skyguide

safety bulletin

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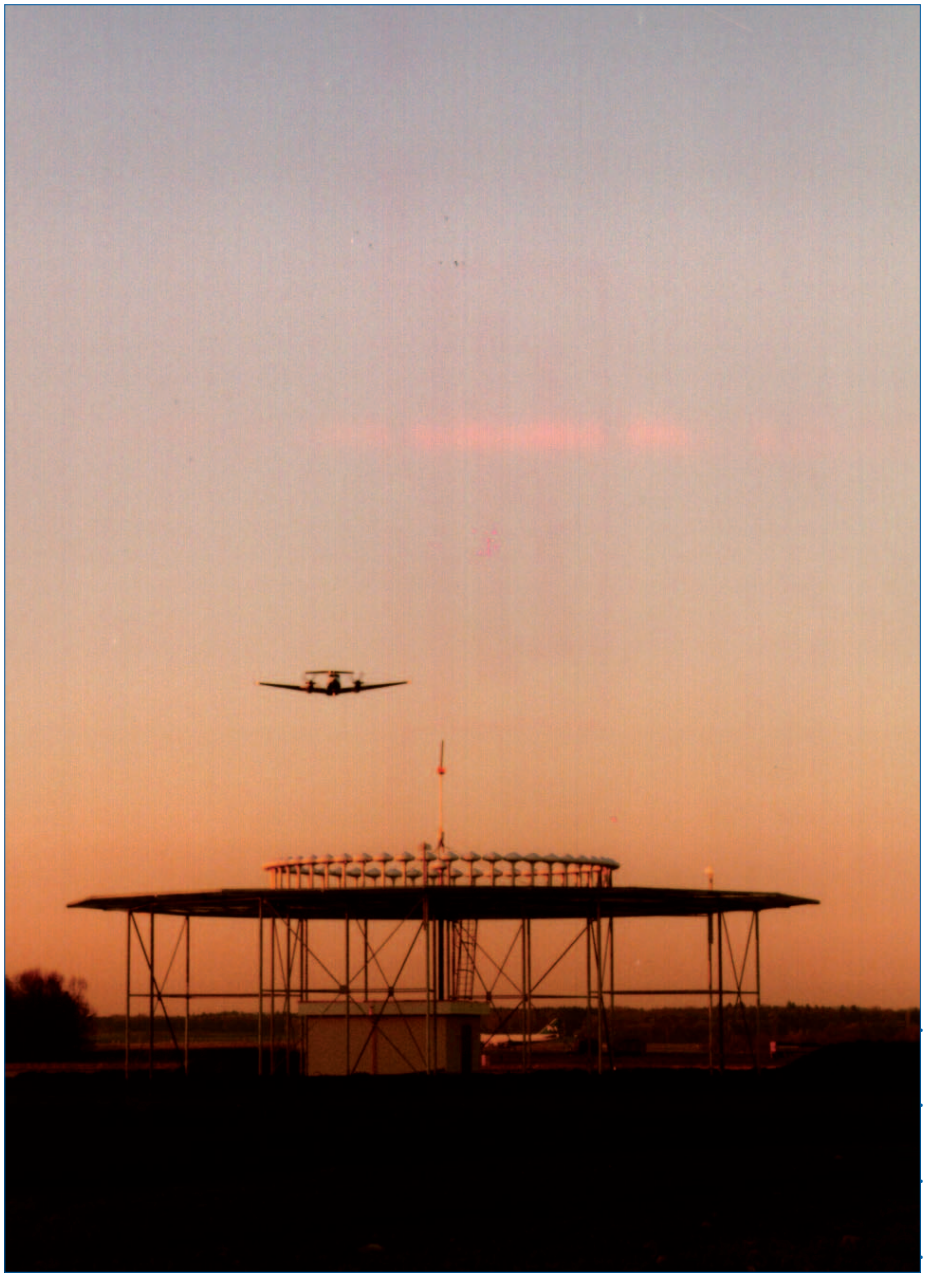


#29 JANUARY/FEBRUARY/MARCH 2010 – www.skyguide.ch/dossiers/safety management
editor: thomas.novotny@skyguide.ch - intranet: skyline/issue/safety/safety bulletin

Dear colleagues,

In this very first issue in the year 2010 of the safety bulletin I would like to address two specific topics.

Safety culture survey

As already announced in a company information 3 weeks ago, we got the results of our second safety culture survey. I'd like to take the opportunity here to again thank the over 600 employees who dedicated some precious time to fill in the company safety culture survey.

Now that we got the answers the time has come to start with the evaluation phase. The figures compiled by an outside company and put into «raw» statistical form need detailed and thorough interpretation in order to be able to extract the essence of the survey. We want to identify not only fields of improvement, but also fields were the good results indicate we've done something good, such that we can keep up this good work. Without anticipating the detailed analysis, we can firmly say that the first comparison with the previous survey shows a quite positive trend in most areas.
A first meeting of a joint working group with representatives of all departments has already taken place to have an initial look at these figures. More meetings will now be organised to further analyze the data and discuss the findings. The whole process will take some time as on one hand we want to make sure we draw the right conclusions, and on the other hand because we want to have operational expertise (ATCO) on board, which requires some planning. The final report with all the conclusions and an associated action plan is expected to be ready after the summer holidays.

Renewal of the safety bulletin

The safety bulletin very first issue has been compiled in March 2003, meaning that it exists for 7 full years by now. I'd like to sincerely thank not only the editors, but also all contributors for their tremendous work. «Safety Promotion» remains a very important pillar of a good safety culture.

Although we also receive some positive feed-backs we are well aware that the safety bulletin is also criticized to some extent. In addition, it still seems quite difficult to reach all the audience we would like to. For all these reasons, during this year 2010 we would like to reflect on how we could enhance the safety bulletin in a manner that it would be able to better fit the readers' expectations.

Should you want to express your possible suggestions relating to the improvement of the safety bulletin please contact myself, or the editor, Thomas Novotny. We warmly welcome any feed-back.

With my best regards

Simon Maurer,
s

The weight of the words

The facts

Last month, an OIR was submitted about an aircraft reporting a TCAS RA when crossing another aircraft. I treated the occurrence and issued an ATIR «ACAS» (Whenever a TCAS RA was generated in one or more aircraft(s) and was reported to ATC by the crew).

ACFT A, flying northbound from LFLL to EDDS, was in contact with L1 sector. It had been cleared to climb to FL280 and to fly direct to DITON.

ACFT B, flying southbound from LFPG to LIRQ, was in contact with L2 sector. It was stable at FL290.

During its climb to FL280, ACFT A reported a TCAS RA when passing FL275 and informed the ATCO that it was clear of ACFT B and was resuming to FL280. At that time:

- ACFT A was climbing with a rate of climb up to 2900 feet per minute
- ACFT B was 1.1 NM/1450 feet away (see picture 1).

The L1 ATCO then gave ACFT A a traffic information.
On sector L2, ACFT B didn't report anything.
This situation didn't cause any harm. There was no loss of separation (5 NM/1000 ft required), the two aircrafts were diverging and the workload that evening was low.

The weight of the words

One of the two ATCOs working at the L1 sector came to see me a few days later. He wanted to know why ACFT A, who had been cleared to FL280, had made a level bust by climbing to FL284 after having crossed ACFT B (see picture 2).

His question was important for two reasons:

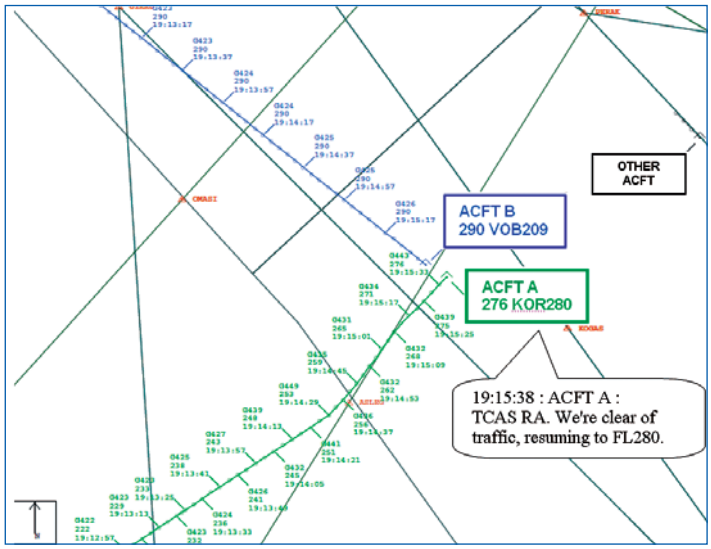
1. Depending on the answer, I may have had to re-qualify the ATIR as «PROCEDURE» (when a procedure is not complied to by the pilot – in that case: an ATC clearance).
2. The ATCO had filled the OIR mainly for the level bust (not for the TCAS RA) and I hadn't seen that.

We replayed the sequence.

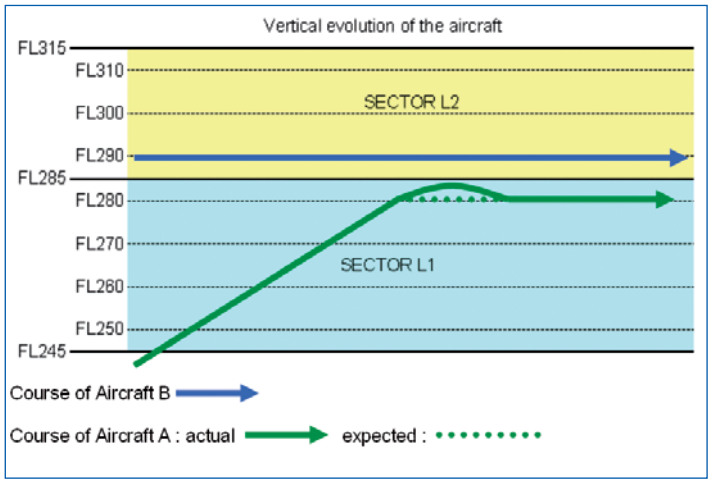
We first ensured that ACFT A had correctly acknowledged his climb clearance to FL280, which was the case.

Then we listened to the traffic information made by the L1 ATCO to ACFT A about ACFT B. He said ***«Roger, there was a traffic on top of you, one thousand feet above, cleared Level 290»***.

31 seconds later, ACFT A asked confirmation about his cleared Flight Level: ***«We are cleared to level 290,***



Picture 1



Picture 2

The weight of the words

that's correct?» to which the L1 ATCO replied «***Negative, you're still cleared FL280***» (See picture 3).

The L1 ATCO then questioned ACFT A to be sure that, before the TCAS RA, it was climbing to FL280 and not above. ACFT A confirmed that he never intended nor needed to climb higher than FL280.

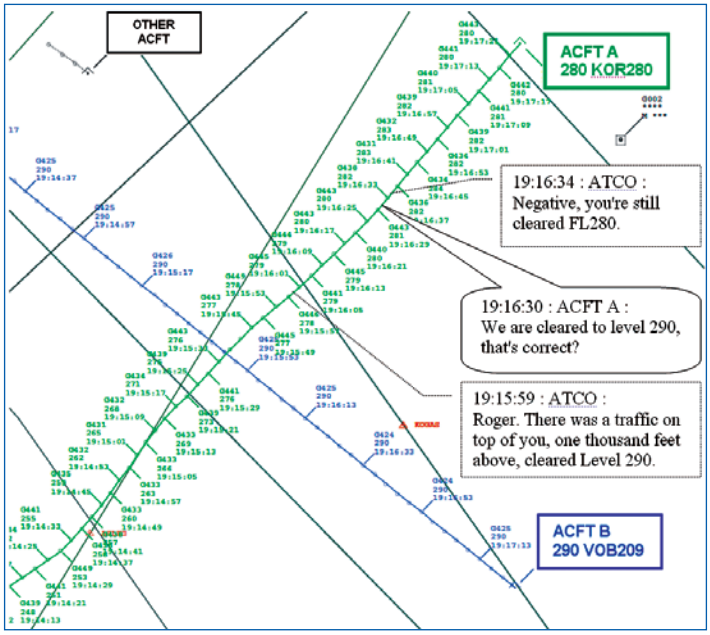
Conclusion

To conclude and to answer the question «Why did ACFT A make this level bust», we will carry out a small recapitulation. We know that:

- ACFT A was cleared to FL280 and its read-back was correct
- ACFT A wasn't climbing higher than FL280 before the TCAS RA
- The traffic information contained «***cleared Level 290***».
- ACFT A didn't intend nor need to climb higher than FL280.

We also noticed that the pilot of ACFT A seemed a little bit stressed after this TCAS RA.

This led us to suppose that, the stress of the pilot, easily understandable in such a situation, associated with the mention of a flight level that could have been logical for him in the traffic information, may have made him mix up the traffic information about ACFT B with a clearance to climb.



Picture3

Therefore, we concluded that:

- The TCAS RA was probably triggered by the high climb rate of ACFT A
- The level bust of the pilot was not intentional.

We finally decided to not re-qualify the ATIR.

What can we learn?

We work in a domain where every word counts. For this occurrence, we both learned two lessons:

- In a traffic information, mentioning a Flight Level can be confusing for the pilot. It is better to describe the difference of altitude of the other aircraft(s) with wordings like «***1000 feet above/below***».
- The dialogue between ATCOs and people working in the Safety department is essential. For that occurrence, it allowed us to compare from two different angles: from the perspective of the ATCO, and from the outside and in hindsight for us in the Safety department.

While this is just a small example and the finding about phraseology is probably known to many of you, I think we could use it as a good analogy for the importance of relationships for improvements on safety. As such I would like to encourage you to come and talk to us about your safety concerns. Our door is open, and your inputs can make a difference.

David Fraternali
SRO

Glossary

ACAS: *Airborne Collision Avoidance System*
ATIR: *Air Traffic Incident Report*
ATCO: *Air Traffic COntroller*
EDDS: *Stuttgart*
FL: *Flight Level*
LFLL: *Lyon Saint-Exupéry*
LFPG: *Paris Charles de Gaulle*
LIRQ: *Firenze*
NM: *Nautical Miles*
OIR: *Operational Internal Report*
TCAS RA: *Traffic Alert & Collision Avoidance System Resolution Advisory*

Further enhancement of SMS – from development to implementation in 2010

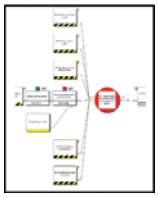
Skyguide's Safety Strategy 2009 – 2013 foresees further improvements of our Safety Management System (SMS). In 2009, the Strategic Safety Development & Policies Division (SD) started the development of a new SMS concept, an intranet safety portal, new risk assessment concepts and new or revised safety procedures and methodologies. The results progressed only step by step and were hardly visible from the outside, since all these activities were carried out in parallel in order to manage the interfaces and links amongst them.

After a year of development, 2010 will be an implementation year. Because it is important that the experts working with these new tools and procedures are involved in the implementation phase, SD will work closely together with them and give the necessary support. In order to be able to adapt the detailed working procedures to the real world, the implementation will often be preceded by pilot cases.

The following main safety procedures and safety tools will, amongst others, be deployed or implemented in 2010:

Establishment of 4 quarterly SSG Safety Cockpits, where 14 Safety Key Performance Indicators are regularly measured with the objective to detect problem areas or negative (and positive) safety trends at an early stage, and to define an appropriate corrective action plan if required.

The safety culture survey carried out at the end of last year will be analysed in detail, involving experts from all skyguide departments. A proposed action plan shall be established and sent to the SSG for decision.



In order to help our managers to better cope with their main risk areas, two Unit Hazard Registers will be established as a basis for the construction of so-called ATM-Unit Safety Cockpits. The deep analysis required to do so will provide the occasion to address larger problems and to propose remedial actions of more systemic nature.

A safety improvement procedure and an amended database will be implemented with the goal to facilitate the management of safety recommendations within skyguide and to enhance the continuous safety improvement process.

The continuous achievement of safety objectives and requirements of new or changed procedures and equipment must be monitored regularly, also after their clearance for operation. With this objective in mind, a high level lifecycle monitoring procedure has been established and will now be tested within the frame of several pilot projects. At the same time, detailed monitoring procedures to be applied by the line shall be developed, and the development of the safety requirements during the safety assessment shall be adapted in order to facilitate their monitoring afterwards.

Existing and new (prescribed by regulations) safety roles, other than those already taken care of by ESARR 5, will be identified, and their associated responsibilities will be described. The necessary competences to fulfill these roles as well as associated training needs will be developed. The result of these activities should be that all skyguide staff members are aware if she or he fulfills one or several of these described safety roles, and gets support to achieve the necessary competencies by appropriate training.

Safety training modules will be developed for basic ATCO and ATSEP training courses, as well as for the preparation of the OJT phase. Additionally, updated safety presentations will be established which will enable a nominated pool of safety experts to regularly inform or train specific groups of people in the safety domain. So called «Safety Roadshows» are planned to be held in individual skyguide units with the goal to allow the S department to better understand the expectations of the line departments and to inform about new safety procedures and tools.

With the realisation of these activities planned for 2010, we believe that more than half of the objectives and goals of the Safety Strategy 2009 – 2013, and the most safety relevant ones, will be implemented.

René Aebersold
SD

Introduction of the skyguide Safety Improvement Procedure

As part of skyguide's continuous improvement process M1.15, a safety improvement procedure has been developed. It is planned to introduce this new procedure in spring 2010.

This new procedure and the use of the existing SODA database will provide a better overview of all existing safety recommendations within skyguide and the identified remedial actions. It will support the line management in the priority setting when managing corrective actions and will allow a better tracking of these actions aimed to continuously improve safety.

The main objective of this new procedure is to consistently manage all safety recommendations coming from the following sources:

- the conclusion of operational or technical occurrence investigation reports,
- the response/result to/of safety improvement reports SIR,
- the result of a safety performance monitoring procedure and the lifecycle monitoring procedure,
- any other recommendation with the intention to improve safety, e.g. recommendations derived from audit findings.

Level of urgency	Criteria
A	Its non-implementation might possibly result in playing a substantial part in an incident which could be mitigated by reducing operational rates only.
B	Its non-implementation might possibly result in playing a substantial part in a situation which reduces existing functionalities and comfort for the operational sharp end considerably.
C	Its implementation might possibly result in improving the general Safety situation but has not by any means an urgency which would justify any priority such as A or B.

The S department will be the entry point of all incoming safety recommendations. A first analysis will be undertaken by a newly established Safety Recommendation Panel (SRP), which bundles the recommendations where necessary and classifies them into 3 categories according to their level of urgency, before allocating them to the line.

The line management remains fully responsible for the in-depth analysis of the safety recommendations, for the development of appropriate remedial actions and for their timely implementation. This also allows the line to fit the remedial actions into their project portfolio, facilitating more efficient and sustainable results. The line management sends the planned remedial actions, including a timeframe for its implementation, to SD. The SRP conducts plausibility checks of the proposed remedial actions and monitors their implementation. Should the SRP not be satisfied with the action or the progress of it, the S department will negotiate with the line management. If no agreement can be achieved, the recommendation will be brought to the SSG for final decision. The SIR procedure, the operational occurrence investigation procedure as well as the technical investigation procedure will have to be adapted since these processes will now stop after the issuance of safety recommendations.

The SRP shall meet at least every 3 months and is composed of the following members:

- Three members of the SD division (chairman, safety expert, secretariat);
- One member of the Regional Investigation Team (RIT) team to provide independent operational know how;
- Responsible SPOC's of O, T and F departments;
- One member of the Internal audit management division (DA).

The procedure has been presented to the SSG of the 24th of March which notified that the ToR (terms of reference) were missing for the Safety Recommendation Panel. These ToR will be discussed at a following SSG meeting.

René Aebersold
SD

EUROCONTROL Safety Regulation Commission Annual Report

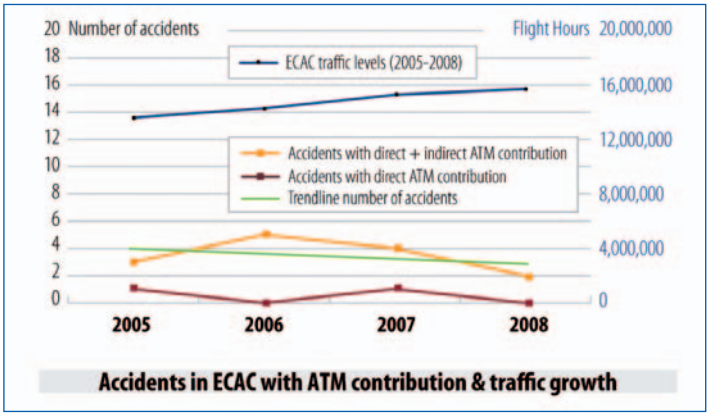
Air traffic safety keeping up across Europe

The following is an extract of an official Eurocontrol press release. Under you will find a few statistics presented in the report itself. The full report is available here: http://www.eurocontrol.int/src.

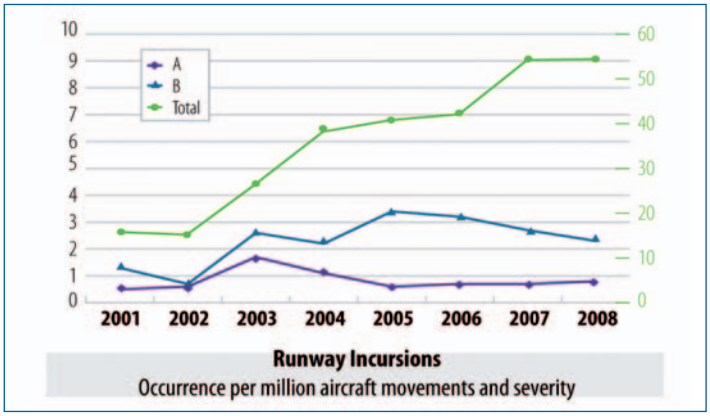
Brussels, Belgium – Air traffic management continues to support the operational needs across Europe whilst maintaining safety levels. The 2009 SRC Annual Safety Report says that in 2009, there was no fatal accident directly induced by ATM and only two non-fatal accidents with an indirect ATM contribution. This continues a trend seen over recent years where the number of ATM-related accidents has decreased year-on-year. At the same time, the safety maturity of both Air Navigation Service Providers (ANSPs) and Regulators continues to improve.

The report notes that whilst there has been an improvement in reporting of safety occurrences, overall progress towards full reporting by States is too slow. In addition, States need to produce more detailed analysis and classification of risks. Safety oversight processes also need to be improved. «It is clear that in the future safety will be tested even more rigorously than ever before,» said Jos Wilbrink, Chairman of the EUROCONTROL Safety Regulation Commission.

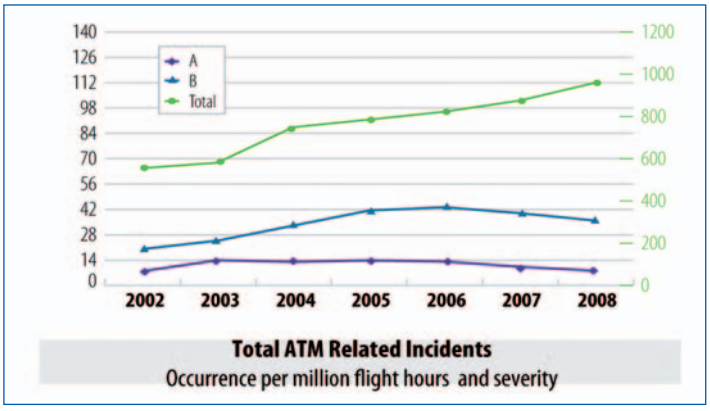
The report underlines the important role of national supervisory authorities (NSAs) in overseeing safety processes in European countries. In this regard, the lack of funding and resources at NSAs is a concern. With additional pressure being put on operating budgets for both ANSPs and Regulators, it is necessary to keep a rigid focus on safety and continue to invest in both developing a safety culture and the necessary infrastructure. «Europe has an ATM system that can and does fully support the system's operational demands. However, major changes are taking place in the way ATM safety is addressed in Europe. With the development of the Single European Sky, we need to continue to work to build the pan-European approach to European air traffic management safety» Jos Wilbrink added.



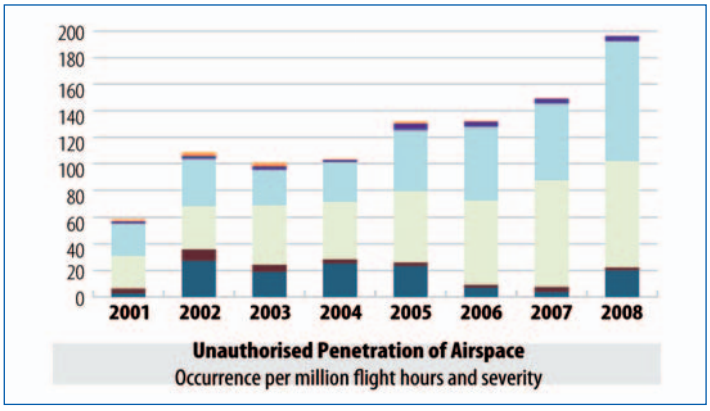
Accidents in ECAC with ATM contribution & traffic growth



Runway Incursions
Occurrence per million aircraft movements and severity



Total ATM Related Incidents
Occurrence per million flight hours and severity



Unauthorised Penetration of Airspace
Occurrence per million flight hours and severity

Safety and Quality debate: the Helios 522 accident

Past the edge of chaos[2]

In the preceding edition of the safety bulletin, an article was published (Safety and Quality: friends of foes, Barraz S.) that was already adressing the problematic relationship that Quality and Safety experience. In the present article we will illustrate again this issue in taking the Helios 522 accident that occurred in 2005.

Quality is not the same as safety

Flight Operational Quality Assurance (FOQA) has become mandatory for most large aircraft operators. Quality Assurance is a system of management activities to ensure that a process, an item, or a service, is of the type and quality demanded by applicable requirements. Quality assurance, then, is about checking whether components or systems meet certain prespecified criteria.

Quality assurance and safety management within the airline industry are often mentioned in the same sentence or used under one department heading (e.g. skyguide!). The relationship is taken as non-problematic or even coincident. Quality assurance is seen as a fundamental activity in risk management. Good quality management will help ensure safety.

Checking whether individual constituent components of a system meet certain prespecified criteria expresses a particular model of risk and safety. It implies a particular idea about where sources of trouble lie and a model of how accidents occur. Accidents are assumed to occur when individual components or processes fail to meet applicable criteria or migrate outside of prespecified boundaries. Flight Data Monitoring (FDM/FOQA), an important ingredient in airline quality assurance, builds on the idea that safety, once established, can be maintained by keeping the performance of a system's constituent components within certain limits.

All of this poses some really interesting questions about the relationship between quality assurance and safety. It raises the possibility that the inspection and safety assurance regimes applied by the industry are increasingly at odds with the accident models it still assumes to be true.

Language as Disabling Device

The two cockpit crew members aboard Helios flight 522 met the prespecified European criteria for acting as co-pilot and captain, respectively, on a Boeing 737 (JAR-FCL, delivered by LBA Germany for the captain, and by United Kingdom for the first officer) . After departure the aircraft did not pressurize well because of anomalies in its pressurization system. The configuration warning system sounded an alarm after take-off—as designed. This is the same horn that goes off before take-off if the aircraft is incorrectly configured (in for example its flap setting) for getting airborne. This has set a stage for confusion about what was ailing in the aircraft, if anything—a confusion that became compounded by an

The flight trajectory (from wikimedia commons)

Summary of the accident[1]

On 14 August 2005, a Boeing 737-300 aircraft operated by Helios Airways, departed Larnaca at 06:07 h for Prague, via Athens.

As the aircraft climbed through 16 000 ft, the Captain contacted the company Operations Centre and reported a Take-off Configuration Warning and an Equipment Cooling system problem. Several communications between the Captain and the Operations Centre took place in the next eight minutes concerning the above problems. Thereafter, there was no response to radio calls to the aircraft. During the climb the passenger oxygen masks deployed in the cabin. The aircraft leveled off at FL340 and continued on its programmed route.

The aircraft entered a holding pattern close to Athens at 07:38 h. At 08:24 h, during the sixth holding pattern, the Boeing 737 was intercepted by two F-16 aircraft of the Hellenic Air Force. One of the F-16 pilots observed the aircraft at close range and reported at 08:32 h that the Captain's seat was vacant, the First Officer's seat was occupied by someone who was slumped over the controls, the passenger oxygen masks were seen dangling and three motionless passengers were seen seated wearing oxygen masks in the cabin. No external damage or fire was noted and the aircraft was not responding to radio calls.

At 08:50 h, the left engine flamed out due to fuel depletion and the aircraft started descending. At 09:00 h, the right engine also flamed out. The aircraft impacted hilly terrain at 09:03 h in the vicinity of Grammatiko.The 115 passengers and 6 crew members on board were fatally injured. The aircraft was destroyed.

1 extract from the synopsis of the official report into the accident published by the Hellenic republic Ministry of Transport & Communications

Safety and Quality : the "Helios 522" accident

accelerating mental disorientation resulting from hypoxia (cabin pressurization normally keeps the cabin altitude at about 8000 feet).

The aircraft, as programmed, kept climbing on autopilot. When it passed 14,000 feet, oxygen masks deployed in the cabin, and a master caution light illuminated in the cockpit.

About the same time, another alarm started sounding on a slightly related matter, warning that there was insufficient cooling air entering the compartment housing avionics equipment. Confusion escalated. The German captain and Cypriot co-pilot discovered that they did not have enough common ground in English to begin coordinating meaningfully about the problems at hand. This situation would have pushed any crew (impaired by hypoxia) far off the beaten track where standard ICAO English still sufficed.

This are 2 extracts of the official investigation of the Hellenic board[3]:

(p.122) *«In general, sufficient ease of use of English for the performance of duties in the course of a normal, routine flight does not necessarily imply that communication in the stress and time pressure of an abnormal situation is equally effective. The abnormal situation can potentially require words that are not part of the "normal" vocabulary (words and technical terms one used in a foreign tongue under normal circumstances)»*

(p.123) *«In particular, according to some statements there were difficulties due to the fact that the Captain spoke with a German accent and could not be understood by the British engineer (…) The language difficulties prolonged resolution of the problem, while the aircraft continued to climb. Moreover, the communication difficulties could also have been compounded by the onset of the initial effects of hypoxia.»*

It seems that the captain's level of English was not good enough to understand his first officer and more importantly, the proposals of the ground engineer. Both cockpit crewmembers did not speak each other's language either. Crew coordination beyond routine checklist items and air traffic control clearances would be difficult, inefficient, arduous and ultimately ineffective.

Upon calling the carrier's maintenance base in Cyprus, they were advised that the circuit breaker to turn off the loud new alarm was in the cabinet behind the captain. The captain got up from his seat to look for the circuit breaker, leaving the confused co-pilot behind at the controls. The aircraft continued to climb on autopilot, and the air grew so thin that the captain passed out first, on the cockpit floor, followed by the co-pilot, who was still in his seat. The autopilot continued to do what it was programmed to do: fly the aircraft to Athens at 34,000 feet and enter a holding pattern. It remained there, shadowed by Greek military jets, until fuel ran low and one engine quit. The thrust imbalance caused the 737 to leave the holding pattern, and it crashed not much later.

Decomposition assumptions of quality management

If we believe that safety can be maintained by keeping system component performance within applicable limits (and we partially express that belief in Quality Assurance) the combination of a properly trained and certified German captain and Cypriot co-pilot of Helios 522 would have been unproblematic. This is because we make certain decomposition assumptions. For example, we assume that each component or subsystem operates reasonably independently, so that the results of our safety analysis (e.g. inspection or certification of people or components or sub-systems) are not distorted when we start putting the pieces back together again. It also assumes, by the way, that the principles that govern the assembly of the entire system from its constituent sub-systems or components is straightforward and that the interactions will be linear.

Helios 522 obviously violates these assumptions. The German captain and the Cypriot co-pilot met the criteria set for their jobs. Even when it came to English, they passed. They were within the bandwidth of quality control within which we think system safety is guaranteed, or at least highly likely. That layer of defense had no holes as far as our system for checking and regulation could determine in advance. And we thought we could line these sub-systems up linearly, without complicated interactions. A German captain, backed up by a Cypriot co-pilot. In a long-since certified airframe, maintained by an approved organization. The assembly of the total system could not be simpler. And it must have, should have, been safe.

Lessons Learned?

So to conclude I would like to rejoin the ideas presented in the preceding article about quality and safety. Obviously it is not at all the purpose here to criticize simply what quality does, of course safety benefits from some quality rules because they enable a structured approach to problem solving, which is good.

However the reductionist approach (taking systems apart and checking whether individual components meet prespecified criteria) suggested by quality (and even some popular safety models like Swiss cheese, Reason 1990) does not allow us to better understand a world which is much more complex in its interactions. The functioning of a whole system is just much greater than just the sum of all its parts. Helios 522 accident offers here a good insight into the troubles that a pure quality based approach might create.

THOMAS NOVOTNY
SDE

2 Dekker, S. W.A Technical report 2006-03 Lund University School of Aviation

3 HELLENIC REPUBLIC MINISTRY OF TRANSPORT & COMMUNICATIONS AIR ACCIDENT INVESTIGATION & AVIATION SAFETY BOARD (AAIASB) AIRCRAFT ACCIDENT REPORT HELIOS AIRWAYS FLIGHT HCY522 BOEING 737-31S AT GRAMMATIKO, HELLAS ON 14 AUGUST 2005 11 / 2006