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focus

ON COMMERCIAL AVIATION SAFETY

WINTER 07

The official publication of the United Kingdom Flight Safety Committee

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Contents

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FOCUS is a quarterly subscription journal devoted to the promotion of best practises in aviation safety. It includes articles, either original or reprinted from other sources, related to safety issues throughout all areas of air transport operations. Besides providing information on safety related matters, **FOCUS** aims to promote debate and improve networking within the industry. It must be emphasised that **FOCUS** is not intended as a substitute for regulatory information or company publications and procedures.

Editorial Office:
The Graham Suite, Fairoaks Airport, Chobham, Woking, Surrey. GU24 8HX
Tel: 01276 855193 Fax: 01276 855195
e-mail: admin@ukfsc.co.uk
Web Site: www.ukfsc.co.uk
Office Hours: 0900 - 1630 Monday - Friday

Advertisement Sales Office:
UKFSC
The Graham Suite, Fairoaks Airport, Chobham, Woking, Surrey GU24 8HX
Tel: 01276 855193 Fax: 01276 855195
email: admin@ukfsc.co.uk
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Front Cover Picture: On Parade - RAF College Cranwell - 8th June 2007 at 20.47 hrs

Credit: RAF Cranwell, Photographic Section

Can the UK Flight Safety Committee survive in the 21st Century?

by Peter G Richards FRAeS Non-Executive Committee Member

By the time you, the reader, will be seeing this edition of FOCUS, Ed Paintin, our former Chief Executive will have retired from the committee and so we are temporarily without an editor. The committee management team members are confident that we will be able to appoint a new Chief Executive in the early part of 2008.

From time to time, all organisations need to review their complete range of activities, to ensure that what they do and how they do them complies with their objectives and the world in which they interact. The UK Flight Safety Committee management board has taken such a step, following some focused criticism of our current style of activities and, as a result, a request was made at a recent meeting for objective feedback, to me. From this request, 15 UKFSC members, roughly 15% of the total committee strength, have responded and I would like, on behalf of the management committee, to thank them for taking the time and trouble to help refresh our goals and strategy. From this feedback, a Strategic Review Meeting was called and every aspect of our activities scrutinised. This produced an 'Options for Change' presentation to the most recent full UKFSC meeting, during which a request was made to the membership for more information and support. If you are a reader in one of the UKFSC membership organisations and have points to raise, then get in touch with your representative and ensure that they do raise them.

What are these 'goals' we seek to score or endorse? The reader will find these printed elsewhere in this edition, but are they the 'right objectives'? The Strategic Review Meeting consensus determined that they are. They have given us ample scope to deliver a network of contacts and tools to improve and sustain the best of airline operating safety for over 40 years. What the committee cannot do is manage or execute any business mechanisms to make this happen – this has to be done by the membership. If members elect to join the committee, they do so in the knowledge that they may well gain much more than they can give, but that giving support to committee ethos is more than merely paying the membership subscription.

Too many times, we have held meetings at which little or no 'lessons can be learned' and this begs the questions, 'What has been lost within organisations if incident analysis is not shared?' and 'What do we do, or not do, now that means we cannot share our events with others?' By outsourcing everything from the flight data recorder onwards, or merely sifting the database for 'exceedencies' and then targeting the crews; is very self-centred, safety management.

The fundamentals of airline operating safety do not change, even though skies get more crowded and airports more congested. Performance needs to be robustly scrutinised, but not just economic performance. Level Busts, Runway/Taxiway Incursions, Fatigue, Security, Weather, Technical Innovation and Ramp cleanliness all remain with us, as they were at the very start. 'New stuff' such as SMS, EGPWS, TCAS, RNAV/RNP, Emissions and TEAM (at LHR); these are merely tools to promote better management of the bigger picture. Closer co-operation with other flight safety organisations and better engagement with regulators and government bodies came across strongly.

There are airlines out there with problems and conditions that will always seek somewhere to call on for help, but they have to be prepared to work with us. This includes you, the FOCUS reader, for this is your magazine too and if there are things you would like to read about or issues you would like us to chase, then, let us know. A major upgrade to the website is planned, including the possibility of an on-line forum between all the Flight Safety organisations by extension of the existing Gulf Flight Safety Committee 'Blue Ballroom'.

The UKFSC can survive in the 21st Century, but only with better support from its worldwide membership. If your organisation sends a representative to the meetings, make sure that they submit some kind of feedback to you, besides a copy of this magazine. Mine, back to the Royal Aeronautical Society Flight Operations Group, routinely runs to an 8 page essay, distributed worldwide.

From the RAeS, as support for the UKFSC, I have gathered some very thought provoking feedback from a recent Conference addressing the topic of Smoke Fumes and Fire in Transport Aircraft. The Proceedings from this one day event are available by contacting the RAeS' conference office and asking for Ms Emma Bossom, or email to emma.bossom@raes.org.uk, from whom a CD-ROM can be purchased.

focus ON COMMERCIAL AVIATION SAFETY

Flight Safety – An International Concern

by Robin Berry, CTC Aviation Services Ltd

That aviation is an international activity goes without saying. As such it is an international activity that, perhaps more than most, needs international co-operation to truly keep the risks at the lowest acceptable level.

All nations recognise the importance of aviation in developing their economies through both trade and tourism. Millions are often spent on developing an international aviation hub when there are far more pressing national needs for that resource. This approach can lead to some troubling anomalies in the environment in which we have to operate. Some examples from my own experience may serve to illustrate my point:

1. During the investigation into a fairly well publicised near accident during a non-precision approach the question was asked "Why were other operators using this airport not aware of the significant errors in the radiation from the approach VOR?" The answer turned out to be that they were not using the VOR approach – they were either still using the ILS, which had been promulgated by NOTAM as "out of service", or were flying "home brew" GPS approaches when aircraft fit allowed. Indeed, as it turned out, the crew involved in the incident had been offered the ILS approach by the local ATC but had declined on the basis of the NOTAM.

2. Another serious incident investigation involving a non-precision approach revealed that other operators were using the ILS facility despite the fact that it was radiating the "TST" code. The particular airport suffered heavily from damage to the ILS antennae by overweight cargo aircraft dragging their gear through the localiser arrays. The airport could effect repairs very quickly but often had to wait months to get the facility flight checked. They would, however, offer use of the ILS to anyone prepared to accept the risk!

3. During preparations for operation to a new destination it became apparent that the only published approach was the classic night non-precision approach into a "black hole" airport. However, crews on early operations were reporting that they were being offered ILS approaches (and judicious use of flight data monitoring showed that some of them were accepting!). Further investigation revealed that other (local) operators were routinely using the ILS although no procedure had ever been published.

I know from discussions with many of you at various international safety conferences that the examples above are just the very tip of the iceberg and that many of you have your own examples of similar situations. I therefore believe that there is a need for much more meaningful co-operation between regional safety organisations such as ours to ensure that the international operation remains as safe as is reasonably practicable. Sitting in our local silo and complaining about such situations to ourselves will achieve nothing. Engaging with the safety professionals who understand the local issues and pressures and working with them might just achieve something.

It is encouraging that the UKFSC has so many international members. Whilst many of these join on the basis of their operation into UK airspace, they also provide valuable expertise to those UK operators operating into their regions. Even more encouraging is the growing desire to forge better links between the regional safety committees around the world. In recent UKFSC meetings I have had the pleasure of meeting representatives from a number of established and budding flight safety committees including Nigeria, Malaysia and the Gulf region. The enthusiasm is refreshing!

UK FLIGHT SAFETY COMMITTEE OBJECTIVES

- **To pursue the highest standards of aviation safety.**
- **To constitute a body of experienced aviation flight safety personnel available for consultation.**
- **To facilitate the free exchange of aviation safety data.**
- **To maintain an appropriate liaison with other bodies concerned with aviation safety.**
- **To provide assistance to operators establishing and maintaining a flight safety organisation.**

TAG Farnborough Airport

by Paul Jones, General Manager (ATS) Farnborough

"TAG Farnborough Airport is an ultra modern business and executive airport serving aircraft up to BBJ or B737 in size" said Paul Jones, NATS General Manager Air Traffic Services. "Operating outside controlled airspace, with the air show every two years makes this an exciting place to work for the ATC team".

Paul, who has been at Farnborough since February, described the history, as well as today's operation and challenges.

Proud History

The United Kingdom's first airfield, Farnborough Airport's aviation history predates even the country's first powered flight conducted there in 1908.

From those earliest days, Farnborough has been a centre of military and civil aviation research. Hundreds of innovations from the Royal Aircraft Establishment Farnborough have left their mark on aviation worldwide. Farnborough "firsts" include the first flight in the U.K. of a jet powered aircraft and the world's first flight of a commercial jet airliner. Thrust SSC, the first car to go supersonic on land in 1997 was pioneered at Farnborough. **Thrust SSC** broke the world land speed record with a speed of 714 mph. A few days later it became the first powered land vehicle to break the sound barrier with a speed of 763 mph Mach 1.02.

The site has been associated with aircraft and airships since 1908 when the Balloon Equipment Store was moved from Greenwich and renamed the HM Balloon Factory. From 1911-18 it was called the Royal Aircraft Factory but changed its name to Royal Aircraft Establishment to avoid confusion with the new Royal Air Force, which shared the same initials.

From the site the American air-navigator and balloonist **Samuel Franklin Cody** (1861-1913) conducted experiments with man lifting kites. In 1908 using his own constructed aircraft Cody made the first recorded flight, in England, in a powered aircraft. In 1910 using his second constructed aircraft he won the Michelin Cup for the first completed flight of over four and a half hours. In 1911 he built and flew the only British plane to complete the round-England race. He was killed in an air crash August 1913.

Farnborough Operations

A full range of Air Traffic Services are offered by the NATS ATC team at TAG Farnborough Airport, including Radar Advisory and Radar Information Services. The airfield, located to the South West of London, just off the M3, is situated outside controlled airspace which brings its own significant challenges.

The 24 controllers, supported by 9 Air Traffic Assistants provide tower, approach and LARS services in the congested airspace and are surrounded by Odiham, Blackbushe, Fairoaks and Lasham - one of the busiest gliding airfields in Europe. Each of the controllers is expected to validate in all controlling positions on the unit.

The skills required to operate outside of controlled airspace are completely different from our colleagues at the major UK airports. The airspace surrounding Farnborough is Class G with no requirement for GA to talk to Farnborough. Luckily most GA traffic does talk to us allowing a 'picture' to be build up, but the controllers need to remain very vigilant, always wary of pop up traffic.

Airspace Infringements and LARS

One of the biggest risks to commercial aviation in the London area is airspace infringements by GA aircraft. There were several such events at the beginning of the year. The NATS board decided that something had to be done to mitigate the risk so London LARS concept was born.

In June of 2007 the go ahead was given to launch a LARS service, free of charge, all the way round the London TMA. Farnborough already provides LARS to the south west of the TMA and so was the obvious choice for location. TAG were enthusiastic partners in this safety endeavour leading to a new LARS position covering the SE of the TMA (Gatwick and London City) opening on the 24th

September. A further LARS position covering the North of the TMA will open in Easter 2008. The new South East sector has already prevented more than 20 infringements.

Farnborough Key Facts

- Operating hours:
  07.00 - 22.00 Mon-Fri
  08.00 - 20.00 Weekends and Bank Holidays
- Civil Aviation Authority (CAA) licensed airfield
- 2440m (8,005ft) ASDA, 1800m (5,905ft) LDA
- 1,981 m (6,500 ft) take-off distance, 1,798 m (5,900 ft) landing distance
- ICAO Category I ILS/DME approach on 06/24
- Radar approach facilities and visual control tower
- Full fire and rescue support to CAA Category 6

Farnborough International Air Show

Since opening to the public in 1948, the Farnborough International Airshow has

become one of the world's foremost aviation events. With origins in exhibitions by the Royal Air Force and Society of British Aircraft Constructors, the Airshow takes place every two years.

After only a six month rest the ATC planning and involvement with the Airshow starts about 18 months before the event. The Airshow is protected by temporary regulated airspace which, whilst only temporary, requires a full Airspace Change Proposal (ACP) to be developed, consulted locally and submitted to DAP for approval.

It's one of the most exciting controlling challenges; the whole team looks forward to it with enthusiasm. The controlling team swells for the fortnight with the addition of an operations centre and a heliport on the SW corner of the airfield. Movement numbers over the period double to about 7,000. The team gets to control a huge variety of aircraft, both civil and military including the A380. In 2008 we are all hoping that the Vulcan will make a welcome return to the Air Show Circuit.

The 2006 Farnborough Airshow drew:

- 42 official delegations from around the world
- 1,360 commercial and other exhibitors
- 243,000 visitors

Official figures show that the Air Show produced approximately US $21 billion of aviation orders and contributed more than £17 million to the local economy.

Farnborough and the Future

Over the past eight years, TAG has invested to preserve Farnborough's past while securing its future as Europe's premier all-business airport. Improvements have included a resurfaced runway, installation of ILS/DME, all new signage and lighting, and many other infrastructure improvements designed to increase safety and protect the environment. Farnborough's new look is taking shape in the form of new buildings - a modern, architecturally-significant control tower, new "wave" design triple hangar, and completely refurbished engineering facilities. The culmination of TAG's efforts occurred in May 2006 when Farnborough's stunning new Executive Terminal was officially opened.

Farnborough now offers a complete range of aviation services to based and transient business aircraft, including passenger services, aircraft handling, fueling, hangarage and maintenance.

Remote Management of Real-Time Airplane Data

by John B. Maggiore, Manager, Airplane Health Management, Aviation Information Services

Operators are reducing flight delays, cancellations, air turnbacks, and diversions through an information tool called Airplane Health Management (AHM). Designed by Boeing and airline users, AHM collects in-flight airplane information and relays it in real-time to maintenance personnel on the ground via the Web portal MyBoeingFleet.com. When an airplane arrives at the gate, maintenance crews can be ready with the parts and information to quickly make any necessary repairs. AHM also enables operators to identify recurring faults and trends, allowing airlines to proactively plan future maintenance.

AHM is a key part of an aviation system in which data, information, and knowledge can be shared instantly across an air transport enterprise. AHM integrates remote collection, monitoring, and analysis of airplane data to determine the status of an airplane's current and future serviceability. By automating and enhancing the real-time and long-term monitoring of airplane data, AHM enables proactive management of maintenance. AHM is intended to provide economic benefit to the airline operator by applying intelligent analysis of airplane data currently generated by existing airplane systems.

This Article addresses the following:

- How AHM works.
- Available data.
- Benefits.
- Recent AHM enhancements.

How AHM works

AHM collects data (e.g., maintenance messages and flight deck effect [FDE] faults) from the airplane in real-time (see fig. 1). The primary source of the data is the airplane's central maintenance computer (CMC) for the 747-400 and 777 or airplane condition monitoring systems (ACMS) on other models. AHM also collects electronic logbook data from the Boeing Electronic Flight Bag. Data is collected and downlinked via the airplane communication addressing and reporting system.

The data received in real-time directly from airplanes is hosted by Boeing within the MyBoeingFleet.com Web portal. If an issue is detected, alerts and notifications are automatically sent to a location specified by the airline via fax, personal digital assistant, e-mail, or pager. Maintenance personnel can then access complete AHM information about the issue through an application service provider tool and reports on MyBoeingFleet.com.

The primary benefit provided by AHM is the opportunity to substantially reduce schedule interruption costs such as delays, cancellations, air turnbacks, and diversions.

Exactly which data will result in alerts and notifications to maintenance staffs is set by individual operators; operators also determine what particular data and information each of their employees can view via AHM, and that information is prioritized, based on its urgency. Having information packages customized to fit the role of each user ensures that users get the particular information they need.

For example, after encountering a flap drive problem en route, a flight crew called in the discrepancy. The AHM notification made it possible for the airline's maintenance control organization to troubleshoot the problem before the airplane landed. Through real-time uplinks, the airline used AHM to interrogate systems information, identify the problem, and prepare the arrival station for repair. The information made it possible for the airline to avoid a flight diversion and the subsequent repair delay was reduced from several hours to a few minutes.

Available Data

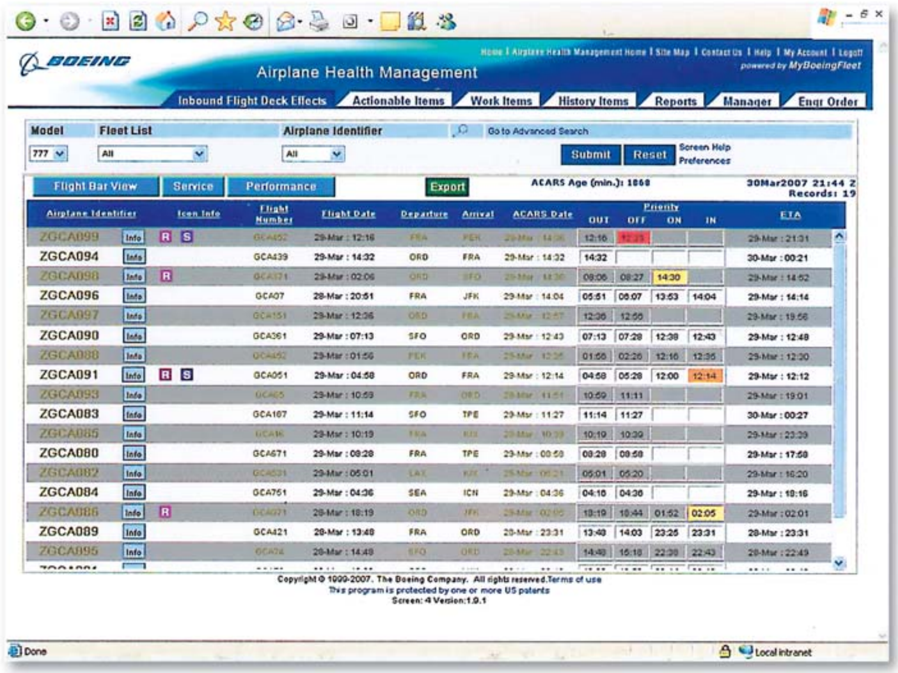
AHM facilitates proactive maintenance by providing ground crews with real-time interpretation of airplane data while flights are in progress, and it leverages Boeing knowledge and fleet data to provide enhanced troubleshooting. With AHM, operators can access Boeing engineering knowledge, worldwide fleet in-service experience, and operator-unique knowledge. It also institutionalizes the use of this knowledge in a repeatable manner, allowing the operator to maintain and grow its engineering- and maintenance-usable knowledge. AHM is currently available for the 777, 777 freighter, 747-400, 757, 767, and NextGeneration 737 airplanes. The type and availability of flight data vary by model. The 747-400 and 777 have a CMC, as will the 747-8 and 787. The CMC allows for fault collection, consolidation, and reporting. AHM relies on other data types, such as ACMS data, on airplanes without CMCs.

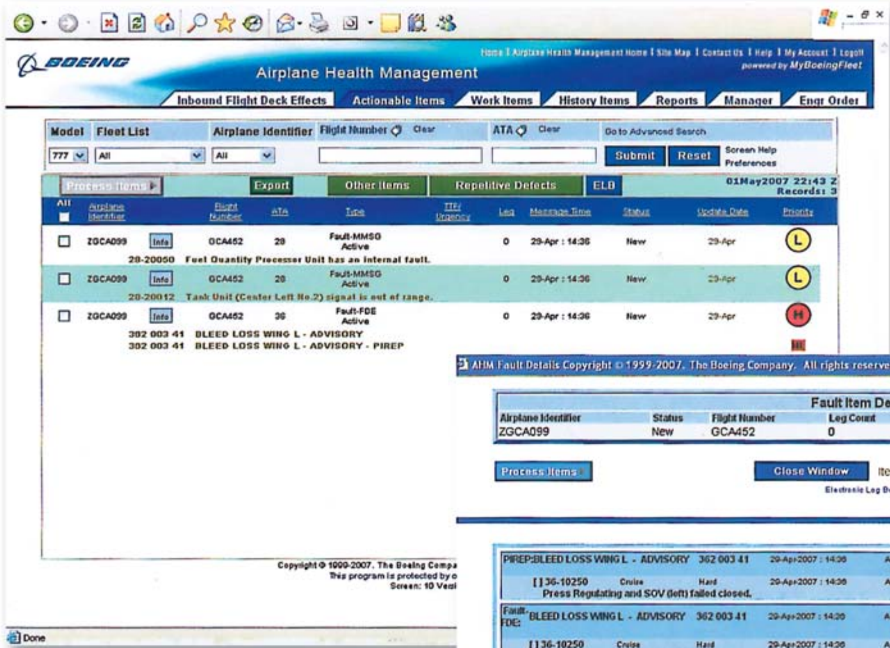
Benefits

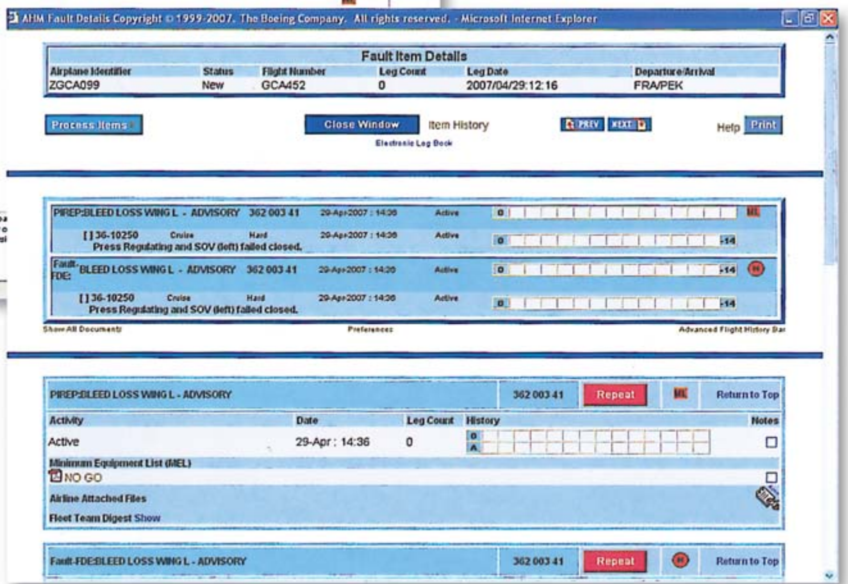
AHM is designed to deliver airplane data when and where it's needed, allowing operators to make informed operational decisions quickly and effectively. The primary benefit provided by AHM is the opportunity to substantially reduce schedule interruption costs. Schedule interruptions consist of delays, cancellations, air turnbacks, and diversions. The three primary ways that AHM reduces schedule interruptions are prognostics, fault forwarding, and prioritization.

Prognostics. AHM helps operators forecast and address conditions before failure, a process referred to as "prognostics." With AHM, operators can identify precursors that are likely to progress to FDE faults, which will affect airplane dispatch and possibly cause schedule interruptions. AHM provides an operator's engineers with the information they need to make sound economic decisions regarding these precursors, so that the operator can perform maintenance on monitored faults on a planned basis, rather than having to react to unexpected problems with unplanned maintenance.

AHM leverages Boeing knowledge and fleet data to provide enhanced troubleshooting.







AHM Real-Time Data

Figure 1.

AHM Automatically collects airplane data and fault information, then prioritizes and organizes the data to assist operators in formulating a plan for repairs.

Fault Forwarding. When a fault occurs in-flight, AHM allows the operator to make operational decisions immediately, and if maintenance is required, to make arrangements for the people, parts, and equipment sooner rather than later. This enables operators to substantially reduce the number of delays (e.g., a delay is prevented altogether) and the length of delays (e.g., a three hour delay is shortened to one hour—see fig. 2). AHM provides both the information and the context to enable operators to make appropriate decisions while the airplane is still en route.

Prioritization. Information about fuel efficiency, economic impacts, and other performance factors is provided according to its importance to the operator, allowing the operator to determine the best course of action.

A number of secondary benefits result from the reduced schedule interruptions realized by using AHM:

Reduced down-line disruptions. AHM can be used by operators to calculate the likelihood of down-line disruptions and estimate the cost of such disruptions.

Reduction of missed Air Traffic Control slots. AHM can help operators reduce missed Air Traffic Control slots that result from technical delays.

AHM enables airline customers to minimize flight delays and cancellations

In one instance, a flight experienced a weather radar condition en route. The required part was identified via AHM, ordered, and sent to the arrival airport. As a result of AHM's in-flight notification, the part was replaced immediately after landing, substantially reducing the delay.

In another case, an exhaust gas temperature problem was encountered en route. The crew began an air turnback, but after AHM interrogated the central maintenance computer and investigated the airplanes history, the operator determined that the flight could continue.

In one more example of AHM in use, an airplane experienced and engine control fault en route. Via AHM, which reports engine and engine accessory fault messages, the needed part was identified and sent on a subsequent flight to the airplane's destination airport. The flight departed with minimal delay compared to what it could have been had initial fault notification occurred after landing.

Maintenance personnel can get a significant head start in their decision making through the proactive use of airplane data.

Improved supply chain efficiencies. With AHM prognostics, operators can better predict line-replaceable unit failures, which means fewer cases of unscheduled removals. That results in fewer parts being borrowed and fewer parts being prepositioned at remote stations.

Redcued no fault found (NFF). AHM reduces the likelihood of NFF, which in turn reduces labor and spares requirements.

Recent AHM Enhancements

AHM has recently been enhanced to provide an even greater amount and depth of information. Called the "parametric module," these enhancements comprise four primary components.

Systems condition monitoring. AHM uses available parametric data to assess the condition of airplane systems. It collects airplane system data using existing and new ACMS reports and compares system performance against system models.

Servicing management. By gathering data on monitored systems—including auxilliary power unit oil, engine oil, oxygen, tire pressure, and hydraulic fluid levels—AHM can provide alerts on system conditions approaching operational limits. This data-based remote condition monitoring identifies airplanes requiring system maintenance to enable replenishment prior to exceeding operational limits.

Airplane performance monitoring (APM). AHM calculates airplane performance using the ACMS APM/engine stable reports and allows operators to compare airplanes through a fleet summary view. It also integrates engine health monitoring alerts, displaying engine manufacturer (OEM) alerts of abnormal conditions and automatically linking to the engine OEM system.

ACMS report viewer and data extractor. AHM incorporates an enhanced means for viewing and analyzing ACMS data.

Summary

The vast potential of condition monitoring airplane systems is being realized today through the innovative use of available airplane data. These advances have been fostered through the team efforts of Boeing and commercial operators. This journey continues, with ample areas for new applications and new directions. For more information, please contact John Maggiore at john.b.maggiore@boeing.com.

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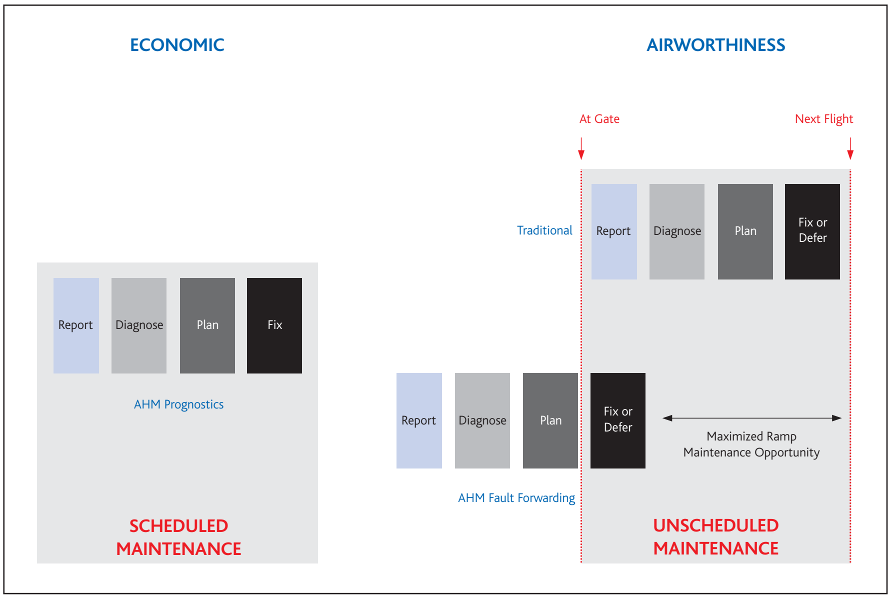


Figure 2

No 55 (Reserve) Squadron and RAF Rear Crew Training

by 55(R) Squadron

Mission Statement

"To train aircrew in systems management, decision making, air leadership and teamwork to meet the operational demands of the Royal Air Force"

Based at Royal Air Force Cranwell in Lincolnshire, No 55 (Reserve) Squadron is responsible for the training of all permanent non-pilot flying branches in the RAF. We train approximately 100 students per year and have a staff complement of 100 Service and civilian instructors and pilots, including full time reservists.

The Sqn operates a fleet of 10 pre-production hybrid Hawker Siddeley 125/Dominie aircraft which, configured as a flying classroom, carry a maximum crew of 6. The Sqn currently has 14 pilots all from varying backgrounds and, although most are serving officers, 4 are mature pilots who fly in a "reservist" capacity. Since the aircraft is 40+ years old, it has been upgraded over time to stay abreast of the training requirements which currently require them to operate much of the time below 2000 ft in either overland or maritime roles. Unfortunately, although now fitted with two 8.33 radios and a SIFF Altimeter/Transponder package, the TCAS modification is still some years away. All in all, despite its age, the Dominie is a very popular aircraft amongst its operators.

Students consist of Weapon Systems Officers (Navigators in old money) and, for NCO training, Weapon Systems Operator (Acoustics and Electronic Warfare), Weapons Systems Operator (Crewman) and Weapons Systems Operator (Linguist). Whether WSO or WSOp, it is expected that mission success will be achieved safely while operating in austere environments with little support. In addition to the high level of technical skill needed for systems management, all rear crew are expected to display high standards of decision making, air leadership and teamwork. These demands are achieved within a training system that teaches the necessary skills to the highest possible standards whilst also recognising the demanding and unpredictable environments that will be encountered on front line operations.

As of 1 April 2003, the 85th birthday of the Royal Air Force, the Navigator and Air Electronic Officer branches amalgamated to

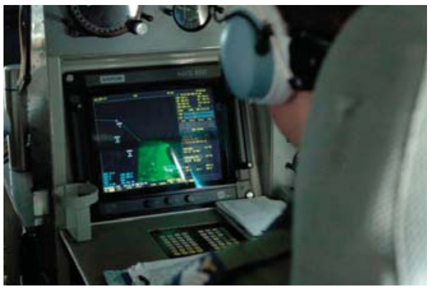
Over the North York Moors.[1]

Falkland Islands 25 yr Commemorative Flypast-London.

form the Weapon Systems Officer Branch. During the first 8 months of their instruction, student officers, who were previously known as navigators, undertake a common syllabus; the initial phase is flown on the Tutor aircraft at RAF Cranwell on a 14 week course. Having completed this initial training, students subsequently move to RAF Linton-on-Ouse in Yorkshire to fly 21 sorties on the Tucano aircraft of 76(R) Sqn to consolidate both medium level and low-level navigation techniques. The students are then streamed to fast-jet (FJ), maritime (Mar) or air transport, air to air and intelligence, surveillance, target acquisition and reconnaissance (AAI) disciplines. They then all return to Cranwell and attend a 3 week Common Multi Engine course. FJ students remain at Cranwell for 11 weeks and continue flying in the Dominie learning low-level radar techniques. This is followed by a move to RAF Leeming in Yorkshire to complete their training on the Hawk aircraft of 100 Sqn, Navigator Training Unit. Those streamed for maritime or AAI flying also continue flying but in the Dominie at Cranwell; in their cases, the phase lasts 14 weeks and concentrates on the introduction of low and medium-level maritime and AAI techniques respectively. On completion of their training, which will have taken nearly 13 months and embraced some 120 hours flying, postings are confirmed and the students are awarded their brevets.

Taxiing back in formation.[2]

Students who successfully complete the Non-Commissioned Aircrew Initial Training Course (NCAITC) are awarded the rank of acting sergeant and progress on to the 24 week Generic Course. During this element, students are given grounding in airmanship and introduced to elements involving the three WSOp roles – WSOp (Crewman), WSOp (Electronic Warfare and Acoustics) and WSOp (Linguist). Subjects taught include voice communications, introduction to Electronic Warfare and communications procedures. Students are then introduced to the Dominie aircraft and after a short ground school and a number of preparatory synthetic exercises, fly 8 sorties to develop and assess system manipulation and airmanship. Further subjects programmed into the Generic course include combat survival, NCA trade knowledge, physical fitness and managerial skills. Students are continually mentored to develop their SNCO qualities. On completion, apart from linguists, who are pre-streamed, students are streamed into either WSOp (Electronic Warfare or Acoustics) or WSOp (Crewman-Fixed wing or rotary). Acoustics specialists concentrate on underwater detection systems during their phase of training and this lasts 18 weeks. Electronic Warfare specialists are responsible for communications and the operation of electronic warfare, radar and magnetic anomaly detection sensors. Their specialist phase lasts 27 weeks and includes a 4-week advanced flying phase. In total, it takes



The main navigation console.

Over Tower Bridge.

46 weeks to train a WSOp (Acoustics) and 55 weeks to train a WSOp (Electronic Warfare). On graduation, they are awarded the brevet. Graduates are then posted to the Nimrod or the Boeing E-3D aircraft to commence operational conversion. Crewman students are streamed to either fixed or rotary-wing training. Rotary-wing students move onto the Defence Helicopter Flying School at RAF Shawbury for the remainder of their training, whilst fixed wing students remain at Cranwell. Fixed-wing students complete a 10-week specialist academic phase comprising both classroom and practical sessions; this also includes visits to RAF Lyneham and RAF Brize Norton. On completion of the specialist phase, the students move onto the 3-week advanced flying phase which comprises ground school, simulator and practical training as well as 3 flying sorties and one overseas trip on the Dominie aircraft. The flying phase emphasises: flight deck awareness, airmanship, radio procedures, Crew Resource Management (CRM) and Flight Reference Card drills. On completion of training at 3 FTS students are awarded their flying badges and move onto their Operational Conversion Units at RAF Lyneham for the Hercules and RAF Brize Norton for the VC10, Tristar and C-17.

As can be seen, 55 (R) Sqn faces the challenge of preparing students for a variety of roles on many different types of aircraft. In particular, despite the diversity of training provided on 55 (R) Sqn, all students are expected to perform well in the field of CRM and to demonstrate a solid understanding of Flight Safety. The ability of 55 (R) Sqn to produce individuals able to progress onto the many differing OCUs is credit to the training system and the quality of instruction in the air and on the ground.

Photograph credits.
[1] Geoffrey Lee Planefocus Ltd
[2] RAF Cranwell, Photographic Section

Have you got the message?

Communication Error continues to be a factor in 43% of all Level Busts and Runway Incursions. Our strongest defence against these risks is phraseology, so how good is yours? Try this 3 minute quiz to find out.

Answers are at the end of the quiz, and a full explanation of the answers can be found at www.customer.nats.co.uk under the Communication Error section.

1. Which of the following is correct phraseology?

a) *Descend to altitude four thousand feet*
b) *Climb to flight level two hundred*
c) *Descend flight level two zero zero*
d) *Climb altitude four thousand feet*

2. The phrase 'go ahead' is not used in the UK. What phrase is used instead?

3. You are instructed: "ENDOL612, runway 22, cleared for take-off, RVR 400, 500, 400, surface wind calm" What must you read back?

a) *"Runway 22, cleared for take off, Endol 612 IRVR 400m, 500m, 400m"*
b) *"Cleared for take off, Endol 612"*
c) *"Runway 22, cleared for take off Endol 612"*
d) *"Yee – hah, here we go!"*

4. When flying en-route, what information must you pass when contacting a new frequency?

5. What should you do when you hear an incorrect readback from another aircraft?

a) *Discuss it with your colleague on the flight deck to see if he noticed it*
b) *Phone the ATC unit when you land to tell them*
c) *Allow ATC time to correct the readback and if they don't then tell them*
d) *Nothing, why would you get involved in instructions not issued to you?*

6. You have departed a UK aerodrome following a SID. The tower has just transferred you to radar. What information do you need to pass on your first contact with the radar controller?

7. If you are unsure of an ATC instruction issued to you, what do you do?

a) *Read back what you thought you heard, ATC will correct you if you are wrong*
b) *Ask the controller to "Say Again"*
c) *Readback what you thought the controller should have said.*
d) *Ignore the instruction and wait for the controller to repeat it.*

8. How must the frequency 129.525 be readback?

a) *One twenty nine five twenty five*
b) *One two nine five*
c) *One two nine five two five*
d) *One two nine decimal five two five*

9. What pieces of information must you pass on first call for start/clearance?

10. Which of the following is the correct pilot response?

a) *"Turn left heading one one zero, climb Flight level one zero zero, callsign"*
b) *"One one zero and one hundred, callsign"*
c) *"Left one one zero, Climb one zero zero, callsign"*
d) *"Turn left heading one one zero degrees, climb Flight Level one hundred, callsign"*

Answers:
1) a
2) Pass Your Message
3) c
4) Callsign, cleared Flight Level and Heading or Speed (if assigned)
5) c
6) Callsign, SID designator, passing altitude and first cleared altitude
7) b
8) d
9) Callsign, type (if requested), stand, ATIS letter, QNH
10) d

Retirement - What a Life

For the past eight and a half years Ed Paintin has been the Chief Executive of the United Kingdom Flight Safety Committee (UKFSC). On the 16th October 2007 he retired after working for 41 years in the aviation industry.

When asked his intention for the future he outlines his plan as follows:

Last year we purchased a game lodge in a wildlife conservancy adjacent to the southern boundary of the Kruger National Park in South Africa. We intend to conduct exclusive safaris for small groups (no more then 4 people at a time) in the area at a price that is affordable to most.

As you may well be aware the area is a paradise for wildlife and the "Big 5" (elephant, lion, rhino, buffalo and leopard) are frequently seen. We cater for bird watchers as over 300 species have been recorded in the area. This is a fantastic place to relax and unwind. For the more active visitor there are several good golf courses in the area and numerous other activities to enjoy. Guided bush walks, sundowners on the river bank, fishing for tiger fish, horseback riding among the wildlife, a visit to the local witchdoctor, barbecues under the African stars to name but a few. Come and join us for the "experience of a lifetime".
Web site: www.crocodileriversafaris.com

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Stable or Unstable Approaches

by Simon Searle - FDSL

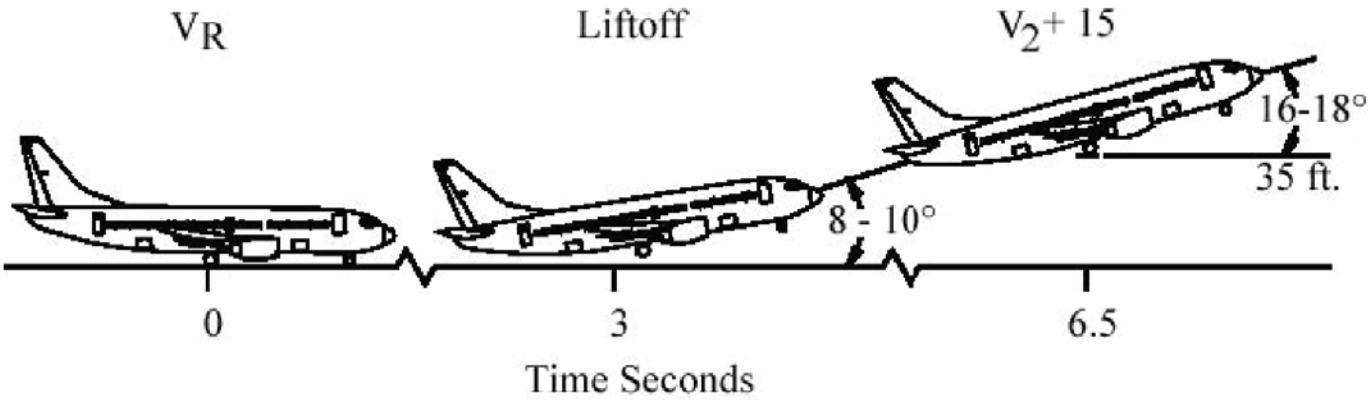
For sometime now stabilised approaches have been a normal part of the Standard Operating Procedures (SOPs) of all responsible operators as they have effectively demonstrated their value in reducing the chances of Controlled Flight into Terrain (CFIT). Flight Data Monitoring (FDM) Programmes have proved invaluable in monitoring the effectiveness of the criteria laid down by particular operators and the way in which crews actually interpret the requirements.

Having checked a number of Operations Manuals, it would appear that most operators require their aircraft to be stabilised in the landing configuration by somewhere around 1000ft Above Aerodrome Level (AAL). In some cases this can be as low as 500ft, but this will of course be dependent meteorological conditions at the time and the type of approach in use and runway in use. Among other things one of the parameters required as part of the landing configuration criteria is that the power be correctly set.

Through the FDM programme, one thing that seems to have been highlighted is lack of understanding by some pilots of the possible effects of an unstable or rushed approach and particularly low power is a factor. This may have been caused by the removal of such exercises as "Recovery from High Sink Rates" in some initial conversion courses. Clearly this is a Fan jet problem as opposed to a propeller problem where the effect of thrust increase is much more immediate. The height loss in a go-around can be quite, from the time the relevant thrust is applied can be quite marked. For a B737, for example, the height loss from a stabilised approach in the landing configuration will be around 28ft with 30Flap selected. If the power were at [flight] idle at the time but the speed correct (Vref+5 in still air) the rate of decent would be considerably higher and so therefore would the height loss in the go-around.

The attached data which has been précised to give only the relevant information to demonstrate this situation:

Flap	Ht	RAlt	IVV	Pitch	N1	N1
5	800	732	-1598	2.99	28.8	30.1
5	768	720	-1387	2.64	28.7	29.9
5	768	696	-1246	1.58	28.8	30.1
10	768	660	-835	0.88	28.8	30.2
10	736	632	-876	0.7	28.8	30.1
10	736	612	-904	1.41	28.8	30.1
10	736	600	-606	2.11	28.8	30.1
10	704	584	-723	1.93	28.8	30.1
10	704	560	-801	0.7	28.8	30.1
10	672	548	-853	2.11	28.8	29.9
10	672	552	-889	0.53	28.9	30.1
10	640	556	-912	1.41	28.7	29.9
10	640	548	-928	1.58	28.8	29.9
10	608	536	-939	2.29	28.7	29.9
10	576	520	-1262	1.23	28.8	29.9
10	544	480	-1479	1.05	28.7	29.9
10	544	452	-1308	1.76	28.8	29.9
10	512	436	-1193	2.64	28.7	29.9
15	480	408	-1433	2.64	28.8	30.1
15	480	388	-1277	2.81	28.8	29.9
15	448	380	-1172	3.16	28.6	29.8
15	416	372	-1419	2.11	28.8	29.9
15	416	356	-1268	1.23	28.6	29.8
15	384	332	-1166	0.88	28.7	29.9
15	384	316	-1098	1.58	28.7	29.8
15	352	304	-1053	1.05	28.7	29.8
15	352	284	-1022	1.76	28.7	29.9
25	320	264	-1002	2.46	28.6	29.8
25	320	248	-988	1.23	28.6	29.8
30	320	252	-662	0.18	28.7	29.8
30	320	244	-443	-2.29	28.6	29.8
30	288	232	-614	-3.16	28.6	29.8
30	288	224	-728	-2.81	28.7	29.7
30	256	208	-805	-1.23	28.6	29.8
30	256	196	-856	-0.53	28.4	29.7
30	224	188	-890	-1.05	28.7	29.8
30	224	172	-913	-0.53	28.4	29.7
30	192	164	-929	-1.58	28.7	29.8
30	192	144	-939	-2.81	28.4	29.7
30	160	132	-946	-2.11	28.6	29.7
30	128	108	-1267	-0.7	28.6	29.7
30	128	92	-1166	1.41	28.7	29.8
30	96	76	-1098	1.58	28.7	29.7
30	96	68	-1052	1.41	28.7	29.7
30	96	56	-705	0.53	29.6	29.9
30	64	44	-789	1.23	29.3	29.9
30	64	32	-846	3.34	30.3	31.3
30	28	28	-883	3.16	34	35.2
30	20	20	-909	2.29	37.9	38.5
30	12	12	-609	2.99	37	37
30	8	8	-725	4.04	33.1	33.6
30	8	8	-802	2.99	29.7	30.7



The data shows the approach from a Radio Altitude of 732ft to 8ft. It can be seen that there was an insignificant application of power at 20ft – presumably in a final attempt to reduce the rate of descent and "save the landing"! The vertical speed can be seen to be high throughout the approach. Had a go-around been required for any reason within the final part of the approach, a number of factors would probably have come together to result in an unpleasant situation, and it is suggested that a successful recovery would have been difficult to say the least!

IASC (knot)	V2 (knot)	TAS (knot)	GSC (knot)	PITCH (deg)	PITCH_RATE (deg/s)	ROLL (deg)	HEAD_MAG (deg)	IVV (ft/min)	HEIGHT (feet)
52.00	137	51.7	34.00	-0.2	0.00	0.62	-116.54	0	-4
56.50	137	56.1	39.00	-0.2	0.00	0.62	-116.54	0	-4
64.50	137	64.1	45.00	-0.2	0.00	0.62	-116.19	0	-4
66.00	137	65.6	50.00	0.0	0.07	0.62	-116.02	0	-4
74.00	137	73.5	55.00	0.2	0.25	0.62	-116.02	0	-4
80.00	137	79.5	60.00	0.0	-0.02	0.70	-116.02	0	-4
84.50	137	84.0	65.00	0.2	0.07	0.62	-116.37	0	-4
88.50	137	87.9	70.00	0.0	-0.22	0.53	-116.37	0	-4
97.00	137	96.4	75.00	0.2	0.11	0.62	-116.19	0	-4
97.00	137	96.4	80.00	0.2	0.02	0.62	-116.54	0	-4
102.50	137	101.9	85.00	0.2	0.00	0.53	-116.72	0	-4
104.00	137	103.3	89.00	0.2	0.00	0.62	-116.19	0	-4
111.00	137	110.3	94.00	0.0	-0.07	0.70	-116.02	0	-4
117.00	137	116.3	99.00	-0.2	-0.08	0.62	-116.19	0	-4
115.00	137	114.3	103.00	-0.2	-0.02	0.62	-116.02	0	-4
122.50	137	121.7	108.00	-0.2	-0.00	0.62	-116.19	0	-4
129.50	137	128.7	112.00	0.0	0.15	0.70	-116.54	0	-4
131.50	137	130.7	116.00	0.2	0.19	0.70	-116.72	0	-4
135.00	137	134.2	120.00	0.4	0.14	0.62	-116.72	0	-4
139.50	137	138.6	124.00	0.5	0.18	0.70	-116.72	0	-4
139.00	137	138.1	128.00	2.1	1.26	0.62	-116.54	0	-4
148.00	137	147.1	132.00	4.0	1.67	0.70	-116.37	0	-4
150.50	137	149.5	136.00	5.8	1.86	1.05	-116.02	-317	-4
149.50	137	148.6	139.00	8.6	2.43	-0.18	-115.66	-212	4
155.50	137	154.5	141.00	10.5	2.09	-0.44	-115.84	175	8
161.00	137	160.1	142.00	12.3	1.68	0.79	-115.66	434	20
164.50	137	163.6	143.00	13.7	1.53	1.14	-115.66	924	64
168.00	137	167.1	143.00	14.2	0.64	1.14	-115.49	936	64
165.00	137	164.3	143.00	14.6	0.43	0.97	-116.02	1261	128
165.50	137	164.8	142.00	16.5	1.55	-0.35	-116.19	1795	160
165.00	137	164.4	141.00	18.5	1.71	-0.18	-116.54	1836	192
169.00	137	168.6	140.00	19.3	1.06	0.70	-116.54	2181	256
165.00	137	164.7	139.00	19.5	0.28	0.97	-116.72	2411	288
163.00	137	162.8	138.00	19.9	0.44	0.62	-117.25	2566	352
158.00	137	158.0	138.00	19.5	-0.08	-0.53	-117.07	2986	416
160.50	137	160.6	138.00	19.5	-0.02	0.35	-117.07	3268	480
161.00	137	161.3	137.00	19.0	-0.41	-1.23	-116.89	3457	544
165.00	137	165.4	137.00	18.8	-0.15	-0.79	-116.72	3583	608
162.00	137	162.6	137.00	18.3	-0.44	0.18	-116.72	3668	672
165.50	137	166.2	136.00	18.3	-0.09	-0.35	-116.54	3408	704
161.50	137	162.3	136.00	18.5	0.09	-0.62	-116.54	3234	768
162.50	137	163.5	135.00	19.3	0.90	0.18	-117.25	3434	832
160.00	137	161.1	135.00	19.9	0.48	-1.85	-118.13	3568	896
162.00	137	163.3	134.00	19.7	-0.06	-2.46	-119.00	3658	960
161.50	137	162.8	134.00	19.2	-0.50	-2.46	-120.06	3401	992
162.00	137	163.5	133.00	18.5	-0.66	-3.60	-120.41	3229	1056

The following tabulated and graphical data show how the aircraft only achieved a maximum of 2.43˚/sec and then only for one second. By the time the aircraft achieves more then 1000ft/min rate of climb the speed has increased to V2 + 28kts and that is at a height of only 128ft.

All this adds together to explain why operators require a go-around to be performed at certain heights if the aircraft is not stabilised in accordance with SOPs.

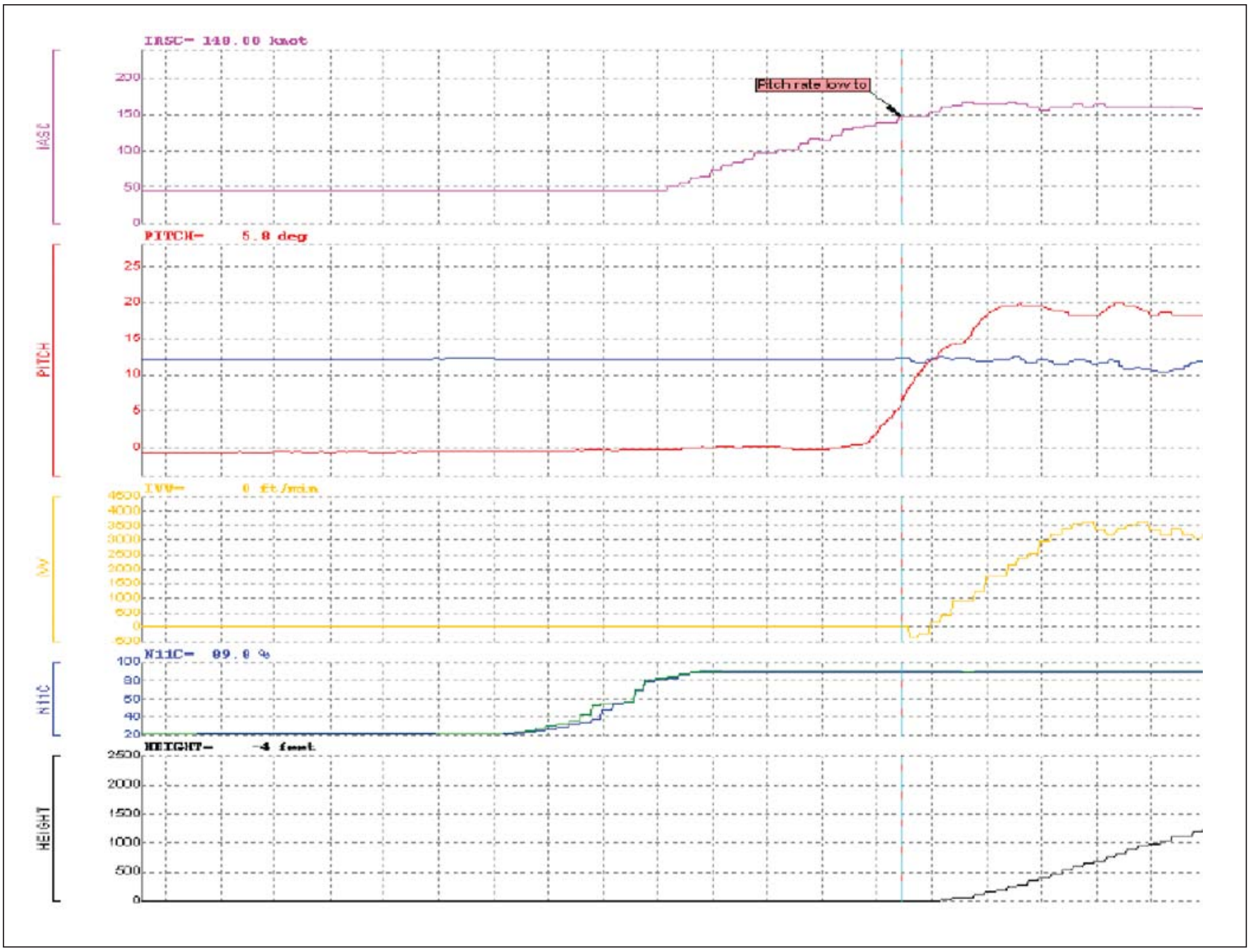
Low Rotation Rates

Another factor that has become apparent through the programme is incorrect rotation procedures being employed.

If we look at two particular aircraft types - the Embraer 170 and the B737-300 – the correct rate of rotation is stated as 3˚/sec. Examining data from both aircraft types the author has regularly seen well rates well below this figure for no identifiable reason. Rates at less than 2˚/sec are not unusual.

One problem that seems to occur in the recording of such events is that they are not highlighted within the programme as exceedences or level 3 events. At the end of the day the setting of these levels is the responsibility of the operator and until such failings are brought to the attention of crews no improvement will occur. One question that must be asked is "do we take enough time to teach the correct procedure in the simulator training and do we insist on it during route training"?

Explaining the reasons for insisting on the correct procedures is vital particularly to new



With each rectangle in the graphs representing five seconds the effects of the slow rotation can clearly be seen. When all this data is shown to the crew it becomes a very good tool for demonstrating the errors of their ways and it is important that they fully understand the effects on performance of not operating the aircraft in the correct manner.

impressionable co-pilots. In smaller companies where there might be a high turn over of crews – particularly contract pilots – the comment "passenger comfort" has been heard on many occasions as a reason for slow rotation rates. Clearly Take off performance does not come into the equation in these cases. This may be all very well with a light aircraft on a long runway with no obstacles, but is it acceptable? What happens in the event of an engine failure at V1 or on a limiting runway. The following statement is an explanation of correct rotation technique for a B737-300:

"Takeoff speeds are established based on minimum control speed, stall speed, and tail clearance margins. Shorter bodied airplanes are normally governed by stall speed margin while longer bodied airplanes are normally limited by tail clearance margin. When a smooth continuous rotation is initiated at VR, tail clearance margin is assured because computed takeoff speeds depicted in the QRH, airport analysis, or FMC, are adjusted to provide adequate tail clearance.

Above 80 knots, relax the forward control column pressure to the neutral position. For optimum take off and initial climb performance, initiate a smooth continuous rotation at VR toward 15° of pitch attitude. After liftoff use the flight director as the primary pitch reference cross checking indicated airspeed and other flight instruments."

All the Rage - Disruptive Passengers and the Law

by Edward Spencer – Barlow Lyde & Gilbert

As operators express concerns about an alarming increase in incidents involving disruptive passengers, we consider the legal position.

In recent months, statistics have revealed a dramatic upward trend in the number of disruptive airline passengers. It is perhaps no coincidence that this follows in the wake of enhanced airport security measures - both at home and abroad. No better is the position reflected than in a recent report published by a House of Commons cross-party transport committee. It paints a grim picture of the passenger's experience, which, it says, leaves them more "frustrated and dissatisfied than ever". It is clear that this mood is translating itself into a dramatic rise in incidents of disruptive behaviour aboard aircraft.

Policing this problem is no easy matter. Take, for example, the scenario of a drunken passenger assaulting a stewardess in the middle of a transatlantic flight. Although such behaviour would ordinarily constitute a criminal offence by reference to UK law, does the location of the aircraft over the sovereign airspace of another country or over international waters make a difference?

The Tokyo Convention 1963 was brought into effect to address precisely this issue. Signatories to the Convention (including the UK) are capable of applying the following framework:-

- The state of registration of the aircraft on which an offence is committed (pursuant to the ordinary law of that state) is competent to exercise jurisdiction provided the offence is commissioned "in flight", on the surface of the high seas, or on the ground of any non-contracting state. For the purposes of the Convention, "in flight" means from the moment when take-off power is applied to the moment when the aircraft ends its landing run.

- Certain offences against penal laws based on racial or religious discrimination, or of a political nature, are excluded unless the safety of the aircraft or passengers is compromised.

- Extradition may be sought and granted as between contracting states but within the framework of existing extradition treaties.

- There are certain circumstances in which a contracting state may, pursuant to the Convention, exercise criminal jurisdiction over a foreign-registered aircraft. An example includes an offence committed against one of the contracting state's nationals or permanent residents.

The above serves to illustrate that in any given case, there is unlikely to be a shortage of jurisdictional options for the purposes of enforcement. And the potential for overlap is compounded by a proviso under the Convention which recognises the exercise of criminal jurisdiction in accordance with national law. Thus, states will often regard their own airspace as sovereign and may therefore wish to exercise their own jurisdiction over activity which occurs within it. This is no better portrayed than in relation to the 1988 Lockerbie bombing, which subsequently resulted in criminal prosecutions being brought before the courts in Scotland, albeit in a neutral venue.

To add to the complexity, local laws may apply their own variations. The Civil Aviation Act 1982 will, for example, permit the UK to exercise jurisdiction over offences which take place on an aircraft, if the ultimate destination of that aircraft is the UK. A case in point is the hijacking of an Afghan aircraft in 2000, which subsequently landed at Stansted and resulted in criminal prosecutions being brought against the perpetrators within the English courts.

Although it can therefore be appreciated that enforcement options are both broad and varied, industry will inevitably wish to adopt an approach aimed at prevention rather than cure. Whilst not all "air rage" incidents can be predicted, a significant number of them involve alcohol as an active ingredient. The UK's Air Navigation Order 2005, which applies to all aircraft within UK airspace and all UK-registered aircraft wherever they may be, is absolutely clear on the point:-

"A person shall not enter any aircraft when drunk, or be drunk in any aircraft".

Although, under the same Order, the aircraft commander has wide authority to ensure the safety of the aircraft, there are obvious practical difficulties in exercising that authority against a "drunk" passenger, particularly if the relatively unusual step is to be taken of denying boarding to that passenger. Above all, by reference to what criteria is drunkenness to be measured in the absence of a prescribed threshold as is found in drink-driving situations? Ultimately, the matter will need to be determined by the operator's own discretion and the competing exposures it perceives between an aggrieved passenger left behind and the wider risks posed by that passenger if allowed to board.

It is clear that the term "air rage" has entered into common vocabulary and public consciousness. Against this background, there now exists a moral determination to treat the problem strictly and decisively. Whilst the existing legal apparatus is capable of reacting to the problem and facilitating an effective deterrent, it is up to all interested parties to apply it. As part of the collective responsibility that will be aimed at achieving zero tolerance, airlines and airports will inevitably want to ask themselves whether they can be doing more to address the causes of the problem rather than the symptoms. It is in their common interests to do so.

Panasonic In Flight Entertainment Systems, a Brief Introduction

by Stefan Suri, Panasonic Avionics Corporation

Panasonic Avionics Corporation is proud to be a full member of the UK Flight Safety Committee and pleased to be asked to contribute to this issue of the Focus Magazine.

Since joining the UKFSC this year, I'm sure that many of you have been wondering *"why we joined and what on earth do we have in common with aviation let alone flight safety"!*

The answers to the above are simple....

We joined to learn, offer our experiences of flight safety from an OEM viewpoint and to contribute towards a safer future for aviation. As for *"what we have in common with aviation"*, read on, you will be enlightened I'm sure!

Matsushita (Panasonic Avionics Corporation, being part of MEI; Matsushita Electric Incorporated) began its expansion into the field of avionics, quickly establishing itself as a market leader. The company was one of the first to market video equipment to airlines and was also one of the earliest suppliers of passenger control units (PCUs) to the industry.

The avionics technology that now characterises Panasonic Avionics Corporation IFE systems traces its inspiration, in part, to the early-day technology that enabled portable electronics.

What raised Matsushita's interest in avionics was the development of an ultra-thin radio. Using surface mount technology, it was possible to make an extraordinarily reliable wafer-thin radio.

The idea was to develop it as a product for use in fields where reliability, compactness and light weight would be particularly valuable. From this beginning, the vision of providing in-flight communication and entertainment systems took hold.

In January 1980, Matsushita signed its first contract to provide a PES/PSS (Passenger Entertainment System / Passenger Service System) for the Boeing 767. That same year the company set up a small operation at Panasonic headquarters in Secaucus, New Jersey and in quick succession introduced a string of technological advancements.

In 1986, the company moved its headquarters to Bothell, Washington. In 1990, Irvine, California was chosen as location for a new research and development facility, accelerating the company's reputation as a pragmatic innovator. In 1995, Bothell and Irvine joined forces as Matsushita Avionics Systems Corporation, with manufacturing support provided from Osaka, Japan.

From those humble offerings in the 80's we now offer full turnkey solutions for our customers including exciting technological features such as;

Interactive Software Engineering: AVOD provides passengers with nearly limitless programming options. With such an increase in programming content, airlines may experience issues managing the volume of content options. That's why, in 1998, Panasonic Avionics Corporation began offering the services of Interactive Software Engineering, its interactive content arm.

Interactive Software Engineering offers the very latest top-quality programming content including interactive and multi-player games, news and information uplinks from CNN, Reuters, NewsEdge, and offline interactive content from some of the hottest websites around including USATODAY.com, Hollywood.com and ZDNetAsia.com.

Drawing upon Panasonic's deep, worldwide legacy in consumer electronics, the X Series delivers high-speed communication tools and state-of-the-art entertainment, including Audio, Video-On-Demand, In-Flight email, internet access and ever-increasing digital entertainment options for passengers.

Features Include:

Aesthetics & Comfort

Ergonomic Comfort: Award-winning industrial design makes travel more personal and more comfortable. Armrest and seatback displays use intuitive controls and deliver crystal-clear audio and video. User-friendly input keypads and touch screen displays make content navigation simple for all audiences.

Entertainment

Broadcast audio: Airlines can program audio for distribution by channel (like today), or by genre and other categorizations. Programming can be displayed to passengers by title, genre, artist, channel or other options.

Broadcast Video: A cable TV-style format delivers a range of content options and provides sequential programming such as silent video/advertisements, trivia and pub games, and airline information.

Audio & Video-On-Demand: Personal IFE display device let users start, stop, pause, fast-

forward, and rewind video, as well as search for movies of interest by keywords, titles and more. During select movies, passengers can view scenes from a choice of multiple camera angles. And for more audio pleasure, users can create, sort, and store audio personal play lists.

Games: An expansive library of PC and Nintendo games covers nearly every game genre – puzzle, classics, trivia, action, adventure, strategy and more. Plus multiplayer options engage any number of passengers in friendly competition, from one-on-one bouts to cabin-wide trivia challenges.

E-Books & Audio Books: A virtual library of electronic books, across a broad range of categories, are right at the passenger's fingertips for on-screen reading. Audio book selections include popular fiction and non-fiction titles, selections read by the author.

Information

Flight information: The iXplor™ in-flight graphical interface gives detailed flight status information – position, path, altitude, and arrival time.

Live text news: Timely, regionalized news content across multiple categories – World News, Sports, Business, Financial Markets, Weather, and Tech News. Updated every hour via SATCOM.

Destination information: Hotel, sightseeing, restaurants, shopping and other destination information, as well as geographical and cultural data.

Detailed maps: Flight and city maps display more detail, including elevations and points of interest. Interactive maps offer zoom capabilities.

Gate information: Connecting gate details and airport maps boost efficiencies inside the terminal and at check-in counters.

Connectivity

Broadband/Narrowband Connectivity: Airlines can choose from a full range of connectivity options to enable simultaneous live television, Internet browsing, shopping, secure e-commerce and more.

Email: Real-time connectivity enables send-receive functionality via passenger laptop or device, seatback screen or personal IFE device.

Internet & Intranet: Huge database of cached Web content is supplemented by live content via broadband or narrowband.

Telephony: Voice over Internet Protocol (VoIP) converges voice and data transmission, providing faster, clearer digital connectivity. New headset designs improve convenience and clarity.

PED Power: In-seat power system provides AC or DC power.

Technology Innovations

Closed captioning: New closed captioning options provide greater enjoyment for passengers who are deaf or hard of hearing.

Noise cancellation: Noise cancellation technology cancels ambient cabin and engine noise, delivering clearer, brighter audio at lower volumes.

Global Communications Suite: Panasonic leads the industry again as the only IFE provider delivering wireless, broadband data communications services, and makes them affordable to any airline. The service supports both data and digital voice communications, including live television. New antenna system provides superior bandwidth in a smaller, lighter and lower drag configuration. Technology opens new possibilities for on-board communications.

I hope that you now understand our involvement in aviation!

With all those systems installed in hundreds of aircraft across the globe, somewhere, sometime, somehow, an LRU is going to be in need of repair.

To meet this demand we have approximately 40 International Line Maintenance and Repair facilities holding many differing regulatory approvals ranging from EASA to CAAS to offer the CRS that our customer needs.

Naturally, we have the odd incident here and there caused by a rogue glass of Bordeaux or hot espresso finding its way into our under seat boxes or handsets.

With the rigorous development and testing that our systems undergo, there rarely passes any incident of note other than a disgruntled PAX as his IFE is switched off!

Nevertheless, if an incident does occur whereby there is a need for an ASR/MOR to be raised, being approved, we follow the same stringent safety guidelines as many in the aviation industry.

So, from television in your lounge to television in the air, we are there but don't call us when the cat knocks the goldfish bowl off the top and into the back of your TV!

Improving Air Traffic Management Safety

by Sean Jones, Head of Safety Strategy

In the last issue of Focus the editorial described the new Strategic Plan for Safety that was recently released by NATS. This article gives some more information on the strategy and highlights some of the actions being taken to improve safety performance in ATM.

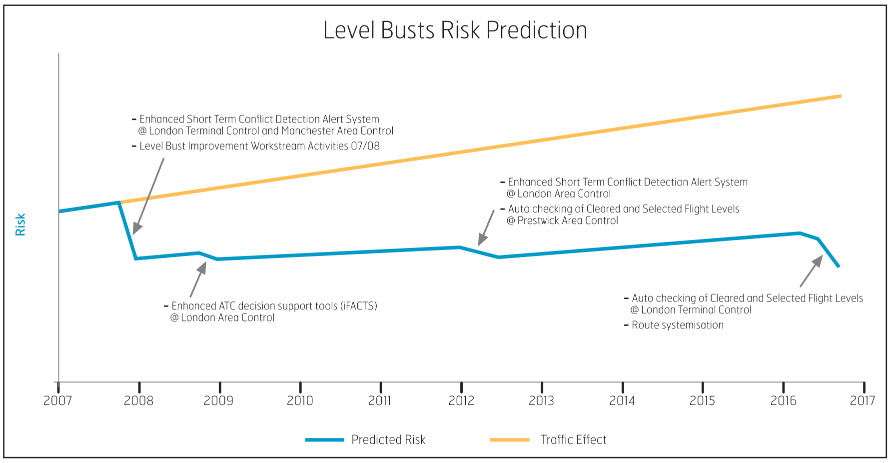
Context

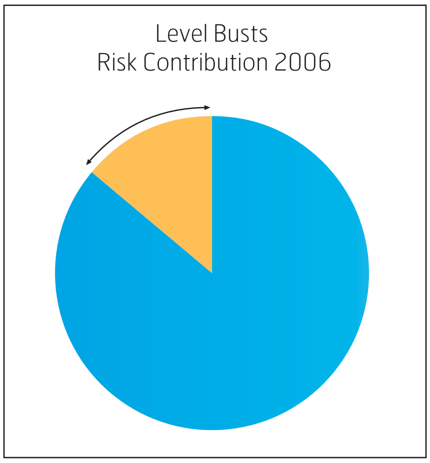
The new plan covers the next 10 years and supersedes the 2004 version. The update follows the completion of NATS '21 Destinations' programme which, amongst other things, had a major focus on safety improvement. This led to a significant change in how NATS thinks about safety. An improved understanding of the causes of incidents has resulted in a more focussed approach to reducing their frequency and severity.

NATS has also recognised that only by working in partnership with all participants in the air transport industry will it be possible to fully address the risks associated with air traffic management. For this reason, many of the safety initiatives involve working with pilots, airline operators and airport owners.

Key Priorities

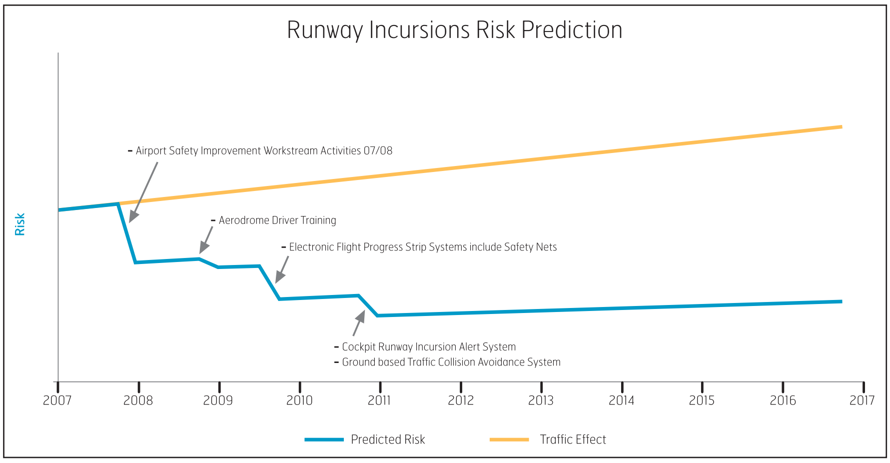
Based on a combination of incident analysis and the expert judgement of operational managers and safety professionals, the plan identifies fourteen key priorities areas. These fall into four broad categories:

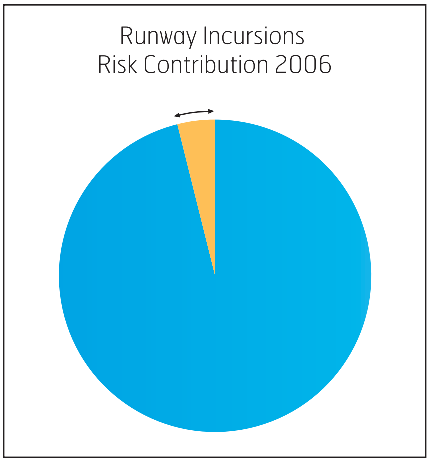




Level Busts Strategic Actions:

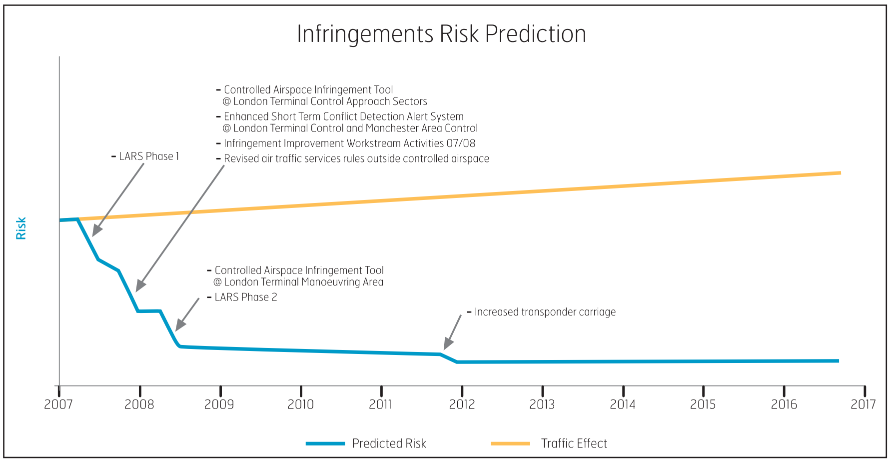
- *Reduce the number of communication incidents*
- *Make pilot intent visible to ATC*
- *Reduce the opportunity for clearance errors*
- *Enhance conflict detection and alerting systems*

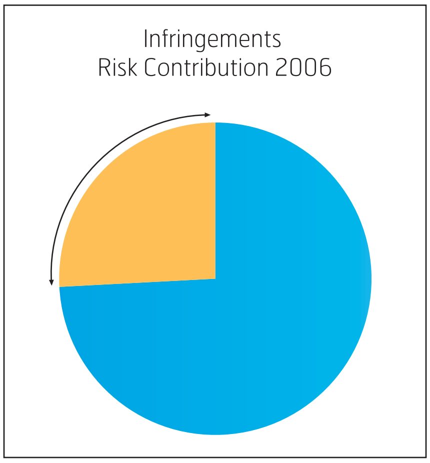




Runway Incursions Strategic Actions:

- *Deliver training on runway safety*
- *Implement Standard Operating Procedures for runways*
- *Develop new technology to support pilots, controllers and drivers*
- *Share data with everyone involved in runway incidents*
- *Work with airport authorities on design of airport changes*





Airspace Infringements Strategic Actions:

- *Increase understanding of root causes*
- *Undertake awareness campaigns with pilots and controllers*
- *Develop an infringement detection and warning tool*
- *Identify infringement hot spots*
- *Expand Lower Airspace Radar Service (LARS)*
- *Simplify airspace boundaries*

- Event Types:
  - *Level Busts,*
  - *Airspace Infringements,*
  - *Runway Incursions.*
- Human Performance:
  - *Human ATC Performance,*
  - *Pilot Performance,*
  - *Workload Management,*
  - *Communication.*
- Environment & Context:
  - *Airports,*
  - *Airspace Rules & Procedures,*
  - *Airspace Complexity & Design,*
  - *Military.*
- Safety Capability:
  - *Safety Leadership & Culture,*
  - *Safety Management Development,*
  - *Future Risks.*

Inevitably there is some overlap between the key priorities. However, they have been selected to provide a set of coherent programmes that provide a clear focus for improvement initiatives that address the main risk areas in ATM in the UK.

Strategies

For each of the key priorities a safety improvement strategy has been developed and a series of improvement activities have been identified. Many of the improvement activities identified require close collaboration between all the participants in the operation. A major difference between this strategic plan and previous versions published by NATS is that the safety benefits from each of the actions have been estimated based on an analysis of previous incidents. This allows the combined effect of all the initiatives to be assessed. Examples of the strategies for level busts, runway incursions and airspace infringements are shown in the panels. The document describing all the key priorities can be accessed via NATS website [www.nats.co.uk].

Measuring Improvement

Although the UK is fortunate in having an excellent reporting culture, there are still many difficulties associated with measuring safety performance in ATM. NATS is therefore working to develop safety measures that will be more sensitive to changes in the operation. This should help determine when actions are being successful and when more work needs to be done. Examples include the use of observers in the ATC operation to sample key events, the development of analysis tools for radar data and some early applications of voice recognition technology to measure the use of different ATC instructions. By developing the capability to measure changes in safety performance over short timescales it should be possible to accelerate the rate of improvement in the system and will also help to facilitate the early introduction of new operational concepts and future technologies.

NATS new Strategic Plan for Safety is only the first step in delivering the ATM safety improvements that will help ensure the continued development of safe and efficient aviation in the UK.

Adherence to ATC Clearances

by Glynne Dawson - ATC Planner, ATC Procedures & Planning Dept. LACC

Within the UK, in order to accommodate the complex traffic flows and volume of flights, en-route airspace is split into a number of "sectors". These sectors are essentially small volumes of airspace that can be safely and expeditiously handled by either a single controller, or a Sector Control Team, depending on the ATC unit concerned. En-route sectors are normally handled by a team of two controllers, one operating in a Planner capacity, making coordination decisions on individual aircraft entry and exit criteria, the other a Tactical controller responsible for the actual control of aircraft as they transit the sector. Each Planner and Tactical team can work in the region of 40–50 aircraft per hour, depending on the sector's complexity.

ATC sectors can abut each other either vertically or laterally, and pilots are regularly issued ATC clearances to cross a particular reporting point at a specific level, e.g. FL350 level LAKEY. This ensures the aircraft does not penetrate adjacent sectors (either MACC S29 or LACC S3, see Figure 1).

Such conditional clearances are issued to either:

- Avoid penetration of a sector that is not in the planned co-ordination sequence of the aircraft, and in which no flight data would be available to the control team.
- Avoid a major confliction point with crossing traffic.
- Ensure that aircraft comply with the agreed levels between ATC sectors, or units. Such agreements are essential tools in vastly reducing the requirement for individual co-ordination of aircraft on standard routeings.

When issued with such a conditional clearance it is vitally important that pilots achieve the cleared levels in order to prevent a potentially dangerous situation from occurring. If, when issued with such a clearance, a pilot considers it unachievable, or subsequent to any clearance it transpires that the level cannot be achieved in time, the sector controller must be informed as soon as possible. If this happens, the sector controller will, at least, be required to re-negotiate the coordination with the next sector along the route, and may well need to stop the aircraft's climb or descent against conflicting traffic ahead of the aircraft's path.

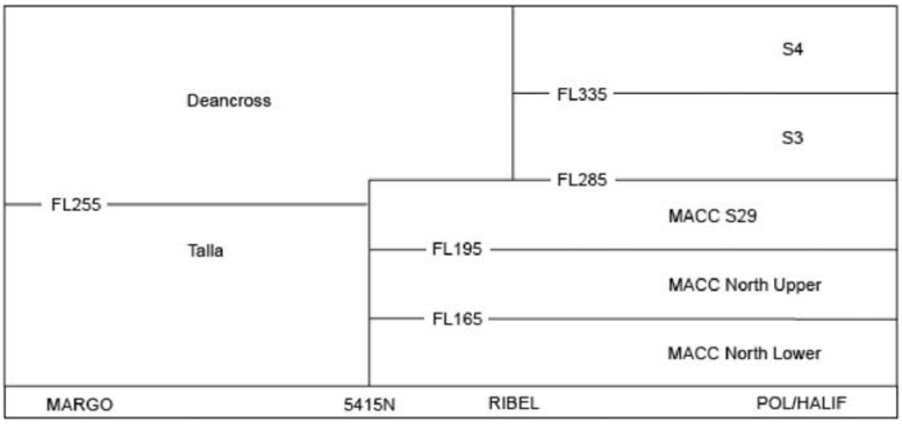


Figure 1.

From a pilot's perspective, it may not always be immediately apparent why it is important for an aircraft to achieve a particular level by a specific reporting point. TCAS may not be showing any conflicting traffic; however, high performance business jets and military aircraft could be operating at speeds of up to Mach 0.98 and with climb/descent rates of up to 8,000 feet per minute in the vicinity. Notwithstanding any apparent lack of conflicting traffic, controllers will inevitably have formulated plans for the safe transit of aircraft through a particular sector based on any conditional clearances issued.

We are regularly asked why standing agreement levels are not always published on STAR charts in order for pilots to expect them. There are various reasons why this approach is not entirely appropriate:

- There are safety concerns that pilots, particularly those not as familiar with UK airspace, may climb or descend to a level on the chart without an ATC clearance, possibly leading to a loss of separation.
- Not all level clearances are standard levels; they are regularly levels planned between sectors, based on expected aircraft performance or sector configuration.
- Standing Agreement levels can be altered tactically to provide separation against conflicting en-route traffic, or military traffic crossing traffic.

Part of a controller's normal duties is to monitor aircraft against any clearances issued; however, the pilot is the only person that knows exactly what his aircraft can achieve on the day and it is vital that any inability to comply with a clearance, no matter how small, is communicated to the controller at the earliest opportunity. It is a legal requirement to comply with ATC clearances in most classes of airspace.

Always advise the controller when you know that you will be unable to comply with any ATC clearances as soon as possible in order that safe and appropriate action can be taken.

Please help us to help you!! Thank you.

EXT 3/2007 Loss of Communications & the Multi Carrier Effect

NATS has recently undertaken an investigation into the operating characteristics of the Air-Ground-Air communications network following a number of 'Loss of Communications' reports. In common with many other European ANSPs, NATS uses a method of radio transmission where the same signal is radiated simultaneously from up to five separate radio stations. This transmission system is used to provide area coverage by extending the effective range of the operating frequency.

Detailed testing showed that despite meeting the published minimum performance specifications, some airborne radio equipment is susceptible to spontaneous receiver muting when subjected to multiple transmissions.

Operations in European and UK airspace can be subjected to localised phenomena referred to as the 'Multi Carrier Effect'. The effect is usually observed by aircrews as an apparent 'hole in coverage'. The principle defining symptom of 'Multi Carrier Effect' is that all Air Traffic Control to Pilot communication is inhibited, while Pilot to Air Traffic and Pilot to Pilot calls operate normally.

The presence of the Multi Carrier Effect can often be suspected when routine RT traffic from other aircraft can be heard but any corresponding ATC commands are inaudible. Similarly, aircrews can recognise that the phenomena is present when ATC apparently fails to respond to repeated calls from the aircraft.

Performance data was acquired from a number of representative equipment types during NATS programme of airborne radio evaluation. The data showed that equipment design practice ensures "Multi Carrier Effect" can only occur when the received signal level is below a pre-determined threshold.

There is potential for aircrew experiencing 'Multi Carrier Effect' to inadvertently cut in on other transmissions and therefore good RT discipline remains essential.
In the event of a suspected occurrence, it is suggested that aircrew should make contact with Air Traffic Control via another aircraft using an Air to Air relay call.

Following any suspected event, aircrew and ATC observations should be reported to CAA (SRG) via the MOR scheme using CAA form 1261 – reports should include the following details: - Date, Time, Callsign, Aircraft type, Frequency, Position, Altitude, aircraft heading and duration of event.

'Multi-Carrier Effect' is characterised when the airborne receiver suddenly becomes insensitive to ATC transmissions.
It is possible in some cases that certain non-user adjustments can be made to the aircraft radio equipment to improve aircraft receiver sensitivity to ATC multi-carrier transmissions. Refer to the radio equipment manufacturer for further information.

Produced by Division of Safety
Contact: Karen Skinner
Tel: 01489 444968

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