

AI2018-2

**AIRCRAFT SERIOUS INCIDENT  
INVESTIGATION REPORT**

**THAI AIRASIA X CO., LTD.  
H S – X T C  
CHINA AIRLINES  
B – 1 8 3 6 1**

**March 27, 2018**

 **JTSA** *Japan Transport Safety Board*

The objective of the investigation conducted by the Japan Transport Safety Board in accordance with the Act for Establishment of the Japan Transport Safety Board (and with Annex 13 to the Convention on International Civil Aviation) is to prevent future accidents and incidents. It is not the purpose of the investigation to apportion blame or liability.

Kazuhiro Nakahashi  
Chairman,  
Japan Transport Safety Board

Note:

This report is a translation of the Japanese original investigation report. The text in Japanese shall prevail in the interpretation of the report

# AIRCRAFT SERIOUS INCIDENT INVESTIGATION REPORT

## RUNWAY INCURSION

1. THAI AIRASIA X CO., LTD.,  
AIRBUS A330-343X, HS-XTC

2. CHINA AIRLINES  
AIRBUS A330-302, B-18361

ON RUNWAY 34R AT NARITA INTERNATIONAL AIRPORT  
AT 20:16, FEBRUARY 14, 2017

February 9, 2018

Adapted by the Japan Transport Safety Board

Chairman Kazuhiro Nakahashi

Member Toru Miyashita

Member Toshiyuki Ishikawa

Member Yuichi Marui

Member Keiji Tanaka

Member Miwa Nakanishi

## 1. PROCESS AND PROGRESS OF INVESTIGATION

<b>1.1 Summary of the Serious Incident</b>	On Tuesday, February 14, 2017, an Airbus A330-343X registered as HS-XTC, operated by Thai Air Asia X, crossed Holding Position Marking and entered onto the runway, despite an instruction to hold short of runway given by Aerodrome Control Facility. Because of this, an Airbus A330-302, registered as B-18361, operated by China Airlines, approaching to land with the Landing Clearance, made a go-around as being instructed by Aerodrome Control Facility.
<b>1.2 Outline of the Serious Incident Investigation</b>	The occurrence covered by this report falls under the category of “Landing on a runway being used by other aircraft or attempt of landing” as stipulated in Clause 2, Article 166-4 of the Ordinance for Enforcement of the Civil Aeronautics Act of

	<p>Japan and is classified as a serious incident.</p> <p>On February 15, 2017, the Japan Transport Safety Board (JTSA) designated an investigator-in-charge and two other investigators to investigate this serious incident.</p> <p>Accredited representatives of Kingdom of Thailand as States of Registry and Operator of the aircraft and an accredited representative of Taiwan as the authority responsible for the operator of the aircraft and an accredited representative of French Republic as State of Design and Manufacture of the aircrafts involved in this serious incident, participated in the investigation.</p> <p>Comments were invited from parties relevant to the cause of the serious incident.</p> <p>Comments were invited from the relevant state and other.</p>
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## 2. FACTUAL INFORMATION

<p><b>2.1 History of the Flight</b></p>	<p>According to the statements of the Pilot in Command (hereinafter referred to as “the PIC”) and the First Officer (hereinafter referred to as “the FO”) of an Airbus A330-343X registered as HS-XTC, operated by Thai Air Asia X (hereinafter referred to as “the Aircraft A”), a PIC of an Airbus A330-302, registered as B-18361, operated by China Airlines (hereinafter referred to as “the Aircraft B”) and Air Traffic Controller of Narita Airport Traffic Control Tower (hereinafter referred to as “the Tower”), and based on recordings of flight data recorders (hereinafter referred to as “FDR”) and “Multilateration System<sup>1</sup>” (hereinafter referred to as “MLAT”), the history of the flight up to the serious incident is summarized below;</p> <p>On February 14, 2017, the Aircraft A was operated to take off from Narita International Airport as a scheduled flight 607 of Thai Air Asia X (hereinafter referred to as “the Company”) with 379 people in total onboard, consisting of the PIC, nine other flight crews and 369 passengers. In the Aircraft A, the PIC</p>
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<sup>1</sup> “Multilateration System” is the system for identifying aircraft position using triangulation based on the time difference of arrival of signals at plural receivers including signals from the ATC transponder equipped on aircraft.

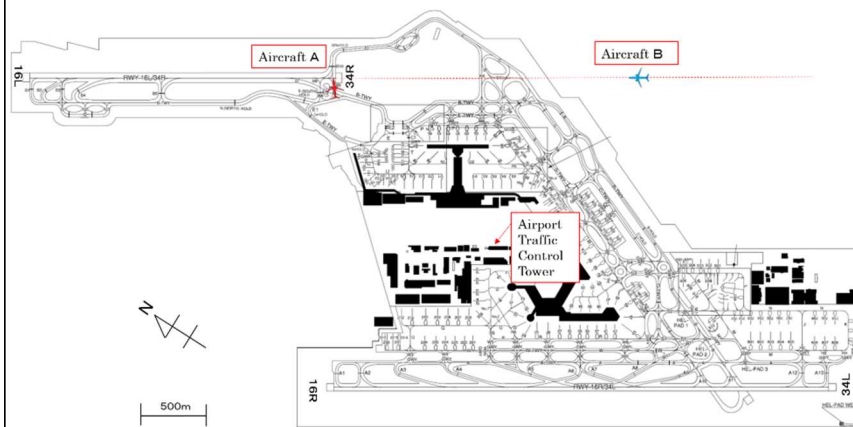
	<p>sat in the left pilot seat as the PF<sup>2</sup> and the FO sat in the right pilot seat as the PM<sup>2</sup>.</p> <p>While the Aircraft A was taxiing on the Taxiway B<sup>3</sup> to the runway 34R for departure, the Tower issued a landing clearance to the Aircraft B which was approaching at approximately 15 nm to the runway.</p> <p>After that, the Aircraft A reported to the Tower being ready for departure, then the Tower instructed to hold short of runway 34R and six minutes delay to be expected due to departure sequence, and again, repeated the instruction to hold short of runway 34R at the end of the communication. For this, the PIC of the Aircraft A read back that he would hold short of runway. The PIC of the Aircraft A ordered the FO to turn on Runway Turn Off Light at the nose landing gear to illuminate to the right hand direction, when turning right in short of Holding Position Markings (hereinafter referred to as “the Stop Line”) of the Taxiway B9 (hereinafter referred to as “B9”). The FO turned on Strobe Light at the wingtip by a mistake, as the PIC pointed out, the FO turned off the Strobe Light few seconds later and turned on Runway Turn Off Light. During this, the PIC was distracted by the FO’s switch operation.</p> <p>When the Tower was visually monitoring the Aircraft A and B, it seemed that the Aircraft A crossed the Stop Line of B9 to enter the runway, even though departing aircraft which holds short of runway should normally stop on the Taxiway B.</p> <p>The Tower asked the Aircraft A and confirmed that “Verify hold short of runway?” at 20:15:31, because a symbol of the Aircraft A on Airport Surface Display System (described later in 2.7 (5)) seemed far closer to the runway than usual. Two seconds later, FDR records showed zero for the ground speed of the Aircraft A which was reading back that “Hold short of runway”</p>
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<sup>2</sup> PF (Pilot Flying) and PM (Pilot Monitoring) are terms used to identify pilots with their roles in aircraft operated by two persons. The PF is mainly responsible for maneuvering the aircraft. The PM mainly monitors the flight status of the aircraft, cross checks operation of the PF, and undertakes other non-operational works.

<sup>3</sup> “Taxiway B” was a name used when this serious incident occurred. The name of the part was changed to “Taxiway K and J” on May 2017.

and stopped, but because the Tower saw the Aircraft A being too close to the runway and the runway condition displayed on the screen of Airport Surface Display System become yellow in color to indicate the warning of aircraft crossing the Stop Line and entering the runway, therefore, the Tower instructed go-around to the Aircraft B because the Tower judged that there was doubt on safety. The PIC of the Aircraft B remembered that the Tower was communicating with a departing aircraft several times, but because he had been concentrated his mind on the landing maneuver, he did not know the contents in detail. In addition, it was dark as being at the night time, he could not see the Aircraft A bring inside of the runway, but made a go-around as following the instruction of the Tower.



**Figure 1 The Serious Incident Site**

The serious incident occurred at 20:16 (JST: UTC + 9 hours, unless otherwise stated all times are indicated in JST on a 24-hour clock) on February 14, 2017, on the runway 34R of the Airport. On this moment, the Aircraft B which was approaching over the position approximately 2,900 m (approximately 1.57 nm) from the threshold on the final approach course.

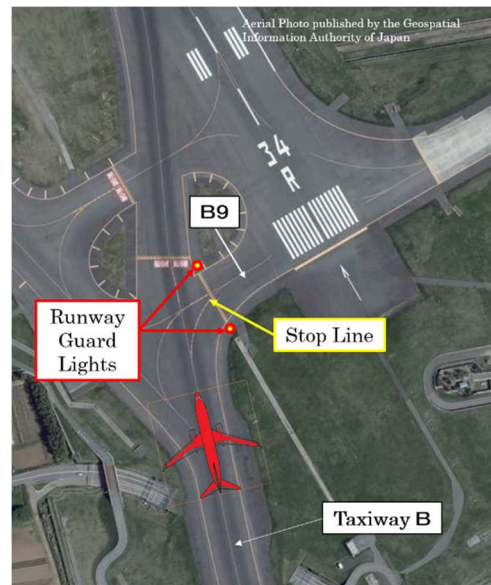
<b>2.2 Injuries to persons</b>	None
<b>2.3 Damage to Aircraft</b>	None

<p><b>2.4 Personnel information</b></p>	<p>(1) the PIC of the Aircraft A Male, Age 49  Airline transport pilot certificate (Airplane) October 10, 2001  Type rating for Airbus A330 August 14, 2014  Class 1 aviation medical certificate; validity August 25, 2017  Aviation English Proficiency Certification  Validity; March 4, 2020  Total flight time 19,176 hours 00 minute  Total flight time on the type of aircraft 1,931 hours 00 minute  Flight time in the last 30 days 70 hours 23 minutes</p> <p>(2) the FO of the Aircraft A Male, Age 31  Commercial pilot certificate (Airplane) February 6, 2012  Type rating for Airbus A330 February 5, 2017  Instrument flight certificate February 6, 2012  Class 1 aviation medical certificate; Validity January 12, 2018  Aviation English Proficiency Certification  Validity; indefinite period  Total flight time 2,549 hours 35 minutes  Total flight time on the type of aircraft 222 hours 35 minutes  Flight time in the last 30 days 65 hours 29 minutes</p>
<p><b>2.5 Aircraft information</b></p>	<p>Aircraft A; Type Airbus A330-343X  Serial Number; 692, Date of Manufacture; November 23, 2005  Airworthiness certificate; 138/2553, Validity; February 22, 2018</p>
<p><b>2.6 Meteorological information</b></p>	<p>The aviation routine weather report of the Airport at the time zone of the serious incident occurrence were as follows;  20:00 Wind direction 290°, Wind velocity 4 kt  Visibility 10 km or more  Cloud Amount 2/8, Type Cumulus, Cloud base 3,000 ft  Temperature 2°C, Dew points -5°C  Altimeter setting (QNH) 30.20 inHg</p>
<p><b>2.7 Additional information</b></p>	<p>(1) Information concerning the taxiway of the Airport  A spacing between the Taxiway B connecting to B9 of the</p>

runway 34R and the runway is narrow. A aircraft with the instruction to hold short of runway 34R, stopped short of B9 on the Taxiway B, because the space in front of the Stop Line of B9 has not enough for the Aircraft to stop with face to the Stop Line right angle. (See Figure 2.)

(2) The Stop Line and others on the runway

B9 which connects to the runway 34R has the Stop Lines, the Stop Bar Lights and the Runway Guard Lights installed in order to indicate the position to halt before entering the runway. (See Figure 3.) The Stop Bar Lights will turn red light on when the low visibility to indicate the halting position, but when the weather is good, even at night, the light would not be on. The Runway Guard Lights flashes in yellow light to indicate the halting position at night of low visibility. When the serious incident occurred, the Stop Bar Lights were not turned on, but the Runway Guard lights were on.



**Figure 2 Image of stopping at B9 stop line**

(3) Information concerning FDR

The Aircraft A and B equipped FDR and Cockpit Voice Recording device (hereinafter referred to as “CVR”) onboard. FDR had the recordings at the time of the serious incident but the CVR was left onboard and were overwritten for sure because it has only the two-hour recordable capacity and the operations of both aircrafts continued after the occurrence of the serious incident.

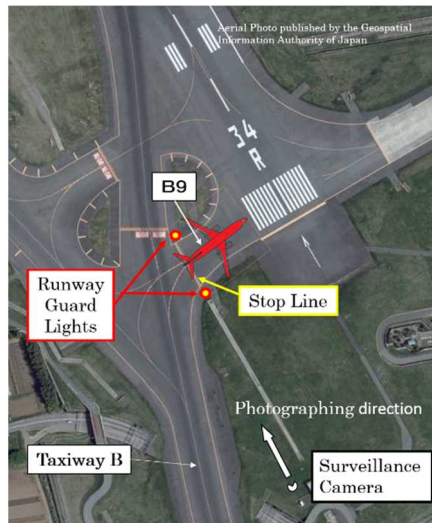
(4) Recordings of FDR and MLAT and images of Surveillance Camera

Based on the recordings of FDR and MLAT, the records



concerning the halting position where the Aircraft A stopped with the instruction of the Tower is as shown in Figure 3. At the moment, the positional relation between the Aircraft at the time of stop and the Runway Guard Lights, which were recorded by Surveillance Camera, is as shown in Photo 1.

Furthermore, when the Tower instructed go-around, the Aircraft B was over the position approximately 2,000 m from the threshold on the final approach course.



**Figure 3 Estimated Stop Position of the Aircraft A based on FDR and MLAT**



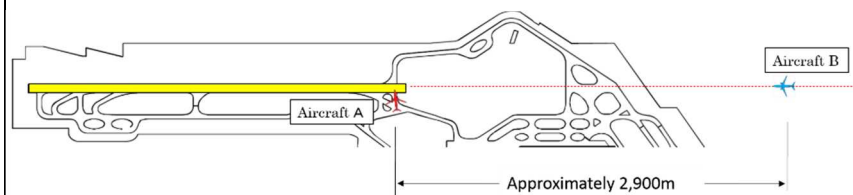
**Photo 1 Positional Relation between where the Aircraft A stopped and Runway Guard Lights according to the Surveillance Camera**

#### (5) Airport Surface Display System

The Control Tower at the Airport was equipped with the system displaying position of moving aircrafts and so on, based on the calculation by MLAT on the screen at the surface of Airport. This system have function to determine whether

aircraft enters the runway or not based on a position of the aircraft, if other aircraft crosses a stop line, the runway condition becomes yellow on the screen to display warning and calls out attention to controllers.

At the time of the serious incident occurrence, when the system identified that the Aircraft A crossed the Stop Line of B9, because the Aircraft B positioned closer to the threshold than a specified range, the warning was displayed.



**Figure 4 Display Image on Airport Surface Display system when a warning is activated**

(6) ATC Communications Status

The communication status between the Tower and the Aircraft A was carried out without any noise or interference.

(7) Situation of the PIC and the FO when the Aircraft A stopped

The PIC had numerous experiences to depart from the runway 34R at the Airport till then. The PIC had felt that it was not easy to find where to stop because there was no clear target to hold short of the Stop Line of B9 on the Taxiway B. In addition, the PIC was distracted by the FO's operation of Runway Turn Off light and Strobe Light, when he received the report to confirm from the Tower, he thought that he might mistake other marking near the threshold as the Stop Line of B9.

The FO had only little experience to depart from the runway 34R and did not understand how the Stop Line of B9 looked from the cockpit or where it should stop, clearly.

The PIC and the FO did not performed a briefing regarding the reminders for ground taxiing to the runway 34R prior to taxiing, when the serious incident occurred.

### 3. ANALYSIS

3.1 Involvement of weather	None
3.2 Involvement Of pilot	Yes
3.3 Involvement of equipment	None
3.4 Analysis of known items	<p>(1) Situation at the time of approaching the runway</p> <p>① Situation of the Aircraft A</p> <p>Based on the images of the Surveillance Camera and records of FDR and MLAT, it is probable that the Aircraft A had already crossed the Stop Line when the Tower asked to confirm the holding position during the taxiing upon receiving the instruction from the Tower to hold short of runway. It is probable that even though the calculated value might have error, the Aircraft A had crossed the Stop Line by approximately 60 m.</p> <p>② Actions of the Tower</p> <p>It is highly probable that because the aircraft A seemed to cross the Stop Line of B9 based on the visual observation of the Tower and the runway condition displayed on the Airport Surface Display System which become yellow to issue the warning of aircraft entering runway, the Tower instructed go-around to the Aircraft B which was at approximately 2,000 m from the threshold under the policy to give priority to safety.</p> <p>③ Actions of the Aircraft B</p> <p>It is highly probable that the PIC of the Aircraft B remembered that there were communication between the Tower and other aircraft, but because he did not recognized the contents and could not see anything visually due to the darkness of nighttime, he did not aware that the Aircraft A entered inside of the runway. Later on, it is certain that it did make a go-around, following the instruction from the Tower.</p> <p>(2) Air Traffic Control Communications</p> <p>Based on the ATC communication records, it is probable that because during the communication, there were no noise or</p>

	<p>interferences and the Aircraft A correctly read back the contents of instruction, the Aircraft A was able to receive the instruction from the Tower, correctly. Furthermore, it is probable that because the Aircraft A was responding to the instruction from the Tower without asking to repeat, he did not have questions or doubts to the instructions.</p> <p>(3) Judgments and piloting by the PIC and the FO of the Aircraft A</p> <p>The PIC ordered the FO to turn on the Runway Turn Off Light during taxiing when the Aircraft A was approaching B9 and turning to the right. Because the FO turned on strobe lights by mistake, it is probable that the PIC ordered the FO to correct it and the PIC was distracted by the FO's switch operation during the time until it corrected, and it is somewhat likely that the PIC and the FO had failed to notice the Stop Line and Runway Guard Lights. It is probable that the PIC stopped the Aircraft A according to the confirmation from the Tower, but the position where it stopped was already crossed the Stop Line by approximately 60m.</p> <p>It is somewhat likely that the FO did not have the images where it should stop, when he had to stop short of the Stop Line of B9, because he had little experiences of departing from the runway 34R.</p> <p>(4) Taxiway near B9 at the Airport</p> <p>Taxiway at common airport is crossing a runway at right angle and aircraft would stop as directly facing runway, therefore, it is probable that they are useful for a pilot of departing aircraft to confirm the stop position or to see landing aircraft by sight. However, B9 is crossing the runway at right angle, but there is not enough space to stop, therefore when a large aircraft stops at the Stop Line of B9 position, it cannot take a position facing the runway in 90°. Because of this, it is highly probable that it is necessary for a large aircraft to stop on the Taxiway B which is short of runway. It is desirable for the Airport Installation Manager to implement the study how to prevent a runway incursion or how to study the visibility of the Stop Line.</p> <p>(5) Risk at this serious incident</p> <p>Estimated separation between two Aircrafts positions when the</p>
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	<p>Aircraft entered the runway 34R and the Aircraft B executed the go-around with the instruction given by the Tower was approximately 2,000 m. It is certain that this serious incident fell under the category C “an incident characterized by ample time and / or distance to avoid a collision.” with a determining tool provided by ICAO, concerning the Severity Classification of the serious incident based on “the Manual on the Prevention of Runway Incursions” published by ICAO.</p> <p>(See Attachment Classification of the Severity of Runway Incursions)</p>
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#### 4. PROBABLE CAUSES

<p>It is highly probable that this serious incident occurred because the Aircraft A entered the runway across the Stop Line despite the instruction given to it by the Tower to hold short of the Stop Line of the runway 34R, and the Aircraft B which had been given landing clearance attempted a landing to the same runway.</p> <p>It is somewhat likely that the Aircraft A entered the runway when the PIC and the FO failed to notice the Stop Line and the Runway Guard Lights because they were concentrating to operate the switches in the cockpit and forgot to pay attentions to the outside.</p>
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#### 5. SAFETY ACTION

<p>(1) Safety Actions taken by the Company</p> <p>① Issuing the safety information</p> <p>The Company issued the safety information to provide the instructions for the time of taxiing in order to prevent a runway incursion, after sharing and reminding all of flight crews concerning the serious incident right after the occurrence.</p> <p>② Measures when taxiing on ground at Airport</p> <p>The Company studied problems concerning taxiing at Airport, and when holding short of the Stop Line of B9 prior to departing from the runway 34R, inform all flight crews to stop at a position with enough space, pay attentions to speed during taxing and other, thoroughly.</p> <p>③ Re-educating the flight crews</p> <p>The Company implemented the re-education to all flight crews primarily by CRM training as the parts of correcting measures for this incident.</p> <p>(2) Framework to prevent re-occurrences by the concerned parties of Narita</p>
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#### International Airport

There was a plan from before this serious incident, at Narita International Airport, relevant parties in charge of operation of facilities including pilots were gathered to establish the conference body to discuss how to improve safeties and started the studies to prevent incursions to the runway and the taxiway at Airport from June 2017.

## Attachment: Classification of the Severity Of Runway Incursions

The classification related to the risk measurement described in the Manual on the Prevention of Runway Incursions (Doc 9870) published by ICAO are as shown in the table below.

**Table 6-1: Severity classification scheme**

<b>Severity Classification</b>	<b>Description **1</b>
<i>A</i>	<i>A serious incident in which a collision is narrowly avoided.</i>
<i>B</i>	<i>An incident in which separation decreases and there is significant potential for collision, which may result in a time-critical corrective/evasive response to avoid a collision.</i>
<i>C **2</i>	<i>An incident characterized by ample time and/or distance to avoid a collision.</i>
<i>D</i>	<i>An incident that meets the definition of runway incursion such as the incorrect presence of a single vehicle, person or aircraft on the protected area of a surface designated for the landing and takeoff of aircraft but with no immediate safety consequences.</i>
<i>E</i>	<i>Insufficient information or inconclusive or conflicting evidence precludes a severity assessment.</i>

\*\* 1 . Refer to Annex 13 for the definition of “incident”

\*\* 2. Shading is added to indicate the applicable category in order to show the applicable category of this serious incident.