

**Ref. No CZ-07-384**

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# **FINAL REPORT**

**Investigation into the incident  
- separation minima infringement between FAH6984 and WZZ135K  
on the FIR Praha and FIR Warsaw boundaries  
on 5 September 2007**

Prague  
November 2007

The present document is the translation of the Czech Investigation Report. Although efforts are made to translate it as accurate as possible, discrepancies may occur. In this case the Czech version is authentic.

## **A) Introduction**

Operator: 1. - FARNAIR Switzerland AG  
2. - WIZZ Air Hungary LTD

Aircraft type: 1. - Aerospatiale / Alenia, ATR 72  
2. - Airbus, A320

Registration: 1. - HB-AFJ (Call sign „Blue Strip 6984“)  
2. - HA-LPH (Call sign „Viz Air 135K“)

Location of Incident: FIR Praha /FIR Warsaw  
Date and Time: 5 September 2007, at 04:11 (All times are UTC)

## **B) Synopsis**

The incident - separation minima infringement between ATR 72 and Airbus A320 was reported to the Air Accidents Investigation Institute (AII) on 5 September 2007 by the ANS of the Czech Republic.

The aircrew of an ATR 72 airplane, on flight FAH6984 from Airport Köln / Bonn (EDDK) to Airport Katowice (EPKT), reported its position ABERU and FL 210 on the air traffic controller ACC Prague (ATCO) frequency. ATCO had no radio contact with FAH6984 whose position was confirmed by asking ACC Munich (München). ATCO restricted climbing of a traffic on the opposite route. After switching the SSR FAH6984 responder to the second set, radar contact was confirmed 12 NM east of OKG at 03:22. Then the flight FAH6984 continued as planned. Before entering FIR Warsaw, the airplane started descent from FL210 at 04:08. FAH6984 was not identified by radar at that time, ACC Warsaw (EPWW) said. An A320 airplane, flight WZZ135K, flew from EKPT to LIME Airport ascending to the point BAVOK, FL 200. At 04:13:30 the minimum separation between FAH6984 and WZZ135K had reduced below the prescribed value.

AII notified the FARNAIR Switzerland AG and asked for more information about the incident. AII conducted investigation into the incident in accordance with Annex 13.

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

Investigator in charge: Ing. Stanislav Suchý  
Members: Milan Zikmund

The Final report was released by:

AIR ACCIDENTS INVESTIGATION INSTITUTE  
Beranových 130  
199 01 PRAHA 99

On the 12 November 2007.

## **C) The Final report includes the following main parts:**

- 1) Factual information
- 2) Analysis
- 3) Conclusions
- 4) Safety recommendation
- 5) Appendices

## 1 Factual information

### 1.1 History of the incident

At 03:14:24 FAH6984 reported its position ABERU and FL 210 on the frequency of air traffic controller sector ACC Prague (LM EC). LM EC had no radio contact established with the airplane, so gave FAH6984 the instruction to change back to the frequency of ACC Munich. ACC Munich reported that FAH6984 with code SSR A 2222 is to the west of OKG. LM EC ascertained by enquiry that the military ACC had no radar information either about A 2222 whose position was confirmed by asking ACC Munich.

At 03:22 LM EC issued the instruction to FAH6984 to check SSR and for squawk "IDENT". The pilot confirmed transmission of A 2222 and after information of not being identified and after the instruction to change to the second set he switched the SSR transponder to the set # 2. At 03:22:40 the airplane was identified through SSR response. The pilot got the instruction to continue flight to FL 210, direct to BAVOK.

At 03:46 LM EC gave FAH6984 the instruction to switch the SSR transponder to the set # 1. The radar identity did not get lost and LM EC checked with the pilot that the SSR set # 1 on the airplane worked also in the Mode S.

At 03:59:54 a coordination message (ACT) was sent from ACC Prague to EPWW for FAH6984 descent from FL 210 to FL 150: "BAVOK 0414 F150 F210B"

At 04:03 ACC Prague began to change sectorisation from B2 (sectors LM and HT) to C3 (sectors L, M, HT) by making a change in the FDP system (ESUP).

At 04:07:27 EPWW gave ACC Prague ACT for WZZ135K: "BAVOK 0419 F220".

At 04:08:14 LM EC gave FAH6984 the instruction to descend to FL 150.

At 04:08:39 EPWW asked of PC ("Planning Controller) of sector L (L PC) the flight TAY23W: "DCT EPKT DES FL 210".

At 04:09:30 L PC gave LM PC clearance for TAY23W to descend to FL 210, direct to EPKT and advised of other traffic from the Polish side (VIZ 2368). LM PC acknowledged the information and announced transferring the responsibility to provide ATS after ensuring the separation between TAY23W and VIZ 2368.

At 04:10:33 LM EC gave TAY23W the instruction to descend to FL 250 and for further descent in three to four minutes.

At 04:11:13 LM coordinated with L PC the transfer of responsibility to provide ATS: *We're handing it over to you Quality (TAY) 23W now descending 250 because of that Veezeer that climbing 240*". Answering an L PC's question "Should we take over now?" LM PC said: "Yeah, he's through". L PC told him then: "So disconnect yourself".

At 04:11:18 WZZ135 reported on LM EC frequency, announced FL 130, climb to FL 200 toward BAVOK, a rate of climb of 2,000 ft/min and less. LM EC acknowledged the radar contact established.

From 04:11:39 to 04:11:44 the frequency 127.125 MHz was blocked (perhaps through parallel broadcasting of two radio stations). ACC Prague did not react to this broadcasting. At that time there was frequency coupling.

At 04:11:48 CSA5KA made another attempt to establish contact on 127.125 MHz (already L EC at that time) and reported they were ready to descend. ACC Prague responded by asking the identity of the calling aircraft.

From 04:11:56 to 04:12:21 L PC called PC at sector M in vain (former sector LM).

At 04:11:59 there was STCA indication in sector M (former LM) between flights WZZ 135K and FAH6984.

At 04:11:59 L EC asked flight ABR2RG if they had called, upon which reacted CSA5KA asking for descent clearance, which he got.

At 04:12:32 TAY23W reported at FL 250 and asked for further descent. L EC passed the instruction to wait "*Stand by*".

At 04:14:19 the sectorization change was finished – by making change in OPSUP of system E2000.

At 04:14:30 WZZ135K reported reaching FL 200. At the end of its message there was a report by another pilot on the L EC frequency (probably from FAH6984): "*We have traffic advisory at time 14*". L EC called FAH6984 but the communication was cut off by a repeated report from WZZ135K.

At 04:16:29 M PC (former LM PC) called EPWW to ask if WZZ135K had reported any problems during climb – EPWW said no and asked that TAY23W be tuned in to its frequency.

At 04:17:06 FAH6984 requested for further descent – L EC did not react to the message. Then FAH6984 tried again to establish contact and L EC asked about its position. FAH6984 stated the position LULAT. L EC instructed him to tune to a frequency of 134.175 MHz. FAH6984 acknowledged and simultaneously reported again TCAS/TA at 04:14 in position BAVOK, FL 150, and significant traffic direct in the opposite direction. L EC acknowledged the TCAS/TA information and said he would check it over.

At 04:17:17 M PC called L PC asking frequency change of TAY23W to EPWW. L PC informed that it had already been transferred and announced that FAH6984 had spoken up on the frequency and asked M PC what was the matter. M PC answered saying: "*Wait*".

At 04:17:48 EPWW called L PC asking about the calculated time of 04:14 of FAH6984 passby and whether the scheduled flight is active, upon which L PC answered: "*Stand by*".

At 04:18:58 WZZ135K advised levelling at FL 280. L EC acknowledged the message, issued the instruction to switch over to A 1465 and to change frequency of 132.890 MHz.

At 04:19:45 EPWW informed that now they could see FAH6984, but they had not seen it before for 10 minutes and had not seen it in front of FIR limits either.

## **1.2 Injuries to persons**

NIL

## **1.3 Damage to aircraft**

NIL

## 1.4 Other damage

NIL

## 1.5 Personnel information

### 1.5.1 The flight crew FAH6984

The PIC, aged 38, holder of ATPL(A), had a PIC qualification for the type ATR 42/72. He has flown total 2,916 hours, of which 2,020 hours on the ATR 42/72, as PIC total 990 hours.

The F/O, aged 28, holder of CPL(A). She has flown total 817 hours, of which 566 hours on the ATR 42/72.

### 1.5.2 The other flight crew

Information related to the other flight crews were not gathered.

### 1.5.3 ATS Personnel (ACC Praha)

ATCO function	Sector LM		Sector L		
	LM PC	LM EC	L PC	L EC	
Age	38	24	43	50	
Days in duty	1	1	3	3	
Duty time	From shift beginning	10 min	10 min	10 hrs	9 hrs
	Since last duty rotation	10 min	10 min	10 min	10 min
Practice (years)	7	10 (months)	12	25	
Qualification valid to:	18.4.2010	23.5.2010	24.4.2009	7.3.2008	
Last training:	31.12.2006	31.12.2006	31.12.2006	31.12.2006	

## 1.6 Aircraft information

### 1.6.1 Basic aircraft information - FAH6984

Type: ATR 72  
Registration: HB-AFJ  
Manufacturer: Aerosatiale / Alenia  
Serial number: 108  
Total flight time: 18,877 hours

### 1.6.2 Information provided by operator

Based on the SSR responder malfunction, the airplane operator took steps to find the problem with the result it was due to a failure of a contactless position switch land/flight (wow 1). After replacing the switch, the SSR responder worked correctly. In this connection, the operator informed there was also a TCAS problem on another ATR 72 plane, which was also caused by a failure of the contactless switch on the plane's landing gear.

## **1.7 Meteorological information**

1.7.1 According to information provided by Air Weather Service the meteorological conditions was following:

Low pressure clouds moved from the east toward the Ostrava and Opava regions, being insignificant in terms of precipitations and radar communications, nevertheless they were abundant between FL 160 and 170.

Wind at FL 160:	VRB / 05 kt
Clouds:	BKN SC 1000 - 1500 ft, TOP 5000 – 6000 ft BKN / OVC LVR 7000 / 25000 ft

1.7.2 Meteorological conditions according to report of the FAH6984

According to the PIC report during descending to BAVOK the meteorological conditions was IMC.

## **1.8 Aids to navigation**

Aids to navigation were no aspect relevant to the incident.

## **1.9 Communications**

There were two-way communications between the FAH6984 and air traffic services at FIR Praha sector SEL EC frequency 127,125 MHz.

## **1.10 Aerodrome information**

NIL.

## **1.11 Flight recorders**

Pertinent data from the flight data recorder were not available to AAI investigation. The ATS radar and communications records of the E 2000 and reports of ATS personnel were used for an analysis.

## **1.12 Description of incident site**

The incident took place on the FIR Praha / FIR Warsaw boundaries, airspace class C.

## **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**

Instructions on performing service at IATCC Prague ACC station state in HEAD 5 Operating and Coordination Procedures, Article 5.4 that:

*“Sectorization change can only be made after the duty handover between PC, resp. EC, handing over / taking over their sectors. The responsibility for ATS is transferred to taking over sector on timewhen has been activated appropriate frequency”.*

### **1.18 Additional information**

NIL

### **1.19 Useful or effective investigation techniques**

The incident has been investigated in accordance with Annex 13.

## **2 Analysis**

### **2.1 XPDR’s wrong actions at the time FAH6984 entered FIR Praha**

At the time FAH6984 reported its position ABERU and FL 210, LM EC had not radio contact established with the airplane. He returned FAH6984 correctly back to ACC Munich. After verifying that FAH6984 was really entering FIR Praha, he coordinated the situation with regard to other traffic. At another call he gave FAH6984 the instruction to check the device, switch on the IDENT function and then to switch over to the second SSR responder set. Then he looked at the possible cause of aircraft non-identification in cooperation with the technical division.

The FAH6984 flight was detected in EDMM area by S-mode answers from the Auersberg radar sensor. But the airborne responder answered incorrectly only in the S-mode the questions of the Auersberg radar sensor which locked him off “roll-call” questions from the other sensors, and did not respond in A/C mode at all. For this reason FAH6984 could not be detected by the radar sensors of the town of Písek (S-mode MSSR) and Prague (MSSR) at the time in question.

On switching to the set #2 of the SSR responder at 03:22, everything was all right; FAH6984 answered all the radars in A/C and S modes. On switching back to the set #1 at 03:46 the situation was the same again with the difference that the SSR airborne responder only worked in the S-mode locked only for the Písek radar sensor. FAH6984 failed to answer other radars in S-mode and standard A/C mode.

This situation caused there was no radar information on the Polish side at the time before and during the FAH6984 entry into FIR Warsaw. However, the FAH6984 image on the radar display remained unchanged for LM EC, so it was not possible to find the persisting failure of the SSR responder.

It follows from the information provided by the aircraft operator that at a subsequent check on the airplane, an occasional failure of the contactless switch was found, whose information is important for the airborne SSR responder to work well.

## 2.2 Situation at ACC Prague at the critical time

At 04:03 the first phase of sectorization change from B2 to C3 took place. Consequently, the data in the electronic strip system (ELS) moved from the original LM sector to L sector.

At 04:08:14 LM EC had no information about the counter-traffic of WZZ 135 when he instructed FAH6984 to descend to FL 150. The information had been transferred to sector L and WZZ135K was not yet displayed on the radar, see Fig. 1.

ACC EPWW did not coordinate the change in input conditions to “In climbing to FL 200” and did not correct the coordinating time that differed by more than 6 minutes.

According to information from ELS (WZZ135K FL 220), FAH6984 did not represent any conflict traffic to L PC. Taking into account the sequence and data of the coordination reports, ensuring the separation lay in the EPWW authority.

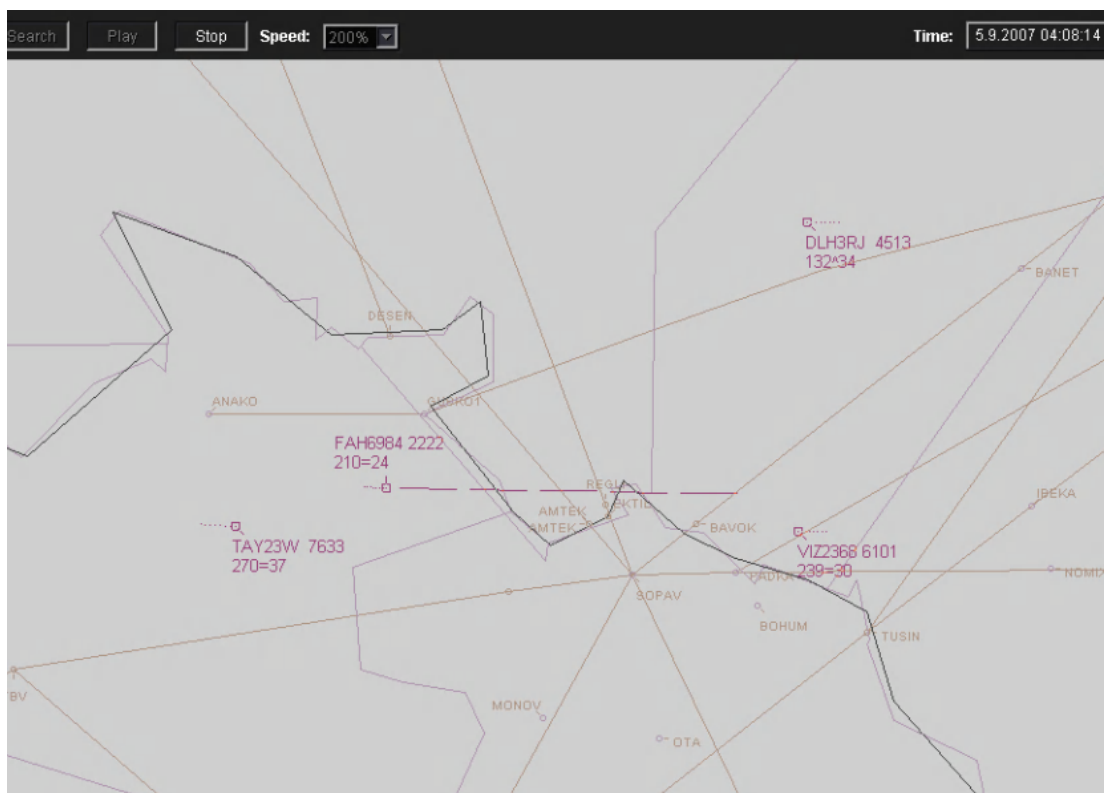


Fig. 1 – 04:08:11



At 04:11:18 WZZ 135K reported on LM EC frequency as it was climbing toward the point BAVOK to FL 200 at a speed of 2,000 ft/min and less (in spite of the ACT report from EPWW saying that it would fly at FL 220). For the traffic situation see Fig. 2.

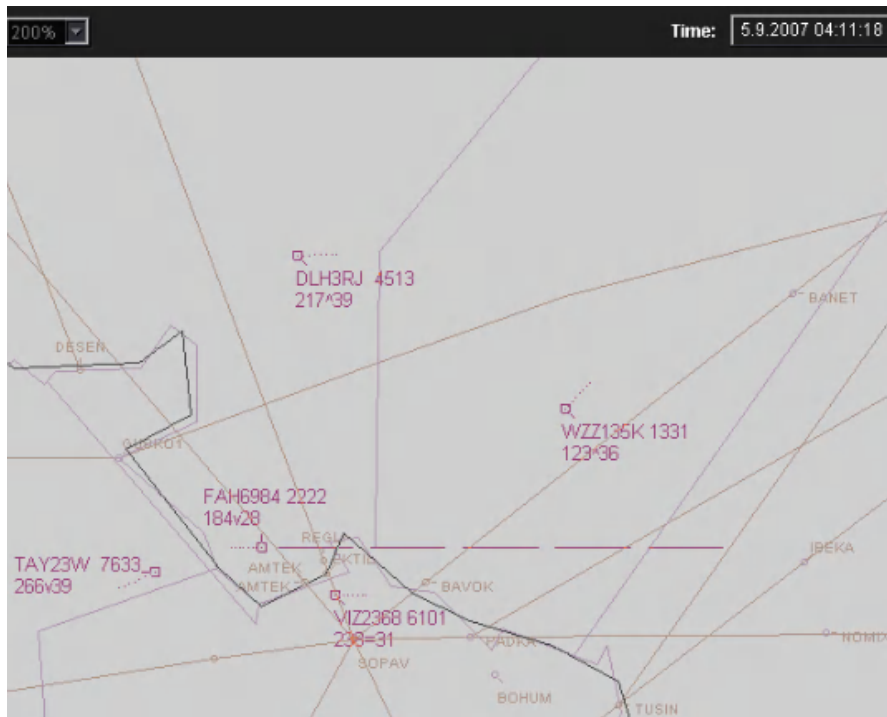


Fig. 2 – 04:11:18

In establishing contact with WZZ135K, LM EC did not take into account the actual conflict with the descending FAH6984. He was convinced that it is ACC EPWW that was in charge of separation control and did not realize that FAH6984 was still on his frequency.

EPWW failed to make good judgment on the situation because FAH6984 was not radar-identified due to the responder malfunction and EPWW had only ACT information about the planned passage. The EPWW assumption was probably based on the radar information only.

As FAH6984 was descending to FL 150, LM PC made a wrong judgment that it had been already tuned to EPWW frequency, without checking it out with LM EC. From this erroneous assumption he concluded that the separation is still in the hands of EPWW and passed on this incorrect conclusion to L PC.

At the same time, coordination between LM PC and L PC was under way as well concerning handing over the responsibility for providing ATS. For these reasons LM PC did not know about the communications between LM EC and WZZ135K, so he had no reason to correct his previous opinion.

The fact that sectorization change (in RDP E2000 system) had not been completed and the sectors had not exchanged information completely had negative impact on the possibility of reacting adequately to the situation.

The minimum separation was violated at 04:13:18 when both of the planes approached each other within less than 5 NM at a vertical distance of 100 ft. Sector LM, which had

STCA indication at that crucial time, had already its working frequency 127.125 MHz off. Sector L was already connected to this frequency, but at the beginning both L EC and L PC had not enough information to provide effective ATS. Based on a radar record, the situation is shown in Fig. 3.

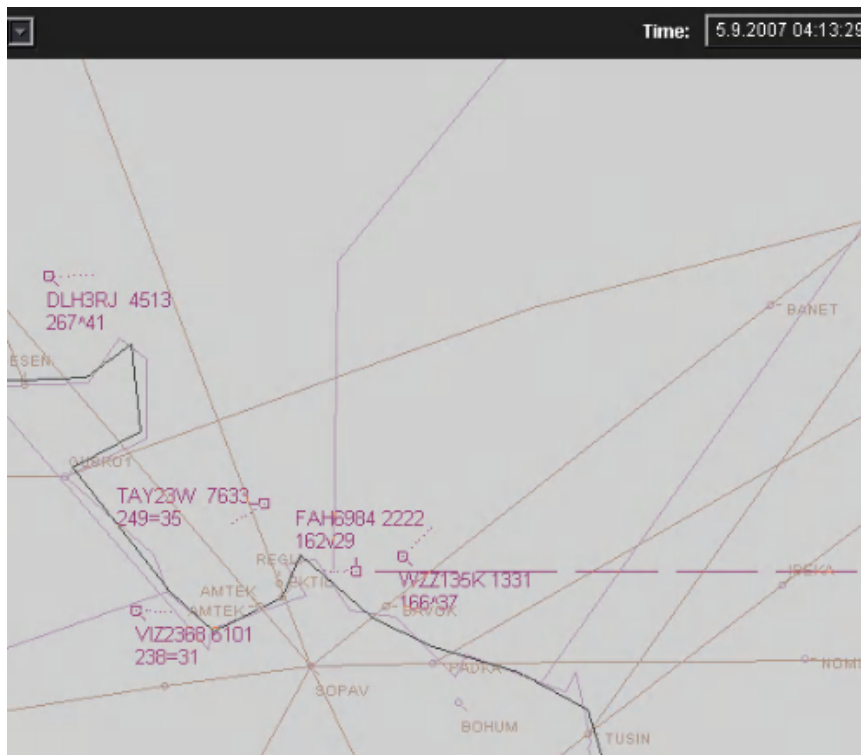


Fig. 3 – 04:13:19

The sectorization change took 11 minutes to complete, which is more than usual at ACC Prague.

### 3 Conclusions

#### 3.1 The commission determined the following conclusions:

- aircrews had no influence on the dangerous situation,
- ATS staff had required qualifications, abilities and skills to do their work,
- radio set # 1 of SSR transponder on FAH6984 aircraft (HB-AFJ) did not work well,
- EPWW did not have indication of FAH6984 radar position (ACC Prague did not know about it either), which had negative impact on the assessment of the traffic situation,
- EPWW sent ACT for WZZ135K flight that was in conflict with ACT already received for FAH6984 flight,

- EPWW issued WZZ135K the conflict clearance to climb to FL 200 at a vertical rate of 2,000 ft/min and less, without coordinating this change contrary to ACT with ACC Prague,
- EPWW returned WZZ135K to ACC Prague, without ensuring separation from FAH6984,
- on the basis of his judgment on the traffic situation, LM PC made a wrong conclusion that the separation is ensured by EPWW, did not check it with EPWW or LM EC and being enquired passed on this information to L PC,
- when WZZ135K reported itself, LM EC did not realize the conflict with FAH6984 and did not react in time by changing clearance to both aircraft,
- ACC Prague did not react adequately to TCAS/TA at 04:14; sectors L and LM did not exchange all the information needed to hand over responsibility for providing ATS between the sectors,
- convinced of the above, LM EC had no reason to react to STCA between FAH6984 and WZZ135K,
- when handling the change of sectorization, WS (“Watch Supervisor”) and SC (“Senior Controller”) did not dispose of a detailed guideline on how to go on with dividing and joining ACC sectors (even if an exact procedure cannot be fixed, as with emergencies),
- SC and WS underestimated the risk following from the fact that the ML (M) and L sectors’ staff was fully changed prior to the configuration change.

### 3.2 Causes

The incident was caused by several factors that joined together to sequence of synergic effect adversely affecting provision of ATS:

- malfunction of airborne equipment – SSR transponder – making it impossible to judge correctly the traffic situation when ensuring separation and coordination for flight WZZ135K from the part of EPWW,
- underestimating traffic situation while ensuring separation and failure to observe coordination rules for flight WZZ135K from the part of EPWW,
- LM EC did not react to the conflict between FAH6984 and WZZ135K when he had contact with both the planes established,
- the wrong conclusion made by LM PC that the separation was being ensured by EPWW; LM PC’s conclusion was drawn from his own judgment, not verified by EPWW or LM EC, and upon enquiry it was passed on during coordination with L PC,
- lack of information needed to take over the responsibility for providing ATS between sectors LM and L and consequently underestimating the traffic situation leading to insufficient ATS provision in sector L.

### **3.3 Deficiencies**

The event was affected by the following deficiencies in the routine processes of ACC Prague:

- inadequate steps taken by SC and WS when handling the sectorization change,
- absence of a convenient procedure for dividing and merging ACC Prague sectors.

According to the ESSAR 2 the event is assessed as the **“Major Incident”** and classified as **Incident / Near Collision / Separation Minima Infringement**,

## **4 Safety recommendations**

**4.1** The ANS of the Czech Republic should make the following provisions:

- analyze the event,
- make ACC Prague controllers familiar with the event,
- modify the relevant measures for making sectorization change in the Regulation for ACC Service at IATCC Prague.