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# focus

ON COMMERCIAL AVIATION SAFETY

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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.

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*Front Cover Picture: Aegean Airlines early morning departures with A320 fleet, from company's main hub Athens International Airport ELEFTHERIOS VENIZELOS.*

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focus ON COMMERCIAL AVIATION SAFETY

# Resilience

by Dai Whittingham, Chief Executive UKFSC

**We hear much about aviation resilience. Most dictionaries like to break the definition of 'resilience' into two basic forms, one physical and the other metaphorical, typically: the capability of a strained body to recover its size and shape after deformation; and the ability to recover from or adjust to misfortune or change. There is also the concept of psychological resilience, described as the ability to use psychological and behavioural capabilities that allow people to remain calm in a crisis or when subjected to other stressors. For the sake of argument, let us consider resilience in two forms: personal and system/organisational.**

Personal resilience is multi-faceted but inextricably linked with your wellbeing. If you are fit and well-rested, you will be better able to withstand environmental and psychological stressors. Fatigue not only reduces cognitive performance but it also reduces your resilience; further, fatigue or tiredness and irritability are closely linked, and there is clear evidence of the link between fatigue and depression. Mental health is of course a key component in personal resilience.

Looking at the psychological aspects of personal resilience, the behavioural processes that allow you to remain calm in the face of an existential threat are often innate but can also be learned. This is where training comes in, providing experience and processes that help you suppress anxieties and deal with what you need to. Fear can be corrosive and contagious, hence the oft-quoted army mantra about officers never letting the troops see them running! Checklists and SOPs provide another form of support because they guide you into a course of action that will almost always keep you out of trouble, but they also provide structure and help you organise your thoughts. There will always be scenarios that require immediate action but pausing for thought can aid diagnosis and prevent you from heading down an inappropriate path; it is also a good remedy for the startle factor.

A little-known but easy technique for managing stress (and improving your resilience) is simply to regulate your breathing – it works because of the various feedback mechanisms between your heart rate, respiration rate and levels of stress hormones. It is one of the techniques taught to elite athletes to help them control pre-race nervousness and hence concentrate on the job at hand, and it promotes general awareness. It works in the air too and you can easily test the principle on the ground if you want to try it there first; you want 10-15 breaths/minute but they need to be evenly spaced. It's a really good defence against coning of attention and loss of situational awareness.

With system or organisational resilience, the ability to adapt or recover is largely resource-based, with some process and training thrown in for good measure. The trouble is that we work in an industry where resources are the absolute minimum required to do the job under normal circumstances, or where assets are being operated at maximum capacity, and there is very little spare to cope with a disturbance in routine operations. A single sick passenger causing a long-haul air return might therefore generate perturbations in crewing and airframe use that lasts for days. The military copes by holding forces in reserve to plug any holes that appear in an operation, an expensive option but necessary when operational failure is unacceptable; commercial aviation entities cannot afford to operate in this way and remain a going concern. Runway capacity is probably the most significant limitation on the resilience of the aviation system in the UK. Runways becoming unavailable have severe knock-on effects, with perfectly serviceable aircraft having to divert. Even if runway capacity exists, managers at busy airports sometimes refuse to accept 'normal' diversions for ground handling capacity reasons, leaving captains in the position of either calling an emergency (when they don't actually have one) or trying to find another alternate. All the while, fuel reserves for those caught up in the mess are dwindling, total system risk is increasing because of the added crew/ATCO workload, traffic congestion and therefore increased MAC risk, never mind the impact on passengers and crew when they end up in the wrong place. And the deteriorating situation inevitably tests one's own personal resilience...

The CAA is taking resilience issues seriously and has established an industry group to explore means of removing some of the capacity hurdles. For example, work is in hand to limit the effect that drone incursions can have on an airport and its surrounding airspace – the rules by which ATC operate mean that a drone sighting can, depending on range, require a runway to be closed and/or departures halted or re-routed. Flexibility in the ATC regulations might allow a more risk-based decision to be taken, where the increase in system risk generated by runway closure is set against the actual risk of collision with a drone.

There are other areas, such as acceptance of diverting aircraft, where wider collaborative decision-making may lead to different outcomes from those driven more locally. That in turn may generate the need for a new process or software support for managing multiple diversion scenarios. The Government's emerging aviation strategy will also be taking account of some of these considerations, so if the DfT or CAA ask you for some help with ideas on resilience issues, please feel free to contribute.

# Error Management – A Continuous Loop?

by Jacky Mills, Chairman UKFSC

**Aviation professionals – both flight crew and Safety Management System guardians – spend a great deal of their time considering Threat and Error Management. Flight crew will brief the specific threats they anticipate in their pre-flight and approach briefings every time they fly. Safety Management Systems encompass Risk Assessments as the 'justification' for commencing or continuing a particular activity – and Risk Assessments are, no doubt, a form of Threat and Error Management. Just as the flight crew briefing is 'assessing the risks' which may be encountered during their flight.**

In either case only the threats which are known, or may be anticipated as possible, can be taken into account. There is always the possibility of the Black Swan event – that unexpected event which nobody had considered or anticipated. 'Expect the unexpected' is a sound piece of advice... 9/11 is a good example of this – prior to the appalling events on that day industry had not seriously considered the possibility of a 'hijacked' aircraft being used as a weapon. Undoubtedly the events of that day changed the aviation world forever, with the ensuing, but necessarily, stringent security requirements ever since.

The 'Black Swan' by definition cannot be specifically managed as a threat. Aviation, however, has very many threats which can be considered and anticipated as potential dangers, and which can and do continue to be addressed.

We spend a good deal of time looking at past accidents and incidents, examining what went wrong, reviewing preventative actions – both those in place and suggested new actions. All fresh safety investigations will endeavour to suggest suitable recommendations to change a procedure or process, in order to prevent a repetition of the event. Rarely can there be no appropriate new recommendation – in which case raising awareness can be the resulting action; however, there is always something to learn. This may indeed be 're-learning' something that industry was well aware of from a slightly different slant, or in the case of the Black Swan may well be eye opening new considerations.

So, why, I have to ask, do the same events seem to repeat themselves? Or at least very similar events pop up again in a slight different guise? Why does 'learning from our mistakes' often not seem to work? Sometimes it almost seems like we are going backwards, in that 'stuff' which we thought had been adequately addressed back in the days of Pontius, comes back into the headlines.

With this thought comes the topic of Unintended Consequences... Progress and seemingly great steps forwards, maybe with technological advances, often seems to bring with it unimagined dis-benefits. Automation is one good example.

Take a look at the Colgan Air Flight 3407 accident nearly a decade ago. In the aftermath of this tragedy safety specialists debated the question of airline pilot's hand flying skills and initial pilots' qualifications, amongst other factors – fatigue also being cited as a major contributory factor. Controversial FAA regulatory changes were made in the aftermath of this which are now showing risk-reduction benefits. In the US changes were made to certification and qualifications for airline pilots giving a significant overhaul to crew training that hadn't been seen for very many years.

The training required to achieve the ATP (airline transport pilot) qualification was greatly increased making it necessary to undergo academic and flight training in critical operating skills. Pilots are now also required to be examined in real scenarios and demonstrate a realistic upset recovery, for example. A similar philosophy is also being applied to training ground staff and cabin crew, which is so important to achieve a total safety system benefit.

A robust Safety Management System means that the Operator has good data collection tools in place, with transparency ingrained in their culture. The risks and hazards will be captured and mitigated inherently. The introduction of performance based regulation has taken great steps towards reducing 'box ticking' and potential time wasting by looking at low risk areas. Regulators working collaboratively with the Operators to proactively improve safety is very obviously a good move.

Hand flying skills and their degradation are certainly attributable to the fantastic advances in automation – some have even described new pilots in recent years as 'Systems Operators' with some justification. The young 'wizz kids' who have grown up with computers find it second nature to programme the FMC with routing/performance details in a flash, whilst quite often, the sage and experienced Captain sits back and lets them demonstrate their talents.

The continual development of automation on aircraft is vital in the progress of world-wide flight schedules which are so much a part of our daily lives now. Without the current level of automation, the traffic volumes of today would be impossible, RVSM (reduced vertical separation minimum) and navigation performance approaches would just not be possible. However, we must continue to be very aware of the unintentional consequences – possible overreliance on automation and the inevitable loss of manual flying skills.

Any safety database will have examples of safety events where the pilot was hand flying the approach in preparation for their simulator training session. Hand flying in a lot of commercial flights is often limited to a couple of minutes after take-off and a few more during the latter stage of the approach to land. Necessarily so, as the automation undoubtedly does it better than the human, but not a wonder manual flying skills become degraded. However, hand flying skills can be required at short notice – an unexpected technical failure or extreme weather conditions can happen on any flight.

We also need to consider Airmanship in this context though. Many investigations may pinpoint manual flying skills when in reality it could have been lack of situational awareness or airmanship that is the hidden cause. It is easy to blame automation when in reality it could be another facet of progress – lack of airmanship. Again, to go back to Pontius' days, the aircraft commander made all decisions relating to the flight from pushback to the time they arrived back on stand. That was before Flight Following and ACARS of course. So, the reality may be that Airmanship is called upon less and less with few decisions required to be made, just the necessity to follow procedure or instruction.

No bad thing of course, standardisation. But we must be aware that any skill that is not in regular use will become eroded. Safety is paramount of course, but accurately measuring if safety has improved in commercial aviation is challenging.

We can and do, of course, look to our safety database to pull out statistics. This will tell us the number of events in certain categories and it may point towards the causes of these too, but it is difficult to be completely precise when assimilating these statistics as there are so many different variables to consider. What we do know is that some events which have been thoroughly investigated and examined and supposedly mitigated against, seem to happen again. Sometimes these are events which on the face of it seem simple to address.


An example of this was detailed in a recent AAIB publication reporting on an event during a positioning flight, with Cabin Crew on board, where a catering cart became dislodged from its stowage in the aft galley on landing. It travelled down the centre aisle of the aircraft and seriously injured one of the cabin crew sitting on an aft-facing Jumpseat by the forward left door.

The aircraft was being positioned without passengers for operational reasons with a crew of two pilots and four cabin crew. The commander had expected the cabin crew to occupy their assigned Jumpseats in the cabin for the take-off, but during the flight he allowed the No 2 to occupy the Jumpseat in the flight deck to observe the descent and landing. He believed the cabin would be secured for landing in accordance with their normal procedures for flights with three cabin crew, and that the three cabin crew would then sit in their assigned Jumpseats in line with the Operators guidance.

The flight deck door was closed and the PA system used to inform the cabin crew that 10 minutes remained before landing. The No 1 subsequently informed the pilots that the cabin was secure. After landing the brakes were applied and the commander then heard a scream from the cabin. The No 2 subsequently left the flight deck to investigate. Shortly afterwards the pilots were told that one of the No 3's legs might be fractured, and they therefore asked ATC to arrange for medical assistance to attend the aircraft on stand.

After the aircraft was shut down on stand, the commander found that the No 3 was lying on the cabin floor blocking the main access door at the front of the cabin. During the landing a catering cart had dislodged from its stowage in the aft galley and had travelled down the aisle until it struck the No 3 who was sitting in the aft facing Jumpseat assigned to the No 4 at the front of the cabin on the left side.

Having seen the cart heading towards him the No 3 had tried to protect himself by raising his knees towards his chest but when the cart struck him it fractured his left femur and caused a minor hand injury. Being unaware his leg was broken he had attempted to stand up but collapsed onto the floor.

As the main door was blocked, the Rescue and Fire Fighting Service (RFFS) personnel were delayed from providing first aid for several minutes. Later following liaison with the local ambulance service, the RFFS disembarked the casualty on a stretcher and he was transported to a local hospital.

The subsequent Engineering investigation found no fault with the catering cart's latching system.

Cabin crew investigations revealed that during the flight the No 3 had moved the catering carts in the aft galley in order to place new bar seals on them. The No 1 reported that after hearing that 10 minutes remained until landing, she had checked the security of the carts and believed they were all correctly stowed. She then moved forward and opened the flight deck door for a short time to inform the pilots that the cabin was secure for landing despite being aware that the No 3 was still standing in the aft galley. After the flight, it emerged that no pre-landing security checks were actioned in cabin areas for which the No 2 was normally responsible; procedures for flights with only three cabin crew were not used when the No 2 was in the flight deck.

A few minutes before landing the No 3 moved forward to the front left side of the cabin and sat on the inboard Jumpseat near the main access door, while the No 1 and No 4 sat in the front row of passengers' seats. The No 3 stated that the aft catering carts had appeared to be secure when he left the aft galley to move forward.

The aircraft operator's investigation found that the deceleration forces during the landing were normal and it was not possible to explain how the catering cart unlatched. Had the No 3 cabin crew been seated is his assigned Jumpseat on the right side of the aft galley he might have seen the catering cart become insecure and been able to prevent it from moving.

Following this accident, the aircraft operator included the procedures for positioning flights in its recurrent training sessions for all cabin crew. They have also circulated a safety publication to all crew reminding them of the cabin procedures which are to be followed during a positioning flight.

Full report can be found at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/708927/AAIB_Bulletin_6-2018_Hi_Res.pdf

The unfortunate events described above had happened before. Human error strikes again, most likely explainable in this case to some extent by the fact that this was a positioning flight and procedures were not rigidly adhered to. These events need to be shared and reiterated to stress that accidents do happen, and will happen, when guard is down, and procedures relaxed. Having said that... similar events have happened with no attributable cause, other than, in the absence of any other evidence to the contrary, purely because a slip or mistake had been made at the end of a busy flight.

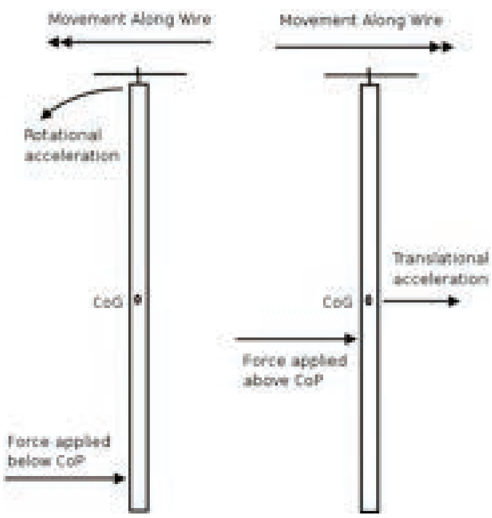
This tells us that every event is worthy of a thorough investigation, that findings from investigations should be shared as widely as possible, and we should never apologise for discussing AGAIN and AGAIN the threats which may be waiting to catch us out each and every day.

# The Sweet Spot, or Did you really get away with that landing?

by Alex Fisher

**Many pilots are sports players, and are familiar with the concept of the sweet spot. It is that point on the bat or racket where the ball flies off with a wonderful effortless ease. You may wonder what on earth that has to do with landings, but the connection is very close, though not always appreciated. I recall clearly years ago a meeting where recent Flight Data results were being discussed and a number of firm (>2g) landings appeared. The training manager was naturally concerned that the fleet was thumping the odd airplane through the 'surface film of concrete', but he was far more worried at how few firm arrivals were reported in the Tech Log. The same discussion just took place, years later, in the UKFSC. While pride might have played some part in the lack of reporting, there are sound physical reasons why the landing could be misjudged by pilots sitting at the far front of the aircraft. Enter the sweet spot.**

The basic physics are easy to understand. Whenever a bat hits a ball, an impulse is imposed on the bat by the ball (and vice versa). That impulse always accelerates the centre of gravity of the bat. If the ball hits the bat at its centre of gravity (CoG), all the motion of the bat is 'translational' i.e. *without any rotation*. If the ball hits the bat anywhere else, away from the CoG, the bat still moves back but it rotates too. The amount of rotation depends on the distance of the point of contact from the CoG and the moment of inertia




of the bat. The figure (thanks to wikipedia) shows the situation where a bar (or bat) is suspended from a wire along which it is free to slide. It shows that a blow right at the end of the bat, moves the CoG to the right, but causes sufficient rotation to move the pivot point at the top to the left. A blow further up the bar causes less rotation and so the pivot point slides to the right. Somewhere between these two blows, the rotation of the pivot exactly equals the movement of the CoG and the pivot remains stationary (and the bat rotates around the pivot as if it were fixed). If one were holding the bar at the top when the force was applied at that point, there would be no force or feeling of the blow; the blow has been applied at the Sweet Spot (or Centre of Percussion, CoP, for those who remember their A level Physics). (For the true pedant, it should be noted that some sportsmen find the shot is sweeter if the pivot is further up the wrist, which means a sweet spot may not be exactly at the CoP but the principle is the same).

What is the connection with landings? Just turn everything through a right angle and just think where the pilot, the CoG and the wheels of a typical airliner are. The crew sit well forward of the CoG, and the wheels are a short distance behind (the wheels must be behind the CoG or the aircraft would sit on its bum on the ground). So any impulse at the wheels caused them striking the ground, produces an upward acceleration through the CoG (where the FDR records it) but also some downwards acceleration, due to rotation, at the pilot's seat. Whether or not the wheels are exactly at the CoP does not matter, what is important is that the impulse felt by the pilot is always less than that felt elsewhere. Conversely, all those sitting behind the CoG enjoy the translational impulse plus an impulse due to rotation. So if your estimate of the excellence of your landing differs from the cabin crew's, they might actually have a point.

Finally, our FDR showed that the 'hottest' firm landings were less likely to be reported than the rest. Again ruling out pride, this might be because the faster landings mean a lower attitude and, because the CoG is some distance above the wheels, a slightly further forward position of the CoG relative to the wheels. This might just heighten the CoP effect. Conversely a firm arrival following a prolonged flare at lower speed/higher attitude (which puts the CoG back a little relative to the wheels) feels more 'solid' to everyone.

# Airmanship 2 – The Right Attitude

by Captain Tony Wride, Manager Safety Risk, Etihad Airways

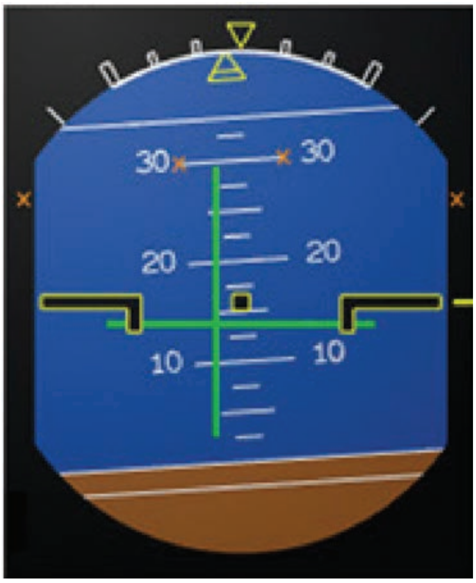
**Whether you fly a huge Airbus A380 or a petite Cessna 150 they both basically operate in a similar manner in terms of flying technique – "Push and the houses get bigger – Pull and the houses get smaller – Keep pulling and the houses start to get bigger again"!! Okay maybe a simplistic view but what that phrase is talking about is attitude and the effect a control input has on attitude and the end result. The aircraft attitude, coupled invariably with a power setting, is normally one of the first things an instructor will teach you using the famous APT (Attitude, Power, Trim) and PAT (Power, Attitude, Trim) for various stages of flight.**

In a modern commercial airliner those basics are quite often forgotten as pilots rely heavily on the automation and the Flight Director (FD) system. They forget that if they looked at the attitude indication then their aircraft obeys all the same principals as the first small aircraft they flew. As an example just about every commercial airliner I know has a cruise attitude of between 2° and 3° nose up with a power setting something above 70% maximum thrust. For a climb, power is increased, pitch attitude increased, and aircraft retrimmed (normally automatically) thereby following the PAT. For a level off, attitude is reduced back to cruise datum, power reduced to maintain cruise speed, and aircraft retrimmed (normally automatically) thereby following the APT. With the autopilot and autothrust/autothrottle engaged all of this is done for you but the aircraft is still following the same technique.

Attitude is the key and knowing what attitude to expect, or set, for the various stages of a flight is a key airmanship skill that sadly seems to be deteriorating. Two tragic accidents clearly show this and one of them is similar to the recent UAE registered B737 crash.

**AIR FRANCE 447 – Airbus A330-200 – June 2009 – South Atlantic**

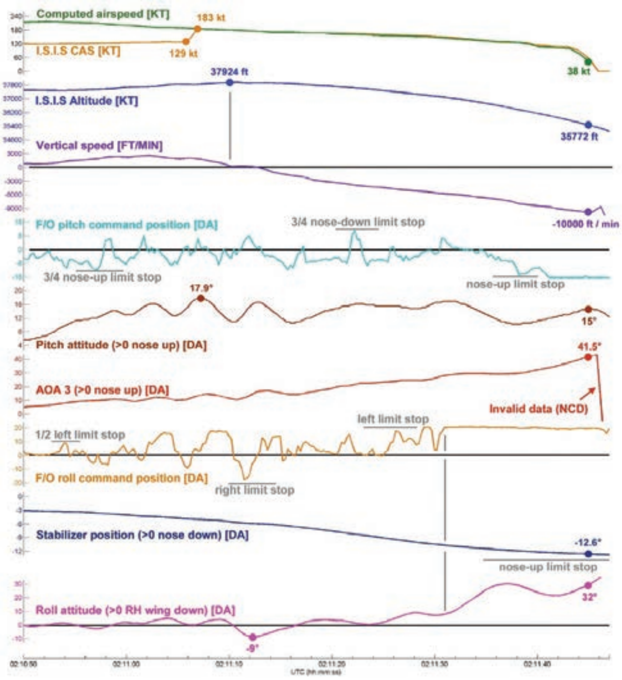
This well documented accident, where 228 people were killed after the aircraft got into a deep aerodynamic stall while in the cruise at FL350, is a classic example of the pilots not flying the aircraft following a malfunction and not looking at the attitude. The aircraft was in a stable state with a pitch attitude of approximately 2.5° nose up and a relatively steady power setting. Following the blockage of the pitot system by ice crystals, resulting in unreliable airspeed indications, the autopilot and autothrust systems disconnected. In the following few seconds the co-pilot pulled back on the sidestick setting a high nose attitude of 12° which resulted in a rate of climb of nearly 7,000 feet per minute (fpm) and speed rapidly decaying from 274knots to 52knots with a high angle of attack. The aircraft climbed 3,000ft until it entered a stall and began a 10,000fpm decent to eventually crash into the Atlantic Ocean. Throughout the 4 minutes from the loss of airspeed indications to the crash, the Primary Flight Display (PFD) was indicating correctly the very high nose attitude which was way above the normal cruise or cruise climb attitude.




*AF447 pitch attitude indication towards top of 'zoom' climb and entering stall. Note confusing Flight Director indications*

In hindsight it is easy to judge the actions of the crew and possibly lay blame but what we should learn from this accident is that perhaps a lack of attitude awareness by this crew, and potentially many other commercial airline pilots, is something that needs highlighting. There are unreliable airspeed procedures, memory items, for the various aircraft types which basically say set a particular attitude and power depending on aircraft configuration.

This action gives time to get the published tables out to then set attitude and power for the required flight path. It is possible to use these published tables to get the aircraft safely back on the ground with no airspeed indications at all!

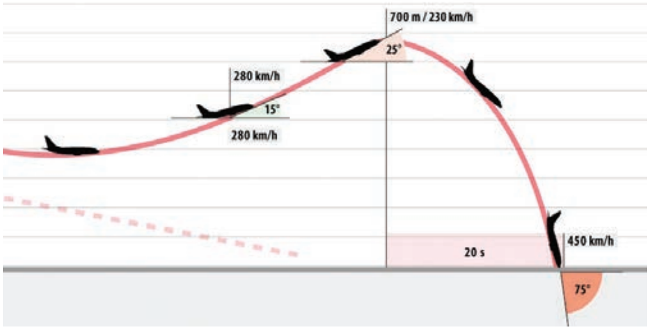



*AF447 Graphical data. Note the pitch attitude (17.9° nose up) as the aircraft enters the stall and the pitch up command by the pilot which is full nose up when fully stalled and descending at 10,000fpm.*

**Tatarstan 363 – Boeing 737-500 – November 2013 - Kazan**


*Tatarstan 363 Crash Site.*

This tragic accident, that killed 50 people, occurred following a go-around where having initiated the go-around by pressing the TO/GA switch the autopilot disengaged. No manual control inputs were made and the pitch attitude increased to in excess of 25° nose up with speed decaying to 117knots. Due to control inputs by the crew and the trim system the pitch angle decreased quickly and resulted in a final attitude of 75° nose down. It is believed that the pilot may have been a victim to a pernicious form of disorientation called "somatogravic illusion" which led him to believe the aircraft was climbing despite the attitude indicator clearly showing a significant nose down indication.




*Tatarstan 363 (B737-500) Go-around and crash profile. FlyDubai 981 profile almost identical!*

There have been other similar accidents of pilot disorientation following a go-around resulting in the aircraft crashing including Gulf Air 072 at Bahrain in 2000, Armavia 967 at Sochi in 2006, and FlyDubai 981 in 2016.

## Believe Your Instruments

Many years ago (1975) when I started my military flying, and then later teaching military pilots, a lot of emphasis was placed on disorientation and believing your instruments. I distinctly remember the instructor telling me to close my eyes while he performed a series of aerobatics that ensured I was totally disorientated then gave me control to recover the aircraft to straight and level flight using my instruments. If I was lucky the attitude indicator had not toppled and could be used but I was also taught how to use other instruments to help me recover the aircraft to level flight. The key learning point was to believe your instrument not what you were sensing.

Modern commercial aircraft have extremely reliable attitude indications and it is extremely unlikely that a pilot would be left without correct attitude information. The pitot and static systems are more likely to provide incorrect information, as happened to AF447, but the recovery procedure in event of such a failure is to set an attitude and power to give a safe stable state and time.

## Attitude Is A Life Saver

Knowing the various pitch attitudes, and power settings, for your particular aircraft type in different phases of flight is an airmanship skill all pilots should have and regularly practice. Whilst maximum use of automation definitely enhances safety pilots need the skill to be able to safely fly the aircraft when the automatics are not available, as in AF447.

**"The manufacturer's published airspeed unreliable pitch attitude and thrust settings could be considered as an initial recovery combination in any situation".**

You may consider that a bold statement but look at the accidents on page 7 and apply that. In the AF447 case setting 5° nose up and Climb thrust would not have resulted in the aircraft zoom climbing and entering a stall. In the Tatarstan case, and the other go-around crashes mentioned, maintaining approximately 15° nose up attitude and re-engaging the autopilot, or setting a level flight nose up attitude and power and re-engaging the autopilot, would have given the time for the pilot's to recover from the disorientation.

## Effective Training

Regular practice of flying your particular aircraft type without the automatics helps maintain and sharpen the airmanship skill of flying the correct attitudes and power settings. I believe that some airlines actually include an additional, non-jeopardy, simulator session each year specifically to re-enforce manual flying skills and in my opinion that is to be commended. Perhaps all airlines should include more manual flying practice in the simulator rather than constantly repeating exercises using the automation.

Manual flying on the line does have some risk associated with it which is why some airlines advocate 'maximum use of automation'. Disconnecting the autopilot at top of descent in an airliner with 400 passengers on board to fly an approach to an airport with a low cloudbase may not be the best time to practice manual flying! On a CAVOK day then perhaps the whole approach, including the turn onto finals, could be flown manually. Remember that as soon as the autopilot is disconnected the workload of the Pilot Monitoring increases dramatically! As a minimum consider looking at and memorizing the approximate attitudes and power settings that the aircraft flies for the different phases of flight because it might come in useful one day.

**GOOD AIRMANSHIP ENHANCES FLIGHT SAFETY**

# Flying a radar heading

SAFETY PARTNERSHIP AGREEMENT

*"Working together to identify and resolve safety issues whilst maximising the use of the airspace and airport capacity"*

**During the investigation of a recent loss of separation it became clear that there is a significant difference between Pilot and Controller assumptions surrounding tolerances when following Radar headings. Following discussions between the airlines and NATS; further questions were raised with regards to reporting headings. This article seeks to address the above findings and provide guidance for controllers and guidance on the subject of radar headings.**

## Instrument Ratings

Some misinterpretation has arisen, because during pilot instrument ratings and subsequent proficiency checks there is a +/-5 degree limit on heading adherence. There is no tolerance on assigned radar headings in an everyday flying environment and pilots should always fly the required heading as accurately as possible. On most modern aircraft, this should be exactly the heading assigned.

## MagVar (Magnetic Variation) Tables

All modern aircraft do their calculation of heading and track in True, and convert the output to Magnetic by means of MagVar tables in the inertial reference systems, and in the flight management systems (separate data). If the MagVar tables are not up to date, the pilots will think they are flying a particular heading, but, if the variation is out, the actual (Magnetic) heading could be different – maybe by up to 3 degrees. The MagVar tables are produced for epochs – periods of 10 years – and the latest update is 2015, but it is likely that quite a few aircraft are flying with 2005, and some even with 1995 data. In some cases updating the MagVar tables involves a hardware change which can cost 10s of 1000s of dollars per airframe.

## Aircraft Technical Tolerances

Most heading indication systems in contemporary aircraft are able to resolve to an accuracy of less than 1 degree and evidence shows it can be about 0.1 degree. The difference between indications on heading within a single flight deck should be effectively zero, there all kinds of monitoring systems that would flag if there were a difference. However in most aircraft a warning is only given when the difference between displays exceeds 5 degrees.


## Continue present heading instructions

When instructed by a controller to continue and report the present heading; the pilot should either:

- report their exact heading (eg 093 degrees) and continue flying that heading (the controller will round the heading up or down as a new instruction if this is needed); or
- adjust their heading to the nearest 5 degrees (eg 093 becomes 095) and fly and report this adjusted heading.

A pilot should never report a heading they are not flying.

**Key Messages for pilots:**

- There is no tolerance on radar headings – always fly the heading assigned.
- When reporting the heading you are flying, report it accurately.

**Key Messages for controllers:**

- MagVar Tables and aircraft technical tolerances may mean the aircraft is not flying the heading assigned accurately
- Anticipate some erosion when using parallel headings for separating aircraft especially over long distances

# Safety Information Bulletin

Operations – ATM/ANS

SIB No.: 2018-08
Issued: 08 May 2018

**Subject: In-Flight Fuel Management – Phraseology for Fuel-Related Messages between Pilots and Air Traffic Control**

## Revision / Cancellation:

This SIB replaces EASA SIB 2013-12, dated 23 July 2013, which is withdrawn.

## Ref. Publications:

- ICAO Annex 6 'Operation of aircraft' Part I – 'International Commercial Air Transport – Aeroplanes', 10th Edition dated July 2016.
- ICAO Annex 6 'Operation of aircraft' Part II – 'International General Aviation – Aeroplanes', 9th Edition dated July 2016.
- ICAO Doc 4444 'Procedures for air navigation services – Air Traffic Management', 16th Edition dated 2016 (hereinafter referred to as PANS-ATM).
- ICAO Doc 9976 'Flight Planning and Fuel Management (FPFM) Manual', 1st edition dated 2015.
- Commission Regulation (EU) No 965/2012 dated 05 October 2012 on air operations (hereinafter referred to as the Air Ops Regulation).
- Commission Implementing Regulation (EU) 2016/1185 dated 20 July 2016 amending Implementing Regulation (EU) No 923/2012 as regards the update and completion of the common rules of the air and operational provisions regarding services and procedures in air navigation (SERA Part C) and repealing Regulation (EC) No 730/2006.
- EASA ED Decision 2016/023/R dated 13 October 2016 amending the Acceptable Means of Compliance and Guidance Material to Commission Implementing Regulation (EU) No 923/2012 'AMC and GM to the rules of the air' – Amendment 1.

## Applicability:

All aeroplane operators, pilots, air traffic service (ATS) providers and air traffic controllers (ATC).

## Description:

Minimum fuel situations have been the subject of several investigations by the air accident and incident investigations boards. Moreover, information received by EASA from mandatory occurrence reports related to fuel indicates that the MINIMUM FUEL declaration has been frequently misunderstood and misused by pilots and ATC.

EASA SIB 2013-12 informed stakeholders about the adopted ICAO amendment 36 to Annex 6 Part I, which, in particular, introduced new standards for in-flight fuel management and associated phraseology. The ICAO standards on the MINIMUM FUEL declaration have been applicable since 15 November 2012. Furthermore, point SERA.11012 introduced a similar requirement in 2016.

The relevant ICAO standard and related notes in Annex 6 Parts I and II require that:

> *'The pilot-in-command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than planned final reserve fuel.'*
>
> *Note 1 – The declaration of MINIMUM FUEL informs ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing and any change to the existing clearance may result in landing with less than planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.'*

For Commercial Air Transport (CAT) operators, Part I includes the following Note 2:

> *'Guidance on declaring minimum fuel for CAT operators is contained in the Fuel Planning Manual (Doc 9976).'*

More clarification is provided in ICAO Doc 9976, chapter 6.8.5 'Minimum fuel declarations':

> *'Note 1 – Pilots should not expect any form of priority handling as a result of a "MINIMUM FUEL" declaration. ATC will, however, advise the flight crew of any additional expected delays as well as coordinate when transferring control of the aeroplane to ensure other ATC units are aware of the flight's fuel state.'*

As highlighted in ICAO Doc 9976, it is 'important to note that although the coordinated escalation process (with ATC) related to the protection of final reserve fuel typically occurs in three steps, each situation is different and may be resolved at any stage in the process. The three steps in the escalation process are:

**Protecting final reserve fuel in accordance with Annex 6, Part I, 4.3.7**

**Step 1** Request delay information when required (in accordance with 4.3.7.2.1).

**Step 2** Declare MINIMUM FUEL when committed to land at a specific aerodrome and any change in the existing clearance may result in a landing with less than planned final reserve fuel (in accordance with 4.3.7.2.2).

**Step 3** Declare a fuel emergency when the calculated fuel on landing at the nearest suitable aerodrome, where a safe landing can be made, will be less than the planned final reserve fuel (in accordance with 4.3.7.2.3).'

Operators can consult several examples and scenarios on the use of the MINIMUM FUEL declaration in ICAO Doc 9976, Ch. 6.10.

The corresponding provisions for air traffic controllers can be found in ICAO Doc 4444 PANS-ATM:

> *'Minimum fuel. The term used to describe a situation in which an aircraft's fuel supply has reached a state where the flight is committed to land at a specific aerodrome and no additional delay can be accepted.' (Ch. 1 Definitions)*
>
> *'15.5.4.1 When a pilot reports a state of minimum fuel, the controller shall inform the pilot as soon as practicable of any anticipated delays or that no delays are expected.*
>
> *Note - The declaration of MINIMUM FUEL informs ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing, and any change to the existing clearance may result in landing with less than planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.'*

The relevant requirements in the European regulation SERA are the following:

*Article 2 Definitions:*

> *'94a. "minimum fuel" means a term used to describe a situation in which an aircraft's fuel supply has reached a state where the flight is committed to land at a specific aerodrome and no additional delay can be accepted;'*

*SERA.11012 Minimum Fuel and Fuel Emergency*

> *'(a) When a pilot reports a state of minimum fuel, the controller shall inform the pilot as soon as practicable of any anticipated delays or that no delays are expected.*
>
> *(b) When the level of fuel renders declaring a situation of distress necessary, the pilot, in accordance with SERA.14095, shall indicate that by using the radiotelephony distress signal (MAYDAY), preferably spoken three times, followed by the nature of the distress condition (FUEL).'*

The associated Guidance Material is provided in the Annex to ED Decision 2016/023/R, as follows:

*GM1 SERA.11012 Minimum fuel and fuel emergency*

> *'The declaration of MINIMUM FUEL informs ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing, and any change to the existing clearance may result in landing with less than planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.'*

Example of phraseology to be used for declaring MINIMUM FUEL:
PILOT: [airline call sign] 'MINIMUM FUEL.'
ATC: 'ROGER [NO DELAY EXPECTED or EXPECT (delay information)].

The Air Ops Regulation does not yet contain requirements about the MINIMUM FUEL declaration. This will be completed through EASA Rulemaking Task (RMT) RMT.0573 'Fuel planning and management'. More examples for the appropriate use of the MINIMUM FUEL declaration will be provided in the EASA Guidance Material associated to RMT.0573. However, all the provisions referenced above already contain the relevant requirements on the MINIMUM FUEL declaration.

## Recommendation(s):

EASA recommends that operators and ATS providers take note of the references provided in this SIB, amend, as appropriate, their procedures for in-flight fuel management and the fuel-related phraseology in accordance with the latest applicable ICAO Standards And Recommended Practices and the SERA requirements, and document those changes in their Operations Manuals accordingly.

EASA recommends that operators highlight in their training that the MINIMUM FUEL declaration is not an emergency declaration but only indicates that an emergency situation is possible if an additional delay occurs.

The 'PAN PAN PAN' call should not be used instead of the MINIMUM FUEL declaration.

EASA also recommends that operators and ATS providers ensure that these procedures are properly disseminated and used by the relevant personnel.

## Contact(s):

For further information contact the EASA Safety Information Section, Certification Directorate. E-mail: ADs@easa.europa.eu.

***This is information only. Recommendations are not mandatory.***

# Emerging threats in a changing world:

## Beijing Convention on aviation security has entered into force on 1 July 2018

By James Jordan, Holman Fenwick Willan LLP

**Following its recent ratification by the Turkish government, the International Civil Aviation Organisation ("ICAO") has announced that the Convention on the Suppression of Unlawful Acts Relating to International Civil Aviation (the "Beijing Convention") will enter into force on 1 July 2018.**

This article identifies the key aspects of the Beijing Convention, its ramifications for the airline industry, and preparatory steps airlines should consider to ensure their observance.

### The Beijing Convention in brief

The Beijing Convention creates a new international legal framework by requiring States to criminalise a number of emerging threats to the safety of civil aviation. These include using an aircraft as a weapon and the organising, directing and financing of acts of terrorism.

Major trading nations that have signed the treaty include the United States, United Kingdom, People's Republic of China and South Korea. However, none of these countries have, to date, formally deposited their instruments of ratification with ICAO.

A link to the list of States that are parties to the Beijing Convention can be found here: https://www.icao.int/secretariat/legal/List%20of%20Parties/Beijing_Conv_EN.pdf.

### Why was a new security convention required?

The tragic events of 11 September 2001 highlighted several weaknesses in the international legal regime relating to aviation security which the international community was struggling to address. This created the impetus for a nine-year process that led to the adoption of the 2010 Beijing Convention and Supplementary Protocol.

At the conclusion of the Beijing Diplomatic Conference on 10 September 2011, the US delegate noted that "on the eve of the anniversary of the 9/11 terrorist attacks, the United States can think of no more fitting and hopeful way to mark that occasion than with the adoption of these two new major counterterrorism instruments."

### What are the key points of the Beijing Convention?

The Beijing Convention and Supplementary Protocol modernises the Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation of 1971 and its Supplementary Protocol of 1988 (both signed in Montréal).

Parties that ratify the Beijing Convention agree to criminalise:

- The use of civil aircraft as weapons.
- The use of dangerous materials to attack aircraft or other targets on the ground.
- The illegal transport of Biological, Chemical, and Nuclear ("BCN") weapons and related material.
- Hijacking and attacks on air navigation facilities by coercion or technological means. For example, ICAO has stated that cyber attacks on air navigation facilities are likely to constitute an offence under the Beijing Convention.

Both the Convention and Supplementary Protocol also specifically cover the criminal liability of directors and organisers of an offence. Making a threat to commit an offence may also be criminally accountable when the circumstances indicate that the threat is credible.

The Beijing Convention also expands the grounds of jurisdiction under the earlier instruments by requiring each State Party to establish jurisdiction when the offence is committed by its national, and by enabling each State Party to establish jurisdiction when the victim of the offence is its national.

Of important note is that a legal entity (i.e. a company or other body corporate, such as an airline) may be held criminally liable if the applicable national law so provides.

### What does the Beijing Convention mean for the airline industry?

While the airline industry has been generally supportive of any efforts by the international community to enhance aviation safety and security, the Beijing Convention has created a number of concerns, namely:

- *Inadvertent transportation of dangerous goods and BCN materials:* airlines legally transport certain categories of dangerous goods on a regular basis. There is a concern that in trying to stop criminal activities, the legitimate and lawful transport of these items may be negatively impaired.
- *Transportation of military assets and weapons:* governments frequently lease, wholly or partly, aircraft to transport equipment

(including BCN) for military purposes. While the Beijing Convention contains a military exclusion clause, this would not seemingly apply to military assets onboard civil aircraft.

When considering the transport offences - which are likely to be of greatest concern to most carriers - the International Air Transport Association ("IATA") proposed language at the Beijing Diplomatic Conference, whereby a carrier would have been conclusively deemed not to have committed one of these offences, if the carrier could demonstrate compliance with the requirements of the ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air. Unfortunately, the Conference was not persuaded by IATA's proposal and the issue remains one of uncertainty for the industry.

The Beijing Convention may create criminal exposures for carriers if processes and procedures are not properly managed. There does, therefore, exist a genuine concern in the industry that innocent carriers and their employees may find themselves embroiled in costly and time-consuming defences to criminal investigations for matters that arise out of the normal course of their operations.

### How should airlines prepare for the Convention coming into force?

Questions still remain as to implementation on a national level, and how widespread global ratification will actually be, but the coming into force of the Beijing Convention may now be an opportune time for carriers to:

- Audit supply chain and cargo processes to ensure strict compliance with dangerous goods regulations.
- Review contracts with government/military entities (including lease agreements where the lessee is a military entity).
- Consider seeking additional contractual indemnities to cover criminal defence costs (fines are unlikely to be contractually recoverable) from business partners (e.g. freight forwarders/ shippers/consignees), whose operations may inadvertently expose the carrier.
- Check whether criminal defence costs for Beijing Convention (or connected) offences may be covered under their insurance policies.
- Liaise with national government(s) to seek assurances in relation to particular areas of concern and/or interpretations of relevant terms.

If you have queries about the impact of the Beijing Convention on your business or any connected issues, please contact HFW.

# Aircraft Damage Assessment Limitations & Application of 3D Scanning Techniques

By Phil Mumford, MSc, Licensed Aircraft Maintenance Engineer

## The Problem

According to a study[1] conducted by Flight Safety Foundation (FSF) in 2007, it was estimated that 27,000 ramp accidents and incidents occurred worldwide every year, resulting in an estimated cost of $5 Billion to the airline industry. Initial analyses of the data collected at the time, indicated that contact between airplanes and ground-service equipment – baggage loaders, air bridges, catering vehicles, fuel trucks, etc. accounted for more than 80 percent of these ramp accidents/incidents.

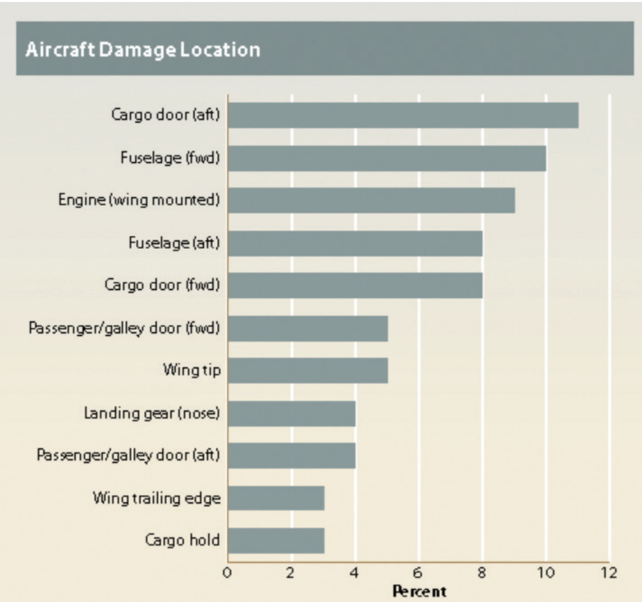



*Figure 1. Location of damage by ground support equipment (Source: FSF Study)*

Additionally, the aircraft damage caused by bird strikes and lighting strikes also result in significant disruption and additional cost for the airlines. In addition, the direct cost of repairing damages is in some cases only a small part of the overall cost. Airline incur considerable indirect costs particularly due to delays, which result in compensation costs driven by consumer protection legislation such as EC261 in the EU. Many damage prevention strategies have been put in place to limit the occurrence of aircraft damage, however damage events do still happen and the recovery process to return an aircraft to service in an expedient manner is of high importance to operators.

Repair activity to recover from aircraft damage is complicated and involves a number of steps, including accurate damage assessment. The current methods have various sources of error, from the use of the tools involved to the human visual inspection element.

[1] *https://flightsafety.org/wp-content/uploads/2016/09/asw_may07_p20-24.pdf*

## The Study

I conducted a research project over the last year as part of my studies at Cranfield University to obtain MSc Airworthiness award. Here, I would like to share an overview of this study and the results.

The study examined the limitations of current aircraft damage assessment activity. The use of dimensional inspection equipment including precision hand tools was critically reviewed. The limitations of humans carrying out this activity were also examined and the benefits and limitations of using 3D scanning techniques were explored.

The study was conducted in three phases: a survey of engineers carrying out damage assessment, an experiment comparing recorded aircraft damage to 3D scan derived measurement data and a visual inspection experiment.

## The Survey

A questionnaire was designed and used to collect data from certifying engineers within an approved maintenance organisation, which is also part of an Operator. A total of 27 responses were received. The organisation sampled has a younger workforce than the UK CAA average by some 8 years.

67% of engineers stated that they carried out damage assessment activity within the last two years; however, 33% of engineers had never carried out any damage assessment. 89% of those surveyed were also found to have never had any specific SRM or damage assessment training. Whilst this is not a regulatory requirement, it is an excellent way of improving skills in an activity that is infrequent for some engineers.

The results also indicated issues with some engineers not having regular eye tests (e.g. every two years) as expected.

## The Visual Measurement & 3D Scanning Experiments

The results of the research indicate a significant problem with reproducibility when examining an engineer's ability to assess aircraft damage. The problem of identification of a reference plane, and the difficulty in use of precision hand tools with an airframe surface were identified as contributing factors.

Standard distributions of dimensional measurement responses indicated an expected response from a sampled group, there was little effect from skew or outliers to the measurements across the group sampled.

There was an observed tendency to underestimate large dimensions (width and height) and a tendency to overestimate the small (depth) dimensional measurement when compared to the reference values obtained by 3D scanning.

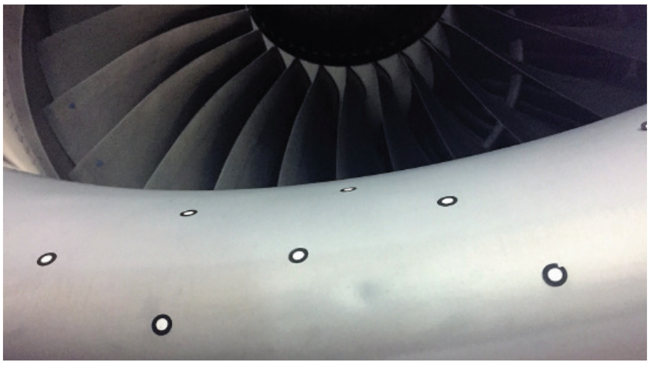
| | |
|---|---|
| Weight | 1.25kg |
| Dimensions | 172 x 260 x 216 mm |
| Measurement rate | 25,000 measurements/s |
| Laser Class | II (eye-safe) |
| Resolution | 0.050 mm |
| Accuracy | Up to 0.040 mm |
| Volumetric accuracy | 0.020 mm+<br>0.100 mm/m |

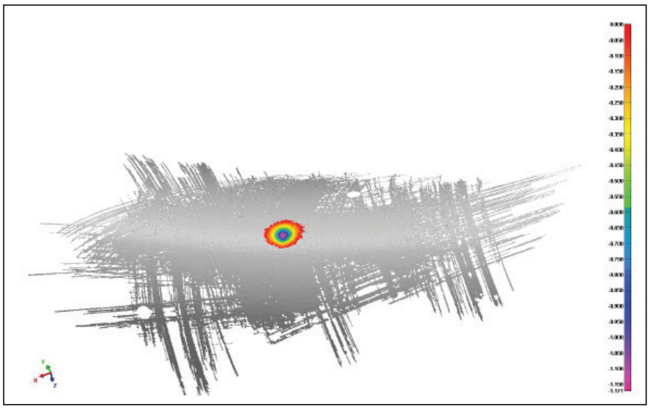

*Creaform EXAscan Technical Specifications*

Where 3D scanning was carried out on existing damaged articles across the operator's fleet, the three selected articles all were found to be out of compliance with the approved data set limits.

Depth measurements were found to be the most reliable when the aircraft tech log values were compared to the 3D scan model measured dimensions. The larger measurements of width and height were found to demonstrate the most deviation from the 3D scanned values.

One of the largest identified issues with carrying out damage assessment on an aircraft surface is that of the reference plane. Where a surface is curved it can be very difficult to accurately measure where the surface used to be, pre-damage, to take measurements from. Many surfaces on an aircraft are also compound curved making the identification of the reference plane even more difficult.





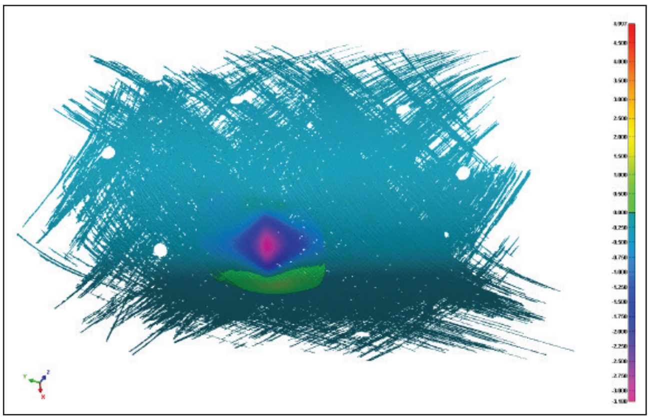
*Engine Air Intake Cowl 3D Scan with surface topography.*

3D scanning was found to offer the benefit of an easily producible reference plane, and ability to measure damage with sub-millimetre accuracy, as well as quickly identifying surface features that are not readily detectable by an inspector through visual inspection.

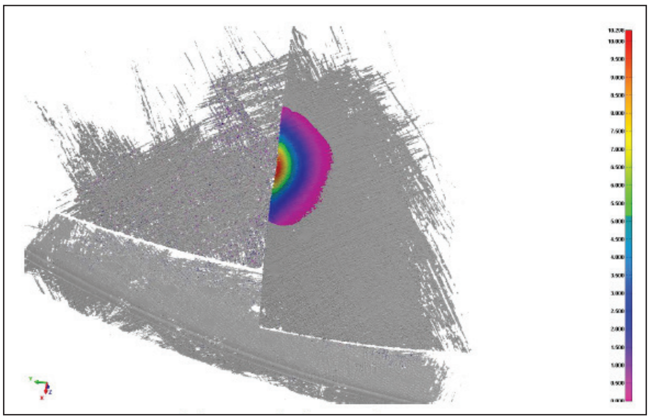
The data recording ability of a 3D scan of aircraft damage offers Part M organisations much more data than the currently used methods where an inspector records damage width, height and depth as appropriate. 3D models of damage allow an organisation to take many bespoke measurements as required and maintains a much richer data set of the fleet damage.

*Leading Edge Slat Damage.*

3D scanning is a broad term and can accommodate number of methods and devices. For aircraft damage assessment the use of 3D handheld Structured Light/Laser scanners is the most suitable for the application of damage assessment in a dynamic environment such as aircraft maintenance, particularly on the line.

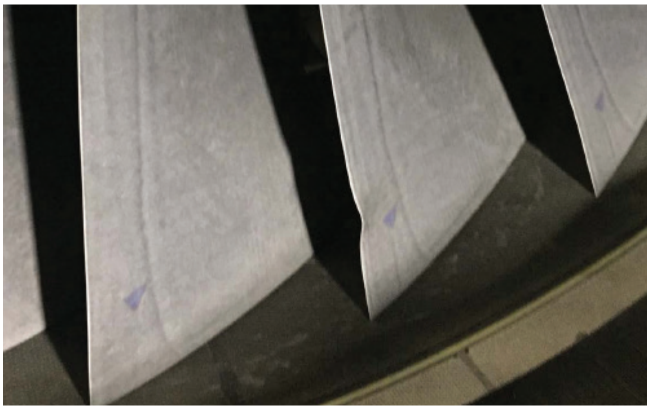


*Leading Edge Slat 3D Scan with surface topography.*



*Engine LP Fan Blade 3D Scan with surface topography.*

Visual inspection weaknesses were identified in literature review and confirmed in the Visual Inspection experiment, and further in the 3D Scan Comparison experiment. The ability of an inspector to accurately identify the limits of any damage article is limited by their ability to accurately perceive deviations of as little as 0.5mm from a reference plane that is as best as they can fit using hand tools, or in some cases only estimated visually.



*Engine LP Fan Blade Damage.*

3D scanners can deliver sub one-tenth of a millimetre resolution and accuracy, but ultimately it is the ease at which their scans can produce a perfect reference surface model from which to measure from, and the ability of software to produce easily readable surface topographies that delivers the greatest benefit to the inspector. Using 3D scanning techniques, it is easy to identify surface deviations of less than 0.5mm, and this makes the identification of damage features very easy where humans are so clearly limited in this respect.

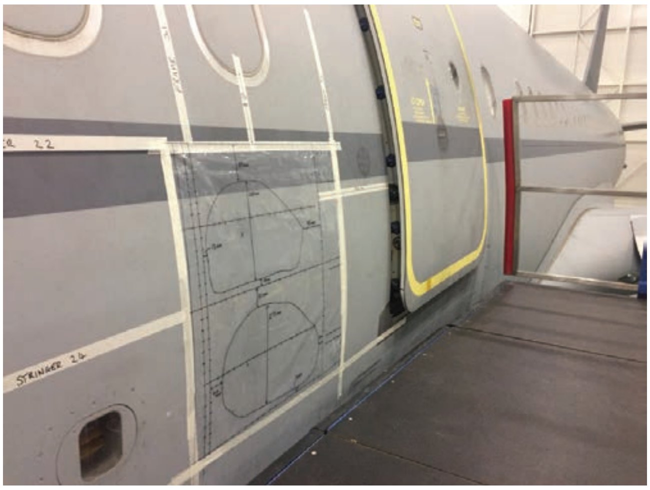
## Future Work

3D scanning process has its own errors and weaknesses. To present the aviation industry with a true alternative approach to assess aircraft damage, the same ease of use the current precision hand tools give to the end user must be considered.

Currently the operator must scan the damage, and then process this in software to create a reference model, then using inspection techniques a comparison is produced from which measurements can be obtained.

This procedure must be automated in order to present an easy solution for the engineer. In theory, this is a case of creating an automated process within software to carry out this set of operations each time it is used. The ease of use is currently not there using the software in this study – an engineer requires measurements quickly in order to resolve an AOG situation.

The aircraft's structural repair manual is essentially a large database of specified limits for damage dimensions around the airframe of an aircraft. One aspect of future work should be to produce a system where the operator can simply select on a computer screen the area of an aircraft's fuselage they are scanning, and for the software to then not only automatically produce the measurements as described above, but for it to pair this with the location information given, presenting the operator an instant GO or NOGO indication of whether the damage being assessed is within allowable SRM limits. This would deliver huge benefits to the industry, reducing damage assessment and aircraft release times significantly, whilst removing as many sources of human error as possible.



## Recommendations

The following recommendations have been developed from the outcomes of this research. They are aimed at OEMs, Operators and MRO organisations.

***OEMs*** – OEMs are encouraged to develop the means to allow operators and MROs to easily integrate the use of 3D scanning equipment into their tooling inventories, for example by inclusion on Tools & Equipment manual documents as part of the instructions for continued airworthiness, and by expanding the methods for SRM data analysis to include methods in line with 3D scanned damage data. Continued efforts by OEMs to gather in-service data through developed reporting channels should also be made.

***Operators*** – It is recommended that operators consider the use of 3D scanning equipment for damage analysis and data collection on their aircraft fleet. Potentially faster dimension acquisition and assessment will deliver a financial benefit to operators in AOG damage events. In addition, the 3D model produced offers operator Part M Engineering departments a much richer data set for recording and confidence in the dimensional accuracy used for the damage assessment.

***MRO Organisations*** – It is recommended that MRO organisations have robust procedures to ensure staff involved in certification are regularly assessed as medically fit to perform visual inspection tasks. Further attention should be brought to the potential for error in visual inspection during human factors continuation training.

MRO organisations are also encouraged to invest in 3D scanning equipment for dimensional inspection of damage. Error rates and misclassification of damage will be reduced and the rich 3D scan data generated is a business unique selling point for 3rd party MRO organisations to offer customer fleets.

# CHIRP
# Reports for FOCUS

## Pressure to Operate into Discretion during Bad Weather

**Report Text:** Crew were initially scheduled to fly 2 sectors but upon arriving at the airport were advised they would be operating 4 sectors. First 3 sectors completed with minor delays. After boarding for the final sector a shower of moderate freezing rain passed the airport. As [operator] does not allow operations in these conditions crew had to wait for the shower to pass. Once the freezing rain had passed the aircraft was de-iced as crew anticipated an imminent departure. During de-icing ATC advised crew of a slot at approx. 2 hours later. Due to poor weather in the UK there was no chance of this slot improving. To depart at this time would have required the use of Commander's Discretion. The flight crew decided not to do this as they felt they would be too tired to safely operate at this time in the demanding weather conditions that were present throughout the route and our destination. Captain immediately contacted operations to advise of the situation. Operations tried to persuade the Captain to operate the flight as it would only take the crew into discretion by one hour. Captain stuck to the decision to not exercise discretion and organised for the passengers to be returned to the terminal building.

Lessons Learned - Airline operations should not try to force tired crew to operate and respect Commanders' decisions with respect to extending duty periods.

***CHIRP* Comment:** Commanders' decisions over the use of discretion must be final and should not be challenged by ops staff. Captains are generally disposed to extend duties to meet passenger and Company expectations provided it can be done safely. Declining to use discretion is not done lightly and ops staffs should limit their questions to those necessary to implement the Commander's decision and make appropriate arrangements for the passengers, crew and aircraft. It is not unreasonable for Commanders to be asked to explain their decisions in the days following a declined use of Discretion and Commanders should have no difficulty in doing so. In the reported occurrence the crew had already had their day extended beyond the rostered 2-sectors; a subsequent delay and the expectation of demanding conditions on the last sector were appropriate reasons for declining to use discretion – a decision supported by the reporter's local supervisor.

## Certifying Engineer as Stores Supervisor

**Report Text:** I'm hoping you can help me as other avenues of enquiry have not been successful. Not really reporting an issue but asking a question.

[ ] have a small outstation in [ ], of which I am the Station Engineer. Due to the very small team based here our resources are limited. In order to get the station up and running we have had a storeman on site for the last six months. As he is now due to return to his home-base the company is asking me to complete a "goods in inspector certificate" course and carry out the duties associated with that role.

My question is this: Am I allowed to receive a component from a supplier, inspect and accept into our stores and then, subsequently, also draw that item, fit and certify on the aircraft? To my mind, if we do this then we are taking away one layer of protection from the whole process, i.e. a different set of eyes inspecting the item into stores to that which inspects prior to fit? I am well aware that the onus is on the certifying engineer to ensure whatever they fit is correct but we all know the pressures of line maintenance and there is the danger of complacency with the "I've inspected this once already" mentality creeping in.

I have approached the CAA on this topic. Their response was "contact the surveyor responsible for your organisation or your regional office". I'm reading between the lines but I suspect they don't know. I have also approached my own QA department but they will not be drawn to give an answer on paper – only verbally. Again, this makes me suspicious of the facts behind the answer. With appropriate training the inspector role should not be complicated but I would like to see some written legislation which allows us to do this. Could you possibly direct me to the answer please?

***CHIRP* Comment:** The answer to the reporter's question is "yes". Engineers are permitted to receive a component, inspect it and accept it into stores then draw the component, fit it and certify it on the aircraft. The inspection on receipt must be recorded separately from the inspection prior to fit. The same principle, an additional level of inspection and recording, applies elsewhere to allow the same person to carry out a task then to certify that it has been completed correctly. It was a puzzle that the reporter's QA department would not confirm in writing their entirely correct response to the reporter's question. When engineers at the coal face have questions about procedures, every effort should be made to answer their questions in full, first time and without delay; they are doing what we encourage everyone to do when concerned about safety: ask!

### Ride Reports

**Report Text:** I have flown to the US for over twenty years and am used to chuckling with colleagues in the flight deck about the amount of our friends from 'across the pond' who constantly asked about ride reports.

In the last year or so there seem to be an increasing amount of Irish requests for ride reports closely followed by 'the world's favourite'.

My main question is why? In one of the most congested airspace areas in the world is this necessary. Severe turbulence, even moderate turbulence yes but a 'ride report?'

Lessons Learned - Yes. Please be quiet on the radio unless necessary!

***CHIRP* Comment:** We agree with the lesson learned. Frequent requests for ride reports in benign conditions can become wearing and distract from the occasions when advice about turbulence is useful. However, the rationale for many of the requests for ride reports is that some carriers require their cabin crew to be seated whenever the fasten seatbelt sign is on. Therefore, in order to determine whether there will be an uninterrupted period of appropriate length for the cabin service being planned, the pilots are seeking information from the best source – pilots ahead of them.

### Abuse of Distress Frequency

**Report Text:** It is now a regular occurrence when monitoring 121.5, particularly (for example) in Holland, France and Germany that individual(s) are transmitting obscenities and disgusting noises on 121.5. One can only assume that they seek attention. It has occurred in several different geographic areas indicating that it is flight crew. Anecdotally colleagues have indicated that it is only a few individuals and that they are single pilot commercial operations.

The writer has reported this to the area control frequency being worked at the time but our European ATC colleagues seem unwilling to take action.

We are instructed to always monitor 121.5 by company but this is extremely distracting not to mention dangerous behaviour when someone genuinely in distress will be deprived of immediate contact. All agencies must act to identify such unprofessional behaviour.

***CHIRP* Comment:** Abuse of 121.5 is a problem in NW Europe, less so in N America and rarely occurs in the Middle East. In addition to blocking the channel for distress messages, abuse of 121.5 prompts pilots to turn down the volume and thereby remove a safety barrier in the event that communications are unknowingly lost with ATC.

Unfortunately this appears to be one of those issues that pilots have become resigned to having to cope with. It doesn't have to be that way. The French authorities have been heard admonishing someone for transmitting inappropriately on 121.5 but it is not clear whether the inappropriate transmissions were being made from the air or the ground. Transmissions from the ground would be unlikely to be heard by ATCUs unless the transmitter is close to an ATC receiver. The only reliable way to address the issue is for pilots to report it every time it occurs. Enough reports will, like the problem with lasers, eventually raise the profile sufficiently for action to be taken.

CHIRP has forwarded the report to EASA and Eurocontrol for their information/advice.

### ATC Questioned Early Turn on Filed Route

**Report Text:** This flight occurred during day VMC during cruise phase of quick 15 minute flight from Farnborough to Northolt on an IFR flight plan. 3 crew (2 pilots, 1 flight attendant). Flight plan route was Farnborough//HAZEL OCKHAM//Northolt.

After take-off and departure vectors at 4000ft and between 230-250 kts we were given direct to HAZEL which was as I recall a south south-easterly heading. My co-pilot was the flying pilot and the autopilot was on using the Honeywell FMS programmed routing HAZEL OCK.

As the non-flying pilot in the right seat (and the Captain) I was completing climb, cruise, level, descent checklists which required my heads down getting Northolt ATIS, programming FMS for arrival ILS 25, and setting landing performance functions of FMS. As we were approaching HAZEL I was busy and not monitoring the navigation systems or flying pilot as I thought things were well under control.

We then received a call from ATC asking where we were going, to which I looked up to see NAV display illustrating the aircraft starting a turn from towards OCK. I asked the flying pilot, ok what are doing, and he said we are now turning to OCK. I replied to ATC on the VHF that we were now going to OCK. The Controller asked why and stated that we weren't close to HAZEL (maybe 7 miles from HAZEL). I delayed a moment trying to get caught up on the navigation situation (I had been heads down) and realized the autopilot was still on, FMS was in LNAV mode with no errors displayed, the winds were 40 kts south-westerly and it appeared to me the FMS/autopilot was executing a winds corrected smart turn and leading the turn so as to intercept the course from HAZEL to OCK. I think we were 5 miles from HAZEL at that time. ATC directed us to a heading of 040 (vector to OCK) and the flying pilot commanded the FMS heading mode now to do so. As our heading was passing through 050 ATC told us we need to start our turn to which I responded to ATC that we were in the turn and that we were passing 050 in the turn to 040. ATC then responded telling us that it looked like we weren't turning yet. I think I may have said maybe the winds but I'm not sure if I mentioned it. It could have been that the flying pilot and I discussed the winds and that it may be affecting how our ground track appears on ATC radar. We would have exceeded that corridor for HAZEL to OCK if we didn't lead the turn though as the winds would have blown us well past.

At no point did we get any Traffic Calls or Resolution Advisories and traffic didn't seem to be an issue by the radios calls heard and the contacts displayed on our navigation display. There was no more mention of this from ATC and rest of flight uneventful.

Lessons Learned: I think our aircraft speed 230-240 was too fast considering 40 kts winds pushing us and the healthy turn angle required from our position to HAZEL and then fly track to OCK. My opinion is the angle was so much that based on the ground speed the FMS computed a smart turn that was not what ATC expected. A slower speed would have produced an FMS wind corrected smart turn with less lead time/closer the waypoint.

Additionally, had I known we were turning that early (I was heads down completing required non-flying pilot flight duties) I would have given ATC a heads up to confirm there was no expectation for us to consider HAZEL a "fly-over" waypoint (since the FMS smart turn doesn't actually fly over a waypoint unless its programmed as a "fly-over" waypoint).

***CHIRP* Comment:** Radar recordings confirmed that the reporter's aircraft was 9nm from HAZEL at its closest point of approach. Aircraft on the route are expected to turn early – but not that early! The reporter was surely correct in their analysis that a lower airspeed would have been sensible but not just in those wind conditions. On such a short route the crew would also have been well advised to complete all the possible checks and obtained the Northolt weather before taking off from Farnborough. This would have enabled the Commander to monitor the co-pilot more effectively.

FEEDBACK readers may wish to be aware of CAA Paper 2013/02: Monitoring Matters which was written to promote a better understanding of the monitoring discipline and which is highly recommended.

The CHIRP report highlights an interesting phenomenon with relevance to the introduction of PBN: i.e. differences in the way FMS calculate turns. FMS from different manufacturers calculate turns differently but there are also differences perceived in the performance of FMS produced by individual manufacturers.

# CHIRP CABIN CREW

## Carriage of Lithium Batteries – No checks completed by the Ground Staff

**Report Text:** I travel frequently between AAA-BBB with one particular operator. They have a policy of queue sweeping and tagging baggage for hold carriage at the gate. At BBB airport (a European airport), the aircraft loaders also stand at the boarding door and do last minute tagging of bags, as well as ground staff tagging at the gate and in the boarding queue. At no point are passengers asked if they have lithium batteries in their luggage (or any other dangerous goods that should not be carried in the hold). No questions are asked - passengers are simply told their bag needs to go in the hold.

I overheard a verbal declaration at the boarding door of a lithium battery being in the baggage, which the ground staff did not understand and appeared to ignore. The time restraints of boarding are such that passengers are practically pushed on to the aircraft and told to sit down, with numerous pleads on the PA from the flight crew. The whole process is so rushed with an absolute dedication to an on-time departure that it appears SOP's are not being adhered to.

Lessons Learned - I just feel this procedure is not conducive to safety. The whole indiscriminate tagging of bags during the entire boarding procedure, which is rushed anyway, doesn't allow sufficient time to check that hold baggage is safe for carriage.

***CHIRP* Comment:** There are two types of Lithium batteries: Lithium metal and Lithium-ion (sometimes abbreviated to Li-ion batteries). Lithium metal batteries are generally non-rechargeable batteries that have lithium metal compounds as an anode. These type of batteries are usually used in watches, calculators, cameras and defibrillators. Lithium-ion batteries are rechargeable batteries where the lithium is only present in an ionic form. This type of battery is used in mobile phones, laptop computers, tablets and other personal electronic devices (PEDs), smart luggage, mobility aids and some portable medical devices e.g. portable oxygen concentrators.

PEDs, which includes mobile phones, tablets and laptop computers, some cameras, power banks and spare batteries should always be carried in the passenger's carry-on baggage. If such devices are contained within checked baggage, measures must be taken to protect the device from damage and to prevent unintentional activation and the device must be completely switched off (not in sleep or hibernation mode). Electronic cigarettes (including e-cigars) and vaping devices must also be stored in the passenger's carry-on luggage. The recharging of such devices is not permitted onboard the aircraft and the passenger should ensure that they cannot be accidentally activated. When carried in the cabin, mobility aids and smart luggage must have their lithium ion battery removed and stowed separately with the terminals protected.

The above report was referred to the operator for further investigation, who advised that the current company procedure required ground staff to ask passengers if they had any medication, spare batteries or passports in their luggage whilst the bag was being tagged to ensure that these items did not go into the hold of the aircraft.

The information in the report was also passed to the Ground Operations Safety and Compliance Manager who issued a memo to all ground staff at the bases concerned, reminding them of the policy on the carriage of lithium ion batteries. A memo has also been circulated to the cabin crew.

Thank you to the reporter for highlighting this issue to CHIRP as they were unable to report their concerns directly to the company as they are not a company employee. By reporting their safety concerns to us, we have been able to pass the information to the operator who has then been able to complete mitigation to ensure that the problem does not continue to occur.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