

Investigation Report

TX002-0/07
September 2008

Identification

Type of incident: Incident
Date: 12 January 2007
Place: Airport Berlin-Tegel
Aircraft: Airplane
Manufacturer / type: Gulfstream / G-IV SP
Injuries to persons: no injured persons
Damage to aircraft: Aircraft not damaged
Other damage: none
Source of information: Investigation by BFU

Factual information

History of the flight

A Gulfstream G-IV SP of the Swedish Airforce with four crew members and four passengers on board parked on the northern apron of the Berlin Tegel Airport. A flight according to Instrument Flight Rules (IFR) from Berlin to Bremen was scheduled.

The crew contacted *Tegel Ground*, requested engine start-up clearance as well as runway 26R for the later take-off. According to the statement of the pilot in command, he was pilot flying and the co-pilot was in radio contact with air traffic control. The airplane taxied over the taxiway NE towards the runways. The (female) ground controller asked whether the crew wanted to conduct the take-off on

runway 26L. This would allow for an earlier take-off. The crew accepted the proposal.

Shortly before reaching the taxi holding position CAT-II/III of the runways 26R/L, the ground controller advised the crew to contact *Tegel Tower*. According to the statement of the ground controller, a co-ordination discussion between her and the tower controller had not taken place. After the ground controller had transferred the flight to the tower frequency, she shifted her activity to an airplane taxiing away from the southern apron.

At the time when the G-IV SP was on ground frequency, the tower controller gave landing clearance for runway 26R to another approaching transport aircraft on the tower frequency at 18:43:22 hrs¹.

At 18:44:20 hrs, the copilot of the G-IV SP addressed air traffic control: "Tower Swedforce ... approaching CAT three holding runway two six right." The tower controller replied: "Swedforce... hello, line up runway two six left." The copilot replied: "... line up, eh, runway two six left ... and tower ... confirm cleared to cross."

Thereupon, the controller replied: "... there is no need to cross two, eh, just line up runway two six left." The co-pilot answered at 18:44:47 hrs: "line up, eh, two six left ..."

¹ All times given are in local time unless indicated differently

Approximately three seconds later, the crew of the airplane in final approach requested a "wind check", the controller gave the requested information.

The crew of the other airplane which was taxiing from the southern apron on taxiway SE in easterly direction, contacted tower at 18:44:50 hrs: "Tegel tower ... Guten Abend taxiing to the holding point runway two six left." The controller answered: "... hello, in sequence line up runway two six left." The crew acknowledged the clearance "line up in sequence, eh, line up runway two six left..."

At 18:45:29 hrs, the copilot of the G-IV SP called the controller again: "Tower ... continue and crossing runway two six, eh, to two six left." Thereupon, the controller asked: "... please confirm do you request two six right for departure or do you want to depart on two six left?"

According to his statement, the pilot in command of the Gulfstream G-IV SP realized that the co-pilot questioned the clearance of the controller. This caused him to stop the aircraft. When he looked towards the final approach sector on runway 26R, he noticed several approaching aircraft. He estimated that the first airplane was very close. Therefore he took over radio communication and replied: "We are coming from the military apron and to get to the two six left we need to cross two six right." Thereupon, the controller gave the instruction: "Ah Swedforce ... I am sorry, so I want you to hold short of runway two six right please." The crew acknowledged the instruction, and according to the statements of the pilot in command the airplane came to a stop even before taxi holding position CAT-I of runway 26R.

The tower controller stated that she had assumed that the Gulfstream came from the southern part of the apron on taxiway SE.

Personnel information

Flight crew

The 56 year old captain served in the Swedish Airforce for 34 years. He held a military pilot license. The pilot had the type rating for the type G-IV SP since 1995. His flight experience on the G-IV SP was 6,014 hours. In the last 90 days he flew 73 hours on that type and performed 20 landings.

The 40 year old co-pilot served in the Swedish Airforce for four years. He held a military pilot license. He had the type rating for the G-IV SP aircraft since 2005. His flight experience on this type was 3,500 hours. In the last 90 days he flew 73 hours on that aircraft type and performed 20 landings.

Ground controller

The ground controller held a controller license since the third quarter of 1991. On the day of the incident, she had been working since 15:15 hrs and was back at her workstation for about 130 minutes after a break of approximately one hour.

Tower controller

The tower controller held her air traffic controller license since November 1992. On the day of the incident, she had been working since 14:30 hrs, and was back at her workstation for 24 minutes after a break of approximately one hour, when the incident happened.

Aircraft information

The Gulfstream G-IV SP is a twinjet, turbine driven medium range airplane. The aircraft had valid certificates of registration issued by Sweden and was operated by the Swedish Airforce.

Manufacturer:	Gulfstream
Type:	G-IV SP
Serial number:	1274
Year of manufacture	1995
MTOM:	33,566 kg
Engines:	Rolls-Royce Tay Mark 611-8

At the time of the incident the airplane had 4,577 total operating hours.

Meteorological information

At the time of the incident, darkness and visual meteorological conditions prevailed.

Clouds:	1-2 oktas in 1,000 ft 3-4 oktas in 2,700 ft 5-7 oktas in 3,200 ft
Precipitation:	Rain
Ground visibility:	more than 10 km
Wind:	240°/ 17 kt, in gusts 27 kt
Temperature:	7 °C
Dew point:	3 °C
Air pressure (QNH):	1014 hPa

Radio communication

The radio communication between the airplane and Tegel Tower was recorded and was available to the BFU as a transcription.

Aerodrome information

The airport Berlin-Tegel has two parallel runways with a width of 46 m each, in the direction 081°/261°. The runway 08L/26R has a length of 3,023 m, the 08R/26L is 2,428 m long. At the time of the incident, both runways were in operation. The northern runway 26R was used for landings, and the runway 26L was used for take-offs.

The terminal buildings for civil aviation are located to the south of the two runways. The airport tower is also located there. The apron for military use is located on the northern side of the airport territory. From the northern apron, the taxiway NE goes in easterly direction, initially parallel to the runways. The taxiway then continues south-eastern and finally in southerly direction and leads into runway 26R. From the southern apron, the taxiway SE goes in easterly direction to runways 26R and 26L. The taxi holding position CAT-I of runway 26L, identical to taxi holding position CAT II/III 26R, is located approximately 150 m from the junction of the taxiway and runway 26L.

The airport was equipped with under-floor stop bars at the CAT-II/III taxi holding positions. These were switched off at the time of the incident.

The airport was equipped with airfield surface movement radar. This was in operation at the time of the incident. Aircraft were displayed as primary targets on a monitor at the working place of the tower controller.

Flight data recording

The airfield surface movement radar recordings were not available to the BFU. According to the air navigation service provider (ANSP), the airfield surface movement radar data had been initially recorded, however deleted 10 days after the incident due to storage capacity reasons.

The airplane was equipped with Flight Data Recorder (FDR) and Cockpit Voice Recorder (CVR). The data were not available to the BFU.

Organizational and management information

More than 80% of all aircraft movements on the Tegel airport take place between the southern apron and the runways.

According to ANSP procedures aircraft taxiing from the northern apron via the taxiway NE to the runways 26L/R, had to be transferred from ground control to tower control at taxi holding position CAT-II/III, in all weather conditions. This procedure had the objective to avoid possible adverse effects to the sensors of the meteorological observation station by the jet blast of airplanes waiting at the taxi holding position CAT-I.

The *operating instructions for air traffic control (BAFK)* specified that airfield surface movement radar is to be used for the monitoring and controlling of aircraft and vehicles on the maneuvering area:

- in case of limited visibility, in particular during meteorological conditions requiring procedures according to CAT II/III
- by night
- in case of inability to see parts of the maneuvering area
- if this seems necessary to the air traffic controller

Additional information

The ground controller assessed the air traffic volume prevailing at her workstation at the time of the incident as "low". She assessed her workload of the last two hours before the incident as medium load.

The tape recording transcription of the radio communication showed that the tower controller had radio communication with seven different aircraft in the period from 18:39:19 hrs to 18:45:57 hrs - the time when the G-IV SP crew confirmed to stop in front of the runway. 29 radio calls were recorded in this period. The tower controller assessed that a medium air traffic volume prevailed at the time of the incident. She assessed the prevailing air traffic volume as "rather complex".

From the aerodrome controller workstation in the tower, the vision in north-easterly direction towards the taxi holding position (CAT II/III) of taxiway NE was constricted by a corner pillar of the tower glazing.

According to the statement of the ANSP, the flight was identified as a state flight in the flight plan.

Analysis

According to the statements of the crew, the aircraft came to a stop even before the taxi holding position CAT I of runway 26R, and thus outside the safety area of the runway. It is the opinion of the BFU that there was no immediate risk of an accident.

Flight operations

From the point of view of the Gulfstream IV crew, the location of their airplane was known to air traffic control after they contacted *Tegel-Ground*. Thus, the crew assumed that the aircraft had been identified and also coordinated with *Tegel Tower*. The controller responded to the initial call of the crew on tower frequency with the clearance for line-up to runway 26L. Because the clearance didn't contain any explicit instruction to cross the other runway, the co-pilot requested confirmation of crossing when reading back the clearance. It is the opinion of the BFU that the answer of the co-pilot "line up ... two six left" to the controller who had said that a crossing of runway 26R would not be necessary, showed that he had certain doubts.

The fact that the crew was able to see the approach sector from their position on the taxiway and also approaching aircraft under the prevailing weather conditions, as well as the call requesting a "wind check" coming from the airplane on final approach, intensified the doubt in the clearance given.

Air Traffic Control

When the ground controller proposed the crew to use the southern runway 26L for take-off, this was - just as the transfer of the aircraft to the tower at the CAT-II/III taxi holding position - not the result of a separate co-ordination with the tower controller, but corresponded to the usual operating procedures. After the transfer to the tower the ground controller focused her attention on the next aircraft.

At the moment of the initial call of the crew, the tower controller assumed that the airplane was on the taxiway SE. This anticipation resulted from her experience at the Tegel airport. In fact, there was another aircraft on the taxiway SE which was in contact with *Tegel-Ground* and changed to tower frequency a short time later. The corner pillar of the tower glazing constricted the view to an aircraft standing on the taxiway NE at the CAT-II/III taxi holding position.

At the begin of the initial call on tower frequency, the crew had stated the call sign "Swedforce ...". This identified the aircraft as a Swedish military airplane. As military airplanes are normally parked on the apron in the north of the airport territory, the tower controller could have derived from this that the airplane probably was on the taxiway NE. Even if the further content of the crew's call "... approaching CAT III holding runway two six right" did not contain any distinct position information of the airplane, the statement of place "CAT III holding" pointed to taxiway NE according to the applicable operating procedures.

Due to the unavailability of airfield surface movement radar recordings, no exact statements can be given on the effectiveness of the system. However, the radio communication recordings and the indications of the tower controller indirectly suggest that she did not integrate the information available on the monitor of the airfield surface movement radar into her situation awareness when she issued the clearances. Only the fact that the crew doubted the instruction several times, and that they insisted on an explicit clearance for crossing

runway 26R, as well as the remark on the position of the airplane, lead to a correction of the mental situation awareness of the controller, and thus to a correction of the taxiing instruction.

The investigation did not show any evidence that a priority of the flight might have been determined or agreed between the two controllers.

Conclusions

The incident was caused by ATC issuing a clearance on the basis of inadequate situation awareness.

Contributing factors:

- constricted view from the control tower to the aircraft
- insufficient use of the airfield surface movement radar

Investigator in Charge Friedemann
ATS Hohensee

