

INCIDENT

Aircraft Type and Registration:	Mystere Falcon 50, G-KPTN	
No & Type of Engines:	3 Allied Signal TFE731-40-1C turbofan engines	
Year of Manufacture:	2004	
Date & Time (UTC):	21 January 2010 at 1617 hrs	
Location:	Approximately 4 nm south-west of London City Airport	
Type of Flight:	Private	
Persons on Board:	Crew - 2	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	None	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	61 years	
Commander's Flying Experience:	12,000 hours (of which 7,000 were on type) Last 90 days - 23 hours Last 28 days - 12 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and subsequent enquiries made by the AAIB	

Synopsis

The aircraft was on a short positioning flight to London City Airport when it descended below its cleared level of 2,000 ft amsl. The commander believed the aircraft was on final approach for Runway 27 when in fact it was downwind for Runway 09. Following an ATC instruction the aircraft climbed to its cleared level and landed on Runway 09 without further incident. The operator took safety action aimed at preventing a recurrence.

History of the flight

The aircraft was on a positioning flight from Biggin Hill Airport to London City Airport (LCY), a distance of about 10 nm. The pilots were operating in a freelance

capacity for the aircraft operator and were normally based overseas. They were both instructors with considerable experience on type and both were qualified to act as commander on the aircraft. Only one of them had previously landed at LCY and he was nominated as the commander for the flight. It was intended that he should use the opportunity to familiarise the co-pilot (the handling pilot for the flight) with the airport and its required steep approach. The commander occupied the right hand seat.

Prior to departure the commander briefed the co-pilot on the intended flight. The weather at Biggin Hill was good with a light southerly wind, good visibility, few cloud at

1,000 ft and scattered cloud at 2,000 ft. Sunset that day was at 1630 hrs.

The aircraft departed from Biggin Hill's Runway 21 at 1608 hrs and was then handed over by Biggin Hill ATC to Thames Radar. Thames Radar instructed the aircraft to climb to 3,000 feet and advised that its range was approximately 32 nm from touchdown on Runway 09 at London City. Thames Radar subsequently instructed the crew to contact City Radar, as follows:

Thames Radar: "GOLF TANGO NOVEMBER
MAINTAIN ONE NINER ZERO
KNOTS CONTACT ERR CITY
RADAR ONE TWO EIGHT
DECIMAL ZERO TWO FIVE"

G-KPTN: "WE MAINTAIN ERR ONE
NINER ZERO ONE TWO
EIGHT ZERO TWO FIVE AH
GOLF TANGO NOVEMBER"

G-KPTN: "ERRSAYAGAINERRTOWER
CITY FREQUENCY PLEASE
TANGO NOVEMBER"

Thames Radar: "GOLF TANGO NOVEMBER
CITY RADAR ONE TWO
EIGHT DECIMAL ZERO TWO
FIVE"

G-KPTN: "ZERO TWO FIVE SORRY
SIR"

The use of City Radar is not routine and often aircraft are passed directly from Thames Radar to City Tower. The commander stated that he attempted to select the frequency for City Tower (as opposed to Radar) but mis-selected it, getting no response to his initial call.

As a result he called Thames Radar again to obtain the frequency, this time establishing contact with City Radar as initially instructed.

On contacting London City Radar the pilots were instructed to descend to 2,000 ft and take up a heading of 275°. The steep approach procedure was normally flown without the use of the autopilot which was disengaged before the aircraft descended. Flap 20 was then set. The APPROACH mode of the flight director was armed during the descent and entered the APPROACH CAPTURE mode shortly afterwards.

The commander was visual with the ground and could see two bright lights ahead, which he believed were the touchdown zone lights for Runway 27 at LCY. The DME indicated that the aircraft was about 4 nm from the airport. At about this time another aircraft on the frequency was instructed to adjust its heading slightly to establish on the localizer and subsequently to descend with the glideslope. Shortly afterwards G-KPTN was given a further slight heading change.

The commander mistakenly believed that the aircraft was landing on Runway 27 and that it was nearing the final approach point, although he couldn't discern the runway itself. He was concerned that it was becoming too high to conduct an approach and therefore instructed the co-pilot to commence a descent.

The spoilers and full flap were both deployed. A steady descent rate of approximately 2,200 ft/min was established until, on passing 1,100 ft amsl (approximately 900 ft agl), ATC instructed the aircraft to climb. The descent rate was reduced quickly, the aircraft descending approximately 250 ft before achieving a climb. The aircraft was now approximately 4 nm south-west of the runway on a downwind leg.

The radio transcript covering this period is reproduced below:

London City Radar: “CLIMB CLIMB ALTITUDE
TWO THOUSAND FEET
INDICATING ONE THOUSAND
ONE HUNDRED”

G-KPTN: “COPY CLIMBING”

G-KPTN: “WE GO AROUND
CONFIRM”

London City Radar: “CLIMB TWO THOUSAND
FEET NOW”

G-KPTN: “CLIMBING NOW TWO
THOUSAND FEET”

During the climb back to the cleared altitude Flap 20 was reset but the spoilers and landing gear remained deployed, contrary to the published go-around procedure. The aircraft regained the cleared altitude and landed on Runway 09 without further incident at 1624 hrs.

Recorded data

The aircraft was fitted with a Flight Data Recorder (FDR) and a Cockpit Voice Recorder (CVR). Power to the CVR was not isolated on landing after the incident and the recording of the event was subsequently overwritten. Data was successfully retrieved from the FDR. Recordings of radar tracks were obtained together with the relevant down linked Mode S parameter recordings. These were combined with recorded ATC transmissions to produce Figures 1 and 2.

London City Airport

The airport is situated in the built-up heart of London, adjacent to the River Thames. The runway is aligned

095°/275° and both Runway 09 and Runway 27 are equipped with an ILS/DME. They share the common frequency 111.15 MHz and both have a glidepath of 5.5°. The identification code for the Runway 09 ILS is I-LSR and for the Runway 27 ILS is I-LST.

Enhanced Ground Proximity Warning System (EGPWS)

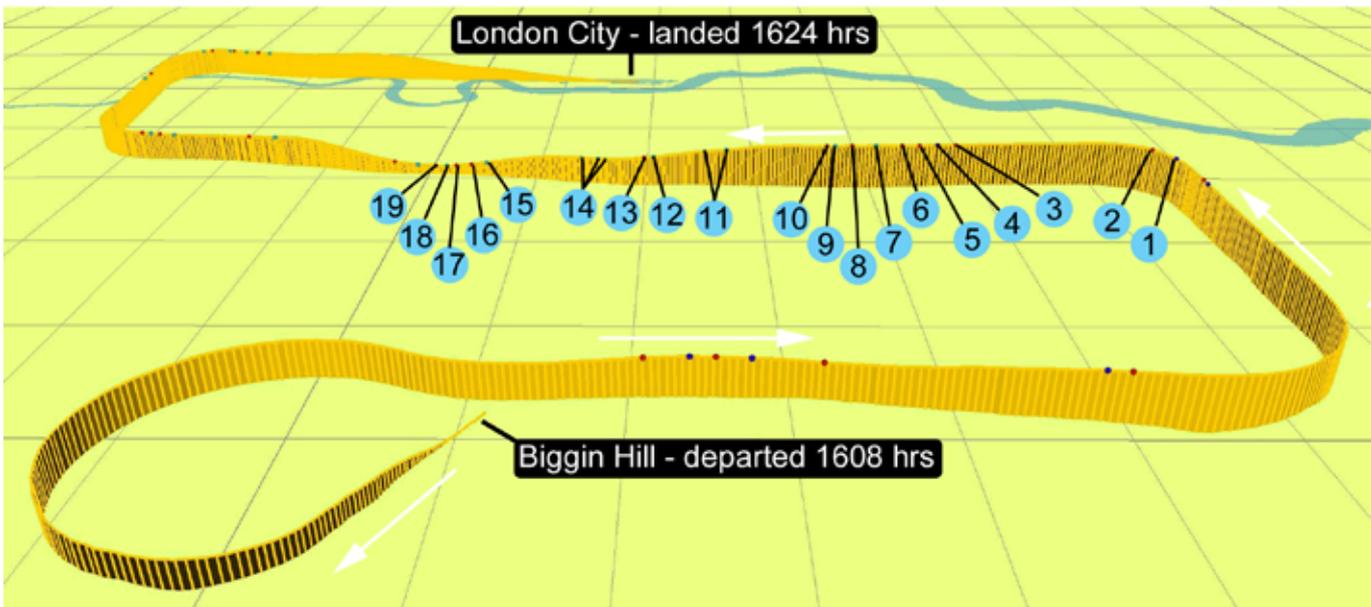
The EGPWS was removed, downloaded and tested. It was found to be fully operational during the event. No crew warnings were generated during the incident but testing and analysis has shown that this was in accordance with its design.

Manufacturer simulations showed that, had the aircraft carried on descending at 2,200 ft/min, “SINK RATE” followed by “PULL UP” aural warnings would have been initiated on passing through a radio height of 422 ft. The crew would then have had 3.4 seconds after hearing the “PULL UP” to successfully initiate the recovery, assuming a similar recovery profile to that flown.

Analysis

It is apparent from the information provided by the commander that he believed the aircraft was intended to land on Runway 27 at LCY and that he had mistaken their position on the downwind leg for Runway 09 as being on final approach for Runway 27. There are several factors that may have influenced this belief.

- The aircraft had departed from Runway 21 at Biggin Hill and therefore a landing in a westerly direction might be expected at London City, only 10 nm away.
- The aircraft was flying into a slight headwind component when on a westerly track.



PERTINENT EXTRACTS FROM ATC RECORDINGS (Call signs omitted for clarity)

AC = AIRCRAFT

TR = THAMES RADAR

CR = CITY RADAR

- 1 TR: "...CONTACT CITY RADAR ONE TWO EIGHT DECIMAL ZERO TWO FIVE" Correctly read back frequency
- 2 AC: "...ONE TWO EIGHT ZERO TWO FIVE..."
- 3 AC: "ER SAY AGAIN THE THE TOWER CITY FREQUENCY PLEASE..."
- 4 TR: "...CITY RADAR ONE TWO EIGHT DECIMAL ZERO TWO FIVE" Did not tune the read back frequency. Expected City Tower frequency
- 5 AC: "ZERO TWO FIVE SORRY SIR"
- 6 AC: "CITY GOOD AFTERNOON..."
- 7 CR: "...DESCEND NOW ALTITUDE TWO THOUSAND FEET TURN RIGHT FIVE DEGREES REPORT THAT HEADING"
- 8 AC: "TO THE RIGHT FIVE DEGREES ER TWO SEVEN FIVE CONFIRM DESCENT TWO THOUSAND"
- 9 CR: "THAT IS CORRECT ..."
- 10 AC: "DESCENDING TWO THOUSAND..." Correctly read back the last cleared altitude of 2,000 ft
- 11 City Radar gave another aircraft a heading change to establish on the localizer and instructions to descend with the glidepath when established. This was acknowledged by that aircraft.
- 12 CR: "...TURN RIGHT HEADING TWO EIGHT ZERO DEGREES"
- 13 AC: "TWO EIGHT ZERO..."
- 14 The other aircraft reported established on the glideslope. The aircraft was instructed to descend with the glideslope and contact City Tower.
- 15 CR: "...CLIMB CLIMB ALTITUDE TWO THOUSAND FEET INDICATING ONE THOUSAND ONE HUNDRED"
- 16 AC: "COPY CLIMBING..." Approach / landing terminology
- 17 AC: "...WE GO AROUND. CONFIRM"
- 18 CR: "...CLIMB TWO THOUSAND FEET NOW"
- 19 AC: "CLIMBING NOW TWO THOUSAND FEET..."

Figure 1

Overview of the flight

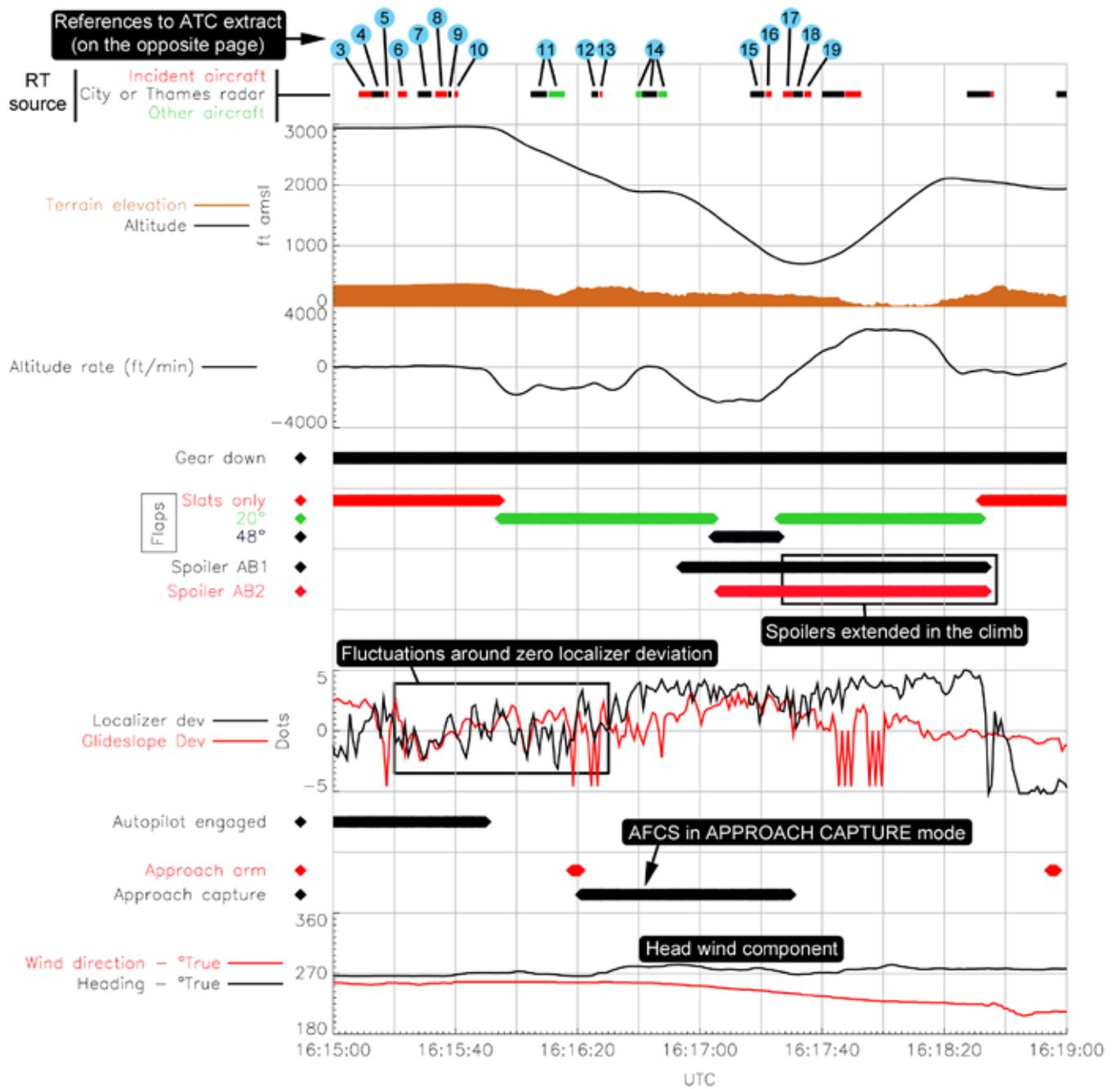


Figure 2
Descent below cleared altitude

- The flight director had entered APPROACH CAPTURE mode whilst on a westerly track.
- The runway at London City is difficult to differentiate from the backdrop of high rise office and residential buildings. This might have been made more difficult by the prevailing lighting conditions, with the aircraft flying in a westerly direction just before sunset. The commander had convinced himself that he could see the runway touchdown lights.
- The ILS/DME frequency required to be selected by the pilots was the same for both runways. The identifier codes, although not the same, are very similar.
- The requirement to fly the steep approach with the autopilot disengaged increased the crew workload on an already busy flight.
- Another aircraft was given a heading change and clearance for the approach, just before the commander was also given a heading change on the same frequency.

- The commander had thought he had been passed to City Tower, rather than City Radar. By not reading back ATC instructions in full the opportunity to pick up this mistake was lost. He associated being passed to City Tower with being on the latter stages of the approach.

The crew's confusion was evident when ATC instructed the aircraft to climb back to its cleared altitude, the spoilers and landing gear remaining deployed as the crew queried the instruction and sought confirmation that a go-around should be initiated.

Subsequent actions

The commander co-operated fully with the operator during the subsequent internal investigation and later attended additional simulator training before returning to flying duties.

As a result of their investigation the operator has made changes to the composition requirements of crews operating into LCY. They have also changed training procedures to minimise the risk of a repetition and published information to crews highlighting the incident and the lessons learned.