ÚZPLN

AIR ACCIDENT INVESTIGATION
INSTITUTE
Beranových 130
199 01 PRAHA 99

CZ-14-181

FINAL REPORT

Investigation into the serious incident Separation minima infringement at TMA Praha on May 13, 2014

Prague
September 2014

This investigation has been carried out in accordance with Regulation EU No 996/2010, Act No49/1997 Coll., on civil aviation and Annex 13 to the ICAO Convention on International Civil Aviation. The sole objective of the investigation of an accident or incident under Regulations shall be the prevention of accidents and incidents. It shall not to be purpose of such an investigation to apportion blame or liability.
The Final Report, findings and conclusions there in concerning air accidents and incidents, and possibility systemic shortcomings endangering operational safety, are only of an informative nature and cannot be used otherwise than as a recommendation for the implementation of measures in order to prevent further air accidents with similar causes. The creator of the Final Report explicitly states that the Final Report cannot be used to determine blame or responsibility in connection with determining the causes of an air accident or incident and cannot be used for enforcing claims in the event of an insurance claim.

Abbreviations used

AAII	Air accidents Investigation institute
AEC	ATCo position APP
APP	approach control office
ARR	APP position ARRIVAL
ATCL	průkaz způsobilosti řídícího letového provozu
ATCo	Air traffic controller
ATS	Air traffic service
DEP	APP position DEPARTURE
DIR	APP position DIRECTOR
FEW	Few
FIR	Flight information region
FL	flight level
ft	feet
INFO	APP position INFO
IAF	initial approach fix
kt	knots
LKKV	aerodrome Karlovy Vary
LKPR	aerodrome Praha Ruzyně
NM	nautical miles
QNH	Altimeter sub-scale setting to obtain elevation when on the ground
RAT	Risk analysis tool
RMK	remark
SHRA	showers of rain
STCA	Short-term conflict alert
TCAS RA	Traffic alert and collision avoidance systém resolution advisory
TMA	Terminal control area
TWR	Aerodrome control tower
UTC	Coordinated Universal Time

A) Introduction

Owner/operator:	ČSA a.s.	ČSA a.s.
Manufacturer and aircraft model:	Avions de Transport Regional, ATR72-500	
Aircraft Registration:	OK-GFR	OK-GFS
Call sign:	CSA973	CSA025
Flight number:	OK973	OK025
Location of occurrence:	RATEV	
Date:	13. 5. 2014	
Time:	14:38 UTC	

B) Synopsis

On 13 May 2014 the Air Accidents Investigation Institute (AAII) was notified of an incident – during holding over the RATEV point the radar separation minimum between two ATR72-500 aircraft was reduced.

On the basis of evaluation in accordance with Annex R to the Rules of the Air (L-13), the incident was evaluated as a serious incident.

The AAII commission set up to look into the incident cause was made up of:

Chairman of commission:	Ing.	Ludmila	Pavlíková	ÚZPLN
Member of commission:	Ing.	Josef	Procházka	ÚZPLN
	Ing.	Petr	Vozdecký	ŘLP ČR, s. p.

The Final Report was issued by:

Air Accident Investigation institute
Beranových 130
199 01 PRAHA 99

On September 8, 2014

C) The Report includes the following main parts:

1) Factual information
2) Analysis
3) Conclusions
4) Safety recommendation

1 Factual information

1.1 The Event History

On 13 May 2014 at 14:36 UTC the radar separation minimum between two aircraft approaching LKPR, holding over the RATEV point, was reduced at LKPR TMA. Both aircraft were flying at the same flight level.

The Air Traffic Controller in the AEC position in cooperation with the Air Traffic Controller in the APC position were resolving a non-standard situation – preferential landing of the SVR740/A320 flight on RWY 24, which having collided with a bird during take-off at the LKKV airport, diverted to LKPR due to a non-operational engine and later requested the local emergency.

Because of this situation the AEC commenced holding other traffic over the GOLOP point, the entrance point to Prague TMA, and over the RATEV point, IAF for RWY 24. The traffic situation was complicated by significant storm cloud cover at TMA and FIR Prague.

1.2 Injuries to person

NIL

1.3 Damage to Aircraft

NIL

1.4 Other damage

NIL

1.5 Personnel information

ATCo:

Position	AEC	APC
Age	**54y**	**31y**
Work experience	**29y**	**7y**
Medical valid to	**14. 2. 2015**	**20. 5. 2016**

1.6 Aircraft information

ATR 72-500

Reg. mark	OK-GFR	OK-GFS
Year of manufacture	2001	2001
Serial number	681	679

1.7 Meteorological situation

Weather: FEW, SHRA and TSRA

Ground wind : 220-360°/7-12 kt

Altitude wind: 2000 ft 300°/14 kt

5000 ft 300°/12 kt

10000 ft 330°/0 8 kt

Visibility: 10 km, in SHRA and TSRA 5 – 8 km

METAR LKPR

131300Z 21007KT	9999	FEW020	10/07	Q1013 NOSIG RMK REG QNH 1010=
131330Z 22008KT	9999	FEW020	11/07	Q1013 NOSIG RMK REG QNH 1010=
131400Z 22006KT 150V280	9999	FEW023CB	12/07	Q1013 NOSIG RMK REG QNH 1010=
131430Z 22007KT	**9999**	**FEW023CB**	**13/07**	**Q1013 NOSIG RMK REG QNH 1010=**
131438Z 30012KT 260V320	**9999**	**FEW023CB**	**12/06**	**Q1013 RMK REG QNH 1010=**
131500Z 36011KT	9999	VCSH FEW023CB SCT040 11/05 Q1014 TEMPO SHRA RMK		
REG QNH 1010=				

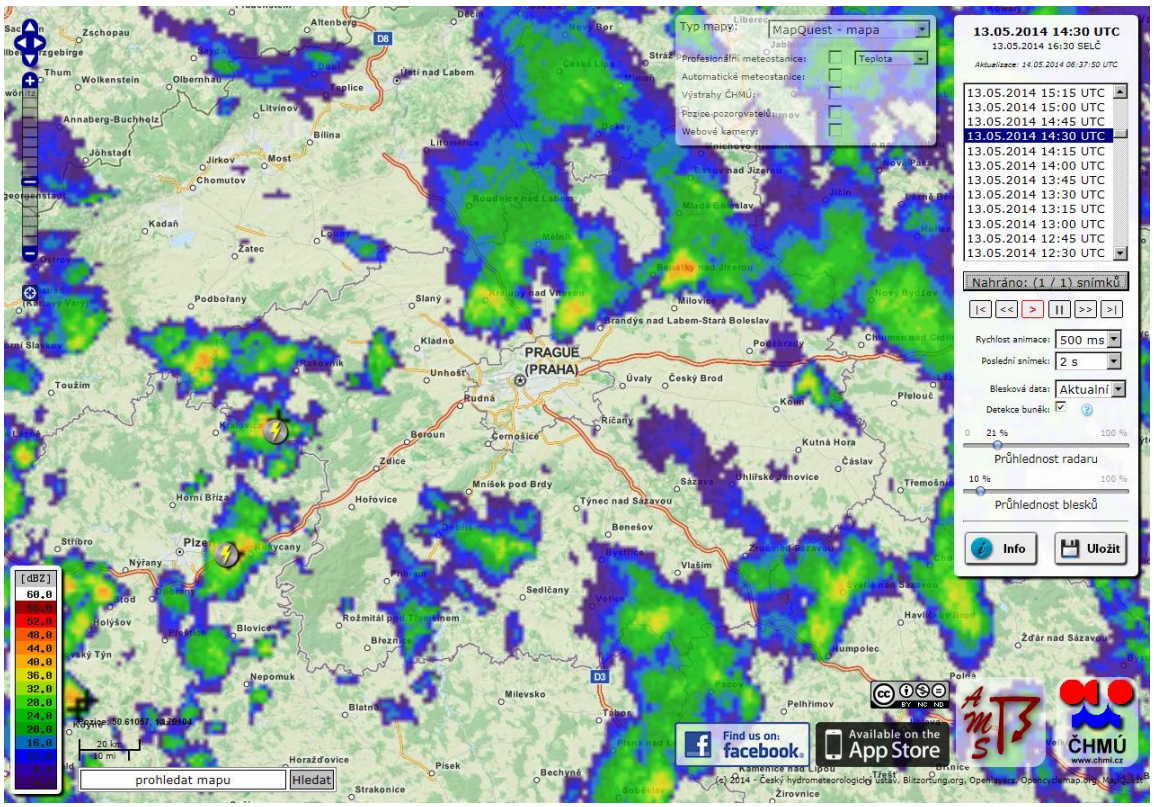


Fig. No. 1: Meteo radar Record

1.8 Radio Navigational and Visual Aids

All radio navigational aids at LKPR were operative without any defects.

All surveillance systems at Prague APP were operative without any defects.

1.9 Communications

At the moment of reduced separation minimum, the aircraft involved in the incident were in connection with AEC APP PRAGUE on the frequency of 127.575 MHz.

1.10 Aerodrome information

LKPR – PRAHA/RUZYNĚ Public International Aerodrome.

1.11 Flight Recorders and Other Means of Recording

Recordings from the recording devices of ŘLP ČR, s. p. have been used.

1.12 Event Location Information

The incident took place at TMA III PRAGUE, over the RATEV point, (IAF for RWY 24), at FL 100.

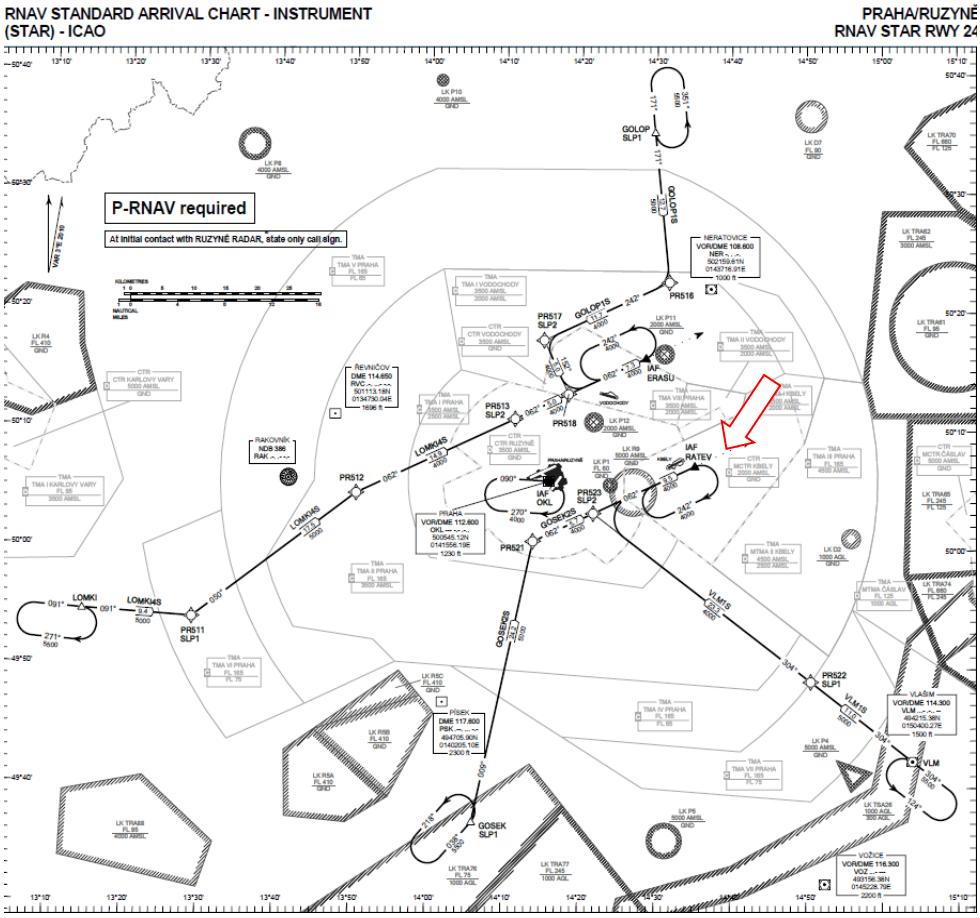


Fig. No. 2: Map - RNAV STAR RWY 24

1.13 Medical and Pathological Information

NIL

1.14. Fire

NIL

1.15 Survival aspects

NIL

1.16 Tests and Research

NIL

1.17 Organisational and Management Information

ATS provider: ŘLP ČR, s. p.

1.18 Additional Information

Inspection of the AEC records on flight strips of the CSA973 and CSA025 flights has revealed that the records of cleared levels were overwritten in the case of the CSA973 flight. It is not possible to determine whether the AEC changed FL 100 to 110 or vice versa.

1.19 Useful or Effective Investigation Techniques

The Serious Incident has been investigated according to L-13 National Regulation (Investigation into Air Accidents and Incidents of the Czech Republic).

2. Analysis

The incident occurred at the Prague APP control site between two arrivals at LKPR. Because of intensive storm activity at Prague TMA, the APP WS decided to join the DEP and ARR control sites. With regards to medium traffic density and meteorological conditions the joining was applied as more suitable in terms of operation.

The Air Traffic Controller in the AEC position in cooperation with the Air Traffic Controller in the APC position were resolving an emergency when it was necessary to provide preferential guidance to the SVR740/A320 flight for approach on RWY 24. This flight diverted to LKPR due to an engine fault after collision with a bird during take-off from LKKV. The procedure for resolving this situation necessitated an increased separation after the aircraft with a faulty engine to at least 15 NM. Therefore the AEC decided to commence holding of KAL935/B744 over the GOLOP point, an entrance point to Prague TMA, and of the CSA8037/AT72, CSA973/AT75 and CSA025/AT75 flights over the RATEV point, IAF for RWY 24. The traffic situation was further complicated by significant storm cloud cover at Prague TMA and FIR, which had to be circumfluent by both the arriving and departing aircraft.

When marshalling the arriving aircraft for holding, the AEC made a decision to provide for a more economical operation and thus to let the aircraft wait above the RATEV point from FL 090 up with the intention to release them from holding once the emergency situation of SVR740/A320 would be resolved. At the moment when it was possible to continue in sequencing other aircraft for landing, the AEC terminated holding of CSA8037 at FL 090 and handed this flight over for control to the

neighbouring DIR control site. At the same time CSA973 started holding over the RATEV point, while descending from FL 110 to FL 100 and CSA025 in parallel was entering the holding pattern over the RATEV point at FL 120. The AEC issued a clearance for CSA025 to descend to FL 100 at the moment of fly-over over the RATEV fix.

During entering the holding pattern, CSA025 was descending to FL 100 occupied by CSA973, while bypassing this traffic with a vertical stack of 1,400 ft. The horizontal distance was 1.05 NM as illustrated in fig. No. 3.

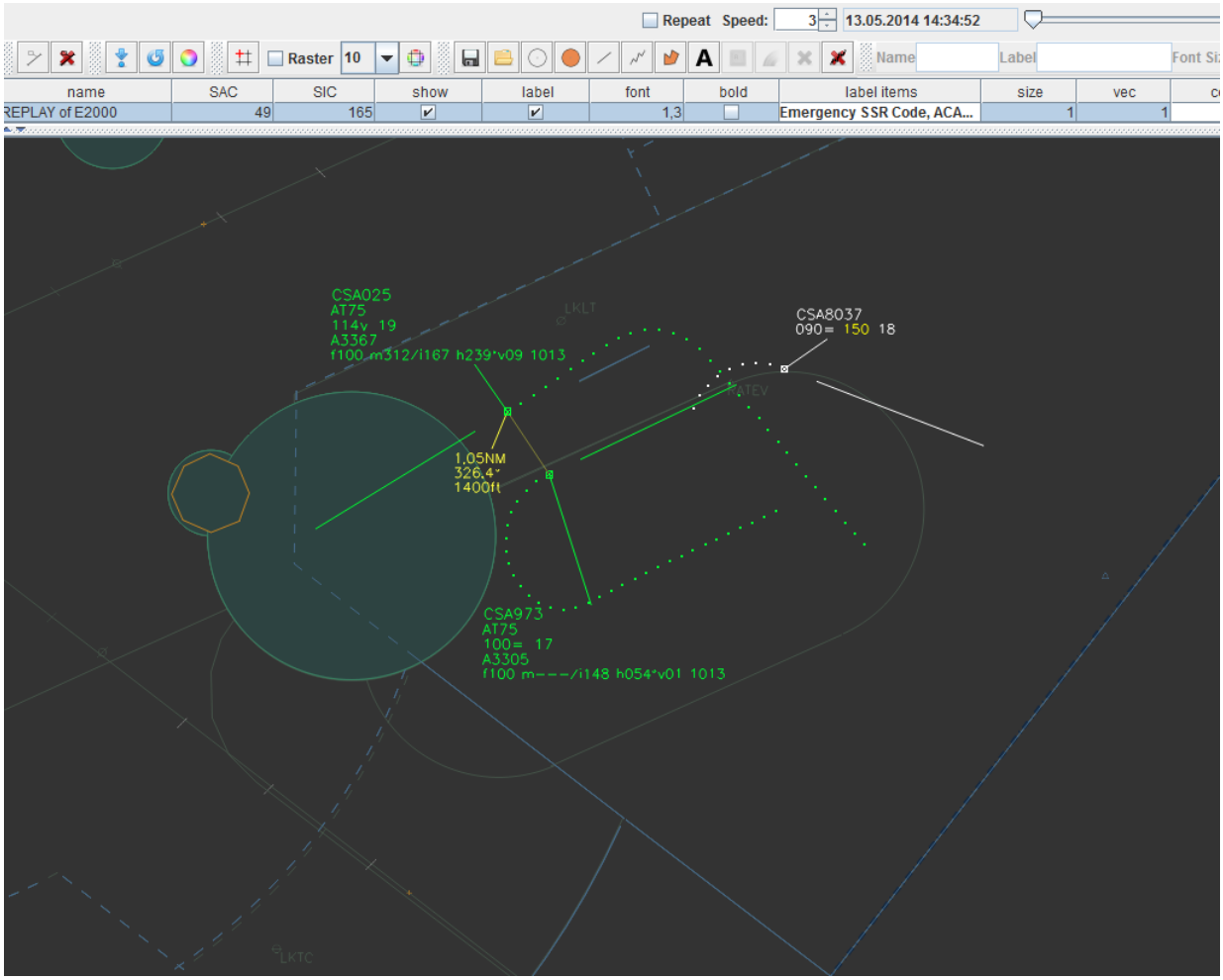


Fig. No. 3

While further descending, CSA025 was completing parallel entry of the holding pattern. This manoeuvre resulted in the situation where both the aircraft were flying on routes in the opposite course at FL 100. The STCA alert function was activated at the moment when the horizontal distance between the aircraft was 3.9 NM. The situation is illustrated in fig. No. 4.

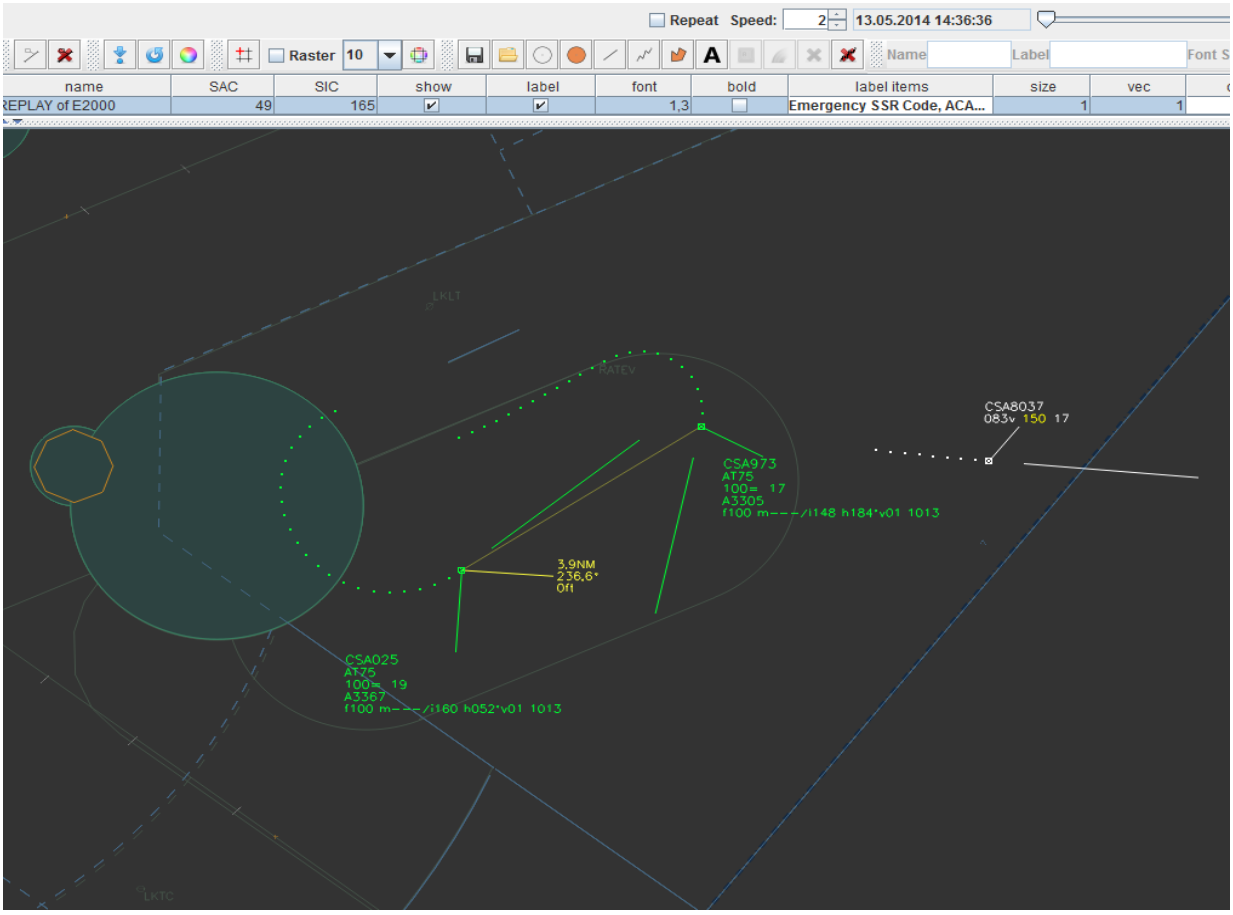


Fig. No. 4: STCA Activation

The APC was the first one to respond to STCA activation and he notified the AEC. The AEC immediately commenced an avoidance manoeuvre by instructing CSA025 to promptly turn left to the heading of 360 degrees. The next instruction issued by the AEC for CSA973 was to turn left to the heading of 180 degrees. The CSA973 crew confirmed the instruction by reporting TCAS RA.

Both crews responded to TCAS RA by changing the FL. See fig. No. 5.

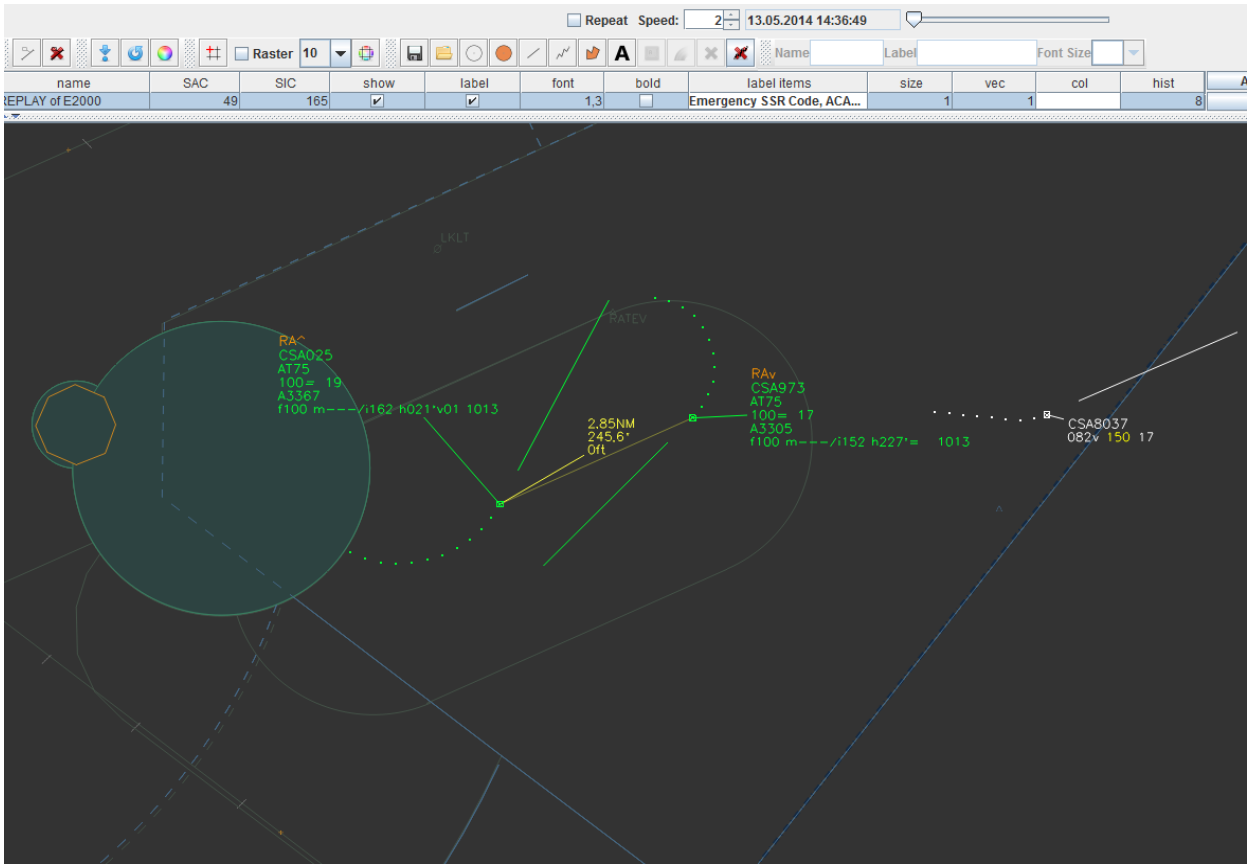


Fig. No. 5: TCAS RA Activation

The AEC continued in controlling CSA973 by issuing an instruction to turn left up to the heading of 060 degrees. The crew of CSA025 responded to this instruction by reporting "clear of conflict".

In spite of a prompt response by both the AECs and both the crews, the radar separation minimum was reduced to 1.83 NM and 475 ft, which corresponds to 61 per cent of the required distance.

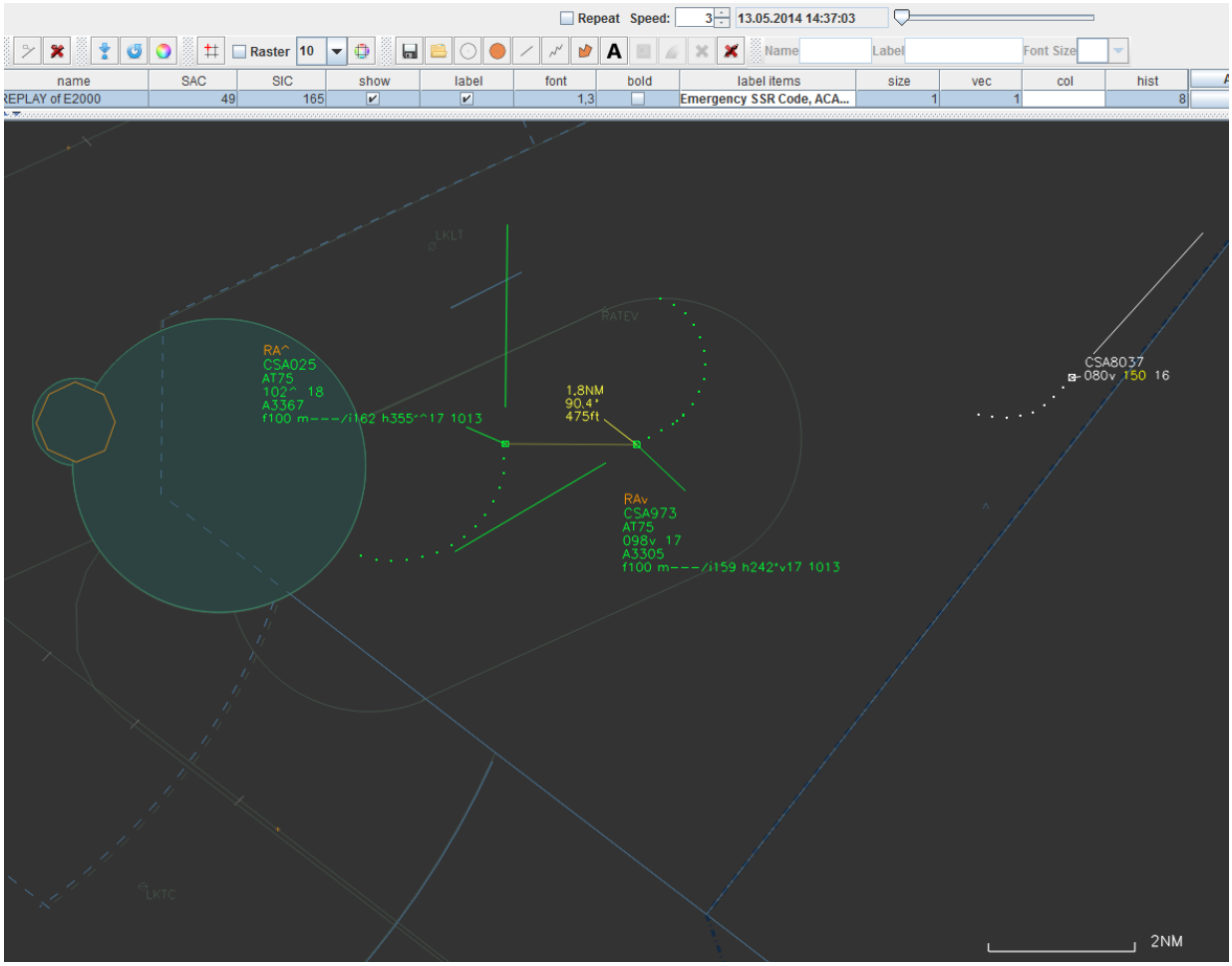


Fig. No 6.

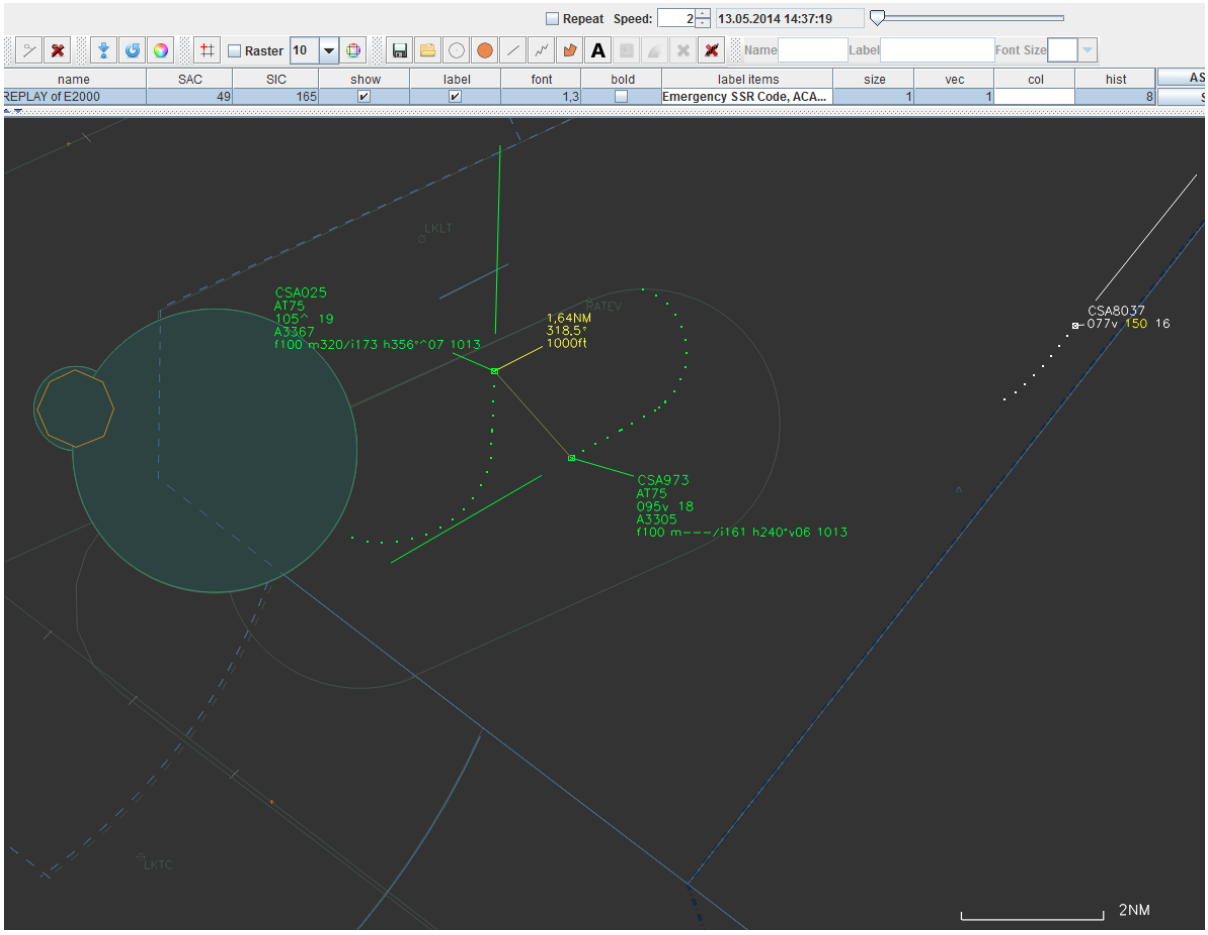


Fig. No. 7: Clear of conflict

After resolving the pressing traffic situation, the AEC was later substituted by the APC. The AEC was subjected to a breath test with a negative outcome.

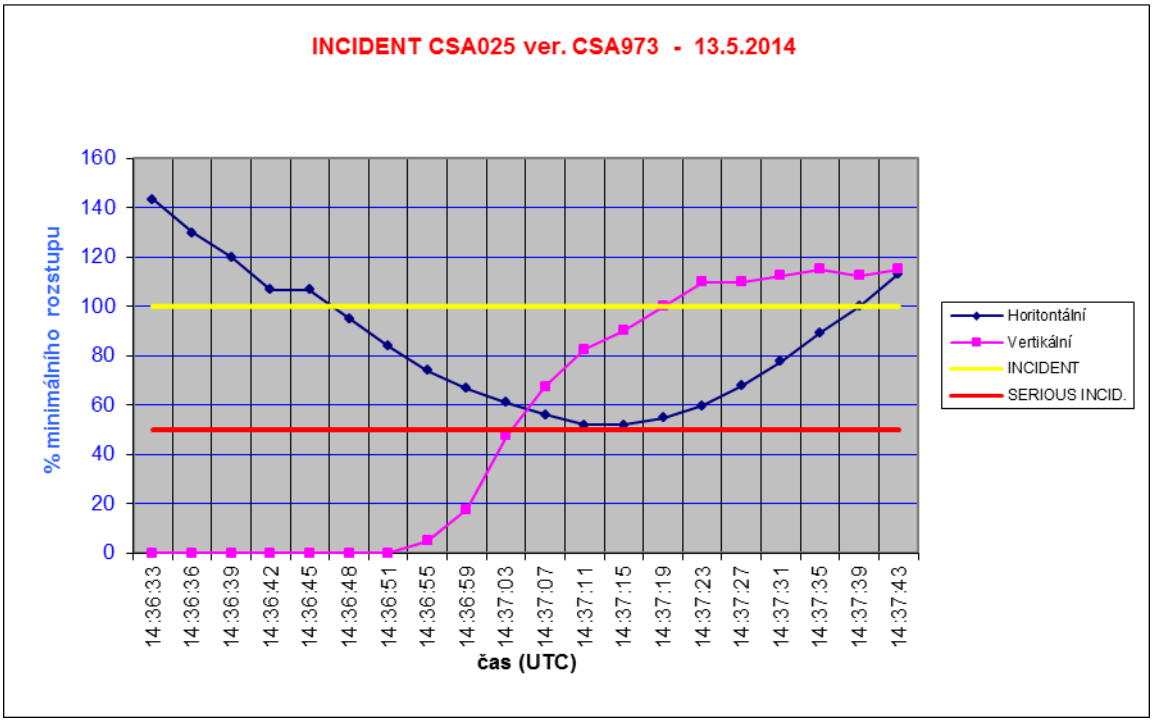
During the assessment of the background noise recording at the Prague APP it has been ascertained that the AEC, while designing a plan to solve the situation, was assuring himself of the correct measures being taken by confirming aloud to himself the cleared flight levels to which he would be able to allow the individual aircraft to descend while holding over the RATEV point. Based on the said findings it can be affirmed with certainty that the AEC's plan how to solve the situation was correct, but during the CSA025 clearance issuance he either made a slip of a tongue or was misled by an incorrectly filled-in flight strip and allowed the flight in question to descend onto the occupied FL 100.

Through inspection of the AEC records on flight strips of the CSA973 flight it was revealed that the records of cleared flight levels had been rewritten. Despite the fact it had been his own record, the AEC was unable to explain this fact in his statement to the incident. The Commission assumes that, most likely, an exchange of flight strips must have taken place. This might have been the cause of the incorrectly issued clearance to CSA025 to carry out descent down to the occupied FL 100.

The APC was not aware of the incorrectly issued clearance to CSA025; according to the background noise recording at Prague APP, at the time of the clearance issuance he was busy coordinating with APP SC.

INCIDENT CSA025 ver. CSA973 - 13.5.2014						
Time(UTC)			Vertical separation (ft)	Vertical separation - per cent	Horizontal separation (NM)	Horizontal separation - per cent
14:36:33			0	0	4,30	143,33
14:36:36			0	0	3,90	130,00
14:36:39			0	0	3,60	120,00
14:36:42			0	0	3,20	106,67
14:36:45			0	0	3,20	106,67
14:36:48			0	0	2,85	95,00
14:36:51			0	0	2,52	84,00
14:36:55			50	5	2,22	74,00
14:36:59			175	18	2,00	66,67
14:37:03			475	48	1,83	61,00
14:37:07			675	68	1,68	56,00
14:37:11			825	83	1,56	52,00
14:37:15			900	90	1,56	52,00
14:37:19			1000	100	1,64	54,67
14:37:23			1100	110	1,79	59,67
14:37:27			1100	110	2,03	67,67
14:37:31			1125	113	2,33	77,67
14:37:35			1150	115	2,68	89,33
14:37:39			1125	113	3,00	100,00
14:37:43			1150	115	3,40	113,33

Tab. No. 1: Analysis of radar mapping



Tab. No 2: Graphic illustration off separation

3. Conclusions

- The ATCo in the AEC position responsible for ATS provision at the time of the incident was a holder of a valid ATCL and had all qualifications and additional training. He also held a valid Medical Certificate Class 3.
- The specified minimum separation reduction was caused by an incorrectly issued clearance by the respective AEC due to which flights CSA973 and CSA025 descended and kept the same flight level in the identical holding pattern over the RATEV point.
- The APC noticed the error on the basis of activation of the STCA alert of the E2000 radar surveillance system after which the TCAS RA on both the aircraft was activated shortly.
- The AEC began to deal with the situation immediately upon activation of the said alert.
- The subsequent operation of the crews on both the aircraft as well as the instructions to avoidance manoeuvre by the AEC led to a swift restoration of the separation minimum.
- The operation of the AEC was influenced by solving of the emergency situation of SVR740/A320 and a complicated meteorological situation.

Cause of the Event:

The AEC issued a flight clearance to CSA025 to descend in the holding pattern over the RATEV point to an occupied FL 100.

The event has been classified in accordance with RAT:

- ATM Ground: A4
- ATM Overall: B4

Having taken all of the circumstances into consideration, the said incident has been classified as serious despite the fact that the radar separation minimum had not been reduced below 50 per cent.

4. Safety Recommendations

ŘLP ČR, s. p., represented by the Internal Audit Department, in cooperation with AAII and CAA has stipulated the following remedial measures:

1. The AEC has been discharged from duty performance at APP until all the below stated remedial measures are implemented.
   Executed immediately upon the incident reporting. The permission to duty performance
   renewed without limitation as of 7 June 2014.

   The AEC has been discharged from duty performance at TWR until the below stated remedial measures under Clause 2 are implemented.
   Executed immediately upon the incident reporting. The permission to duty performance
   renewed as of 3 June 2014.

2. The AEC was sent to a specialised medical examination in order to verify his fitness to duty performance.
   Executed on 2 June 2014.

3. The AEC has undergone three (3) exercises on the simulator. The training was completed by the fourth exercise as a "competency check" with the classification PASSED.
   It is necessary to focus on heavy operational burden caused by circumflying of significant clouds, joint D+A+PC+P sectors, holding, TCAS RA, STCA, concurrent potential conflicts in various parts of Prague TMA; furthermore, handling of strips, recording of issued flight clearances and administration of the progress chart shall be reviewed.
   Executed on 6 June 2014.

4. The AEC underwent a theoretical preparation course completed by a knowledge verification test. Aims: responses and operation of EC during TCAS RA, STCA and STCA parameters settings for APP, application of separation of 3 and 5 NM, phraseology, non-standard procedures at Prague APP.
5. Executed on 6 June 2014.

6. Briefing all of the ATCOs at Prague APP/TWR about the serious incident.
   Completion deadline set for 31 December 2014.

AAII issues no further safety recommendations.