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FINAL REPORT

Investigation into TCAS RA Incident between the Flights AFR 1983 and DLH 1072 On 25 January 2006

Prague
December 2006

A) Introduction

Operator:	Deutsche Lufthansa AG
Aircraft type:	Airbus Industrie, A321
Call sign:	DLH 1072

Operator:	Deutsche Lufthansa A.G
Aircraft type:	Aerospatiale / Alenia, ATR72
Call sign:	DLH 3272

Operator:	Air France
Aircraft type:	Airbus Industrie, A320
Call sign:	AFR 1983

Operator:	The State Company Air Navigation Services of the Czech Republic (ANS)

Place of Incident:	1 NM N NDB RAK, FIR Praha (LKAA)
Date:	25. January 2006
Class of Airspace:	C
Time:	15:15 (All times in this report are UTC)

B) Synopsis

On 25 January 2006 UZPLN (Czech Republic Air Accident Investigation Institute) was notified by the state-owned Air Traffic Control Centre of the Czech Republic (ANS) of a TCAS RA incident as reported by A320´s crew, call sign AFR 1985 of Air France, which was on a scheduled flight from Praha-Ruzyně Airport (LKPR) to Paris-Charles de Gaulle Airport (LFPG), as well as by A321´s crew call sign DLH 1072 of Deutsche Lufthansa, which was on a scheduled flight from Munich Airport (EDDM) to Dresden Airport (EDDC).

In accordance with the standards set in ICAO Annex / L 13, the Czech Republic was the State of Occurence and AAII carried out the investigation.

The cause of the incident was investigated by an AAII commission comprising:

Investigator in charge: Ing. Radomír Havíř, AAII Czech Republic

Member: Ing. Stanislav Suchý, AAII Czech Republic

The Final report was releised by:

ÚSTAV PRO ODBORNĚ TECHNICKÉ ZJIŠŤOVÁNÍ PŘÍČIN LETECKÝCH NEHOD
Beranových 130
199 01 PRAHA 99
On the 29. December 2006.

C) The Final report includes the following main parts:

1) Factual information
2) Analysis
3) Conclusions
4) Safety recommendation
5) Annexes (to copy No.1 stored in UZPLN archive)

1 Factual information

1.1 History of the incident

1.1.1 History of flight AFR 1983

On 25 January 2006 an A320, call sign AFR 1982, SSR code 6623, was on a scheduled flight from LKPR (DEP 14:50) to LFPG. In FIR Praha the crew flew on the route DONAD – T170 – RAPET.

At 15:11:57 the F/O, who was the non-flying pilot and maintained radio communication with ATC, after retuning from the Prague approach station (APP EC), reported himself for the first time on the ATCO frequency of regional ATC centre (ACC Praha) "PRAHA RADAR" (WL EC) and announced he had reached FL 150. He was instructed by WL EC to climb to FL 230 for the point RAPET. F/O read back the instruction to WL EC.

Some minutes later at 15:14:41 at FL 196, the F/O reported climb to FL 230. WL EC confirmed the information by issuing the instruction: *That is correct, when reaching maintain FL 230*". F/O read back the instruction.

At 15:16:17 WL EC issued the instruction to stop climbing at FL 220: "*AFR 1983 stop your climb at FL 220* ". The moment WL EC was sending the instruction, AFR 1983 had already reached FL 215. An instant later WL EC issued the instruction to change the heading by 10 degrees to the left to maintain spacing: " *AFR 1963 10 degrees to the left for spacing and stop your climb at 220 ".* F/O responded by the question: "*AFR 1983 10 degrees to left?*". WL/EC confirmed the instruction. Then F/O sent out the report: "*10 degrees to the left AFR 1983 and TCAS*".

At 15:16:52 F/O advised WL EC of descent by TCAS RA and repeated climb to FL 230: "*AFR 1983 TCAS descend and end of conflict and we like to climb FL 230".*

WL EC informed AFR 1983 about conflict traffic: "*It was crossing DLH 1072 descending by mistake*". F/O confirmed the information. Later on WL EC advised F/O of the end of the conflict and issued the instruction to continue by his own navigation to the point RAPET and to go up to FL 250. F/O acknowledged the instructions.

At 15:18:47 F/O advised WL EC of AIPROX report and conveyed the necessary data. Then WL EC issued the instruction to climb to FL 280 and tune in to ACC RHEIN frequency.

1.1.2 History of flight DLH 3272

The crew of ATR72 call sign DLH 3272, SSR code 3610, was on a scheduled flight from EDDM to LKPR. In FIR LKAA the plane was on the route DOMAL – N871 – DOBEN- LKPR at FL 180.

At 15:13:41 it was instructed by WL EC to descend to FL 150: "*DLH 3272 when ready descend to FL 150"*. The crew confirmed the instruction by: "*3272 leaving 180 descending to FL 150"* and began descent to FL 150.

At 15:14:33 WL EC issued the instruction to tune in to APP EC frequency: "*DLH 3272 contact Praha 127.575".* Despite the frequency interference it is apparent that the DLH 3272 crew confirmed the instruction.

The DLH 3272 crew reported to APP EC the moment it was descending FL 168: "*Praha dobry den DLH 3272 descending FL 150".* But this information was again disturbed by the DLH 1072 crew´s message. Since the 3272 crew did not receive an expected answer from APP EC, it repeated its report after the DLH 1072 crew had finished transmitting its report: *DLH 3272 Praha dobry den descend 150 we have P".* APP EC answered he had radar contact and issued instruction to descend to FL 120: *DLH 3272 radar, radar contact, descend to FL 120".* The crew confirmed the instruction.

Later on the crew, regarding the heavy communication between other traffic and APP EC, checked the instructions issued before: "*Praha confirm for DLH 3272 descending FL 120 and direct to RASIM*". APP EC confirmed the instruction.

1.1.3 History of flight DLH 1072

The crew of A321, call sign DLH 1072, SSR code 3607, was on flight from EDDM Airport to EDDC Airport. In FIR Prague the airplane flew at FL 240 on the route AGNAV – L132 – KILNU. After establishing contact with WL EC, the crew was instructed to go direct from the AGNAV point to DC 003.

At 15:14:33 the DLH 1072 crew reacted to the instruction to change the frequency, which WL EC issued to another aircraft with a similar call sign (DLH 3272): *"DLH 3272 contact Praha 127.575".*

At 15:15:05 the DLH 1072 crew reported itself on APP EC frequency: "*DLH 1072 direct to DC 003 maintaining FL 240".* A moment later the DLH 1072 crew responded again to the instruction issued by APP EC for other traffic (DLH 3272): "*DLH 3272 radar, radar contact, descend to FL 120* ", as it sent information: " *DLH thréééé, correct DLH 1072 descend to FL 120* ". At that time the DLH 1072 crew had already started descent from FL 240.

At 15:16:06 the DLH 1072 crew sent again the information: " *Praha DLH 1072* " , upon which APP EC responded: *"DLH 1072 descend, FL 220 maintain".* (one can hear, on the background of the information being sent, an instruction by APP PC "stop at once DLH 1072).

When descending FL 233, the DLH 1072 crew confirmed the instruction and at the same time announced TCAS RA: "*DLH 1072 to maintain FL 220 we have TCAS climb now*". APP EC responded by the instruction to climb again to FL 220: " *DLH 1072 climb 220, climb again*". The crew reacted to this instruction announcing the end of conflict: "*DLH 1072 we are at FL 237, right now clear of conflict with TCAS RA, and say again your instruction*". APP EC responded: "*Read you, stand by, and contact FREQ 120.275*". The DLH 1072 crew confirmed the instruction to change frequency "*DLH 1072 120.275*".

After retuning in to WL EC frequency, the DLH 1072 crew at 15:17:32 reported its FL and route: "*DLH 1072 at FL 240 by DC 003*".

WL EC confirmed the report and issued DLH 1072 with the instruction to descend to FL 170 and information to say that previous instructions were for DLH 3272.

The 1072 crew apologized for the mistake and confirmed receipt of the descent instruction.

At 15:20:29 WL EC issued instruction to contact ACC Berlin. "*DLH 1072 now contact Berlin 125.625*". The crew confirmed the frequency change: "*DLH 1072 125.625 Berlin, and thank you, we are ready to fill to the report, sorry".*

1.1.4 WL EC´s Activity

At 15:11:57 the AFR 1983´s F/O reported itself on WL EC frequency for the first time and informed he had achieved FL 150. He got from WL EC the instruction to climb to FL 230 to the RAPET point. F/O confirmed the instruction.

At 15:13:41 WL EC issued instruction to DLH 3272 to descend to FL 150: "*DLH 3272 when ready descend to FL 150*". The crew confirmed the instruction saying: "*3272 leaving 180 descending to FL 150*" and started descent to FL 150. Following this instruction WL EC hand over the flight control to APP EC using a HAND – OFF function. At 15:14:33 he issued instruction to DLH 3272 to contact APP EC: "*DLH 3272 contact Praha 127.575*. It follows from the radio record that the DLH 3272 crew confirmed the instruction.

A few seconds later, at 15:14:41, AFR 1983´s F/O reported climb to FL 230. WL EC confirmed the information by issuing the instruction: "*That is correct, when reaching maintain FL 230*". F/O confirmed the instruction.

At 15:16:11 WL EC responded to STCA conflict signals by giving the DLH 1072 crew the instruction: "*Lufthansa 1072 stop your descent at FL 230*" But the crew did not confirm the instruction, so WL EC gave AFR 1983 the instruction to stop climbing too: "*AFR 1983 stop your climb at FL 220*". The moment WL EC was sending this information, AFR 1983 had already achieved FL 215. Presently, WL EC issued the instruction to change the heading by 10 degrees to the left to maintain spacing: "*AFR 183 10 degrees to the left for spacing and stop your climb at 220*", to which F/O responded asking: "*AFR 1983 10 degrees to the left*?". WL EC confirmed

the instruction. Then F/O sent out the message: "*10º to the left AFR 1983 and TCAS*."

At 15:16:52 AFR 1983´s F/O advised WL EC of his descent under TCAS RA and subsequent climb to FL 230: "*AFR 1983 TCAS descend and end of conflict and we like to climb FL 230*".

WL EC informed AFR 1983 about the conflict traffic: "*It was crossing DLH 1072 descending by mistake*". F/O confirmed the information. Later on WL EC informed F/O about the end of the conflict situation and issued the instruction to continue to the RAPET point navigating by himself, and to climb to FL 250. F/O confirmed the instruction.

After retuning in WL EC frequency, the DLH 1072 crew reported its FL and route at 15:17:32: "*DLH 1072 at FL 240 by DC 003".*

At 15:18:47 F/O informed WL EC about reporting AIPROX and submitted the necessary details. Afterwards, WL EC issued the instruction to continue climbing to FL 280 and to tune in to ACC RHEIN frequency.

WL EC confirmed the information and gave DLH 1072 the instruction to descend to FL 170 and informed that the previous instructions had been addressed to DLH 3272.

The DLH 1072 crew apologized for the previous error and confirmed receipt of the instruction to descend.

At 15:20:29 WL EC issued the instruction to contact ACC Berlin: "DLH 1072 now contact Berlin 125.625". The crew confirmed the instruction: "*DLH 1072 125.625 Berlin, and thank you, we are ready to fill to the report, sorry".*

Some communication concerning other traffic was also on the WL EC frequency in the time period investigated.

1.1.5 Activity of APP EC, PC

The DLH 3272 crew reported itself to APP EC at 15:15:05 when descending FL 168: "*Praha dobrý den DLH 3272 descending FL 150*". This information was however disturbed. On the radar monitor CWS a flashing offer was displayed to take over DLH 3272 HAND-OFF.

At the same time, the DLH 1072 reported itself too: "DLH *1072 direct to DC 003 maintaining FL 240*". DLH 1072 could not be seen on CWS display because a filter up to FL 150 was in use.

APP EC responded he had radar contact and issued the instruction to descend to FL 120: "*DLH 3272 radar, radar contact, descend to FL 120*".

The DLH 1072 responded again immediately to the APP EC instruction issued to other traffic (DLH 3272) by sending news. "*DLH thréé, correct DLH 1072 descend to FL 120*". At that time the crew already started its descent from FL 240.

APP EC responded to the repeating DLH 3272´s information that he had radio contact and issued the instruction to descend to FL 120: "*DLH 3272 radar, radar contact, descend to FL 120*", The crew confirmed the instruction.

At 15:15:52 APP PC informed WL PC about establishing contact with DLH 1072 crew. WL PC issued the instruction to stop immediately the DLH 1072 descent at FL 220.

Therefore at 15:16:06 APP EC reacted to the repeated call from the DLH 1072 crew "*Praha DLH 1072*" by issuing the following instruction: " *DLH 1072 do not descend, FL 220 maintain".*

When descending FL 233, the DLH 1072 crew confirmed the instruction and announced TCAS RA: *" DLH 1072 to maintain FL 220 we have TCAS climb now*". APP EC responded by giving instruction to climb again to FL 220: "*DLH 1072 climb 220, climb 220 again*". The crew reacted to this instruction by reporting the end of conflict: "DLH 1072 we are at FL 237, right now clear of conflict with TCAS RA, and say again your instruction". APP EC replied: "Read you, stand by…… and contact FREQ 120.272". The DLH 1072 crew confirmed the instruction to change the frequency: "*DLH 1072 120.272*". Regarding the previous communications, the DLH 3272 crew checked instructions issued in the past: "*Praha confirm for DLH 3272 descending FL 120 and direct to RASIM"*. APP EC confirmed this instruction.

1.2 Injuries to persons

NIL

1.3 Aircraft damage

NIL

1.4 Other damage

NIL

1.5 Personnel information

1.5.1 Personnel information ATCO

Job function		**APP EC**
Age		49
Day on duty		1
Duty duration (hours)	from beginning of workshift (including breaks)	5h 15 min
	From the latest duty rotation	1h 15 min
Practice (years)		24
Qualification good till		17.08.2006
Latest qualification training		7.06.2005

1.6 Information about aircraft

1.61. AFR 1983

Aircraft type: A320
Registration: F-GFKQ
Manufactuer: Airbus Industrie

1.6.2. DLH 3272

Aircraft type: ATR 72
Manufactuer: Aerospatiale / Alenia, ATR72

1.6.3. DLH 1072

Aircraft type: A321
Manufactuer: Airbus Industrie

1.7 Meteorological information

According to PIC AFR 1983 the flight went on under IMC with respect to several cloud layers consisting of AS and CI.
Wind: 260°/ 35 kt
Temperature: - 40°C

1.8 Radio navigation and visual aids

Radio navigation and visual aids had no effect on the incident.

1.9 Communications

Two way communications between ACCs and the AFR 1983, the DLH 3072 and the DLH 1072, respectively, were conducted on frequencies APP EC 127.575 MHz and WL EC 120.275 MHz.

Communications were clear without interference except for the case the aircrews communicated at the same time.

Between ACC and APP is established direct radiotelephone connection.

1.10 Information about Airport

NIL

1.11 Flight recorders and other recording means

The incident reconstruction was based upon the record of radar information and communications between area control centres and the AFR 1983, the DLH 3072 and the DLH 1072 aircrews, respectively.

The recorded data from the flight recorders were not available to the commission.

1.12 Description of the place of incident

The incident occurred in FIR Praha (LKAA), 1 NM N NDB RAK, (LKAA), class of airspace C. Minima aplicated separation distance is 1000ft/5NM.

1.13 Medical and pathological information

NIL

1.14 Fire

NIL

1.15 Survival aspects

NIL

1.16 Tests and research

NIL

1.17 Organizational and management information

NIL

1.18 Additional information

Deutsche Lufthansa AG and PIC AFR 1983 submitted a filled-in Air Traffic Incident Report.

ANS submitted a Statement of the event to: ACC WL EC, ACC WL PC, APP EC and TEC.

According to PIC AFR 1983, the sun light made it worse to read flight displays in the cockpit and monitor surrounding traffic on EFIS.

1.19 Useful or effective investigation techniques

The incident investigation was conducted in compliance with Regulation L 13, employing information on AFR 1983 and DLH 1072 flights, and statements by ACC WL EC, ACC WL PC, and APP EC.

2 Analysis

The subject of analyses was aircrews´ activities and ATCO, procedures, radio communications and instructions of area control centres.

2.1 Analyses of Aircrews´ activities

The AFR 1983 crew made its take-off and climb according to the instructions. The pilot in command, who was a flying pilot, reacted correctly to TCAS RA “Descend”, switched off the auto pilot, carried out the TCAS instruction: “Adjust Vertical Speed and went on in compliance with the instructions from WL EC and APP EC.

The DLH 3272 crew proceeded in accordance with the instructions issued by WL EC and APP EC.

The DLH 1072 crew proceeded in accordance with the instructions issued by WL EC until 15:14:33 hrs when it reacted to an instruction which had been addressed, by understandable call sign, to another aircraft.

The DLH 1072 reported itself on APP EC frequency at 15:15:05. An instant later, there followed the instruction that APP EC sent in an understandable way to another aircraft. Although intended for another plane, the DLH 1072 crew confirmed the instruction and kept to it. However as the crew did not have any answer from APP EC, the DLH 1072 crew repeated its call a few seconds later at 15:16:06 hrs. At that time it was descending FL 233. It received the instruction from APP EC: "*DLH 1072 do not descend, FL 220 maintain*". The crew confirmed the instruction and at the same time announced TCAS RA (because of conflict traffic with AFR 1983) and in accordance with TCAS RA it began its climb from FL 232. Crossing the AFR 1983 trajectory, it achieved FL 236.

Then the crew reacted to further APP EC instruction by announcing the end of conflict, and again tuned in to WL EC frequency.

2.2 Analyses of WL EC, APP EC Activities

WL EC

The traffic situation in the WL sector at the time of the incident was classified as KH 2 – medium stress for controllers - according to Sm 1 Guideline for area control centres.

Flight clearances for AFR 1983 and DLH 3272 were issued in time with respect to actual traffic in the sector.

The confirmation by DLH 3272 of the instruction to contact APP EC frequency was recognizable although it was disturbed. However it was not possible to tell by the confirmation if DLH 1072 acknowledged the frequency change.

In compliance with operation procedures, the DLH 3272 flight control was handed over to APP EC using the HAND-OFF function.

WL EC reacted correctly to STCA by issuing instructions to the AFR 1983 crew changing its flight clearance and demanding to stop its climb at FL 220 and change its heading by 10 degrees to the left for spacing.

When the AFR 1983 crew reported TCAS RA, he passed the information about significant traffic.

In handling the situation, he then collaborated with WL PC.

APP EC

The operation situation in the APP/A sector at the time of incident was classified as KH 2 – medium stress for controllers - according to Sm 1 Guideline for area control centres.

APP EC had the CWS altitude filter adjusted at GND – FL 150.

Note: *The altitude filter does not suppress the flights subjected to STCA indication and also the flights that according to their calculated trajectories enter a sector controlled by the centre, the flights that are in a state of handing over (hand-*

over in, hand-over out) and flights with emergency SSR codes on (EMG - 7700, RCF – 7600, HIJ – 7500.

APP EC reacted to the first call from DLH 1072 "*DLH 1072 direct to DC 003 maintaining FL 240"* by issuing DLH 3272 with the instruction: "*DLH 3272 radar, radar contact, descend to FL 120".*

After issuing DLH 3272 with the instruction, he took over the control of this flight using also the HAND – OFF function.

He did not react to the wrong confirmation of his instruction by another crew, DLH 1072. When a moment later the DLH 3272 crew reported itself on his frequency, he only repeated his previous instruction: "*DLH 3272 radar, radar contact, descend to FL 120".*

As the DLH 1072 crew did not receive confirmation from APP EC, the crew repeated its call: "*Praha DLH 1072*". APP EC responded to this call: "*DLH 1072 do not descend, FL 220 maintain"* after he was given notice from APP PC, who was having a coordination talk with WL PC at that time.

After confirming the end of descent and receiving information that DLH 1072 had activated TCAS RA, he gave the instruction to climb to FL 220 again: "*DLH 1072 climb 220, climb 220 again".*

After the announcement that the conflict was over, he gave the DLH 1072 crew the instruction to contact WL EC again.

3 Conclusions

The commission made the following conclusions:

3.1. Aircrews of the planes (AFR 1982 and DLH 3272) made an avoidance manoeuvre which, along with the ATCO instructions, reduced the risk of collision.
Minimum of separation distance between AFR 1982 and DLH 3272 was 1800ft vertical separation and 4,95 NM horizontal distance.

3.2. AFR 1982 Crew

- Made a flight away and clinb following the received instructions;
- Proceeded correctly in compliance with the TCAS RA call: "Descend" and instructions by WL EC.

3.3 DLH 3272 Crew

- Acted as instructed by WL EC and APP EC.

3.4 DLH 1072 Crew

- Reacted to the instruction of frequency change from WL EC to APP EC which did not concern it and which was addressed by a clear call sign to another airplane;
- Reacted repeatedly also to the instruction of FL change issued by APP EC to another airplane;
- Stopped its descent as instructed by APP EC;
- Proceeded correctly in compliance with the TCAS RA call “Climb”.

3.5 Air Traffic Control Procedures

ACC WL EC

- Flight clearances were issued in time with regard to actual traffic in the sector;
- Reacted to STCA function by issuing AFR 1983 with new instructions to change its flight clearance, to stop its climb at FL 220 and to change its heading by 10 degrees to the left for spacing;
- Passed information on significant traffic;
- Tackled actively the situation in co-operation with WL EC.

APP EC

- Misjudged the contents of the radio communication with DLH 1072 with regard to the traffic situation displayed (DLH 1072 was above the set vertical filter);
- Reacted wrong to the call sign of another aircraft (call sign of the two planes were alike);
- Did not respond to the confirmation of his instruction by the crew of another airplane;
- Tackled the situation in co-operation with APP PC.

3.6 Incident Causes

- DLH 1072 crew reacted repeatedly to the instructions that were addressed to another aircraft with a similar call sign;
- APP EC – not enough attention paid to contents of A/G communications.

According to L13 Regulation the event is classified as a **Significant Incident / Human to Human / Communication / Call sign confusion.**

From the seriousness point of view the event is classified as **“Significant Incident”.**

4 Safety recommendation

- CAA suspended APP EC´s qualification to be on duty at APP Prague and ordered him to go on one-day duty under OJTI supervision to see if he is fully capable of taking the job of air traffic controller. Based upon OJTI judgement, APP EC will be allowed to continue in his work, or a detailed analysis will be made to find faults and take corrective measures.
- Analyse the event in the presence of crewmembers of the airline companies involved.
- Make ATCO´s ACC and APP Prague familiar with the event to be more attentive in handling flights with similar call sign.
- Check out radio equipment on aircraft and think about the possibility of installing an anti blocking transmitter, in accordance with recommendation by EUROCONTROL AGC Edition 1,0 May 2006, 4.2.04.
- When planning flights of a company, make a systematic analysis in view of preventing conflicting or similar call signs being assigned to flights in one air sector, according to recommendation by EUROCONTROL AGC Edition 1,0 May 4.4.01.