
Safety Bulletin

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Editorial

Why a Safety Bulletin?

Safety is neither achieved nor assured by reading a Safety Bulletin. Safety is achieved and assured through the daily work, and most obviously, by ATCOs in the operational units and technicians by the maintenance of current equipment. Likewise safety is improved by developing new equipment or procedures and last but not least by the management when setting policies and making decisions.

The skyguide Safety Bulletin is the means to disseminate information about current and ongoing safety activities in and around our company in order to improve safety awareness within skyguide. The Safety Bulletin is written for all employees but mainly focuses on employees in the O and T departments. It will be published quarterly from now on.

The Safety Bulletin team would appreciate receiving your feedback to this first Safety Bulletin in the history of Swiss Air Navigation Service Provision. And I would appreciate receiving as well your input for further articles or even your own articles for this bulletin (s.b@skyguide.ch).

I am glad that you are reading the Safety Bulletin, and I hope that you enjoy reading it.

Martin PROBST, DMS

Inside this Issue

In Focus

Safety Improvement Report: Status 2

Risk Management

What is Risk Management ? 3

Audit Management

What does Audit Management have to do with safety ? 5

Lessons learned

Co-ordination 6

Call on 121.5 8

Miscellaneous

Reducing Level Bust 9

What are the most common risks in our airspace ? 12

Statistics on AIRPROX 14

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Safety Improvement Report: Status

At the beginning of this year, safety management implemented the Safety Improvement Report (SIR) not dedicated to occurrences but rather to so-called safety-relevant problems or unsatisfactory states.

The possibility to file a SIR is available to anybody within O and T department. If requested the report will be treated confidentially. In the first two months we received 31 reports; just one was confidential.

As reminder: the SIR form is available on the Intranet under “management/safety (SIR)” or under “operations/OPS formulas”. We would like to take the opportunity to say that the SIR process is only oriented to safety matters and should not be used for any other purpose.

Examples of issues that could be identified

- Holding ‘point’ instead of ‘position’ phraseology (done in UK which has circumnavigated ICAO recommendations)
- No back-up data-line for radar, SYCO and phone between Bern and Zurich
- Co-ordination made in Swiss German not understood by all ATCOs.
- Loss of holding fix on CALM display when sector East is separated from sector North.
- Discrepancy in QNH values on the TIP page and INFONET
- Licensing of technical personnel undertaking operational safety related tasks.

All issues have been addressed to the responsible managers for treatment. They are now accountable for the changes requested.

We will keep you informed in the next Safety Bulletin issues of the progress made in the SIR process.

We would like to encourage everybody to submit SIRs as their contribution to enhancing the safety of our service.

Thomas NOVOTNY, DMS1

What is Risk Management?

This article is the first of a rubric dedicated to the new and very sensitive field of risk management.

Safety is usually defined as “freedom from unacceptable risks” (ISO/IEC - 1996). This highlights clearly the fact that perfect safety is an unachievable goal and that a “risk-based” approach is the only way to address the subject. Taking risks into account when introducing new systems or planning modifications on existing ones can be achieved with different approaches.

The “classical” one is the best known: major risks associated for example with business development, internal and external constraints or resources availability are identified, classified and put in relation with the project planning, cost and deliverables. A systematic evaluation of their associated severity and the introduction of proper mitigation means helps project managers stay in line with their business plan.

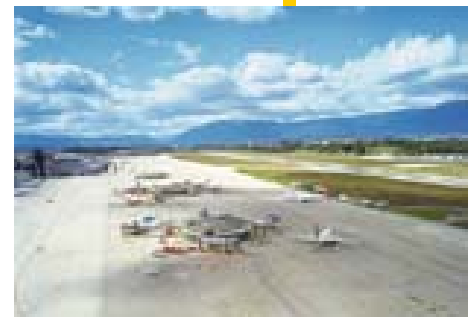
Air traffic service providers contribute to *aviation safety*. This is a very particular and sensitive domain because of its high public impact. Consequently, a more “specialised” risk assessment approach based on a set of Eurocontrol Safety Regulation Requirements (ESARRs) has been developed and should be usable soon as a valuable complementary tool. This approach is derived from the overall EATMP safety objectives guiding the implementation of major ATM improvement programs in Europe:

“While providing an expeditious service, the principal safety objective is to minimize the EATMP program contribution to the risk of an aircraft accident, as far as reasonably practicable”

The willing to identify and minimize risks by keeping them as low as reasonably practicable can be considered as the main outcome of a so-called *risk management* oriented approach. To succeed, this approach requires the availability of a well-defined *risk management system* as a subset of a more global safety management system which in itself depends on a company-wide quality management system. The idea behind this is very simple: provide a formal and coherent framework within which skyguide will be able to identify risks and determine in a justified and traceable manner if those risks are acceptable, tolerable or unacceptable.

This is usually achieved by *safety assessment programs* conducted by safety experts and mainly based on:

Risk Management



- A risk management policy describing the basic assumptions and working principles applicable in the company.
- A methodology describing the way risks have to be properly assessed.

In addition, company guidelines and a well-defined risk management process should also be available. It is important to stress that no safety assessment program succeed under the direction of safety experts alone. On the contrary, it is necessary that specialists who perfectly understand the system be available and actively involved. A safety assessment program is not an 'alibi' exercise and should be done carefully with adequate time and enough resources available.



But let me conclude with a brief overview of what is actually going on: the skyguide Safety Steering Group validated the following systems for initial safety assessments:

- New TMA structure and associated instrument approach procedures for runway 28 and 34 in Zurich (ZAP).
- Integration of regulation functions into ACC sectors in Geneva (IFREG).
- Track deviation during missed approach runway 14 in Zurich (TWR-ZRH).
- Interconnection between Switzerland and Italy for flight plan and telephone data transportation (SETInet).

Concrete results should be available by the end of April this year. Based on this first experience, subsequent Safety Assessments will be defined.

Stéphane BARRAZ, DMR

What does Audit Management have to do with safety?

For more than ten years an audit team exists within what was previously known as swisscontrol and now as skyguide which performs evaluations in the operational units of the company at regular intervals.

Since 1999 this task has been performed in cooperation with ACG and DFS (TriNET organisation). That means during audits within skyguide a co-auditor from Austria (ACG) or Germany (DFS) is always part of the audit team. On the other side a skyguide auditor participates in the evaluations in these countries. The purpose of this alliance is to guarantee the independence of the evaluations and also to harmonize the procedures and regulations between these three ATS organisations. Furthermore all three ATS organisations can benefit from the experiences of the others.

In 2002, the military ATC was integrated into skyguide. As a result of this the auditors from skyguide have evaluated all military units except the air defense direction center (ADDC) last year. For secrecy reasons no auditors from abroad may participate in these evaluations for the time being. Some important evaluation work is planned within skyguide this year, in particular at the Geneva and Zurich ACCs, Geneva TWR and the ADDC. Furthermore evaluations in the Bern, Lugano, Payerne and Meiringen TWR/APP are planned. The participation of auditors from the audit management on the evaluations abroad at the Vienna ACC and Frankfurt APP and other foreign units should be mentioned.

Safety has a very high if not the highest priority during the evaluations. Through our activities in the different units in the three countries, we always discover new issues relevant to safety which we check in the next evaluations and which could be safety problems in these units as well.

With the introduction of the Safety Improvement Report (SIR) we now receive reports of additional problems. Therefore the audit management will examine in following evaluations the solution of these problems, and check if the same problems occur in other units as well.

For further questions concerning evaluations we are always available at our office in Zurich.

Jürg BICHSEL, DMA / Peter SCHEUBER, DMA1

Audit Management



Lessons Learned

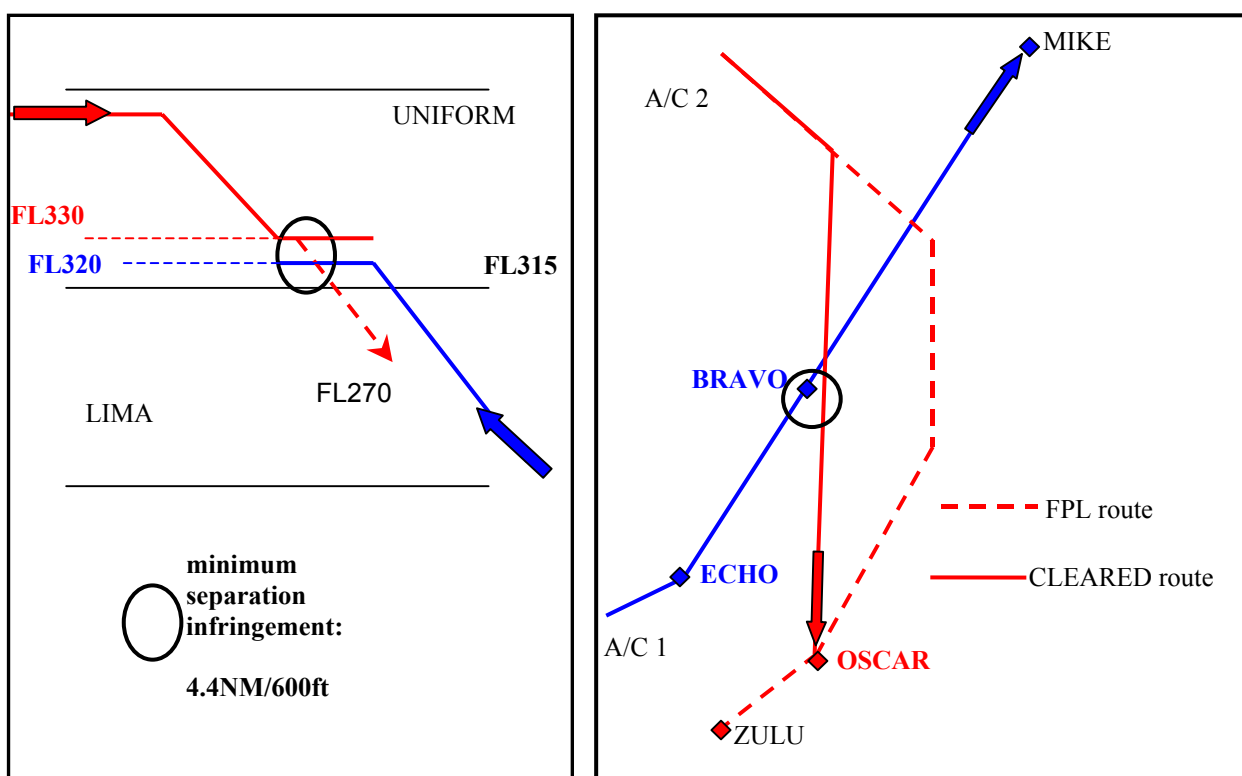
OSG (OPS Safety Group)

Co-ordination

Description of the occurrence

A/C 1, en-route from ECHO to BRAVO then MIKE, establishes radio contact with sector LIMA. On the first call, it is cleared to climb to FL340, as previously co-ordinated between LIMA and UNIFORM sectors.

A/C 2 calls sector UNIFORM at 12:03 UTC. It is cleared direct OSCAR - ZULU. When the crew requests initial descent 2 minutes later, a new co-ordination between the planners of the concerned sectors revises the previous one and the new decision is to stop A/C 1 at FL320 and then to descend A/C 2 to FL330 before sending it over to the LIMA sector in order to have both conflicting traffic on the same frequency. A/C 2 is then transferred on LIMA sector's frequency.



However, at 12:06:41 UTC, A/C 1 is sent over on UNIFORM sector's frequency. The result of this action, which is in contradiction with the last co-ordination, is that the two conflicting traffic are no longer under control of the same sector. Executive UNIFORM controller stops the A/C 1 climb at FL320 on its first call.

Lessons learned

OSG (OPS Safety Group) is a working group mandated by O and formed with 6 active ATCOs representing MIL, Zurich and Geneva ATC, nominated as safety officers.

Among of the duties of these safety officers are the production of unit safety letters describing occurrences that happened in their respective unit and the issuance of recommendations or corrective measures helpful for safety improvement in the unit in collaboration with OO and DMS.

At 12:09 UTC, one minute before the crossing point, A/C 2 is instructed to descend to FL270. At this time, A/C 1 reaches FL320.

At 12:10 UTC, LIMA and UNIFORM controllers detect the imminent conflict and instruct both craft to turn left.

Nevertheless, this avoiding action is not sufficient to resolve the hazardous situation and the minimum separation, according to the radar recording, was 4,4NM / 600ft.

Both crews reported having had the other traffic in sight, but only A/C 1 mentioned a RA and descended to 31500 feet as an avoiding action.

Transcript of co-ordination

To	From	Time	Communications
UNIFORM	LIMA	12 :05 :31	Allô.
LIMA	UNIFORM	12 :05 :32	Deux choses, l'Ali deux quarante et un.
UNIFORM	LIMA	34	Two forty...one, ça c'est trois cents...,...trois cents,...j'te rappelle.
LIMA	UNIFORM	40	Trois cents tu rappelles, et le A/C 2 qui voulait déjà descendre, ...en haut là.
UNIFORM	LIMA	46	D' A/C 2 det obe, ah det obe ja, le "A/C due", drunder... ou wart schnäll, es isch es Puff det obe. Ja... .. heu...
LIMA	UNIFORM	12 :06 :00	????? dr A/C 1 gaht scho ufe ?
UNIFORM	LIMA	03	Ja, ja, de gömmer e mal...
LIMA	UNIFORM	06	Mache mer halbi, halbi.
UNIFORM	LIMA	07	Ja, halb. halb, mache mer drü...
LIMA	UNIFORM	11	D'A/C 1 drü zwänzg und d' A/C 2 drü drissg ?
UNIFORM	LIMA	13	Okay, de mache mer das so.
LIMA	UNIFORM	15	I schicke der der A/C 2.
UNIFORM	LIMA	15	Ja schick du mer der A/C 2.
LIMA	UNIFORM	17	Okay.

Recommendations

In a similar or comparable situation:

- Co-ordinations between sectors should be clear, concise and transmitted in due time to the radar executive (RE)
- Both A/C should be under control of the sector in which the crossing occurs.

Call on 121.5

Description of the occurrence

A/C A, MD87, LEBL – LSZH, is on a Geneva-frequency. The flight is cleared to descend to FL210 and to change frequency to 135.67. The pilot reads back: *"Maintain 210 and Zurich 135.67? Confirm."* Geneva's answer: *"Affirm, 35.67"*. A/C A then says: *"Au revoir."*

A/C A flew south-east of KORED into the Zurich airspace without any contact with Zurich. According to radar, there was no level-off at FL210. A/C A flew via BERSU to BASKI and EKRI. Over BASKI, maintaining FL140, A/C A called Zurich APP-West (118.0): *"We had negative contact on 125.605."* After co-ordination with ACC, APP cleared A/C A for approach. After landing, the pilot called Zurich ACC and explained he was on a wrong frequency.

What went wrong?

The Zurich customer service wrote to the operator of A/C A and asked for explanation about this manoeuvre. The pilot answered via e-mail:

"Once Geneva control gave me the frequency 135.67, an error occurred and I tuned 125.605 instead of. On this frequency and on the initial contact I informed of my call sign and flight level, Control authorised "descend to FL140".

This fact made me to believe that I was on the correct frequency, and I began to descend. Some minutes later, when I notified approaching to FL140, and when we did not receive reply (probably because we were out of the frequency coverage), I decided to contact Zurich APP (Frequency 118.0). When Zurich APP received us on this frequency, we were informed that our previous frequency was not correct, but despite of this, we continued the normal approach. We did not receive any call on 121.5 (always open on the COM Radio equipment). After landing on Zurich Airport, I phoned Control in order to comment the incident and they told me that was not necessary to inform because there was not an incident case.

Best regards "

Recommendation

In a similar or comparable situation, try to call on 121.5 to establish contact with the flight and to send it on the correct frequency as the pilot suggested.

Operations Safety Group (OSG)



Reducing Level Bust

Safety is not only our common goal; it is also the common goal of ATC and pilots. Together with Martin Probst, Head of Safety Management at skyguide, we from Swiss Safety have decided to improve our co-operation in the area of information. So that you can understand our view on the delicate subject of “level bust”, I would like to reproduce an un-abridged article that was published in Swiss Internal Safety Letter, a quarterly bulletin that is distributed within the flight operations division.

On 12 November 1996, an IL76 inbound to Delhi at FL150 was advised of an outbound Saudi B747 at FL140. The radio operator onboard the IL76 acknowledged the traffic advisory and asked how far away the Saudi aircraft was. ATC replied “traffic is at 8 miles now FL140”. Meanwhile the pilot and co-pilot were discussing the traffic information and it is suggested that the co-pilot only heard the last part of the ATC transmission “...now FL140” and interpreted it as a clearance to descend. Suddenly realising that the pilots had begun to descend, the radio operator shouted out “keep at FL150, don’t descend!” The by now highly anxious crew began to initiate a climb. 349 people died as a result of the subsequent collision; the worst disaster in India’s civil aviation history.

This was a classic level bust incident resulting from poor communication and a lack of co-ordination on the IL76 flight deck.

Nowadays we can surely agree upon air travel as the safest method of public transport in Europe, this mainly due to great effort from air operators, controllers, regulators and manufacturers. Only by working together we can improve flight safety and learn from our experiences.

With the increase of air travel and the introduction of RVSM with reduced vertical separation between aircraft, the number of level busts will increase if we don’t take measurements to reduce the possibilities for a level bust. It has been difficult to find statistics on the amount of level busts, but in UK airspace alone NATS (National Air Traffic Services Ltd) estimate some 600-900 level busts/ year, whereas ca 300 LBs/ year are reported. We are all involved, whether being the operator, the manufacturer or the controller, and independent of where we are located. This is an issue, which knows no boundaries!

Miscellaneous

A **Level Bust** is defined as “Any deviation from an assigned altitude or flight level in excess of 300 feet”. Level Busts rarely result in a mid-air collision, but it is true to say that many CFIT (controlled flight into terrain) accidents are also the result of a Level Bust.

A study by our colleagues at Air France found that mostly there are 3-4 causal factors leading to a Level Bust and that the absence of only one of these factors makes the accident nearly impossible! They also found that the Human Factor was the main causal factor for a Level Bust.

What has been done?

Much has been done to reduce the number of level busts by making crews more aware of the dangers. By promoting good CRM, and by promoting standard operating procedures, system design and communications procedures, which minimise the chance of a level bust, and mitigate the risk of a level bust leading to an accident. Improved radar coverage and technological improvements in secondary radar and ATM, coupled with the widespread use of ACAS (Aircraft Collision and Avoidance System), have also reduced the risks of a level bust.

To find ways of reducing the number of level busts, we need to understand fully the various causal factors. Not surprisingly, we find that the causal factors behind level busts are often those that contribute to other categories of accidents; poor communication, distraction, lack of standard operating procedures, cockpit & controller workload, pilot handling, etc.

The Human Factor

To err is human wrote William Shakespeare once and it is fair to say that humans will never be perfect. We cannot avoid errors, but we can

- **reduce the probability of occurrence** and we can
- **increase the probability of detection and time/means of correction!**

Improved automation helps us (BA found a significant drop of level busts when they faced out their B747-200s which had a somewhat unsophisticated auto pilot system). Scientists have introduced a term which is called human error probability (HEP). HEP figures can be calculated for different discrete tasks (like rotary dial selection) and to tell it short: The more tasks we have to perform at the same time and the more information we have to collect during a certain time period, the more prone we are to error. Individual HEP is influenced by several factors such as experience, training, circadian rhythm etc. Also the influence of stress on HEP is significant.

Conclusions

The human factor is present everywhere and because of human performance limitations, the role of human factors should be considered in all aspects of system design and operational procedure. This means a better co-operation between manufacturer, controller and operator in improving the working environment. Communication is a key player in level busts. Experience shows that adherence to SOPs and standard radio phraseology used by controllers (and pilots) helps to reduce confusion and the chances of a level bust. Further areas of improvements are:

- Terminal chart design (appropriate amount of information presented)
- Design of instrument flight procedures (SIDs & STARS)
- Callsign confusion

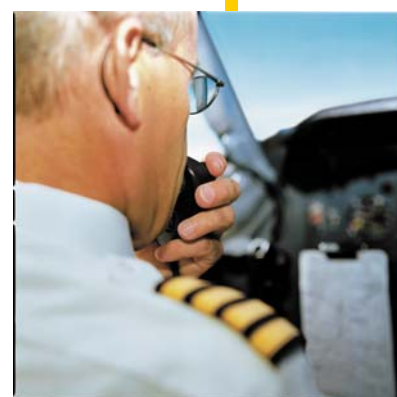
Man: “A creature that was created at the end of the week when god was very tired”
(Mark Twain)

Recommendations for Operators

- SOPs
- Reduce flight deck workload by avoiding all activity not directly related to the safe conduct of the flight (i.e. during climb and descent).
- Ensure clear procedures for altimeter cross-checking and approaching level calls.
- Always confirm a clearance if any doubt exists (Maintaining a reasonable level of doubt).
- Always report the level cleared to when checking in on a new frequency while in the climb or descent
- Always follow TCAS RAs!

As professional pilots we all know this, and still we make mistakes! With the increase of air traffic and reduced vertical separation we need to be even more stringent on discipline on the flight deck!

(Flight Safety, SWISS)



Recommendations for ATCOs

- SOPs
 - Avoid giving heading and height clearances in the same transmission
- Radio phraseology
 - Use ICAO standard phraseology
 - Use standard phraseology “Flight level one hundred” to refer to FL100
 - Use the word “degrees” after all headings
- Improve the level of safety reporting

*According to a level bust workshop by Eurocontrol in Brussels
(10. /11. October 2002)*

Martin PROBST, DMS

What are the most common risk areas in *our* airspace?

The most frequent and most serious occurrences in *European* airspace can be categorised into the following risk areas. Runway incursions, loss of air-ground radio communication, VFR flights penetrating controlled airspace and level busts (both en-route and in terminal areas).

What are the most common risk areas in *our* airspace?

In order to answer this question all occurrences must be reported, stored and analysed in a single company-wide database. Only then it will be possible to get a systematic overview of the risk areas in our airspace. Only with such a base will it be possible to draw conclusions and to implement mitigation actions.

Therefore the most important thing is that all occurrences are reported using an operational internal report (OIR). Even if the estimated severity of the occurrence had no safety significance it should be reported via OIR and not just recorded in the LOG. To make it easier for controllers to file an OIR the form was redesigned. It is available in all operational units and also on the Intranet where it can be filed electronically.

Request to all controllers: Report all occurrences to get an overview of the most common risk areas in our airspace. The four categories mentioned above can easily be found in the new OIR form.



OPERATIONAL INTERNAL REPORT (OIR)

1. Classification / safety aspects

collision A/C deviation from ATC clearance

separation minima infringement level bust

inadequate separation unauthorised penetration of airspace

near CFIT deviation from applicable ATM regulations

runway incursion no contact

runway excursion similar call signs

other (mention below) wake read back

FMS problem

wake vortex

2. Location of occurrence

Location:

Airspace:

3. Date and Time

Date:

Time (UTC):

4. Workload

Low Medium High Very high

5. Avoiding action (if any)

Initiator: both ATCO pilot

6. Estimated closest distances

NM/ ft

7. Involved

Number of A/C: vehicle person other:

ATS unit(s): sector(s): frequency(ies):

8. Type of monitoring alert

STCA ACAS MSAW GPWS other:

9. Estimated severity of occurrence serious major significant no effect

10. Information on involved A/C (relevant only)

Aircraft info	A/C 1	A/C 2
Callign		
Type of A/C		
SSR code		
IFR/VFR		
VMC/IMC		
Actual level		
Cleared level		
Taxi/DEP/en-route/ARR		
TFC info given	<input type="checkbox"/>	<input type="checkbox"/>

11. ACAS information (if relevant)

(Please tick if answer is yes)

ACAS info	A/C 1	A/C 2
ACAS equipment available	<input type="checkbox"/>	<input type="checkbox"/>
TA reported	<input type="checkbox"/>	<input type="checkbox"/>
RA reported	<input type="checkbox"/>	<input type="checkbox"/>
radio contact established	<input type="checkbox"/>	<input type="checkbox"/>
Pilot asked for TFC info	<input type="checkbox"/>	<input type="checkbox"/>
If yes, was it before manoeuvring?	<input type="checkbox"/>	<input type="checkbox"/>
Pilot's reaction was justified	<input type="checkbox"/>	<input type="checkbox"/>
Pilot reported airmiss	<input type="checkbox"/>	<input type="checkbox"/>
Did the occurrence disturb your activities?	<input type="checkbox"/> yes	<input type="checkbox"/> no

level bust

unauthorised penetration of airspace

no contact

runway incursion

For incidents which had no safety significance file an OIR and select "no effect"

From now on until the end of this year the amount of occurrences of these four categories will be published in the Safety Bulletin.

Definitions according to HEIDI

(Harmonisation of European Incident Definition Initiative for ATM)

Runway incursions

- Unauthorised presence on RWY of an A/C, vehicle, person or object that creates a collision hazard or results in potential loss of separation.

Loss of air-ground radio communication / No contact

- No definition available

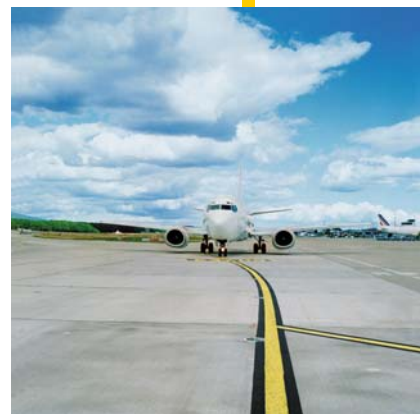
Unauthorised penetration of airspace

- An aircraft entering a published prohibited area or active danger area without permission from the appropriate authorities, or an aircraft entering controlled airspace without an ATC clearance.

Level bust

- Any unauthorised vertical deviation of more than 300 feet from an ATC flight clearance. Departing from a previously maintained FL, overshooting, undershooting, leveling-off at a different level than cleared level.

Martin PROBST, DMS



Statistics on AIRPROX France / Germany / Switzerland

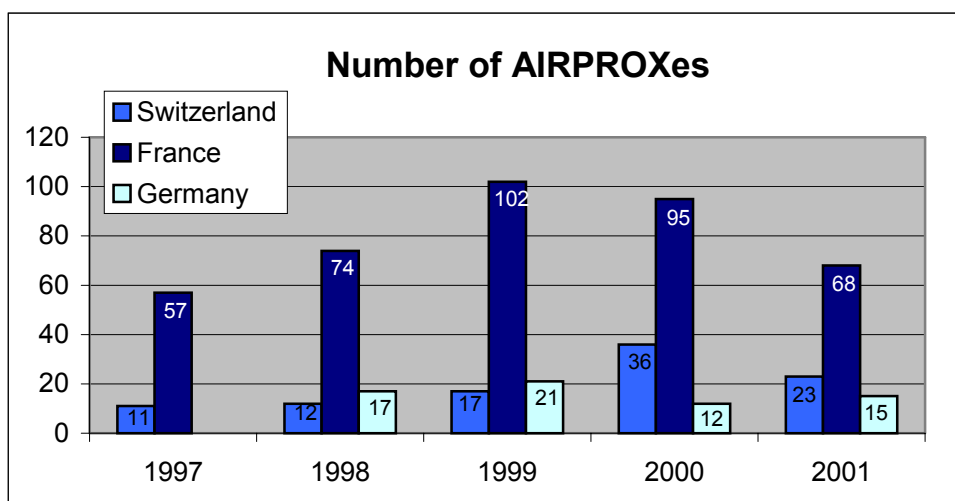
Statistics on AIRPROXs are available but it is nearly impossible to compare them between different countries. Therefore the comparison between countries should not be considered as too reliable. The classification of AIRPROX is quite subjective and reporting procedures vary from state to state.

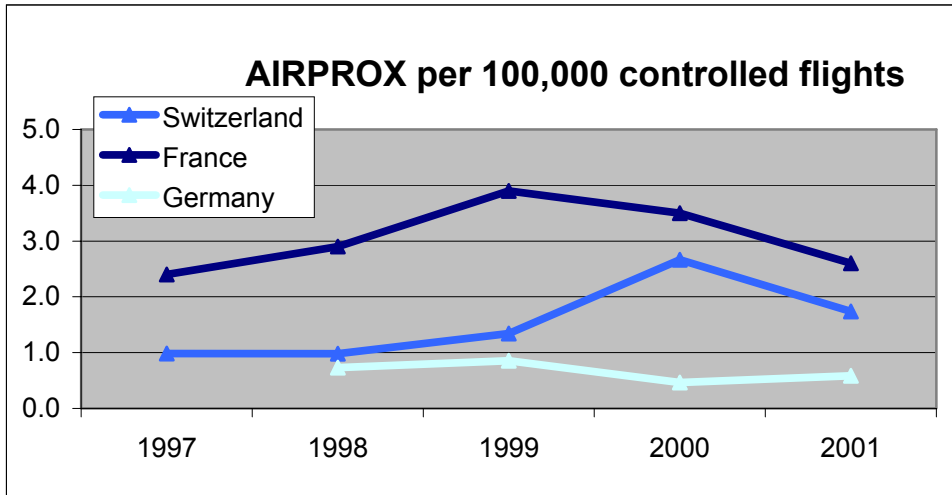
Let us take for example France and Germany. Both control about 2.6 Mio IFR flights per year, while Switzerland operates approximately half of it. “Logically” as shown in the following table, France has more AIRPROXes in absolute numbers than Switzerland. Germany, however, has less AIRPROXes than Switzerland despite managing twice the traffic! Are France and Switzerland really so ‘unsafe’ compared to Germany? We can’t confirm this as long as we don’t have standard rules to score closely the severity of incidents.

Eurocontrol is working on that topic assisted by many providers; skyguide takes part in this work.

When we compare the number of AIRPROXes relative to the amount of traffic (number of AIRPROX per 100,000 controlled flights, which is really the value we should compare, with all the restrictions cited) Germany has the lowest rate followed by Switzerland and France.

Since every country has its own definition of AIRPROX statistical comparisons become impossible. Therefore other countries (e.g. UK) have not been added to these statistics. Any statistical comparison would have lead to confusion.





The statistics are based on officially published data (for Switzerland extracted from BfU website / annual statistics). The choice to compare A (serious) and B (major) AIRPROXes has been made because the consistency of data available was the best when considering these two most severe categories of AIRPROXes.

Conclusion

Learn from all AIRPROXes but don't compare statistics of AIRPROXes at least as long as classification is not harmonised within Europe.

Thomas NOVOTNY, DMS1