

# Interim Report

## Identification

|                       |                               |
|-----------------------|-------------------------------|
| Type of Occurrence:   | Serious incident              |
| Date:                 | 30 January 2013               |
| Location:             | Berlin-Tegel Airport          |
| Aircraft:             | Airplane                      |
| Manufacturer / Model: | Dassault Aviation / Falcon 7X |
| Injuries to Persons:  | None                          |
| Damage:               | Minor damage to aircraft      |
| Other Damage:         | Crop damage                   |
| Information Source:   | Investigation by BFU          |
| State File Number:    | BFU EX002-13                  |
| Published:            | March 2013                    |

## Factual Information

During the take-off run the airplane veered off the runway. The pilots aborted the take-off. The aircraft came to a complete stop on the grass next to the runway.

The three crew members remained uninjured and the airplane was undamaged.

## History of the Flight

At the day of the occurrence at about 0830 hrs<sup>1</sup> the airplane Dassault Aviation Falcon 7X had taken off from Braunschweig-Wolfsburg Airport to a flight to Berlin-Tegel Airport. Two pilots, one flight attendant and one passenger were aboard. The pilots stated that after take-off the landing gear could not be retracted.

Shortly after take-off at 0831 hrs the Crew Alerting System (CAS) showed the following amber CAS messages regarding the landing gear: GEAR: SYSTEM FAULT and the nose wheel steering: NWS: FAIL. In addition, several fault messages were generated: GEAR: NORM SYSTEM 2 FAULT, NWS: 1, 2 FAULT and BRAKE: SYSTEM 1, 2 FAULT 3.

The pilots decided to continue the flight to Berlin-Tegel Airport with extended landing gear. At about 0905 hrs the aircraft landed at the airport of destination. The Pilot in Command (PIC) stated that after the landing the aircraft was taxied to the stand using differential power and differential braking.

The crew called the maintenance organisation of the company in Braunschweig and described the events of the flight and the type of generated messages. The messages of the CAS and of the Central Maintenance Computers (CMC) were downloaded and transmitted to the maintenance organisation. The maintenance personnel stated several telephone calls had been made with the crew. In one of the telephone conversations the crew was informed that another company aircraft would come to Berlin and transport the passenger. The crew was further informed that the airplane should return to Braunschweig if possible. The pilots had agreed to check if the flight was possible.

The pilots stated that after they had turned off all electrical users in the airplane for a few minutes and had disconnected the batteries, all failure messages had disappeared once the power was turned on again. The pilots decided to conduct the flight.

The pilots stated that after engine start-up at the stand, the airplane had taxied east on taxiway SM, running parallel to the runway, and then via taxiway SE to runway 26L. The nose wheel steering "was somewhat smoother than usually" but it had responded normally to the control input of both pilots. The Digital Flight Data Recorder (DFDR) data shows that, at the time, the aircraft taxied with about 20 kt with an almost constant heading of 080°; the rudder pedal position changed repeatedly between +30% and -40%.

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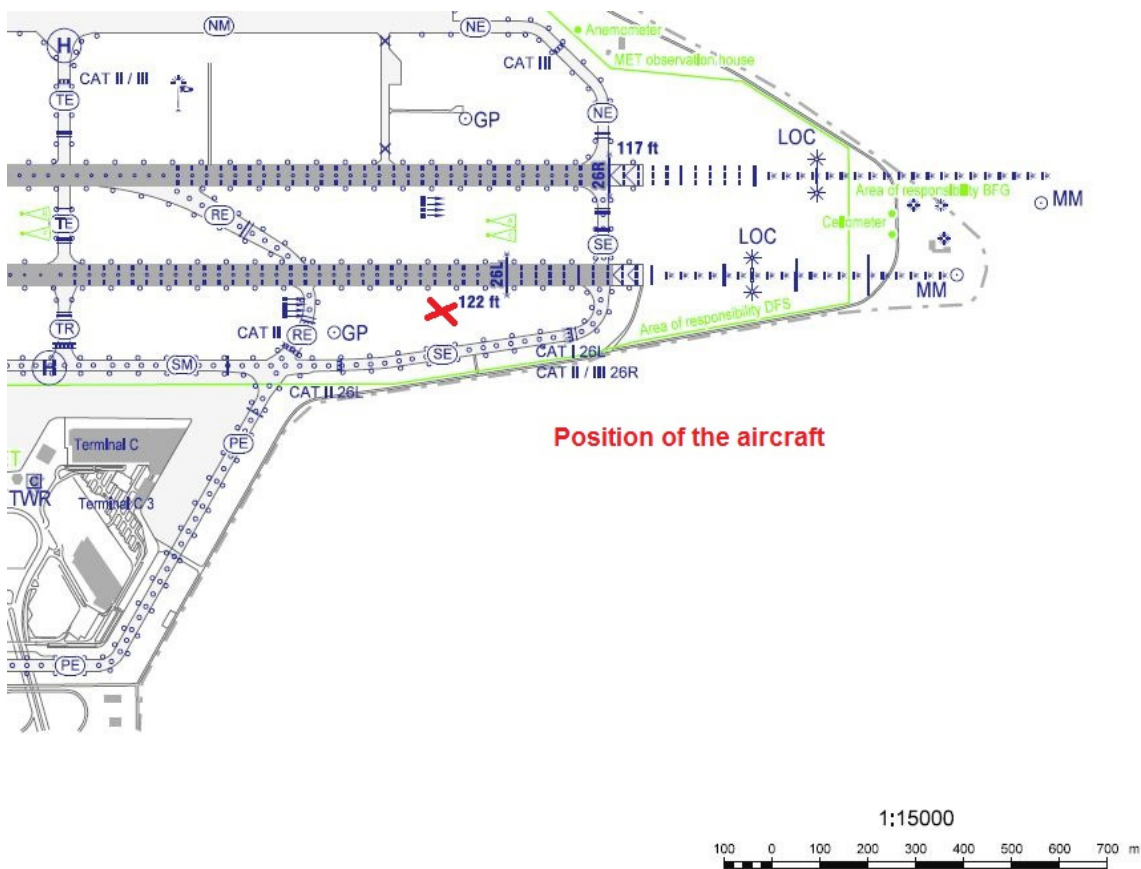
<sup>1</sup> All times local, unless otherwise stated.

Shortly before the airplane had reached runway 26L the controller issued the take-off clearance.

The PIC stated he had informed the co-pilot that he would conduct a rolling take-off. Within 2 - 3 seconds after aligning the airplane with the take-off direction he pushed the power levers completely forward. He noticed that the airplane had the tendency to veer strongly to the left even before the power levers were in the TO position. At this time, speed was about 30 kt. He called out "Abort" loudly, pulled the power levers back, tried to keep the airplane on the runway and brake. The pilot had the impression that neither the nose wheel steering nor the wheel brakes responded to the input.

The DFDR data shows that the airplane taxied with about 10 kt in take-off direction as engine speed N1 changed from about 25% to about 90% within 10 seconds. During this time the speed increased to 30 kt whereas the heading remained by constant 260°. The rudder deflection to the right increased and reached full deflection. The heading decreased in the following 7 seconds to approximately 220°. Engine speed N1 of the three engines decreased to about 30% and N1 of engine 2 increased as the thrust reverser was activated.

The airplane came to rest left of the runway in the grass.



Position of the airplane

Source: AIP, BFU

## Personnel Information

### Pilot in Command (PIC)

The 45-year-old PIC held an Air Transport Pilot's License (ATPL(A)) issued in accordance with to JAR-FCL 1, German. It was first issued on 3 August 1999 by the Luftfahrt-Bundesamt (German civil aviation authority, LBA) and valid until 16 September 2014. His license carried the following ratings as PIC and the Instrument Rating (IR): Falcon 7X valid until 31 December 2013 and Falcon 50/900 valid until 30 September 2013.

His medical class 1 certificate was last issued on 25 July 2012 and valid until 17 August 2013.

His total flying experience was about 7,750 hours, about 260 hours of which were on the type.

## Co-pilot

The 30-year-old PIC held an Air Transport Pilot's License (ATPL(A)) issued in accordance with to JAR-FCL 1, German. It was first issued on 21 May 2008 by the LBA and valid until 15 May 2017. He held the rating for the Falcon 7X valid until 28 February 2013 and the Falcon 50/900 valid until 8 May 2013 and the IR.

His total flying experience was about 2,000 hours, about 300 hours of which were on the type.

## Aircraft Information

The Falcon 7X is a low-wing airplane with a mid-height horizontal stabilizer powered by three jet engines. It is equipped with fly-by-wire controls. The aircraft type is certified for up to 22 occupants.

|                                     |                                |
|-------------------------------------|--------------------------------|
| Manufacturer:                       | Dassault Aviation              |
| Type:                               | Falcon 7X                      |
| Manufacturer's Serial Number (MSN): | 143                            |
| Year of manufacture:                | 2012                           |
| MTOM:                               | 31,750 kg (70,000 lbs)         |
| Engines:                            | Pratt & Whitney Canada, PW307A |

The airplane had a certificate of registration of the civil aviation authority of the Cayman Islands. A German company operated the airplane on non-public company flights. Total operating time of the aircraft was 769 hours at 449 cycles. The take-off mass was approximately 20,591 kg and the centre of gravity of about 31.5%.

## Meteorological Information

At the time of the occurrence Visual Meteorological Conditions (VMC) prevailed.

|                |                           |
|----------------|---------------------------|
| Wind:          | 220°/ 14 kt               |
| Clouds:        | 5-7 oktas in 3,000 ft AAL |
| Visibility:    | More than 10 km           |
| Precipitation: | light rain                |
| Temperature:   | 10°C                      |

Dewpoint: 8°C

Barometric air pressure (QNH): 1,001 hPa

## Communication

The radio communications were recorded by the air traffic control service provider and made available to the BFU.

## Aerodrome Information

Berlin-Tegel Airport has two parallel asphalt runways oriented 081°/261°. The northern runway 08L/26R has a length of 3,023 m and a width of 46 m. The south runway 08R/26L is 2,428 m long and 46 m wide. At the time of the occurrence operating direction 26 was active.

## Flight Recorder

The aircraft was equipped with two solid state Digital Voice Data Recorder (DVDR). The recorders were seized and evaluated by the BFU in Braunschweig.

Manufacturer: Honeywell

Type: AR-Combi

About 400 parameters were recorded.

## Wreckage and Impact Information

The airplane had come to a complete stop on a grassy, flat area about 140 m from the threshold and about 70 m south of the centre line of runway 26L. The nose was pointing into the direction of 218°. The right tire of the nose landing gear was damaged. Aileron and rudder were in neutral positions. The horizontal stabiliser was deflected down. Flaps and spoilers were extended.

In the cockpit the circuit breakers on the CB panel had not been pulled.

The Landing Gear and Steering Control Unit (LGSCU) and the Rotary Variable Differential Transformer (RVDT) were removed and shipped to the aircraft manufacturer for further tests.



Final position of the airplane south of runway 26L

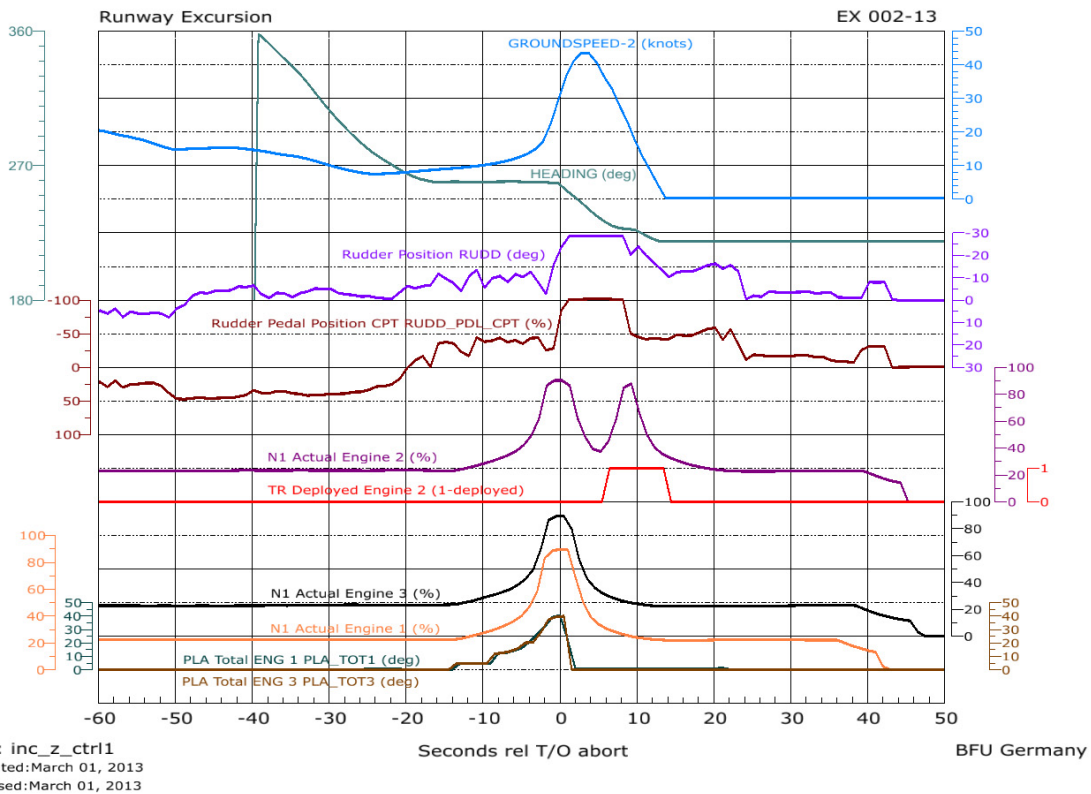
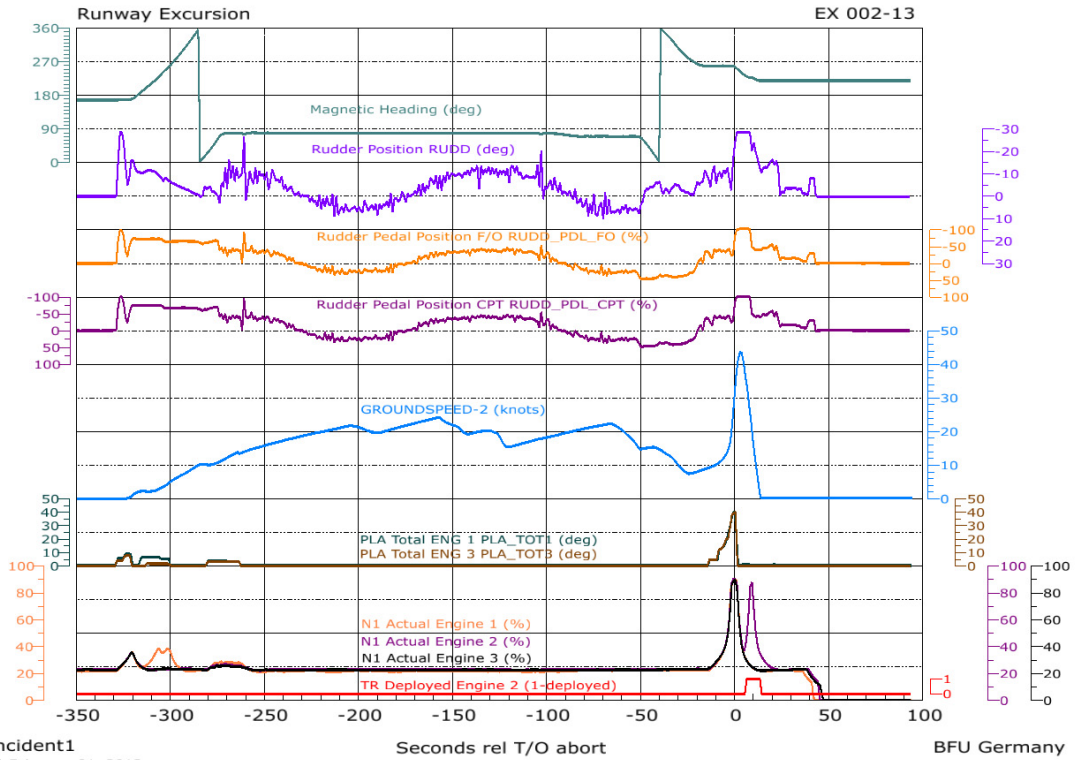
Photo: BFU

Investigator in charge: Jens Friedemann

Field Investigation: Thomas Kostrzewa, Holger Röstel, Jens Friedemann

## Appendices

DFDR excerpts



This investigation is conducted in accordance with the regulation (EU) No. 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and the Federal German Law relating to the investigation of accidents and incidents associated with the operation of civil aircraft (*Flugunfall-Untersuchungs-Gesetz - FIUUG*) of 26 August 1998.

The sole objective of the investigation is to prevent future accidents and incidents. The investigation does not seek to ascertain blame or apportion legal liability for any claims that may arise.

This document is a translation of the German Investigation Report. Although every effort was made for the translation to be accurate, in the event of any discrepancies the original German document is the authentic version.

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Bundesstelle für  
Flugunfalluntersuchung

Hermann-Blenk-Str. 16  
38108 Braunschweig

Phone +49 531 35 48 - 0  
Fax +49 531 35 48 - 246

Mail [box@bfu-web.de](mailto:box@bfu-web.de)  
Internet [www.bfu-web.de](http://www.bfu-web.de)