft has been issued with a clearance to enter the runway immediately behind the preceding aircraft, the Air controller should re-activate the RGB as soon as possible after the first aircraft has crossed it and no longer requires the guidance of the green centreline lighting.
When Low Visibility Procedures (LVPs) are not in force, once an aircraft that is lining up has physically entered the runway (i.e. it has crossed the runway edge lights) it does not require the green centreline lighting to be illuminated to ensure that it will be able to correctly line up on the runway centreline.

Note: It is recognised that it is not possible to use this procedure when in LVPs, or when traffic is crossing the runway, as re-activation of the RGB will deselect the green centreline lighting.

OPNOT 031/05 has been published detailing the use of A-SMGCS as follows:
The A-SMGCS is a perfectly valid tool for use when ascertaining that the runway is clear before issuing a take off or landing clearance. That is not to say that the intention is to replace visual observation, however, as borne out by the interviews carried out on Heathrow controllers, the system allows rapid situational assessment in a fraction of a second.

Although a controller's scan is almost subconscious, good practice would dictate that whenever the controller's view of the runway is impaired for any reason (such as during reduced visibility, at long ranges or at night) the A-SMGCS should be utilised to ensure that the correct aircraft are on, or entering, the runway.

Both the controller and the pilot agreed to attend an interview with a NATS HF expert.

Actions underway

Manager Engineering confirms that work continues to fine-tune RIMCAS to reduce to an acceptable level the number of false alerts.

B777 G-ZZZB LHR-YYZ
Flight deck filled with fine debris after reinstating L pack after pack failure

During the cruise the left pack failed. The pack was reinstated after reviewing the checklist. The flight deck momentarily filled with dust/fine debris, which irritated the eyes of the flight deck crew. The pack subsequently failed in descent and was left inoperative. The aircraft returned to Heathrow with the left pack locked out.

Investigation

During the flight the compressor temperature sensor L status message annunciated. The message relates to the compressor discharge temperature sensor signal to the air supply cabin pressure controller (ASCPC) being out of range. If the signal from the sensor gave a high air cycle machine (ACM) compressor temperature scenario then the pack would perform a protective shut down for an overheat condition. The removed compressor discharge temperature sensor was sent to BAAE and was scrapped as it failed the CMM test. As the component is an un-serialised repairable there is no data as to how long it had been fitted. Over all there have been three unserviceable removals for this sensor across the Boeing 777 fleet since April 2004.

When a pack is started in flight a surge of air is used to start the ACM and get air flowing through the pack. This surge of air can disturb any dust or dirt from within the duct. As the flight deck is the first area that the left pack provides and it does not receive air mixed with re-circulated cabin air, it would be noticed on the flight deck and not the cabin. Since the sensor was replaced there have been no adverse pilot reports for air conditioning operation.

Conclusion

The most probable cause of the pack shutdown was due to the failure of the Compressor Discharge Temperature Sensor, giving a false over temperature reading. The dust experienced when the pack was restarted was due to the initial high flow through the pack liberating dust or debris in the duct.

Actions

Due to the rare nature of pack shut downs due to failure of the compressor discharge temperature sensor no further action is considered necessary.

B767 G-BNWW PRG-LHR
Engine oil loss in flight

During the cruise from PRG to LHR the oil level on No.2 engine gradually reduced to zero. The flight crew initiated the checklist. As the oil pressure and temperature on No.2 engine was normal the flight continued. A PAN was declared and the aircraft was given priority to land at LHR. On a short final approach the oil pressure started to reduce remaining in the 'white band'. The engine was shut down on the runway after a normal landing.

Initial investigations identified that the High Speed Gearbox Magnetic Chip Detector (MCD) was missing from its housing and subsequently found located in the fan cowls. The MCDs on the B767 are replaced as part of a 'weekly check' last actioned four days previous.

Following replacement of the MCDs the aircraft operated a further 14 sectors (approximately 36 hours) prior to this incident. A review of aircraft records failed to identify any additional maintenance performed on No.2 engine following replacement of the MCDs with no additional oil uplifts recorded during this period. This incident was a direct result of the HSG MCD being incorrectly installed within the housing. The subsequent 'verification check' should have identified that the MCD was incorrectly installed and would have prevented this incident. During the final sector the MCD managed to work loose remaining within the housing allowing oil to gradually seep past the two seals before finally becoming detached.

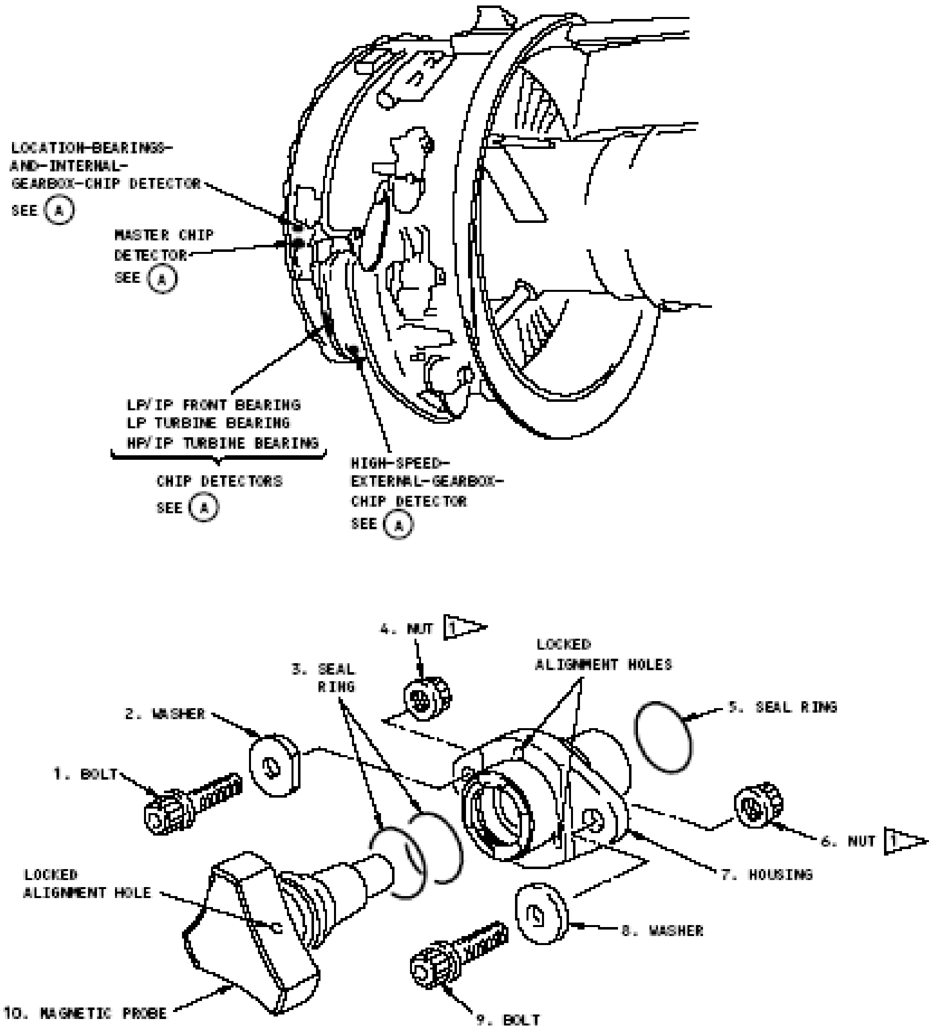
Following interviews with the technicians concerned a number of anomalies have been identified:

- The same technician replaced all the MCDs on both engines without consideration of the requirements for safety critical maintenance tasks, which requires different personnel to replace MCDs on each engine.

- The same technician carried out the 'verification checks' on both engines without consideration of the requirements for safety critical maintenance tasks, which requires different personnel to verify correct MCD installation on each engine.

Investigation Details

There are 3 MCDs fitted to each of the RB211-524 series engines fitted to the B767 aircraft:
Master (Blue), Location (Yellow) and HSG (Silver). The MCD probe is installed in a MCD housing. It is locked into



the MCD housing with a quick-release type connector. The quick-release connector makes it possible to replace the MCD probe quickly. When the MCD probe is removed, the MCD housing seals automatically to prevent oil leakage. Seal rings must be installed on the MCD probe when it is installed in the MCD housing. The seal ring is installed to prevent oil leakage. The MCD housing prevents the installation of the MCD probe if the oil seals are not correctly installed.

Figure 1

The MCDs are replaced on the B767 as part of the 'weekly check'. Due to the fail safe design of the MCDs fitted to the RB211-524 series engine they have been classified as 'Non-Critical'. This requires different personnel to carry out MCD replacement on each engine followed by 'verification checks' on each engine to ensure correct fitment and sealing of the MCD in the housing.

A search for the associated maintenance records failed to locate the actual certification sheet for the 'weekly check' performed. The aircraft Technical Log Sheet and the 'Daily Check' were found though. The entry in the Aircraft Technical Log confirmed that both the 'daily' and 'weekly' checks had been actioned. Also recorded were the serial numbers of the MCDs replaced.

A team of two A3 LMA Technicians were assigned to carry out the checks on this aircraft, which included the replacement of the MCDs on both engines.

One of the technician's was authorised for A3 LMA certification on the B767 aircraft whereas the other was only authorised to M5 Level on this aircraft type. From this it is clear that although despite only one technician having the appropriate authorisation for this aircraft type he would have been responsible for certifying work completed by the other. Technicians are allowed to certify for tasks completed by someone other than them self provided that they were personally involved in performing the completed task. This however does not extend to specific items on the 'daily' or 'weekly' checks, which should be certified by appropriately authorised A3 LMA holders. Items may be 'completed by' staff not holding the specific authorisations but these must then be 'certified by' an appropriately authorised B1/B2 FMA holder. It is likely that this situation occurred due to a shortage of B767 LMA staff on the shift on this particular night.

One technician confirmed that all three MCDs on both engines had been replaced without consideration of the requirements for safety critical maintenance tasks as defined in both the British Airways Standards Manual (GEN 35) and CAA Airworthiness Notice 72, which requires different personnel to replace MCDs on each engine. This requirement is clearly explained in the 'weekly check' instruction sheet. The technician was unaware of this requirement and did not know where to find the 'weekly check' instruction sheet, which is located along with the other 'Airforms' at the back of the Tech Log. It is normal practice in for technicians to be provided with a folder containing all the planned work for that aircraft registration. Copies of the certification sheets for the daily and weekly check are included in this folder but not the instruction sheets.

The technician had performed this task many times and was familiar with the locking mechanism of the MCD ensuring that both seals were fitted and that the alignment holes were in the correct position. An additional check for MCD security was performed, which involved gently pulling on the back of the MCD to ensure correct fitment. The other technician assisted with the opening and closing of the fan cowls and took no part in replacement of the MCDs. They recall witnessing the checking the security of the MCDs following fitment. In order to complete the 'weekly check' both technicians returned to Tech 1 for assistance in completing the 'verification checks' on both engines.

A third technician arrived at the aircraft and performed 'verification checks' of the installation of the MCDs on both engines in direct contravention of the requirements for safety critical maintenance tasks. This technician was aware of the requirement for ensuring different personnel performed the task (i.e. MCD replacement) but did not seem to fully understand that this also applied to the 'verification checks'.

The aircraft was parked on a remote stand and when he arrived the fan cowls on both engines were closed. Due to the physical location of the HSG MCD (See Figure 1) the right-hinged cowl of No.2 engine was required to be open for access to this MCD. He stated that he managed to hold the cowl open with his foot whilst checking the security of the MCD with the aid of a torch, gently pulling on the back of the MCD to ensure it was fully locked in the clockwise position. Due to the awkwardness of holding the cowl open, the poor lighting and possible disorientation from being in such an uncomfortable position he may have simply missed the fact that the MCD was unlocked or accidentally moved the MCD from its locked position.

Following replacement of the MCDs the aircraft operated a further 14 sectors (approximately 36 hours) before experiencing the gradual oil loss on No.2 engine on the return sector from PRG four days later. A review of the 'DISC' aircraft records failed to identify any related maintenance performed on No.2 engine subsequent to the replacement of the MCDs. In addition to this there were no additional oil uplifts during this period suggesting that the high speed gearbox MCD was initially installed prior to this incident occurring.

Conclusion

Following this incident the HSG MCD housing was inspected in conjunction with Powerplant Technical. No damage or wear was identified and clearance between the fan cowls and MCD was found to be satisfactory. The MCD was replaced and high power runs actioned satisfactory with no leaks evident. The aircraft was released for further service. Engineering raised an ADD two days later to ensure the integrity of the MCD housing. This involved running No.2 engine without the HSG MCD fitted to check the self-sealing mechanism of the housing. No leaks were evident. As a further precautionary measure the HSG MCD housing and MCD were removed and replaced for further external investigation. Engineering has confirmed that there was no obvious technical failure of the MCD within the housing. Provided the MCD was correctly installed there is no way that the HSG MCD could have detached from the housing.

It is likely that during the installation of the MCD the probe was not fully located within the housing. It is possible to have an unlocked situation whereby the MCD appears to be locked. The seal indicator would have been visible however the holes on the MCD would not have been fully aligned with the markings on the housing resulting in the unlocked condition. The verification check should have identified this anomaly. During the final sector the MCD managed to work loose remaining within the housing allowing oil to gradually seep through the seals before it finally became detached.

A319 G-EUOB LHR-BUD
Loss of instruments due to a major electrical failure

During climb out from LHR, en-route to Budapest, the aircraft suffered a failure of the No.1 electrical AC Bus. The failure caused the loss of captain's and first officer's primary flight displays (PFDs), navigation displays (NDs), the upper ECAM display and a number of other systems. The handling pilot (captain) flew manually on standby instruments while the first officer worked through the ECAM checklist. One of the ECAM actions was for the selection of the AC ESS FEED pushbutton that restored electrical power to most equipment, including all the displays. The duration of the electrical failure was approximately 90 seconds.

From the limited data available the full sequence of events and failures have yet to be determined, however the initial assessment by Airbus is as follows:

19:26:40 AC BUS 1 and ESS / DC BUS 1 and ESS were lost because of a differential protection (DP) being triggered by the GCU.

19:26:45 DC BUS 1 was recovered due to contactor 1PC2 closure (DC BUS 2 supplying DC BUS 1 through BAT BUS).

19:28:10 AC and DC ESS BUS was recovered as soon as the copilot pushed the AC ESS FEED alternate switch.

19:28:55 AC BUS 1 was recovered as soon as the GCU 1 was reset.

The process for submission of the ASR, plus the fact that the fax message of the event was not received resulted in the content of the ASR not coming to light until a few days after the event. The flight crew, following an extensive and methodical decision making process and in consultation with engineering, elected to continue to Budapest in the light of the satisfactory technical status of the aircraft. The resetting of the No.1 TRU (TR1) on the ground at Budapest cleared all remaining defects. The captain recorded only the outstanding defects on the aircraft in the aircraft technical log on arrival in Budapest, with the details of the actual incident only being entered on the ASR and given verbally to the ground engineer. For reasons that have not been fully determined, the ASR took four days to come to light. It was not until the ASR became available to engineering and Corporate Safety, and when the captain met with the Flight Manager, that the significance of the incident became apparent. The reported event has not recurred since and has not been reproduced either on the aircraft or in the simulator. British Airways, Airbus and the AAIB have investigated the event.

The ASR states that power was lost to captain's and first officer's PFD's (Primary Flight Display) and ND's (Navigational Display), upper ECAM, autopilot, autothrust, intercom, VHF, flight deck lighting, N1 EPR, cabin lights plus other minor failures. Crew manually flew on standby instruments. Mayday declared but no VHF available. Most power restored by crew selection of AC ESS feed to alternate. The remaining failures were due to TR1 failure.

For the above defects the following BUS's would be failed:

AC Bus 1
AC Bus 2
AC Essential Bus
DC Bus 1
DC Bus 2
DC Essential Bus

Under normal circumstance the AC Ess is fed from AC Bus 1. The DC Ess from DC Bus 1. DC Bus 1 is fed from AC Bus 1 via TR1. On failure of AC Bus 1 the Bus Tie operates and AC Bus 1 is fed from AC Bus 2.

If AC Bus 1 cannot be powered the AC Ess will not be powered and AC ESS switch must be selected to operate AC Ess from AC Bus 2. On failure of TR1 (due to AC Bus 1 failure) the DC Buses are tied and the DC Ess is fed from ESS TR (from the AC Ess Bus). The captain's PFD and ND are supplied from AC Ess Bus (shedable).

The first officer's PFD and ND are supplied from AC Bus 2. The Lower ECAM is supplied from AC Bus 2. The Upper ECAM is supplied from AC Essential Bus.

The first officer's PFD, ND and lower ECAM are all supplied from AC Bus 2. The ASR reports only the upper ECAM failed (AC Ess). The fact the lower ECAM was powered but the first officer's PFD and ND were not, cannot be explained. AC Bus 2 must have had power due to the switching of AC ESS restoring most supplies.

If AC Bus 1 power is restored (as it would appear to have happened in this case) the TR1 will remain off until reset via CFDS.

The VHF Radio is supplied from the DC Bus:

VHF 1 from DC Ess
VHF 2 from DC Bus 2
VHF 3 from DC Bus 1

Engineering action

No previous history of any electrical failures and aircraft flew for many sectors after the event without further incident. An ADD was raised to carry out checks of the emergency generation system with a single TR failed and also to carry out DC generator switching checks. All checks satisfactory. Another ADD was raised to check both engine IDG Feeder connections. Both found satisfactory. It also called for flickering lights/generator checks. These checks are satisfactory. During engine runs various switching and failures simulated (observed by AAIB). It was noticed that failing Gen1 with Bus Tie selected off could reproduce a similar failure, (this did not fail AC Bus 2). This prompted an ADD to be raised to replace GCU-1 as switching for bus tie is carried out by this unit, via interlock circuits. Another one was raised to carry out an integrity test of electrical power. In conclusion based on the ASR report the following occurred: Gen 1 or AC Bus 1 failed, TR1 failed, AC Bus 1 failed to connect to AC Bus 2 via tie Bus, DC Bus 1 failed to connect to DC Bus 2 and DC Ess Bus failed or Ess TR failed to come on line due - AC Ess Failed (due AC Bus 1 failure). Connecting AC Ess to AC Bus 2 (Crew selection) restored AC Ess thereby restoring DC Ess. Gen 1/AC Bus 1 restored. TR 1 remains failed.

Air Traffic Control

The failure occurred within LACC airspace. The initial MAYDAY call was not received by ATC due to the loss of power to the VHF 1 transceiver. Once VHF communication had been re-established a PAN call was made and acknowledged, and the aircraft was cleared by ATC to hold at BRASO while the crew continued trouble shooting the problem. Once the crew were satisfied that it was safe to continue the PAN was cancelled and the aircraft was cleared by ATC to continue towards Budapest.

Flight Recorders

The flight data from the aircraft was recovered and analysed. The data confirmed the failure of the No.1 AC bus and recorded the following key events:

Time	Event
19:26:40:	AC BUS 1 and ESS / DC BUS 1 and ESS were lost because of a differential protection (DP) being triggered by the GCU.
19:26:45:	DC BUS 1 was recovered due to contactor 1PC2 closure (DC BUS 2 supplying DC BUS 1 through BAT BUS).
19:28:10:	AC and DC ESS BUS was recovered as soon as the first officer pushed the AC ESS FEED alternate pushbutton switch.
19:28:55:	AC BUS 1 was recovered as soon as the GCU 1 was reset.

Tests and Research

In association with the AAIB, the failure of the No.1 AC bus was reproduced on a flight simulator and the effects observed and recorded. During this simulation a number of possible scenarios were tried and the effects noted. In addition the aircraft was taken for engine runs on the ground and the No.1 AC bus failure was reproduced. Under normal conditions the failure of the first officer's Primary Flight Display and Navigation Display could not be reproduced. Several components have been removed from the aircraft to investigate the reported events, namely the Generator Control Unit (GCU) No.1, all three Display Management Computers (DMCs), System Data Acquisition Computer (SDAC) No.2 and the Flight Warning Computer (FWC). When BITE and other information has been gathered a technical meeting between Airbus, AAIB and British Airways will take place and an attempt made to reproduce the reported scenario.

Organizational and Management information

When the crew had recovered the display units and were holding to determine the state of the aircraft, they contacted Maintrol using the VHF radio. The discussion between the crew and Maintrol revolved around the continuing failures of TR1 and EPR mode and did not discuss in any detail the original failures that had now been cleared by the ECAM action. The crew elected to continue to Budapest based on the fact that the aircraft was in a safe and stable technical condition, the reported and forecast weather en-route and at the destination was adequate and that the reported failures could be handled by the engineer in Budapest to enable despatch back to LHR. The incident was raised by the flight crew on an Air Safety Report (ASR) form, which was given to the Malev contracted ground engineer in Budapest on arrival. The crew also verbally reported the content of the ASR to the Hungarian ground engineer. However they only entered details of the remaining defects in the aircraft technical log. On returning to London two days later the captain telephoned the Flight Manager to discuss the incident but during the conversation opted to leave the debrief until he was next at the Compass Centre two days later.

The Malev engineer passed the ASR to the British Airways Customer Service staff at Budapest for onward transmission to Flight Operations. The ASR was reportedly faxed to LHR on the day after the incident, however the fax was not received. The event only became apparent four days after the incident when the significance of the event became apparent.

Flight Crew actions

Following the electrical failure, the crew performed as trained and expected, with the captain continuing to fly the aircraft using external references and standby instruments. The first officer worked through the ECAM checklist to restore the essential AC/DC power and reset the No.1 AC generator. The selection of the AC ESS FEED pushbutton restored power to most of the systems affected, however it was not one of the first items on the ECAM checklist and it therefore took approximately 90 seconds to restore power to the instruments. It is also worthy of note that had the lower ECAM also failed the crew would have only had very limited information and advice on how to correct the problem.

Once the instruments had been restored the first officer took control of the aircraft as per the SOPs. The captain then analysed the remaining failures and sought advice from Maintrol on any potential problems these may cause engineering in Budapest. The crew, having satisfied themselves that the aircraft was safe to continue and that the remaining defects would not lead to the aircraft becoming unserviceable in Budapest, opted to continue the flight. The decision about whether to continue to Budapest was made in a timely and considered way, considering the implications and benefits of each option and using the established British Airways NOTECH system of problem-solving and decision-making. Having spoken to Maintrol about the technical status of the fault, and considered the available fuel on board and the weather en-route and at Budapest, the crew decided to continue. On arrival at Budapest the captain passed the ASR regarding the incident to the ground engineer for onward transmission to Flight Operations. The crew also verbally reported the content of the ASR to the Hungarian ground engineer, however they only entered details of the remaining defects in the aircraft technical log. The lack of information regarding the actual course of events in the tech log, rather than just the remaining minor effects, meant that the significance of the incident was only recorded in the ASR. The verbal report to the ground engineer, for whom English is not a native language and is not employed by British Airways, was not an acceptable alternative for a detailed entry in the tech log. The engineer, as would be expected, only addressed the issues raised in the tech log and Maintrol and Tail Support Group who monitor the tech log would be unaware of the full nature of the failure. The reason for the lack of detail in the tech log is not fully understood. It is clear from the detailed ASR that the crew were aware of much more detail and of the significance of the event than the tech log entry reflected. During the incident debrief the crew accepted that a more detailed entry in the tech log would have been appropriate.

Aircraft systems

From the limited data available the full sequence of events and failures has yet to be determined, however the initial assessment by Airbus is as follows:
Note that AC and DC BUS 2 was not recorded as having been lost.

IDG2 continued to supply the AC and DC ESS BUS until the end of the flight (until the AC ESS FEED alternate switch was de-selected).

The following systems are connected to the aircraft side 1 or ESS and have been reported inoperative in the PFR: TCAS, GPWS, FMC1, FCDC1, DME1, SDAC1, PHC1, PHC1, BMC1, Press Transducer 8HA1, FWC1, ADF1, FAC1,RA1, FAC1, FQI1, DMC3, SFCC1, CFDIU and RADAR1.

However, the following systems are connected to the aircraft side 2 and have been reported inoperative in the PFR: Ext. fan 18HQ, EIU2, ADF2 and EEC2.

ATA31:
Depending on DMC selection, the pilot ND and PFD were lost with the upper ECAM until 19:28:10 (DMC1 selected) or until 19:28:55 (DMC3 selected). With the current information available, we do not know which DMC was activated.

The co-pilot ND and PFD together with the lower ECAM panel are supplied by the AC BUS 2 and should have remained powered. Normal indication would be displayed if DMC2 is selected but a diagonal on all three displays would appear if DMC3 was selected.

Note that since the CFDS remained un-powered during the first 5 seconds (connected to the DC BUS 1), the first ECAM warnings and fault messages have not been recorded in the PFR (although the warnings have been displayed on the remaining Display Unit).

However, the crew reported the loss of five DUs with the lower ECAM remaining.

ATA33:
The side 1 or ESS supplies all cockpit lights except the co-pilot console and floor lights.

Half of the passengers reading lights are supplied through side 1 and the other side through side 2.

The cabin general illumination is supplied through side 2. However the cockpit lighting was reported to be lost and the cabin lighting was reported as “momentarily lost” by the crew.

Airbus have proposed the following actions in order to investigate the issue further:
Lab tests in order to try to reproduce the five failed DUs with unstable voltage regulation on the AC BUS 1.

Analysis of GCU1 BITE content by Hamilton-Sundstrand to confirm that a DP was triggered by the GCU1.

Analysis of GCU shop finding to check whether the DP that was triggered could result from the GCU itself.

Note: we don’t know any typical internal GCU failure mode that would cause a DP trip.

Analysis of the DMCs, SDAC and FWC BITE.
Theoretical analysis to try understanding why some systems were lost on the side No.2 (including cabin lighting).

Previous experience

Following this incident a review of the UK CAA MOR database for similar incidents was conducted and Airbus reviewed their own records for similar reports.

From the review of UK MORs there were two incidents of particular note, where during engine shutdown the aircraft failed to transfer automatically to the APU generator. In both cases all the five upper display screens failed leaving only the lower ECAM.

The Airbus review of reports revealed the following:
In the past, Airbus has investigated around ten cases that resulted in multiple losses of Display Units as a result of an electrical failure. These events can be grouped in two types of event.

Events that resulted from the loss of the AC BUS 1 and ESS / DC BUS 1 and ESS (because of a differential protection that was triggered) with DMC3 selected at the first officer’s side. This resulted in the loss of all six DUs until the AC ESS FEED alternate switch is selected or until the NORM display is selected for the EIS.

Note: In these cases, the lower ECAM was lost while it was not during the BAW incident

One event resulted from the loss of only one phase of the AC BUS 1 and ESS / DC BUS 1 and ESS with DMC3 selected at the first officer’s side. This resulted in the loss of five DUs (only the lower ECAM DU remained) until the AC ESS FEED alternate switch is selected or until the NORM display is selected for the EIS.

Aircraft design

The actual reported failures have not been reproduced on the aircraft or the simulators. It is however possible to reproduce a loss of data on the first officer’s instruments during an AC bus 1 failure in a number of ways:
Selection of EIS DMC switch to F/O 3. This runs the first

officer's instruments off the No.3 DMC, which is also powered off AC Bus 1. This configuration causes a diagonal line to appear across all three displays (including the lower ECAM) Selection of Air Data to F/O 3. This provides the air data for the first officer's instruments from the No.3 ADIRU, which is powered off AC Bus 1. This configuration causes a significant loss of data from the first officer's displays and a number of failure flags are displayed.

Selection of ATT HDG to F/O 3. This provides the Inertial Reference data for the first officer's instruments from the No.3 ADIRU, which is powered off AC Bus 1. This configuration causes a significant loss of data from the first officer's displays and a number of failure flags are displayed.

Although none of these scenarios replicate the sequence of events reported in this incident, they do however demonstrate that the aircraft can be set up to experience a complete loss of flight instruments in the event of an AC Bus 1 failure, as reported in the Airbus events.

Conclusions

The aircraft suffered a failure of AC Bus 1, the cause of which is yet to be determined.

As a result of the AC Bus 1 failure a number of systems were lost. In addition, systems that were powered from AC Bus 2, that should not have been affected, were also lost.

The flight crew handled the failure in accordance with their training and restored power to most systems by selecting the AC ESS FEED push button in accordance with the ECAM checklist.

The ECAM checklist contained a number of items before the selection of the AC ESS Feed push button and it therefore took approximately 90 seconds to restore power to the displays.

The crew, following an extensive and methodical decision-making process and in consultation with Maintrol, elected to continue to Budapest in the light of the satisfactory technical status of the aircraft.

The resetting of the No.1 TRU (TR1) on the ground at Budapest cleared all remaining defects.
The captain recorded only the outstanding defects on the aircraft in the aircraft technical log on arrival in Budapest, with the details of the actual incident only being entered on the ASR and given verbally to the ground engineer.

For reasons that have not been fully determined, the ASR took four days to reach eBASIS. It was not until the ASR became available to Engineering and Corporate Safety, and when the captain met with the Flight Manager, that the significance of the incident became apparent.

Approximately 900 (13%) of the 7563 ASRs submitted in 2005 took more than four days (96 hours) to reach eBASIS. The reported events have not recurred since and have not been reproduced either on the aircraft or in the simulator.

Recommendations

1. Review the guidance and training for the completion of defect entries in the aircraft technical log and remind crews of their responsibilities in ensuring that full details of any technical failures and incidents are accurately recorded in the tech log.

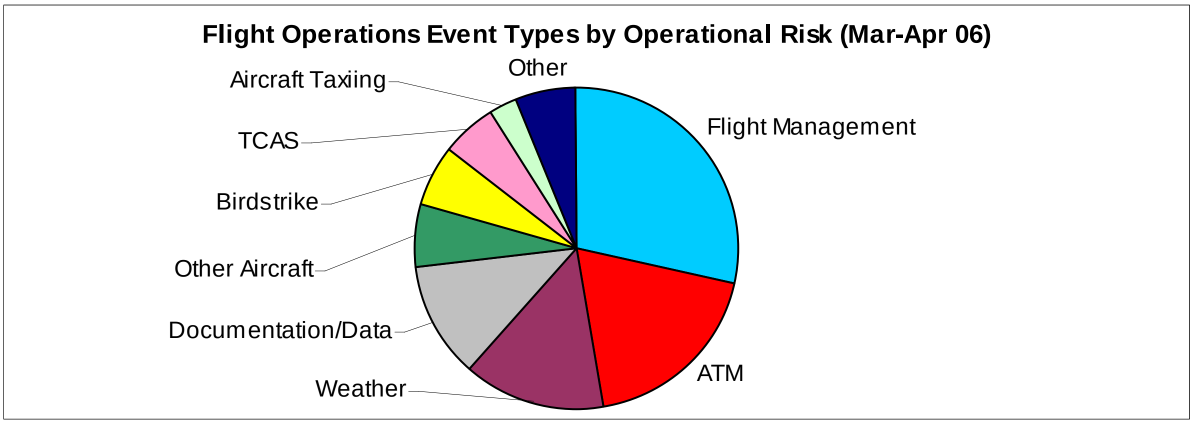
2. Review with Airbus the ECAM actions for this failure, and crew actions to be taken in event of the lower ECAM also failing, to ensure that flight instruments are restored as quickly as possible.

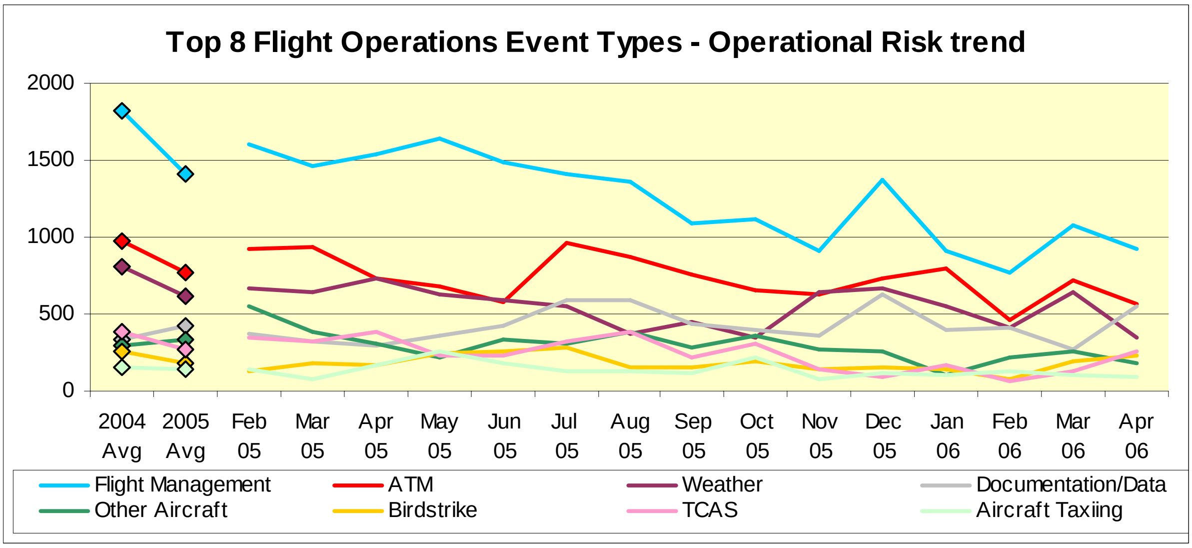
3. Continue active involvement in the Airbus and AAIB investigation into the technical background to this incident and ensure appropriate actions are taken within British Airways in response to its findings.

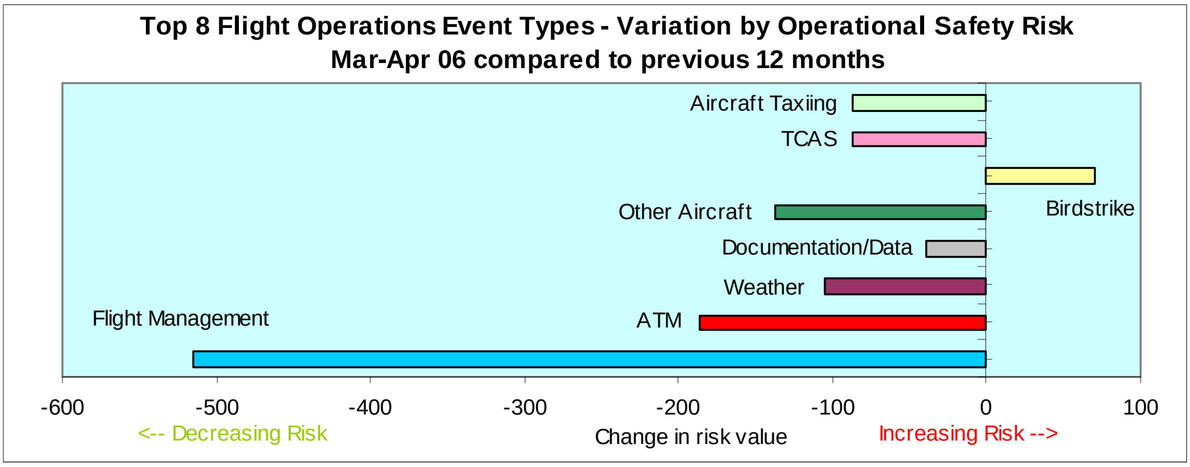
4. Review and revise the ASR reporting process with regards to improving its robustness in ensuring that submitted ASRs are processed within the 96 hours, as specified for MORs.

Flight Operations Event Types

by Operational Risk (March-April 2006)

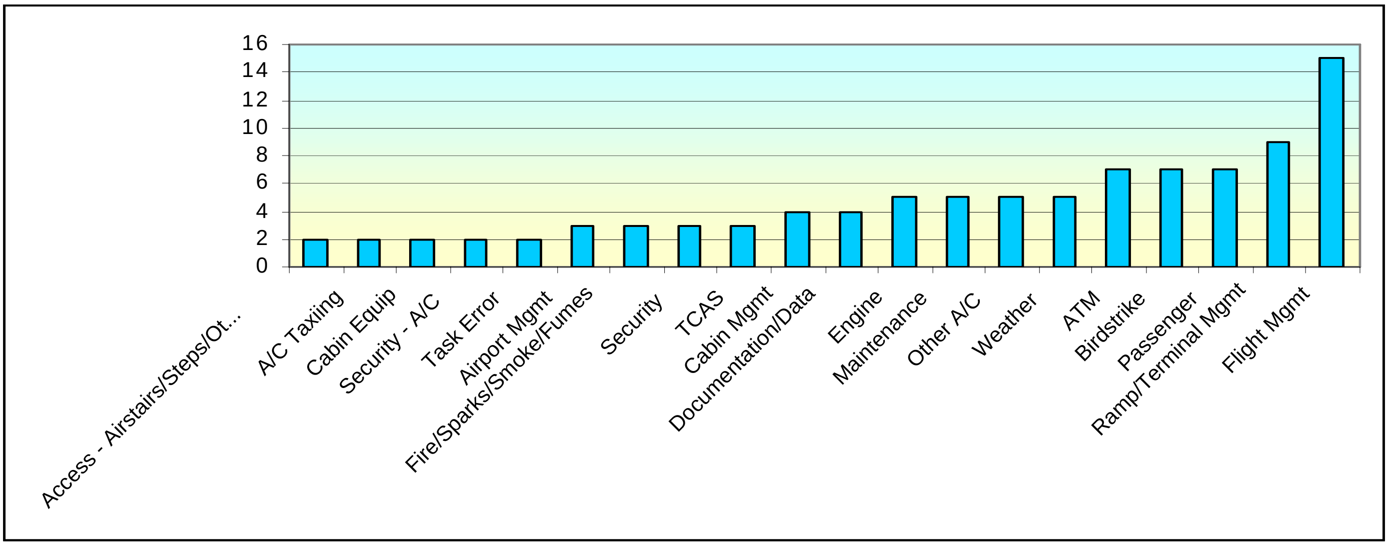






British Airways Incidents

A319



G-EUOG BA1462 LHR-EDI

Approach: **Go-around due excess energy on visual approach.** Subsequent visual circuit flown without incident. FDR reviewed. Visual approach flown by the first officer, that resulted in excess energy below 1000 feet. Correct decision made to go-around, which was initiated around 700 feet radio altitude. This is an appropriate point to go-around, having made an assessment of energy state at 1000 feet and correctly assessed that the stable approach criteria had not been met at 1000 feet, and would not be met at 500 feet. The first officer has been invited to view the FDR with following points in mind:

1. How approach became high-energy.
2. P1 flight directors remained on despite visual approach flown by P2.
3. Was noise abatement complied with at EDI?
4. Go-around was non-standard. FDR viewed with the first officer and it was accepted that his high speed on descent was unhelpful and that he misjudged the energy state of his visual approach. He recalls asking for flight directors off, but doesn't recall whether the captain deselected his own (the FDR shows captain's flight director on throughout). At 1000 feet RA the captain said he thought they would have to go-around, and the first officer agreed. He then thought about his actions, but no mini-brief was made, and the autopilot was not re-engaged - both of which he accepts would have helped the subsequent go-around. At around 700 feet they initiated the go-around, and ATC immediately offered a visual circuit, which was accepted. This explains the non-standard go-around, where the thrust was reduced early to capture the circuit altitude. The handling pilot's flight director was again de-selected (same error), as this is normal SOP in the simulator for visual circuits.

The HP accepts that his workload, and that of his colleague, was unacceptably and unnecessarily high. This could have been reduced by better briefing, a more conservative energy profile, and most of all, by use of autopilot. He accepts that he should have recognised how busy they had become and re-engaged the automatics. No further action required.

G-EUOG BA312 LHR-CDG

Landing: **Poor air traffic control.** At 2nm on short finals for R/W27L, ATC cleared another aircraft to line up and take off. We advised ATC of our position, but ATC cleared the other aircraft to take off. Received landing clearance at 150 feet radio, but preceding aircraft was airborne. Go around considered, but aircraft seen to rotate. It was considered landing to be safest option, as preceding aircraft would be airborne, and go-around track could have conflicted with departing aircraft. Very poor situational awareness from ATC.

G-EUOA BA926 LHR-CGN

Approach**: No.2 engine idled uncommanded on short final.** Aircraft dispatched with engine No.2 TLA fault. At 350 feet (short final) No.2 engine thrust reduced to idle (no ECAM). Aircraft stable so landing continued. No reverse available on No.2 engine (reverser 2 fault ECAM). Landing uneventful on long clear run with no reverser selected, no ECAM, items except 'engine 2 one TLA fault'. Failure briefed before event due dispatch restrictions. No.2 throttle control limit engine No.2 replaced, fault 'Eng 2 one TLA fault' still present. Harness replaced. Extensive wiring checks and ground runs all operated satisfactory.

Troubleshooting this defect traced the fault to a high resistance across a single disconnect (plug 470VC) within the CH A harness of the engine control wiring between the throttle and the engine. Upon disconnection of the connector an amount of contamination was found inside. The contamination was described as 'oily' in nature, but the source could not be determined. The contamination within the connector was removed and the connection was then remade. Following this reconnection the resistance value across the connection was found to have returned to a normal value. Since return to service there have been no further reports of this type on this aircraft. Engineering are continuing to monitor.

Airbus comment on their experience is as follows: There are occasional reports of contamination inside of connectors leading to system faults. The range of this type of event over the full aircraft is varied, and the specific event experienced on this aircraft is quite infrequent, so we cannot provide specific fleet experiences.

The connectors such as the 470VC pair are designed to prevent ingress of contamination including moisture or liquids. Contamination or the ingress of moisture can occur for a variety of reasons; missing sealing plugs, damaged grommet, stress on wires pulling and distorting the cavities, connectors left disconnected during maintenance without protection, high pressure washing to name a few. However, in general there is a very low incidence of connector contamination considering the numbers used and the environment in which they are sited.

The following provides a summary of the fault logic for this event.

The throttle lever is fitted with two throttle resolvers. Each resolver is dedicated to one FADEC channel (A or B). In the case where one of the two resolvers should fail, there is an accommodation logic that will utilize the other resolver input. The 'Eng X one TLA fault' message is then generated. The aircraft was dispatched with an 'Eng 2 one TLA fault.' Therefore, at dispatch one of the resolvers had already provided invalid data (probably due to the contaminated connector). During the subsequent flight and at the time of the event, both TRA inputs were considered by the FADEC to be valid, but with a delta. A crosscheck was carried out, and the delta was at more than 1.8° per FADEC logic, if this occurs, the selected TRA will be set to past value. If the failure persists for one second or more, the 'Eng X thr lever disagree' message will be displayed, and an accommodation logic will be utilized based on the selected TRA (past value) at the time of the crosscheck. If this condition disappears for 5 seconds, the TRA values will be utilized as normal and the ARINC bit will be cleared. If the throttle is moved after the accommodation logic is invoked, the logic will change accordingly. Furthermore, if the flight status transition from flight to ground or from ground to flight, the accommodation logic will transition accordingly. Should this crosscheck occur in the approach phase either continuously or intermittently for a total of over 3 seconds, then the 'Eng X thr lever disagree' fault will be latched and the TLA will be set to forward idle. This is the case experienced in this event.

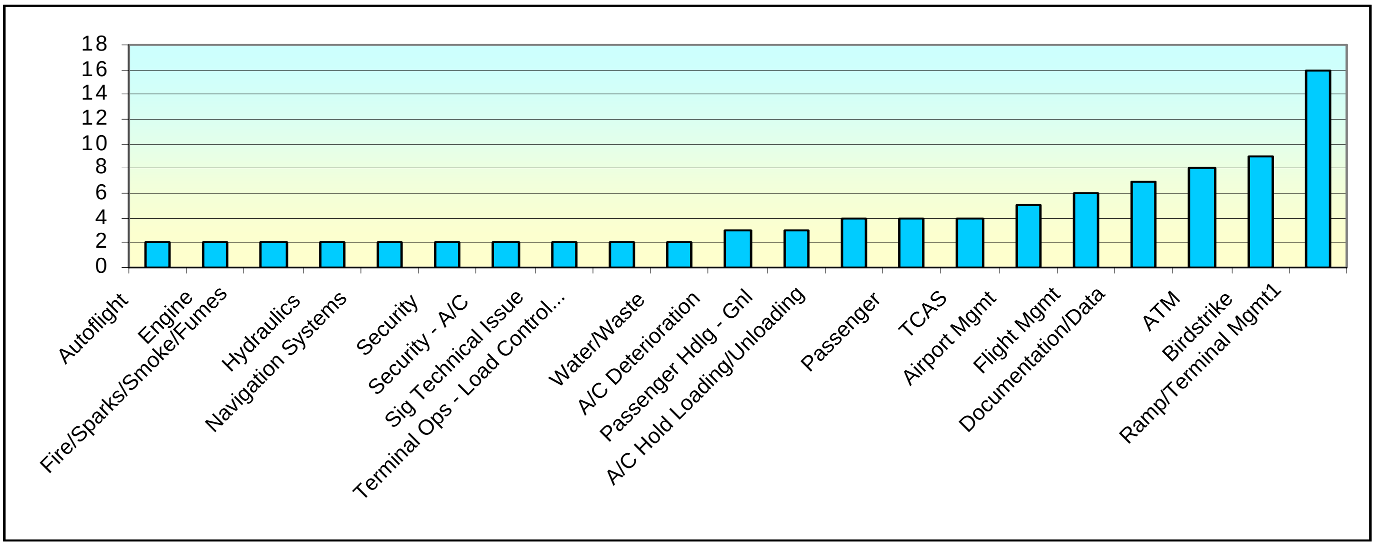
Airbus cannot comment on the probability of a double engine event scenario, as there is no common link on both engines to this type of event. The EEC has a number of tests and accommodation logics, which aim at continuing normal function in spite of a resolver fault in addition to the fact that each lever has two resolvers. When this aircraft was dispatched, one of the resolvers had already shown signs of failure.

The TRA parameters to the EEC are not available on the DFDR. It would therefore not be possible to track a divergence of TLA values, during routine engine trend monitoring for example.

G-EUPY BA794 LHR-HEL

Descent: **No.2 engine sensor fault required autothrottle disconnected.** At top of descent, an engine No.2 sensor fault was present. When power was applied, engine No.2 lagged significantly behind engine No.1. No.1 reached 1.2 before No.2 engine moved at all. The autothrottle was disconnected and a manual thrust descent and approach was flown. The landing was normal with the captain handling. Due to the current autothrottle policy (no manual thrust) a normal situation became abnormal, as this crew had limited experience flying the aircraft using manual thrust. It has been assessed that from a technical and training point of view, the crew and aircraft performed as expected. The trace has been reviewed and the approach was stable throughout. P6 sense line purged of moisture i.a.w TSM requirements. Defect cleared with no further recurrence

A320



G-EUUA BA963 HAM-LHR:

Take-off: **Incorrect V speeds used for take-off.** V speeds for take-off at a weight of approximately 3 tonnes below actual take off weight used due to error in submission of performance request. Aircraft rotated and climbed normally, though V2 bug noticed adjacent to VLS strip, thus pitch slightly reduced to increase speed. During flight deck set up a distraction from the cabin caused interruption to sending performance request, P1 having half completed request, it was then finished by P2, a weight in between ZFW and TOW was used, error not spotted. Flap 3 figures for R/W05 at HAM received. It was noted that speeds were relatively low but due to flap 3 departure speeds appeared acceptable. Note: It is felt that with three flap settings and three aircraft variants it is now difficult to estimate V speed as a 'gross error' check and combined with distractions extreme vigilance is required. A discussion was carried out with the first officer, who made the original error on sending the performance request. He cannot recall the exact circumstances, but did recall that the crew were working extremely well together during the tour, to the extent that they may have become slightly complacent. The large variation in valid take-off speeds seen on the fleet (and commented in the ASR text) was also mentioned, and his analysis is that more rigour was required. He now double and triple checks all data to ensure avoidance of this kind of error. No additional causal factors were identified, despite prompting on the possible issues of fatigue, illness, inadequate SOP, confirmation bias or external distractions. During the take-off it was realised that the speeds were 'wrong' and mitigated by flying at a speed appropriate to the actual weight, using the independent guidance given by the PFD speed scale - this disregards pilot-input data and protects from errors of this type. Flight management reviewed the FDR trace and animation. Aircraft safely flown throughout, and in fact the design of the Airbus allows more effective mitigation of this type of error as the accurate safe speeds are displayed on the PFD irrespective of the incorrect V-speeds. It was this discrepancy that allowed the error to be spotted and mitigated by the crew. The rotation was normal, and during the initial climb-out, the speed flown was approximately VLS (which is safe). The speed then increased to ensure increased margin. The event was further discussed with the flight crew ensuring complete understanding of the causal factors.

G-EUUR BA458 LHR-MAD:

Approach: **Airprox at 1500 feet on final approach.** At 1500 feet the tower controller advised of another aircraft crossing ahead at the same altitude. A target was seen on TCAS and a TA was received. Traffic was observed visually at 1.5nm ahead left to right and 500 feet below. It appeared to be a small commuter aircraft on final approach to another airport. The approach was continued as the other aircraft's bearing was increasing. The landing checklist was interrupted due to the distraction and was completed at 800 feet. This report has been forwarded to IATA who is passing MAD ASRs through to AENA. IATA and the airlines are in discussions with AENA to improve their investigation and feedback procedures. This report will not be investigated by the Spanish authorities but will form part of our ongoing discussions with AENA.

G-BUSK BA561 LIN-LHR

Taxi-in: **Stand guidance 240 does not align with markings on ground.** The lateral guidance in this stand is out of alignment with ground markings. Marshalls and ATC informed. HAL informed who respond that they viewed the AGNIS from the flight deck of a B767. The aircraft was slightly port of centreline, but well within acceptable limits. It is therefore suspected that a fault has been raised and has been attended to since the ASR was raised. For an A320, there would be no issues with wingtip clearances.

G-EUUK BA565 LIN-LHR

Take-off: **Aircraft given unsafe clearance to take-off.** A problem on roll out and vacating runway (only one runway at Linate) was reported by previous landing aircraft. Possible debris on runway. ATC gave clearance to take off with arriving aircraft behind on finals. Clearance refused and runway inspection requested. ATC then instructed to clear the runway for landing traffic. Aircraft on finals instructed to go around. Eventually ATC agreed to runway inspection. Debris found. Runway (and airfield closed for 25 minutes.) Runway declared safe eventually. ATC showed no concern for report of debris or unsafe runway. Linate ATC was asked to investigate and report: *they could not find any evidence supporting the complaint of the crew. The pilot of the previously landed airplane, YU-BTT, only reported a generic 'tyre problem' when the TWR solicited him for vacating the runway expeditiously, not mentioning a tyre burst or the possibility of any debris on the runway itself.*

In a period of heavy communication load, the controller cleared BAW565 for takeoff, but the clearance was erroneously picked up by another inbound aircraft on final (VP-BHN), not only, but misinterpreted by that traffic as a landing clearance for him. At the same time the crew of YU-BTT declared to have got 'a blocked gear' and to be unable to fully vacate the runway (when BAW565 was cleared for takeoff, the landed aircraft YU-BTT was in a position, and proceeding in such a way, that there was reasonable assurance that separation as per DOC4444 para 7.8.2 existed when BAW565 would begin the takeoff run). ATC Tower cancelled the takeoff of BAW565 and instructed VP-BHN to go around, while other inbound traffic were instructed to hold over LIN beacon or switched back to ACC. At this point, the runway was closed and inspection began. To be precise, BAW565 was even allowed to wait the completion of the inspection lined up on the runway, so not only he was the first aircraft taking off when the runway reopened, but he took off even before any inbound traffic that were holding and waiting to land for 25 minutes.

We cannot explain how the crew of BAW565 could say that the TWR attempted other to land, since the runway, inspection apart, was occupied by him! The only message in which a landing clearance was mentioned was the (wrong) read back from VP-BHN of the takeoff clearance addressed to the very BAW565, but we cannot really believe that the crew of BAW565 misinterpreted an already misinterpreted clearance readback from another aircraft. And the statement 'ATC showed no concern for report of debris or unsafe runway' could hardly be explained: the runway was closed during the inspection, and declared usable before operations resumed. As previously mentioned, the aircraft that scattered some rubber debris on the runway, YU-BTT, never declared a flat tyre nor a tyre burst, but a generic 'tyre problem', and he was still rolling out of the runway, so the controller did not have any reason (having observed nothing strange during his landing run) to suspect that the runway was contaminated by FOD.

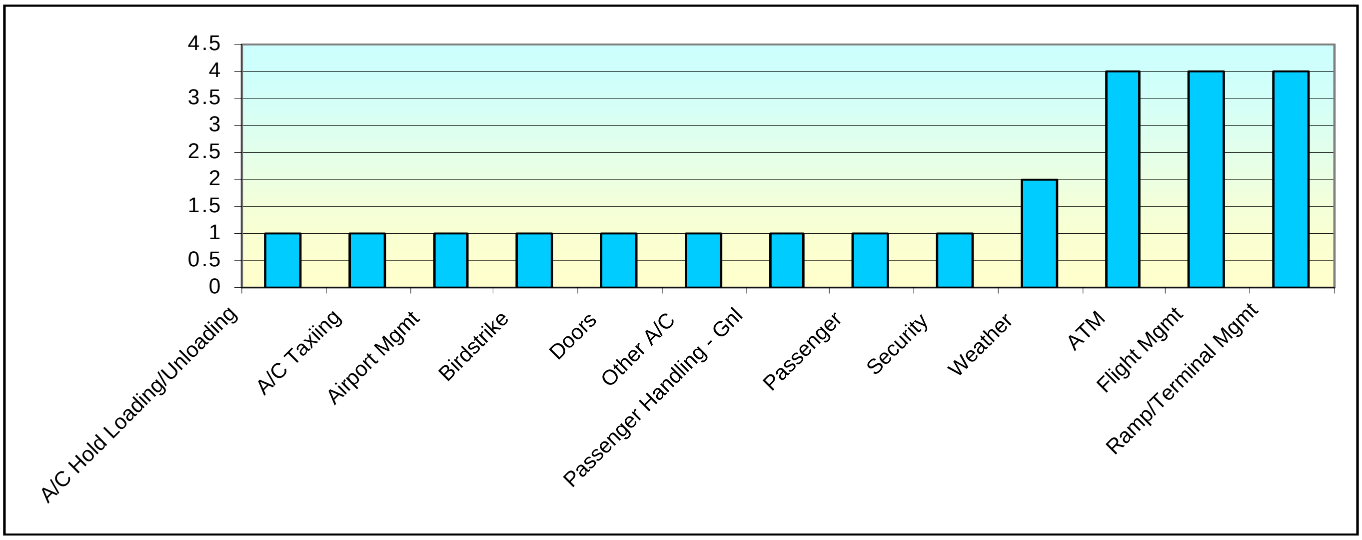
G-EUUP BA869 BUD-LHR

Pushback: **Pushback tow bar disconnected before parking brake set.** Aircraft pushed back from stand 38 normally using tug and tow bar. Engines started during pushback. After pushback completed, aircraft was felt to move forward slowly. At same time, the headset operative urgently called for brakes to be set to park. Brakes applied (at approximately 1kt) and park brake set. Engineer admitted he had omitted to call for brakes to be set to park before tow bar disconnected. Engineer confirmed no damage to nose leg. Aircraft only moved forward approximately 1 to 2 feet. After start checks completed. Further taxi without incident. Malev engineering has been reminded that when pushing back they must receive confirmation that brakes are set or released as required. The engineer concerned admits his mistake and understands the possible implications for failing to have the aircraft brakes set with engines running and tow bar removed.

G-EUUP BA886 LHR-OTP

Parked: **Over wing exit found not armed during first flight of day checks.** Before the first flight of the day and post engineering input, the captain reported that the right over wing slides were not showing armed on ECAM. On investigation the right over wing exit found not armed. Engineering contacted and found slide had been disarmed whilst on maintenance on the previous night. Engineer re-armed the slide. Initial investigation revealed that this aircraft was recently in maintenance and during maintenance an operational test of unlocking and opening from inside in the 'Armed Mode' Mode was carried out. This task requires the latch pin to be turned ¼ turn to the 'Armed position' following replacement of the hatch. It would appear that this was not carried out as the door was noted to be in the 'Disarmed position' on the first flight of the day after this check. The staff involved in this incident have been briefed on the detail of this report. They are very aware of the arming and disarming procedure, however, in this particular instance the procedure was overlooked. From now on all staff will follow the correct procedure and will double check the indication on the lower ECAM display.

A321



G-EUXH BA362 LHR-LYS

Landing: **Go around from 200 feet due increasing and excessive tail wind.** The aircraft was stable and the in the landing configuration by 1500 feet. The Tower reported a tailwind. (320/10-17kt). The approach was continued with the captain taking control at 400 feet. Some difficulty was experienced getting wind reports due French R/T in use. The autopilot was disconnected at 200 feet Radio and land clearance and wind at 180-360/18 was passed. Some positive windshear noticed by crew, so a go-around was initiated. A manual go-around was flown and the autopilot engaged at 300 feet. At Aa climb thrust selected but autopilot speed control was very poor reducing to VLS. The autopilot was disconnected and a manual clean up to flap zero carried out, after which the autopilot was re-engaged. Radar vectors to normal ILS and landing on R/W36R, wind 260/20 that equalled 4kt tail wind. There was CB activity 5-10nm SW of the airfield (moving towards the airfield), which may have accounted for the unusual winds experienced on both approaches. FDR viewed, and all aspects of approach normal (with tailwind) until last 200 feet. Autopilot disconnected and windshear observed, prompting initiation of go-around. Aircraft attitude and thrust remains constant but aircraft drifts above glide. Go-around was well flown.

G-EUXI BA393 BRU-LHR

Descent: **Altitude bust by 600 feet during descent.** Aircraft descended towards FL100. ATC noticed aircraft passing through FL106 descending and instructed aircraft climb to FL110. ATC advised that cleared level had been FL110. Flight crew disconnected autopilot and gently returned aircraft to FL110. Lowest flight level reached was approximately FL104 during recovery. Both flight crew believed cleared level had been FL100. The ATC tape was reviewed to and is as follows: *relevant recording attached. BAW393 cleared down to FL110, clearly and accurately acknowledged by crew. I attach a print from the London radar showing the reason for descending only to FL110. Separation maintained, just! Closest BAW393 got to the SAS531 holding at LAM was 5.2nm laterally, 300ft vertically*.

G-EUXI BA709 ZRH-LHR

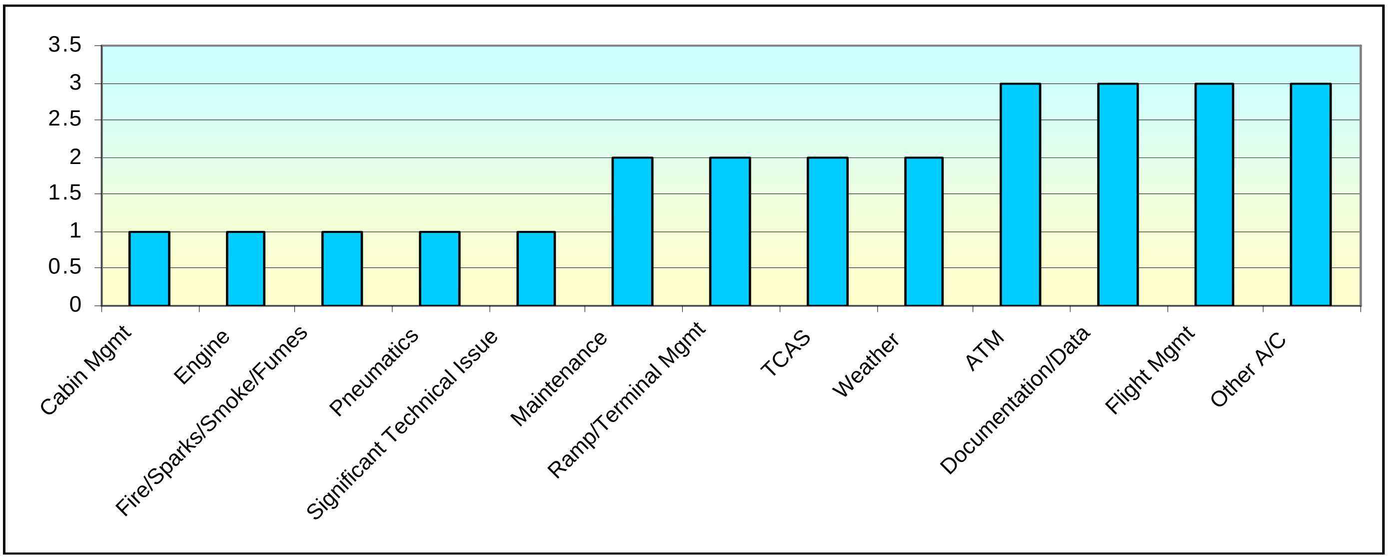
Take-off: **Early application of pitch during take-off roll.** No.2 thrust lever slipped out of flex gate as power set. Thrust lever clicked back into flex gate at approximately 50kt. Distraction caused prolonged application of forward stick input beyond 80kt, removal of forward stick input and correction (over) caused early application of pitch up

input after V1 > just before Vr. Event discussed.
The FDR has been viewed. The thrust lever angle for No.2 engine goes beyond the flex 'gate' and is adjusted (prompted by captain) back to flex around 60kt. Therefore the power is adequate and correct at around the right place in the takeoff. The stick stays forward of neutral until 126kt (it should move to neutral by 100kt) and the rotation is initiated early at this point. The nose gear becomes uncompressed at 131kt and the aircraft lifts off at 152kt, which is safe and greater than the V2 safety speed of 135kt. The pitch attitude as main gear uncompresses is 6.3 degrees against a tail-strike angle of 9.7 fully compressed. Captain describes debrief following event, with co-pilot stating that captains prompt distracted him to the extent that he rotated early. This seems to have been mitigated during the rotate to ensure tail clearance and all aspects of subsequent takeoff normal.

G-EUXF BA706 LHR-VIE

Landing: **During night landing - all aircraft landing lights u/s.** During a landing at night all landing lights were unserviceable. Investigation revealed there is no current AMP requirement for an operational check of the landing lights or runway turnoff lights therefore we are reliant on pilot reports for rectification of defective lights. In this particular case it is unlikely that all the lights failed on this sector. The only inspections of these light carried out by engineering are general visual inspections of these lights from the ground. Appropriate action taken by engineering,

B737-300



G-LGTI BA2366 LGW-MRS

Pushback: **Nr2 engine start aborted due potential EGT exceedance.** No.2 engine started during pushback using APU bleed air. Maximum motoring achieved 22.5%. EGT observed still rising through 705°C, so start aborted by selecting start lever to cut off. Peak EGT 710°C (limit 725°C). QRH actioned. After discussion with engineering a restart was commenced with No.1 starting normally (maximum motoring achieved 23.5%, peak EGT 673°C), and No.2 started satisfactorily using cross bleed procedure. On previous sector (BOD-LGW) it was noted that No.2 engine peaked at 707°C during engine start using APU bleed.

At the time of this incident, the APU fitted was a loan unit supplied by Honeywell. This APU has had a history of intermittent low bleed air pressure since fit. The APU was removed for investigation. The APU was sent to Honeywell where a receiving test was carried out. It was confirmed that the APUs bleed air pressure was below limits at certain power settings. The APU had an HSI performed and it was found that the turbine nozzles were eroded beyond limits. The APU was repaired and is now held by Honeywell for further loan/lease. The APU that has replaced this loan unit has performed satisfactorily and no further incidents have occurred. Since installation this APU has had a history of not producing sufficient air for main engine start.

This APU has since been replaced. After replacing the APU there has been no further reports of aborted engine starts due to engine EGT raising rapidly. Powerplant will continue to monitor for any occurrences.

G-LGTE BA2487 BCN-LGW

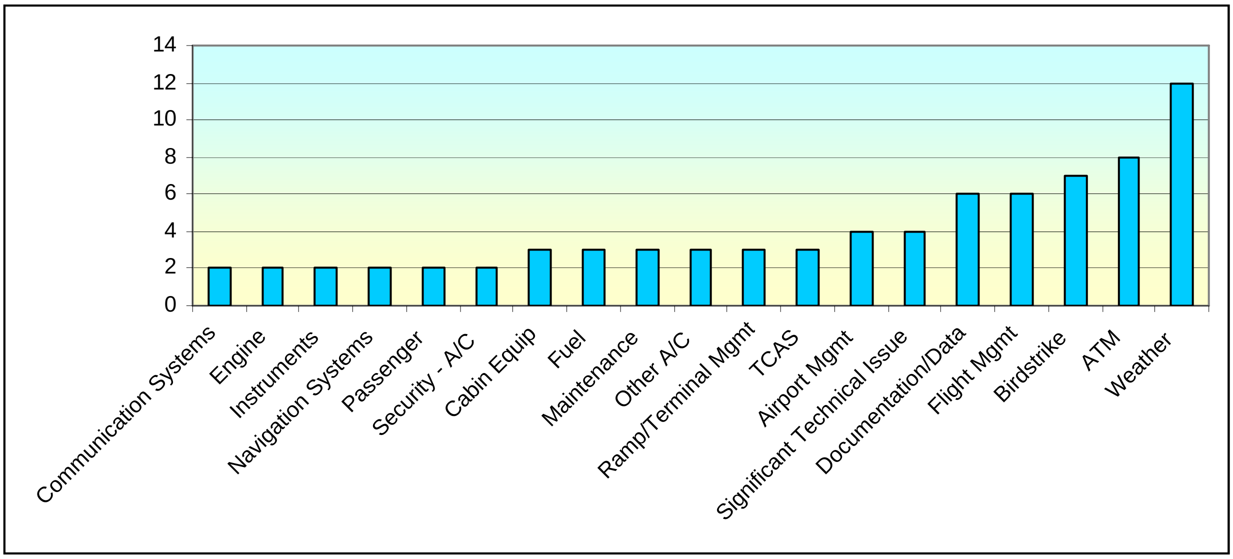
Pushback: **During pushback driver came off centre line by at least three metres.** As described above, the aircraft was pushed at least 3m off centre line to the right, and it is believed compromised safety by bringing the aircraft too close to a company aircraft on stand E5 (aircraft also parked on E3 (Globespan 737). The pushback was continued safely tightly observing our proximity to aircraft. Tug driver and girl on headset informed that a report would be submitted. Girl on headset outside tug but didn't react to aircraft coming off centre line (flight crew starting engines during pushback). An agreement has been reached with ICTS to start providing a wing walker, whenever our aircraft is parked in E4 and there is another on E3, following the recommendation of British Airways Corporate Safety and Quality. This measure should ensure that British Airways does not face a similar incident again on pushback from E4.

Swissport also investigated the event and concluded that clearance was not jeopardised during the pushback. The move off the centreline (which is for guidance only) was to avoid a fuel truck and the headset op and driver were confident at all times of clearance. However, there was no wing walker in place as recommended. BCN have been advised to confirm that the wing walker is being utilised for pushback from E4 when aircraft is on E3.

G-LGTF BA2618 LGW-NAP

Approach: **Airprox with light aircraft at 600 feet AGL.** On approach to NAP R/W24 at 1500 feet AGL TCAS traffic observed at 3 miles two o'clock position no height information, and traffic not visual. Traffic continued on intercept course. At 600 feet AGL TCAS TA received and traffic became visual as it took avoiding action. We estimate traffic was within 200m and 300 feet displaced to right. After reporting occurrence to tower a heated discussion in Italian took place with an aircraft with possible call sign of 'Eight Charlie Foxtrot'. The report was filed with the Italian authorities (ENAV).

B737-400



G-DOCO BA2885 ALG-LGW

Parked: **Single pack operation due to pack failure after start.** Elected to operate back with one pack operating after fuel assessment made (restricted to FL250) and discussion with engineering. During climb, auto fail light illuminated at around FL80, cabin alt around 5000 feet with cabin rate 1500 ft/min. QRH actioned, pressurisation mode switched to standby, cabin began to pressure and flight continued to LGW with continuous fuel assessment. QRH actioned and MEL consulted re pack failure. Fuel monitored, diversion options discussed should the aircraft arrive at hold with reserve or less. The QAR data was obtained for this flight. After take off the cabin is seen to be climbing at a faster rate than expected for the selected flight altitude of 25,000 feet. The cabin differential pressure also is seen to be fluctuating. At 8000 feet aircraft altitude the cabin altitude is 5000 feet as reported? At this point the flight crew noted the auto fail light was illuminated. The pressurisation controller will 'auto-fail' under three conditions; a loss of 115v AC power for greater than 15 seconds, cabin altitude exceeding 13,875 feet or most likely a cabin rate of change of 1psi per minute (equivalent to 1890 ft/min). The first two conditions are most unlikely and the cabin rate of change did not appear to exceed 1500 ft/min at its worst. Therefore the reason for the auto fail is currently unexplained. As the cabin differential pressure reaches 2.0psi there is a significant change in the cabin altitude. From this point the cabin smoothly moves towards the selected cabin altitude (3500 feet) for a cruise altitude of 25,000 feet and remains under control thereafter. Subsequent to this flight there were a number of reports of the cabin altitude hunting in auto resulting in the controller being replaced. The workshop testing did not find any faults with this unit. However it had been removed for auto fail problems a number of times in the past and the auto board was replaced in May 1999. There were a number of subsequent reports of PACK lights. The left and right pack/zone controllers were swapped to aid troubleshooting. Since this action there have been no further reports of pack lights or trips. Nuisance pack lights on recall have been an ongoing issue for some years on the 737-400 and 8/900 series aircraft. Analysis by Honeywell has shown that electrical interference during power transfers can cause the pack zone controller to show a fault. A modification is available from Honeywell to upgrade the controllers; this mod incorporates an EMI filter. The pressurisation controller will be monitored for any repeat of the auto failure problem, should this occur the unit would be subject to the 'rogue' procedure. The Honeywell modification for the pack zone controller will be evaluated for possible embodiment. The initial cause of the left pack trip was most likely a nuisance warning. The cause of the pressurisation auto fail has not been determined.

G-GFFF BA7984 BOD-LGW

Approach: **Encountered light aircraft on final with less than standard separation.** Non-altitude TCAS observed, visually spotted, at 11 o'clock on a converging flight path. Traffic was observed to turn right and pass down left side approximately ½ mile laterally and slightly below. Identified as a PA-28, exact model not know. Captain (handling) was considering a go around. As other aircraft was seen to be turning in a safe direction. Approach was continued. ATC informed and responded that traffic was not known to them. Captain reported separation as ½ mile and 300 feet, but on reflection this may have been an underestimate vertically. ATC report that the aircraft concerned has been positively identified and is the subject of a TC investigation. We had to discontinue approaches and the aircraft eventually routed to the south of Gatwick and cleared controlled airspace.

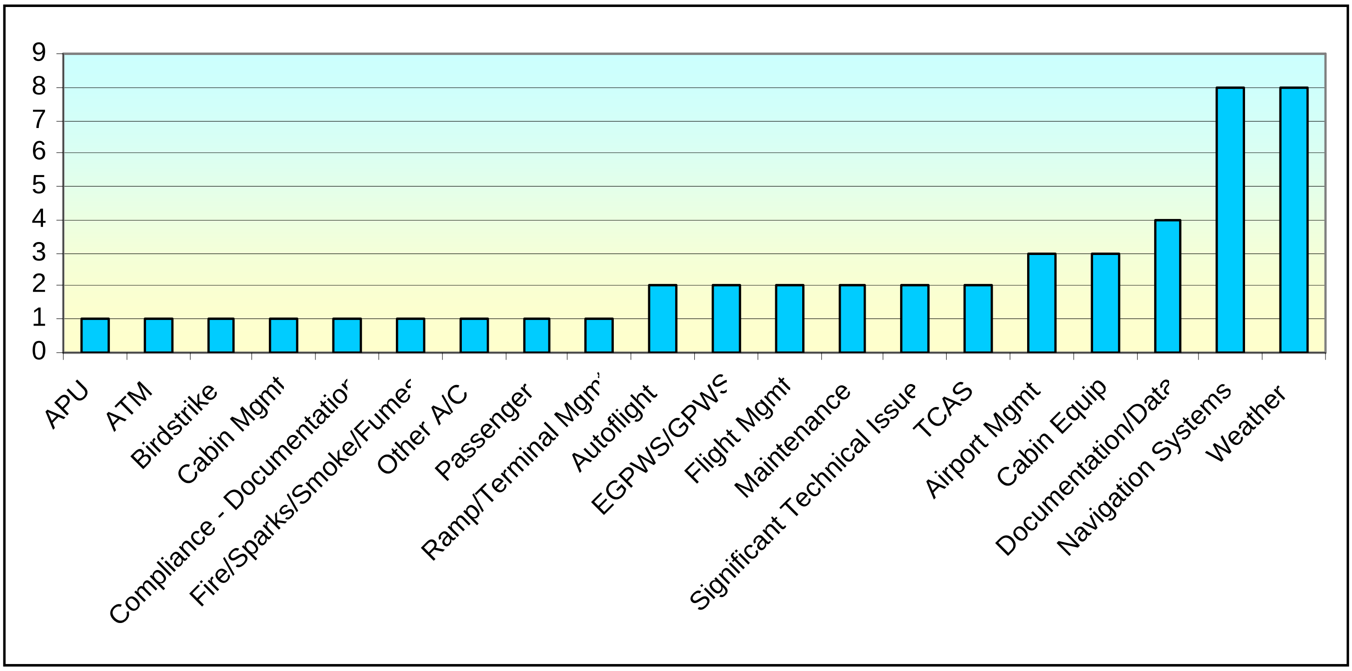
G-DOCN BA2606 LGW-NAP

Taxi-in: **ATC cleared another aircraft to depart while still vacating the runway.** After landing NAP (121.9) instructed to hold on link whilst another aircraft taxiing at high speed was given priority. Crew held in link and not clear of the runway. ATC cleared an A330 to take off which passed very close to our 6 o'clock position just after VR. ATC stated, 'For us you are clear of the runway' I responded that an ASR would be filed. ATC were informed that we did not believe we had vacated the runway and that this was an unsafe practice. (Further info, ATC communications from NAP ATC was garbled and non-standard throughout our arrival/ departure). Event was filed with ENAV. The Italian authorities have a poor record of responses to ASRs so the report was filed with their HQ and the following was received: *the Board investigating Naples occurrences has been involved on the matter and we're waiting for a complete answer. In the meantime, after a preliminary evaluation, we know that (in chronological order): Taking-off aircraft was in radio contact with TWR whilst BAW2606 was on ground frequency. Taking-off aircraft was given instruction to hold, waiting for runway vacated. BAW2606 reported runway vacated and, few seconds later, the take off clearance was issued. Finally, as you certainly know, the relative position of the TWR and 'B' taxiway enable a good perception of such kind of scenario.*

G-DOCO BA2721 MUC-LGW

Initial Climb: **Aircraft failed to pressurise in auto mode.** On initial climb aircraft failed to pressurise in auto mode. Auto fail light did not illuminate. Aircraft levelled at FL80 with the cabin altitude at 8000 feet. Standby mode selected and system functioned normally. NB. No auto-fail light, so no master caution. Fault identified by the flight crew on after takeoff checks. Flight continued normally in standby mode. Engineering report that both the pressurisation controller and the outflow valve were not faulted when tested in the workshops. Therefore further investigation was required. The QAR data for the flight was reviewed and it was noted that the cabin rate of climb was higher than was expected for the anticipated cruise altitude. Also the cabin rate of climb was constant regardless of that the aircraft was doing, i.e. when the aircraft levelled at 8000 feet the cabin altitude should have been held constant. It appeared as if the outflow valve had frozen. The previous and subsequent flights were also replayed and the pressurisation behaviour appeared normal. The fault was therefore very intermittent, having been reported only once before. Two operators reported pressurization problems in auto mode during all phases of flight in which the cabin altitude would rise uncontrollably until standby mode was selected. Investigation revealed that the No.1 transfer relay had corroded contacts that caused an intermittent under voltage condition. This intermittent under voltage condition, not low enough or sustained long enough to cause an 'Auto Fail,' caused the pressure controller to enter a 'hold' mode. During this uncontrolled period, an uncommanded cabin rate of climb or descent may result. The condition described above can best be identified by an uncommanded cabin rate of change in the auto mode in which the cabin pressure control system does not command the outflow valve closed. A Boeing equipment quality analysis (EQA) indicated that contact resistance and load tests did not reveal any problems with contact engagement or conductance. Evidence of contact arcing to the case and between phases was discovered upon disassembly of the unit. This arcing phenomenon has been documented in past removals and has been under extensive investigation. As the information above appeared to correlate well with the incident flight the No.1 bus transfer relay was replaced. Unknown item is not tracked. When tested in the workshop using a millivolt drop test the relay was found to be out of specification. The normal course of action is to up the current and cycle the contacts, which will normally burn off contaminate. This was carried out for this unit, which brought the test readings back within specifications. It is concluded that the failure to pressurize was caused by an intermittent low voltage condition on the AC 115 volt supply to the pressurization controller that caused the controller to enter a 'hold' condition. The low voltage was caused by dirty or contaminated contacts on the No.1 bus transfer relay.

B737-500



G-GFFE BA2612 LGW-PSA

Parked: **APU failure (no fire).** APU started by under training copilot. APU GEN selected on BUS and after 1 minute left pack selected to auto. APU then shutdown with fault and maintenance lights illuminating. APU selected off as per QRH. Captain in cabin at the time then became aware of activity at rear of cabin with cabin crew calling forward. Investigation revealed rear cabin crew had heard a loud bang. APU debris ejected 200 feet behind aircraft. Passenger boarding had been called but no passengers yet boarded. Crew carried out integrity check of APU fire system (okay) and Fire Service attended. APU had suffered major internal failure. A Service Bulletin raised will prevent material exiting the exhaust when a turbine wheel failure occurs. The SB will be embodied at next shop visit of this APU type. Although the APU is maintained

'on-condition', a programme of removal will be carried out on the remaining three APU's to introduce the SB.
The captain wrote this account of the incident: Passenger boarding had been requested on stand 110 at LGW. After monitoring the trainee first officer starting the APU, the captain went into the cabin to carry out the pre flight cabin check prior to an external check. Shortly after entering the cabin, the cabin lights extinguished. The captain returned to the flight deck to be told that the APU had auto shutdown. The APU was switched off as per the QRH but the FAULT and MAINT lights remained illuminated. The captain left the flight deck to check the APU area to be greeted by commotion in the cabin with the rear cabin crew stating that a loud bang had been heard. The aircraft tail had moved and a sound of 'smashing' had been heard. They thought that a vehicle had hit the aircraft. The captain looked out of door 2L and noticed ground staff kicking dark objects into a heap. Debris was observed on the ground behind the aircraft and on taxiway 'K'. The APU did not appear to be on fire. The captain returned to the flight deck, advised the first officer that the APU had suffered a major failure and to carry out a test on the APU fire system to check its integrity. The test was satisfactory. Radio calls made to ATC to request the Fire Services. Passenger boarding was cancelled (no passengers had boarded) and the refuelling was stopped. The first officer was then asked to monitor the flight deck and APU fire system whilst the captain went outside to check for any injuries. None were reported or observed. Debris had been projected out of the APU jet pipe to the south side of taxiway, a distance of around 200 feet. Fire Services were promptly in attendance to monitor the situation and engineering opened the APU cowlings. A BAA sweeper vehicle promptly arrived to sweep up debris, which made subsequent plotting of the debris field difficult when requested by AAIB. The first officer reported the APU had started normally. The APU generator was placed on both bus bars and after one minute the first officer had selected the left pack to AUTO, which is normal for the 737-500 series aircraft. The captain acted appropriately and promptly to deal with unusual event. The APU was removed and was released by the AAIB for investigation. The AAIB required no further investigation. The APU was sent to Hamilton Sundstrand for strip and investigation. Investigation showed that the turbine wheel suffered a single blade separation at the hub. This created an imbalance in the rotating assembly with the result that the turbine wheel made contact with the containment shield. The containment shield forced the turbine nozzle against the turbine casing causing a split in the casing. The incident was fully contained, with a small amount of material exiting the exhaust. To date, there have been five occurrences of this type of turbine wheel failure due to high cycle fatigue. Due to the exiting of material out of the exhaust, Hamilton Sundstrand has released a Service Bulletin; this SB introduces an axial retainer in the exhaust to prevent material exiting the exhaust when turbine failures occur. The SB will be embodied at next shop visit. This APU is considered beyond economical repair.

G-GFFD BA2467 MAD-LGW

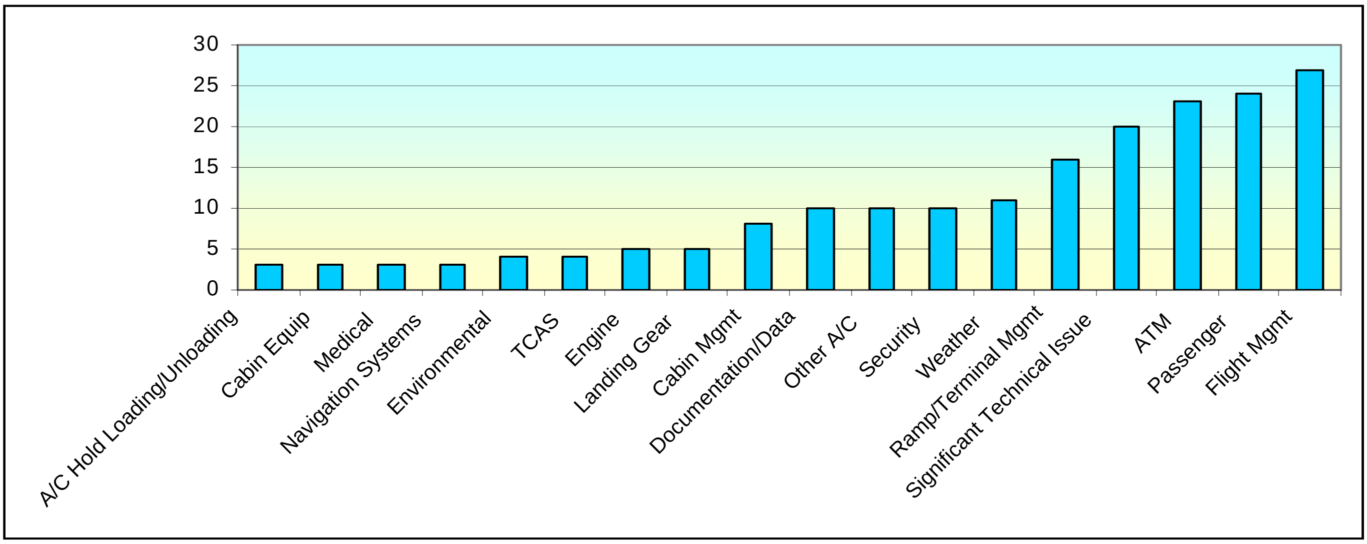
Descent: **Pan declared to multiple failures.** After NAV problems during cruise. Additional problems caused us to declared pan. Both autopilots failed, autothrottle failed, off schedule descent for no reason, PMC failure, TCAS failure among others. On landing problem selecting reverse. All this while flying in discretion.
Captain and first officer have spoken to both Fleet management and Engineering. The Nav problem was a known and deferred defect. The other failures occurred in quick succession during the descent. The crew were faced with assessing and actioning a number of apparently unrelated defects in a short period of time before landing so elected to declare a PAN in order to get full assistance from ATC. The failures did not affect the actual landing apart from being unable to use reverse thrust for about 10 seconds. The captain spoke to engineering after landing. The initial assessment is that the aircraft detected a spurious 'on ground' signal for a few seconds at about 16,000 feet, possibly through a faulty squat switch. Engineering were very appreciative of the details the captain was able to provide which greatly helped with their diagnosis.
The FDR data was analysed and identified that the air/ground discrete is recorded in the ground condition for nineteen seconds at approximately 17,000 feet.
In view of the information from the flight recorder the subsequent post incident engineering investigation removed the ground sensing squat switch card M990 and the R343 air/ground relay from the under floor E11 landing gear logic shelf. The R343 relay had been replaced the previous day while trouble shooting a different defect. Insulation and continuity checks of the relay coil and contacts did not reveal any conditions that might have contributed to the reported failures. Ground sensing squat switch card M990 was sent to workshops who report that after extensive testing in accordance with the CMM they were unable to identify any faults. These removed items were offered to Boeing for their examination and comments. Boeing advised that because these items are expendables they did not have the facilities to test them. After a review of the circumstances of the incident Boeing offered their opinion that they did not consider a failure of the R343 relay could cause the multiple failures that were

reported. They considered that the most likely cause was a defect related to the ground sensing squat switch card M990, they consider that it is likely that either the card was loose in the E11 card edge connector, or the card is marginal and is not revealing an anomalous condition under test conditions. Relay R343 and the ground sensing squat switch card M990 are expendable items and will not be returned to service. There are no further reports of associated faults to date.

'It is a very sobering feeling to be up in space and realise that ones *safety* was determined by the lowest bidder on a government contract'

Alan Shepherd

B747-400



G-BNLA BA054 JNB-LHR

Approach: **Wrong runway selected.** R/W27L ILS selected and joined at 4300 feet and 14nm, with R/W27R the allocated landing runway. ATC and flight crew noticed simultaneously and R/W27R ILS joined without delay. The captain called to explain the event. This was a straight forward error incident. It was a long flight plus a delay therefore tired crew. The crew had briefed for R/W27L. The re-brief somehow did not change the FMC arrival runway. The only point of note was the third pilot was in the toilet at this stage when his attention could have of more value monitoring the approach.

G-CIVX BA117 LHR-JFK

Taxi-in: **Poor marshalling standards.** The yellow lines on stand 3 are confusing and space is tight. A marshaller is provided. During the turn-in, the marshaller made a signal moving both batons to his left, as if passing us to another marshaller. A second person was present, who made a signal to turn left. Instruction complied with, but then gave a signal to stop. In retrospect, it was apparent that the first marshaller was intending us to turn right. Not transferring control. This incident has been addressed with Evergreen. The incident has been addressed by retraining the staff involved, and others who have been involved with similar issues. Going forward we are increasing the level and frequency of wing walking and marshalling recurrent training with the goal of getting the entire ramp staff retrained.

G-BNLM BA018 MEL-SIN

Cruise: **PAN declared due to low tyre pressure warning. Normal landing resulted.** In cruise, EICAS message 'Tire pressure starboard wing gear' outer rear tyre had pressure of 160psi. Cabin crew and ATC informed. A 'PAN' was declared and emergency services requested to attend. Conventional NITS briefing was not given but the CSD was advised that there was a potential problem although the flight deck thought that the warning light was probably spurious. Maximum reverse thrust used with minimum braking. A normal landing was carried out. No adverse indications. The No.15 tyre was found to have a low pressure. The No.16 tyre was also replaced.

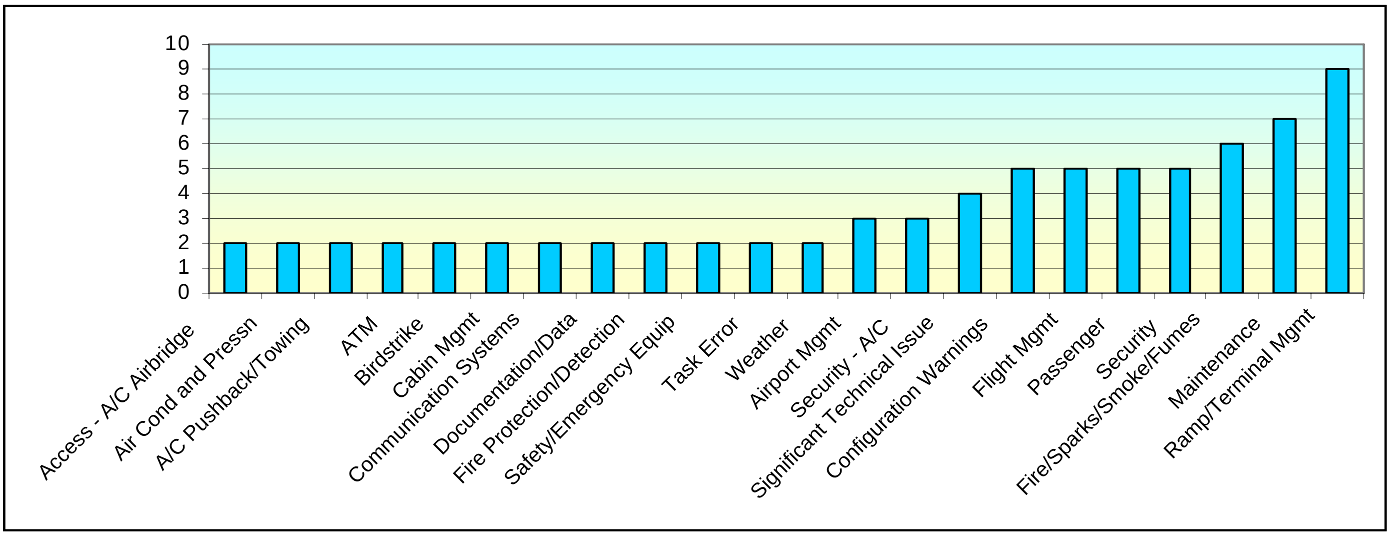
G-CIVF BA174 JFK-LHR

Taxi-out: **Wrong flap setting selected during after start checks.** During the after start checklist, flap 10 degrees was selected in error instead of flap 20 degrees. The error was noticed a few minutes later. With thrust levers closed at night the flap 20 position is sometimes hidden from the captain's position. Care needed. The first officer was debriefed who recalls he was handling pilot and called for flap 20 at the appropriate time in the after start checklist. The captain selected the flap, which the he was aware of but did not notice the flap had been selected to the flap 10 gate rather than the required flap 20. The fact that the flap lever moved he thought it had had been correctly set. The first officer was concerned with the position of the pushback tug and taxiing the aircraft in a confined space, which again led to him not spotting the incorrect selection. The aircraft left the apron and taxied for R/W13R. The before start checklist was started shortly after leaving the apron and it was then that the incorrect selection was picked up. The flight deck was dark and this was cited as a possible reason for the incorrect selection, however the importance of checking the selection against the upper EICAS was emphasised. The captain was debriefed and confirmed the account. Initially he stated that the problem lie in not being able to see the flap 20 gate behind the thrust levers in a dark flight deck. It was emphasised that the upper EICAS should be checked to confirm the selected position. The captain accepted this and will in future ensure he does this. The fleet believe no further action is deemed necessary at this time.

G-CIVX BA138 BOM-LHR/BOM

Take-off: **RTO at 120kt due No.3 engine fire warning.** Arcing sound heard, fuel control switch fire light on No.3 flashed intermittently and the same sound heard again. Fire bell accompanied the light at 120kt. RTO carried out and waited on runway five minutes, then vacated runway. Fire Services attended. Taxied back to stand. Engine fire/overheat test module panel removed and checked for signs of arcing/loose connections. Nil evident. Engine inspected for signs of fire/overheating. Nil evident. Turbine overheat detector card A15 interchanged with No.2 engine card A10. Engine run carried out. Fault transferred to No.2 engine. The fault confirmed as a faulty Turbine Overheat A15 card, which was replaced.

B757



G-CPEN BA1463 EDI-LHR

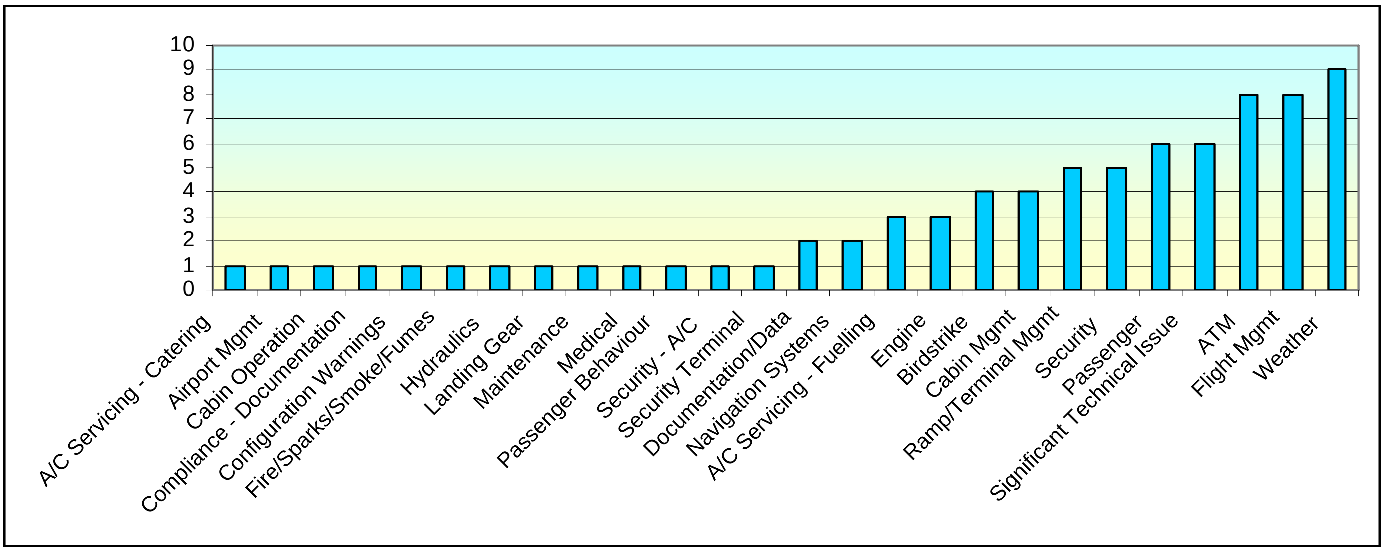
Pushback: **Fumes on aircraft after engine start.** A short discussion ensued and smoke reduced. Some minutes into flight both flight crew suffered slight headache and mild nausea but all symptoms gone by 20 minutes after take off. At no time was oxygen needed or used. Note: After landing both crew felt headache/nausea persisting. Both crew members contacted, who confirmed that the smell, which was 'oily' rather than 'fuel', became apparent just as they were releasing the push-back crew. The smell was transient. The captain contacted the cabin crew at the front, centre and rear of the aircraft and the only area where the smell was evident was the rear, where the crew reported it to be disappearing. On the basis that this was a transient event, the crew decided to continue with the flight. There was no further recurrence. After take-off both crew members felt a slight headache, which went after some 20 minutes. The remainder of the flight was uneventful. During the crew debrief the following morning, the co-pilot reported feeling a little nauseous, but suggested this might be coincidental. This event was investigated and engineering found that the left engine front bearing feed and scavenge tubes were leaking. Seals replaced. During this investigation swabs were taken from the engine handling bleeds and the APU pneumatic duct. Following this the APU has been replaced and currently waiting investigation. The aircraft has operated since this event with one repeat prior to the APU change.

G-BPEC BA786 LHR-ARN

Take-off: **Low speed RTO from below 30kt due to configuration warning.** The configuration warning was due to the speedbrake lever not being fully in the down detent. The aircraft had dispatched with the auto speedbrake deactivated. The configuration warning activated on engine spool up (EPR selected). EICAS message 'spoilers,' configuration warning light and horn all received. The aircraft was taxied clear of runway. The checklist, flying manual and brake cooling schedule were consulted. The passengers, cabin crew and ATC were all advised. A decision was made to depart for ARN. The subsequent departure was without incident. The aircraft has been carrying various faults with autospeed. An outstanding ADD specifically states that the speedbrake lever has to be positively stowed in the detent due to the no-back clutch deactivated as part of the MEL procedure. MAN merely lubricated the pedestal seal in case the pilots were finding difficulty re-stowing the lever and asked for further report.

> One is not exposed to danger, who even when in safety is always on their guard.
>
> Publicus Syrus (Roman Author 1st Century BC)

B767



G-BNWU BA254 LUN-LHR

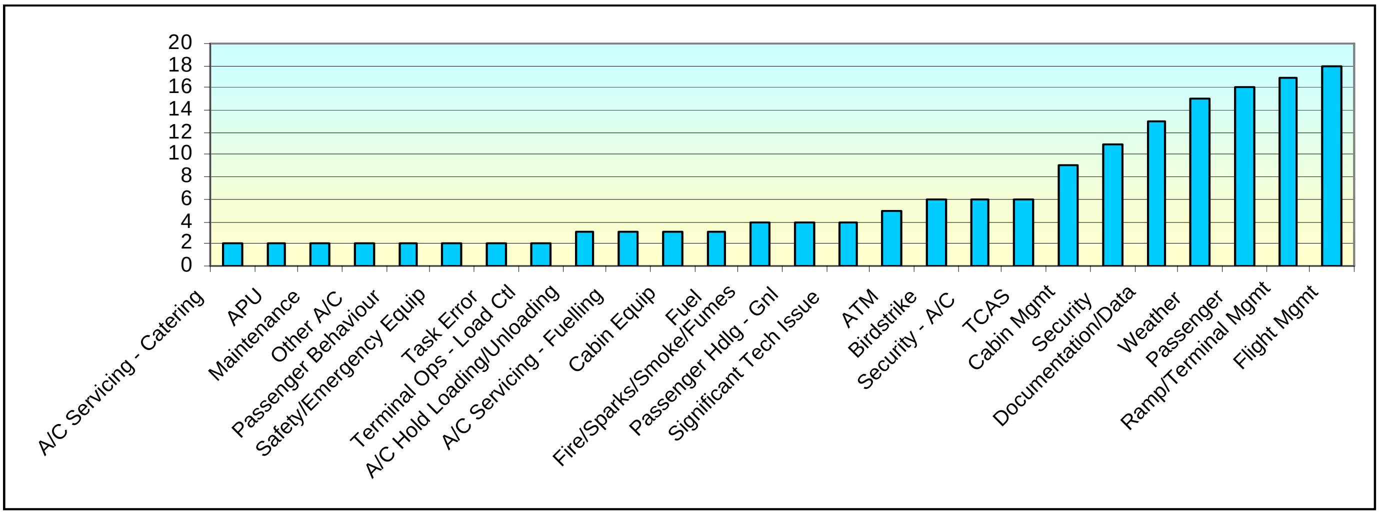
Descent: **ATC queried cleared level.** Aircraft initially cleared FL130. Descent clearance to FL80 heard by both captain and first officer. Clearance was readback. The readback also heard by 'heavy' first officer. On passing FL110, ATC queried cleared level. On stating FL80, ATC said that the crew might have accepted a clearance for another aircraft. Initial readback was not queried by ATC. ATC then cleared the flight to FL90 and handed aircraft over to the next controller.

Please see the response below. RTF recordings attached. BAW254 took the descent instruction issued to EZY5354 that was also on frequency and inbound to Gatwick. There is no indication that BAW254 answered, but this is not uncommon these days, new generation radios with narrow frequencies results in less 'squeal' when two transmissions are made, thus fewer alerts to both crews and ATC. On this occasion there was no other traffic to affect the BAW254 and the event went unreported by ATC, although there is evidence that the ATC had accessed the RT recordings to check the communication exchanges. It appears the mentor wished to determine that her trainee had not issued an incorrect clearance. The last clearance to BAW254 was descent to FL130. The issue regarding the 'lack of squeal' when two aircraft transmit at the same time is an issue NATS are looking into. Prior to the fitment of new radios by airlines, two aircraft transmitting at the same time would have highlighted to ATC by the squeal, this no longer occurs.

Benefits of the Go-around

Last year 129 people died during accidents on landing. No deaths were recorded as a result of an aircraft carrying out a go-around

B777



G-VIIL BA182 JFK-LHR

Parked: **Incorrect CARD performance data (TORA R/W04L at JFK).** The CARD performance data was requested for R/W04L at JFK. When the data was reviewed the TORA assumed by CARD was 3460m. The crew then recalled a NUBRIEF item where the TORA had been temporarily reduced by 800 feet. On checking the two TORA figures it was apparent that the 800 feet reduction was not reflected in the CARD data. As a result R/W04R was used for departure.

The following NOTAM was issued by New York airport authority:

101744 EGGNYNYX
(A1861/05 NOTAMN
Q)KZNY/QMRLC/IV/NBO/A/000/999/4038N07347W005
A)KJFK B)0509101730 C)UFN
E)R/W 04L/22R CLOSED NE 800 feet

As the NOTAM issued by the state was ambiguous regarding the promulgation of the runway closure, the info was added correctly to the Nubrief, but a copy of the NOTAM was not passed to FTSS (Aerodromes and Performance). The local procedure in FTD did not require the passing of runway closure NOTAMs to FTSS, on the basis that if a runway was closed then its use would not be requested by ATC (and thus no CARD data requested). There are a number of similar ‘filters’ in place within FTD to manage the 2000+ NOTAMs received per day.

Following the incident the CARD data and landing figures were amended to reflect the 800 feet reduction.

The FTD process that was applicable in this instance has since been changed. Manager FTD and AIS Team Leader have reviewed the NOTAM receipt /dissemination/action processes and found them compliant. The ever increasing number of NOTAMs received by FTD has led to a renewed focus exploring system solutions to assist the manual process. This is ongoing.

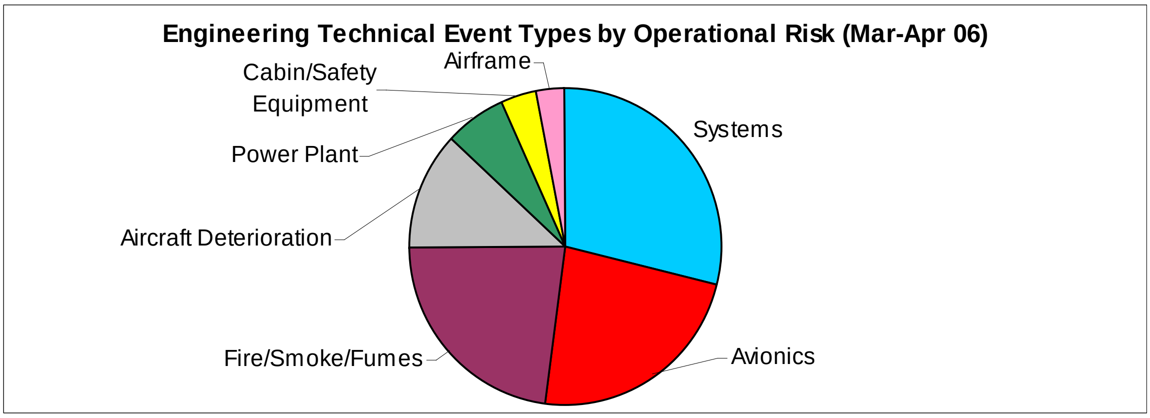
G-VIIV BA155 LHR-CAI

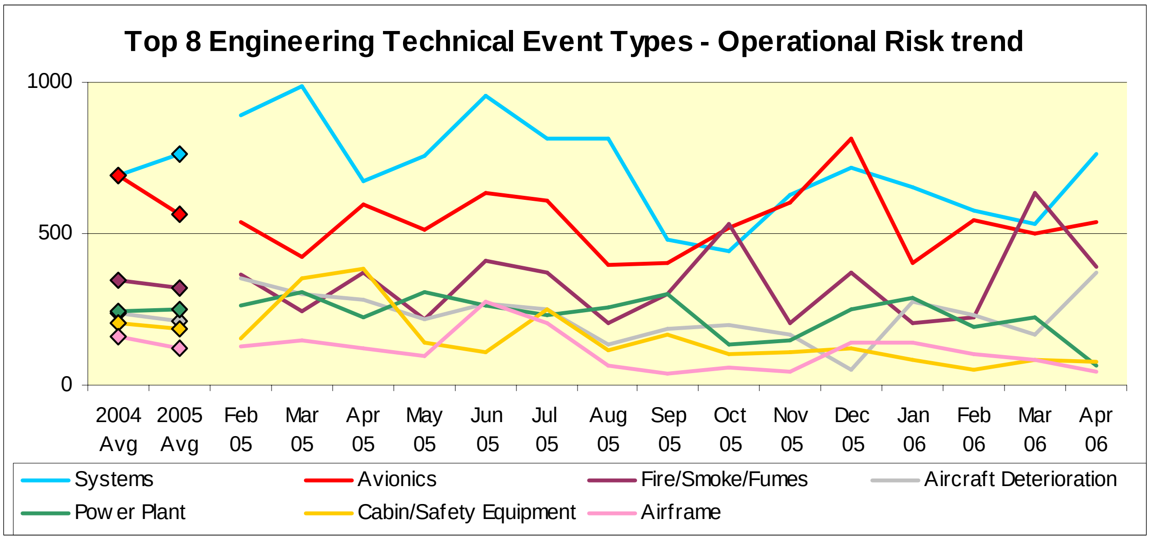
Parked: **Fuel - Surge tank on fuel bowser failed.** This resulted in a fuel spill greater than 2 metres in diameter. Fire Services contacted and the passenger boarding was delayed until confirmed safe to proceed. Area cleaned and the Fire Services remained until aircraft pushed back. During refuelling on stand a fuel spillage greater than 2m occurred. Fire services alerted and dealt with in accordance FCO 1613. Fuel spillage cleaned up. Refuelling then completed and passengers boarded. Aircraft departed about 25 minutes late. A sticking overflow valve on the hydrant dispenser dump tank caused the spillage. This is designed to operate when the tank is full and re-circulate the tank contents through the vehicle filters and back onto the aircraft. The valve has been changed and is now functioning correctly.

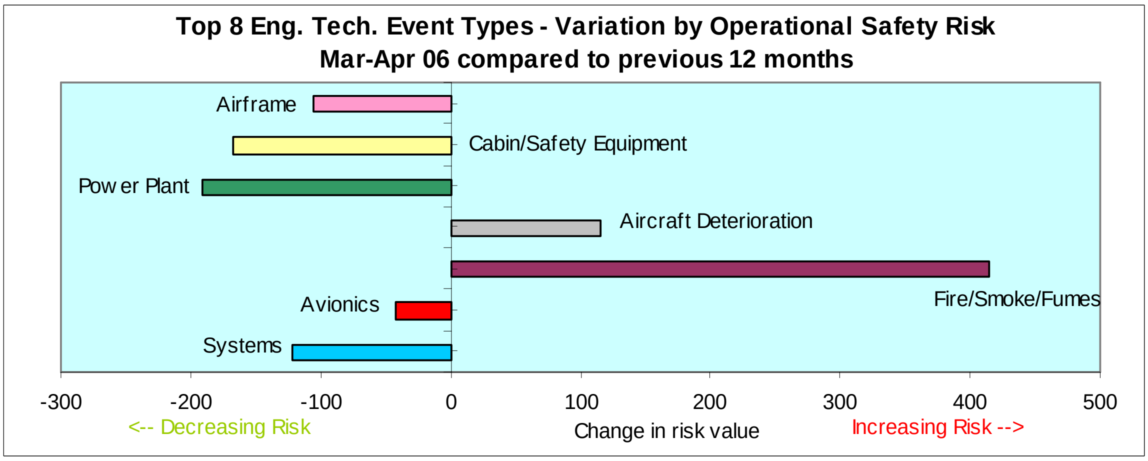
G-VIIN BA238 BOS-LHR

Taxi-in: **Sparks reported from APU exhaust during APU start and taxi in.** A following Company aircraft reported sparks from the APU exhaust during APU start and again when APU running whilst taxing onto stand, all flight deck indications were normal. APU shut down as a precaution. The APU was removed and forwarded to Honeywell. Inspection revealed that the bolts holding the 1st stage de-swirl assembly had worked loose and the nuts became detached and were ingested into the 2nd stage impeller causing severe damage. The damage to the 2nd stage impeller caused contact with the impeller shroud producing the observed sparks during APU operation. It was found that the nuts and bolts holding the de-swirl assembly had not been torque loaded correctly during APU assembly at the previous shop visit. Honeywell have now added an additional inspection point during assembly of the compressor section of this APU type to eliminate further failures that caused this event. Additional inspections during the compressor build will eliminate further failures of the type seen during this event.

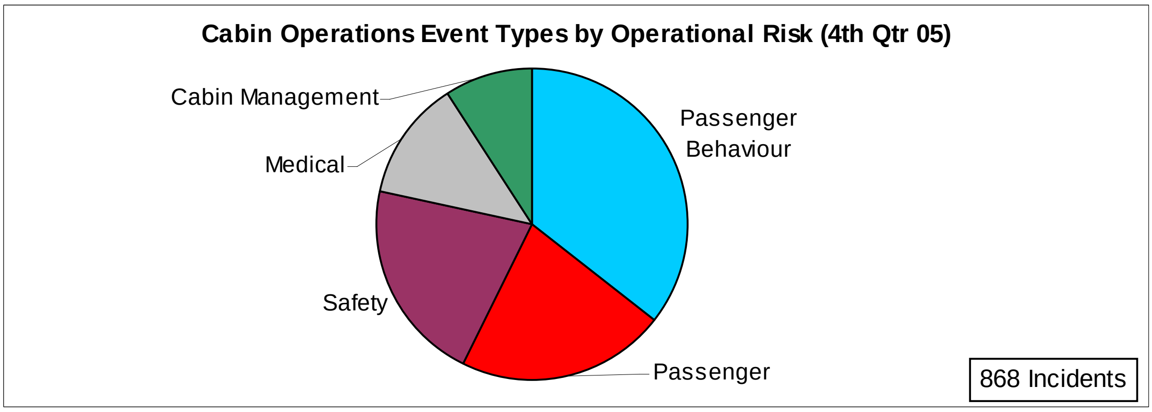
Ground Occurrence Reports

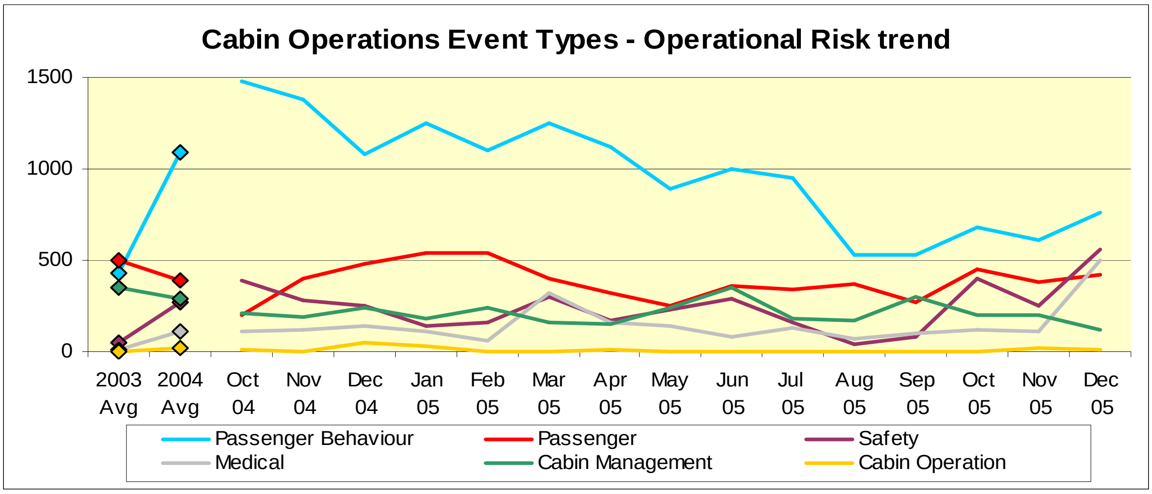




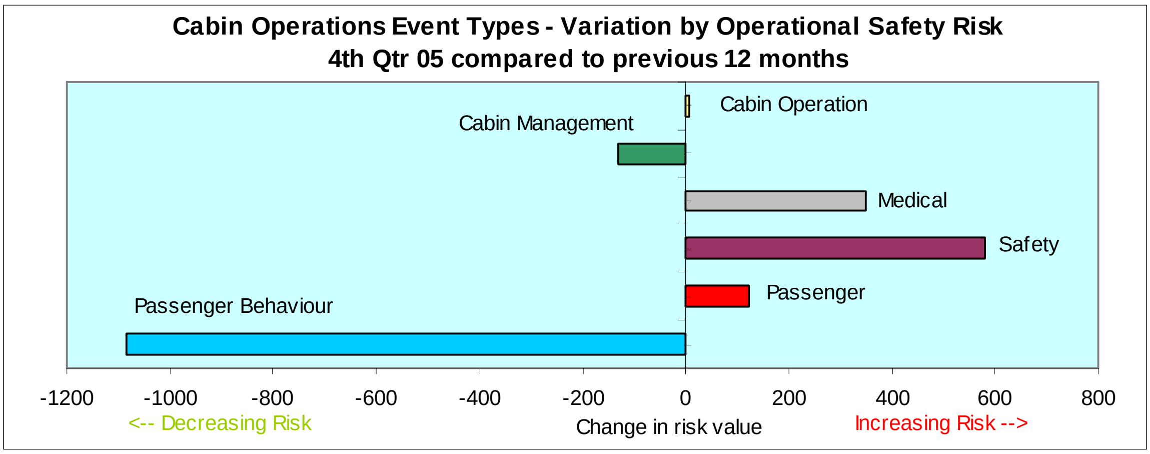


Cabin Safety Reports





The increase in risk associated with Medical event types appears to be due to the use of higher risk ratings. In October and December there were approximately the same number of events (50) however the total assigned risk value in December was 486 compared to 124 in October.



The increase in risk associated with the 'Safety' event type is both due to a significant increase in the number of reported incidents and a use of higher operational risk ratings. It should be noted that the 'Safety' event type is often used as a 'catch all' when no other event type fits, so does not necessarily mean that there is a disproportionate increase is safety risk. This will be resolved when the event types available in eBASIS are revised.

Oops!!!

Boeing 747-400 Gate A22, Terminal 1, Frankfurt

A B747-400 aircraft collapsed on its nose at Frankfurt airport when the front landing gear gave way as it was preparing to fly to New Delhi, an airline spokesman said. The 242 passengers and 16 crew members on board the aircraft had to disembark the aircraft after the nose sank down onto a waiting tow truck.

“No one was injured. Everyone was able to leave the aircraft via the passenger bridge,” the spokesman said. “The cause of the fall is not yet known. It’s very unusual,” said the spokesman. The spokesman added that the incident had been reported to German air accident investigators.

The aircraft was relatively new and had been delivered to in December 2001.

Boeing spokespeople in Berlin and Brussels were not immediately reachable for comment.

Checks were performed on hydraulic system one. The gear lever was selected up according to maintenance procedure.

The aircraft is now in the hangar, further checks are being performed to access the damage and find out what went wrong.

Other Operators' Incidents/Accidents

Cessna 208 Grand Caravan
Cuenca, Equador
24 March 2006

The single engine aircraft crashed in an administrative building few minutes after takeoff from R/W05 at Cuenca-Mariscal Lamar Airport. Of the fourteen people onboard, there were five fatalities.

- o O o -

A321-211
Torp, Norway
26 March 2006

On landing in slippery conditions, the aircraft skidded beyond the end of the runway coming to rest 150 metres past the end of the paved surface. No one on board the aircraft was injured, but traffic was disrupted for hours. A localiser antenna was also reported as damaged.

- o O o -

Antonov 12N
Teheran, Iran
28 March 2006

Shortly after take-off from Payam Airport, the crew radioed and reported their intention to return immediately due to a technical problem. The pilots were unable to reach the runway and made a forced landing in farmland about 3 miles from the airport where the aircraft broke into pieces and was destroyed. At the time, the local weather consisted of rainfall with strong winds. According to reports a bird strike may have been a contributory factor.

- o O o -

DC10-30F
New York-Newark
28 March 2006

During the initial climb a section of the No.2 engine cowling detached from the aircraft and fell into a residential neighbourhood. No injuries resulted or property damage caused. The aircraft continued its flight and landed at Oakland without further incident.

- o O o -

IL62
Domodedovo, Russia
29 March 2006

After landing in darkness the aircraft veered off the side of the runway. The aircraft ran over uneven ground before coming to rest 400 metres past the end of the runway where it broke into three parts. Two crew members suffered light injuries. At the time of the accident visibility was 100 metres in fog.

- o O o -

Pilatus PC-6
Chantaburi, Thailand
29 March 2006

The crew was performing an artificial rain operation when the aircraft crashed in the eastern province of Chantaburi. All four occupants were killed. The flight was being carried out for the Ministry of Agriculture.

Let 410
Saquarema, Brazil
31 March 2006

The aircraft left Macae Regional Airport at 1719LT and crashed near Saquarema at 16 minutes later. The ETA was scheduled at Rio at 1802LT. The rescue teams did not find any survivors among the 19 occupants. It is the first accident involving a Let 410 in Brazil.

- o O o -

Lockheed C5 Galaxy
Dover, Delaware
03 April 2006

The crew encountered technical problems during take-off and the aircraft crashed in an open field after the runway end. The aircraft broke into three pieces: the empennage, the cockpit and also No.1 engine separated. All 17 occupants were injured.

- o O o -

DC10-30F
Mexico City, Mexico
13 April 2006

While the aircraft was being unloaded the centre of gravity shifted resulting in the aircraft tipping on its tail causing minor damage. A member of the ground staff was injured.

- o O o -

Fokker Friendship F27
Guayaramerin, Bolivia
16 April 2006

The aircraft ran off the runway in heavy rain causing extensive damage to the wings and landing gear. No one was injured, however, one elderly passenger died of a heart attack several hours after the accident.

- o O o -

Antonov AN74
Ndjamena, Cameroon
23 April 2006

The cargo aircraft crashed during landing attempt west of Ndjamena killing all on board. Apparently a technical fault occurred on board prior to the accident. The aircraft was operating on behalf of the Libyian foreign ministry carrying humanitarian aid. The cargo consisted of vegetable oil and tinned food.

- o O o -

Antonov AN32
Lashkar Gar, Afghanistan
24 April 2006

A cargo aircraft carrying U.S. anti-narcotics officials crashed while attempting to land at Bost Airport in Lashkar Gah. The aircraft overran the runway and crashed into a residential area after trying to avoid a truck that pulled onto the runway. The pilot pulled up to avoid hitting the truck but was unable to gain sufficient speed to remain airborne. The AN32 crashed into a nomad settlement destroying two mud-brick houses before it came to a halt with a broken fuselage and demolished left wing. Both pilots, as well as two children in the houses, suffered fatal injuries.

B737-300
Stavanger, Norway
26 April 2006

During overnight parking the aircraft rolled backwards until its right elevator struck the terminal building. The right elevator and control surfaces suffered substantial damage. On investigation the park brake was found not set nor were chocks inserted.

- o O o -

Mil Mi-14 Haze
Sea of Okhotsk
11 May 2006

The amphibious helicopter crashed int the sea during a Russian-Japanese exercise. One person was killed. Specialists were trying out measure to deal with an imaginary oil spill. The accident happened as the Mi-14 was flying just above the surface of the water.

Excess Luggage!!!

Haywain

Milkman

T

Car Transporter

Air Ground Communications

Rod Young
GM Corporate & Air Safety, British Airways

Communication in aviation has always come under the microscope and a number of initiatives are under way to target further improvements. As GM Corporate & Air Safety I felt I should give you a summary of some of the progress, in particular on the work undertaken by a Eurocontrol task force and some of the findings and general guidance issued. Corporate Safety need to do our bit in ensuring that our flight crew are aware of the significance of the problems through effective and continued publicity.

British Airways is very active in working within or alongside these initiatives and we are also working with National Air Traffic Services (NATS). NATS reported that it handled 187,788 flights in April this year which clearly shows the volume of traffic and why communication and the further use of technology is so important.

The EUROCONTROL Safety Team launched the Air-Ground Communication Safety Improvement Initiative in 2004, and is addressing communications issues identified in the Runway Incursion and Level Bust Safety Improvement Initiatives as well as other issues of concern such as call sign confusion, undetected simultaneous transmissions, radio interference, use of standard phraseology, and prolonged loss of communication.

Clear, unambiguous, timely and uninterrupted communications are central to the efficient and safe management of air traffic. In time, controller pilot data link communications (CPDLC) will replace voice as the medium for passing a large proportion of information, intentions, requests, and instructions between pilots and controllers, but voice communications will always have a role to play in emergency situations and in tactical intervention. Not surprisingly, communications related problems are a factor in many flight safety incidents.

Communication between air traffic controllers and pilots remains a vital part of air traffic control operations, and communication problems can result in hazardous situations. A first step towards reducing the incidence of communication problems is to understand why and how they happen.

Analysis of level bust events occurring in the first half of 2005 showed that four out of the top five causal factors involved a breakdown in communications, including incorrect read-back by the correct aircraft and pilot read-back by the incorrect aircraft, which is often the result of call sign confusion.

Call sign confusion is the major cause for aircraft taking a clearance not intended for them. The danger of an aircraft taking and acting on a clearance intended for another is obvious. Call sign confusion can lead to runway incursions, level busts, loss of separation and CFIT. There are many factors, which contribute to call sign confusion, associated with:

- The way the message is transmitted
- The quality of the communication channel
- The perception and cognitive processing of the message, influenced between the other things by the frequency workload and flight phase complexity
- Inadequate mitigation.

Aircraft identification on radar screens and controllers' "strips" often use ICAO 3-letter groups plus a flight identifier number. Controllers can experience both visual and phonetic confusion with ICAO 3-letter groups and flight numbers relating to different airlines. For example, identical final letters (ABC & HBC), parallel letters and numbers (ABC & ADC, 1458 and 1478), and block letters and figures (ABC & ABD, 14 and 142).

A large proportion of communication problems have no actual safety consequences, but about a quarter of the reported occurrences result in a prolonged loss of communication (PLOC), which has become a matter of security as well as a safety issue. In northern Europe in 2004, there were over 120 military intercepts of aircraft not responding to air traffic control. These reports indicated a general lack of awareness of interception procedures among controllers and pilots, and failure to monitor 121.5 at all times.

Simultaneous transmission by two stations results in one of the two (or both) transmissions being blocked and unheard by the other stations (or being heard as a buzzing sound or as a squeal). With the steady growth of air traffic worldwide there is a corresponding increase in the incidence of blocked or simultaneous transmissions. Radio interference caused by unauthorised transmissions or breakthrough from commercial stations can have a similar effect, causing reception difficulties or the loss of all or part of a message.

Possible significant outcomes of communication errors include the following:

- a flight takes a clearance intended for another flight and takes action with resultant loss of separation;
- a flight misses all or part of a clearance intended for it and maintains its level and/or heading, bringing it into conflict with other flights;
- a controller assumes that a message received is from a different flight and issues inappropriate instructions;
- a controller fails to note error in read-back (including wrong call sign) and does not correct the error (hear-back error);
- unacceptable delay in establishing RTF contact or in issuing a clearance or passing a message;
- the workload of controllers and pilots is increased due to the need to resolve the confusion.

Communication between pilots and air traffic controllers is a process that is vital for the safe and efficient control of air traffic. Pilots must report their situation, intentions and requests to the controller in a clear and unambiguous way; and the controller must respond by issuing instructions that are equally clear and unambiguous. Although data link communication has reached an advanced stage of development, verbal communication is likely to remain the prime means of air-ground communication for many years to come.

Standardised phraseology reduces the risk that a message will be misunderstood and aids the readback/ hear-back process so that any error is quickly detected. Ambiguous or non-standard phraseology is a frequent causal or contributory factor in aircraft accidents and incidents.

Other factors such as the format and content of the message, language and the speed and timeliness of transmissions also make important contributions to the communications process.

Many experienced pilots and controllers may feel that some of the best practice highlighted in this Action Plan is basic professional knowledge that should not require reinforcement. Unfortunately, analysis of incident reports concerning air-ground communications safety suggests that what many consider to be standard practice is not always achieved for many reasons.

The Language Issue…

The purpose of standard phraseology in pilot-controller communication is for it to be universally understood.

Standard phraseology helps lessen the ambiguities of spoken language and thus facilitates a common understanding among speakers of different native languages; or, of the same native language, but who pronounce or understand words differently.

While the importance of standard phraseology is generally accepted, non-standard phraseology is a major obstacle to effective communications and we always need to be aware of this.

Best Practice

Advise ATC if any of the following situations are observed:

- Two or more aircraft with similar call signs are on the RTF frequency;
- It is suspected that an aircraft has taken a clearance not intended for it;
- It is suspected that another aircraft has misinterpreted an instruction;
- A blocked transmission is observed.

After a flight where an actual or potential call sign confusion incident is observed, file a report!

If in doubt about an ATC instruction, ask the controller to re-confirm the clearance rather than saying what you thought you heard i.e. “London, confirm the cleared flight level for Speedbird 162” not “London, confirm the cleared flight level for Speedbird 162 is FL 190”. This procedure should also be followed if any doubt exists between flight crewmembers.

Be alert to the possibility of loss of communication, as soon as a loss of communication is suspected, check radio equipment settings and carry out a radio check.

If any part of a message for you is distorted, request repetition.

If loss of communication is suspected, and no other solutions work, attempt to establish whether contact can be made via the company (SATCOM, ACARS, etc.).

Follow company procedures for the monitoring of 121.5 MHz. If loss of communications is suspected, confirm 121.5 MHz is set correctly and listen out for any transmission from intercepting aircraft.

Do not switch immediately to the next sector frequency following read back of controller's instruction, but delay the change for a short period to ensure that the air traffic controller is not revising an error in your read back.

The pilot-controller confirmation/correction process is a "loop" that ensures effective communication and the confirmation/correction process is a line of defense against communication errors. (See diagram below).

In Summary

British Airways always encourage flight crew to report safety occurrences and we in turn constantly try keep flight crew informed of action taken following their reports through feedback. Our confidential reporting system leads to more straightforward and satisfactory investigations, because it allows the investigator to make contact with the reporter in order to clarify any points and to therefore go deeper into the investigation and more importantly establish the causes and human factors involved.

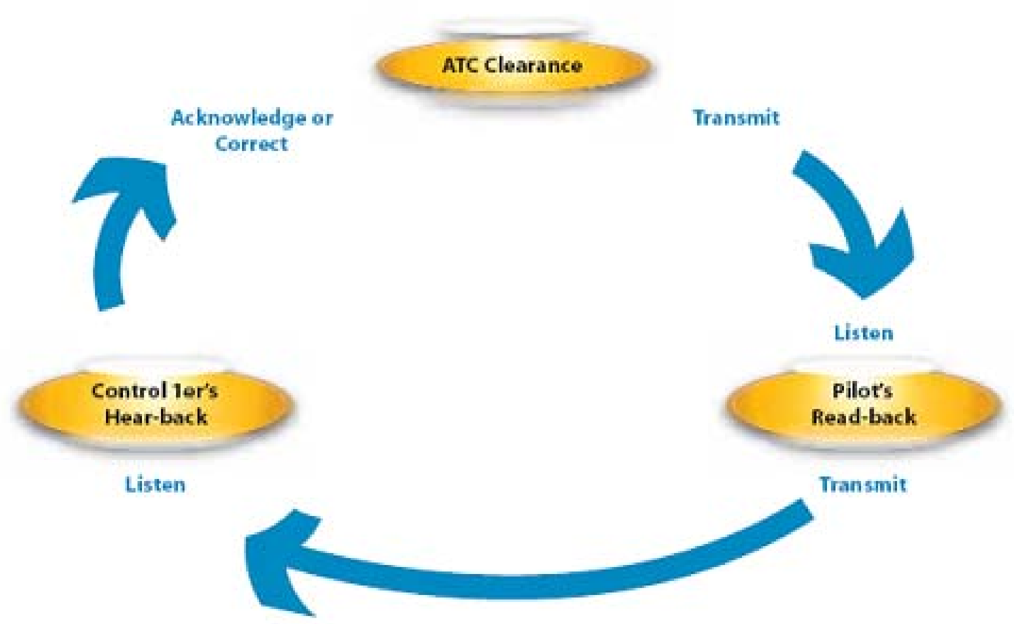
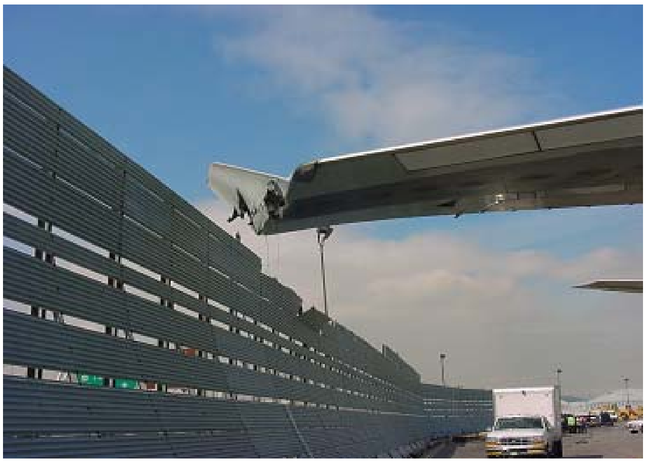


Figure 1 - The pilot / controller communication loop

It Is Expensive If You Don't Learn From Previous Incidents

British Airways B747-400 at JFK - 2003



Another Operator's B747-400 at JFK - 2006

The only difference.......it was a cloudier day in 2006

A Test for Airline Safety Departments

Do you believe that your Safety Department has the correct safety expertise and personnel, that is the people with the correct qualifications, training and background?

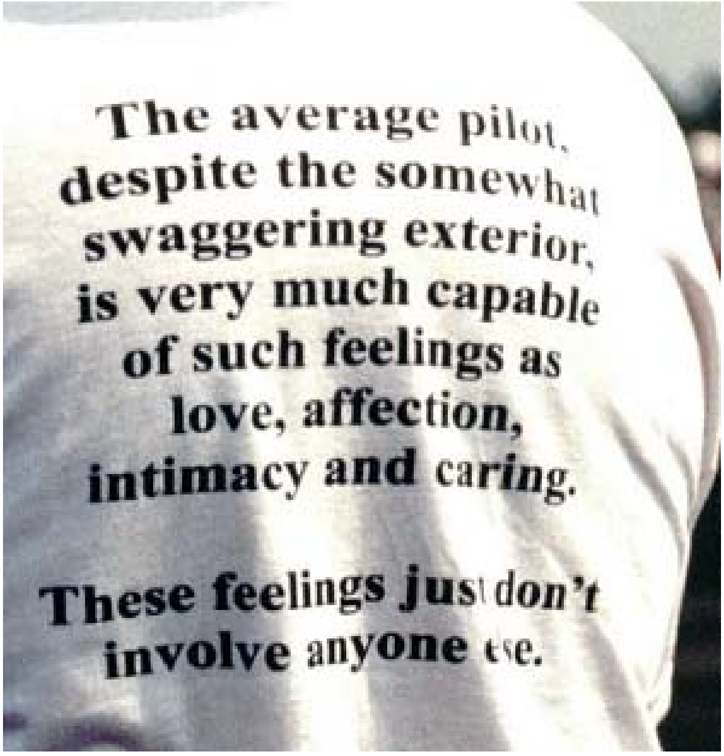
The Test Is:

If after a hull loss would the staff numbers increase and the personnel change, if the answer is no, then you have the right people in place already. If it is yes, you are too late.

History shows that not many airlines had it right in the past.

Confusing Messages

The Truth Has Come Out!!



Comment Sheet

We would like to receive your comments and suggestions about *Flywise*, about Corporate Safety and Quality, and about safety matters in general.

The author's name will not be used unless he or she specifically requests it and confidentiality will be guaranteed.

1. The *Flywise* magazine.

- Format and appearance:

- Content:

- General:

2. Any other comments about Corporate Safety & Quality or safety matters.

Rank or Title:__________ **Name:**____ **Fleet:**______ **Base:**_____

Return Address:____

____

e-mail:____

We request this information in case we need to seek clarification from you about your comments.

Flywise

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Harmondsworth
Middlesex
UB7 0BG

Oops…….

GOING…..

GOING…..

GONE…….

Three civil aircraft an Armavia A320, an Armenian International Airways A320 and a Hellas Jet A320 plus a Lockheed C-130 of the Belgian Air Force, are understood to have suffered damage in the blaze that broke out in a hangar at Brussels airport during the night. The ensuing fire caused the hangar roof to collapse increasing damage to the parked aircraft inside. One person was injured.

Flywise