

FINAL REPORT

on

investigation of a serious incident with an A-320 aircraft, registration F-GJVA,
operated by Air Operator Air France realized on 13.04.2007 at Sofia Airport



2007

Purpose of the report and level of responsibility

In accordance with Annex 13 to the Chicago International Civil Aviation Organization Convention. Council Directive 94/56/EC, introduced in Civil Aviation Act of Republic of Bulgaria, published in State Gazette, No94/01.12.1972 (last amendment and addition of 30.01.2007) and Regulation No 13/27.01.1999 of Ministry of Transport (last amendment and addition of 16.01.2007), the purpose of an investigation of aviation occurrence is to reveal the reason for its realization in order to remove and avoid it in future, without seeking anybody's blame and liability.

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LIST OF ABBREVIATIONS

AF 268P	- „Air France 268P”;
A/L	- Airline;
AC	- Aircraft;
CAA	- Civil Aviation Authority;
ATSA BULGARIA	- State Enterprise Air Traffic Control;
CAAct	- Civil Aviation Act;
ICAO	- International Civil Aviation Organization;
MT	- Ministry of Transport;
RWY27	- Runway 27;
TW	- Taxiway;
ATC	- Air Traffic Controller;
ATC	- Air Traffic Control;
AAIU	- Aircraft Accident Investigation Unit.

1. Introduction

On the 13.04.2007 at 11:54 an A320 aircraft lined up at Sofia Airport without clearance by the Air Traffic Controller – Sofia Tower and forced an CRJ200 aircraft, approaching for landing the same runway, to make maneuver for avoiding an impact.

On the ground of Article 139, Para.1 of Civil Aviation Act (CAAct) of Republic of Bulgaria, published on 01.12.1972 (last amendment and addition of 30.01.2007) and in pursuance of Regulation No 13/27.01.1999 of Ministry of Transport (last amendment and addition of 16.01.2007), the following authorities were notified: Aircraft Accident Investigation Unit and Main Directorate of Civil Aviation Authority at the Ministry of Transport of Republic of Bulgaria, EASA, Eurocontrol, National Bureau of Aviation Occurrences Investigation of Republic of France and Federal Bureau of Aviation Occurrences Investigation of Federal Republic of Germany.

On the ground of Article 142, Para.2 of CAAct of Republic of Bulgaria (last amendment and addition in State Gazette, No108/29.12.2006) and Article 10, Para.1 (amendment – State Gazette No83/2004) in connection with Article 2, Para.1 of Regulation No 13/27.01.1999 of Ministry of Transport a commission for investigation of aviation occurrence was appointed by an order of the Minister of Transport.

With a letter of 27.04.2007 from the National Bureau of Aviation Occurrences Investigation of Republic of France an authorized representative of the Republic of France was appointed.

Information about the crew qualification and explanation of the commander from National Bureau of Aviation Occurrences Investigation of Republic of France was asked. The work station at Control Tower – Sofia was visited and an inspection was made. An inspection was made also at the holding point of RWY27, lights, technical means of control. The radio-exchange between AC, Control tower – Sofia and Sofia Radar was listened to, as well as all the internal communications between the two working stations. Conversations with the ATC working shift from the time realized aviation occurrence were conducted.

On the ground of Article 19, Para.1 of Regulation No 13/27.01.1999 of Ministry of Transport of Republic of Bulgaria the Commission prepared the final report.

The commission was determined that the 13.04.2007 should be the closing date for submission of the report in final version.

Not cleared lining-up at operation runway is a serious violation of the safety rules in the civil aeronautics. On the grounds of Article 9 Para.1 (amendment in State Gazette No 83/2004, addition in No 77/2005) and in accordance with enclosure No 4a to Para.8 (new – State Gazette No 83/2004) of Additional Provisions of Regulation No 13/27.01.1999 of MT, the aviation occurrence was classified by AAIU as a serious incident. Materials about the aviation occurrence were filed under No 03/13.04.2007 in AAIU records.

The serious incident didn't lead to consequences for the passengers, crew and aircraft. The difference between the local time and UTC is +3 hours.

2. Factual Information

2.1 History of flight

On April 13th 2007 the Air France's A320 aircraft was about to execute scheduled flight number Air France 268P (AF 268P).

Type of flight: International flight for passenger transportation on schedule airline Sofia – Paris (LBSF-LFPG).

The crew was briefed according to the Air France procedures.

At 11:43:15 Sofia Tower gave RWY 27 taxi clearance and announced departure conditions.

At 11:52:30 Sofia Tower asked the crew whether it was ready for an immediate take-off from RWY27: „AF 268P are you ready for immediate departure RWY 27”. The pilot answered indistinctly and ATC asked an answer again: „Sorry, say again”.

The pilot answered the second time clearly: „We are ready for immediate AF 268P”.

ATC said „Roger” and after that informed the crew about the location of the approaching for landing on the same runway aircraft and gave instruction to stay at holding point „AF 268P landing traffic RW 27 five miles from touch down, keep holding point”.

Pilots of Air France reported a visual on the landing aircraft: „OK. Traffic in sight AF 268P”, but didn't repeat the Sofia-Tower instruction: „Keep holding point”.

The air traffic controller skipped the lack of reply (confirmation of understanding). He didn't asked for a reiteration of his instruction “Keep holding point”.

At 11:53:27 the landing traffic (for which Air France reported in sight), a CRJ 200 aircraft, registration DA-CRM of Lufthansa, performing scheduled flight from Düsseldorf to Sofia, flight number DLH 5HW, reported: „Sofia Tower, hallo, Lufthansa 5HW aaa.... Left hand base visual 27”.

Sofia Tower controller gave actual weather information and a landing clearance to the aircraft: „Good afternoon Lufthansa 5HW tower, wind 270°/8kt, clear to land RW 27”
„Lufthansa” confirmed the landing clearance for RWY27: „Clear to land RW 27 Lufthansa 5HW”.

This radio exchange was at the frequency of Sofia Tower, which the pilots of A320 of Air France were still listening.

At 11:53:46 h there is a record from Sofia Tower: „Air France”....

At 11:53:53 informed Lufthansa that the runway is occupied and gave instruction for a go around: „Lufthansa 5....Sorry, Lufthansa 5HW runway is occupied. Go around now, go around”.

„Lufthansa” executed and answered: „Going around, Lufthansa 5HW”.

At 11:54:08 the air controller gave instruction to „Air France”: „AF 268P keep position, stop at this position”.

„Air France” answered: „Keep position AF 268P” .

At 11:54:55 the A320 crew asked: „Air France...for information,...268P..., are will us clear for line up confirm?”

The air controller answered: “Negative AF 268P, I told you to keep your holding position due to landing traffic who was five miles from touch down”.

Followed by: „Sorry, we understood continue in taxi for position, sorry”.

At 11:55:29 Sofia Tower asked „Lufthansa”: „Lufthansa 5HW, would you like to make visual approach, RW 27 right hand circuit?”

„Lufthansa” pilot answered: „OK... Will be nice 5HW”.

At 11:56:15 the air controller cleared „Air France” for take-off

On 18.04.2007 ATSA BULGARIA submitted to the Commission a record of the trajectory of the „Lufthansa 5HW” flight according to the radar control transponder code 2223 (Enclosure No1), where the movement of the aircraft during the aviation occurrence is visible.

At 11:52:30, when the air traffic controller asked „Air France 268P” whether it was ready for an immediate take-off, „Lufthansa” aircraft was at 7.2 NM from touch-down point of RWY27 of Sofia Airport and started left-hand turn to heading 315°;

At 11:53:27, when landing traffic established contact with Sofia Tower, its position was at 6.9 NM from the touch-down point, with a heading of 315°;

At 11:53:46, when air traffic controller saw that the A 320 was lining up on RWY27, the landing traffic was at 6NM from the touch-down point, with a heading of 315°;

At 11:53:53, when the air traffic controller informed „Lufthansa” that the runway was occupied and instructed it for a go-around procedure, its location was at 5.5NM from the touch-down point.

At 11:54:08, when the air traffic controller instructed „Air France” to keep position, the location of the landing traffic was at 4.9NM from the touch-down point.

As to the moment of aviation occurrence the air traffic controller at Sofia Tower has been communicating with 5 aircrafts and operation at Lesново Airfield.

2.2 Injuries to persons

There were no injuries to any of the passengers, crew and third parties.

2.3 Aircraft damages

No damages.

2.4 Other damages

No other damages

2.5 Personnel information

2.5.1 Commander: a 50 years old licensed pilot, with a valid medical certificate.

(Enclosure No 2)

2.5.2 First officer (1): a 45 years old licensed pilot, with a valid medical certificate.

(Enclosure No 2)

2.5.3 First officer (2): a 37 years old licensed pilot, with a valid medical certificate.

(Enclosure No 2)

2.5.4 Cabin crew

Because of the nature of the aviation occurrence the Commission didn't ask about any information concerning the cabin crew.

2.5.5 Air traffic controller's work station in Sofia Tower.

2.5.5.1. Air traffic controller – shift leader - a 56 years old licensed ATCo, with a valid medical certificate.

2.5.5.2. Acting ATCo during the aviation occurrence - a 56 years old licensed ATCo, with a valid medical certificate.

2.5.5.3. Air traffic controller – assistant during the aviation occurrence - a 45 years old licensed ATCo, with a valid medical certificate.

2.5.6 Air traffic controller work station at Sofia- Approach - a 32 years old licensed ATCo, with a valid medical certificate.

2.6 Aircraft information

Aircraft manufacturer:	- Airbus Industries;
Type of aircraft:	- A320;
Serial number:	- N/A;
Year of production	- N/A;
Registration	- F – GJVA;
Certificate of registration	- B21808;
Operator	- Air France Airline;
Certificate of airworthiness	- No F-SF 005;
- validity	- 30.09.2009;
Minimal crew	- commander and first officer.

The nature of aviation occurrence was not related with the aircraft worthiness.

2.7 Meteorological information

2.7.1 General weather information

During the day of the aviation occurrence there was a vast anti-cyclone, specific with clear sunny weather and high atmospheric pressure.

2.7.2 Weather at Sofia Airport

Wind	270° / 8 kt ;
Visibility	CAVOK (over 10 km).

2.8 Aids to navigation

At the moment of the aviation occurrence at Sofia Airport the following aids to navigation were operational: VOR, ILS, NDB, DME, etc., which had no relation with the occurrence, except the ATIS information (Enclosure No 4).

2.9 Communications

On the 18.04.2007 ATSA BULGARIA submitted a record of the radio-exchange on the Sofia - Tower frequency 118.1 MHz, Sofia – Radar 123.7 MHz and the intercom communication between the two working stations at the moment of aviation occurrence (Enclosure No5).

2.10 Airport

Sofia Airport coordinates are N 42°41'42" and E 023°24'30". Elevation 531 m. RWY heading 091°/271° (designated as 09/27), length 3600 m and width 45 m.

Location of the aviation occurrence: at the beginning of RWY27 with coordinates N 42°41'42", E 023°26'23":99 and elevation 531.7 m.

The airport was operational with continuing repair and construction works. At the moment of the aviation occurrence taxiways (TWY) „K”, „B” & „D” were closed. TWY „H” between the crossing between with TWY „B” and crossing with TWY „C” was closed. TWY „H” between crossing with TWY „C” and crossing with TWY „L” was closed. TWY „N” between the crossing with TWY „H” and crossing with TWY „Q” was closed. TWY „J” between the internal middle holding position „H” and the crossing with TWY „M” was closed. TWY „J” between the crossing with TWY „B” and the apron was closed.

A new terminal No 2 was commissioned at Sofia Airport and new runway. New tower wasn't built and because of it the paring rests of telescopic walkways from No1 up to No4 are not visible from the work station of the Sofia Tower ATCo. There is no visibility to: the whole TWY „L”, part of TWY “H” and part of the first third of the RWY from East (Enclosure No 6).

Taxi way “H” is equipped with microwave detectors, showing the presence of AC, which are not commissioned for operation by ATSA BULGARIA and with lighting stop line for RWY27, which is in operation and works.

2.11 Flight recorders

No flight records were used.

2.12 Wreckage and impact information

The occurrence didn't lead to destruction of AC.

2.13 Medical and pathological information

Not performed because of the nature of the aviation occurrence.

2.14 Fire

Not occurred.

2.15 Survival aspects

No survival equipment was used.

2.16 Tests and research

An inspection of the working station at Sofia Tower was made, the place of the aviation occurrence, visualization system, technical and light engineering equipment were also inspected. The records of the radar, the radio-exchange and the intercom between Sofia Tower and Sofia Radar were interpreted and analyzed.

2.17 Additional information

In order to support the work from the workstation at Sofia Tower and in situation of deficiency of direct visibility ATSA BULGARIA uses a radar for observation of the airfield and video observation system consisting of 6 cameras.

In order to inform pilots that there was a part of manoeuvring area not observed by the air traffic controller, a letter with outgoing number № 80-03-1.4-3338/08.09.2006 (ingoing No 40-13-2098/08.09.2006), ATSA BULGARIA has prepared and submitted to CAA with the MT of the Republic of Bulgaria a proposal for publication in AIP. There is no answer to this proposal.

2.18 Useful and Effective Methods of Investigation

The ergonomic characteristics and the working conditions at the workstation in Sofia Tower were inspected with the cooperation of the Specialized Laboratory for Air Medical Certification. (Enclosure No 7)

3. Analysis

3.1 General

The realization of the aviation occurrence is a result of objectively existing facts, circumstances and subjective omissions and violations.

3.2 Objective facts and circumstances

A new runway was commissioned at Sofia Airport, which was displaced to the East, which changed the operational conditions (Enclosure No 6). A new Terminal No2 was constructed and commissioned. It is placed in such a way that it hides about 300 - 320m of the runway in the observation sector of the air traffic controller to the East from 72° to 075°. The whole area to the east behind the Terminal No 2 could not be observed in the sector between 072° and 086°, including telescopic walkways from No 1 up to No 4, the whole taxiway "L" and about 1000m of taxiway "H" (Enclosure No8).

The A320 aircraft might be observed visually at the end of taxiway "H" with heading 360° in the observation sector between 079° and 082°, where was the exit to RWY27, from air traffic controller workstation at Sofia Tower with normal working seating position of his body. The distance between the tower and the location of the aviation occurrence is about 2920 m and tower height is 20m.

The Commission determined that it is difficult for the ATCo to control visually the movement of AC without technical means.

The technical means for supporting the air traffic controller in execution of his duties are as follows.

1. Radar for observation of the airfield.

By an Order No 46/17.02.2000 of the Executive Director of ATSA BULGARIA such radar, produced and supplied by “Chernomore” EAD – Varna, was commissioned for normal operation at Sofia Airport.

ATSA BULGARIA presented to the Commission Operability Certificate for the radar No 222, issued on 02.03.2007. The radar wasn't tested technologically for its ability for airfield use. There was no full cover of the entire maneuvering area. The radar working time schedule (Enclosure No 9) showed: The radar was working during the aviation occurrence; on the 10.04.2007 from 03:09:14 till 16:04:47 the radar didn't work; on the 15.04.2007 from 03:02:35 till 16:05:47 the radar didn't work. Every day there were several interruptions at any time. The interruptions in everyday radar work were without considering of the actual airport situation. During its visit to workstation at Sofia Tower the Commission found the radar not turned-on for the shift.

2. Visual observation system

The video observation system used at Sofia Airport didn't possess a licence as aviation technical equipment. It wasn't operable and because of it wasn't commissioned with particular order. At the moment of the aviation occurrence the system was the only possibility for visualisation of the hidden for the air traffic controller part of the manoeuvring area. The cameras (Enclosures No 6 & No9) are indirect (secondary) source of information. They are of low resolution and there is an area of no visibility at TWY “L”. There are some moments of “freezing” of the picture.

3. Binocular

During the inspection it was determined that the binocular had not been used by the air traffic controller or his assistant because there was one binocular at Sofia Tower and it was defective.

4. Microwave detectors of TWY “H” to RWY showing the presence of AC.

This technical mean wasn't commissioned to ATSA BULGARIA. On the day of aviation occurrence it wasn't used.

5. Lighting stop-line on TWY “H” to RWY27.

The lighting stop-line is commissioned and works. On the day of the aviation occurrence it wasn't used by air traffic controller.

During the investigation the Commission determined that the ergonomic condition of working station wasn't at high level:

- The screens of auxiliary camera system are placed at right-hand and above the sight of the air traffic controller;
- The clock for UTC was too small;
- The radio station for Lesnovo airfield and Net19 are placed in low position in the middle between the controller and his assistant;
- Because of construction work ATIS information is very big in volume and changes its letter at each change of conditions, what is troublesome for both controller and crews.
- Torn plastic floor cover under the controller's chair;
- Lesnovo Airfield (on the glide path to RWY27, at 8 NM from touch-down point) is also controlled by Sofia Tower.

The said above has shown that the air traffic controller duty at Sofia Tower is accomplished in increased risk conditions for loss of control over the AC on manoeuvring area of the airfield.

3.3 Human factors

3.3.1 Air traffic controller

The air traffic controller controls the AC movement on the manoeuvring area of Sofia Airport.

In relation with the aviation occurrence the Commission analyzed the following aspects related with the air traffic controller at workstation at Sofia Tower:

1. At 11:52:30 Sofia Tower asked: „AF 268P are you ready for immediate departure RW 27”. The crew answered indistinctly. After the second question: „Sorry, say again”, the crew answered: „We are ready for immediate AF 268P”. According to the controller’s explanation, the time for immediate take-off was missed and he said: “Roger”.

In order to increase of traffic capacity Sofia Tower might ask and to know what was the crew readiness for immediate take-off or after the landing traffic.

2. To the next controller’s instruction „AF 268P landing traffic RW 27 five miles from touch down, keep holding point” the crew answered „OK, traffic in sight AF 268P”, but didn’t repeat the instruction of Sofia Tower „Keep holding point”. Sofia Tower didn’t asked confirmation of understanding of „keep holding point”.

The aviation phraseology demands to repeat instruction as the only confirmation of exactly what as received and exactly what was understood.

3. At the moment of instruction “Keep holding point”, A320 aircraft was headed to East and the crew reported the landing traffic of Lufthansa was in sight.

The word “keep” was wrongly used during the movement and might be interpreted as instruction to retain (maintain) some action, movement in the case. More wrongly is to use the word “keep” (retain, maintain), if before it the question about immediate take-off was asked.

In the same time the Commission didn’t accept the aviation phraseology absolutely blocked in a frame. The used by Air France phrase „OK, traffic in sight” wasn’t correct. The used by Lufthansa phrase “OK...Will be nice” was also incorrect. “OK” is not aviation phraseology. „Will be nice is also not aviation phraseology, but they clear enough what should be understood.

The specific phrase in controller’s sentence was: “holding point”.

4. The entire shift, including controllers at Sofia Radar, testified they behave with increased attention to the Air France crews, but air traffic controller didn’t control carefully the AC movement in the maneuvering area at Sofia Airport.

3.3.2 Crew

The crew of the A320 aircraft didn’t follow attentively the situation at Sofia Airport.

There was discrepancy between the commander’s report and the actual situation

In his report about the aviation occurrence (Enclosure No10) the commander said: „During taxi to RWY 27 the tower asked us if we were ready for an immediate”. The answer was “affirm”. A couple of seconds after that he told us: „keep holding and wait” We understood and repeated) „keep rolling and wait” Once aligned we heard a go around procedure for the aircraft on final. We understood the mistake.

The commander explained the mistake of the crew as a result of wrongly interpreted instruction, which was repeated the same way as interpreted.

The radio record was without any interference.

1. We understood and repeated.

After the crew's reply „OK, traffic in sight”, there was no repetition. If the phrase „Keep holding point” was received and interpreted as “keep rolling and wait”, this wrong phrase wasn't repeated.

2. The ATCo said “keep holding point”. The commander understood „keep rolling and wait”. “And wait” might give some sense of the sentence on the assumption of changing “holding” with “rolling”.

From the record it was clearly heard, “H” and “D” for „HOLDING”, as well „P” for „POINT”.

3. When taxiing to the beginning of the runway for a take-off, the crew normally expects several variants for instructions:

- „holding” (wait on taxiway)
- „line-up” (go to runway, take-off not permitted yet);
- „line-up and take-off” (go to runway and take-off);
- „rolling take-off” (go to runway and take-off without stopping).

Under the instruction “Keep rolling and wait” might have some sense to keep on movement and wait for instruction for immediate take-off, but there was no logic, if after the reply of the crew: „OK. Traffic in sight AF 268P, Sofia Tower cleared landing of another aircraft on the same frequency on the only operational RWY27 at Sofia Airport, „Good afternoon Lufthansa 5HW, Tower. Wind 270° / 8kt, clear to land RWY27”.

According to the Aircraft Operation Manual of A320 aircraft, the crew consists of two pilots: commander and first officer.

On the base of the documents available the Commission determined that there were commander-instructor and two first officers onboard of the A320 aircraft. During the investigation Air France submitted a document for in-flight check for an A320 aircraft of the two pilots from 5.04.2007 and 26.04.2007 (Enclosure No 11), i.e. 12 and 13 days after the aviation occurrence. The two pilots didn't possess type rating for A320 aircraft on the day of aviation occurrence. As to the day of preparation of the report the Commission hadn't receive any answer from Air France why the two first officers had no type rating for A320 aircraft in their licenses on the day of the aviation occurrence. The Commission assumed the two first officers were trainees. There was no safety pilot onboard. The requirements of JAR-OPS 1.940, Para (a), p.1 & 3 were not met, where it is said: “Air operator should provide the flight personnel and the number of its members to comply as minimum to the minimal requirements of the Aircraft Operating Manual”, and in the case of an A320 aircraft it meant two pilots; and also “all members of the flight personnel should possess valid licenses and to be suitably qualified “, or there should be assuring first officer (safety pilot) with type rating for A320 aircraft.

At the realization of the aviation occurrence one of the pilots had 5 flights during the last 90 days and the other one – 8 flights during the last 90 days, which means less than 2-3 flights monthly.

4. Summary

4.1 Conclusions

On the base of the above mentioned the Commission made the following conclusions:

1. The air traffic controller at Sofia Tower was hampered to look visually after the AC movements in the manoeuvring area of Sofia Airport from its workstation.
2. The technical equipment at the workstation in Sofia Tower is of lowered qualitative indexes and it hampers also the ATCo.
3. The workstation at Sofia Tower should be assessed from ergonomic point of view.
4. ATCo at workstation in Sofia Tower didn't require repetition of basic instruction (acknowledgement), which is a violation of the technology of the air traffic service.
5. The crew of A320 aircraft didn't follow attentively the situation at Sofia Airport

6. The commander of the A320 aircraft didn't assess properly the conflict situation created by the crew.
7. During the flight planning the requirements of JAR-OPS 1.940, Para (a), p.1 & 3 were not met:
 - The two pilots had no type rating for A320 aircraft;
 - There was no safety pilot onboard.

4.2 Causes

4.2.1 Main cause

Understated attention by ATC – workstation in Sofia Tower and by the crew of A320 aircraft during movement in maneuvering area of the airfield

4.2.2 Accompanying causes

1. The tower of Sofia Airport doesn't correspond to the new layout of RWY 27 and Terminal No 2.
2. Technical equipment of workstation in Sofia Tower is not useful enough and in full the ATCo in execution of his duty for control of AC in Airport Sofia maneuvering area.
3. First officer training was performed onboard of Air France A320 aircraft without safety pilot.

5. Safety recommendations

1. ATSA BULGARIA to reappraise the working technology at ATC workstation in Sofia Tower in the specific created situation, related with a raised risk during the control of AC in Airport Sofia maneuvering area.
2. CAA and ATSA BULGARIA to ensure that the conditions for execution of control technology of the AC in Airport Sofia maneuvering area are according to the new airfield infrastructure.
3. ATSA BULGARIA to analyze the expedience of creating of new workstation "Ground Control".
4. ATSA BULGARIA to perform ergonomic assessment of workstation Sofia Tower and to create adequate working conditions.
5. DGAC of Republic of France to inspect the training process of new first officers in Air France airline.
5. Chief pilot of Air France airline to give a talk with the commander of „Air France 268P” flight about the correctness of the described by him aviation occurrence.

Enclosures:

Enclosure No 1: Record of the trajectory of Lufthansa 5HW flight

Enclosure No 2: Information about the crew

Enclosure No 3: Information asked from Air France airline

Enclosure No 4: ATIS Information

Enclosure No 5: Radio exchange records

Enclosure No 6: Airport Sofia chart

Enclosure No 7: Medical Commission Report

Enclosure No 8: Commander's report about the aviation occurrence.