

**SERIOUS INCIDENT**

<b>Aircraft Type and Registration:</b>	Gulfstream G5, CS-DKE	
<b>No &amp; Type of Engines:</b>	2 Rolls Royce BR710 turbofan engines	
<b>Year of Manufacture:</b>	2007	
<b>Date &amp; Time (UTC):</b>	21 November 2008 at 0740 hrs	
<b>Location:</b>	'D' Ramp, Farnborough Airport, Hampshire	
<b>Type of Flight:</b>	Public Transport	
<b>Persons on Board:</b>	Crew - 3	Passengers - 1
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	Scuffing to winglet on CS-DKE. Top of winglet broken off on parked aircraft	
<b>Commander's Licence:</b>	Airline Transport Pilot's Licence	
<b>Commander's Age:</b>	44 years	
<b>Commander's Flying Experience:</b>	5,500 hours (of which 994 hrs were on type) Last 90 days - 75 hours Last 28 days - 26 hours	
<b>Information Source:</b>	AAIB Field Investigation	

**Synopsis**

As CS-DKE taxied from its parking position on the Delta ramp at Farnborough Airport, its left winglet severed the right winglet of a parked, unoccupied Global Express aircraft, C-GGLO. The Delta ramp was not painted with parking stand markings. Although the flight crew had identified that wingtip clearance was a concern, the pilot taxiing CS-DKE did not detect the collision. The investigation identified similarities with collisions involving the wingtips of larger aircraft. The operator of CS-DKE has introduced a procedure to prevent reoccurrence, and the airport operator has taken safety action.

**History of the flight**

C-GGLO had arrived at Farnborough some days before the event and was parked on the Delta ramp according to the airport's normal procedures (the Delta ramp is a long ramp area, formerly a taxiway, now used for aircraft parking and as a taxiway). CS-DKE then arrived and was parked adjacent to C-GGLO. Both aircraft were parked at approximately 45° to the edge of the ramp area, facing north-east, such that if CS-DKE were to move straight forwards from its position, the left winglet of CS-DKE would pass close to the right winglet of C-GGLO.

CS-DKE was scheduled to fly to West Palm Beach, Florida. The flight crew consisted of a captain under training in the left seat and a training captain in the

right seat, who was the commander. During pre-flight preparations, it was decided that the captain under training was to be pilot flying (PF) for the sector; the training captain was to be pilot monitoring (PM).

The PM carried out the exterior inspection, noting as he did so that C-GGLO was parked close to the path which CS-DKE would take as it taxied from its position. The PF also carried out an exterior inspection of the aircraft and estimated the clearance between the aircraft winglets to be about three metres if he taxied forward without turning.

The PF stated in his pre-flight briefing that he intended to manoeuvre slightly to the right as he began to taxi, to ensure that there was no danger of a collision.

At about 0730 hrs, the PF began to taxi the aircraft forward. The sun had risen and the PF later stated that there was sufficient daylight to see the wingtip clearly. He made a “slight” turn to the right<sup>1</sup> as he moved off the parking position. He stated that he was conscious of the need to monitor the wingtip clearance and that he was also paying attention to positioning his aircraft accurately onto the taxiway ahead, which was not marked with a centreline. After taxiing forward a short distance, he brought the aircraft to a halt again, aware that the winglet of his aircraft was “quite close” to the winglet of C-GGLO. However, he perceived that sufficient clearance existed and continued taxiing.

CS-DKE took off normally. A short time later, airport staff noticed the severed upper section of the winglet of C-GGLO on the ground, and recognised that there may have been a collision when CS-DKE left the ramp (no other aircraft had moved in that area). The operator of

CS-DKE was contacted and a satellite telephone call made to CS-DKE, which was over the western Atlantic. The flight crew were informed that their aircraft may have been involved in a wingtip collision on the ramp at Farnborough. The flight crew and cabin attendant inspected the wingtip in flight but did not observe any damage.

After landing at West Palm Beach, a visual inspection by an engineer showed slight scuff marks on the winglet of CS-DKE, consistent with a collision. There was no structural damage, and the marks were polished out. C-GGLO was subsequently fitted with a new winglet.

### **Flight crew**

The captain under training had a total of 7,500 hours flying experience, of which 150 hrs were on the G5. He was widely experienced in business jet operations and had been a commander on other aircraft types. The operator of CS-DKE required captains transitioning onto the G5 fleet to spend a short period, typically about six months, as co-pilots on the type before releasing them as captains on the fleet. The captain under training of CS-DKE had successfully completed this period, and was undergoing line training as a captain on the accident flight. The training captain in command of CS-DKE was experienced in his role.

### **View of the wingtip from the flight deck**

The AAIB investigator inspected an aircraft identical to CS-DKE and found that the winglet and the outer part of the left wing could be seen clearly from a seated position in the left flight deck seat. This required either the use of a small mirror fitted to the window structure for the purpose or positioning one’s head against the side window. The wingtip was not visible from the other flight deck seat.

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#### **Footnote**

<sup>1</sup> FDR data showed that the aircraft turned from a heading of approximately 045° onto a heading of slightly more than 050° soon after beginning to taxi.

The captain under training reported that he preferred to look directly at the wingtip, rather than using the mirror.

### **Aircraft parking at Farnborough**

Farnborough has operated as a civil airport, specialising in executive aviation, for several years with routinely used parking procedures. Aircraft arriving at Farnborough were parked under the guidance of a marshaller, such that they might depart without needing to be towed or marshalled from their position. Because of the wide variety of aircraft sizes using the airport, no parking stands were marked out, although the edges of parking areas were clearly identified by painted lines.

The airport management considered that although marking parking stands out might reduce the likelihood of a wingtip collision, the consequent reduction in parking capacity would require aircraft to be routinely re-positioned by tug and this activity would incur additional risk. The airport operator provided marshalling staff to departing aircraft either on request, or if the marshallers themselves considered their attendance desirable.

### **Analysis**

Although the flight crew of CS-DKE were aware that wingtip clearance was a concern, they judged that the aircraft could depart safely under its own power without a marshaller. The PF's decision to make a gentle right turn as he taxied forward may have been significant as

it is possible that CS-DKE was not parked precisely parallel to C-GGLO, but may already have been pointing slightly towards it<sup>2</sup>. The lack of ground markings at 45° to the centreline makes accurate positioning of aircraft difficult although no such marking is specified in the relevant international standards.

The PF was monitoring the progress of his aircraft's wingtip as he taxied forward and yet did not see the collision or recognise it was imminent. Other investigations into ground collisions have identified that pilots of large swept-wing aircraft have difficulty perceiving the path a wingtip will take on account of its remoteness and the geometry of the flight deck and wingtip. This geometry had not previously been identified in smaller aircraft accidents but it is possible that this was a factor in this event.

### **Safety action**

Following the event, the operator of CS-DKE issued an instruction to flight crews that all aircraft departing from Farnborough were to be marshalled out of their parking positions.

The airport operator introduced additional procedures after the event, requiring aircraft departing the Delta apron to be marshalled from their parking positions. However, the airport operator has since withdrawn that procedure and replaced it with information in the UK Integrated Aeronautical Information Package (IAIP) and broadcast on the ATIS, advising flight crew that marshalling is available.

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### **Footnote**

<sup>2</sup> The precise parked position of CS-DKE from CCTV could not be ascertained.