



Accident between the Boeing 777-300 registered **F-GSQT** operated by Air France and the Airbus A330-900 registered **N411DX** operated by Delta Air Lines on Wednesday 30 August 2023 at Paris-Charles de Gaulle

Time	Around 13:30 ¹
Type of flights	Passenger commercial air transport
Persons on board	Air France flight: captain (PM ²), co-pilot ³ (PF), relief pilot, 12 cabin crew members and 473 passengers Delta Air Lines flight: captain (PF), co-pilot (PM), relief pilot, 10 cabin crew members and 282 passengers
Consequences and damage	Boeing 777- 300: APU access hatches and RH and LH elevators damaged Airbus A330-900: RH winglet damaged
This is a courtesy translation by the BEA of the Final Report on the Safety Investigation. As accurate as the translation may be, the original text in French is the work of reference.	

Collision between an aeroplane taxiing and a stationary aeroplane

1 HISTORY OF THE FLIGHT

Note: the following information is principally based on CVR and FDR data from the Airbus A330-900, FDR data from the Boeing 777-300, statements, radio-communication recordings and radar data.

The Air France Boeing 777-300 from Lima (Peru), landed on runway 26L of Paris-Charles de Gaulle airport at around 13:15. The aeroplane vacated the runway via ramp V3, crossed runway 26R via taxiway S3 and then taxied on taxiway T6 (see *Figure 1*). At the junction with taxiway T, the controller asked the crew to turn left onto T and then right onto UT3 in order to hold on the de-icing pads. She told the crew that there would be a 20 to 30 minute hold before the terminal parking stand was free. The Boeing 777-300 taxied on taxiway T at a ground speed of roughly 8 kt and passed behind an Air France Boeing 777-200 which had arrived from New York JFK (USA) and was holding on UT4. At roughly 13:22, the crew of the Boeing 777-300 informed the controller that they had shut down the engines and that they wanted to be given a five minute warning before the clearance to continue to the terminal parking stand.

¹ Except where otherwise indicated, times in this report are local.

² The glossary of acronyms and abbreviations frequently used by the BEA can be found on its [web site](#).

³ In Air France, a co-pilot is designated by the term First Officer (FO).

The Delta Air Lines Airbus A330-900 from Seattle (USA), landed on runway 26L at around 13:25. The aeroplane vacated the runway via ramp V2, crossed runway 26R via taxiway S3 and then taxied on taxiway T6. At the junction with taxiway T, the controller asked the crew to turn left onto T and then right onto UT2 in order to hold on the de-icing pads, as their terminal parking stand was also busy. The Airbus A330-900 taxied on taxiway T at a ground speed of around 12 kt, passed behind the Boeing 777-200 holding at UT4, slowed down to around 8 kt and passed behind the Boeing 777-300 holding at UT3.

At 13:31:30, the tip of the right wing of the Airbus A330-900 stuck the tail of the Boeing 777-300. The Airbus A330-900 came to a halt a few metres further on.

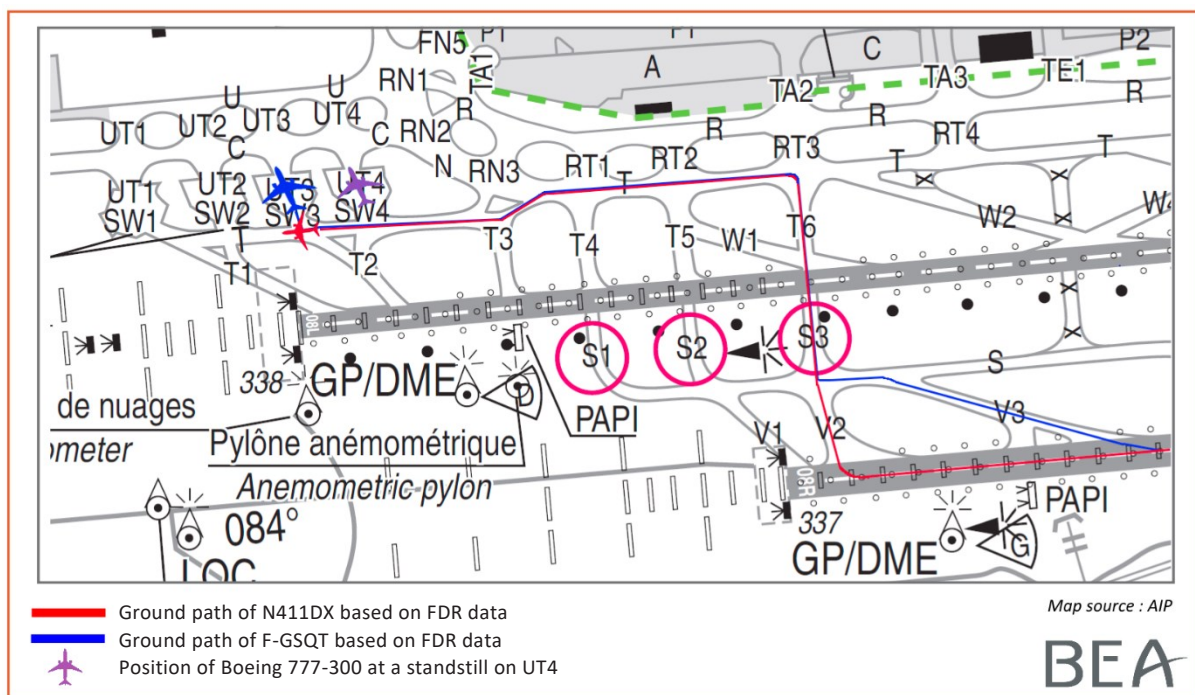


Figure 1: ground paths of 777-300 registered F-GSQT and A330-900 registered N411DX
(Source: AIP, annotations BEA)

2 ADDITIONAL INFORMATION

2.1 UT taxiways

There are four taxiways UT1 to UT4 on the south-west side of Paris-Charles de Gaulle airport. They are situated between taxiways U and T and are crossed by taxiway C.

These taxiways can be used as de-icing pads. The Paris-Charles de Gaulle AIP specifies that the designation of the de-icing pads is distinct from the designation of the taxiways on which they are located. When these taxiways are used for de-icing, they change name to become de-icing pads SW1 to SW4. They are situated between taxiways C and T. In this particular case, the de-icing pads were associated with runway 08L.

The AIP includes a limit regarding the use of taxiway T, in section 20.3.3.2.2 (20. Local traffic regulations /3. Ground movement / 3. Taxiing / 2. Limitations and restrictions / 2. Limitations

accessibility): “The taxiway T between T1 and T2 is limited to aircraft with a maximum wingspan⁴ of 36 m when an aircraft is waiting on the de-icing bays SW1 to SW4. This restriction is valid at any time of the year.”

This information is given in the documentation used by the crews (LIDO et Jeppesen).

It is also indicated in the documentation for air traffic controllers:

- in the Operations Manual: when holding on taxiways UT1 to UT4, with or without de-icing, taxiing on T is prohibited for aircraft with a wingspan ≥ 36 m. When leaving the de-icing areas, only left turns are possible. The LH turns mentioned thus concern the use of the de-icing pads facing southwards before take-off;
- in directive 16-C-22 (June 2022) relating to “holding on SW pad”/“holding on pad and taxiing on T”: when holding on taxiways UT1 to UT4, no aircraft with a wingspan greater than 36 m can operate on Tango (same rule as for de-icing). No limitations for taxiing on C;
- in the 2023 Ground leaflet (published in December 2022) regarding ground movements:
 - de-icing pads closed: taxiway T between UT1 and T3 can be used by all types of aircraft (except when holding on a pad for a parking space),
 - pads open: taxiing on T, in front of an open pad, is prohibited for aircraft with a wingspan ≥ 36 m.


This information is also accessible on the MAPS screen⁵ available to controllers in the control tower. A  is used to display the limitations for ground movements: T can be used if wingspan < 36 m if there is de-icing or an aircraft holding on pad SW.



Figure 2: limitation for taxiing on T (Source: SNA-RP/CDG)

Lastly, a sign giving this information is located on taxiway T in the eastward direction (use of de-icing pads facing southwards before take-off). It is not concealed when the de-icing pads are in use (mainly in winter). There is no sign in the westward direction. Aéroports de Paris, the airport operator specified that the de-icing pads SW1 to SW4 are designed to be used in the south-facing direction: the ground markings and the sign are laid out accordingly.

⁴ The wingspan of the Boeing 777 and the Airbus A330 is around 60 m. The aeroplanes in the Airbus A320 and Boeing 737 family have a wingspan of slightly less than 36 m.

⁵ General information screen of ground movement plan.

2.2 Personnel information and statements

2.2.1 Air France Boeing 777-300 crew

The 60-year-old captain (PM) had logged around 16,000 flight hours including approximately 4,000 hours on the Boeing 777. The 51-year-old co-pilot (PF) had logged around 12,000 flight hours including approximately 2,500 hours on the Boeing 777. The 37-year-old relief pilot had logged around 7,000 flight hours including approximately 2,000 hours on the Boeing 777.

The crew specified that the weather conditions were good. The relief pilot added that it had been a long and thus tiring flight. When the controller asked them to turn left onto UT3, the crew understood that their parking stand was busy and that they were going to have to hold. The PF explained that when he passed behind the Boeing 777 holding on UT4, he moved a few metres to the left. The relief pilot indicated that the tail of the Boeing exceeded the ground markings (markings for south facing use). The PF then positioned the aeroplane on UT3. He specified that there were no ground markings (no marking for north facing use) and that no one helped them get into position. He positioned the aeroplane level with the Boeing 777 on UT4. The PF stated that he did not move too far forwards in order to leave the taxiways in front of him free. The relief pilot specified that it was not possible for them to know the margin they had left behind them. They then shut down the two engines and started up the APU (*Remote holding* procedure, see paragraph 2.3). They kept the anti-collision light lit. They indicated that they realised later that the Boeing 777 on UT4 was a “-200”, 10 m shorter than their “-300”.

The three crew members felt a jolt, like a gust of wind, at the time of the collision. They then questioned the controller as to what might have happened. After the collision had been confirmed, they monitored the APU parameters as they had identified a fire risk. They did not start up the engines as this would have called on the APU and the aeroplane was towed to the parking stand.

The PF explained that he had previously taken up position on a de-icing pad on the UT taxiways facing south, in the winter, to de-ice before taking off from runway 08. In these conditions, a ground signal man helps them take their position. The PF indicated that it was not usual to wait at this location for a terminal parking stand to become free.

The PF considered that the controller could have organised the holds starting with the taxiway which was the furthest away, UT1. He also thought that these taxiways should be “one-way” and only used in the south-facing configuration as in the winter period. Lastly, he added that ground markings would not necessarily be visible in the event of poor visibility.

2.2.2 Delta Air Lines Airbus A330-900 crew

The 62-year-old captain (PF) had logged approximately 20,000 flight hours, including around 6,900 hours on the Airbus A330. The 42-year-old co-pilot (PM) had logged approximately 5,000 flight hours including around 1,400 hours on the Airbus A330. The 43-year-old relief pilot had logged approximately 10,000 flight hours including around 5,000 hours on the Airbus A330.

The relief pilot indicated that the flight had been long and that the crew might have been tired. The PF explained that he had held on UT4 the previous month and was not surprised by the controller’s request. He saw the two Boeing 777s and observed that the tail of the second Boeing

was possibly outside of the markings. He slowed down to a walking pace, 3 to 4 kt according to him. The first Boeing 777 did not pose any problems. He asked the PM to keep a close eye on the second aeroplane. The PM asked him to slow down and then reported the collision. He indicated that he had not noticed the difference in size between the two Boeing 777s holding on UT. From his position, he could see that the wing tip was close to the tail but he thought that there was a sufficient margin.

The crew explained that they felt protected from collisions while taxiing on a taxiway. They also specified that they had not noticed that the anti-collision light was ON.

2.2.3 Controller

The 38-year-old controller joined the Paris-Charles de Gaulle Air Navigation Service (SNA-RP/CDG) in the winter of 2022/2023. She held the GND position rating obtained in June 2023 but did not yet hold the ratings for the other positions.

The controller stated that the workload was normal. She had followed two instruction sessions in the TWR position in the morning and was finishing with an hour in the GND position.

She explained that there was a lot of waiting, that the parking stands were not available and that the aeroplanes therefore had to be made to hold on the platform. She indicated that the controllers could use taxiways R and T for remote holding but that this could interfere with the movement of traffic on the ground. The taxiways associated with the de-icing pads were thus also used. Taxiway UT4 was already occupied when she took the frequency as one of her colleagues had had a Boeing 777-200 hold there. She thus asked the Air France Boeing 777-300 and then the Delta Air Lines Airbus A330 to taxi respectively to UT3 and UT2. She knew of the limitation associated with taxiway T at the de-icing pads: she had started her ground position training in the winter. However, she had only associated this limitation with the use of this area for “de-icing” in order that the de-icing vehicles could move around easily, and as the de-icing poles were considered as obstacles for the movement of aeroplanes, and not for “holding”.

The controller regretted that there was no methodology for the use of these taxiways for holding.

2.3 Remote holding

Air France stated that aeroplanes regularly had to wait at Paris-Charles de Gaulle airport, in particular because of the closure of some parking areas: areas H had been closed since 2020 and areas A had been closed for work for several months. Air France added that the parking areas were often saturated. This was the case on the day of the accident. The Boeing 777-300 and the Airbus A330-900 had arrived on time but the parking stands were not free, being occupied by aeroplanes which were running late; as for the Boeing 777-200, it had arrived nearly one hour ahead of schedule. A pilot mentioned that the option of allocating a new parking stand was generally not chosen in order to avoid moving passengers ready for boarding on the next flight to be carried out by the aeroplane.

The crew of the Boeing 777-300 had shut down the aeroplane’s two engines (and started up the APU) for the expected wait of 30 min before being able to access the parking stand at the terminal. The crew took this decision with a view to saving fuel and reducing carbon emissions. It was based on a procedure (remote holding procedure) recently introduced by Air France requiring crews to shut down the engines when remote holding for departure when they had vacated a

parking stand. The crew of the Boeing 777-200 had shut down one engine, the waiting period was initially expected to be 15 min. Following a bridge problem, the wait was finally longer.

Aéroports de Paris specified that the remote holding procedure is only designed for departing flights, with the aeroplanes taking up position on a de-icing pad not in use, in the usual direction of use of the areas (facing south).

Aéroports de Paris indicated that taxiways UT1 to UT4 are not parking areas except in exceptional circumstances and as part of a change subject to the completion of an Airport Safety Impact Study⁶. Thus, according to Aéroports de Paris, the use of taxiways UT to hold inbound aircraft has no “framework”.

For its part, the SNA-RP/CDG indicated that aircraft holding, whether outbound or inbound, can be managed on any taxiway of the platform. This is particularly the case for taxiways UT1 to UT4. It added that there is a framework relating to holding on taxiways (particularly in the case of remote holding for departure), in which case the aeroplane's engines are shut down. The SNA-RP/CDG considered that holding on arrival is carried out with the engines operating while waiting for the terminal parking stand to be vacated. The controllers thus hold the aeroplanes on the taxiways, according to their availability, while ensuring that a certain fluidity of ground traffic is maintained.

2.4 Similar accident

In October 2019, the BEA published the [investigation report into the accident to the Airbus A330-200 registered F-GZCI operated by Air France and the Airbus A330-300 registered N817NW operated by Delta Air Lines on 31 October 2018 at Paris-Charles de Gaulle airport](#). The investigation report concludes that, *“While taxiing, the crew of flight DAL97 [Delta Air Lines] identified a possible conflict with flight AFR498 [Air France] at a standstill on a perpendicular taxiway [T4, No 2 at holding point of runway 08L]. After stopping before the junction and considering that they had enough of a margin, the crew started taxiing again. The left wingtip of the Delta Air Lines aeroplane then came into contact with the tail of the Air France aeroplane. [...]”*

The investigation report also indicates that, *“Although having its own limitations, the main barrier against ground collisions between two aircraft on intersecting taxiways is therefore based on the flight crews, with the principle of stopping before the possible conflict and until the crew is certain that there is no risk of collision.”*

On 31 October 2018, Air France addressed a communiqué about this accident to its crews, specifying that:

- the distance margins on the taxiways are small;
- visual perception is imperfect and is subject to parallax errors, especially on large aircraft;
- [...]
- if in doubt about ground distance, stop taxiing.

In October 2019, Delta Air Lines also addressed a communiqué to its crews: *“If in doubt, stop. If you feel like you need to deviate from centerline to assure clearance, stop. If your inner monologue is telling you this is a bad idea, use your ASAP report voice. Those foreign objects outside your side window actually are closer than they appear.”* Furthermore, Delta Air Lines modified its training programme with respect to wingtip clearance after several ground collisions.

⁶ Étude d'Impact sur la Sécurité Aéroportuaire (EISA).

3 CONCLUSIONS

The conclusions are solely based on the information which came to the knowledge of the BEA during the investigation.

Scenario

As the terminal parking stands were busy, the controller held aeroplanes on taxiways UT. A first Boeing 777-200 was already stopped on UT4 when the controller asked the crew of the Air France Boeing 777-300 to join UT3 to hold, passing behind the Boeing 777-200 via taxiway T. In these conditions, taxiway T is limited to aeroplanes with a wingspan of less than 36 m, which was not the case for the aeroplanes involved.

The controller then asked the crew of the Delta Air Lines Airbus A330-900 to join UT2 also via taxiway T in order to hold. The crew of the Boeing were unaware of the margin that remained behind their parked aeroplane. The Airbus crew estimated that this margin was small. The tip of the right wing of the Delta Air Lines aeroplane came into contact with the tail of the Air France aeroplane when passing behind it.

Contributing factors

The following factors may have contributed to the ground collision:

- aeroplanes with a wingspan of more than 60 m taxiing on taxiway T limited to aeroplanes with a wingspan of less than 36 m when an aeroplane was already holding on taxiways UT;
- the crew not stopping and confirming that there was no risk of collision while taxiing on a taxiway where the margins in relation to obstacles seemed to them to be small;
- ambiguities in the wording used in the various documents, which meant that it could be understood that the wingspan limitation on taxiway T was linked to de-icing and not to the distance between taxiways;
- the lack of signs/markings, framework and methodology for using taxiways UT1 to UT4 to hold inbound aircraft.

Measures taken

Shortly after the collision on 30 August 2023, all the SNA-RP/CDG controllers were reminded of the directive regarding the use of taxiway T (see paragraph 2.1). Information about the circumstances of the accident was also given.

However, in January 2024, Air France informed the BEA of a similar event that had occurred on 19 December 2023. The controller in on-job-training⁷ had asked the crew of a Boeing 777 arriving from Los Angeles (USA) to taxi on taxiway T and to hold on UT2, while an Airbus A320 was holding on UT4. The crew of the Boeing 777 recalled afterwards that there had been a collision on 30 August 2023 and that there was a limitation at this point. The controller in on-job-training indicated that he had not thought that the limitation applied because an Airbus A320, with a wingspan of less than 36 m, was involved.

In February 2024, the SNA-RP/CDG published a Ground Safety Bulletin addressed to controllers regarding the taxiway T restriction. In addition to the accident of August 2023 and the incident of December 2023 acting as illustrations, the following information was given:

⁷ At the time, the controller had not obtained his GND position rating. He was reminded about the directive.

- when aircraft are holding on taxiways UT1 to UT4, taxiing on taxiway T is prohibited for aircraft with a wingspan $\geq 36\text{m}$. Whatever the type of aircraft holding!
- when using taxiways UT in a northerly direction to manage aircraft holding, it is recommended to hold on UT1 first, whatever the type of aircraft, and then use UT2, UT3, UT4, etc.

The SNA-RP-CDG and Aéroports de Paris also initiated two airport safety impact studies on the following topics:

- remote holding prior to departure;
- holding for parking space on arrival.

These safety impact studies should collect the needs of the air navigation service with regard to the use of taxiways and aprons, so that Aéroports de Paris can modify the infrastructures if necessary.

Risk reduction measures would be studied, such as:

- modifying the remote holding procedures;
- creating holding for parking space procedures;
- creating intermediate holding points if needed;
- amending the AIP to avoid interpretations.

The BEA investigations are conducted with the sole objective of improving aviation safety and are not intended to apportion blame or liabilities.