



AIR ACCIDENTS INVESTIGATION  
INSTITUTE OF CZECH REPUBLIC  
Beranových 130  
199 01 PRAHA 99

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**CZ-10-229**

Copy No.: 7

# **FINAL REPORT**

**Air accident involving  
Airbus A321-131, registration mark D-AIRT  
And  
Boeing B737-8BK, registration mark TC-SNM,  
On 18<sup>th</sup> June 2010 at LKPR.**

December 2010

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The final report, its findings and conclusions concerning air accidents and incidents or system failures threatening operational safety are of informative character solely and can only be used as recommendation steps to be taken to avoid similar accidents or incidents. The producer of the report specifies explicitly that the Final Report cannot be used as background to determine persons' fault or responsibility for the mishap in question or for average claims ensuing thereof.

## List of abbreviation used

|         |  |
|---------|--|
| ATC     | Air traffic control  |
| ATCo    | Air traffic controller   |
| ATIS    | Automatic terminal information service                         |
| ATPL    | Airline transport pilot license                                |
| ATS     | Air traffic services   |
| BED     | Safety dispatcher  |
| CDP     | Terminal operation central dispatcher                          |
| CPL     | Commercial pilot license                                       |
| FDR     | Flight data recorder   |
| FO      | Flight officer   |
| HP      | Holding point  |
| HP LVO  | holding point at LVO CAT II/III                                |
| HZS     | Rescue and fire service  |
| KT (kt) | Knot – unit of speed (one nautical mile i.e. 1,852 m per hour) |
| LKPR    | Prague/Ruzyně airport indication                               |
| LN      | Air accident or incident                                       |
| LP      | Airport Praha, joint-stock company                             |
| LVO     | Low visibility operation                                       |
| M (m)   | Unit of length   |
| MMP     | Power service vehicles   |
| NIL     | None   |
| PČR     | Police of the Czech Republic                                   |
| PF      | Pilot flying   |
| PIC     | Pilot in command   |
| RCC     | Rescue and coordination centre                                 |
| RWY     | Runway   |
| ŘLP ČR  | Air traffic control of the Czech Republic                      |
| RPL     | Airport operation control                                      |
| SELČ    | Central European Summer Time                                   |
| T       | Temperature (degree centigrade)                                |
| TWR     | Aerodrome control tower  |
| TWR-DEL | Aerodrome control tower, position Delivery                     |
| TWR-GEC | Aerodrome control tower, position Ground Executive Controller  |
| TWR-MMP | Aerodrome control tower, position Power vehicle controller     |
| TWR-TEC | Aerodrome control tower, position Tower Executive Controller   |
| TWY     | Taxiway  |
| UTC     | Coordinated Universal Time                                     |

## A) Introduction

### Aircraft A321-131

Operator: Lufthansa, Germany  
Manufacturer and type of aircraft: Airbus A321-131  
Registration mark: D-AIRT  
Call sign: DLH5NC

### Aircraft B737-8BK

Operator: Sun Express, Turkey  
Manufacturer and type of aircraft: Boeing B737-8BK  
Registration mark: TC-SNM  
Call sign: SXS5663

Location

|          |   |
|----------|---|
| Location | Prague/Ruzyně airport (LKPR)                                  |
| Date     | 18 <sup>th</sup> June 2010                                    |
| Time     | 10:40 Central European time (08:40 UTC) next all times in UTC |

## B) Synopsis

On 18<sup>th</sup> June 2010 an investigation into an occurrence regarding a collision of two airplanes got started based on an announcement by RCC and Prague Airport authorities. The collision happened during aircraft taxiing for take-off. The collision caused damage to the right winglet of the B737 which was taxiing on TWY F behind the tail of the A321-131 standing on TWY E. Also damaged were the left elevator and left stabilizer of the A321-131 that was not in motion. There was no injury at the occurrence. Neither airplane was able to fly without being repaired first.

The event was investigated by a ÚZPLN (AAI CZ) commission consisting of:

Investigator in charge: Josef Procházka  
Members: Viktor Hodaň  
Ludmila Pavlíková  
Vladimír Boháč, ŘLP ČR, s.p.

The Final Report was issued by:

ÚSTAV PRO ODBORNÉ ZJIŠŤOVÁNÍ PŘÍČIN LETECKÝCH NEHOD (Air Accident Investigation Institute)  
Beranových 130  
199 01 PRAHA 99  
On November 15, 2010

The body of the report contains:

1. Actual information
2. Analysis
3. Conclusions
4. Safety recommendations

## 1. Factual information

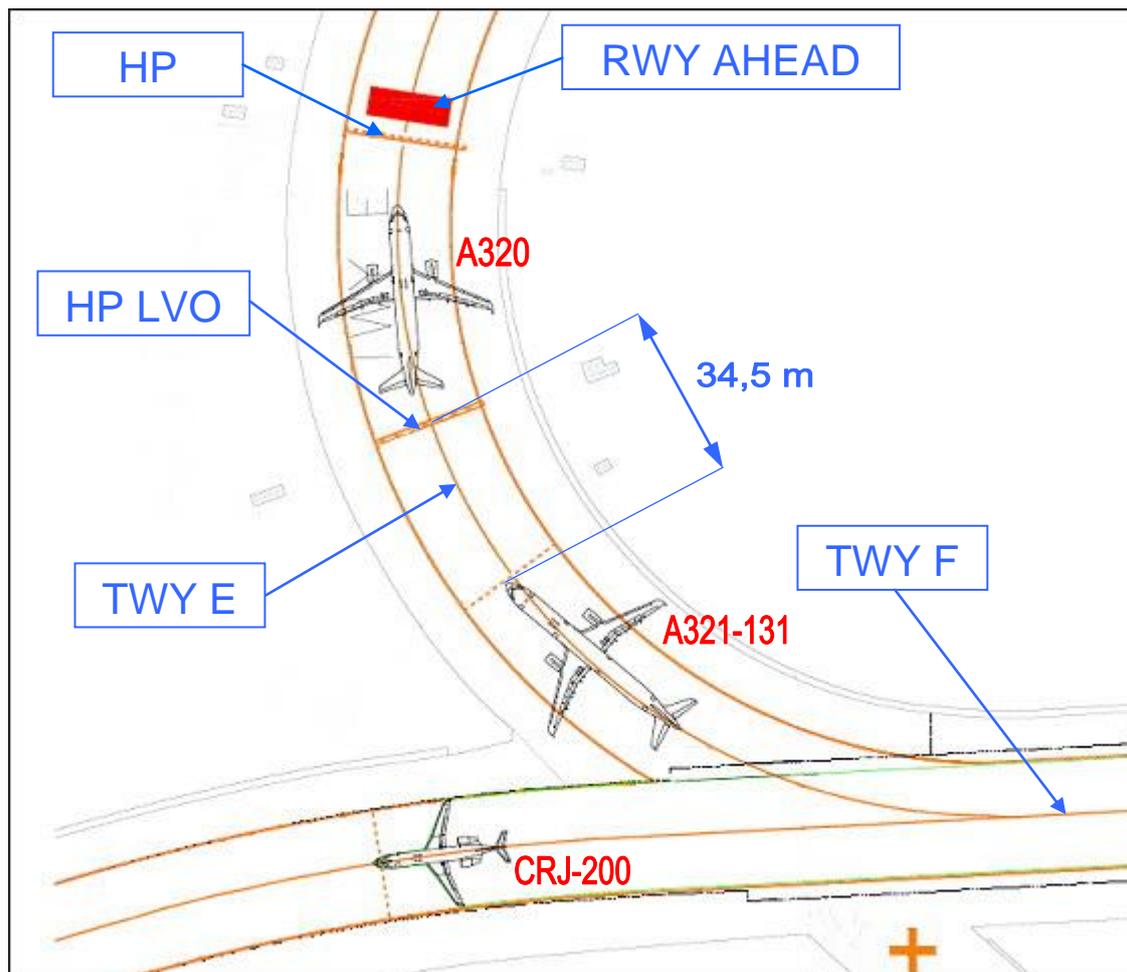
### 1.1 History of the flights

RWY 06 was the runway in use at LKPR. Operation took place in the morning rush hours. The A321-131 crew began taxiing at 08:26:21 from the stand 17 on TWYs H, F, E following ATS instructions. The A321-131 crew stopped at the crossing TWY F and TWY E and after a short hold (ca 5 seconds) went a little bit farther on TWY E. The A321-131 nose was more than 34.5 m behind the A320 that was standing in front of it at the RWY 06 holding point. On TWY E the A321-131 crew reported “ready at sequence” at 08:31:40. At 08:34:45 an airplane CRJ-200 taxiing on TWY F to RWY 06 holding point passed behind the A321-131 (see Scheme 1). The distance between the CRJ-200 wing tip and the A321-131 tail was ca 6 m.

The distance between the A320 and the A321-131 was established from a radar record of the S-SMGCS system.

All of the schemes presented were processed in an Aero Turn program and the aircraft and the land infrastructure are in the same scale in this report.

Scheme 1

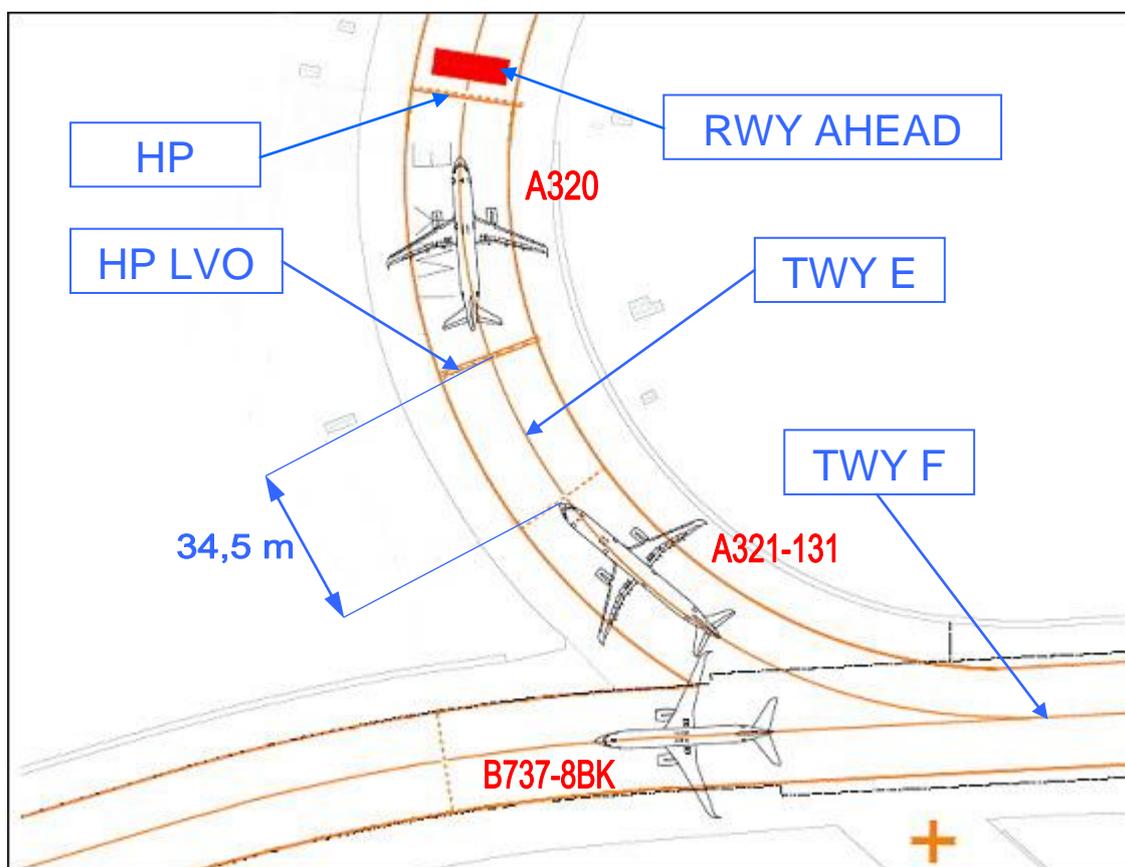


At 08:28:50 the B737-8BK crew on stand 2 asked for taxiing clearance. TWR-GEC cleared taxiing on TWYs A1, Z, H, and F to RWY 06 holding point.

At 08:37:04 the B737-8BK crew reported it could start from RWY 06 / TWY E intersection and stopped at TWY F on TWY FF level. TWR-GEC issued an instruction, for operational reasons, "continue to the end please". At 08:37:40 the B737-8BK crew continued its further taxiing on TWY F toward THR RWY 06. During this taxiing the B737-8BK right winglet struck the stabiliser of the A321-131 standing on TWY E (see Scheme 2). After the collision the B737-8BK crew stopped. At 08:38:23 the B737-8BK crew reported the event over the TWR-GEC frequency.

At 08:40:03 the A321-131 crew reported the collision with the B737-8BK over the TWR-TEC frequency and asked for return to the stand. TWR-TEC confirmed he had been already advised of the collision by the B737-8BK crew.

Scheme 2



At 08:40:50 the TWR-MMP informed RPL dispatcher about "two airplanes having been brushed against" each other on TWY E / TWY F intersection asking him to check the intersection for possible debris.

At 08:42:25 TWR-TEC cleared the A321-131 to taxi on RWY 06 back to the apron.

## 1.2 Injury to persons

### 1.2.1 The A321-131

| Injury     | Crew | Passengers | Other people (inhabitants, etc) |
|------------|------|------------|---------------------------------|
| Fatal      | 0    | 0          | 0                               |
| Heavy      | 0    | 0          | 0                               |
| Light / No | 0/6  | 0/145      | 0/0                             |

### 1.2.2 The B737-8BK

| Injury     | Crew  | Passengers | Other people (inhabitants, etc) |
|------------|-------|------------|---------------------------------|
| Fatal      | 0     | 0          | 0                               |
| Heavy      | 0     | 0          | 0                               |
| Light / No | 0 / 6 | 0/179      | 0/0                             |

## 1.3 Damage to aircraft

The A321-131 - Left stabiliser and left elevator damaged.  
The B737-8BK - Right winglet damaged.

## 1.4 Other damage

No other damage has been reported.

## 1.5 Personnel information

### 1.5.1 The A321-131 crew

PIC (man) – age: Aged 41 years  
Total flight time: 11,844 hours  
On type: 2,412 hours  
As PIC: 2,412 hours  
ATPL: Valid  
Medical: Valid

F/O (man) – age: Aged 26  
Total flight time: 1,730 hours  
On type: 1,730 hours  
CPL: Valid  
Medical: Valid

### 1.5.2 The B737-8BK crew

PIC (man) – age: Aged 42 years  
Total flight time: 5,775 hours  
On type: 900 hours  
AS PIC: 4,430 hours  
ATPL: Valid  
Medical: Valid

|                    |               |
|--------------------|---------------|
| F/O (man) – age:   | Aged 33 years |
| Total flight time: | 2,900 hours   |
| On type:           | 2,300 hours   |
| ATPL:              | Valid         |
| Medical:           | Valid         |

## **1.6. Aircraft information**

### **1.6.1 The A321-131**

|                            |        |
|----------------------------|--------|
| Year of manufacture:       | 1997   |
| Total hours flown:         | 32,967 |
| Airworthiness certificate: | Valid  |
| Insurance:                 | Valid  |

### **1.6.2 The B737-8BK**

|                            |        |
|----------------------------|--------|
| Year of manufacture:       | 2005   |
| Total hours flown:         | 15,861 |
| Airworthiness certificate: | Valid  |
| Insurance:                 | Valid  |

## **1.7 Weather situation**

### **ATIS LKPR 18. 6. 2010**

XAT424 180801  
GG LKPRXATB  
180801 LKPRXATA  
GOOD MORNING RUZYNE ATIS INFORMATION ROMEO  
0800  
ILS APPROACH  
RUNWAY IN USE 06  
RWY IS WET  
TRANSITION LEVEL 60  
RWY 13 AND 31 CLOSED  
METAR PRAHA ISSUED AT 08,00  
WIND 300 DEGREES 4 KNOTS  
VISIBILITY 8 KILOMETRES  
SCATTERED 7 HUNDRED FEET BROKEN 1 THOUSAND 5 HUNDRED FEET  
TEMPERATURE 14  
DEWPOINT 13  
QNH 1009 HECTOPASCALS  
RECENT MODERATE RAIN  
NOSIG  
YOU HAVE RECEIVED ATIS INFORMATION ROMEO

XAT425 180831  
GG LKPRXATB  
180831 LKPRXATA  
GOOD MORNING RUZYNE ATIS INFORMATION KILO  
0831  
ILS APPROACH  
RUNWAY IN USE 06  
RWY IS WET  
TRANSITION LEVEL 60  
RWY 13 AND 31 CLOSED  
METAR PRAHA ISSUED AT 08,30  
WIND 310 DEGREES 6 KNOTS  
VISIBILITY 8 KILOMETRES  
BROKEN 7 HUNDRED FEET BROKEN 1 THOUSAND 2 HUNDRED FEET  
TEMPERATURE 14  
DEWPOINT 13  
QNH 1009 HECTOPASCALS  
TREND BECOMING SCATTERED 7 HUNDRED FEET BROKEN 1 THOUSAND 5  
HUNDRED FEET  
YOU HAVE RECEIVED ATIS INFORMATION KILO

XAT426 180901  
GG LKPRXATB  
180901 LKPRXATA  
GOOD MORNING RUZYNE ATIS INFORMATION LIMA  
0901  
ILS APPROACH  
RUNWAY IN USE 06  
RWY IS WET  
TRANSITION LEVEL 60  
RWY 13 AND 31 CLOSED  
METAR PRAHA ISSUED AT 09,00

## **1.8 Aids to radio navigation**

Radio navigation aids at the airport had no influence on the accident.

Visual aids corresponded to the 4E Airport Class with runway for precision instrument approach CAT IIIB according to regulation ICAO ANNEX14.

## **1.9 Communications**

Air traffic control services communicated with aircraft over the following frequencies:

- 120.050 TWR-DEL further DELIVERY
- 121.900 TWR GEC further GROUND
- 118.100 TWR-TEC further TOWER

Communication between air traffic control and ground vehicles took place over the frequency:

- 121.700 TWR-MMP further RUZYNEŇ OPERATION (Ruzyně provoz).  
With no effect on the accident.

## **1.10 Airport information**

Airport category 4E.

Markings according to regulation ICAO ANNEX 14.

TWY F and TWY E are taxi ways for taxiing category E, width 23 m, with 10.5 m wide paved shoulders on either side so that the total paved width amounts to 44 m.

Visual navigation aids on TWY F and TWY E at the given place consist of taxiway centre line and side markings, taxiway side markers, taxiway centre line lights and information signs (to identify particular TWYs).

On TWY E are designated two holding points. One is standard at a distance of 90 m (HP) and the other for operation under LVO condition at a distance of 150 m from RWY 06/24 centre line (HP LVO).

On TWY F and TWY E are designated intermediate holding points to identify TWY strip.

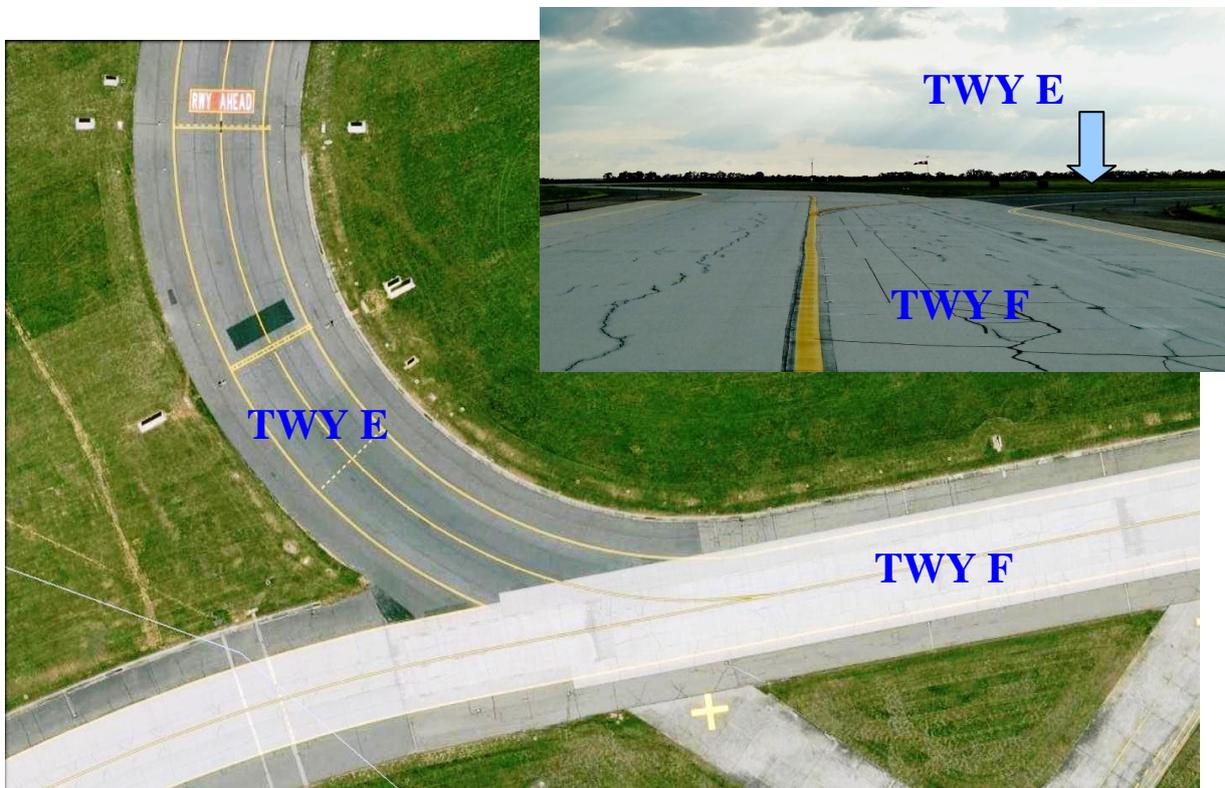


Fig. 1 The place of accident – horizontal marking.

### 1.11 Flight recorders and other recording means

AT CR's checking devices were utilized as follows:

- radar record from A-SMGCS system
- radio phone conversation records
- records of phone conversation

A record from FDR A321-131 was used.

Images from LP cameras could not be used due to a big distance between the cameras and the scene of the air accident.

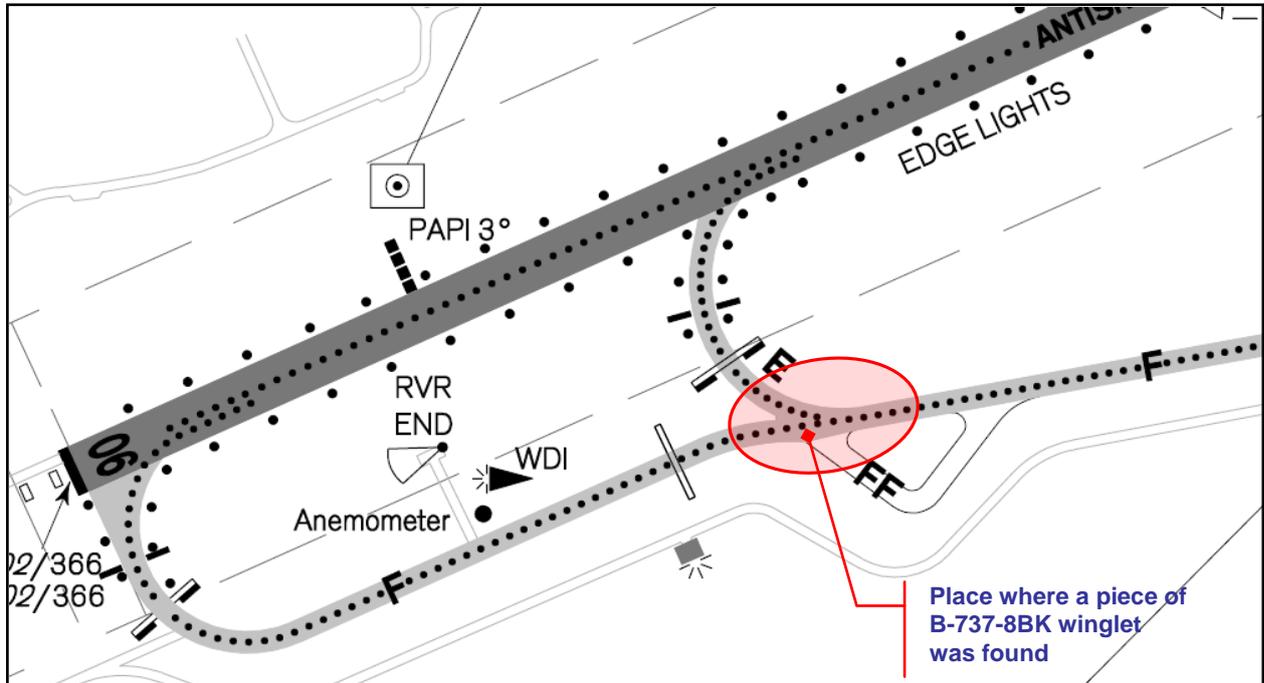
The Aero Turn software was used for reconstruction of the aircraft's positions.

## 1.12 Accident site and wreckage description

### 1.12.1 The accident place

Intersection where TWY E branches off TWY F. (see Scheme 3)

Scheme 3



An exact position of the aircraft was not drawn and documented on the scene. Both the planes went back to the apron stand after the collision. See Chapter 1.1 Scheme 2 for a reconstructed position of the aircraft at the time of the accident.



Fig. 2 Scene of the collision and a B737-8BK right wing winglet piece long approx. 1.2 m.

### 1.12.2 Wreckage description

Crew members of both of the planes taxied to designated apron stands following instructions by ATS.

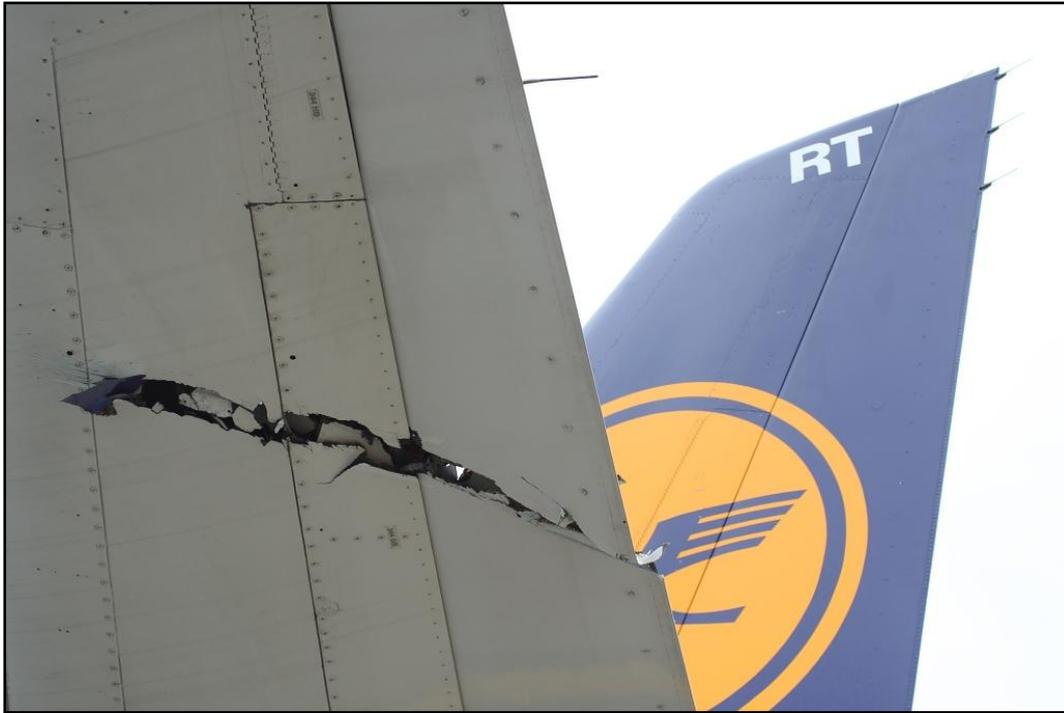


Fig. 3 Damage to A321-131 left rudder and stabiliser.

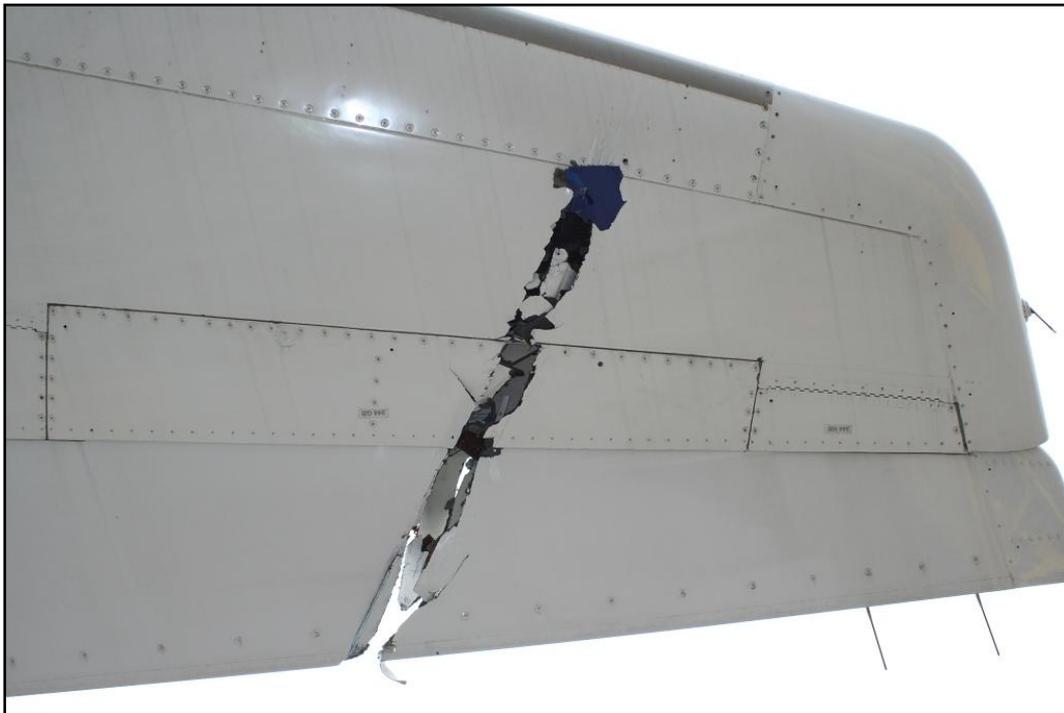


Fig. 4 Damage detail of A321-131 left rudder and stabiliser.



Fig. 5 Damage to B737-8BK right wing winglet.

### **1.13 Medical and pathological findings**

NIL

### **1.14 Fire**

NIL

### **1.15 Search and rescue**

NIL

### **1.16 Tests and research**

NIL

### **1.17 Organizational and management information**

#### **1.17.1 Air traffic control of the Czech Republic**

ATS CR is a provider of air operational services at LKPR.  
Approval to provide these services – valid.

#### **1.17.2 Airport Prague, joint-stock company**

Airport Prague, joint-stock company is the operator of the International Airport Prague/Ruzyně.

Aerodrome certificate – valid

## 1.18 Additional information

### 1.18.1 From Damage Report of A321-131 crew

*Our A/C was parked in the hold short POS in TWY E as No 2, 10 meters behind Aeroflot A320 just taking off. The Sun Express A/C taxied on TWY F and hit our L/H vertical stabilizer with their R/H winglet. During the hit our A/C was standing with PRK BRK set.*

*By my opinion, the winglets of the 737-800 are very large there was not enough space to pass.*

### 1.18.2 From Damage Report of B737-8BK crew

During taxiing the PIC was as PF.

*While taxiing on taxiway F, approaching E intersection we said to ground, “we can accept E intersection”, but ground said us, “continue taxi to end”. There were 2 aircraft on the E taxiway, second one was Lufthansa A321. While passing I said the FO check the wing clearance with the other aircraft and he said everything clear. I continued taxi and we made a small hit the right winglet to the A321 left horizontal stabilizer.*

*After hit we stopped on the taxiway immediately and informed ATC (Ground). Our taxi speed was approximately 5 kt. While approaching taxiway E I reduce the speed.*

*In front of us there was a small aircraft ahead 400-500 m.*

*While passing the other aircraft my nose wheel were approximately 50 cm left of the centreline.*

*From the FO side it was possible to see the clearance of the wing from the other aircraft.*

FO confirmed this information. The reality whether FO could have seen end of wing from his seat was check experimentally.



Fig. 6. View from the right seat of cockpit to end of right halves of wing B737-800

### **1.18.3 From the TEC-GEC's statement**

*A standard taxiing clearance had been issued for both of the aircraft*

## **1.19 Investigation techniques**

Standard investigation techniques conforming to ANNEX 13 have been used in looking into the accident.

## **2 Analysis**

### **2.1 A321-131 Crew**

- The pilots had valid ratings.
- The pilots had valid medicals.
- The crew informed TWR on the collision with another airplane.
- The crew informed TWR on no other technical problems.
- The crew did not ask for assistance.
- The crew asked to return to the stand.
- Following ATS instructions, the crew drove the plane back to stand 55 on TWY E, RWY 06, and TWY L using the plane's own engines.

### **2.2 The A321-131 Aircraft**

- Had valid airworthiness certificate.
- Had valid insurance.

### **2.3 B737-8BK crew**

- The pilots had valid ratings.
- The pilots had valid medicals.
- The crew informed TWR on the collision with another airplane.
- The crew did not ask for assistance.
- Following ATS instruction, the crew drove the plane back to stand 54 on TWY E, RWY 06, and TWY L using the plane's own engines.

### **2.4 The B737-8BK**

- Had valid airworthiness certificate.
- Had valid insurance.

### **2.5 Weather**

- Had no influence on the accident.

### **2.6 History of the flights**

- ATC cleared the A321-131 crew to taxi to RWY 06 holding point on TWY E using a standard phrase. The crew began taxiing at 08:26:21. It taxied down TWY F behind the A320 to reach the intersection TWY F x TWY E at 08:33:40. Here, still on TWY F, the crew stopped.
- At 08:34:00 the A321-131 resumed taxiing towards TWY E and about 34.5 m short of HP LVO stopped at 08:34:20 as the second at sequence behind the A320.

- Using a standard phrase, ATCo cleared the CRJ-200 crew to taxiing. This crew passed behind A321-131 at 08:34:55 and continued to the hold position RWY 06 on TWY F. The crew stopped there at 08:36:43 at sequence behind B-737.
- Using a standard phrase, ATCo cleared the B737-8BK crew to taxiing. The crew began taxiing at 08:28:50 to get short of the place where TWY F branches off to TWY E at 08:37:05. Here on TWY F, it stopped and then continued at 08:37:40.
- At intersection where TWY E turns off TWY F, the B737-8BK crew was taxiing at a speed of 3 to 5 kt and intentionally veered off ca 0.5 m left from the TWY E centre line.
- The PIC relied on FO's information on the clearance between the wing and the second airplane, the piece of information FO was not able to determine uniquely from his position.
- At 08:38:07 there was a collision as the B737-8BK right winglet hit the A321-131 left elevator and left stabiliser.
- At 08:38:18 the B737-8BK stopped on TWY F behind the intersection with TWY E.
- The B737-8BK crew advised ATC of the event at 08:38:23.
- At 08:39:10, the Airbus A320 waiting at the TWY E holding point ahead of the A321-131 began entering RWY 06 to start its take-off at 08:40:03.
- The A321-131 reported the event at 08:40:03.
- It followed from the reports of either crew that the Boeing B737-8BK's right winglet brushed against the A321-131 stabiliser.
- The crews of both of the planes did not ask for assistance.
- Consequently, ATC did not send an emergency signal Air Accident to the rescue teams according to the Prague Aerodrome emergency plan.
- At 08:42:55, ATCo cleared the A321-131 to RWY 06 and taxi to the apron down the ways TWY F, RWY 06, TWY L, TWY G, to stand 54.
- At 08:43:40 A321-131 vacated RWY and continued to stand 55, which reached at 08:45:00.
- At 08:55:03 B-737-8BK cleared entry on RWY 06 and taxiing on apron via TWY F, RWY 06, TWY L, TWY G, stand 54.
- At 08:57:15, the B-737-8BK cleared RWY 06 to TWY L and continued to stand 54, which it reached at 08:58:30.
- Damage of either aircraft was assessed on the apron.

## **2.7 Summary analysing ATS and Prague airport activities after reporting the event by crews of both the aircraft.**

### **2.7.1 ATS**

- ATCo of TWR Ruzyně received and confirmed information on aircraft collision by B737-8BK SXS 5583 crew and subsequently by A321-131 DLH 5NC.
- ATCo passed on this information to a TWR shift leader.
- The TWR shift leader assessed the actual operation situation, all the information available, and decided not to call alert degree Air Accident.
- At 08:42:27, ATCo asked the A321-131 crew to move a little bit farther on TWY E toward RWY 06 to clear TWY F passage to RWY 06 holding point on TWY F.
- TWR continued to control air traffic and gradually made it possible for either aircraft to taxi back to the apron.

- Because of both the damaged aircraft taxiing on RWY 06 to the apron, the TWR shift leader asked the Aerodrome Operation to check RWY 06 behind the taxiing damaged aircraft.
- At the time before and after the event, there was heavy traffic at the airport, corresponding to one takeoff or landing per 60 to 70 seconds.

### **2.7.2 Prague Airport**

- At 08:40, RPL got radio information from TWR on a collision of the two aircraft along with a request to check the TWY F / TWY E intersection for the possible presence of wreckage.
- At 08:41, TWR informed CDP in accordance with procedures of coordination between Air Traffic Control (ŘLP) and Prague Airport (LP).
- At 08:43, Airport operation control (RPL) began transfer to the scene of collision. On this occasion it checked RWY 06/24 after the damaged A321-131 had passed.
- At 08:47:40, an RPL dispatcher came to the TWY F / TWY E intersection and removed a piece of the B737-8BK winglet about 1.2 m long.
- At 08:58:22, RPL checked RWY 06/24 for clearance after the damaged B737-8BK had passed, and reported RWY 06/24 serviceability to TWR.
- Fire and rescue services (HZS) of the airport did not participate in solution to the situation because there was no signal announcing the accident.
- The safety dispatcher (BED) did not participate in solution to the situation since he had got information on the event from the Terminal central dispatcher (CDP) as late as 08:44, at time the A321-131 was already on stand 55 and the B737-8BK taxied on stand 54.
- At 08:49, BED was informed by RPL dispatcher.

## **3 Conclusions**

### **3.1 The investigation commission made the following conclusions:**

- The B737-8BK crew did not make good assessment of the distance between their right wing tip and the A321-131. FO was not able to tell the distance uniquely.
- Both of the crews did not make good judgement of the gravity of the situation, did not ask for the damage scope assessment on the scene, and taxied with their damaged aircraft back to the apron.
- The TWR shift leader decided not to put HZS on the alert Air Accident since he had not enough information available at that time.

### **3.2 Causes**

- Human factor failure – the taxiing crew did not keep a safe separation distance of their airplane from the standing one.

## **4 Safety recommendation**

I leave it to discretion of the national AIB's of either aircraft.

Reminders of the Lufthansa

**Comment contributed by Lufthansa's Safety Department on the Final Report of the Air Accidents Investigation Institute of Czech Republic involving Boeing B737-8BK, registration mark TC-SNM and A321-131, registration mark D-AIRT on 18<sup>th</sup> June 2010 at LKPR**

Concerning Taxi with Deflated Tires Lufthansa's Operations Manual Part B, 1-20-32-4 provides an operational guideline, which is found attached in the appendix below.

In addition to this there is no official company guideline for the severity of damage that would dictate not to taxi by own means.

Self explanatory, flight crews are required to assess the situation and decide on every single incident, e.g. not to taxi with hot or dysfunctional brakes.

According to the ECAM display of the aircraft there were neither brakes nor wheels damaged.

Furthermore, the ECAM showed all the Hydraulic Systems without damage and no Hydraulic Leaks.

The Lufthansa Safety Department draws the conclusion that these circumstances make the decision of the Lufthansa A321-131 flight crew comprehensible.

Appendix:

**1-20-32-4 Taxi with Deflated Tires**

If tire damage is suspected after landing or rejected takeoff, an inspection of the tires is required before taxi. If the tire is deflated but not damaged, the aircraft can be taxi at low speed with the following limitations:

- a) If one tire is deflated on one or more gears (i.e. a maximum of three tires) the speed should be limited to 7 knots when turning.
- b) If two tires are deflated on the same main gear (the other main gear tires not being deflated), speed should be limited to 3 knots and the nose wheel steering angle limited to 30 degrees.