

AI2014-3

**AIRCRAFT SERIOUS INCIDENT
INVESTIGATION REPORT**

**HAWAIIAN AIRLINES, INC.
N 5 8 8 H A
ALL NIPPON AIRWAYS CO., LTD.
J A 8 3 5 6**

June 27, 2014

 **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.

Norihiro Goto
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

HAWAIIAN AIRLINES, INC.
BOEING 767-300, N588HA
ALL NIPPON AIRWAYS CO., LTD.
BOEING 767-300, JA8356
RUNWAY INCURSION
ON RUNWAY 06R AT KANSAI INTERNATIONAL AIRPORT
AT ABOUT 21:36 JST, OCTOBER 12, 2011

May 30, 2014

Adopted by the Japan Transport Safety Board

Chairman	Norihiro Goto
Member	Shinsuke Endoh
Member	Toshiyuki Ishikawa
Member	Sadao Tamura
Member	Yuki Shuto
Member	Keiji Tanaka

SYNOPSIS

<Summary of the serious Incident>

On October 12 (Wednesday), 2011, a Boeing 767-300, registered N588HA, operated by Hawaiian Airlines, Inc., was holding short of Runway 06R at Kansai International Airport for takeoff as the scheduled flight 450 of the company for Honolulu International Airport (in the State of Hawaii in the United States), while another Boeing 767-300, registered JA8356, operated by All Nippon Airways Co., Ltd., was on final approach to Runway 06R of Kansai International Airport as the scheduled (cargo) flight 8519 of the company.

When an arriving aircraft passed in front of N588HA that had been holding, the air traffic controller instructed N588HA again to hold, and then cleared JA8356 to land. However, N588HA entered the runway and, as a result, at around 21:36 JA8356 made a go-around following the instructions of the air traffic controller.

There were 208 people on board N588HA, consisting of a Pilot in Command (PIC), 11 other crewmembers and 196 passengers, while two people on board JA8356, consisting of a PIC and another crewmember. No one was injured on either aircraft and no damage was sustained to the two aircraft.

<Probable Causes>

It is probable that this serious incident occurred as a departing aircraft (N588HA) entered a runway despite the fact that it had been instructed to continue holding short of the runway, leading to an arriving aircraft (JA8356), which was cleared to land after the instruction to N588HA, attempting to land on the same runway.

It is probable that N588HA entered the runway because the flight crewmembers of the aircraft incorrectly heard the instruction to continue holding as an instruction to hold on the runway and misunderstood whereas the Controller assumed that his instruction was correctly understood by N588HA and did not request clarification despite the fact that the readback from N588HA did not match the phraseology of the original instruction.

It is probable that the following contributed to the mishearing of the instruction by the flight crewmembers.

- (1) The words included in the instruction were the same as those previously used in the U.S. to instruct aircraft to hold on the runway.
- (2) The crewmembers were expecting that the next instruction from the Tower would be for them to hold on the runway.
- (3) The instruction to hold was issued to N588HA, which had been holding short of the runway, just when an arriving aircraft passed in front of them.
- (4) The crewmembers thought that they would be able to take off before JA8356 landed.

It is probable that the following contributed to the Controller's assuming the instruction to be understood by N588HA.

- (1) The Controller did not know that the phraseology used in the readback was previously used in the U.S. to instruct aircraft to hold on the runway.
- (2) The readback included the same words that were used in the instruction.

Abbreviations and Acronyms used in this report include the following:

AIP:	Aeronautical Information Publication
CVR:	Cockpit Voice Recorder
DFDR:	Digital Flight Data Recorder
DME:	Distance Measuring Equipment
FAA:	Federal Aviation Administration
FOM:	Flight Operations Manual
ICAO:	International Civil Aviation Organization
IRO:	International Relief Officer
NTSB:	National Transportation Safety Board
PF:	Pilot Flying
PM:	Pilot Monitoring
SIC:	Second-in-command
TACAN:	UHF Tactical Air Navigation Aid
TCAS:	Traffic Alert and Collision Avoidance System
VOR:	Very High Frequency Omnidirectional Radio Range
VORTAC:	VOR and TACAN combination

Unit Conversion Table

1 ft:	0.3048 m
1 nm:	1,852 m
1 kt (1 nm/h):	1.852 km/h (0.5144 m/s)
1 lb:	0.4536 kg

1. PROCESS AND PROGRESS OF AIRCRAFT SERIOUS INCIDENT INVESTIGATION

1.1 Summary of the Serious Incident

On October 12 (Wednesday), 2011, a Boeing 767-300, registered N588HA, operated by Hawaiian Airlines, Inc., was holding short of Runway 06R at Kansai International Airport for takeoff as the scheduled flight 450 of the company for Honolulu International Airport (in the State of Hawaii in the United States), while another Boeing 767-300, registered JA8356, operated by All Nippon Airways Co., Ltd., was on final approach to Runway 06R of Kansai International Airport as the scheduled (cargo) flight 8519 of the company.

When an arriving aircraft passed in front of N588HA that had been holding, the air traffic controller instructed N588HA to continue holding while clearing JA8356 to land. However, N588HA entered the runway and, as a result, at around 21:36 JA8356 made a go-around following the instructions of the air traffic controller.

There were 208 people on board N588HA, consisting of a Pilot in Command (PIC), 11 other crewmembers and 196 passengers, while two people on board JA8356, consisting of a PIC and another crewmember. No one was injured on either aircraft and no damage was sustained to the two aircraft.

1.2 Outline of the Serious Incident Investigation

The occurrence covered by this report falls under the category of “An attempt of landing on a runway being used by other aircraft” as stipulated in Item 2, Article 166-4 of the Ordinance for Enforcement of the Civil Aeronautics Act, and is classified as a serious incident.

1.2.1 Investigation Organization

On October 13, 2011, the Japan Transport Safety Board designated an investigator-in-charge and two other investigators to investigate this serious incident.

1.2.2 Representatives from Foreign Authorities

The Japan Transport Safety Board notified the occurrence of this serious incident to the United States (the U.S.), as the State of Registry, the Operator, Design and Manufacturer of the aircraft involved in this serious incident. The U.S. did not designate any accredited representatives.

1.2.3 Implementation of the Investigation

October 13 and 14, 2011	On-site investigation and interviews
October 16 and 21, and November 10, 2011	Interviews

1.2.4 Comments from Parties Relevant to the Cause of the Serious Incident

Comments were invited from parties relevant to the cause of this serious incident.

1.2.5 Comments from the Relevant State

Comments on the draft report were invited from the relevant State.

2. FACTUAL INFORMATION

2.1 History of the Flight

At around 21:26 on October 12, 2011, a Boeing 767-300, registered N588HA, operated by Hawaiian Airlines, Inc. (hereafter referred to as “the Aircraft A”), started taxiing from Spot 15 towards Runway 06R at Kansai International Airport.

The flight plan for the Aircraft A was outlined below:

Flight rules:	Instrument flight rules (IFR)
Departure aerodrome:	Kansai International Airport
Estimated off-block time:	21:30
Cruising speed:	467 kt
Cruising altitude:	Flight Level (FL) 350
Route:	TME (Tomo VOR/DME) – GBE (Gobo VOR/DME) – TONDA (reporting point) – KEC (Kushimoto VORTAC) – A1 (airway) – MJE (Miyakejima VOR/DME) – Y81 (RNAV route) – rest omitted
Destination aerodrome:	Honolulu International Airport
Total estimated elapsed time:	6 h 35 min

At the time of the serious incident, in the cockpit of the Aircraft A, the PIC sat in the left seat as the PF (pilot flying: pilot mainly in charge of flying) and the First Officer (FO) sat in the right seat as the PM (pilot monitoring: pilot mainly in charge of monitoring). In addition, a third pilot (hereafter referred to as “the IRO*1”) sat in an observer seat behind the pilots’ seats, as a relief.

Another Boeing 767-300, registered JA8356, operated by All Nippon Airways Co., Ltd. (hereafter referred to as “the Aircraft B”), took off from Narita International Airport at 20:38 and was flying to Kansai International Airport.

The flight plan for the Aircraft B was outlined below:

Flight rules:	Instrument flight rules (IFR)
Departure aerodrome:	Narita International Airport
Estimated off-block time:	20:25
Cruising speed:	472 kt
Cruising altitude:	FL340
Route:	KZE (Kisarazu VOR/DME) – HYE (Yokosuka VOR/DME) – SZE (Shizuoka VOR/DME) – V17 (airway) – SINGU (reporting point) – DINAH (reporting point) – GBE (Gobo VOR/DME) – EDDIE (reporting point)
Destination aerodrome:	Kansai International Airport
Total estimated elapsed time:	1 h 06 min

*1 IRO (International Relief Officer) is the term specifically used by Hawaiian Airlines for an additional flight crewmember who is required by the U.S. Federal Aviation Regulations when a U.S. airline operates an international flight exceeding a specific flight time.

At the time of the serious incident, in the cockpit of the Aircraft B, the PIC sat in the left seat as the PF and the FO sat in the right seat as the PM.

The flight histories of the Aircraft A, the Aircraft B and other relevant aircraft up to the serious incident are outlined below, based on the Air Traffic Control (ATC) communications records, the radar tracking records, data of digital flight data recorder (hereafter referred to as “DFDR”) of the Aircraft B and the statements from the flight crewmembers of both aircraft and the air traffic controller (hereafter referred to as “the Controller”) involved in the serious incident.

2.1.1 History of the Flight Based on the ATC Communications Records and DFDR Records

21:19:31	The Aircraft A requested a pushback from Spot 15 from the ground control (hereafter referred to as “the Ground”). The Ground told Aircraft A to stand by for a while.
21:19:57	The Ground approved the pushback for the Aircraft A.
21:26:04	The Aircraft A asked the Ground for a taxiing clearance. The Ground instructed the Aircraft A to taxi via Taxiways E4 and P. The Aircraft A read it back.
21:29:38	The Ground instructed the Aircraft A to contact the local control (hereafter referred to as “the Tower”).
21:31:36	The Tower called the Aircraft A and asked if it was ready to go. The Aircraft A responded that it was ready.
21:31:42	The Tower instructed the Aircraft A, “Hold short of Runway 06R.” The Aircraft A read it back.
21:32:01	The Aircraft B reported the Tower that it was 3 nm before JANET (reporting point). The Tower provided the Aircraft B with wind information and instructed it to continue its approach to Runway 06R. The Aircraft B read it back.
21:32:43	The Aircraft A entered Taxiway A14 and stopped short of Runway 06R.
21:34:11	The Tower cleared All Nippon Airways Flight 1720 (hereafter referred to as “the Aircraft C”), which was preceding the Aircraft B, to land on Runway 06R, and instructed it to take Taxiway A7 for leaving the runway, if possible, after landing. The Aircraft C read them back.
21:35:29	The Aircraft C passed over the runway threshold. The Tower instructed the Aircraft A, “Hold position” and also advised, “Expect departure after next arrival 5 miles.”
21:35:37	The Aircraft A read back saying “Position and hold.”
21:35:52	The Aircraft A on Taxiway A14 resumed taxiing, and then entered Runway 06R beyond the holding position marking.

21:35:56	The Tower instructed The Aircraft C, which had landed and was leaving the runway through Taxiway A7, to contact the Ground.
21:36:14	The Tower cleared the Aircraft B to land on Runway 06R. The Aircraft B read it back and requested wind information.
21:36:25	The Tower instructed the Aircraft B to disregard the landing clearance, go around and follow the missed approach procedure, and reported that a departing aircraft (Aircraft A) had entered the runway. At that time, the Aircraft B was about 3.0 nm to the threshold of Runway 06R and at an altitude of about 960 ft.
21:36:32	The Aircraft B read back the go-around instruction, reported that they had the aircraft on the runway in sight, and then climbed from an altitude of about 840 ft. At that time, the Aircraft B was about 2.5 nm to the threshold of Runway 06R.
21:36:53	The Tower told the Aircraft A, "I instructed as hold position. But you entered the runway."
21:37:01	The Aircraft A answered the Tower, "You tell me, 'Position and hold.'"
21:37:04	The Tower then told, "That does not mean 'Taxi into position and hold,' but 'Hold position' I said."
21:37:12	The Aircraft A responded, "We read back 'Position and holding.'"
21:37:18	The Aircraft A added, "And hold on the runway."
21:37:53	The Tower again told the Aircraft A, "I said, 'Hold position' that means continue to hold short of the runway," and asked if the Aircraft A hadn't been able to understand.
21:38:08	The Aircraft A answered to the Tower, "We all've heard 'Position and hold' on the runway."

2.1.2 Statements of Flight Crewmembers

2.1.2.1 Flight Crewmembers of the Aircraft A

(1) PIC

While the Aircraft A was taxiing from Spot 15 to Runway 06R, the PIC saw the lights of two arriving aircraft on final approach. When asked by the Ground if the aircraft was ready for takeoff, the PIC responded affirmatively as the FO was carrying out the checklist. Since they were instructed to "taxi to runway six right and hold short," they did that and stopped the aircraft short of the holding position marking. The PIC had always stopped about 150 ft short of the marking to avoid any risk in anticipation of arriving aircraft deviating off course for some reason or other. Soon after the first

arriving aircraft (Aircraft C) landed, the Tower instructed the Aircraft A to “position and hold runway six right” and provided further information about arriving aircraft by saying something similar to “Traffic on final.” However, the PIC did not clearly remember the information about the arriving aircraft. The PIC, the FO and the IRO were all wearing headsets to monitor ATC radio communication, and all three understood that they were instructed to position and hold on the runway. Therefore, they all looked left and right, and the FO read back saying “Position and hold runway six right.” As there was no response from the Tower to that readback, the crewmembers started the before-takeoff checklist and illuminated all the exterior lighting including the strobe and landing lights. The crewmembers completed the checklist as they slowly entered the runway while watching to the right for arriving aircraft. After that, the Aircraft A spent about one and a half minutes on the runway without any communication with the Tower. As the PIC was about to ask the Tower if the aircraft would have a takeoff clearance soon, they heard communications between the Tower and the Aircraft B about a go-around. Then, the crewmembers saw the Aircraft B flying above on the left, at an altitude about 1,000 ft, and turning left for the downwind leg. After that, the Tower told the crewmembers that they were not instructed to “Position and hold on runway six right.” The PIC responded to the Tower that they had surely been instructed to “position and hold runway six right.”

The PIC started flying into Japan earlier in 2011. In the U.S., the phraseology for the instruction to hold on the runway changed in September 2010 to “Line up and wait.” For some time after the changeover, there were air traffic controllers who still continued to use the previous phraseology “Position and hold.” In response to that instruction, the PIC would read back saying “Position and hold.”

Prior to the changeover, Hawaiian Airlines issued a written statement notifying the change of phraseology change from “Position and hold” to “Line up and wait.” The Federal Aviation Administration (hereafter referred to as “the FAA”) also provided a notification to that effect.

(2) FO

The Aircraft A taxied to Runway 6R via Taxiway L and stopped on Taxiway A14, which led to the threshold of Runway 6R. While holding on Taxiway A14, the Tower instructed the Aircraft A to “taxi into position and hold six right.” The FO read that back. The three crewmembers in the cockpit looked at each other and confirmed that it was cleared to “taxi into position.” Because there was an arriving aircraft (Aircraft B), shortly after the FO read back the instruction from the Tower, the crewmembers looked for the approaching traffic, expecting to get a takeoff clearance immediately after the aircraft (Aircraft C) that had landed left the runway. The crewmembers thought that they had time to enter the runway and take off before the arriving aircraft (Aircraft B) landed. The arriving aircraft (Aircraft B) was still several miles away and not too close to the runway threshold to have a doubt that they could enter the runway for takeoff. All three crewmembers looked in the direction of the aircraft (Aircraft C) that had left the runway after landing and in the direction of the arriving aircraft before entering the

runway. The crewmembers turned on the lights and were waiting on the runway for takeoff clearance when the Tower told them that he had not instructed the Aircraft A to “taxi into position.” Then, the FO told the Tower that they were given the instruction “Taxi into position six right” and that he had read back, “Taxi into position runway six right.”

Before the serious incident, the FO had flown to Japan, once into Haneda Airport and six times into Kansai International Airport since the service to Kansai was launched earlier in 2011.

The official phraseology currently used in the U.S. is “Line up and wait.” Previously, it was “Position and hold.” The FO did not remember when the changeover occurred. After the changeover, however, there were still some air traffic controllers who would use “Position and hold.” Given that, the FO has since been simply reading back what had been said.

The FO remembered seeing a bulletin or a memo, issued either by Hawaiian Airlines or the FAA, notifying the phraseology change prior to its implementation.

(3) IRO

An IRO was on board the flight, sitting in the observer seat. The Aircraft A taxied from Spot 15, via Taxiway P to Runway 06R, and stopped short of the runway. The IRO thought that the Tower initially instructed the Aircraft A to “taxi and hold short six right.” However, the IRO did not clearly remember the instruction in detail as he was not in charge of ATC radio communication and was checking with the cabin crewmembers if all crewmembers were seated. When the Aircraft A stopped short of the runway, the IRO saw an aircraft (Aircraft C) on final approach. As this aircraft left the runway after landing, the Tower instructed the Aircraft A to “position and hold six right.” While the aircraft entered the runway, all three crewmembers saw an aircraft (Aircraft B) to the right on long final approach. The crewmembers then aligned the aircraft with the runway center line, thinking that they would soon start taking off. About one minute passed while waiting on the runway and the IRO felt that something might be strange, when the Tower told the Aircraft A that he had not cleared it to enter the runway. The FO responded, saying that the Aircraft A had been instructed to “position and hold” and that he had read back “Position and hold six right.” After that, there was communication between the Tower and the Aircraft B about a go-around. If the crewmembers had seen that the Aircraft B was much closer, they would not have entered the runway.

While the correct phraseology is “Line up and wait,” the IRO did not understand why the Tower said “Position and hold” to the Aircraft A that was holding short of the runway. The IRO thought that the Controller mistakenly used this phraseology.

The IRO had flown to Japan, three times into Haneda Airport last year, and two times into Kansai International Airport including this flight.

The IRO did know that they use “Line up and wait” in Japan. As all previous flights on which the IRO was onboard departed during hours with no arriving flights, he was instructed to “line up and wait” at the end of the runway. This time, however, the Aircraft A was instructed to “position and hold” when an arriving aircraft (Aircraft C)

had landed and the next arriving aircraft (Aircraft B) was on long final approach. Under these circumstances, the crewmembers might assume that they must take off immediately, and this might have prevented them from correctly listening what the Controller said.

In the U.S., the phraseology changed about a year ago from “Position and hold” to “Line up and wait,” but the IRO did not understand why the change was made. For several months after the change, everyone was confused, with some air traffic controllers using neither “Position and hold” nor “Line up and wait.” For some time after the change, everyone’s minds are “Position and hold,” not “Line up and wait.”

The IRO remembered that prior to the phraseology change, Hawaiian Airlines issued a bulletin about the change.

2.1.2.2 Flight Crewmembers of the Aircraft B

Since the Aircraft B was a freighter, it was heavy. The landing weight was approximately 310,000 lbs; therefore, made the approach speed fast. Besides, there was a tailwind of about 10 kt, which made the approach slightly difficult. While the Kansai Approach Control gave the Aircraft B an instruction about minimum speed, the flaps were already extended to 15°. For further slowdown, the crewmembers had to extend the flaps to the landing position. At Kansai International Airport, however, landing flaps are not available above 1,500 ft for noise abatement. Given the circumstances, the crewmembers told the Kansai Approach Control that the minimum speed at the flaps 15° was slightly faster than 160 kt.

The crewmembers made an ILS approach and came into sight of the airport at around JANET, a reporting point located about 12 nm from the touchdown point. The TCAS*² indicated the preceding traffic (Aircraft C), which was 6–7 nm ahead of the Aircraft B. Considering the speed of the Aircraft B and the effect of the tailwind on final approach, the crewmembers recognized that the separation was too short for Aircraft A to take off between the landing of the Aircraft C and the landing of the Aircraft B. The Aircraft B was cleared to land while flying about 5 nm to the touchdown point and at an altitude of about 1,500 ft. At that time, the crewmembers saw what appeared to be landing lights on the ground. The Aircraft A might have been taxiing along a parallel taxiway at that time. The crewmembers then set the landing flaps and completed the landing checklist.

After that, the crewmembers saw an aircraft entering the runway. At an altitude of about 1,000 ft, the Aircraft B was instructed to go around. The crewmembers did not feel too stressed about following the instruction. At that time, the Aircraft A was aligning itself with the runway for takeoff. To follow the instruction, the crewmembers set the engines to go-around thrust, retracted the flaps by one increment and was about to retract the landing gear, when the Tower told that the Aircraft B might enter the traffic pattern. The crewmembers chose to enter the downwind leg.

*² TCAS (Traffic Alert and Collision Avoidance System) is designed to prevent mid-air collisions by using ATC secondary surveillance radar system. TCAS works by sending interrogation signals from an ATC transponder on board aircraft and receiving transponder signals from other aircraft. It detects and shows the range and bearing of other aircraft from those signals, and altitude information if it is included in the transponder signals. From the successive responding signals, TCAS calculates the rate of proximity with other aircraft and, if a potential conflict is detected, generates a TA (Traffic Advisory) or RA (Resolution Advisory).

Type rating for Boeing 767	November 12, 2008
Class 1 Aviation Medical Certificate	
Validity	January 31, 2012
Total flight time	18,975 h 00 min
Flight time in the last 30 days	101 h 51 min
Total flight time on the type of aircraft	2,415 h 18 min
Flight time in the last 30 days on the type of aircraft	101 h 51 min
(2) FO of the Aircraft A Male, Age 50	
Airline Transport Pilot Certificate (Airplane)	July 22, 1998
Type rating for Boeing 767 (SIC* ³)	September 24, 2009
Class 2 Aviation Medical Certificate	
Validity	August 31, 2012
Total flight time	14,989 h 00 min
Flight time in the last 30 days	100 h 00 min
Total flight time on the type of aircraft	1,302 h 00 min
Flight time in the last 30 days on the type of aircraft	100 h 00 min
(3) IRO of the Aircraft A Male, Age 37	
Airline Transport Pilot Certificate (Airplane)	May 3, 1999
Type rating for Boeing 767	August 8, 2006
Class 1 Aviation Medical Certificate	
Validity	April 30, 2012
Total flight time	6,500 h 00 min
Flight time in the last 30 days	50 h 00 min
Total flight time on the type of aircraft	1,034 h 48 min
Flight time in the last 30 days on the type of aircraft	50 h 00 min
(4) PIC of the Aircraft B Male, Age 62	
Airline Transport Pilot Certificate (Airplane)	July 28, 1987
Type rating for Boeing 767	August 1, 1984
Class 1 Aviation Medical Certificate	
Validity	March 9, 2012
Total flight time	16,381 h 43 min
Flight time in the last 30 days	53 h 03 min
Total flight time on the type of aircraft	9,493 h 54 min
Flight time in the last 30 days on the type of aircraft	53 h 03 min
(5) FO of the Aircraft B Male, Age 53	
Airline Transport Pilot Certificate (Airplane)	June 8, 2004
Type rating for Boeing 767	October 16, 1989
Class 1 Aviation Medical Certificate	
Validity	July 18, 2012

*³ The type rating "SIC" (Second-in-command) is issued by the FAA specifically for FOs for flights outside the U.S. FOs flying as SIC are not involved in PIC duties and therefore do not require a Class 1 Aviation Medical Certificate as stipulated by the U.S. Federal Aviation Regulations.

Total flight time	14,202 h 51 min
Flight time in the last 30 days	48 h 44 min
Total flight time on the type of aircraft	12,600 h 26 min
Flight time in the last 30 days on the type of aircraft	48 h 44 min

2.2.2 Air Traffic Controller Information

Air Traffic Controller on the duty of the Tower	Male, Age 32
Air Traffic Controller Qualification Certificate	July 1, 2005
Aerodrome control rating	July 1, 2005
Facility rating: Kansai Airport Traffic Control Tower	May 9, 2008
Medical certificate	
Validity	June 30, 2012
Aviation English language proficiency certificate	
Validity	March 4, 2013

2.3 Meteorological Information

The aviation weather observations at Kansai International Airport around the time of the serious incident were as follows:

21:30	Wind direction 170°,	Wind velocity 4 kt,	Visibility 10 km
	Cloud: Amount FEW,	Type Cumulus,	Cloud base 4,000 ft
	Amount BKN,	Type Unknown,	Cloud base Unknown
	Temperature 20°C,	Dew point 14°C	
	Altimeter setting (QNH)	30.01 inHg	

2.4 Information on Communications

At the time of the serious incident, the ATC radio communication facilities at Kansai International Airport were operating normally and the radio communication between the airport traffic control tower and the Aircraft A or the Aircraft B was in a good condition. Communications between the airport traffic control tower and the relevant aircraft are shown in Attachment 1 – ATC Communication Transcript.

2.5 Aerodrome Information

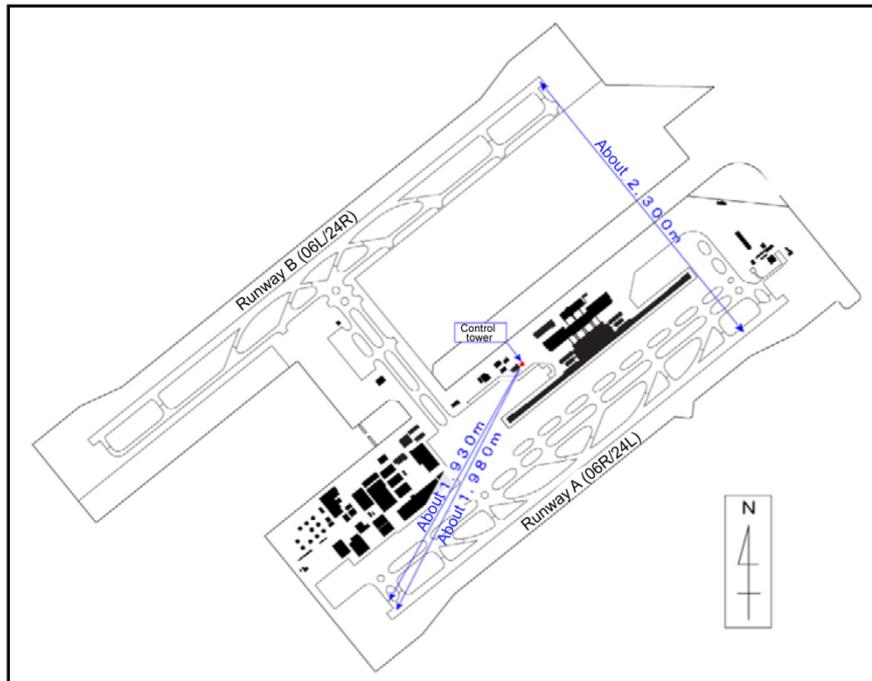
2.5.1 Runways

Kansai International Airport has two runways that are parallel to each other: the Runway A (06R/24L) on the southeast side is 3,500 m long and 60 m wide, and the Runway B (06L/24R) on the northeast side across the control tower and the terminal building from the Runway A is 4,000 m long and 60 m wide. The two runways are about 2,300 m apart from each other and allow simultaneous takeoffs and landings. When the serious incident occurred, only the Runway A (06R) was being used for takeoff and landing while the Runway B was not being used.

2.5.2 Control Tower

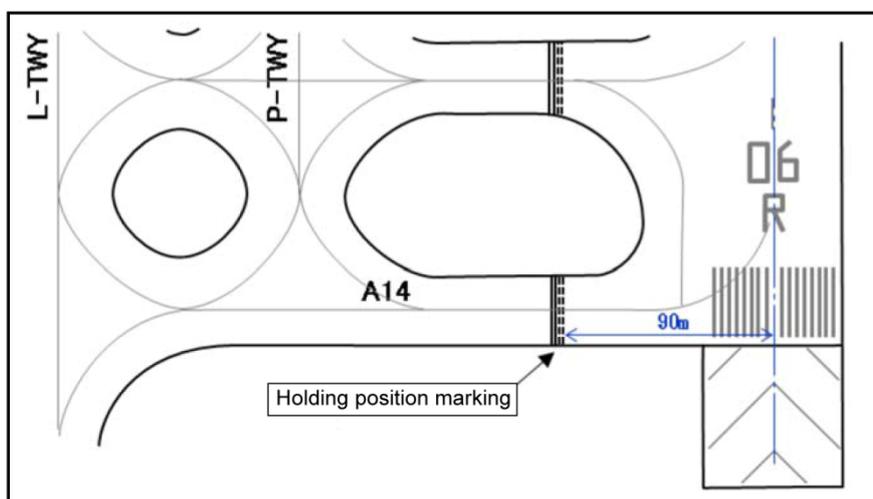
The control tower is located on the west side of the terminal building. It is 84 m high from the ground level and the floor of the control cab is 79 m high from the ground level. The control tower is about 1,980 m away from the threshold of Runway 06R where the serious incident occurred and is about 1,930 m away from the holding position marking on Taxiway A14.

The tower is provided by two control positions, one responsible for the Runway A and the other for the Runway B. The control positions face the respective runways directly.



2.5.3 Taxiway A14

Taxiway A14 is located between the parallel Taxiway L and Runway A and runs across the parallel Taxiway P. Taxiway A14 leads to the entry to Runway 06R; therefore, it is primarily used for departing aircraft when they enter Runway 06R for takeoff. A holding position marking is installed at 90 m from the centerline of the Runway A to indicate where aircraft shall stop before entering the runway.



2.6 Information on DFDR and Cockpit Voice Recorder

The Aircraft A was equipped with a DFDR (part number: 980-4700-042) and a cockpit voice recorder (hereafter referred to as “CVR”) (part number: 980-6022-001), both manufactured by Honeywell of the United States of America. The Aircraft B was equipped with a DFDR (part number: 10077A500) manufactured by Lockheed Aircraft Service of the United States of America and a CVR (part number: 2100-1020-00) manufactured by L-3 Communications of the United States of America.

The DFDR of the Aircraft A, capable of recording for more than 25 hours, and the CVR of the aircraft, capable of recording for two hours, did not retain data relevant to the serious incident as the aircraft, after arriving at Honolulu International Airport, flew to Manila International Airport and back, causing the data to be overwritten. The CVR of the Aircraft B, capable of recording for two hours, did not retain data relevant to the serious incident as the aircraft, after arriving at Kansai International Airport, flew to Naha Airport and Narita International Airport, causing the data to be overwritten. However, the DFDR of the Aircraft B, capable of recording for more than 25 hours, retained data relevant to the serious incident.

The time data on the DFDR of the Aircraft B was corrected by correlating the VHF transmission keying signals on the DFDR with the time signal recorded on the ATC communication records.

2.7 Information on Airport Surface Detection Equipment and Multilateration System

At Kansai International Airport, in addition to airport surface detection equipment, a multilateration system*⁴ is installed to check the existence and position of aircraft and vehicles on the airport surface. The positions of aircraft and vehicles detected by these systems are displayed on the airport surface map of the tower display subsystem at the airport traffic control tower.

In the investigation into this serious incident, the data recorded by the systems mentioned above were used for the tracks of landing and taxiing of the relevant aircraft.

2.8 Information on Air Traffic Control

2.8.1 ATC Phraseology

The phraseology used in air traffic control radio communication should be based on Procedure for Air Navigation Services – Air Traffic Management*⁵ (hereafter referred to as “Doc 4444”) approved by the International Civil Aviation Organization (hereafter referred to as “ICAO”)

*⁴ The multilateration system is the surveillance system to locate an aircraft or vehicle by measuring the time difference of arrival of a signal from the ATC secondary surveillance radar transponder on board the aircraft or vehicle at three or more receiver sites at airport.

*⁵ This document was originally titled “Procedure for Air Navigation Services – Air Traffic Control (PANS-ATC).” From the fourth edition that came into effect on September 1, 1952, the title was changed to “Procedure for Air Navigation Services – Rules of the Air and Air Traffic Services (PANS-RAC).” From the 14th edition that came into effect on November 1, 2001, it was again changed to the current title, “Procedure for Air Navigation Services – Air Traffic Management (PANS-ATM).” Through all these title changes, ICAO has retained the same document number “Doc 4444.”

under the Convention on International Civil Aviation. In Japan, air traffic control radio communication phraseology is prescribed in III Standards for Air Traffic Control Procedure in Fifth Air Traffic Service Procedure Hand Book of Air Traffic Service Procedure Handbook (hereafter referred to as “Standards for ATC Procedure”) by the Civil Aviation Bureau (CAB) of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT). In the United States, it is prescribed in Order JO 7110.65*6 (hereafter referred to as “Order 7110.65”) by FAA.

2.8.1.1 Instruction to Hold

The phraseology used when instructing an aircraft to hold are described as below. The information in brackets is typically numerals, names, etc.

Standards for ATC Procedure	<i>HOLD ON [location]; HOLD SHORT OF [location]; HOLD FOR [reason].</i>
Order 7110.65	<i>HOLD POSITION; HOLD FOR [reason]; HOLD SHORT OF [location]; HOLD AT [specific point].</i>
Doc 4444	<i>HOLD [direction] OF [position, runway number, etc.]; HOLD POSITION; HOLD [distance] FROM [position]; HOLD SHORT OF [position].</i>

2.8.1.2 Instruction to Hold on Runway

The phraseology used when instructing a departing aircraft to hold on the runway has changed as shown below. The information in the [] brackets is typically numerals, names, etc. Information in the () brackets may be added as required.

Standards for ATC Procedure	Up to and including October 25, 2006 <i>RUNWAY [number] TAXI INTO POSITION AND HOLD. (traffic information)</i>
	From October 26, 2006 <i>RUNWAY [number] LINE UP AND WAIT. (traffic information); RUNWAY [number] AT [intersection designator], LINE UP AND WAIT (traffic information).</i>

*6 The order is revised regularly (every 728 days) and suffixed with an alphabetical letter representing the specific version. Each version is also revised three times and suffixed with Change 1, Change 2 or Change 3, as appropriate. (The original version is suffixed with “Basic.”) Order 7110.65T Change 3 was in effect when this serious incident occurred.

Order 7110.65	<p>Up to and including February 19, 2003 <i>RUNWAY [number], TAXI INTO POSITION AND HOLD.</i></p> <p>From February 20, 2003 up to and including September 29, 2010 <i>RUNWAY [number], POSITION AND HOLD.</i></p> <p>From September 30, 2010*7 <i>RUNWAY [number], LINE UP AND WAIT;</i> <i>RUNWAY [number] AT [taxiway designator], LINE UP AND WAIT.</i></p>
Doc 4444	<p>Up to and including June 6, 1984 <i>CLEARED INTO POSITION RUNWAY [specify] AND HOLD.</i></p> <p>From June 7, 1984 up to and including October 31, 2001 <i>LINE UP;</i> <i>LINE UP RUNWAY [number].</i></p> <p>From November 1, 2001 <i>LINE UP (AND WAIT);</i> <i>LINE UP RUNWAY [number].</i></p>

The February 2003 change to Order 7110.65 was made for the following reasons: to reduce possible confusion among foreign flight crewmembers likely caused by the similarity between phraseology “TAXI INTO POSITION AND HOLD,” which had been used by that time in the U.S., and “TAXI TO HOLDING POSITION” of ICAO Doc 4444; and to reduce communication load by shortening the phrase. The changeover to “LINE UP AND WAIT” on September 30, 2010 originated from the recommendation in July 2000 by the National Transportation Safety Board (NTSB) that required FAA to amend ATC phraseology for airport surface operations specified in Doc 4444.

2.8.2 Prior Notification of Change in ATC Phraseology

2.8.2.1 Notification by the FAA to Operators

On August 10, 2010, the FAA issued InFO*8 10014 to notify operators of all aircraft and airport service personnel that the instruction to hold on the runway would change to “LINE UP AND WAIT” from “POSITION AND HOLD” as stipulated in N JO 7110.536.

In addition, the FAA developed a dedicated “LINE UP AND WAIT” page on the FAA Runway Safety website and released a pilot training animation, and then informed subscribing pilots by e-mail of the new page and animation available on the website.

Moreover, the FAA coordinated with national aviation organizations to advise their members of the coming “LINE UP AND WAIT” phraseology change and also e-mailed to airports,

*7 This changeover to the current phraseology was made not by revising Order 7110.65 itself, but by issuing Notice, N JO 7110.536, which replaced the relevant paragraphs of Order 7110.65 to read as amended. Subsequently, N JO 7110.536 was superseded by N JO 7110.547 with minor changes. On March 10, 2011, Order 7110.65 itself was revised with Change 2 to Order 7110.65T by reflecting the amendment of N JO 7110.547.

*8 InFO (Information for Operators) offers valuable information for operators that should help them meet administrative requirements or certain regulatory requirements with relatively low urgency or impact on safety. It may also, if deemed necessary, contain recommended actions to be taken by the respective operators. InFO is only accessible on the FAA website and no printed versions are available.

States and local aviation organizations, asking them to distribute “LINE UP AND WAIT” information through their own communication channels.

2.8.2.2 Notification at Hawaiian Airlines

At Hawaiian Airlines, the chief pilot created a memo and distributed copies to all flight crewmembers in December 2009, notifying them that the current phraseology “POSITION AND HOLD” would be replaced by “LINE UP AND WAIT” around the middle of 2010.

To follow up on the memo, Hawaiian Airlines claims to have notified flight crewmembers via the bulletin board on the company’s intranet of the changeover to “LINE UP AND WAIT.” However, it was not possible to verify the content and timing of the notification as the relevant records had not remained.

2.8.2.3 Expected Scope of the Change in ATC Phraseology

In the United States, when instructed to hold on the runway, aircraft were only required to acknowledge receipt of the instruction with their call signs. With that in mind, prior to the change from “POSITION AND HOLD” to “LINE UP AND WAIT,” the FAA did not consider a proposal to change the requirements related to the pilot readback of the instruction used with incorrect phraseology.

Hawaiian Airlines anticipated that some air traffic controllers might continue to use “POSITION AND HOLD” after it was changed to “LINE UP AND WAIT.” In the event that “POSITION AND HOLD” was used, the company thought that flight crewmembers would consider the instruction to be ambiguous and request clarification as per the flight operations manual of the company (hereafter referred to as “the FOM”). The company did not, however, set forth specific actions that flight crewmembers should take in the event that “POSITION AND HOLD” was used by air traffic controllers.

2.8.3 Hawaiian Airlines Manuals

The FOM of Hawaiian Airlines includes the following descriptions.

(1) Holding on runway

The following descriptions are included in Section 10 ENGINE START – TAKEOFF.

10.12 LINE UP AND WAIT

Flight crewmembers must be vigilant during taxi operations, especially when cleared onto or across an active runway or intersection.

When instructed to “line up and wait,” a pilot should expect an imminent takeoff except when explicitly advised of a delay. Causes for delays in position include wake turbulence and traffic on an intersecting runway, among others.

Pilots should be sensitive to the length of time they have been holding in position whenever they have not been cleared to takeoff and have not been advised of any expected delay. After two minutes in position, it would be particularly appropriate to query the controller about the delay holding in position. Similarly, if uncertain about any ATC instruction or clearance, a pilot should contact ATC immediately.

Operations during night or reduced visibility conditions and when operations are being conducted on multiple and intersecting runways require increased situational awareness.

If landing traffic is a factor, ATC will normally withhold landing clearances and advise both aircraft. ATC will also issue traffic advisories to aircraft holding in position and to aircraft holding, departing, or arriving on an intersecting runway.

Always resolve any ambiguity or confusion concerning an ATC transmission by questioning ATC immediately. Likewise, if you have any doubt about your ability to comply with an ATC instruction, advise ATC.

(2) Readback to ATC

The following descriptions are included in Section 13 COMMUNICATIONS.

13.5 ATC CLEARANCES (AIM 4-4-1)

(Omitted)

Whenever possible, both flight crewmembers should monitor and verbally verify all ATC clearances, altitudes, headings, speed restrictions, and routings with one another. If either flight crewmember is uncertain of a clearance, ATC should be questioned and the clearance clarified, especially in areas of high terrain.

(Omitted)

The following ATC clearances and instructions will be acknowledged by the full call sign / flight number followed by a verbatim read back of the clearance to ATC:

(Omitted)

- *Taxi clearance / runway assignment.*
- *Taxi clearances involving hold short instructions restricting runway or taxiway access.*
- *Taxi clearance to cross any runway surface.*
- *Clearance to line up and wait on the runway.*
- *Takeoff clearance.*

(Omitted)

2.8.4 Notification to Air Traffic Controllers

2.8.4.1 Confirmation of Pilot Readback

Following the occurrences of incidents at Osaka International Airport on September 6 and October 5, both in 2007, and a serious incident at Kansai International Airport on October 20 of the same year, the Director-General of the CAB issued the following notification to air traffic controllers regarding the verification of pilot readback. (Excerpts)

- (1) *The importance of confirming pilot readback must always be reminded while close attention must be paid to any possible misunderstanding in pilot readback. If necessary, pilot readback must be corrected or clarified or any other appropriate actions taken immediately. (Notification titled “Ensuring the confirmation of pilot readback in air traffic control” dated October 22, 2007)*
- (2) *Pilot readback must be confirmed, not only when it is incorrect but also when it is*

ambiguous or otherwise raises questions.

It must be understood that when issuing instructions or clearances, providing relevant traffic information depending on the situation facilitate pilots' understanding of the instructions or the clearances. In particular, as ATC instruction "HOLD SHORT OF RUNWAY," directly leads to safety issue if there is a discrepancy in mutual understanding, information such as on arriving traffic must be provided more positively. (Notification titled "Confirmation of pilot readback and information provision regarding air traffic control instructions" dated October 31, 2007)

2.8.4.2 Actions to Prevent Runway Incursions

From 2007 to 2008, the "Committee on the Prevention of Runway Incursions" composed of the members of the CAB and other experts from aircraft operators was set up. Following comprehensive review and consideration including measures to improve communication between air traffic controllers and pilots and the possible introduction of systems to enhance controllers' situational awareness, a proposal was made to set forth "guidelines on air traffic control communication." Based on this proposal, the Civil Aviation Bureau developed the "ATC Communication Handbook" and in April 2011 distributed copies to air traffic controllers. The document contains the results of analyses on air traffic control communication during runway incursions and other incidents on runways that occurred in the period from 2007 through 2009 and controllers' communication techniques to prevent pilots' misunderstandings and incorrect assumptions regarding ATC instructions and clearances.

3. ANALYSIS

3.1 General

3.1.1 Airman Competence Certificate and Others

The PIC, the FO and the IRO of Aircraft A and the PIC and the FO of Aircraft B each held both a valid airman competence certificate and a valid aviation medical certificate.

3.1.2 Air Traffic Controller Competence Certificate and Others

The Controller at the Tower held a valid air traffic controller competence certificate and a valid medical certificate.

3.1.3 Relevance of Meteorological Phenomena

It is highly probable that the meteorological conditions at the time of this serious incident had no bearing on the occurrence of this case.

3.2 Analyses of the Flight Crewmembers and the Controller

3.2.1 Progress of Events Leading to the Go-Around Instruction by the Tower to the Aircraft B

(1) Awareness of arriving traffic by the crewmembers of the Aircraft A

According to the description of in 2.1.2.1 (1), the PIC of the Aircraft A saw the lights of two arriving aircraft on their final approach while taxiing to Runway 06R; therefore, it is probable that the flight crewmembers of the Aircraft A were aware of the traffic approaching the runway.

(2) Anticipation of ATC instruction by the Aircraft A

An aircraft holding short of the runway for arriving or departing traffic will normally be instructed to wait on the runway; therefore, it is probable that the crewmembers of the Aircraft A was holding short of the runway while expecting to receive clearance onto the runway.

(3) Awareness of the sequence of takeoff and landing by the Controller

According to the statement in 2.1.3, the Controller at the Tower stated that he had initially planned to let the Aircraft A take off between the landings of the Aircraft C and the Aircraft B. Subsequently, however, as described in 2.1.1, when the Aircraft C passed the runway threshold, he told the Aircraft A, "Expect departure after next arrival five miles," indicating that the Aircraft A would be taking off after the Aircraft B landed. It is highly probable that this reflects the judgment made by the Controller that the separation between the Aircraft C and the Aircraft B was not sufficient to allow the Aircraft A to take off before the Aircraft B landed considering the tailwind that the Aircraft B was experiencing and the approach speed of the Aircraft B.

(4) Timing of instruction issued to the Aircraft A

Normally, when an aircraft is holding short of the runway for takeoff while waiting for the arriving aircraft to land, the departing aircraft will be instructed to hold on the

runway immediately after the arriving aircraft has passed in front, and it will then be cleared for takeoff as soon as the arriving aircraft has left the runway, all this to ensure efficient use of the runway.

As shown in Figure 2, ATC communication records and tracking records of the Aircraft C indicate that the Tower issued an instruction to the Aircraft A, which had been holding short of the runway, when the Aircraft C passed in front of it. It is possible that this facilitated the mishearing of the instruction by the crewmembers of the Aircraft A.

(5) Visual recognition of arriving traffic by the Aircraft A

According to the statement in 2.1.2.1, all flight crewmembers of the Aircraft A saw the Aircraft B approaching the runway as they entered the runway. It is therefore probable that they thought they would be able to take off before the Aircraft B landed.

(6) Confirmation of pilot readback by the Controller

According to the statement in 2.1.3, the Controller stated that he heard: “Position hold” from the Aircraft A in response to his instruction: “Hold position.” It is probable that the Controller did not hear the readback correctly because “Position and hold” had never been used in Japan as described in 2.8.1.2. It is also probable that the Controller did not think the flight crewmembers of the Aircraft A mistook his instruction to mean that they were cleared to hold on the runway because he did not know what that phraseology “Position and hold” meant.

In addition, as the Controller was able to hear both “position” and “hold” that he had used in his instruction, it is probable that he mistakenly assumed that his instruction was understood by the Aircraft A and did not correct or confirm the readback although the order of “position” and “hold” was inverted.

(7) Landing clearance and go-around instruction to the Aircraft B

According to the statement in 2.1.3, the Controller stated that he cleared the Aircraft B to land as he confirmed that the Aircraft C, which had landed, was leaving the runway but that, after realizing that the Aircraft A, which had been holding short, was moving to the runway, he immediately instructed the Aircraft B to go around. It is probable that after clearing the Aircraft B to land as he saw the Aircraft C leaving the runway via Taxiway A7 in front of the Tower, he looked to the right for the Aircraft B and noticed the Aircraft A entering the runway via Taxiway A14 and that he then instructed the Aircraft B to go around.

As shown in Figure 1, based on ATC communication records and taxiing tracking record of the Aircraft A, it is highly probable that when the Aircraft B was cleared to land at 21:36:14, the Aircraft A had already entered the runway. Considering that the go-around instruction starting at 21:36:25 followed the readback of the landing clearance by the Aircraft B stating 21:36:20 with no time interval, it is highly probable that it was between 21:36:20 and 21:36:25 that the Controller realized that the Aircraft A was on the runway and that the timing was just when the Aircraft A was aligning itself with the runway for takeoff.

(8) Go-around by the Aircraft B

As ATC communication records indicate, the crewmembers of the Aircraft B saw an

aircraft on the runway as mentioned in their readback for the go-around instruction to the Tower. As described in 2.1.2.2, the crewmembers of the Aircraft B stated that they saw an aircraft enter the runway. As described in 2.1.2.1, the PIC of the Aircraft A stated that they illuminated the strobe and all other exterior lights on the aircraft as they entered the runway. Therefore, it is probable that the crewmembers of the Aircraft B were able to see Aircraft A as it entered the runway with the strobe and other lights illuminated.

Considering the above, it is probable that, although cleared to land, the crewmembers of the Aircraft B were anticipating a go-around. Tracking records and DFDR records of the Aircraft B indicate that at 21:36:25 when it was instructed to go around, it was about 3 nm away from the runway threshold and at an altitude of about 960 ft. Therefore it is probable that they made a go-around without stress.

3.2.2 Understanding of ATC Instructions by the Crewmembers of the Aircraft A

ATC communication records indicate that the FO of the Aircraft A read back, “Position and hold” in response to the instruction “Hold position” from the Tower. According to the statement in 2.1.2.1, all crewmembers of the Aircraft A understood the instruction as “Position and hold” or “Taxi into position and hold” and no question was raised in the cockpit as to that understanding. It is therefore probable that all crewmembers of the Aircraft A heard the instruction wrong as “Position and hold” and believed that they were cleared for entry onto the runway.

Regarding the information “Expect departure after next arrival five miles” that was provided by the Tower together with the instruction above, the three crewmembers did not remember that information accurately. They saw the Aircraft B on final approach and that they may have incorrectly understood that they had been cleared for holding on the runway; therefore, it is probable that they failed to recognize the information about the timing of their departure, assuming that it was traffic information about the aircraft that would be landing after their takeoff.

3.2.3 Awareness by the Crewmembers of the Aircraft B

(1) Separation on final approach

According to the statement in 2.1.2.2, the Aircraft B was heavy, which made its approach speed faster, while a tailwind was bringing it closer to the preceding traffic, the Aircraft C, on final approach. Therefore, it is probable that, although the separation between the Aircraft B and the Aircraft C was 6 to 7 nm when the Aircraft B established a communication with the Tower, the crewmembers of the Aircraft B thought that it would be difficult for departing traffic to take off before their landing.

(2) Visual recognition of the Aircraft A

According to the description in 2.1.2.2, the crewmembers of the Aircraft B stated that they saw what appeared to be landing lights illuminated towards them while they were at an altitude of about 1,500 ft and that what seemed to be the Aircraft A was moving along a taxiway which was parallel to the runway. However, as shown in Figure 1, from 21:32:43 the Aircraft A was holding short of the runway on Taxiway A14 at right angles to the final approach course. From 21:32:43, it was not possible for arriving aircraft on final

approach to see landing or taxiing lights of the Aircraft A, and that flight tracking records indicate that at that time the Aircraft B was about 13 nm from the runway threshold and at an altitude of 4,000 ft; therefore, it is highly probable that the aircraft that the crewmembers of the Aircraft B saw on a parallel taxiway was not the Aircraft A but another aircraft that had landed just before the Aircraft C and was taxiing on the parallel Taxiway P in the opposing direction to Runway 06R.

It is probable that the crewmembers of the Aircraft B recognized the Aircraft A while it was entering the runway as described in 3.2.2 (8).

3.3 ATC Phraseology

3.3.1 Customary Expressions and Misunderstanding

In the U.S., as described in 2.8.1.2, “POSITION AND HOLD” was used as the ATC phraseology to instruct aircraft to hold on the runway from February 20, 2003 up to and including September 29, 2010.

The reason “POSITION AND HOLD” was adopted in the U.S. was, as described in 2.8.1.2, to reduce possible confusion among foreign flight crewmembers likely caused at U.S. airports by the similarity between phraseology “TAXI INTO POSITION AND HOLD,” which had been used by that time, and “TAXI TO HOLDING POSITION” of ICAO Doc 4444. It is probable that in this serious incident, flight crewmembers from the U.S. confused an expression in a foreign country with “POSITION AND HOLD,” a customary expression that had been used in the U.S.

As described in 2.1.2.1, the crewmembers of the Aircraft A stated the instruction from the Controller as both “POSITION AND HOLD” and “TAXI INTO POSITION AND HOLD.” Because “POSITION AND HOLD” is the short form of “TAXI INTO POSITION AND HOLD,” it is probable that the flight crewmembers from the U.S. regarded “POSITION AND HOLD” to be the same as “TAXI INTO POSITION AND HOLD” and had frequently used “POSITION AND HOLD” not only in ATC communication but also in other phases of operations. It is probable that, although the serious incident occurred about a year after the phraseology had been changed, the customary expression “POSITION AND HOLD” had subconsciously remained in the minds of flight crewmembers; that the crewmembers of the Aircraft A, while holding short of the runway, were expecting an instruction to hold on the runway as described in 3.2.1 (2); therefore, that they misheard “HOLD POSITION” for “POSITION AND HOLD,” which included the same words.

3.3.2 Interpretation and Selection of Phraseology

At 21:35:29, the Controller instructed the Aircraft A to “HOLD POSITION.” While “HOLD POSITION” is not prescribed in the Standards for ATC Procedure but is included in Order 7110.65 and Doc 4444 as described in 2.8.1.1, it is probable that the expression is used to promptly stop taxiing aircraft. Therefore, it is probable that “HOLD POSITION” can make holding aircraft continue holding if the expression is understood correctly by the flight crewmembers. However, it is probable, that all flight crewmembers of the Aircraft A heard the instruction wrong as “POSITION AND HOLD.” The FO read back the instruction as misheard. The Controller recognized that the readback was different from the phraseology he had used. It is probable that if the Controller had confirmed the readback with the Aircraft A instead of assuming that the words were only inverted,

the serious incident could have been avoided. While the Controller used “HOLD POSITION,” which is not prescribed in the Standards for ATC Procedure, to instruct the Aircraft A, which was holding short of the runway, to continue holding there, he should have clearly indicated the position where the aircraft should hold by using “HOLD SHORT OF RUNWAY,” which is stipulated in the Standards for ATC Procedure.

3.3.3 Anticipation and Actual Action with Respect to Phraseology Change

As described in 2.8.2.3, Hawaiian Airlines anticipated that air traffic controllers might use “POSITION AND HOLD” even after it was replaced by “LINE UP AND WAIT.” In the event that “POSITION AND HOLD” was used, the company thought that flight crewmembers would request clarification in accordance with the FOM of the company; therefore, did not set forth specific procedures that flight crewmembers should take in such an event. However, it is probable, that the crewmembers of the Aircraft A, who heard the instruction from the Tower wrong as “POSITION AND HOLD,” did not consider it obsolete and ambiguous but instead erroneously believed without any doubt that the instruction meant holding on the runway.

3.3.4 Actions against Different ATC Phraseology

It is possible that if the crewmembers of the Aircraft A had been fully aware that “POSITION AND HOLD” was used in limited countries including the U.S. and is not used in other countries including Japan, they would have questioned the instruction and asked the Tower for clarification. It was desirable that Hawaiian Airlines had sufficiently educated the flight crewmembers serving on an international flight about the difference between Order 7110.65 and Doc 4444, and had had them realize the non-standard nature of the U.S. ATC phraseology.

3.4 Severity of the Serious Incident

As described in 2.1.1, the Aircraft B was about 2.5 nm (about 4.6 km) away from the threshold of Runway 06R and at an altitude of about 840 ft when it made a go-around and started climbing.

According to the classification of the severity in the ICAO’s “Manual on the Prevention of Runway Incursions” (Doc 9870), as a result of assessments based on the programs provided by ICAO, this serious incident is considered as (C) “An incident characterized by ample time and/or distance to avoid a collision.”

(See Attachment 2 –“Classification of the Severity of Runway Incursions”)

4. PROBABLE CAUSES

It is probable that this serious incident occurred as a departing aircraft (Aircraft A) entered a runway despite the fact that it had been instructed to continue holding short of the runway, leading to an arriving aircraft (Aircraft B), which was cleared to land after the instruction to the Aircraft A , attempting to land on the same runway.

It is probable that the Aircraft A entered the runway because the flight crewmembers of the aircraft incorrectly heard the instruction to continue holding as an instruction to hold on the runway and misunderstood whereas the Controller assumed that his instruction was correctly understood by the Aircraft A and did not request clarification despite the fact that the readback from the Aircraft A did not match the phraseology of the original instruction.

It is probable that the following contributed to the mishearing of the instruction by the flight crewmembers.

- (1) The words included in the instruction were the same as those previously used in the U.S. to instruct aircraft to hold on the runway.
- (2) The crewmembers were expecting that the next instruction from the Tower would be for them to hold on the runway.
- (3) The instruction to hold was issued to the Aircraft A, which had been holding short of the runway, just when an arriving aircraft passed in front of them.
- (4) The crewmembers thought that they would be able to take off before the Aircraft B landed.

It is probable that the following contributed to the Controller's assuming the instruction to be understood by the Aircraft A.

- (1) The Controller did not know that the phraseology used in the readback was previously used in the U.S. to instruct aircraft to hold on the runway.
- (2) The readback included the same words that were used in the instruction.

5. SAFETY ACTIONS

5.1 Actions Taken by Hawaiian Airlines

After the occurrence of this serious incident, Hawaiian Airlines provided remedial training to the three crewmembers of the Aircraft A on the international flight procedures, such as runway safety, standard ATC phraseology, ATC procedures and communications, and crewmembers resource management.

With regard to other flight crewmembers of the company, on November 21, 2011, the system chief pilot of the company sent an email to them emphasizing the importance of using the ICAO phraseology. In addition, the company opened a new training course on international flight procedures and had all flight crewmembers who serve on international flights receive the course including the use of ICAO phraseology and communication procedures. With regard to those flight crewmembers who had never, or had not for more than a certain period, served on international flights, the company mandated international familiarization flights before they started serving as international flight crewmembers whereby a check airman (corresponds to a check pilot in Japan) flies with them and has them familiarize themselves with international flight procedures including the use of ICAO phraseology.

5.2 Safety Actions Taken by the MLIT

5.2.1 Actions Taken by the CAB

On May 3, 2012, the CAB of the MLIT amended AIP, specified pilot readback procedures concerning ATC clearance, instruction and permission and clearly defined that holding instructions must never omit appropriate phraseology including “HOLDING” or “HOLDING SHORT OF.”

On the same day, the CAB amended the Standards for ATC Procedure, adding a new stipulation on the confirmation of pilot readback. With regard to an instruction to hold short of the runway, the amended standards require controllers to request a complete readback of the holding instruction from aircraft when the readback does not include “HOLDING” or “HOLDING SHORT,” or the readback is ambiguous, and include new ATC phraseology specifically used for requesting the readback.

5.2.2 Actions Taken by the Kansai Airport Office of the Osaka Regional Civil Aviation Bureau

After the occurrence of this serious incident, the Kansai Airport Office of the Osaka Regional Civil Aviation Bureau, MLIT decided not to use the phraseology “HOLD POSITION” when instructing aircraft to continue holding short of the runway and notified its air traffic controllers of the change.

Figure 1: Estimated Taxing Route of Aircraft A

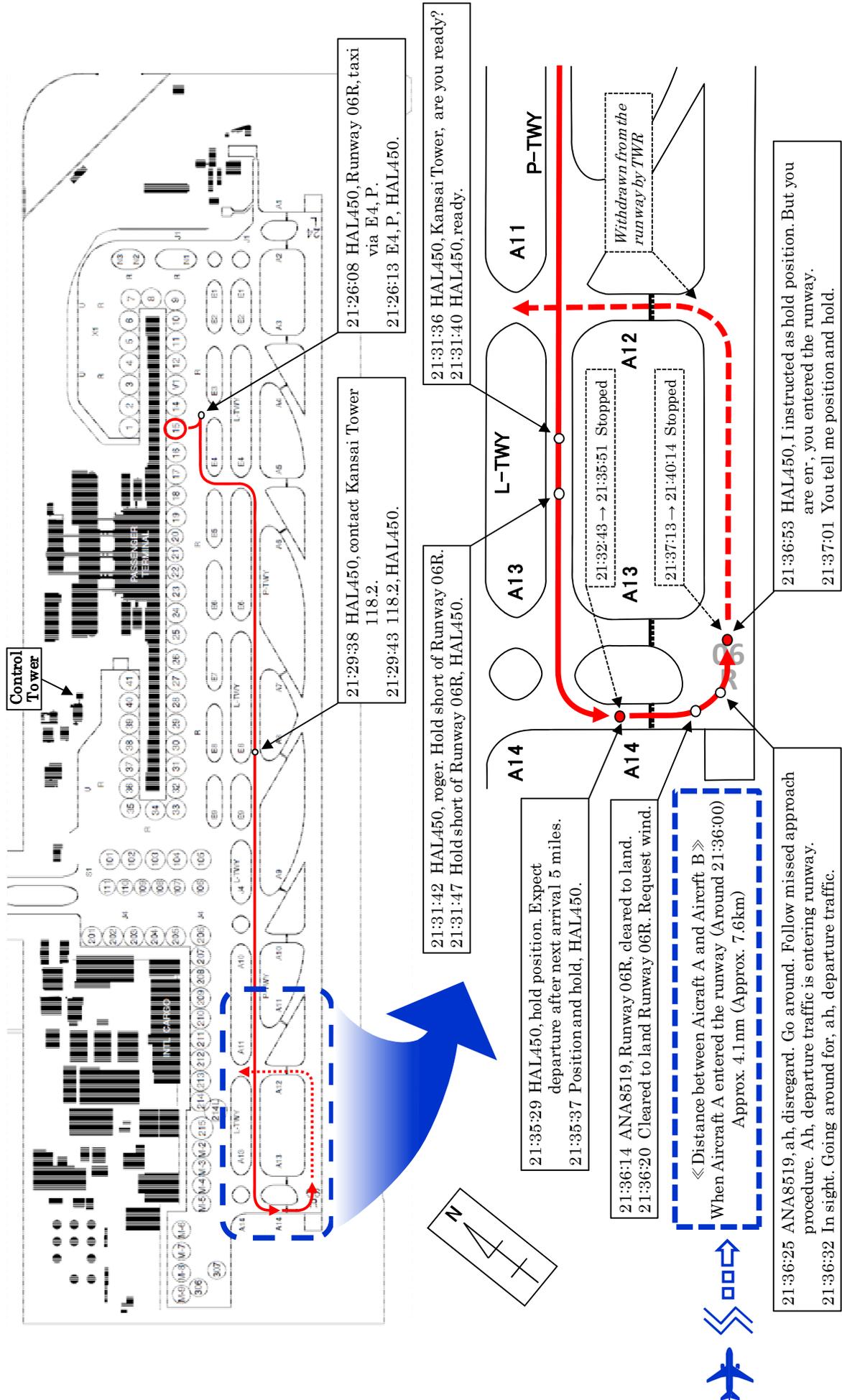
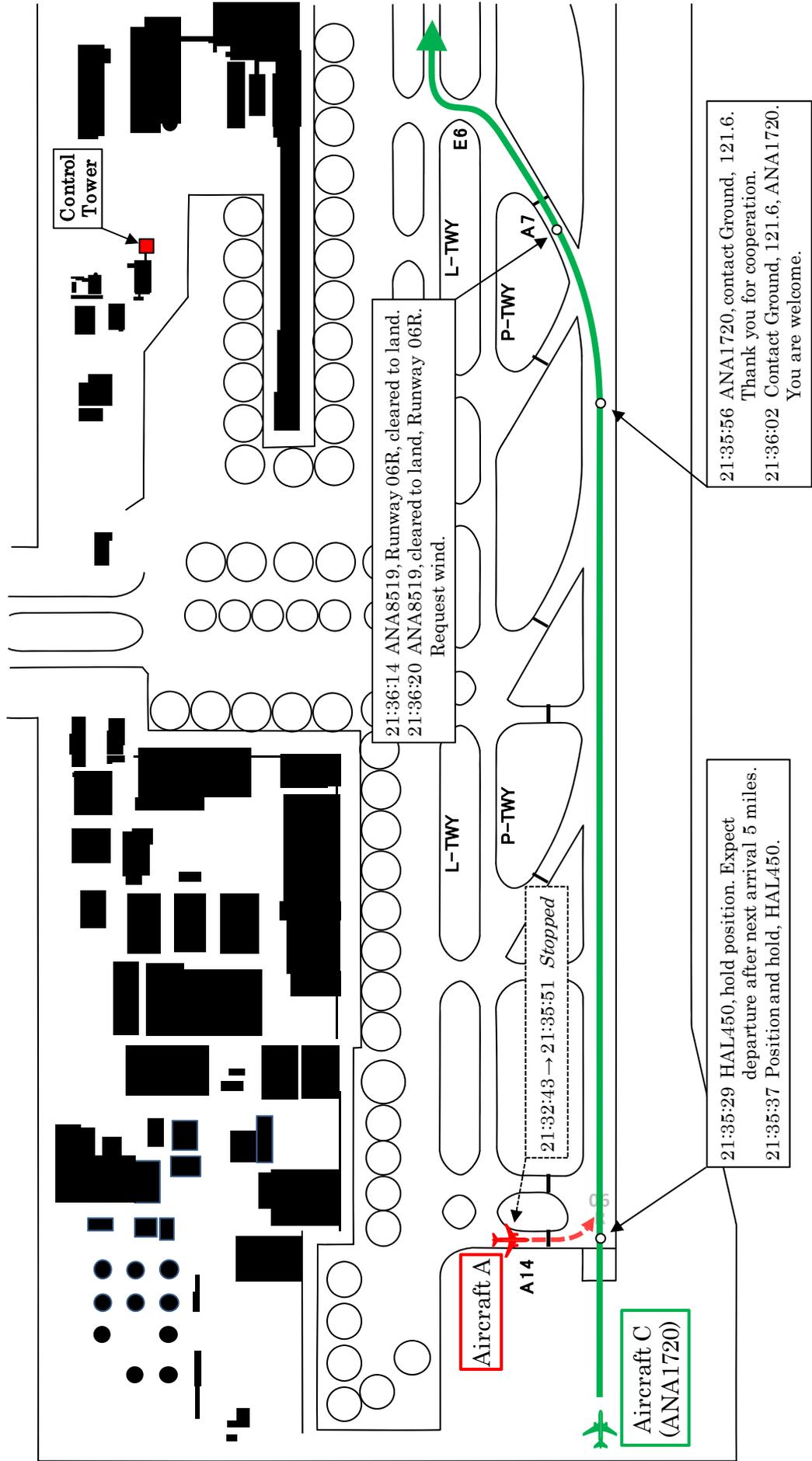


Figure 2: Estimated Landing and Taxiing route of Aircraft C



Attachment 1: ATC Communication Transcript

Ground Control Communication

Time	Transmitter	Message
21:19:31	HAL450	Kansai Ground, Hawaiian Four Five Zero, ready to push back, Fifteen.
21:19:37	GND	Hawaiian Four Five Zero, Kansai Ground, stand by shortly.
21:19:40	HAL450	Standing by.
21:19:41	NCA283	Kansai Ground, Nippon Cargo Two Eight Three, now Alfa Six, Gate Two One Four.
21:19:45	GND	Nippon Cargo Two Eight Three, Kansai Ground, taxi via Papa, Alfa Eleven, Spot Two One Four.
21:19:51	NCA283	Papa, Alfa Eleven to Spot two one four, Nippon Cargo Two Eight Three.
21:19:57	GND	Hawaiian Four Five Zero, now push back approved, Runway Zero Six Right.
21:20:01	HAL450	Push back approved, Zero Six Right, Hawaiian Four Five Zero.
21:20:09	GND	Dynasty Five Seven Zero One, contact Tower, one one eight decimal two.
21:20:12	CAL5701	One one eight decimal two, Dynasty Five Seven Zero One. Good night.
21:20:16	GND	Good night.
21:20:18	GND	<i>Zennikku-senshu Three One Zero Speedy, tow approed via Echo Nine, Lima, Juliet Four to Spot One Zero Six.</i>
21:20:24	ZS310S	<i>Roger. Understand via Echo Nine, Lima, Juliet Four to Spot One Zero Six, Zennikku-senshu Three One Zero Speedy.</i>
21:20:42	DAL278	Delta Two Seventy-Eight, taxi.
21:20:45	GND	Delta Two Seven Eight, Runway Zero Six Right, taxi via Echo One and Lima.
21:20:51	DAL278	Echo One, Lima, Delta Two Seventy-Eight.
21:23:38	ANA147	Kansai Ground, All Nippon One Four Seven, take Alfa Six, Gate, ah, One Eight.
21:23:43	GND	All Nippon One Four Seven, Kansai Ground, taxi via Echo Four, Spot One Eight. Taxi behind departure Delta Airbus Three Thirty on Lima taxiway.
21:23:52	ANA147	Roger, Echo Four, Spot after the Delta, All Nippon One Four Seven.
21:23:56	GND	Delta Two Seven Eight, taxi via Lima, Echo Eight, Papa.
21:24:00	DAL278	Lima, Echo Eight, Delta Two Seventy-Eight.
21:25:30	ZS310S	<i>Kansai Ground, this is Zennikku-senshu Three One Zero Speedy. Tow to Spot One Zero Six was completed. Thank you.</i>

Time	Transmitter	Message
21:25:36	GND	<i>Zennikku-senshu Three One Zero, roger.</i>
21:26:04	HAL450	Kansai Ground, Hawaiian Four Five Zero, ready to taxi.
21:26:08	GND	Hawaiian Four Five Zero, Runway Zero Six Right, taxi via Echo Four, Papa.
21:26:13	HAL450	Echo Four, Papa, Hawaiian Four Five Zero.
21:26:20	GND	Delta Two Seven Eight, contact Kansai Tower, one one eight decimal two.
21:26:24	DAL278	One one eight decimal two, Delta Two Seventy-Eight.
21:29:38	GND	Hawaiian Four Five Zero, contact Kansai Tower, one one eight decimal two.
21:29:43	HAL450	One one eight decimal two, Hawaiian Four Five Zero.

Legend

Time	Japan Standard Time (hh : mm : ss)
GND	Ground control
HAL450	Hawaiian Airlines Flight 450 (Aircraft A)
NCA283	Nippon Cargo Airlines Flight 283 (Arrival)
CAL5701	China Airlines Flight 5701 (Departure)
DAL278	Delta Air Lines Flight 278 (Departure)
ANA147	All Nippon Airways Flight 147 (Arrival)
ZS310S	ANA-Senshu 310 (High speed aircraft towing tractor)
<i>Italic</i>	Translated from Japanese

Local Control Communication

Time	Transmitter	Message
21:31:36	TWR	Hawaiian Four Five Zero, Kansai Tower, are you ready?
21:31:40	HAL450	Hawaiian Four Five Zero, ready.
21:31:42	TWR	Hawaiian Four Five Zero, (ro)ger, roger. Hold short of Runway Zero Six Right.
21:31:47	HAL450	Hold short of Zero Six Right, Hawaiian Four Five Zero.
21:32:01	ANA8519	Good evening, Kansai Tower, All Nippon Eight Five One Nine, establish Runway Zero Six Right. Ah, three miles to JANET.
21:32:08	TWR	All Nippon Eight Five One Nine, Kansai Tower, Runway Zero Six Right, continue approach, wind one seven zero at four.
21:32:16	ANA8519	Continue approach, Runway Zero Six Right, All Nippon Eight Five One Nine.
21:32:23	TWR	All Nippon Eight Five One Nine, reduce to minimum approach speed for departure.
21:32:28	ANA8519	Ah, roger. Ah, this already one six two knots is minimum.
21:32:33	TWR	All Nippon Eight Five One Nine, roger.
21:33:44	TWR	China Eastern Seven Two Nine, contact Ground, one two one decimal six.
21:33:48	CES729	One two one six, confirm?
21:33:51	TWR	China Eastern Seven Two Nine, affirm. One twenty-one six.
21:33:54	CES729	(Twenty-one) six, good day, sir. Roger, Seven Two Nine.
21:33:58	TWR	Good day.
21:34:11	TWR	All Nippon One Seven Two Zero, Runway Zero Six Right, cleared to land, wind one seven zero at four. If possible, after landing take Alfa Seven for departure.
21:34:21	ANA1720	Runway Zero Six Right, clo-, cleared to land. Pick up Alfa Seven if available, All Nippon One Seven Two Zero.
21:35:29	TWR	Hawaiian Four Five Zero, hold position. Expect departure after next arrival five miles.
21:35:37	HAL450	Position and hold for Hawaiian Four Five Zero.
21:35:56	TWR	All Nippon One Seven Two Zero, contact Ground, one two one decimal six. Thank you for cooperation.
21:36:02	ANA1720	Contact Ground, one two one point six, All Nippon One Seven Two Zero. You are welcome.
21:36:14	TWR	All Nippon Eight Five One Nine, Runway Zero Six Right, cleared to land.
21:36:20	ANA8519	All Nippon Eight Five One Nine, cleared to land, Runway Zero Six Right. Request wind.

Time	Transmitter	Message
21:36:25	TWR	All Nippon Eight Five One Nine, ah, disregard. Go around. Follow missed approach procedure. Ah, departure traffic is entering runway.
21:36:32	ANA8519	In sight. Going around for, ahh. Ah, departure traffic.
21:36:38	TWR	All Nippon Eight Five One Nine, ahh.
21:36:43	TWR	All Nippon Eight Five One Nine, traffic pattern is also available. Request intention.
21:36:48	ANA8519	Stand by.
21:36:53	TWR	Hawaiian Four Five Zero, I instructed as hold position. But you are en-, but you entered the runway.
21:37:01	HAL450	You tell me position and hold.
21:37:04	TWR	Ahh, Hawaiian Four Five Zero, not mean 'Taxi into position and hold' but 'Hold position,' I said.
21:37:12	HAL450	I read back, 'Position and holding.'
21:37:18	HAL450	And hold on the runway.
21:37:26	ANA8519	All Nippon Eight Five One Nine, ahh, going around and we enter left-hand downwind for, ahh, departure traffic.
21:37:34	TWR	All Nippon Eight Five One Nine, roger. Report left downwind, Runway Zero Six Right.
21:37:41	ANA8519	Roger.
21:37:53	TWR	Hawaiian Four Five Zero, I said, 'Hold position' that means continue to hold short of runway. Ahh, couldn't you understand?
21:38:08	HAL450	Hawaiian Four Fifty, we all've heard 'Position and hold' on the runway.

Legend

Time	Japan Standard Time (hh : mm : ss)
TWR	Local control
HAL450	Hawaiian Airlines Flight 450 (Aircraft A)
ANA8519	All Nippon Airways Flight 8519 (Aircraft B)
CES729	China Eastern Airlines 729 (Arrival preceding Aircraft B)
ANA1720	All Nippon Airways Flight 1720 (Aircraft C)
()	Unreadable/muffled

Attachment 2 Classification of the Severity of Runway Incursions

ICAO's "Manual on the Prevention of Runway Incursions" (Doc 9870) classifies the severity of runway incursions as follows:

Table 6-1. Severity classification scheme

<i>Severity classification</i>	<i>Description*</i>
<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</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 take-off 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>

** Refer to Annex 13 for the definition of "incident".*