



<sup>(1)</sup>Except where otherwise indicated, the times in this report are in Coordinated Universal Time (UTC). One hour should be added to obtain the legal time applicable in Metropolitan France on the day of the event.

<sup>(2)</sup>Pilot Flying.

<sup>(3)</sup>Pilot Monitoring.

## Serious incident to the EMBRAER ERJ190-100LR registered **CS-TPV** on 6 November 2017 at Nice Côte d'Azur (Alpes-Maritimes)

<b>Time</b>	19:23 <sup>(1)</sup>
<b>Operator</b>	Portugalia, Companhia Portuguesa De Transportes Aereos S.A.
<b>Type of flight</b>	Commercial air transport - passenger
<b>Persons onboard</b>	Captain (PF <sup>(2)</sup> ); first officer (PM <sup>(3)</sup> ); 3 cabin crew; 61 passengers
<b>Consequences and damage</b>	None
<i>This is a courtesy translation by the BEA of the Final Report on the Safety Investigation published in March 2020. As accurate as the translation may be, the original text in French is the work of reference.</i>	

## Rejection of take-off run on a taxiway at night

### 1 - HISTORY OF THE FLIGHT

The crew left parking area 10B (cf. ❶ figure 1) more than an hour late on the scheduled time, with a west-facing push-back proposed by the controller for taxiway T, for a flight bound for Lisbon. The captain was the PF and the first officer was the PM.

The ground controller cleared the crew to taxi via taxiways T and A ❷ and to hold at holding point A1 in order to take off from runway 04L. The crew read back the route but not the instruction to hold at the holding point. One minute later, at the crew's request, the ground controller confirmed the taxi route.

The crew then started up the second engine ❸. A few seconds later, the PM carried out the flight control tests while the aeroplane was taxiing ❹.


As the aeroplane approached point ❺, the crew indicated that they were at holding point A1 and ready for departure. The ground controller asked them to contact the tower controller. At this moment, the aeroplane was on taxiway T, level with the sign indicating taxiway A on the left, i.e. 350 m before holding point A1.


The crew contacted the tower controller and indicated that they were at holding point A1 for runway 04L, ready for departure. The tower controller cleared them to line up on runway 04L<sup>(4)</sup> with the indication "line up four left". The crew read back the alignment for runway 04L. At this moment, the aeroplane was in the middle of the bend from taxiway T to taxiway A ❻.

<sup>(4)</sup>Two aeroplanes were on the approach path, one at 12 NM from the runway threshold, followed by another at 15 NM.

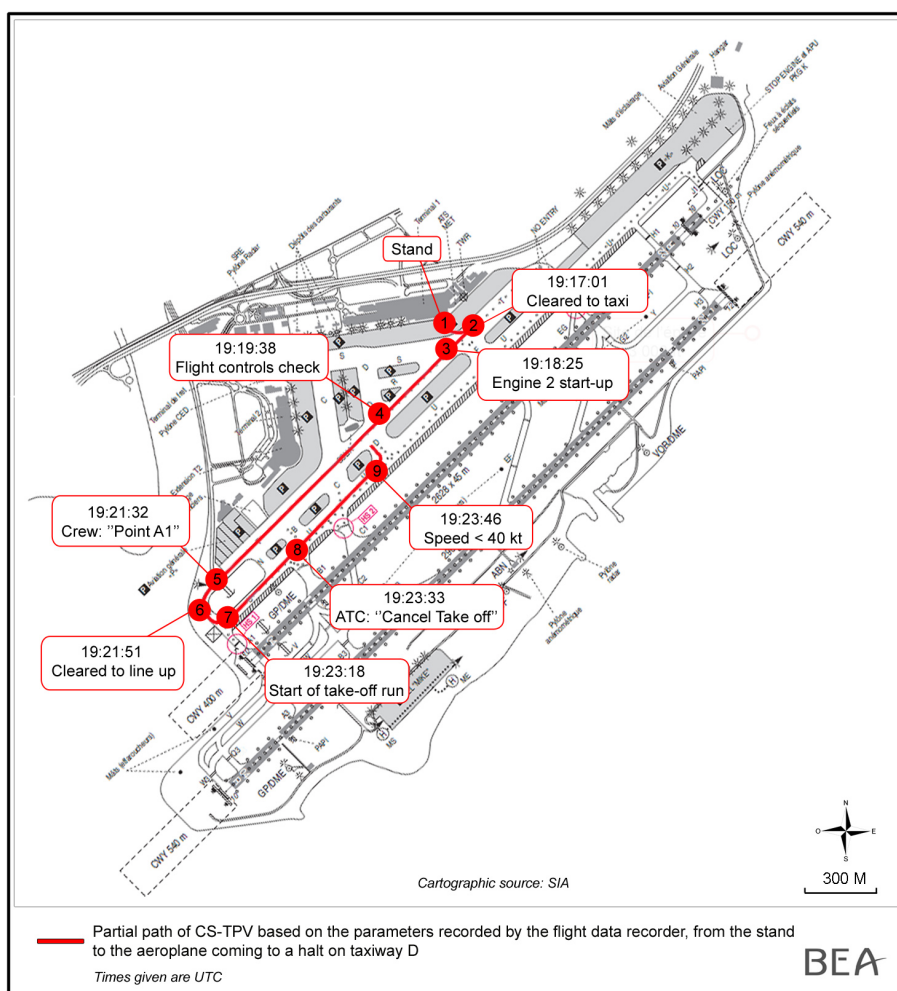
<sup>(5)</sup>The aeroplanes on approach were now at 5 and 10 NM from the runway threshold.

<sup>(6)</sup>For a decision speed V1 of 149 kt.

Forty seconds later, the tower controller cleared the crew to line up and take off from runway 04L. At this moment, the aeroplane was on taxiway U . The controller repeated the clearance ten seconds later and specified that they were to make a quick take-off. The crew requested to "stand by please." The tower controller then asked them to hold at holding point A1. The crew replied that they were on the runway without using the word "negative" as specified by the standard phraseology. The controller replied "OK" and asked them to contact him when they were ready.

When the crew indicated that they were ready, the tower controller cleared them to line up and make a quick take-off from runway 04L <sup>(5)</sup>. The crew read back the take-off clearance and started the take-off. Around 20 s later , the tower controller asked them to immediately cancel the take-off as they were on the taxiway. The aeroplane had travelled around 550 m from the application of thrust and the aeroplane speed was then more than 85 kt<sup>(6)</sup>. The crew rejected the take-off. The speed reached a maximum of 94 kt. The aeroplane decelerated and came to a halt level with taxiway D, after having travelled 922 m from the application of thrust.

The crew then again asked for clearance to take-off which occurred at 19:33. The flight to Lisbon took place without any particular event.



## 2 - ADDITIONAL INFORMATION

### 2.1 Personnel information

#### 2.1.1 Captain

The captain, aged 54 years, held a valid Airline Transport Pilot Licence (Aeroplane) (ATPL(A)) and type rating. He had been working for this company since 2000.

He had logged 12,003 flight hours, of which 555 hours on type as captain. The table below specifies his recent experience at Nice in terms of number of rotations:

2015	2016	2017	Total
14	6	16	36

Since becoming captain and thus PF while taxiing (cf. section 2.7.2), he had carried out 20 rotations at Nice of which at least 16 with a take-off from runway 04R. Only once when taking off from runway 04R had he taxied via taxiway T to taxiway A. This was at night, in August 2016, during his first flight as PF while taxiing.

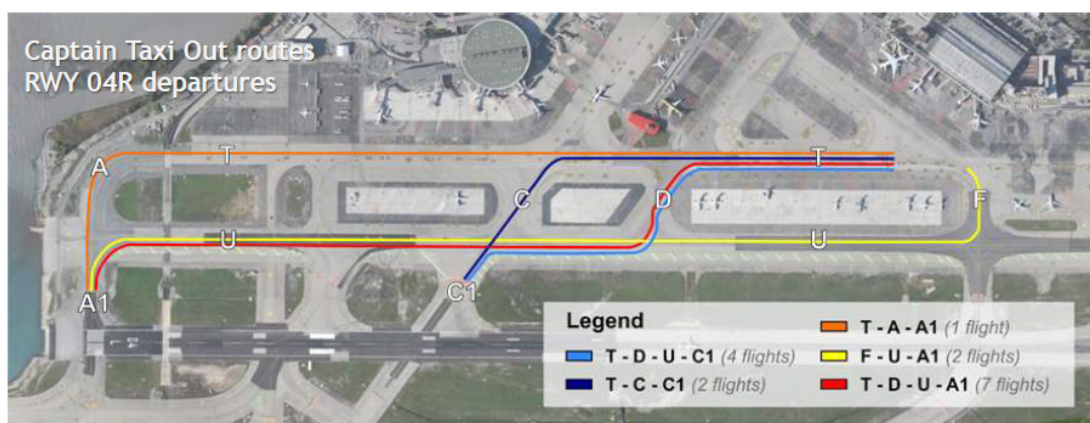


Figure 2: routes previously used by the captain

<sup>(7)</sup>Boeing Alertness Model.

It was his fifth consecutive working day. The crew fatigue level calculated by the operator using the BAM<sup>(7)</sup> did not reveal the possible impact of fatigue in this event.

#### 2.1.2 First officer

The first officer, aged 62 years, held a valid Airline Transport Pilot Licence (Aeroplane) (ATPL(A)) and type rating. He had been working for this company since 1990.

He had logged 14,530 flight hours, of which 739 hours on type as first officer. The table below specifies his recent experience at Nice in terms of number of rotations:

2015	2016	2017	Total
15	13	20	48

It was his second consecutive working day. The crew fatigue level calculated by the operator using the BAM did not reveal the possible impact of fatigue in this event.

### 2.1.3 Ground controller

The ground controller held a controller rating since 2008. He had been posted at Nice since 2008 and held the ground position rating since August 2008.

He was on duty in the ground position. The pre-flight and ground frequencies were combined.

It was his third consecutive working day. He had come on duty at 18:00.

### 2.1.4 Tower controller

The tower controller held a controller rating since 2002. He had been posted at Nice since 2011 and held the tower position rating since 2012.

He was on duty in the LOC1 position. The LOC1 and LOC2 frequencies were combined.

It was his third consecutive working day. He had come on duty at 18:00.

## 2.2 Aircraft information

### 2.2.1 Runway Awareness and Advisory System (RAAS)

The RAAS is an option for the EMBRAER ERJ 190 and was not installed on CS-TPV.

It is a software system available in certain recent EGPWS<sup>(8)</sup> which provides short and discrete pieces of aural information to the flight crew to improve situational awareness and break the link in the sequence of events leading to runway incursions.

The installation of this system in the aeroplane might have warned the crew that they were not on the runway by:

- ☐ the absence of the "Approaching Zero-Four Left" message;
- ☐ the absence of the "On Runway Zero-Four Left" message while aligning;
- ☐ an "On Taxiway! On Taxiway!" advisory message when the speed was greater than 40 kt on the taxiway.

### 2.2.2 Digital maps

The airport maps cannot be displayed on the ND<sup>(9)</sup> present in the aeroplane.

The aeroplane was not equipped with an EFB<sup>(10)</sup>.

Thus, no information about the position of the aeroplane on a digital map was displayed for the crew.

## 2.3 Meteorological information

The meteorological conditions at the time of the incident were the following: wind from 330° at 7 kt, visibility above 10 km, sky overcast, recent rain, temperature 10 °C. It was night.

<sup>(8)</sup>Enhanced Ground Proximity Warning System.

<sup>(9)</sup>Navigation Display.

<sup>(10)</sup>Electronic Flight Bag.

## 2.4 Communications

The crew were successively in radio contact with the ground controller and then the tower controller.

The analysis of the exchanges revealed the use of non-standard phraseology by the controllers and the crew. In particular, the crew did not use the word “negative” when they said “we are already on the runway.” The use of the word “negative” alerts the controller of the inconsistency of the clearance. If the crew had used the word “negative”, the controller either might have understood the location of the aeroplane’s position or might have asked for clarification

Below is an excerpt of the transcription of what it was possible to understand during the analysis of the radiocommunication recording.

(11) Tower controller

UTC	Person speaking	Message
19:21:45	CS-TPV	Tower bonjour, this is Air Portugal four eight seven Bravo, holding point Alpha 1, zero four left, ready for departure
19:21:51	[TWR] <sup>(11)</sup>	Bonjour Portugal eight seven Bravo, line up four left
19:21:54	CS-TPV	Line up runway zero four left, Air Portugal four eight seven Bravo
19:22:28	[TWR]	Portugal eight seven Bravo is cleared line up, take off zero four left, wind 310°, 7kts
19:22:37	[TWR]	Portugal four eight seven Bravo is cleared for line up and take off zero four left, quick take off please, wind 310°, 7kts
19:22:45	CS-TPV	Euh stand by please
19:22:48	[TWR]	Ok, four eight seven Bravo hold short Alpha 1
19:22:51	CS-TPV	We are already on runway, Portugal four eight seven Bravo
19:22:57	[TWR]	Ok you call me back ready
19:23:04	CS-TPV	We are ready, Portugal zero four ... euh Air Portugal five eight seven Bravo
19:23:09	[TWR]	Portugal four eight seven Bravo is cleared for line up take off, quick take off please, 310°, 08kts, zero four left

## 2.5 Aerodrome Information

### 2.5.1 General

Nice Côte d’Azur airport is a civil-controlled aerodrome open to public air traffic. It is situated at a mean altitude of 12 ft and has two parallel runways with a centreline to centreline distance of around 300 m. In normal conditions, runway 04L/22R is used for landings and runway 04R/22L for take-offs.

Runway 04R/22L had been closed for work since 30 October. An impact assessment on airport safety had been carried out by the aerodrome operator and the regional approach and control centre. The closure of the runway was indicated by NOTAM. The lighting of this runway and the taxiways leading to it from runway 04L/22R was not on.

### 2.5.2 Runway 04L

The runway to be used for the take-off was the 04L (magnetic bearing 043°), of a length of 2,628 m and width of 45 m.

This runway has:

- ☐ white lighting down the centreline except over the last 900 m where the lights are alternately white and red and then red over the last 300 metres and,
- ☐ white edge lighting, except over the last 600 metres where the lights are yellow.

Holding point A1 can be identified by the mandatory signs located on either side of the taxiway, ground markings and the runway guard lights whose single-direction beams are aligned to be visible to the crew taxiing towards the holding point.

The lighting of runway 04L and the identification means of holding point A1 complied with the aerodrome certification requirements<sup>(12)</sup> and had no malfunction the day of the event.

### 2.5.3 Taxiways

#### 2.5.3.1 Taxiway U

Taxiway U is an old runway<sup>(13)</sup> of a length of around 3,000 m and width of 60 m.

This taxiway has directional green centreline lighting. There is no edge lighting. The lighting complies with the aerodrome certification requirements.

A ground marking of green and white stripes indicates the no-taxiing zones. It is not visible at night.

There is no sign at the beginning of taxiway U in line with 04, this sign is situated at 250 m from the beginning of the taxiway. According to the aerodrome certification requirements, this sign is mandatory for the identification of the taxiway after an intersection, without specifying the distance.

#### 2.5.3.2 Taxiways T and A

From the intersection with taxiway D and up to the intersection with taxiway U, taxiways T and A do not have green centreline lighting but single-direction blue edge lighting. These differences are shown in the chart below:

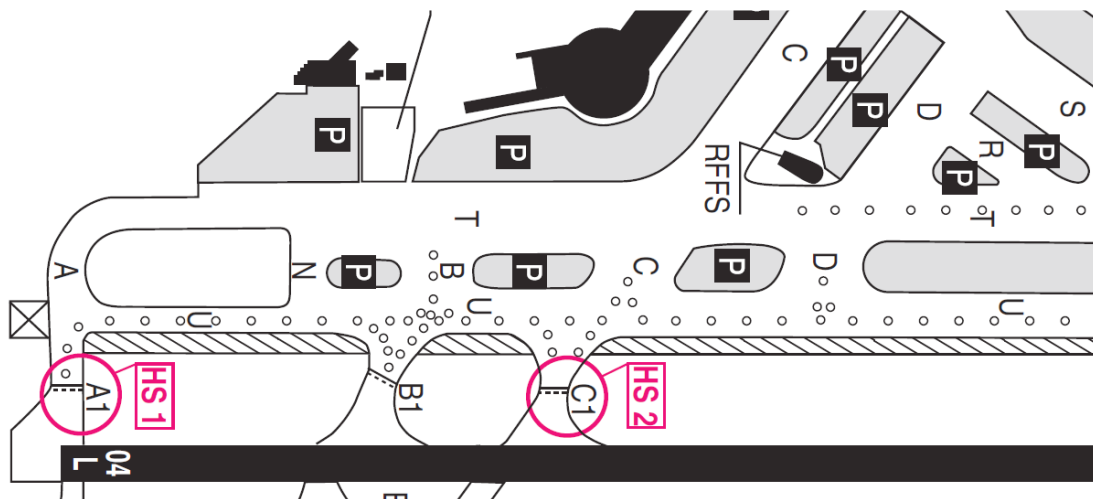


Figure 3: taxiway lighting

The lighting of these taxiways and the signs comply with the aerodrome certification requirements. In particular, a sign on taxiway A indicated the identification of the taxiway and the direction of taxiway U on the left.



### 2.5.3.3 Chart available to crew

On the Jeppesen chart used by the crew, the taxiways are identified. The fact that taxiway U is old runway 05L/23R is mentioned.

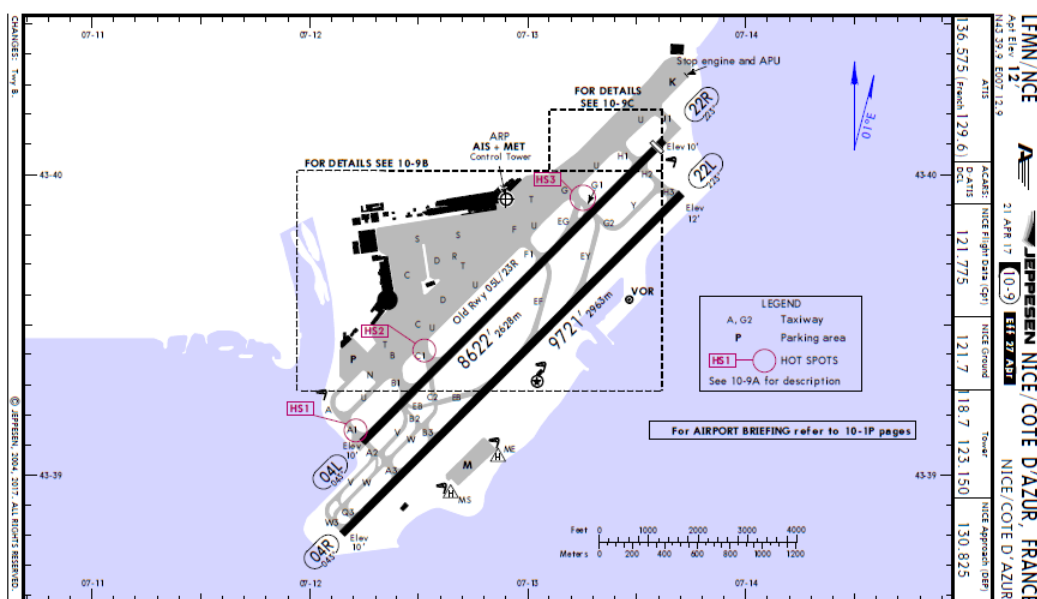


Figure 4: Jeppesen chart

## 2.6 Flight recorders.

<sup>(14)</sup>Digital Voice Data Recorder.

The aeroplane is equipped with two Universal combined DVDR<sup>(14)</sup> which record both the flight parameters and audio data.

As the audio data recording lasts two hours, the data relating to the incident was no longer saved as the crew had taken off just after the incident for the planned flight to Lisbon.

The flight parameters recorded by the DVDR were downloaded.

## 2.7 Organizational and management information

### 1.17.1 Aerodrome operator information

The operator had assessed the risk of a landing on taxiway U. The risk mapping did not mention the risk of a take-off from this taxiway. The aerodrome operator indicated that this risk had been excluded given the lighting that existed.

### 2.7.2 Portugalia Information

Portugalia carries out flights between Lisbon and Nice twice a day, seven days a week.

The operations manual sets out the crew's tasks and responsibilities. It is specified that the captain is PF and the first officer PM while taxiing.

The following taxi best practices are also given:

- ☐ The PM has the important task of monitoring the taxiing and assisting his colleague.
- ☐ All check-list activity is cancelled when crossing and entering runways.
- ☐ When in receipt of line-up clearance, the crew must advise ATC if they will need to hold on the runway for more than 90 s beyond the time it would normally be expected to depart.
- ☐ A sterile flight deck shall be adopted whilst taxiing.
- ☐ Anytime the crew feel uncertain about the location of the aircraft position on the movement area, they shall stop the aircraft, advise ATC, and ask for clarification. They shall not hesitate to take the question out of the flight deck.
- ☐ If necessary, they shall request progressive taxi instructions.

The operations manual indicates that taxiing shall be considered as a critical flight phase and specifies, in particular, that:

- ☐ Each flight crew member shall have the necessary aerodrome layout charts available.
- ☐ Thorough planning for taxi operations reduces the workload and increases attention while taxiing.
- ☐ In order to know the exact position of the aeroplane at all moments and to have good situational awareness, the PM shall monitor the taxi route and compare it with the chart information.
- ☐ The timing and execution of check-lists shall be planned so that no distractions occur when approaching and / or crossing runways; i.e. all eyes are outside during this phase.
- ☐ While taxiing, crews need to ensure that they follow the clearance or instructions that are actually received, and not those they are expecting to receive. A taxi route assigned by the controller shall be briefed as thoroughly as an instrument approach. Taxi-instructions shall be written down and cross-checked against the chart.

The take-off briefing by the PF before taxiing shall include the following items:

- ☐ The weather conditions, the minimum equipment list, NOTAMs, special briefings, push-back and taxiing with one engine.
- ☐ Route based on available charts, runway condition, configuration and performance for take-off, departure path and radionav aids.
- ☐ Any possible specificities.

The standard procedures in Portugalia's operations manual also specify that crews are required to single engine taxi out if the conditions and engine warm-up time permit, in order to reduce fuel consumption. When taxiing has to be performed with the two engines operating, the second engine shall be started after receiving the taxi clearance and after the aeroplane has been released by the ground crew.

The **"before take-off"** actions and check-lists are to ensure that the aeroplane is ready for take-off. They are carried out after the start-up of the two engines. They include, in particular, the following warning:

***To avoid the possibility of departing from the wrong runway, verbally verify the proper runway***

Portugalia had not issued a specific directive to warn pilots that taxiway U was an old runway.



<sup>(15)</sup> Advanced-Surface Movement, Guidance and Control System.

### 2.7.3 Information about the regional approach and control centre (SNA)

The south-east regional approach and control centre had assessed the risk of a landing on taxiway U. The risk mapping did not mention the risk of a take-off from this taxiway.

#### 2.7.3.1 Technical equipment

The south-east regional approach and control centre has an A-SMGCS<sup>(15)</sup> at their disposal. This system uses radar data to display the surface movements and their identification in real-time, and has an automatic alert server which warns the controller when there is a potentially dangerous situation.

The information and alerts available at Nice are the following:

- ☐ alert relating to a take-off or landing on an occupied or closed runway and information about a vehicle incursion;
- ☐ dual alert relating to a conflict between mobiles;
- ☐ alert relating to aeroplane movements counter QFU on the same runway or on a parallel runway.

Information is sent by colouring the mobile labels in yellow. An alert is shown by the corresponding label becoming red on the screen and an audio signal is sent to the LOC position.

The status of the runways (active, occupied, closed) and taxiways is manually entered by the controllers and tower manager.

The A-SMGCS can include an alert function to detect a take-off from a taxiway but this functionality had not been configured in the version deployed at Nice.

#### 2.7.3.2 Ground controller

The ground controller is responsible for the manoeuvring area north of the holding points of runway 04L/22R. He issues push-back and taxi clearances in the zone for which he is responsible.

He has an A-SMGCS screen at his disposal which he uses to:

- ☐ check that crews comply with the clearances and instructions;
- ☐ confirm the position of aircraft;
- ☐ help crews taxiing on the ground.

He uses a paper strip system to record the taxiways and holding point. The holding point is underlined when the pilot reads back the hold instruction. The controller only gives the clearance to contact the tower controller when this information is underlined and thus the crew have read back the instruction to hold at the holding point.

Except in the case of specific instructions, for gates 10 to 4, the push-back of aeroplanes positioned "nose in"<sup>(16)</sup> should position them facing east. This push-back, called the standard push-back, is described in the AIP and in the Nice tower operations manual. There is no specific rule with respect to the non-standard push-backs which can be requested or proposed according to the operational circumstances in real time. The standard push-back from stand 10B is incompatible with taxiing on taxiway T. When non-standard push-backs are necessary, due to work for example, it is specified by NOTAM.

<sup>(16)</sup> i.e. parked facing the airport terminal.

<sup>(17)</sup>Control Traffic Region.

<sup>(18)</sup>Above Mean Sea Level.

Communication is transferred to the tower controller as soon as the taxiing aeroplane no longer interferes with the other traffic taxiing and at the latest, at the holding point. The control is transferred to the tower controller at the holding point.

### 2.7.3.3 Tower (or local) controller

The tower controller is responsible for the manoeuvring area south of the holding points of runway 04L/22R and for the CTR<sup>(17)</sup> between the ground and 3,500 ft AMSL<sup>(18)</sup>.

He must, in particular:

- ☐ manage the runway and implement the lights;
- ☐ closely survey the holding points;
- ☐ define the landing and take-off rate with the tower manager and apply this rate;
- ☐ issue take-off and landing clearances.

He has an A-SMGCS screen and two approach radar screens at his disposal.

He can use the information from the A-SMGCS screen to:

- ☐ check the position of aircraft;
- ☐ confirm that the runway is vacated.

The alignment phraseology must contain the holding point or taxiway used in order to clarify the position.

### 2.7.3.4 Training covering use of a single runway

At Nice, the initial and recurrent training of controllers deals with the situations in which only one runway (single runway) is used. The recurrent training particularly concentrates on changing from operation with twin runways to operation with a single runway. Single-runway operation per se has not constituted an unusual situation at Nice for several years as the operator's work and maintenance programme leads to periods of single-runway operation of several months during each winter period. Only changing from twin-runway operation to single-runway operation without advance warning constitutes an unusual situation and is practised in the scope of the controller's recurrent training.

## 2.8 Witness statements

### 2.8.1 Captain's statement

The captain said that he knew Nice Côte d'Azur airport well and that he had been coming regularly to it for 18 years. Generally he used taxiway U for taxiing and runway 04R for taking off. He did not follow the aeroplane's progression while taxiing, on the charts in his possession.

They were transferred from the ground controller to the tower controller on leaving taxiway T. It was at this point that he saw the sign for taxiway A and thought that he was at holding point A1. He therefore turned left when he was cleared to line up thinking that he was joining the runway.

Once the aeroplane was lined up, the lighting<sup>(19)</sup> seemed green to him. He therefore asked the first officer to confirm that he was actually on the runway. The latter confirmed this and he started the take-off.

<sup>(19)</sup>He cannot remember whether this was the centreline or edge lighting.

<sup>(20)</sup>There is a speed callout on reaching 80 kt in the take-off procedure.

When the controller asked him to cancel the take-off, he understood his error. He had just exceeded a speed of 80 kt<sup>(20)</sup> and, therefore, had not yet reached the decision speed. He immediately rejected the take-off.

He checked that the aeroplane was still flightworthy which included checking that the brake temperature was acceptable, and that the first officer was still apt for flying.

He specified that the flight was running an hour late and that he was in a hurry. He added that he was not particularly tired.

He said that he was aware that it was a serious incident but that he had not thought about preserving the CVR.

### 2.8.2 First officer's statement

The first officer said that he knew Nice Côte d'Azur airport well and that he had been coming regularly to it for 20 years. Generally he used taxiway U for taxiing and runway 04R for taking off.

He specified that the check-lists are very long and that while taxiing, he carried out the check-list actions rather than monitoring the route. He did not follow the aeroplane's progression while taxiing, on the charts in his possession.

When the aeroplane was approaching the end of taxiway T, he started the take-off checklist while the captain lined up. He specified that there were two aeroplanes on approach and that the controller was pressing them to take-off.

When the aeroplane was aligned, the captain asked him if they were on the runway or the taxiway. He then looked outside and saw the green lighting. He believed that taxiways had blue lighting. He concluded that they were not on a taxiway so he confirmed that they were indeed on the runway. After the incident, he understood that he had been mistaken.

### 2.8.3 Ground controller's statement

The ground controller said that he had cleared the start-up, non-standard push-back and taxiing via taxiways T and A up to holding point A1. His attention was then concentrated on an unusual request from an inbound crew who wanted gendarmes to intervene on board their aeroplane. His attention was focused on looking out for the arrival of the gendarme car and he did not precisely check the position of the aeroplane on the ground radar when the crew said that they had arrived at A1. He told them to contact the tower controller.

Shortly afterwards, he looked at the ground radar and saw that the aeroplane was on taxiway U. He had a doubt as to the accuracy of the radar, so he looked outside and shouted to the tower controller to interrupt the take-off.

He specified that after the rejected take-off, he asked the crew to confirm that they were ready to leave before clearing them again to taxi to holding point A1 with a view to taking off.

He said that the exchanges with the crew were conventional and that the latter did not seem to be worried.

He specified that the transfer was made at A but before A1 to avoid the aeroplane stopping and thus keep the traffic moving smoothly.

He added that aeroplanes could be equally routed via taxiways T or U and that there were no instructions about this. Generally he used the route via taxiway T as there were less turns to be made for the crews. He used the route via taxiway U when another aeroplane being pushed back at terminal 2 might interfere with the taxiing. He did not think that a crew could be used to using only taxiway U.

#### 2.8.4 Tower controller's statement

The tower controller specified that he chiefly worked by looking outside and very rarely with the A-SMGCS screen. He added that it was not possible to know the direction of the aeroplane on the screen.

He said that he gave the clearance to line up and take off several times as the crew seemed to hesitate. When they told him that they were not ready, he was not surprised by this. According to him, crews may not be ready due to the short taxiing time on this aerodrome. The controller asked them to hold at holding point A1 and the crew replied "*we are already on runway.*" He understood something else<sup>(21)</sup> and gave the clearance to line up and take off when the crew told him that they were ready.

He then checked the position of the next inbound aeroplane on the approach. While he was monitoring the take-off run, he was troubled by something but could not identify what. It was at this point that the ground controller told him that the aeroplane was taking off from taxiway U. He immediately gave the order to interrupt the take-off. He specified that the aeroplane stopped very quickly and he thought that the crew must have been aware of their error.

He added that he asked himself whether he could clear the crew to leave but that there was no procedure prohibiting him from doing this.

He said that there was often work in the winter period and that the closure of runway 04R had a high impact on the controllers' work: the landing and take-off rates and workload increased.

## 2.9 Previous events

The BEA has identified five previous events concerning the application of thrust on a taxiway:

- ☐ At Amsterdam, on 10 February 2010<sup>(22)</sup>: at night, the crew lined up in error on a taxiway that they should have crossed and took off from it.
- ☐ At Oslo, on 25 February 2010<sup>(23)</sup>: the crew took the wrong route and took off from a taxiway.
- ☐ At Hong Kong, on 27 November 2010<sup>(24)</sup>: at night, when using a single runway because of work, the crew lined up in error on a taxiway that they should have crossed.
- ☐ At Sofia, on 16 October 2012: at night, the crew lined up in error on a taxiway that they should have crossed. The taxiway was an old runway.
- ☐ At Sharjah, on 24 September 2015<sup>(25)</sup>: at night, the crew took off from a taxiway parallel to the runway.

<sup>(21)</sup> He can no longer exactly remember what he had understood.

<sup>(22)</sup> [https://www.onderzoeksraad.nl/en/media/attachment/2018/7/10/rapport\\_taxibaan\\_en\\_web.pdf](https://www.onderzoeksraad.nl/en/media/attachment/2018/7/10/rapport_taxibaan_en_web.pdf)

<sup>(23)</sup> [https://reports.aviation-safety.net/2010/20100225\\_A320\\_VP-BWM.pdf](https://reports.aviation-safety.net/2010/20100225_A320_VP-BWM.pdf)

<sup>(24)</sup> <https://www.cad.gov.hk/reports/B-LAT1-2011.pdf>

<sup>(25)</sup> [https://reports.aviation-safety.net/2015/20150924\\_B734\\_AP-BJR.pdf](https://reports.aviation-safety.net/2015/20150924_B734_AP-BJR.pdf)

Among the factors contributing to these events were:

- ☐ flight operations: the workload, lack of vigilance, habits and insufficiently robust procedures;
- ☐ air traffic control: insufficient monitoring by controller and early take-off clearance;
- ☐ infrastructures: insufficient signs, brightness of green lighting of taxiway, runways and taxiways with similar names and the width of the taxiway.

Recommendations were issued on the following subjects:

- ☐ assessment of benefits of installing a RAAS;
- ☐ training of crews;
- ☐ taxiing and take-off procedures;
- ☐ analysis of risks linked to these problematics;
- ☐ take-off clearance procedure;
- ☐ implementation of green centreline lighting on all taxiways.

### 3 - LESSONS LEARNED AND CONCLUSION

The west-facing push-back from the aeroplane's stand led the ground controller to choose, from habit, the route via taxiway T. As for the crew, they were used to using taxiway U to get to the runway 04 thresholds. They thus found themselves in an unusual situation without probably realizing it and even though they correctly read back the ground controller's messages about taxiing.

The crew taxied without sufficiently looking outside for visual references (lighting, signs, indications) and without using and checking the charts at their disposal. The number of actions to be carried out, in particular due to the starting up of the second engine while taxiing, and the short taxiing time from push-back from the stand probably contributed to limiting the crew's availability to monitor, check and confirm the position of the aeroplane while taxiing.

On arriving at the end of taxiway T, the PF mistook the taxiway A sign for the mandatory sign at holding point A1. He then thought that the runway in service, 04L, was the first on his left as was usually the case when taking the route via taxiway U.

Focused on other tasks, neither the ground controller nor the tower controller checked the position of the aeroplane. Hence, they did not identify the positioning error of the crew.

The tower controller wanted to insert the take-off before two approaches due a few minutes later in order to gain time and avoid the aeroplane being even temporarily at a standstill at holding point A1. He gave the line-up and take-off clearance before the aeroplane had reached holding point A1. The aeroplane had not yet passed taxiway U. This practice, even if it is authorized in the operations manual, leaves room for the crew to make a route error which is difficult to detect by the controllers.

The change in lighting when making the turn, from blue edge lighting to green centreline lighting may have misled the crew and make them think that they had entered the runway. While lining up, they did not identify the difference between the colour of the taxiway lighting and runway lighting. Lastly, they were not alerted by the dimensions of the taxiway as this was as wide as a runway and there was no sign at the beginning of taxiway U to indicate their error.

The PF did, however, have a doubt, and asked the PM to confirm where they were. The latter confirmed that they were on the runway. The crew did not call the controller for clarification as stipulated in the operator's procedures.

The various alignment and take-off clearances from the tower controller to keep the traffic flowing probably increased the time pressure linked to the aeroplane running late which led the crew to accelerate the before take-off actions to the detriment of asking the controller for confirmation of the aeroplane's position.

Lastly, the before take-off actions include a warning to check that the aeroplane is on the correct runway. The crew were aware of this warning but did not check that the 04L indication was actually present on the runway. It was not an item of the check-list.

Thanks to the A-SMGCS<sup>(26)</sup>, the ground controller detected the take-off run on the taxiway and the take-off was cancelled.

The take-off from the taxiway can be explained by the following factors:

- ❑ A high workload for the PM during the short taxiing time, due to the start-up of the second engine after the push-back and to the different actions and checks to be performed.
- ❑ Insufficient monitoring, checks and confirmation of the position of the aeroplane while taxiing, perhaps because the crew had the habit of taking the same route at this aerodrome which led them to have an erroneous representation of the aeroplane's position.
- ❑ A confirmation bias mechanism which, in the absence of clear signals informing the crew that they were on the taxiway, meant that they gave priority to information reinforcing their erroneous representation of the situation: the change in lighting and the width of the taxiway seemed to be that of a runway. The difference between arriving on a taxiway and arriving on a runway is first and foremost the absence of elements (signs, ground marking at holding point A1 and runway guard lights, lighting, etc.). Indeed it is easier to note the presence of an unusual element than the absence of something expected.
- ❑ The crew's partial clarification of their position on lining up on taxiway U linked to a confusion between the different lighting colours and the pressure to take off quickly.
- ❑ The tower controller focusing on keeping flight traffic flowing rather than on the position of the aeroplane, probably due to the confidence in the crew's position message, which led to the line-up and take-off clearance being given well before holding point A1 was reached.
- ❑ The use of approximate phraseology which could have allowed the tower controller to think that the aeroplane was at holding point A1 although it was in fact lined up on the taxiway.



<sup>(27)</sup>Standard Operational Procedures.

<sup>(28)</sup>Runway Awareness and Advisory System

<sup>(29)</sup>Collaborative Aerodrome Safety Highlights. It is a publication written to draw the pilots' attention to the aeronautical environment and to the main dangers associated with an aerodrome. [https://www.ecologique-solidaire.gouv.fr/sites/default/files/Nice\\_fr.pdf](https://www.ecologique-solidaire.gouv.fr/sites/default/files/Nice_fr.pdf)

## 4 - ACTIONS TAKEN AFTER INCIDENT

### 4.1 Actions taken by the aircraft operator

- ☐ Modification of SOPs<sup>(27)</sup>: it is no longer required that the aeroplane leaves the stand on one engine. It is now recommended to leave the stand on one engine only for long taxiing times.
- ☐ Addition of an item "check runway, confirm runway", in the before take-off check list.

The operator also envisaged implementing the RAAS<sup>(28)</sup> on all its aeroplanes. After a cost/benefit analysis taking into consideration the possibility of the fleet being renewed, this measure was abandoned. If the fleet is replaced, the operator envisages equipping the new aeroplanes with this system.

### 4.2 Actions taken by the aerodrome operator

- ☐ Installation of centreline lighting on taxiway A and on the part of taxiway T situated between taxiways A and B.
- ☐ Addition of an item "risk of confusion between taxiway Uniform and runway 04L/22R" in the publication, CASH<sup>(29)</sup>.

### 4.3 Joint actions taken by the aerodrome operator and the south-east regional approach and control centre

- ☐ Carrying out of a risk analysis of a take-off from a taxiway.

The risk identified by this analysis is an on-ground collision resulting from an aeroplane incursion on the taxiway during take-off and the severity is classed as catastrophic. The mitigation measures taken into account, those existing before the incident and those implemented since then, reduce, according to this analysis, the frequency of this undesired event.

## 5 - RECOMMENDATIONS

*Note: in accordance with the provisions of Article 17.3 of Regulation 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, a safety recommendation in no case creates a presumption of fault or liability in an accident, serious incident or incident. The recipients of safety recommendations report to the authority in charge of safety investigations that have issued them, on the measures taken or being studied for their implementation, as provided for in Article 18 of the aforementioned regulation.*

### 5.1 Ground radar

The take-off run on the taxiway was visually detected by the ground controller on the ground radar screen while the tower controller was busy managing the approaches. No alert had been triggered in the tower.

The Nice regional approach and control centre has an A-SMGCS ground radar. This system does not currently have all the alerts technologically available. A modification of the Nice A-SMGCS parameter settings would, in particular, supply controllers with an alert on the detection of an excessive speed on a taxiway, synonymous with a takeoff from a taxiway.

Consequently, the BEA recommends that:

- **The DSNA study the advisability of modifying the ground radar at Nice to allow detection of a take-off from a taxiway. [Recommendation FRAN-2020-001]**

## 5.2 Control procedures

Communication can be transferred from the ground controller to the tower controller as soon as the aeroplane no longer interferes with other taxiing traffic. The ground controller thus cleared the crew to contact the tower controller although the aeroplane was still on taxiway T. The tower controller, wanting to keep to the landing and take-off rate that he had defined, gave the line-up and take-off clearance although the aeroplane had not yet passed taxiway U and a route error was still possible.

The analysis of previous occurrences found that an early take-off clearance was a contributory factor and that a route error was more difficult for crews to detect at night.

The take-off clearance should not, therefore, be given so long as a route error is still possible, i.e. so long as the aeroplane has not passed taxiway U, if the aeroplane is not taxiing on the latter.

Consequently, the BEA recommends that:

- **The DSNA impose the setting up of a procedure so that the take-off clearance from runway 04L, at night, at Nice, takes into account the risk of a take-off from taxiway U. [Recommendation FRAN-2020-002]**