

# Safety Bulletin

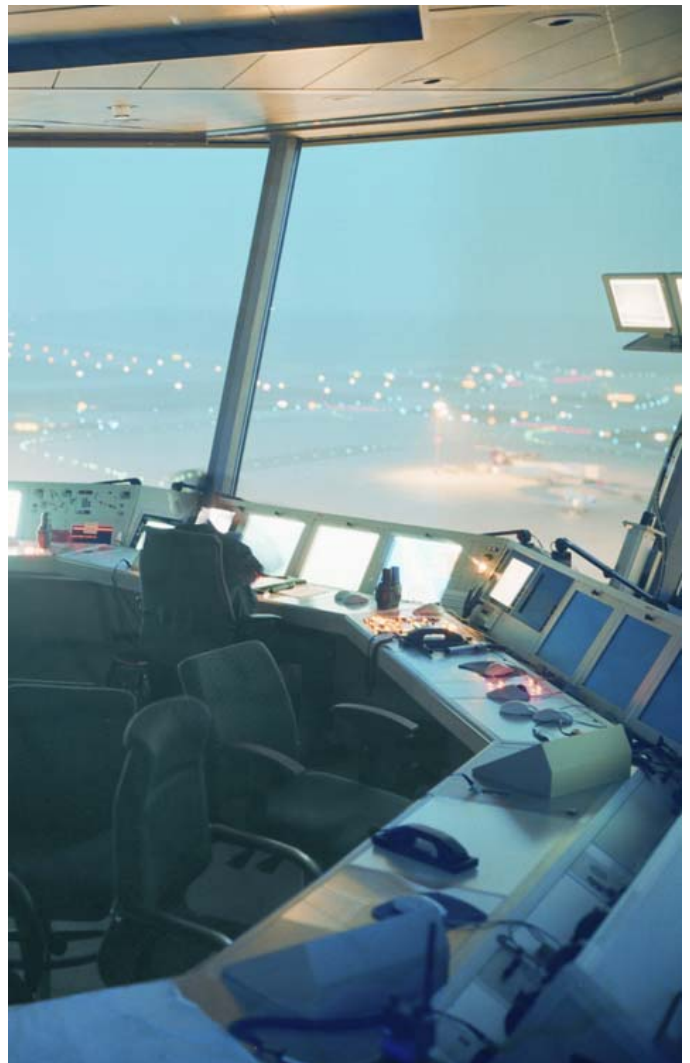
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e-mail: s.b@skyguide.ch  
Intranet: SWAN/management/safety/safety bulletin

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## Inside this issue

<b>Editorial</b> .....	<b>2</b>
New organisation of safety and quality dpt.	
<b>TCAS between IFR and VFR</b> .....	<b>3</b>
Extracts from ACAS bulletin No. 4	
<b>Avoiding action</b> .....	<b>4</b>
The correct phraseology to use	
<b>Air-ground communication study</b> .....	<b>4</b>
Analysis of pilot-controller occurrences	
<b>Lessons learned</b> .....	<b>5-7</b>
1 <sup>st</sup> case: loss of communication after departure	
2 <sup>nd</sup> case: clearance must be a crew/ATC contract	
<b>SAFIR</b> .....	<b>7</b>
Second info bulletin issued	
<b>The UAC-CH safety assessment</b> .....	<b>8</b>
The UAC-CH safety group starts up the work	
<b>System Safety management</b> .....	<b>9</b>
What's actually going on ?	



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**Safety Bulletin Team: Editor** Thomas Novotny

**Operations Safety Group** Denis Droz (Head), Alois Schneider, Christoph Gilgen, Bertrand Du Bois, Heinrich Baumgartner, Lukas Vasatko, Olivier Bussard, Reto Hunger, Roland Baumgartner

**Audit Management** Jürg Bichsel, Peter Scheuber

**Systems Safety Assessment** Stéphane Barraz, Jean-Marc Bory, Fabrizio Balda, H-U Glauser, Marc Vettovaglia

**Safety Management** Martin Probst, Thomas Novotny

## Editorial



### New organisation in safety and quality department

The Safety Management Organisation has been re-organised; the new group leaders have been nominated and the development of our Safety Management System (SMS) can further proceed. This article does only present the safety part of the safety and quality department, but quality and information management are integrated in this department like they were before.

The objective of all skyguide's Safety Management activities is to identify and mitigate risks in the ATM system before they could lead to an accident. To achieve this our Safety Organisation is structured in the following three groups and tasks (in accordance to ESARR 3 requirements).

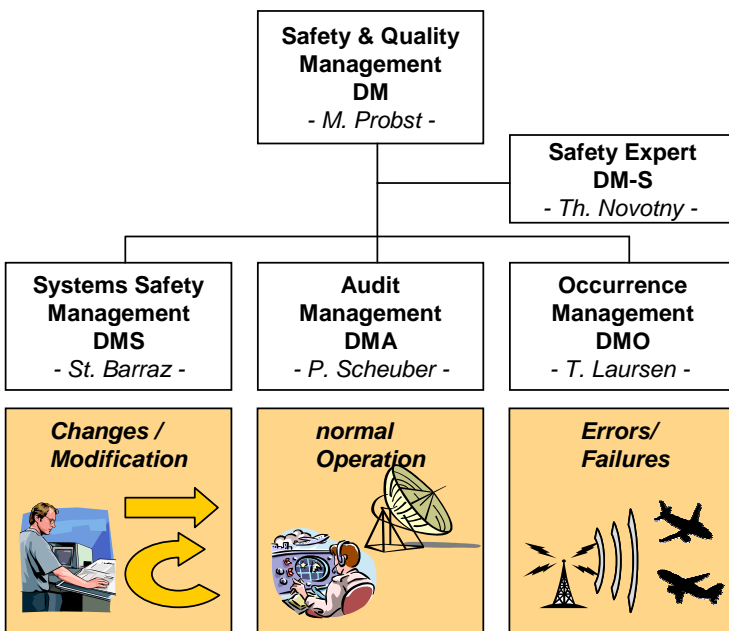


Figure: This figure shows the safety part of the Safety & Quality Management Organisation. For further details see on SWAN (organigram).

#### Systems Safety Management

- shall ensure that risk assessment and mitigation is conducted to an appropriate level to ensure that due consideration is given to all aspects of ATM

- shall ensure that changes to the ATM system are assessed for their safety significance, and ATM system functions are classified according to their safety severity
- shall ensure appropriate mitigation of risks where assessment has shown this to be necessary due to the safety significance of the change

#### Auditing Management

- shall ensure that safety audits are carried out as a matter of routine, to recommend improvements where needed, to provide assurance to managers of the safety of activities within their areas and to confirm conformance with applicable parts of their Safety Management Systems.

#### Occurrence Management

- shall ensure that ATM operational occurrences which are considered to have significant safety implications are investigated immediately and any necessary corrective action is taken.

In order to give you a deeper insight into the activities of the three groups each of them will introduce itself and their staff in the three following Safety Bulletins.

An other important task of a SMS is "Lesson dissemination". This means to ensure that the lessons arising from safety occurrence investigations and other safety activities are disseminated widely within the organisation at management and operational levels.

That is a task of the whole division but especially of the DMO group in close collaboration with the Safety Officers of each operational unit. Lessons learned can be published in our Safety Bulletins, Safety Letters or lead to improvements at various levels of our organisation.

A closing remark - again according to ESARR 3 - concerning the responsibility for safety. The safety management function is responsible for the development, implementation and maintenance of the Safety Management System. But everyone involved in the safety aspects of ATM service-provision has an individual safety responsibility for his own actions, and managers are responsible for the safety performance of their own organisations.

### ***SAFETY IS EVERYBODIES RESPONSIBILITY***

*Martin Probst, DM*

## TCAS resolution between IFR and VFR traffic

### TCAS between IFR and VFR traffic in Class D airspace

#### Excerpts from Eurocontrol ACAS II Bulletin No 4

Europe's first mid-air collision in 1976 in ex-Yugoslavia marked the milestone in development of ATM Safety Nets.

The drive for TCAS II development in the US was from mid-air collisions involving light aircraft -between a B727 and a Cessna 172 at San Diego in 1978, and between a DC9 and a Piper at Cerritos, California, in 1986.

In Europe, extensive safety analyses showed that TCAS II systems would provide significant safety benefit in all the airspace. Resulting mandates mean that most airliners and many business jets are now equipped with TCAS II.

Operationally TCAS has proven to be very effective, and this includes encounters with VFR traffic squawking altitude. However, pilots and controllers often question the value of TCAS where IFR and VFR traffic is mixed:

- ❖ Does TCAS only cause problems between IFR and VFR traffic or does it give good protection?
- ❖ Does VFR traffic require a transponder for some TCAS protection?
- ❖ Although IFR and VFR traffic are “correctly separated by 500 ft”, TCAS triggers alerts. Are these false alerts, or are they normal?
- ❖ Does TCAS still work when aircraft are flying in the aerodrome traffic pattern?

Some answers are given here, to read the rest of the ACAS bulletin have a look to SWAN under Opérations(Betrieb) or Technique(Technik) / safety infos / external.

**Over a period of approximately 2 years of TCAS II operational monitoring, 8.3% of the RAs reported by pilots of a major European airline were generated against VFR traffic (about 1 per week). 85% of these RAs, which occurred in both Europe and the United States, were considered necessary and useful by the pilots**

A PA28 flying VFR is transiting a TMA, in Class D airspace. It is level at FL55 (mode C reports show FL54).

An E145 is climbing on departure, on a reciprocal heading, passing 3000 ft.

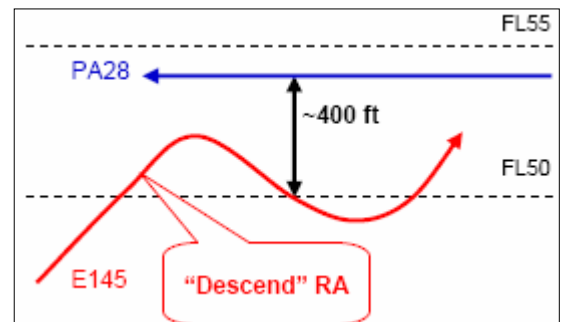
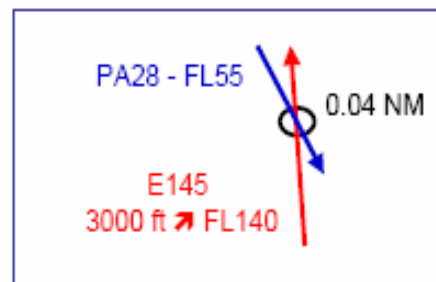
The E145 is cleared to climb to FL140 by the Approach controller and “to expedite through 5500 ft due to VFR traffic at 12 o’clock, 10 NM, opposite route”.

The controller also provides traffic information to the PA28 about the E145, “12 o’clock, opposite route, passing

your altitude”. Then, he provides further traffic information to the E145 (traffic at 12 o’clock 4 NM).

About 15 seconds later, the E145 receives a “Descend” RA, when passing FL51. The pilot follows the RA correctly and initiates a descent.

4 seconds before passing the E145, the PA28 pilot reports visual contact.



As a result of following the “Descend” RA, the E145 passed about 400 ft below the PA28. Simulations indicate that without TCAS the separation between the aircraft would have only been about 100 ft and 0.04 NM.

The E145 pilot, who never saw the VFR traffic, filed an Airprox report because IFR separation was not provided against the VFR PA28. The controller remarked that he had provided the appropriate and correct traffic information. The controller reported that the Airprox was unjustified because the PA28 had visually acquired the E145 and reported that it had passed clear.

**Although the approved procedures appeared to have been applied, it is clear that TCAS II helped to solve a real risk of collision.**

Isa Alkalay for Safety Net Task Force (SNTF)

## AVOIDING ACTION PHRASEOLOGY

### CORRECT PHRASEOLOGY TO INITIATE AN AVOIDING ACTION

Eurocontrol analyses reconfirmed again and from recent safety occurrences it was found that the correct Avoiding Action phraseology has not been effectively used, and/or it has not been used in where it would have been appropriate to;

The BFU Überlingen Investigation Report emphasised the importance of the proper use of the avoiding action phraseology.

### WHAT IS THE CORRECT PHRASEOLOGY

Please be reminded of the ATMM CH Section 19, §. 8.5 Traffic information and avoiding action :

**"TURN LEFT (or RIGHT) IMMEDIATELY HEADING (three digits) TO AVOID [UNIDENTIFIED] TRAFFIC (bearing by clock-reference and distance)"**

ICAO is providing two formats for an avoiding action message, both specifying a manoeuvre in the horizontal plane. The second phrase is:

**"TURN LEFT (or RIGHT) (number of degrees) DEGREES IMMEDIATELY TO AVOID [UNIDENTIFIED] TRAFFIC AT(bearing by clock-reference and distance)"**

This second possibility has been recently included into the ATMM (amendment 29 with validity from 1<sup>st</sup> September 2004). It is therefore an approved phraseology as well.

Note that the tone of transmitting the message also participates in conveying the urgency of the situation.

## AIR GROUND COMMUNICATION SAFETY STUDY

### An analysis of pilot-controller occurrences

Eurocontrol SISG (Safety Improvement Sub-Group) identified this issue as still being a major threat to aviation community. NLR has been mandated to make a study about this issue. The study presents the results of the analysis of 444 occurrences happened in Europe in 2002-2003 and concerning aircraft with MTOW 5.7 tons or more. The data used is provided by ATCO and pilot reports, following mandatory or voluntary reporting schemes.

As a result of the study a number of recommendations are made.

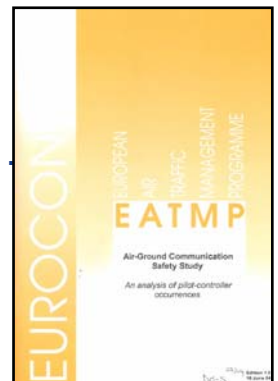
One of the results shows that the occurrence rate of air-ground communication problem is estimated at 1.4 per 10'000 flights.

However this apparent low frequency shall not hide the fact that the associated risks of such occurrences are high.

For example miscommunication is a primary factor causing runway incursions (EUROCONTROL 2003).

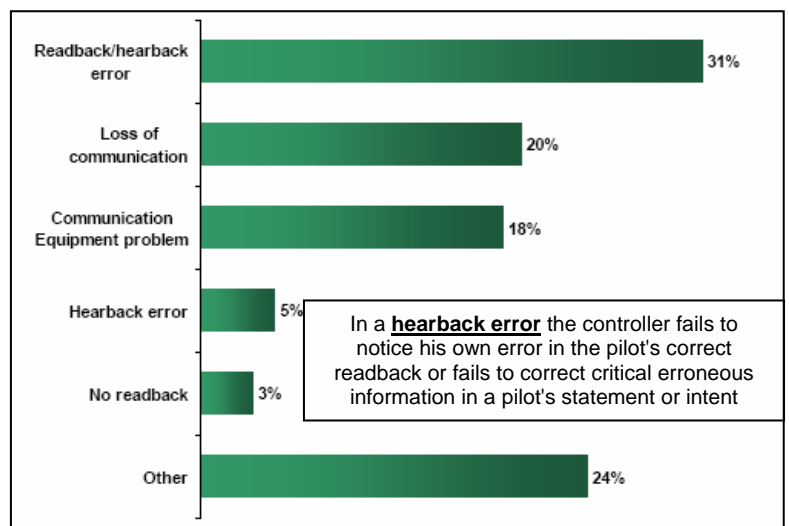
To see the entire study with its whole results, conclusions and recommendations have a look to SWAN under :

*Opérations (Betrieb)/ safety infos / external*



Result example in graphic below:

The distribution of generic communication problems

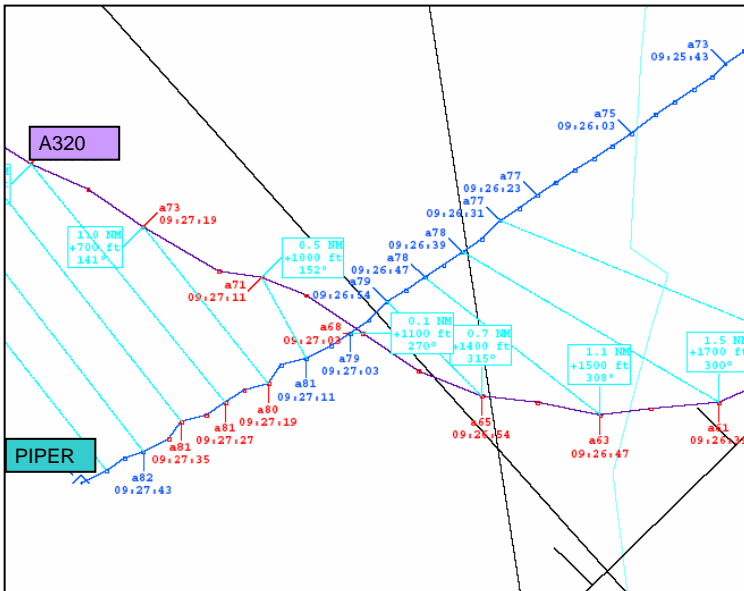


## Lessons learned – 1<sup>st</sup> case

### LOSS OF COMMUNICATION AFTER DEPARTURE

#### Facts and analysis

The occurrence happens the 25th August at Geneva with RWY 23 in use and CAVOK weather conditions. A Piper 28 is departing on an IFR flight to Lyon. On the SID, he has to climb on RWY heading to 7000 ft before setting course to the point OTKOL with a right turn of 40 degrees. An Airbus A320 follows it on a flight to Paris. The Airbus must follow the same route as the Piper until 7000 ft before turning right direction Dijon. The Piper was ready long before the Airbus and was therefore taken as first in the sequence in front of the Airbus.



As the Airbus was lining up on the RWY, the aerodrome controller (ADC) coordinated with the departing controller (DEP). The Piper was passing 4800ft therefore it was decided to stop the Airbus at 4000ft. The altitude restriction was transmitted and after departure the ADC sent the Airbus on departure frequency. On the first call, it was recleared to 5000ft, 1000ft below the slow climbing Piper. After one minute he was recleared to 6000ft. At this point no read back came and the DEP ATCO said again the clearance. The read back came. Suddenly, the frequency was blocked and one could hear what the pilots of the Airbus were saying. They were realising the frequency problem. At that point, as the microphone of the Airbus is transmitting it is not possible for the Airbus' crew to receive any information from ATC. Radios are working only one way, either in transmission or reception mode. It was tried to reach the Airbus on the emergency frequency but of course as described before it was not possible to

reach them. Then DEP tried to call the Piper to turn him right to free the route of the Airbus. In case of frequency blocking, it is some time possible to reach the other traffic to tell them information or to ask them to change frequency.

The power of the ground transmission is stronger than the one of the aircraft and ATC can overpass the transmission of the radio of the blocking traffic. But in this case as the Airbus was between the Piper and the ground antenna, the transmission of the Airbus was too strong and ATC could not get in contact with the Piper.

ATC could hear the pilots talking about squawking A7600; the official code for the radio communication failure. They were talking as well about what they were seeing on the TCAS. The Piper was shown as a conflicting target one thousand feet above. After 2 minutes and a half, they decided to climb to their cruising flight level. The radio communication failure procedure is the following “after 3 minutes climb to RFL”.

After the Piper was slightly behind and below, the Airbus climbed. One minute after, the radio blocking stopped and it was again possible to get in contact with the Airbus crew. Reclearance and explanation occurred. For the pilots of the Airbus there was no problem to climb with less than 3 NM separations with the Piper. They had the traffic on TCAS, the crossing was effective and there were no risk for them to climb. ATC has to provide separation of 3 or 5 NM to guarantee Safety according the precision of our radar but actually there is no danger for aircraft to cross each other with less than these minima as soon they are taking the responsibility for the safety.

Of course seeing what was going on was felt by DEP and all present controllers as a threat to safety because it is very difficult to be a witness and not an actor of the situation. In this case everything was done correctly to get in contact with the two traffic to keep safety, as it should be from our side. The pilots of the Airbus did the crossing and the separation infringement occurred after the crossing, when there was no more danger for a collision to happen.

#### And what happens now ?

An OIR was filled and transformed into an ATIR. Now it will be interesting to see how the BFU will treat this case how severity will be balanced, to which conclusions they will come.

*Bertrand Du Bois , GVA TWR/APP safety officer*

## Lessons learned – 2<sup>nd</sup> case

### AN ATC CLEARANCE MUST BE A CONTRACT BETWEEN THE CREW AND ATC

#### Facts

An Airbus is flying westbound over Switzerland, just north of LSZG. The aircraft is passed from UAC East to UAC West into contact, steady at FL 330. On initial contact it is cleared towards MILPA - MEBAK and the request for FL 370 is formulated by the Airbus' crew.

After all is coordinated (to permit a climb to cruising FL 370 at exit point), sector K3 is asking top sector (KL4) for a level. FL 370 is given, but with a restriction of 1500 ft/min or more until reaching (due to traffic). In order to make sure that this restriction can be met, the following R/T exchange takes place:

“XXX123, if you're reclassified to flight level three seven zero, can you make fifteen hundred feet a minute”

“XXX123, unable one thousand five hundred, maximum would be eight hundred feet per minute”

(follows again a coordination with KL4, where it is agreed that 800 ft/min is also OK and clearance to FL 370 is maintained with this restriction).

Here is the official transcription of the clearance given by the radar controller of K3:

“XXX123, climb to flight level three seven zero, make your best, please”  
(the flight is then sent to KL4 sector into contact and on initial contact it is greeted by “identified”).

Result: the heavy Airbus 320 (its destination is a Portuguese island situated in the Açores) climbs with 800 ft/min until FL 360, and then reduces first to 300 ft/min, and at the end 100 ft/min. A TCAS RA is triggered with another Airbus 320 flying at FL 360, northbound, just over the East side of Lake Geneva. Even avoiding actions of 20 degrees left for both aircraft, given at the last moment,

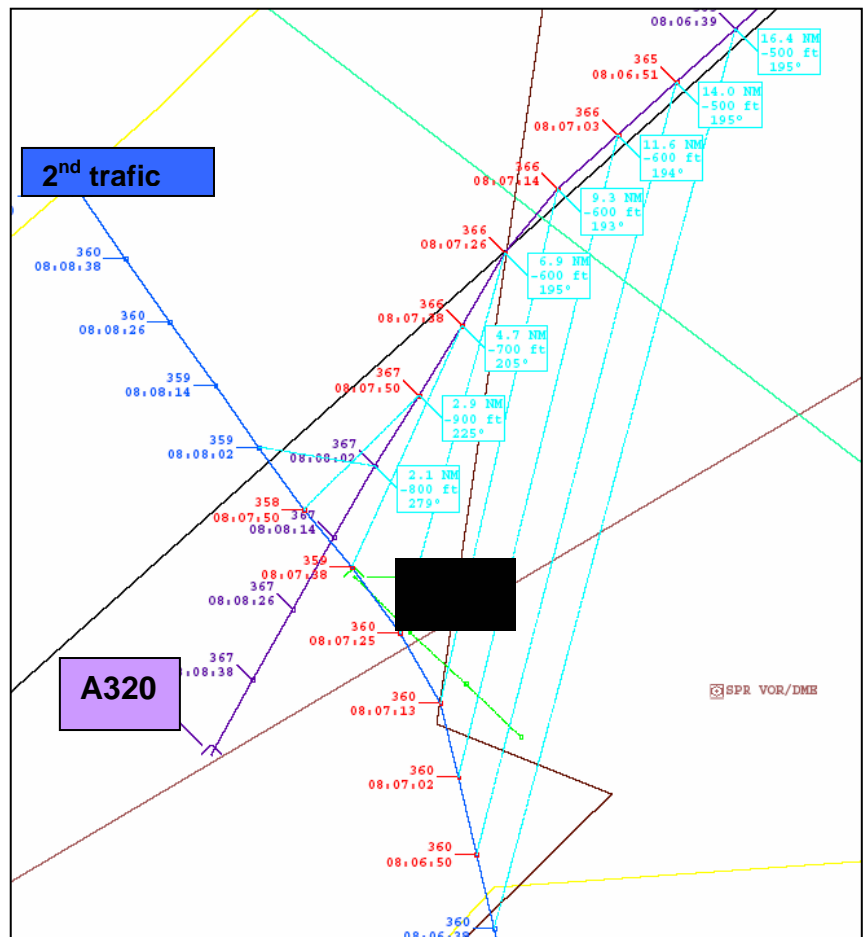
are not sufficient to prevent a loss of separation.

### What went wrong and what can we learn from this event?

Whereas the internal communication between K3 and KL4 was clear in so far as 800 ft/min is required by the crew to meet the restriction and to provide separation with the other Airbus 320 northbound at FL 360, the clearance given to the Airbus is definitely too vague and non binding (no contract and firm restriction in “do your best”). The receiving sector KL4 thought that a rate restriction of 800 ft/min or more was transmitted on the preceding sector and saw no reason to question or check this.

The crew actually wrote in their report “*best rate of climb*” (no further instruction) was transmitted, which tells the whole story: the 800 ft/min they indicated on initial contact was a rate they could hold at the moment, at FL 330. But no guarantee that this can be held until FL 370. They have written that they were flying green dot speed and they had to reduce as from FL 365 to as low as 100 ft/min, just before the TCAS RA was triggered.

(See next page)



## Conclusion

“Do your best” is not a good and binding clearance to base radar separations on. This type of phraseology is unsuitable to serve as basis of a positive ATC separation, it is much too vague. If you want to make sure that an aircraft is really at the point or at level where you want to have it (where separation falls or is about to fall), use either:

“XXX 123 climb to FL 370 with 800 ft/min or more, until ....”

“XXX 123 climb to FL 370 to be level within the next 30 miles or over ....”

Many will say now that this is not yet sufficient to guarantee that the aircraft is really level with 800 ft/min rate of climb all the way up, or at the distance/point indicated. This is a correct remark.

But ICAO has foreseen this situation as well: it is called “*alternate clearance*”. When the restriction given cannot be respected anymore, the crew is under the obligation to report this immediately to ask for an alternate clearance. Looking at the performance of the A320, it is noted that the aircraft is reducing its rate of climb to below 800 ft/min when passing FL 360. So, at this moment the pilots, when correctly cleared, would have been forced to report this fact to ATC.

At that very moment both aircraft were just a little bit less than 30 NM from each other. So, a successful avoiding heading (very smooth and not that difficult) would have been easy to be achieved and performed by the radar controller.

## Remember

ATC separations are based on binding, firm and stringent restrictions and instructions transmitted and acknowledged.

When vague and not completely binding restrictions and clearances are used, the crews are not aware of the danger and they don't fly the restriction as expected. Therefore it is important to restrict climbs and descents in such a manner that a “*contract is concluded and acknowledged*”.

1) ATC: impose a firm and binding restriction

2) Crew: acknowledge (read back) the restriction

By this a contract is concluded and the crew (that accepted the condition) must fly their aircraft accordingly, or, report immediately when the restriction cannot be met anymore.

This (normally) buys ATC the time to formulate an alternate clearance to avoid a loss of separation.

Christoph Gilgen, Safety Officer ACC/UAC Geneva

## SAFIR

### SECOND INFO BULLETIN ISSUED

The SAFIR (SAfety FIRst) action plan that has been mandated by federal councilor Moritz Leuenberger following the recommendations from the NLR audit that has been initiated by the DETEC itself.

New SAFIR info bulletins are issued depending on the news and progress made in the project. The bulletin is available in French and German only and is issued in electronic format. It is available in our SWAN under :

Opérations(Betrieb) or Technique(Technik) / safety infos/ external



# The UAC-CH Safety Assessment Program

## The UAC-CH Safety Group starts up works

Following the PJM validation of Phases 1-2-3 document and Safety Program Plan, a safety team has been created for the Safety Case of the UAC-CH Program.

The UAC-CH Program has recently been launched by skyguide, following the stop to the ATMAS project and the company objective of having a common upper airspace in Switzerland, managed in Geneva.

The PJM and the BoD validated the "UAC-CH Phase 1-2-3 Study & Detailed Plan Report" and the associated Safety Program Plan (SPP), under the condition that planning is reviewed. In particular, the way proposed for the realization and management of the Program activities, as well as the nominative organization, were approved.

Y. Le Roux (TY) has been nominated as UAC-CH Program Manager. J. Rais (OCH) is the Operational Program Manager, E. Berney (TSP) the Technical Program Manager and F. Balda (DMS) the Systems Safety Manager. These compose the UAC-CH Management Board.

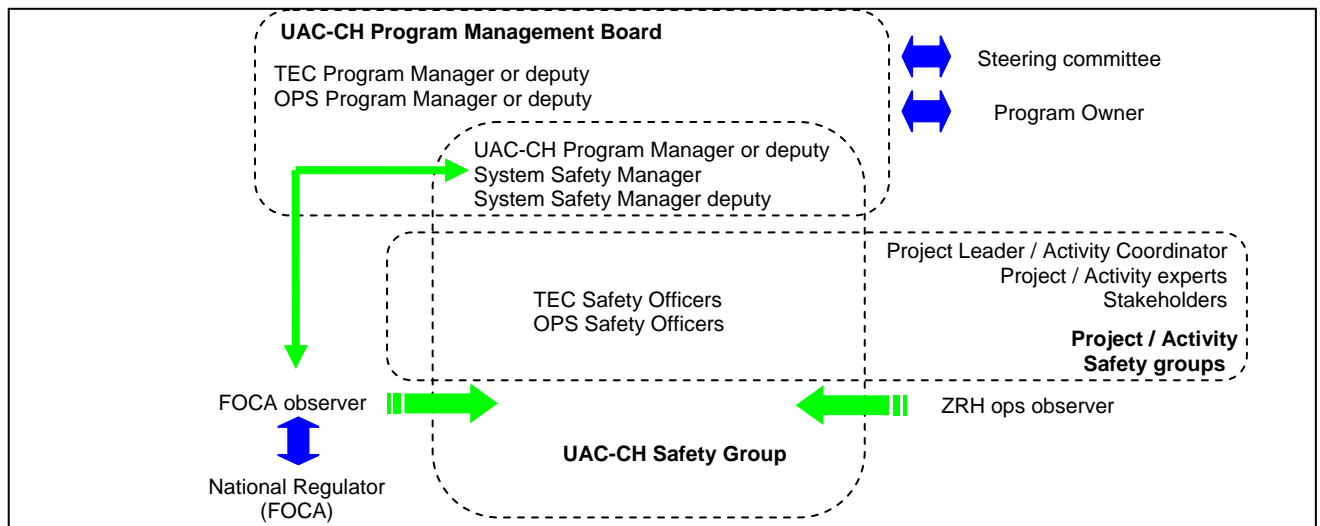
In order to include a correct safety approach from early stages of the Program, and to implement safety activities as much as possible within program planning, the structure sketched in the figure has been organized. This structure has the objective of coping with the numerous constraints and complexities of the Program, some of the most outstanding ones being the time frame, the new functionalities and working methods to be developed, the number of project and activities that are ongoing, or planned, in parallel. A first measure to mitigate a "big bang" transition is the "Batch strategy", i.e. the new functionalities will be put in operation step by step and grouped in packages or "Batches". The first Batch within the scope of UAC-CH is foreseen by end November 2004.

The objective of the UAC-CH Safety Assessment Program, as stated in the SPP, is "to make sure that the changes that are introduced by the implementation of UAC-CH Program do not result in remaining unacceptable Risks which have not been properly mitigated". The Safety Assessment has to be conducted on the basis of a partnership of roles and responsibilities, and must be driven by an ESARR4 approach.

A UAC-CH Safety Group (USG) has been constituted. The UAC-CH Program Manager is member of USG, and is responsible to formally demonstrate to the National Regulator (participating as observer on a non-permanent basis) that the System is safe for operational use. The Safety Manager (F. Balda) or his deputy (S. Barraz) chairs the USG meetings, and is responsible to support the Program Manager in organizing safety activities, with the purpose of identifying the risks related to the Program in a systematic way, through appropriate methods and following as much as possible ESARR4 guidelines.

Four Safety Officers (C. Gilgen, L. Zurfluh, C. Delmere, G. Vern) with competences in operational and technical areas are also permanent members of USG. A ZRH observer will participate to USG meetings, representing ZRH operations. The main task of Safety Officers is to chair **Project/Activity Safety Meetings**, with project leaders, activity coordinators, system experts and in general all stakeholders that are involved in the framework of UAC-CH Program. These meetings have the purpose of identifying potential hazards arising from the changes introduced at any Batch by any project or activity related to UAC-CH, and analyzing the correspondent risk and proposing appropriate mitigation barriers; such mitigations will then be discussed at Program Management level. The results of these analyses will be re-collected and harmonized within the USG, and used to address each Batch and to build up a Safety Case Document.

Fabrizio Balda / DMS



## System Safety Management

### What is actually going on ?

The following table provides a short overview of the main activities that are running in the Systems Safety

Management domain. For any question you may have or for deeper details on the subject, please contact directly the Program Manager in charge of the related Safety Assessment.

Safety Assessment Programs status				
ATM-System	Program Manager	Safety Manager	Status	Target date
ZAP-DVO3	W.Vogt	H.Glauser	Running	2004/5
SAMOPS	G.Bailue	M.Vettovaglia	Running	2004/5
UAC-CH	Y. Le Roux	F.Balda	Initialized	2005
VISTA	L.Chevalley	S.Barraz	Initialized	2004/5
EMRA DUB	J.Büchi	tbd	Requested	2005
sTSA	A.Maag	tbd	Requested	2005
KLODUB	P.Stampfli	tbd	Requested	2007
ZAP-DVO2	W.Vogt	S.Barraz	Achieved	30.04.2004
PRIMUS	P.Kuenzli	JM. Bory	Achieved	31.03.2004
ASR-10 GVA	Ph.Chauffoureaux	S.Barraz	Achieved	09.12.2003
SETInet	D.Epp	JM.Bory	Achieved	30.09.2003
TWR-ZRH	A.Heiter	S.Barraz	Achieved	10.06.2003
IFREG	Y. Le Roux	JM.Bory	Achieved	11.02.2003

#### Running

Safety Program Plan validated.  
Safety Assessment Program team constituted .  
Working sessions running.

#### Initialized

Safety Program Plan under preparation.

#### Requested

First contact between project management and Safety department established.  
Need and scope for Safety Assessment under discussion.

#### Achieved

Safety Case Document delivered and endorsed by official instances.