

AI2008-01

# AIRCRAFT SERIOUS INCIDENT INVESTIGATION REPORT

1. SKYMARK AIRLINES INC.  
BOEING 767-300, JA767F
2. ALL NIPPON AIRWAYS, Co., Ltd.  
BOEING 777-200, JA8967  
NEW CHITOSE AIRPORT, JAPAN  
AT AROUND 21:09 JST, JUNE 27, 2007

November 28, 2008

Japan Transport Safety Board

The investigation for this report was conducted by Japan Transport Safety Board, JTSC, about the aircraft serious incident of SKYMARK AIRLINES INC. BOEING 767-300 registration JA767F and ALL NIPPON AIRWAYS, Co., Ltd. BOEING 777-200 registration JA8967 in accordance with Japan Transport Safety Board Establishment Law and Annex 13 to the Convention of International Civil Aviation for the purpose of determining cause of the aircraft serious incident and contributing to the prevention of accidents and not for the purpose of blaming responsibility of the accident.

This English version report has been published and translated by JTSC to make its reading easier for English speaking people those who are not familiar with Japanese. Although efforts are made to translate as accurate as possible, only the Japanese version is authentic. If there is difference in meaning of the texts between the Japanese version and the English version, text in the Japanese version is correct.

Norihiro Goto,  
Chairman,  
Japan Transport Safety Board

# AIRCRAFT SERIOUS INCIDENT INVESTIGATION REPORT

1. SKYMARK AIRLINES INC.

BOEING 767-300, JA767F

2. ALL NIPPON AIRWAYS, Co., Ltd.

BOEING 777-200, JA8967

ON RUNWAY 19R OF NEW CHITOSE AIRPORT,

AT AROUND 21:09 JST, JUNE 27, 2007

October 22, 2008

Adopted by the Japan Transport Safety Board  
(Aircraft Sub-committee)

Chairman	Norihiro Goto
Member	Yukio Kusuki
Member	Shinsuke Endo
Member	Noboru Toyooka
Member	Yuki Shuto
Member	Akiko Matsuo

# 1 PROCESS AND PROGRESS OF THE SERIOUS INCIDENT INVESTIGATION

## 1.1 Summary of the Serious Incident

The event covered by this report falls under the category of “an aborted takeoff from a runway used by another aircraft” as stipulated in Clause 1, Article 166-4 of the Civil Aeronautics Regulations of Japan, and is classified as an aircraft serious incident.

On June 27, 2007 (Wednesday), a Boeing 767-300, JA767F, operated by Skymark Airlines Inc., started a takeoff roll on Runway 19R of New Chitose Airport as SKY730 for Tokyo International Airport. At around 21:09 Japanese Standard Time (JST), it rejected the takeoff as another aircraft was observed crossing the same runway. The aircraft was Boeing 777-200, JA8967 operated by All Nippon Airways, Co., Ltd. It departed from Tokyo International Airport at 19:53 JST as ANA79, and was crossing Runway 19R from Taxiway B9N toward A8S after having landed on Runway 19L of New Chitose Airport.

A total of 158 people were on board JA767F, consisting of the captain, seven crewmembers and 150 passengers, and a total of 246 people were on board JA8967, consisting of the captain, ten crewmembers and 235 passengers; no one was injured, nor was any damage done to the both aircraft.

## 1.2 Outline of the Serious Incident Investigation

### 1.2.1 Investigation Organization

On June 28, 2007, the Aircraft and Railway Accidents Investigation Commission assigned an investigator-in-charge and two investigators to the serious incident.

### 1.2.2 Accredited Representative Participating in the Investigation

An accredited representative of the United States, the state of design and manufacture of the aircraft involved in this serious incident, participated in the investigation.

### 1.2.3 Implementation of Investigation

June 28 and 29, and August 7 and 8, 2007

On site investigation and interviews

### 1.2.4 Comments from Parties Relevant to the Cause of the serious incident

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

### 1.2.5 Comments from the State of Design and Manufacture

Comments were invited from the State of Design and Manufacture of the aircrafts involved in the serious incident.

## 2. FACTUAL INFORMATION

### 2.1 History of the Flight

On June 27, 2007, at around 21:00, a Boeing 767-300, JA767F (hereafter called, "Aircraft A") operated by Skymark Airlines Inc., started pushing back from Spot 18 toward Runway 19R (hereafter called, "19R") of the parallel runways<sup>1</sup> to take off from New Chitose Airport (Reference point: Latitude 42°46'31"N, Longitude 141°41'33"E).

The flight plan of Aircraft A submitted to the Fukuoka Air Traffic Control Center of the Ministry of Land, Infrastructure, Transport and Tourism is outlined below.

Flight rules: Instrument flight rules (IFR),

Departure aerodrome: New Chitose Airport,

Cruising speed: 463kt

Cruising altitude: FL380,

Route: TOBBY (Reporting point)- Y10 (Airway)- TLE (Ami VOR/DME)

Destination aerodrome: Tokyo International Airport,

Total estimated elapsed time (EET): 1h and 10min

Endurance: 3h and 13min

Meanwhile, a Boeing 777-200, JA8967 (hereafter called, "Aircraft B") operated by All Nippon Airway Co., Ltd. had been given landing clearance on Runway 19L (hereafter called, "19L"), at around 21:04 on June 27, 2007.

The flight plan of Aircraft B submitted to the Fukuoka Air Traffic Control Center of the Ministry of Land, Infrastructure, Transport and Tourism is outlined below.

Flight rules: Instrument flight rules (IFR)

Departure aerodrome: Tokyo International Airport

Cruising speed: 479kt

Cruising altitude: FL410

Route: SNE (Moriya VOR/DME) – Y11 (Airway) – CHE (Chitose VOR/DME)

Destination Aerodrome: New Chitose Airport

Total estimated elapsed time (EET): 1h and 15min

Endurance: 3h and 59min

Then, the flight history of the Aircraft A and B, based on the records of Flight Data Recorders (hereinafter called, "DFDR"), the Cockpit Voice Recorder (hereafter called, "CVR") and the Quick Access Recorder (hereafter called, "QAR"), ATC radar tracking records and ATC communications records, as well as on statements made by flight crewmembers and the air traffic controllers (hereafter called, "the Controllers"), on the occurrence of the serious incident are summarized below.

#### 2.1.1 Flight History based on DFDR, CVR and QAR records, and ATC Radar and Communications Records

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<sup>1</sup> In the case of two or more runways whose centerlines run parallel in the same airport, two parallel runways are distinguished by L and R, while three parallel runways are indicated with L, C, and R.

21h:04m:11s Aircraft A having been given an instruction from the Ground Controller (hereafter called, “the Ground”), started to taxi toward 19R.

04m:22s Aircraft B started communications with the Tower Controller (hereafter called, “the Tower”) short of Point MAOIE on the final approach course of VOR/DME NR 2 RWY 19L approach. The first officer was the PF<sup>2</sup> and the captain was the PNF<sup>2</sup>

04m:26s The Tower issued landing clearance to Aircraft B to 19L, and informed the B767 was planned to take off from 19R.

06m:39s The captain of Aircraft B took over the control as the PF while the first officer took on the PNF.

06m:44s Aircraft B made a call of its passage of 500 feet.

06m:54s Aircraft A which had just entered Taxiway D3 reported to the Tower its ready for takeoff, and received takeoff clearance from 19R. Aircraft B was approximately 1,200 meters before the 19L approach end.

07m:20s Aircraft B touched and landed at around 700 meters from the 19L approach end.  
Aircraft A was at around the midpoint of Taxiway D3.

07m:41s Aircraft B decelerated to 60 knots.

07m:44s The first officer of Aircraft B took over control as the PF while the captain took on the PNF. The speed was 47 knots.

07m:50s Having been cleared to cross 19R from the Tower, Aircraft B switched its frequency over to the Ground.  
Aircraft A was moving from Taxiway D3 toward A2.

08m:06s Aircraft B reported to the Ground, “Crossing Runway 19R, Spot7”.

08m:13s The Ground instructed Aircraft B to, “continue taxi H6 and J, hold short of H5”.

08m:52s Aircraft A started takeoff roll from 19R.  
Aircraft B moved from Taxiway B9 to B9N.

09m:08s Aircraft B moved from Taxiway B9N to 19R.

09m:12s Aircraft A visually confirmed an aircraft crossing 19R, and determined to reject the takeoff (meaning to cancel a takeoff. Hereafter called, “Reject”). It closed the thrust lever at a speed of 88 knots, at around 500 meters from the 19R approach end.

09m:14s Aircraft A recorded the 95-knot peak speed, and then gradually decelerated.

09m:17s Aircraft A reported to the Tower that it had rejected the takeoff as an aircraft had been crossing the runway ahead of it.

09m:27s Aircraft B moved from 19R to Taxiway A8S.  
Aircraft A was decelerating, at approximately 1,100 meters from the 19R approach end.

09m:43s Aircraft A came to a full stop at approximately 1,250 meters from the 19R approach end.

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<sup>2</sup> PF stands for the Pilot Flying, the pilot primarily responsible for aircraft maneuvering. PNF stands for the Pilot Not Flying, who is responsible for non-maneuvering tasks.

## 2.1.2 Statements of Crewmembers about History of the Flight

### (1) Captain of Aircraft A

I was taking on the PF duty in the left seat. After the aircraft was pushed back, we received an instruction from the Ground to head toward 19R via Taxiway T1, H5, D3, and A2. We made contact with the Tower at Taxiway D3, and received takeoff clearance.

We went through the checklist by turning on the anti-collision light (white), operating the transponder, and so on, then lit all the lights when we lined up on the runway. Before starting a takeoff roll, the first officer reminded me that an aircraft had landed on 19L.

I made a call saying, “No problem for takeoff, runway clear, heading 182”. When I started a takeoff roll, the first officer reported that he visually confirmed an aircraft crossing the runway. Having confirmed the aircraft myself, I rejected the takeoff in compliance with the procedures. It was around the time to call an 80-knot. The visibility was good.

I don’t remember the communications with the Tower or with other aircrafts after takeoff clearance.

After Reject, I made contact with the Tower to report that we needed some time to check the brake temperature on the runway, and I was instructed to release the runway from Taxiway A6. At that position, I again reported to the Tower that we needed to stop for a few minutes, and received an approval.

We made a check and found no abnormality with the aircraft. We made an announcement to the passengers that we had rejected the takeoff due to the conditions of air traffic control, but there were no problems with the aircraft, before returning to the spot.

### (2) First Officer of Aircraft A

I took the right seat, performing the PNF duty. We received takeoff clearance. I felt anxious when I saw Aircraft B landing on 19L before we had lined up on the runway, but I thought it would stop short of 19R releasing the runway.

On my previous flight, we landed on 19L and then crossed 19R. As I recall, it was B747 that was about to take off, but we could not see for certain whether the aircraft was moving on the runway. Feeling a bit uneasy, we acknowledged a clearance to cross the runway, and crossed it watching for the starting point of takeoff roll. Such was the experience I had right before this flight, so I was paying attention to an arriving aircraft in a reversal of situation.

We started the takeoff roll, and the auto throttle started to accelerate. Aircraft B was moving at a certain speed, and as I was beginning to worry that it might not stop, it started to cross the runway. I told the Captain, “Crossing traffic” in a bit loud voice. The Captain confirmed the aircraft himself and decided to reject the takeoff. I think it was somewhere at around 80-knot call.  $V_1$  was 130 knot. As we were not speeding, we didn’t feel danger, thinking we’d be able to stop at this distance and speed. The illumination of the airframe was clearly seen as it was night. We didn’t hear the Tower issuing Aircraft B landing clearance or crossing clearance. When we were cleared for takeoff, we didn’t hear any traffic information of an arriving aircraft.

As we rejected the takeoff, the Tower instructed us to clear the runway, but we requested to hold on the runway, and were given permission.

I made a cabin announcement to explain the situation to the passengers as was directed by the Captain before returning to Spot 18.

### (3) Captain of Aircraft B

I was not an LAC<sup>3</sup>, however, as it is one of the tasks for captains to instruct and train first officers, I let the first officer take control of this flight except for landing and takeoff. I had a briefing with the first officer, and decided before assuming the flight that the captain would take control of the flight from lined up position on the runway to gear retraction during takeoff and, during landing, from altitude 500 feet until the aircraft settles down to taxiing speed after landing, whereas the first officer would take the rest of the operations.

We were cleared from Chitose approach for VOR/DME NR2 RWY 19L approach, and made contact with the Tower just before MAOIE point. We could visually confirm the runway from MAOIE point.

The Tower gave us landing clearance right away, but I don't think there was information about a departing aircraft.

Because the aircraft had aligned with the runway and altitude decreased to approximately 500 feet, I called, "I have it", and took over the control from the first officer.

As the aircraft touched down on the ground being extended slightly due to tail wind, I decelerated so as to pick up Taxiway B9. The first officer again took over control when the aircraft slowed down sufficiently.

As I was concentrating on landing, I didn't watch for any other departing aircraft at 19R. Nor was I listening to whether the departing aircraft had been cleared for takeoff.

Before we entered Taxiway B9, the Tower instructed us to, "cross Runway 19R, contact ground". I took charge of radio communication from that point.

As we were entering B9, we called the Ground saying, "Crossing Runway 19R, Spot 7", then, the Ground instructed us to, "continue taxi H6 and J, hold short of H5".

When crossing 19R, the first officer in the right seat confirmed the runway, and I also confirmed the runway from my left seat. We could see an aircraft at the end as the lights were on, but it didn't seem to be moving. Because we were given the crossing instruction from the Tower, we judged that it was not making a takeoff roll, and crossed the runway as instructed by the Ground.

I knew that the important points to note after landing at Chitose Airport were to confirm whether or not the runway crossing is permitted and to check for the right and left before crossing the runway.

Although I visually confirmed Aircraft A near H6, I made a ramp-in without taking notice of Aircraft A on the runway, as I was paying attention to other aircrafts and we were taxiing normally.

#### (4) First officer of Aircraft B

I took charge of flight operations except for landing and takeoff. After the aircraft had aligned for the final approach, the captain took over the control. After landing, the captain said, "You have it", at 60-knot call, so I again took over as PF. I don't remember whether receiving the information about a departing aircraft when we received landing clearance.

We were instructed from the Tower to, "cross Runway 19R, contact Ground".

I made contact with the Ground short of B9, and received a taxiing instruction after crossing 19R. I could clearly see an aircraft on the runway from B9N. I watched for it, and made sure that it was not moving, so I crossed the runway without delay. After that, I followed the instructed

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<sup>3</sup> LAC stands for the Landing Approved Captain, and means the captain who is qualified to train a first officer or candidate for co-pilot training, by having him take the right seat, at ALL NIPPON AIRWAY Co., Ltd.



route to spot in.

I didn't hear any communication between the Tower and Aircraft A.

### 2.1.3 Statements of Controllers about History of the Flight

#### (1) Tower Controller (the Tower)

When Aircraft B called the Tower at approximately 18 km north to the runway, Aircraft A was preparing for taxiing from Spot 18. From the positioning of the two aircrafts, I predicted that the landing of Aircraft B would concur with the takeoff of Aircraft A, so I issued Aircraft B landing clearance informing of planning for Aircraft A departure from 19R.

When Aircraft A reported from D3 that it was ready for takeoff, Aircraft B was about to land. Based on the positioning of the two aircrafts, I figured that Aircraft A would not have to wait for long at the starting point for takeoff roll if I'd let Aircraft B cross the runway ahead. I thought I had given instructing Aircraft A to, "Runway 19R line up and wait". Later, I found out that I had given takeoff clearance at that point, saying, "Wind 090 at 2, Runway 19R cleared for takeoff". And I permitted Aircraft B to cross 19R, and instructed to make contact with the Ground, saying, "Cross Runway 19R, contact Ground 121.6."

After transferring control of Aircraft B over to the Ground, the controller in charge of the radar informed me that ANA729 (hereafter called, "Aircraft C") would be going to make a visual approach<sup>4</sup>, so I looked at the high southeastern sky for it. I could confirm the position of Aircraft C when it called.

When Aircraft A started the takeoff roll, I was not looking at the field as I was watching Aircraft C.

When Aircraft A reported that it would reject the takeoff because an aircraft was crossing the runway, I felt something wrong with Aircraft A's moving close to A5 on 19R when it should have been waiting on the runway at first, and wondered if some faults were found with the aircraft. It was when I confirmed that Aircraft B was moving from A8S toward Taxiway D that I realized I had given it takeoff clearance by mistake. Aircraft A requested that it would want to stay on the runway for three minutes to check the brake temperature, so I permitted it to do so.

Because it is hard to see the southern part of the runway at night, we sometimes use the ASDE<sup>5</sup> as a supplement, but I didn't use it that night because the weather was fine.

It was about 16:40 that I took on the swing duty assignment. After performing duties at the Tower control position of Chitose Airfield, sub watch (monitoring and advice for New Chitose Airport) and the Ground control position of New Chitose Airport, I took the Tower control at about 19:40. I reported the rejected takeoff to my chief after 21:00 when the event was classified as a serious incident, and have taken the Tower control position until a reserve personnel came in.

There are no rules about the time at which to rotate the controllers' shift, thus the timing for rotating the shift is determined by the watch supervisor who also has the coordinator duty.

I had conducted the radar facility flight inspection as the watch supervisor the previous day, and I had been busy in coordinating the inspection and was tired out. I had entered the TOWER at 11:40 and stayed until 16:40 the previous day. Two days before, I worked in the TOWER from 7:40 to 11:40 and from 16:40 until about 19:00.

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<sup>4</sup> A type of approach, an IFR aircraft which is radar-vector to traffic pattern makes by visually observing the airdrome or preceding aircrafts without depending on the instrument approach procedure.

<sup>5</sup> ASDE stands for Airport Surface Detection Equipment, the radar for observing the movement or positions of aircrafts and vehicles on runways and taxiways.

The flight inspection was conducted for a special inspection of the ASR (Airport Surveillance Radar) by flying the airways, Standard Instrument Departure, and orbit flights.

When the serious incident occurred, there were a total of four personnel working on duty at the TOWER, one controller at the Tower control position, the Ground control position of New Chitose Airport, respectively, and one trainee for tallying traffic amount at the Chitose Airfield console, and the watch supervisor who was also the coordinator of New Chitose Airport. There were only three qualified personnel, and the condition was such that we couldn't even go downstairs to use the restroom unless the traffic became light.

We can't take a recess when working on the morning shift and then resuming from that evening until the following morning (Swing & Midnight). We have to build up our strength, but we are exhausted after the night shift.

I didn't give the departing aircraft any information about the arriving aircraft when I erroneously issued it takeoff clearance, because I had been under the impression that I had instructed it to, "line up and wait". In this case, even when I had had an intention of issuing takeoff clearance, I wouldn't have given any traffic information because the arriving aircraft had almost landed by that time.

#### (2) Ground Controller (the Ground)

I had worked at the Radar room first, and it was about 19:50 that I arrived at the Ground control position. There were aircrafts to depart from Spots 12 and 15. I first issued Aircraft A clearance for taxiing to 19R, and when Aircraft A had passed those spots, I made two aircrafts push back concurrently. I think it was when I instructed Aircraft A to make contact with the Tower at around D3 that Aircraft B landed. At that time, the watch supervisor went out to the restroom downstairs. I wrote in the landing time of Aircraft B, which is the task of the sub control position controller, to report the landing time. The Tower had transferred the control of Aircraft B. As Aircraft B reported crossing 19R, I watched Aircraft B just for a while, and issued taxiing clearance to hold short of H5 for letting departing aircrafts at Spots 12 and 15 to taxi out. I can't recall the position of Aircraft A.

When Aircraft A rejected the takeoff, I looked at the ASDE wondering if there was anything wrong with the airframe. Then I found Aircraft B crossing the runway, at around A8S. Aircraft B didn't make any specific remark.

As Aircraft A requested to return to the spot, I coordinated the spot allocation with the Air Traffic Service Flight Information Officer, and gave permission. Upon coordination with Sapporo Air Control Center, I told Aircraft A that the flight plan and ATC clearance remained unchanged.

#### (3) Watch/Coordinator (Charging concurrently)

As the controllers had worked over one hour, I was thinking it was high time to rotate their positions. I think it was about five to six minutes before Reject that I went out of the room to go to the restroom downstairs. I can't recall if Aircraft B had called the Tower. I don't remember clearances to Aircraft A or Aircraft B. I think the traffic condition at that time was rather thin.

I think I returned to my position one or two minutes before Aircraft A rejected its takeoff. Before I returned to my position, I was called by a person in charge of equipment maintenance downstairs. He asked if it was possible to conduct maintenance work for the console at night. I returned to the TOWER, and when I was trying to check whether the night maintenance work was possible or not to respond to him, I was informed of Reject. It came in out of the blue, and I just couldn't grasp what it was all about.

The personnel on duty were four in total; the Tower, the Ground, the Watch Supervisor serving as the Coordinator position concurrently, which is myself, and a trainee. The trainee was working on tallying traffic amount.

All positions were seated until the night flight (the night training by the JSDF aircrafts performed in Chitose Airfield) was over at 19:34, and the positions were all taken by the personnel on the evening shift (SWING) and night shift (MIDNIGHT). At 19:53, only night shifters were left in the room.

There were no particular rules for rotating the position, but we rotate roughly once per hour, depending on the traffic condition, feelings of weariness of controllers, and on my past experience.

We check on NOTAM, announcements and relevant information before starting to work. Concerning the night maintenance work, the maintenance schedule sheet would normally be circulated one month in advance, but minute arrangements would be made on the day when the maintenance personnel comes up to the control room. This time, it just so happened that I met the maintenance worker when I went to the restroom downstairs, so we talked about the arrangements that time.

The person in charge of the entire night shift is the Control Section Chief, and he stays in the TOWER only when the JSDF performs flights. We report to the Control Section Chief should anything happen.

After the rejected takeoff, I checked on the conditions of the Tower control position and Ground control position, and immediately reported it to the Control Section Chief.

This serious incident occurred on 19R of New Chitose Airport at around 21:09, June 27, 2007. (See Figures 1-1, 1-2, 2, 3, 4, 5 and attachment)

## 2.2 Information of Pilots and Controllers

### 2.2.1 Pilots' Information

(1) Captain of Aircraft A	Male, 47 years old	
Airline Transport Pilot Certificate (Airplanes)		August 28, 2002
Type rating for Boeing 767		August 28, 2002
1 <sup>st</sup> class aviation medical certificate		
Validity		August 7, 2007
Total flight time		15,066 hrs and 25 min
Flight time in the last 30 days		78 hrs and 24 min
Flight time on the aircraft type		1,785 hrs and 25 min
Flight time in the last 30 days		78 hrs and 24 min
(2) First Officer of Aircraft A	Male, 29 years old	
Commercial Pilot Certificate (Airplane)		February 20, 2004
Type rating for Boeing 767		November 8, 2005
Instrument rating		March 1, 2004
1 <sup>st</sup> class aviation medical certificate		
Validity		September 3, 2007
Total flight time		1,434 hrs and 22 min
Flight time in the last 30 days		83 hrs and 26 min
Flight time on the aircraft type		1,204 hrs and 07 min
Flight time in the last 30 days		83 hrs and 26 min

(3) Captain of Aircraft B	Male, 40 years old	
Airline Transport Pilot Certificate (Airplane)		May 26, 2003
Type rating for Boeing 777		February 24, 2000
1 <sup>st</sup> class aviation medical certificate		
Validity		July 15, 2007
Total flight time		7,982 hrs and 52 min
Flight time in the last 30 days		59 hrs and 14 min
Flight time on the aircraft type		4,740 hrs and 01 min
Flight time in the last 30 days		59 hrs and 14 min
(4) First Officer of Aircraft B	Male, 37 years old	
Commercial Pilot Certificate (Airplane)		August 22, 1996
Type rating for Boeing 777		March 30, 2007
Instrument rating		August 22, 1996
1 <sup>st</sup> class aviation medical certificate		
Validity		June 23, 2008
Total flight time		4,690 hrs and 01 min
Flight time in the last 30 days		43 hrs and 47 min
Flight time on the aircraft type		119 hrs and 41 min
Flight time in the last 30 days		43 hrs and 47 min

## 2.2.2 Controllers' Information

(1) Controller in charge of local control position	Male, 32 years old	
Air traffic control certificate		
Aerodrome control service		January 1, 1997
Chitose tower (sub)		January 1, 1997
Chitose tower (main)		September 10, 1997
Approach control service		December 10, 1999
Chitose terminal control		December 10, 1999
Terminal radar control service		March 28, 2000
Chitose terminal control		March 28, 2000
Ground controlled approach (GCA)		December 15, 1998
Chitose ground controlled approach		December 15, 1998
(2) Controller in charge of ground control position	Male, 30 years old	
Air traffic control certificate		
Aerodrome control service		September 25, 2002
Chitose tower (sub)		September 25, 2002
Chitose tower (main)		September 22, 2003
Approach control service		June 28, 2006
Chitose terminal control		June 28, 2006
Terminal radar control service		June 28, 2006
Chitose terminal control		June 28, 2006
Ground controlled approach (GCA)		March 16, 2005
Chitose ground controlled approach		March 16, 2005
(3) Controller in charge of watch supervisor/coordinator	Male, 38 years old	

Air traffic control certificate	
Aerodrome control service	March 1, 1992
Chitose tower (sub)	December 19, 1995
Chitose tower (main)	December 19, 1995
Approach control service	April 1, 1997
Chitose terminal control	April 1, 1997
Terminal radar control service	April 1, 1997
Chitose terminal control	April 1, 1997
Ground controlled Approach (GCA)	January 1, 1994
Chitose ground controlled approach	May 27, 1996

### 2.3 Meteorological Information

The aviation routine weather report (METAR) data at around the time of the serious incident were as follows:

21:00 Direction of wind... variable, Velocity of wind... 2 kt, Prevailing visibility... 10 km,  
Clouds: amount...FEW, type... cumulus, Ceiling... 1,000 ft,  
amount... BKN, type... unknown, Ceiling... unknown,  
Temperature... 16 C, Dew point... 15 C, Altimeter setting (QNH)... 29.74 inHg

21:30 Direction of wind... variable, Velocity of wind... 1 kt, Prevailing visibility... 10 km,  
Clouds: amount... FEW, type... cumulus, Ceiling... 1.000 ft,  
amount... BKN, type... unknown, Ceiling... unknown,  
Temperature... 16 C, Dew point... 14 C, Altimeter setting (QNH)... 29.75 inHg

### 2.4 Communication Information

Communication among Aircraft A, Aircraft B, Aircraft C and the ATC was in good condition at the time of this serious incident.

### 2.5 Information on the Serious Incident Site

This serious incident occurred on 01L/19R, the west runway of two parallel runways of New Chitose Airport (hereinafter called, "Runway A"). B9N and A8S, through which Aircraft B taxied in order to cross 19R after it had landed on the east runway 01R/19L (hereafter called, "Runway B"), are 30 meters wide and located at approximately 2,500 meters from the approach end of 19R.

### 2.6 Information on DFDR and CVR

Aircraft A was equipped with a Digital Flight Data Recorder (DFDR) (P/N 980-4700-042) manufactured by Allied Signal Inc. and a Cockpit Voice Recorder (CVR) (P/N 980-6022-001) manufactured by Honeywell Inc.

Aircraft B was equipped with a DFDR (P/N S800-3000-02) manufactured by Fairchild and a CVR (P/N 2100-1020-00) manufactured by L-3 Communications Corp.

The DFDR of Aircraft A retained records from the time it started taxiing from Spot 18 of New Chitose Airport until the aircraft came to a full stop after this serious incident had occurred. The CVR, on the other hand, was overwritten and erased because Aircraft A taxied to the apron to check the airframe and conduct inspection after this serious incident had occurred, and then flew

to Tokyo International Airport.

The DFDR of Aircraft B retained all recordings from the time it departed from Tokyo International Airport until it entered the apron of New Chitose Airport after this serious incident, whereas the CVR retained the voice data before and after the serious incident.

The precise time of DFDR recording was determined by comparing the time signal of NTT on the ATC communication records with the VHF transmission keying signals on the DFDR's record.

## **2.7 Other Necessary Information**

### **2.7.1 New Chitose Airport**

New Chitose Airport has two runways running parallel in the north-south direction. The runways are 3,000 meters in length and 60 meters in width, and the distance between the two runway centerlines is 300 meters. The taxi hold line for the runway is designated on each taxiway 75 meters short of the runway center line.

Taxiway D is located to the west of Runway A in parallel, leading to the apron of New Chitose Airport Terminal building. The distance between the centerlines of Runway A and Taxiway D is 184 meters.

Chitose Airfield, adjacent on the west of New Chitose Airport, is supervised by the Ministry of Defense. The two runways in the field are 3,000 meters long (on eastern side) and 2,700 meters long (on western side), and exclusively used by the Self-Defense Forces' aircrafts except for the occasional use by the aircrafts of the Maritime Safety Agency.

The distance between the centerline of Runway A of New Chitose Airport and that of the eastern runway of Chitose Airfield is 1,500 meters.

The air traffic control services of New Chitose Airport and Chitose Airfield are consolidated and carried out by the Air Self-Defense Force, Air Support Command, Air Traffic Control Group, Chitose ATC Squadron (hereafter called, "Chitose ATC Squadron") at the TOWER and RAPCON<sup>6</sup> located between the two aerodromes.

### **2.7.2 Air Traffic Amount of New Chitose Airport**

The traffic amount of New Chitose Airport in 2006 was 126,892 flights by instrument flight rules (IFR) and 8,814 flights by visual flight rules (VFR), totaling 135,706 flights, which comes to 372 flights per day on average. The traffic amount from January 1 to May 31, 2007 was 53,878 in total, 50,132 flights by IFR and 3,746 flights by VFR, thereby making 359 flights per day on average.

The total number of flights on the day of the serious incident was 454; 425 flights by IFR and 29 by VFR.

The breakdown of traffic amount by the hour on the day of the serious incident was 22 flights between 16:00 and 17:00, 26 flights between 17:00 and 18:00, 15 flights between 18:00 and 19:00, 15 flights between 19:00 and 20:00, 17 flights between 20:00 and 21:00, 13 flights between 21:00 and 22:00, and two flights between 22:00 and 23:00. The largest traffic amount was between 13:00 and 14:00, with 33 flights.

Incidentally, the traffic amount of Chitose Airfield in 2006 totaled 33,043 flights including

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<sup>6</sup> RAPCON stands for Radar Approach Control, and means an organization or facility providing the terminal radar control service, approach control service, and ground controlled approach service. The term is used by Ministry of Defense or US Armed Forces.

touch-and-goes and low approaches. The number of flights on the day of the serious incident (June 27, 2007) was 149.

### 2.7.3 Information on Aeronautical Lights

In compliance with the specified night luminous intensity based on the weather condition of that night, all lights necessary for the airport operation were lit.

### 2.7.4 Air Traffic Control Equipment

The ASDE display unit of New Chitose Airport is installed only at the ground control position. The Tower control position, therefore, employs a compact video camera to shoot the screen images on the display unit to have them transmitted to the display unit of the Airport Vehicle Position Information System in order to make avail of those images tentatively.

The Airport Vehicle Position Information System was initially introduced to boost the safety of vehicles running in the Airport and the efficiency of airport service, and its display units are installed on the Ground control position as well as the Tower control position.

A unit of Tower Bright Display<sup>7</sup> (hereafter called, “the Bright”) is installed on the Tower control position.

The ASDE and the Bright were installed in 1988, and another ASDE display unit is scheduled to be added to the Tower console, while the Bright is scheduled to be updated in 2008.

The ARTS<sup>8</sup> was installed in 1995.

The major airports in Japan (Narita International Airport, Tokyo International Airport, Kansai International Airport, Chubu International Airport, and Naha Airport) that provided ATC service by Civil Aviation Bureau are equipped with the ARTS-F<sup>9</sup>, the latest model of ARTS. Because the ARTS-F Tower Display Unit allows aircrafts in the air space and on the airport surface to be displayed on the same screen in full colors, it is easier to grasp the aircrafts in and around the aerodrome.

The addition of support functions with which to monitor the runway occupancy has been under consideration.

In foreign countries, the introduction of the Runway Status Light System which gives warnings to pilots by automatically turning on Runway Entrance Lights or Takeoff Hold Light has been under consideration.

### 2.7.5 Controllers' Work System

#### (1) Work system

Chitose ATC Squadron is made up of 78 controllers including the Deputy Chief Controller.

The Service Groups are divided into five sections, Air Traffic Control Section 1, Air Traffic Control Section 2, Operation Section, Training Section, and System Section, each of which is placed under the supervision of a section chief. Air Traffic Control Section 1 is further divided into three teams, A, B, and C, and Air Traffic Control Section 2 has D, E, and F teams. Each team consists of eight to nine controllers and takes charge of air traffic control service on the scene.

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<sup>7</sup> A display unit installed to allow Tower to monitor the radar screens used by RAPCON.

<sup>8</sup> This stands for Automated Radar Terminal System, meaning the airport surveillance radar which digitally displays call sign, altitude, ground speed, etc., in linkage with aircraft transponders and the computer for processing flight plans.

<sup>9</sup> This stands for the latest model of ARTS which displays aircraft positions and information on a digital map of air space (ASR) and airport surface (ASDE) in the Tower display unit and the Radar-room display unit.

The Operation Section has 17 controllers and is responsible for both the desk work and air traffic control service. They work on the scene about ten times a month.

The Training Section and System Section have four controllers each. The Training Section handles clerical work involved in certification check procedures, and so on, while the System Section is in charge of management of controlling equipment such as the ARTS.

Air Traffic Control Section 1, Air Traffic Control Section 2, and the Operation Section are assigned to TOWER or RAPCON and perform air traffic control service. The Control Section Chief is in charge of TOWER and RAPCON and supervises the whole of air traffic control operations by the Director of the Tower.

Among the controllers having qualification of watch supervisor, each is designated as the watch supervisor of TOWER and RAPCON, respectively, to supervise them.

(2) Work hours

The work hours at TOWER and RAPCON are given below. However, the controllers working for the Operation Section are assigned to work either Morning and Swing, or Afternoon shift from Monday to Friday.

Morning shift	07:30 to 12:00
Afternoon shift	11:30 to 17:00
Swing shift	16:30 to 21:30
Midnight shift	21:30 to 24:00
Midnight shift	00:00 to 08:00

The above-mentioned work hours include about 10 minutes' briefing before entering the TOWER and RAPCON and about 10 minutes' briefing after completing the work shift, however, they don't include break times.

At briefing, the Watch announces the operational condition of air traffic control equipment, air traffic conditions, weather conditions and predictions, the landing area and its surrounding conditions, pertinent NOTAM and other necessary matters.

After the swing shift is through, there are times when a meeting is held to confirm important matters or systems in addition to debriefing.

(3) Shift rotation

A 6-day shift work rotation pattern, in which crews have five-day work followed by one day-off, is employed. In order to coordinate work hours, one day out of several work rotations is designated as a holiday. Two crews from Air Traffic Control Sections 1 and 2 work from 07:30 to 21:30, with several crewmembers from the Operation Section also joining from Monday to Friday.

① The Basic work rotation

- Day 1 Afternoon shift
- Day 2 Morning shift, Swing shift
- Day 3 Afternoon shift
- Day 4 Morning shift, Swing shift, Midnight shift (continued to the next day)
- Day 5 Midnight shift (from the previous night until the next morning)
- Day 6 Day off

② Work schedule (June 17 to 28, 2007)

Shift	Time	17	18	19	20	21	22	23	24	25	26	27	28
Midnight	00:00-08:00	F	A	D	B	E	C	F	A	D	B	E	C



Morning	07:30-12:00	AB	DE	BC	EF	CA	FD	AB	DE	BC	BF	CA	FD
Afternoon	11:30-17:00	DE	BC	EF	CA	FD	AB	DE	BC	EF	CA	FD	AB
Swing	16:30-21:30	AB	DE	BC	EF	CA	FD	AB	DE	BC	EF	CA	FD
Midnight	21:30-24:00	A	D	B	E	C	F	A	D	B	E	C	F
Off		C	F	A	D	B	E	C	F	A	D	B	E

The controllers on duty at the time of this serious incident (at about 21:09, June 27) were crew C and it was on the fourth day of their work rotation. As indicated with the bold line of the above table of the work schedule on the 27th, after they had completed the morning shift, they took a four-and-half hour recess and resumed the swing shift, and the incident had occurred just before they were to finish the swing shift. They were slated to continue on the midnight shift after that.

(4) The minimum personnel

Given below are the minimum number of work personnel at the TOWER and RAPCON according to Clause 1, General Rule 4 of the Air Traffic Control Procedures specified by Chitose ATC Squadron (hereinafter called, “the Air Traffic Control Procedures”).

The time necessary for transferring from one shift block to the next is determined by the Control Section Chief, taking the amount of air traffic, weather conditions, etc, into consideration.

1 Block 1

Time frame when it is anticipated that flight training by Air Wing 2 is to be conducted or more than three units of the JSDF aircrafts are to perform intensive takeoff and landing

TOWER		RAPCON	
Watch supervisor	1	Watch supervisor	1
Controllers qualified as RT or Tower Watch supervisor	1	R	5
T	8	G	2

2 Block 2 (Midnight shift etc.)

TOWER		RAPCON	
Watch supervisor	1	Watch supervisor	1
T	2	R	1
Others	1	G	1

3 Block 3 (others)

TOWER		RAPCON	
Watch supervisor	1	Watch supervisor	1
Controllers qualified as RT or Tower Watch supervisor	1	R	3
T	4 (or 5)	G	1

\* Numbers in parentheses indicate the minimum number of personnel for winter operation (December to March).

Abbreviations and its meaning

Abbreviation	Meaning
T	Controllers qualified for tower control service (for all positions)

R	Controllers qualified for terminal radar and approach control services
G	Controllers qualified for ground controlled approach

(5) Position log of controllers before the serious incident occurrence (21:09)

① Tower Controller (the Tower)

- 16:40~ Tower control position of Chitose Airfield
- 18:10~ Sub watch
- 19:10~ Ground control position of New Chitose Airport
- 19:40~ Tower control position of New Chitose Airport

② Ground Controller (the Ground)

- 16:40~ Ground controlled approach position (RAPCON)
- 17:40~ Approach control position (RAPCON)
- 19:10~ Coordinator (RAPCON)
- 19:40~ Ground control position of New Chitose Airport

③ Watch supervisor

- 16:40~ Watch supervisor position
- 19:40~ Watch supervisor position, coordinator of New Chitose Airport, Tower control position (supervisor) of Chitose Airfield

(6) Examples of Civil Aviation Bureau work shift

The Civil Aviation Bureau adopts a 6-rotation work shift which completes one rotation cycle in six weeks (42 days), allocating on average a 40-hour-work week excluding recesses.

They have eight-hour work days and 15 hours and 30 minutes work hours on midnight shift, excluding recesses. However, they are allowed to have two holidays out of seven midnight shifts.

(7) Rotation time of Civil Aviation Bureau Control Position

In October 2001, the Civil Aviation Bureau issued the guidelines concerning the rotation hours so as to prevent controllers' attentiveness and concentration from lowering due to fatigue. According to the guideline, they shall rotate the positions roughly every hour.

(8) Work hours in the United States

The United States Federal Law includes the maximum hours for as air traffic controller which are;

- ① Except in an emergency, a certificated air traffic control tower operator must be relieved of all duties for at least 24 consecutive hours at least once during each 7 consecutive days. Such an operator may not serve or be required to serve -
- ② For more than 10 consecutive hours; or
- ③ For more than 10 hours during a period of 24 consecutive hours, unless he has had a rest period of at least 8 hours at or before the end of the 10 hours of duty.

The Federal Aviation Administration (FAA) set these requirements to ensure that the above law is adhered to (A part)

- ① Do not work more than 10 operational hours in a shift.
- ② Hours worked before a shift, whether operational or not, will count as operational hours.
- ③ Have at least an 8-hour break from the time work ends to the start of any subsequent shift.
- ④ Have an off-duty period of at least 12 hours following a midnight shift.
- ⑤ Do not work more than six shifts without taking a regular day off.

## 2.7.6 The Services of Each Control Position

(1) The service of each control position of the TOWER set out in the Air Traffic Control Regulations IV ATC Facility Operation Standards (hereafter called, “the Operation Standard”) specified by the Air Support Command are as follows.

*Watch supervisor position*

- ① *Supervising each controllers’ services,*
- ② *Ensuring personnel and equipments necessary for the control facility,*
- ③ *Assigning the control positions in accordance with the amount of duty and work hours, etc., (weather conditions, trainee controllers),*
- ④ *Getting weather information, NOTAM, etc., and making thorough notification of it to all controllers,*
- ⑤ *Operating control equipments, frequencies, etc.,*
- ⑥ *Making arrangements of evacuation, etc., of controllers in case of emergency and implementing treatment*

*Tower control position*

- ① *Giving clearance and instructions for aircrafts flying with the VFR, when they are to take off from or land on the aerodrome or fly over the surrounding area of the aerodrome,*
- ② *Giving instructions for aircrafts flying with IFR, if:*
  - a *an aircraft is to take off from the aerodrome and until transferring its control over the Area Control Center or Terminal Control Facility*
  - b *an aircraft is to land on the aerodrome whose control has been transferred from the Area Control Center, Terminal Control Facility or Ground Controlled Approach*
- ③ *Clearance and instructions for aircrafts operating in the maneuvering area<sup>10</sup> and the persons engaged in the aerodrome services*
- ④ *Clerical work entailed in the air traffic control service rendered by the Tower control position,*
  - a *Relaying the following*
    - (a) *ATC clearance, clearance, instructions, and special VFR clearance given by other air traffic control facilities,*
    - (b) *Position report and other reports from aircrafts*
  - b *Flight information service*
  - c *Alerting service*

*Ground Control Position*

- ① *Clearance and instructions for aircrafts operating in the maneuvering area and the persons engaged in the aerodrome services,*
- ② *Air traffic control services rendered by the Ground control position, including:*
  - a *Relaying ATC clearance, instructions and special VFR clearance issued by personnel of other air traffic control facilities or Tower control position,*
  - b *Flight information service*

*Coordinator Position*

- ① *Assistance to the service of Tower control position,*
- ② *Recording or relaying of the following:*
  - a *ATC clearance, clearance, instructions, special VFR clearance, and flight plans,*
  - b *Position reporting and other reports from aircrafts,*

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<sup>10</sup> This means the area in the airport where aircrafts take off, land or move, excluding the apron.

*c The time at which aircrafts take off and land, weather conditions and other information*

③ *Communication and coordination with other air traffic control facilities, and so on.*

(2) In addition to the Operation Standard, the duties of the Director and the Watch supervisor of the TOWER are specified in the Facility Memorandum 2-1 as follows.

① *Director D:*            *a controlling aircraft departure and arrival priority for both Chitose Airfield and New Chitose Airport,*

*b coordinating aircraft flights around Chitose Airfield and New Chitose Airport with RAPCON*

② *Sub Watch SW:*        *a Monitoring and supervising New Chitose Airport Tower control ,*

*b Other instructions given by the Watch supervisor*

③ *Watch Supervisor W: TOWER Watch supervisor*

*Note: The SW is positioned whenever Air Wing 2 conducts flight training: usually the Watch Supervisor serves concurrently as Sub Watch.*

(3) According to the Facility Memorandum Clause 2-2, the Watch supervisor of the Tower is allowed to combine the control positions based on the volume of traffic, as follows:

① *Combine position D with position W*

② *Combine position G1 with A1*

③ *Combine position B1 with B2*

④ *Combine position C with G2*

⑤ *Combine position SW with W*

(See Figure 3.)

### 2.7.7 Simultaneous Use of Parallel Runways

With respect to the simultaneous use of parallel runways, Air Traffic Control Services Regulations III Air Traffic Control Procedures (hereafter called, “the Procedures”) specified by the Air Support Command, (III) Aerodrome control procedure 2 Clearance etc., (8) in compliance with Air Traffic Control Services Regulations III Air Traffic Control Procedures set by Civil Aviation Bureau sets out as follows;

(8) *Parallel runways can be used simultaneously if the following conditions are satisfied;*

(a) *The aerodrome weather condition is VMC,*

(b) *Air ground communication with referent aircraft is ensured to provide appropriate traffic information,*

(c) *The referent aircraft can be visually contacted either from the Tower control facility or from the other aircraft.*

*i If the centerlines of two runways are separated 300 meters (1,000 feet) or more, simultaneous takeoff, landing, or takeoff and landing in the same direction can be allowed, after traffic information is issued.*

*ii If the centerlines of two runways are separated 1,310 meters (4,300 feet) or more, simultaneous takeoff, landing, or takeoff and landing in the opposite directions can be allowed, after traffic information is issued.*

### 2.7.8 Holding Instructions concerning Departure

The holding instructions concerning departure are specified in the Procedures (III) Aerodrome control procedure 4, Taxiing and Departure, as follows:

### *Holding on the runway*

(10) *Even when clearance cannot be issued to a departing aircraft immediately, if it is confirmed to be safe, it is possible to inform the aircraft of the runway number to use and to clear to hold on it. In such a case, the traffic information shall be provided to the aircraft as necessary.*

★ *Runway (number), line up and wait. (traffic information)*

### *Holding short of the runway*

(11) a *Depending on the traffic condition, aircrafts should be instructed to hold short of the runway.*

★ *Hold short of Runway (number). (traffic information)*

## 2.7.9 Using Frequency

The frequency used by the Tower control facility is specified in the Procedures (III) Aerodrome control procedure 4, Taxiing and Departure as follows;

Using frequency

(9) a *The taxiing information and instructions are to be issued using the ground control frequency. If the ground control frequency is not available, the Tower control frequency shall be used.*

b *The takeoff clearance and afterword communication are to be issued using Tower control frequency.*

## 2.7.10 Ground Control Procedure concerning Runway A Crossing

The runway crossing clearance is specified in Facility Memorandum Clause 6, Ground Control Procedure, as follows;

4 *Clearance for runway crossing etc.*

*Clearance for runway crossing to an aircraft shall be issued by the Tower control frequency. However, if the traffic condition hinders the use of the frequency, it can be issued by the ground control frequency on condition that the ground controller is given the permission of its use by the Tower controller.*

## 2.7.11 Operational Features of Parallel Runways of New Chitose Airport

At New Chitose Airport, Runway A is designated for departing aircraft while Runway B is designated for arriving aircraft. Because 19L is not set for a precision approach, precision approach from North under bad weather condition is performed only on 19R for takeoffs and landings. Under normal conditions, two runways are almost used.

When operating with two runways, an aircraft landed on Runway B must cross Runway A in order to move to the spot around terminal.

The taxi hold lines are set at Taxiway A4 and A5 against Taxiway D, at a distance by which the wingtip of B747 taxiing on taxiway D would be cleared when B747 is holding at taxiway A4 or A5.

The Facility Memorandum specifies that an aircraft the size of B747 be allowed to hold at the taxi hold lines if no other aircraft is taking off or landing on Runway A.

Although Taxiways other than Taxiway A4 and A5 don't have taxi hold lines against Taxiway D, when an aircraft holds short of Taxiway D, other aircraft may not be cleared for takeoff or

landing on Runway A.

#### 2.7.12 Procedure for Transfer of Control

Procedure for transferring of control<sup>11</sup> of an aircraft landed on Runway B is specified in the Facility Memorandum Clause 2, Coordination of each control position (RJCC<sup>12</sup> arrival), as follows:

*The Tower, after issuing clearance for crossing Runway A to an aircraft landed on Runway B, transfers the control of the aircraft over to the Ground when it becomes clear that the aircraft releases Runway A, and hands the flight progress strip of the aircraft over to the Ground.*

#### 2.7.13 Visual Condition of Runways from the TOWER

At about the same time as when this serious incident had occurred, the visual condition from the TOWER was examined under the same visibility. The north side of Runway A was clearly observed in the night. The south side of the Runway was also observed.

#### 2.7.14 Visual Condition of 19R Departing Point from Taxiway B9N

Similarly to 2.7.13, as a result of investigation conducted on the taxi hold line of Runway A of B9N, an aircraft moving from a taxiway to 19R for takeoff can be confirmed, but whether an aircraft was holding on the runway or starting takeoff run could not be determined. The distance between B9N and the northern approach threshold of Runway A is about 2,500 meters.

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<sup>11</sup> It means to transfer the authority of issuing clearances or instructions for aircraft concerned over to other control facilities or controllers, and it is conducted after the communication is transferred (the frequency of the aircraft is switched over to the frequency of the other agency), on the borderline of control areas as a rule.

<sup>12</sup> The location indicator is for New Chitose Airport. The indicator is used for identifying the location of the airport, communication station, or facilities related to the flight of aircrafts, by the indication code.

## 3 ANALYSIS

### 3.1 General Matters

#### 3.1.1 Airman Competence Certification, etc.

The captains and first officers of Aircraft A and B possessed both proper airman competence certification and valid aviation medical certification.

#### 3.1.2 Air Traffic Controller Competence Certification, etc.

The controllers of Chitose Tower Control Facility possessed required airport traffic control competence certification and medical certification.

#### 3.1.3 Weather Conditions

The weather condition of New Chitose Airport at the time of this serious incident occurrence is estimated to have no impact on the incident, from the statements of flight crewmembers as well as from the aeronautical meteorological observation values.

### 3.2 Analysis

#### 3.2.1 Circumstance of Rejected Takeoff

The passage of Aircraft A from starting takeoff roll until determining to reject when it visually contacted Aircraft B crossing 19R is as described in 2.1.1.

As First officer of Aircraft A had landed on 19L on his previous flight, at which he had been worrying about the move of a departing aircraft at the departure point, during crossing 19R, at the time of this serious incident occurrence, he was paying attention to Aircraft B that landed on 19L while Aircraft A had started its takeoff roll. Therefore, it is estimated that he noticed Aircraft B's crossing the runway early, and reported it to the Captain, who thereupon decided to make Reject.

Although the flight crewmembers of Aircraft B confirmed an aircraft near the takeoff roll starting point of 19R before crossing it, they crossed the runway judging the aircraft was not starting a takeoff roll, as they had been cleared for crossing from the Tower. As the distance between Aircraft B and the takeoff roll starting point is approximately 2,500 meters, and because the flight crewmembers of Aircraft B wouldn't distinguish directional change as they were seeing Aircraft A in the nose direction, it is estimated that they couldn't notice Aircraft A was making a takeoff roll.

#### 3.2.2 Situation of Closeness between Two Aircraft

Captain of Aircraft A rejected takeoff at about 500 meters from the 19R approach end at 21h:09m:12s, and the aircraft stopped at around 1,250 meters from the 19R approach end at 21h:09m:43s.

Aircraft B, from 21h:09m:08s to 21h:09m:27s, was positioned on 19R to cross the runway. At 21h:09m:27s, Aircraft A was at around 1,100 meters from the 19R approach end, and the closest distance between the two aircrafts on Runway A was approximately 1,400 meters.

When the closest possible distance between the two aircrafts on the ground was estimated in the case that Aircraft A hadn't made Reject, Aircraft A would have been around the midpoint of

the runway at 21h:09m:27s, making the distance between the two aircrafts about 1,000 meters. (See Figure 2.)

### 3.2.3 Controllers' Response

#### (1) Tower Controller (the Tower)

According to the statement in 2.1.3 (1), in this serious incident, the Tower made Aircraft A hold on 19R based on the situation of two aircrafts, judging that it would be more effective to let Aircraft B cross the runway first. However, the Tower issued takeoff clearance to Aircraft A when Aircraft A reported that it had been ready for takeoff. Then, he cleared Aircraft B for crossing 19R.

Amid traffic conditions where the number of remaining flights was gradually reducing to the final flight of the day, and the controller was working at the same control position over an hour without knowing when he would be relieved, and because it is considered that he was feeling tired from his statement, it is considered possible that he issued Aircraft A takeoff clearance by mistake when he should have given it a holding instruction, as his attentiveness became slack.

After that, as he had thought that Aircraft A was holding, and because he didn't keep watching Aircraft A until Aircraft B finished crossing 19R once he had transferred the control of Aircraft B over to the Ground control after giving clearance for crossing 19R, he was not watchful enough to pay close attention to the field because he was concerned with Aircraft C which was making a visual approach, and therefore, it is estimated that he couldn't recognize the occurrence of Reject until he received the report from Aircraft A.

#### (2) Ground Controller (the Ground)

According to the statement in 2.1.3 (2), the Ground took over the control of landed Aircraft B from the Tower, and when it received the report of crossing 19R from Aircraft B, the controller gave it a brief look and instructed the taxiway after crossing the runway, and didn't pay good attention to its taxiing. It is considered that the reason for this is that the controller was paying attention to departure aircrafts from Spot 12 and Spot 15 which would affect the way of the taxi route of Aircraft B. Moreover, because the Watch supervisor had left his position, the controller had to take up the duty of the coordinator in addition to the ground control, which made him unable to afford to pay attention fully to the entire taxiing area of the airport.

#### (3) Watch supervisor

According to the statement 2.1.3 (3), because there were only three qualified personnel, the Watch supervisor was charging concurrently as the coordinator before Reject occurred.

Though thinking that it was high time for the controllers to be rotated as they had worked more than one hour, the Watch supervisor did not come back to his position and was making coordination with the maintenance personnel about the night maintenance work.

Furthermore, he stated that he couldn't remember the clearances to Aircraft A or B, and was not able to grasp what was going on when he was informed of Reject.

Based on the above, it is considered that the Watch supervisor was not supervising them sufficiently.

### 3.2.4 Work System of Controllers

#### (1) Position duration time

According to the statements of controllers in 2.1.3, there were no certain rules about the



position duration time, and position rotation is decided by the Watch supervisor's judgment. The Watch supervisor stated that he made controllers rotate their positions roughly every hour based on experience, however, the position duration time is not fixed, as explained in 2.7.5 (5).

As described in 2.7.5 (7), the Civil Aviation Bureau specifies that the controllers rotate positions about every hour so that their attentiveness and power of concentration wouldn't be lowered due to fatigue.

In this serious incident, it is considered possible that the controllers continuing working at the same control position over one hour without knowing when they would be rotated could be one factor in making their attentiveness slack.

Therefore, it is considered desirable that the Facility Memorandum clarifies the time of rotation for control positions.

#### (2) Combine of control positions and the minimum number of personnel

According to the statements of controllers in 2.1.3, because three qualified personnel were on duty at the TOWER from 19:53 until the time of this serious incident occurrence, it is estimated that the Control Section Chief had decided and changed to shift into Block 2, which was the minimum number of personnel, during that time.

Based on of the Facility Memorandum described in 2.7.6 (3), the control positions can be combined into five: Watch Supervisor, Tower Controller of Chitose Airfield, Tower controller, Coordinator and Ground controller of New Chitose Airport, and as such, it is estimated that the Watch Supervisor was charging concurrently as the Chitose Airfield Tower control position on top of the Coordinator.

Based on the above, it is considered that the Watch supervisor couldn't sufficiently supervise them.

With respect to the combine and charging concurrently of control positions, it is considered necessary that supervisor be ensured, in consideration of the workload.

#### (3) Ensuring working personnel

According to the Facility Memorandum described in 2.7.5 (4), the time when a block is shifted to the next is determined by the Control Section Chief taking traffic amount etc. into consideration.

The traffic amount of New Chitose Airport at around the time of shifting to Block 2, as described in 2.7.2, is 15 flights from 19:00 to 19:59, 17 flights from 20:00 to 20:59, and 13 flights from 21:00 to 21:59, not much different from the traffic amount before shifting. The traffic amount on Chitose Airfield from 19:00 to 19:59 was nine flights, and after the night flight was through, there was one flight from 20:00 to 20:59.

On the basis of the above, it is considered that the Control Section Chief should have shifted the Block from Block 1, which has the largest number of personnel, to Block 3, which has the median number of personnel, and then further decreased the number of personnel after 21:30 to Block 2, which has the minimum number of personnel.

It is considered that Chitose ATC Squadron shall be required to ensure personnel suited for the traffic amount so that safe and smooth air traffic control service can be rendered.

#### (4) Coordination of night work

According to the statement in 2.1.3 (3), the form of night work schedule is circulated one month in advance, leaving the fine adjustment to be made directly to the TOWER by the maintenance personnel on the day of the work. At the time of serious incident occurrence, the

Watch supervisor was stopped by personnel in charge of maintenance to make a fine adjustment for the night.

Concerning the adjustment of night work, it is considered necessary that rules shall be established between the controllers and maintenance personnel that it must be done when there are no taking off or landing aircrafts so that the control service would not be interfered with.

(5) Briefing, debriefing, and allocating of work time

According to the work time described in 2.7.5 (2), approximately ten minutes are allocated for pre-work briefing and debriefing, except when after the swing shift.

Based on the position log of the controllers described in 2.7.5 (5), they started to control at 16:40, ten minutes after the swing shift started.

On the basis of briefing described in 2.7.5 (2), it is estimated that it was difficult for the Watch supervisor to prepare for the briefing in ten minutes that after he came into the operation room and made a thorough notification to the controllers before starting air traffic control service.

Time for preparation is necessary for controllers before starting air traffic control service when entering the operation room, and Director, Watch supervisor and Sub watch, those who supervise them, need even more time as they prepare for briefings. It is considered necessary that the Chitose ATC Squadron shall allocate work time ensuring time for preparation before starting air traffic control service, considering the above-mentioned aspects.

(6) Work System

According to the work rotation described in 2.7.5 (3), controllers work on the morning shift and then resume swing shift after four-hour-and-30-minute recess, twice out of six days. Once, after they are through the morning shift, they resume the swing shift which continues on until eight o'clock the following morning. The work hours from morning shift started at 07:30 straight for 24 hours come to 19 hours and 30 minutes.

According to the references of work rotation of the Civil Aviation Bureau described in 2.7.5 (6), a day's work time is designated to be eight hours excluding recesses. However, the work time from midnight shift started at 15:00 for the straight 24 hours come to 15 hours and 30 minutes excluding recesses.

According to work time of the United States' controllers described in 2.7.5 (8), the work hours of one shift must not exceed 10 hours and an 8-hour-interval must be taken before next shift, etc. are specified.

Based on them, it is considered necessary that the Chitose ATC Squadron shall review the work system to take sufficient time between the work shifts and to ensure the controllers be placed appropriately in order to implement safe and smooth air traffic control service.

### 3.2.5 Procedure of Parallel Runways Operation at New Chitose Airport

(1) Frequency

Although the Procedures described in 2.7.9 specifies that the taxiing information and instructions are to be issued using the ground frequency, the runway crossing clearance is issued with the tower frequency at New Chitose Airport in accordance with the Facility Memorandum as described in 2.7.10. Based on the procedure for transfer of control described in 2.7.12, it is specified that After issuing clearance for crossing Runway A to an aircraft landed on Runway B, the Tower transfers the control of the aircraft over to the Ground when it becomes clear that the aircraft releases Runway A, and hands the flight progress strip of the aircraft over to the Ground.

(2) Runway A and Taxiway D

As described in 2.7.1, the distance between the centerlines of Runway A and Taxiway D is 184 meters. From this, when an aircraft holds short of Taxiway D keeping a separation from an aircraft taxiing Taxiway D, or when an aircraft holds short of Taxiway D after crossed Runway A as being unable to receive after-crossing instruction promptly from the Ground, it is considered possible that clearance for takeoff from Runway A cannot be issued to the aircraft, as the tail or the wingtip of the aircraft might be out of the taxi hold line of Runway A, depending on its holding position.

Therefore, at New Chitose Airport, it is considered that the controllers pay attention not to let an aircraft hold between Runway A and Taxiway D when there are takeoff and landing aircrafts.

(3) Time for transfer of communication

In this serious incident, the Tower issued clearance for crossing 19R to Aircraft B on 19L shortly after it had landed and transferred the communication as well as control to the Ground simultaneously.

It is considered that they transferred the communication at an early stage in consideration of the efficiency of communication and the instruction of the after-crossing route.

According to the statements in 2.1.3 (1) and (2), neither the Tower nor the Ground was watchful about Aircraft B and its surrounding when its communication was being transferred.

The Tower thought that the route up to Taxiway A8S toward which Aircraft B was going to taxi was clear, while the Ground thought that the route up to Runway A crossing was clear, and the route up to short of Taxiway H5 where Aircraft B was instructed to taxi after transfer of control was also clear, and it is considered that they didn't pay attention to the surrounding area.

Issuing clearance for crossing Runway A at an early stage and transfer of communication simultaneously could enable efficient control in concise communication. However, it is considered that neither the Tower nor the Ground paid sufficient attention to the aircraft concerned.

(4) Cooperation of the Tower with the Ground

As described in (1), because clearance for runway crossing is issued with the tower frequency, it is considered necessary that the scope of responsibilities of the Tower and the Ground be clarified, and the control shall be transferred after a landed aircraft has crossed Runway A so as to keep controllers attentive to the arrived aircraft until it has crossed Runway A.

With regard to the transfer of communication, it is desirable that the transfer shall be conducted after an arrived aircraft has crossed Runway A because both the taking-off or landing aircrafts are allowed to listen to air traffic communication with the tower frequency until an arrived aircraft has finished crossing Runway A, thereby having an advantage of sharing communication information with each other.

However, as described in (2), in order for an arrived aircraft to promptly get the taxi route after it has crossed Runway A, it is considered that it may need that transfer of communication to be carried out before the aircraft crosses the runway, depending on the traffic condition.

In such case, it is considered necessary that both the Tower and the Ground confirms aircrafts, and transfer communication with information of other aircrafts or aircrafts planned to take off from Runway A as necessary, and pay sufficient attention to the aircraft and their surroundings until the aircraft finishes the crossing.

(5) Transfer of control and communication

According to the procedure for transfer of control in 2.7.12, communication and control are

specified to be transferred concurrently. Although the transfer is to be made when it becomes clear that the arrived aircraft releases Runway A after issuing clearance for crossing it, no specific location or the timing has been set.

As described in (3), it is considered possible that this could be the factor which caused the attentiveness of the Tower and the Ground to the concerned aircraft to fade after the control had been transferred.

As described in (4), the timing of communication transfer depends on the traffic condition. Concerning the timing of transfer of control, because the instruction of crossing Runway A is issued by the Tower, it is considered necessary that geographical positions, such as the finishing point of crossing Runway A, shall be concretely indicated.

Because of the above-mentioned factors, it is considered necessary that the Chitose ATC Squadron shall distinguish the transfer of control from transfer of communication, indicate the point for transferring of control of arrivals from the Tower to the Ground concretely in the Facility Memorandum, as well as describe the timing and procedure of mutual confirmation with regard to the transferring communication for each runway and taxiway in use.

### 3.2.6 Air Traffic Control Communication

#### (1) Listening to the air traffic control communication

According to the statements in 2.1.2, it is considered that flight crewmembers of both aircrafts concentrated on the checklist and maneuvering after they had started taxiing for takeoff or made final approach, and weren't listening carefully to the communications between the Tower and other aircrafts. Especially, because the flight crewmembers of Aircraft B had decided to take turns controlling the Aircraft before descending to 500 feet, it is considered possible that they didn't remember the traffic information on the departing aircraft given after receiving landing clearance, as the Captain stated. If flight crewmembers of Aircraft B had remembered that listening to the departure information and takeoff clearance for Aircraft A, it is considered possible that they might have confirmed the Tower about it when they received clearance for crossing Runway A.

It is considered necessary that the flight crewmembers should listen to the air traffic control communication between other aircrafts and the Tower as much as possible to grasp the traffic condition around the airport. Furthermore, if they feel uncertain about any movement of other aircrafts or when they were unable to get information of other aircrafts, it is considered necessary that they should try to make confirmation with the controller.

#### (2) Traffic information

##### 1 Simultaneous use of parallel runways

Concerning the simultaneous use of parallel runways at New Chitose Airport, aircrafts are permitted to take off or land at the same time after traffic information has been issued about the other aircraft, as described in (8) (c) of 2.7.7.

According to the ATC communication record, when the landing clearance was issued to Aircraft B, the traffic information of Aircraft A was also given as the parallel runways were used simultaneously. However, it is considered possible that the flight crewmembers of Aircraft B didn't remember the information of Aircraft A because the traffic information was not told prior to landing clearance but added to it afterwards. They must have given the necessary information in accordance with the Procedures.

## 2 Awareness of providing the traffic information

As described in 2.7.8, the traffic information is provided when aircrafts are instructed to hold on the runway or hold short of the runway as necessary.

According to the statement in 2.1.3 (1), though the Tower stated that it had intended to make Aircraft A hold on the runway, it is estimated that it wouldn't have intended to issue the traffic information in any way.

If it had an intention of providing the departing aircraft and arriving aircraft with traffic information, it is considered possible that it would have paid attention to concerned aircrafts, thereby being able to prevent an incorrect instruction from having issued.

(See attachment)

### 3.2.7 Air Traffic Control Equipment

At New Chitose Airport, the ASDE display unit is installed only at the Ground control position and not at the Tower control position. As described in 2.7.4, the display unit for the Airport Vehicle Position Information System is used as a tentative device as ASDE display. However, as the ASDE display unit is the equipment for confirming the movement or positions of aircrafts and vehicles on the runways and taxiways, it is necessary to install it at the Airport control position as well.

The ARTS-F Tower Display Unit which can provide aircrafts in the area and on the airport surface on the same screen enables easier grasp of the aircrafts in and around the aerodrome than the conventional ARTS. The Civil Aviation Bureau has installed the ARTS-F in major airports (Narita International Airport, Tokyo International Airport, Kansai International Airport, Chubu International Airport, and Naha Airport).

As the traffic amount is large and the parallel runways are used at New Chitose Airport, it is desirable that equipment having functions like the ARTS-F be introduced when updating the air traffic control equipment in the future. Moreover, it is considered necessary that the installment of the runway occupancy monitor support system, Runway Status Light System, etc. shall be examined at the earliest possible time for the prevention of runway incursion.

## 3.3 The Hazard of This Serious Incident

It is estimated that the closest distance between Aircraft A and Aircraft B on the runway was approximately 1,400 meters. At the favorable visibility, it is estimated that there was sufficient distance and time to avoid collision due to the appropriate judgment and operation by the flight crewmembers of Aircraft A, as described in 3.2.1.

## 4 PROBABLE CAUSE

It is estimated that this serious incident was caused because the Tower Controller issued takeoff clearance to Aircraft A by mistake despite that he had planned to instruct it to hold on 19R, while allowing Aircraft B to cross 19R without realizing the mistake, and Aircraft A which started takeoff run, visually confirmed Aircraft B crossing 19R and rejected the takeoff.

Concerning the erroneous issuance of takeoff clearance by the Tower Controller, it is considered possible that he had been tired out and kept working at the same control position over an hour without knowing when the next rotation personnel would take over his position, thereby causing his attentiveness to slacken.

As for the fact that the controller didn't realize his mistake until Aircraft A reported him of its reject, it is considered that this is so because he had been thinking that Aircraft A would be holding at the takeoff run starting point of 19R, and he was not watching carefully the Aircraft until Aircraft B finished crossing 19R as the control of it had been transferred over the Ground control after issuing the crossing 19R clearance, and also he was not watching the airport surface carefully as he was concerned with Aircraft C making a visual approach.

In addition, regarding that neither the Watch Supervisor nor the Ground Controller noticed the mistake made by the Tower Controller, being unable to grasp the condition until Reject was reported, it is considered that this is so because the proper personnel assignment was not made, as the watch supervisor was charging concurrently as several positions such as the coordinator position, and the ground controller was charging as the coordinator position when the watch supervisor left his position, and it was unable to pay attention appropriately and evenly, and unable to pay attention to the entire maneuvering area of the airport.

## 5 PROPOSALS

In view of this serious incident, the Japan Transport Safety Board submits proposals pursuant to the provision of the Article 28 of the Act for Enforcement of the Japan Transport Safety Board to Minister of Defense and Minister of Land, Infrastructure, Transport and Tourism as follows:

In order to ensure safe air transport, it is necessary to examine the following agendas to improve the work system of controllers, air traffic processing system and equipment at parallel runways, and to take necessary measures. In this case, because the air traffic control service of New Chitose Airport where this serious incident occurred, is entrusted from the Minister of Land, Infrastructure, Transport and Tourism to the Minister of Defense by Article 137 of the Civil Aeronautics ACT of Japan, the Minister of Land, Infrastructure, Transport and Tourism is in charge of controlling its operation of service, therefore the Minister of Land, Infrastructure, Transport and Tourism should appropriately control the measures for this statement.

### 1 Work System of Controllers

As for the rotation work of Chitose ATC Squadron, some work shifts are long and the interval between the shifts is short. Therefore, it is considered possible that the controllers were tired out which could be one of the factors for the issuing of incorrect clearance.

Furthermore, if the controllers had been assigned appropriately based on the traffic amount and had been supervised properly, it is considered possible the mistake by the controller could have been corrected and this serious incident could have been prevented.

Therefore, the Minister of Defense should review the work system of controllers and take necessary measures in order to ensure safe air transport.

### 2 ATC Procedure on paralleled runways

As two runways are regularly used at New Chitose Airport, an aircraft landed on the landing runway must always cross the takeoff runway. Therefore, it is critical that utmost attention shall be paid and close cooperation also shall be exerted among controllers when issuing instructions to the aircrafts concerned.

From above, in order to reinforce cooperation between the Tower Controller and the Ground Controller, the Minister of Defense should examine thoroughly and take preventive measures for human errors by reviewing and stipulating the procedure for transfer of communication and control, improving the communications between the Tower and the Ground by arranging their positions closer to each other, and so on.

### 3 Improvement of air traffic control service equipment

One ASDE display unit and Bright of the airport traffic control tower of Chitose ATC Squadron that were both outmoded are only installed at the Ground control position and the Tower control position, respectively. And their functions and performance for the airport traffic control support system are considered to be inadequate in view of the traffic amount of the current New Chitose Airport.

The airport traffic control support system installed at civil airports in Japan has the function

of adding colored identification tags to individual aircrafts' markings on the display so that the controllers can easily confirm the aircrafts in the airport. Moreover, addition of support functions such as monitoring the runway occupancy has been under consideration for the future.

Overseas, the introduction of the Runway Status Light System which gives warnings to pilots by turning on the Runway Entrance Light or Takeoff Hold Light automatically so as to prevent aircrafts from runway incursion has been under examination.

In line with the aforementioned trends, the Minister of Defense should examine system implementation for preventing runway incursion caused by human error, and take necessary measures.

Also, the Minister of Land, Infrastructure, Transport and Tourism should endeavor to share the information of the airport traffic control support system etc. with the Ministry of Defense, and if necessary, take appropriate processes such as improving cooperation with the system implementation and so on.



## 6 SAFETY OPINIONS

At New Chitose Airport, when two runways are used, an aircraft landed on Runway B must always cross Runway A before proceeding to the spot at the terminal via Taxiway D. Meanwhile, the distance between Runway A and Taxiway D is not far enough for a large aircraft to hold short of Taxiway D after crossing Runway A, moreover, the distance from Taxiway D to the terminal area is not spacious enough too.

Based on these, it is considered that the controllers pay attention not only to permitting aircrafts to cross Runway A but also not to having kept aircrafts holding short of Taxiway D after crossing, and control well aware of instructing the crossing timing as well as the taxiing route after crossing at the earliest possible time.

For the construction, repair and operation of airports having several runways, it is desirable that the number of crossing runway used for takeoff and after landing shall be made as few as possible, or measures for ensuring safe crossing shall be taken so that the runway, taxiway and the entire terminal area flow would be made smooth.

## 7 REFERENTIAL MATTERS

7.1 The Air Self-Defense Force Chitose ATC Squadron has implemented the measures below after this serious incident occurrence.

(1) Revision of Facility Memorandum

After instructing an aircraft to cross Runway A, the Tower control position transfers the control of the aircraft over to the Ground control position upon confirming Runway A has been released. In the case that the control is to be transferred before Runway A is made safe, the Tower control position must make pre-coordination with the Ground control position. The Ground control position, if the control of an arriving aircraft were transferred before the aircraft finished crossing Runway A without any prior coordination, must confirm with the Tower control position about the handling of the aircraft .

(2) The number of controllers to be assigned

The number of controllers certificated for airport traffic control service was increased from three to five until 21:30.

(3) On July 18, 19, and 20, 2007, the pilots of airline companies and the controllers of the Chitose ATC Squadron held meetings to explain the operation of New Chitose Airport, preventive measures of serious incidents and to exchange opinions in order to strengthen common awareness among them. The pilots of the Japan Coast Guard and the JSDF Special Air Transport Division which also use runways of New Chitose Airport took part in exchanging opinions as well.

(4) Providing traffic information at the time of runway crossing

The controllers, when issuing to an aircraft an instruction to cross the runway, should visually confirm that there is no other aircraft landing or taking off from the runway as well as confirm with the ASDE or the pilots' report and provide the traffic information (the presence of other aircrafts) together with the instruction.

7.2 On June 29 and 30 of 2007, the Civil Aviation Bureau conducted an ad-hoc inspection at the JSDF Chitose ATC Squadron. As a result of the inspection, it reported "Agenda for Improvement etc." to the Ministry of Defense, as follows (made in public on July 18, 2007).

"Agenda for improvement etc."

(I) Coordination between the Tower control position and Ground control position

(Analysis of current condition)

The Facility Memorandum Clause 2, Coordination of each control position (RJCC arrival) of the Chitose ATC Squadron specifies that, "The Tower, after issuing clearance for crossing Runway A to an aircraft landed on Runway B, transfers the control of the aircraft over to the Ground when it becomes clear that the aircraft releases Runway A." Therefore, the Ground control position which is handed over the control does not usually make confirmation concerning a departing aircraft to the Tower control position, as the control is transferred on condition that there are no other aircrafts that might be blocking the way for the aircraft from moving.

(Guidance)

Including the case of transferring control before a landed aircraft has crossed the runway for

departure runway just as in this incident, the Manual must be revised to make the transferring procedure more certain by, for instance, making both the Tower control position and Ground control position mutually confirm the aircrafts, etc.

## (II) Prevention of human errors

### (Analysis of current condition)

It is estimated that this incident was caused by takeoff clearance for a departing aircraft and clearance for runway crossing to an arrived aircraft had been issued simultaneously, resulting in two aircrafts coming close to each other. It is confirmed that one factor that caused the incidence is the possibility of human errors such as misunderstandings or forgetfulness.

### (Guidance)

For the prevention of misunderstandings or forgetfulness, examine the concrete measures such as the usage of the flight progress strip or review of personnel system, and introduce and promote seminars, etc., on human factors which have been deployed in Japan and abroad.

In addition to the aforementioned points, the following items are also instructed from the standpoint of improving further safety.

## (III) Implementation of ASDE (Airport Surface Detection Equipment)

### (Analysis of current condition)

At night and when the visibility is low, etc., it is difficult to see the position of an aircraft in relation to the taxiway on the south side of the runway where the arrival of this serious incident taxied after landing, from both of the control positions. Although the ASDE is utilized to grasp the position of aircrafts on the ground surface as a supplement, it is installed only on the Ground position of the control tower, requiring the controllers at the Tower control position to leave their position to see the display etc., posing significant burden on their service.

### (Guidance)

The display unit is scheduled to be installed at the Tower control position in December 2008. Considering the unique operating system of the airport, having several runways and thereby being in need of far-reaching monitoring of aircrafts, examination of early installment of the display unit is of urgent importance. In addition, as the current display unit is outmoded, it sometimes reveals poor performance in identifying targets depending on weather conditions and so on, and as such, it is desirable to consider replacing it with state-of-art equipment (the ASDE with digital functions or other latest system, etc.).

## (IV) Common awareness between the controllers and pilots

### (Analysis of current condition)

At the time when the Tower control position issued takeoff clearance to one aircraft and clearance for runway crossing to the other aircraft, the two aircrafts were listening to the same radio frequency, therefore, it is estimated that it was possible for the aircrafts to know about the movement of other aircraft. Although it is not required of pilots to listen to the communication with other aircrafts, and they were not blamed, it is considered necessary that the pilots should try to consider the communications between the controller and other aircrafts as much as possible and make confirmation if there arise any doubts concerning the instructions by the controllers, and so on, like in unique operating conditions in which several runways and intersections cross.

### (Guidance)

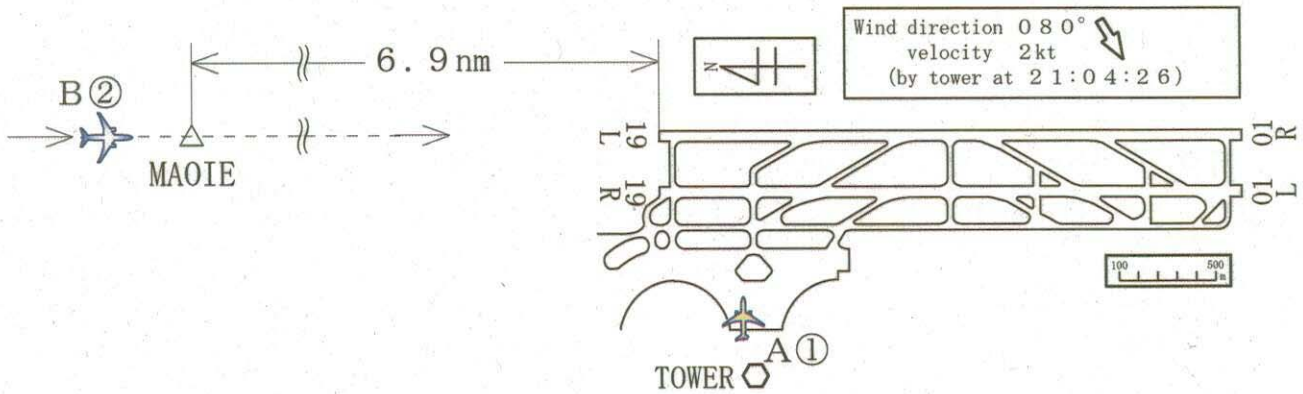
A joint meeting should be held between the controllers and pilots as soon as possible so that common awareness will be strengthened with respect to the operating procedure, etc. of the airport.

7.3 Revisions effective from August 28, 2008 of Air Traffic Control Procedures are as follows:

- (1) Clearance of crossing runway shall be issued by tower control frequency.
- (2) When an aircraft gets close to runway which is necessary to cross, issue clearance or hold short instruction..
- (3) Do not issue crossing clearance with additional conditions.
- (4) Do not issue further taxi instruction without crossing clearance.

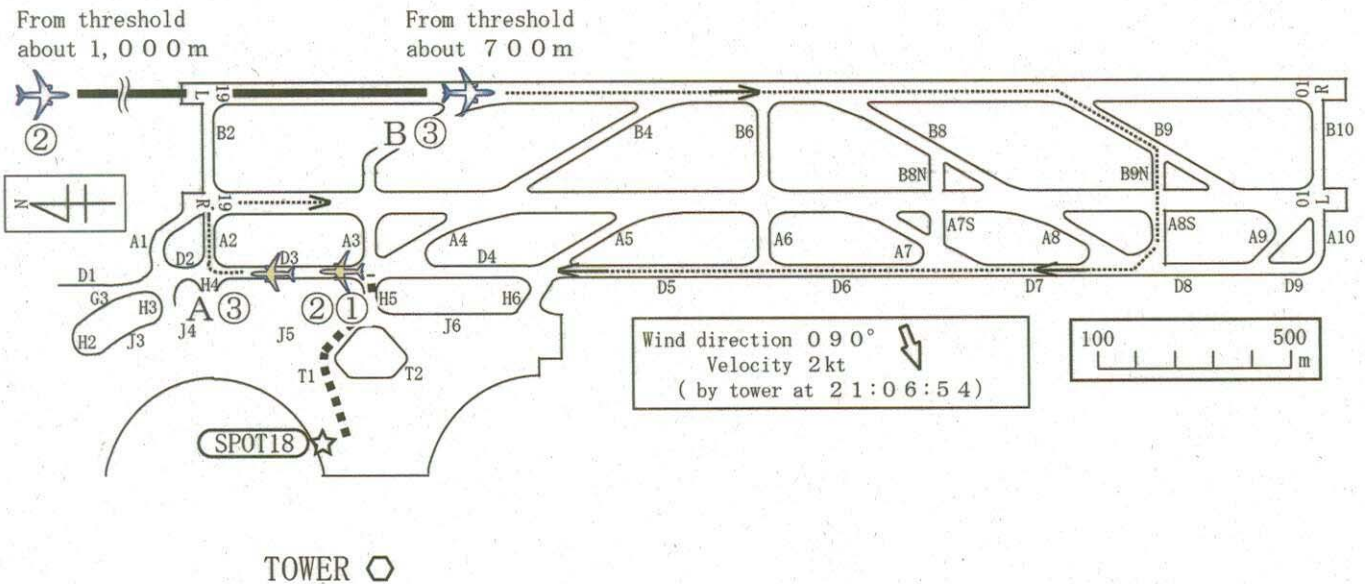
Figure 1-1 Estimated aircraft movement

1. Aircraft A started to taxi ~ Issued landing clearance for Aircraft B



- ① at 21:04:11, A started to taxi from spot 18
- ② at 21:04:26, B got landing clearance

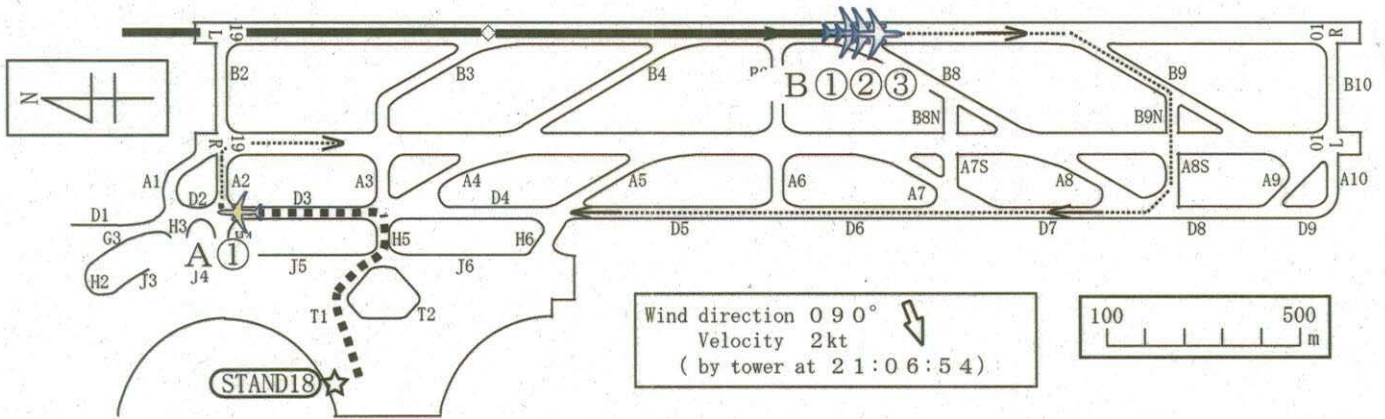
2. Takeoff clearance for Aircraft A ~ touchdown of Aircraft B



- ① at 21:06:51, A ready for takeoff
- ② at 21:06:54, TOWER cleared A for takeoff
- ③ at 21:07:20, B touched down

Figure 1-2 Estimated aircraft movement

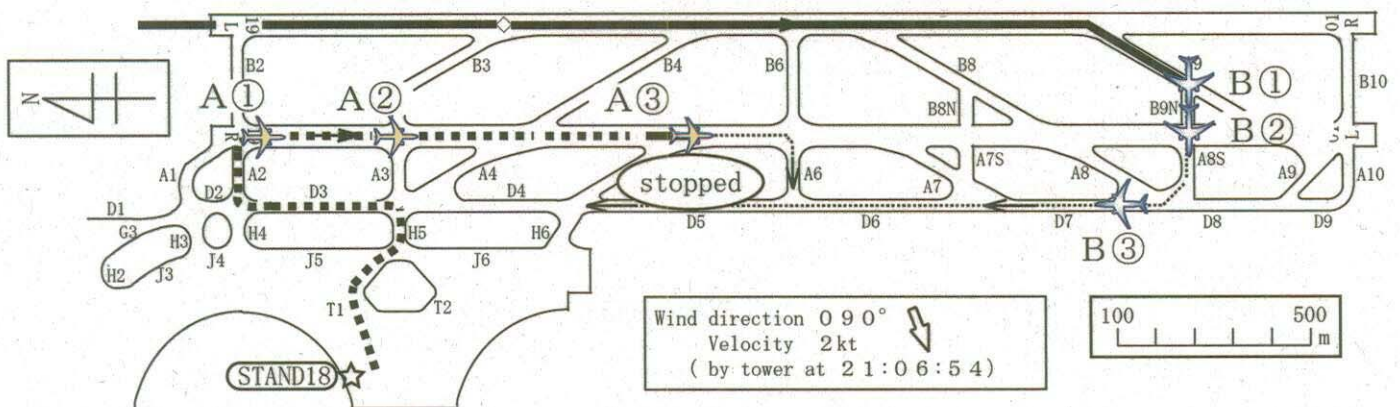
3. Aircraft B landing roll ~ change of PF ~ crossing 19 R



TOWER ◊

- ① at 21:07:41, B landing roll at 60kt
- ② at 21:07:44, B PF changed to FO
- ③ at 21:07:50, Tower cleared B to cross 19 R

4. A taking off run ~ rejected ~ stopped



TOWER ◊

- ① at 21:08:52, A Lining up runway doing rolling takeoff
- ② at 21:09:12, A decided to reject
- ③ at 21:09:43, A stopped



# Figure 2 Situation of Closeness between Aircraft A and B

(Based on DFDR records of both aircraft)

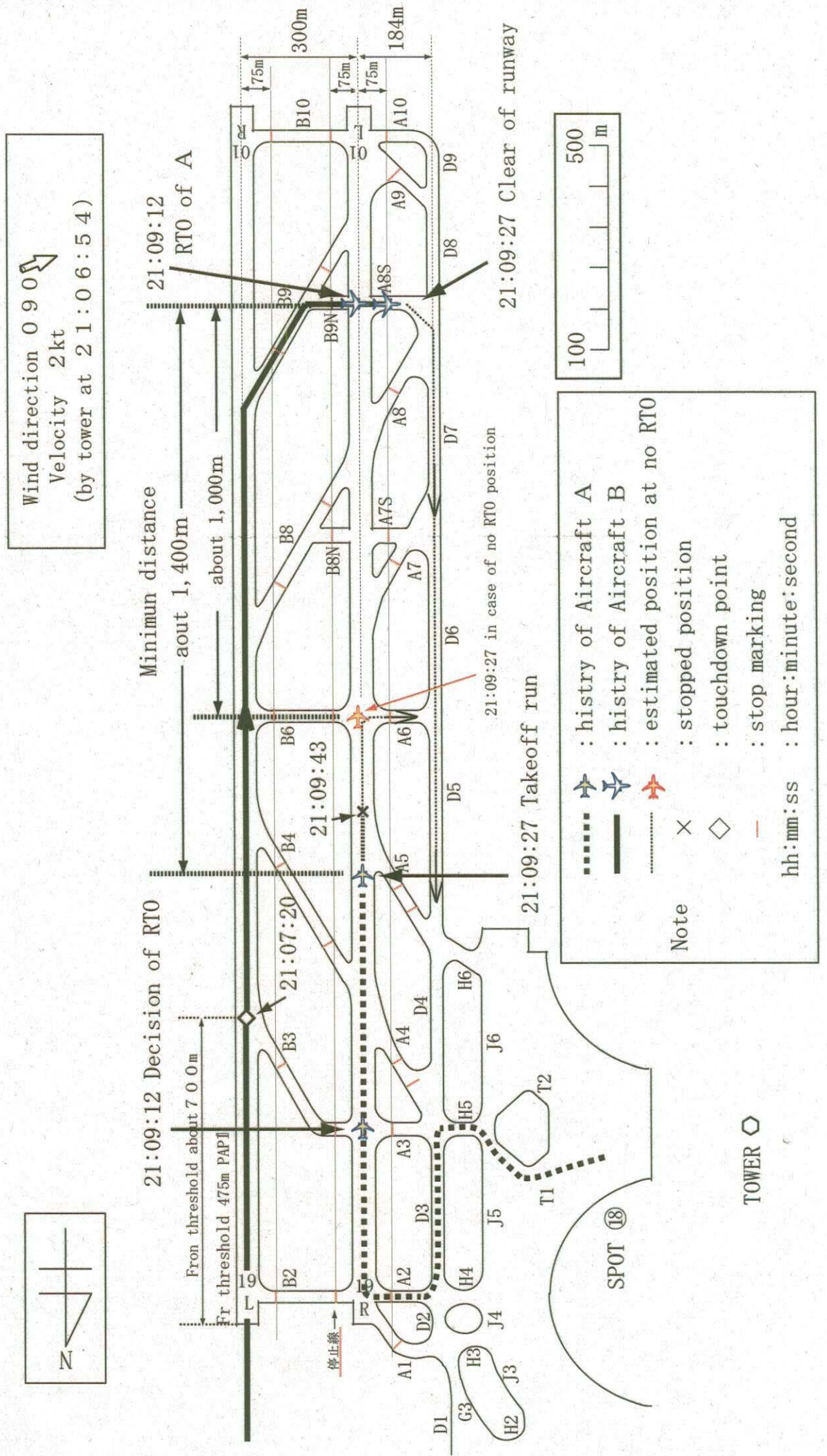


Figure 3 COTROLLERS' POSITION

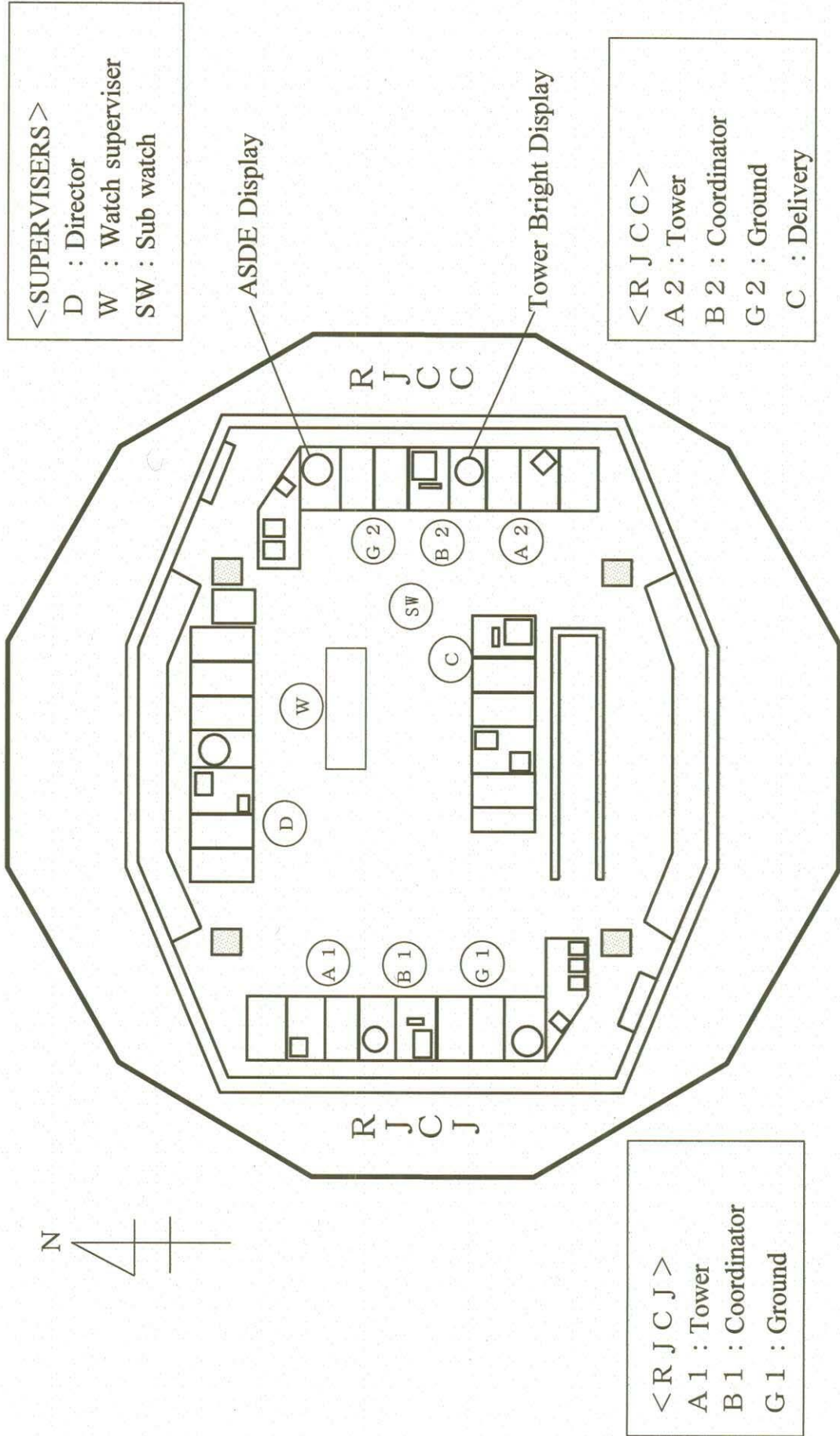




Figure 4 Boeing767-300 (Aircraft A) 3 Dimensions

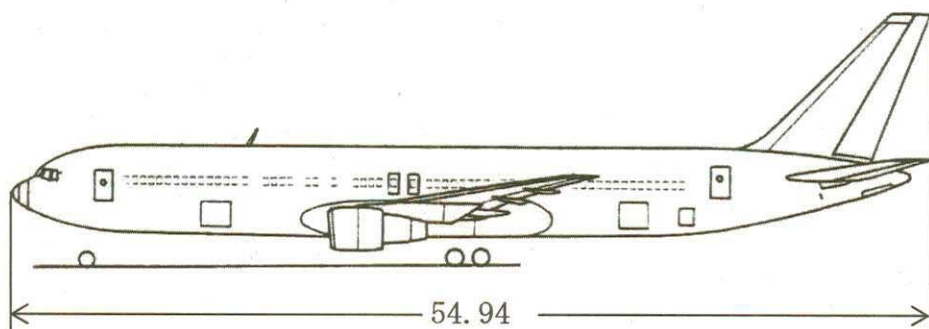
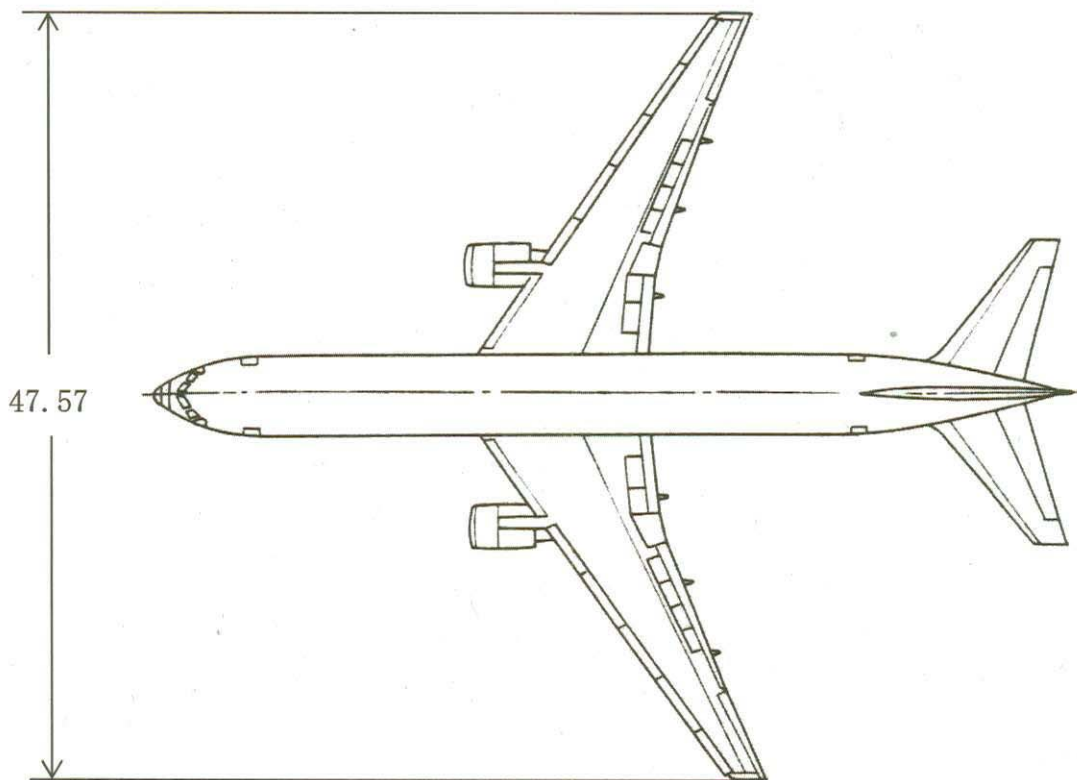
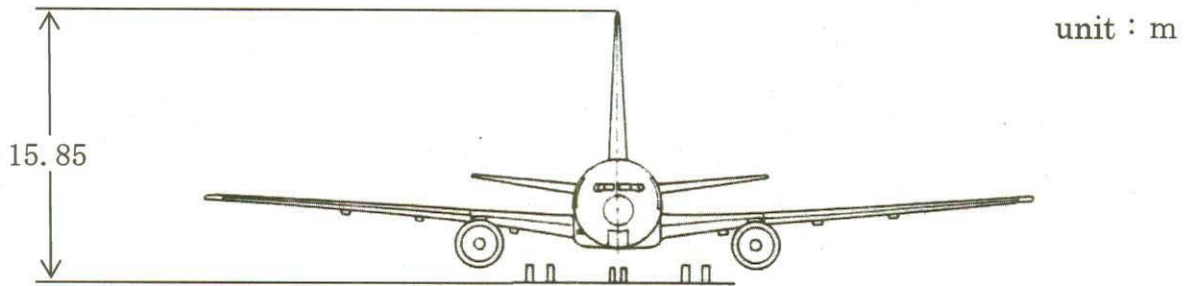
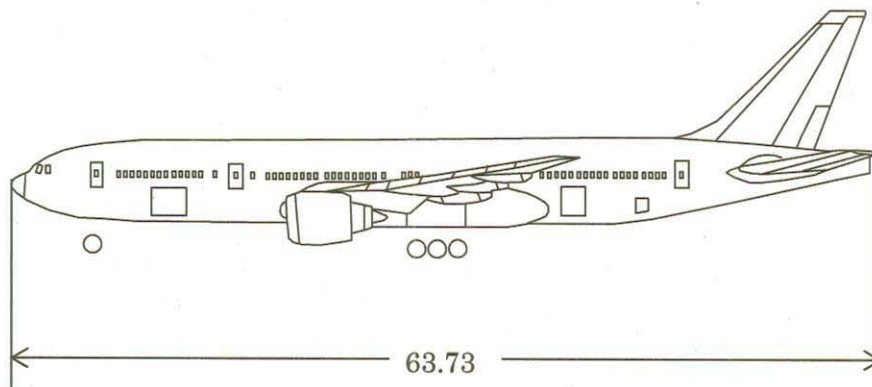
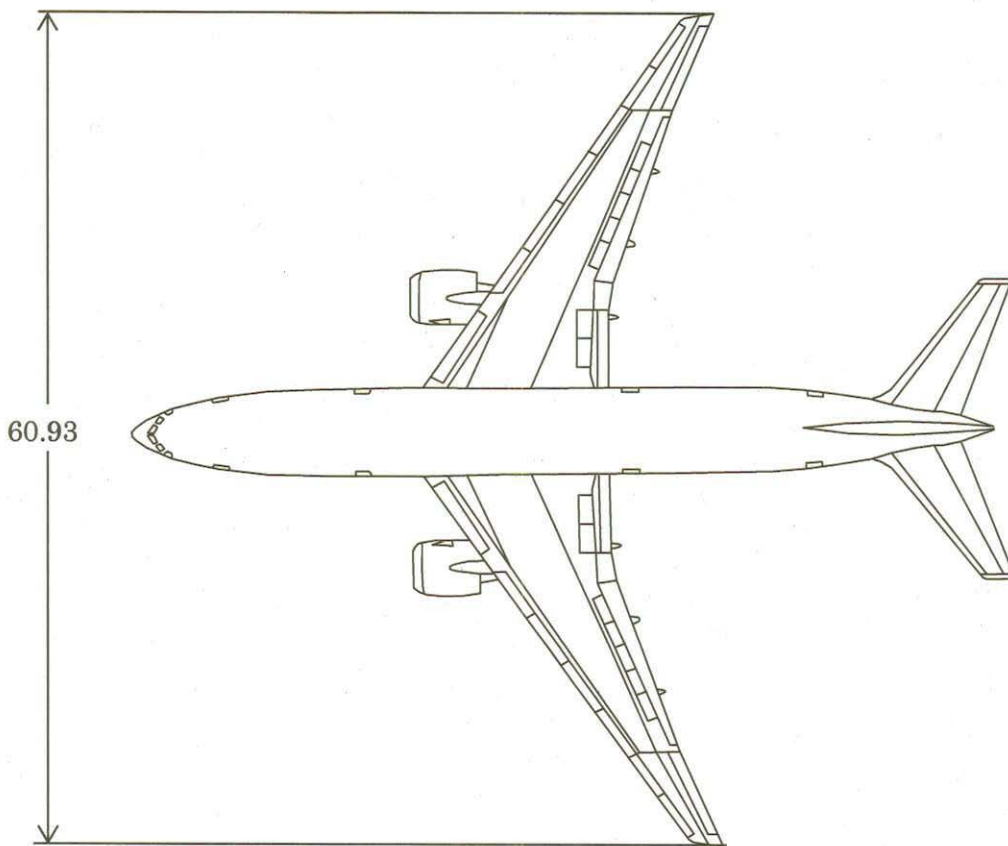
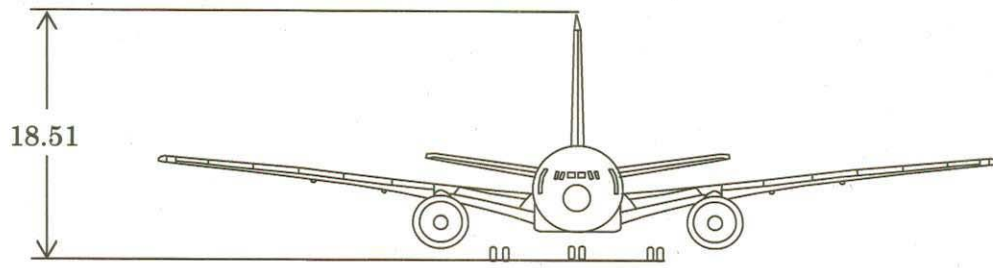


Figure 5 Boeing777-200 (Aircraft B) 3 Dimensions

unit : m





Attachment ATC radio communication (SKY730:Aircraft A, ANA79:Aircraft N,

	Local control (TWR)		Ground control (GND)	
20:59:54			SKY730	CHITOSE GROUND SKY730 SPOT 18 INFORMATION "F" REQUEST PUSH BACK.
21:00:00			GND	SKY730 ROGER PUSH BACK APPROVED FACE TO NORTH.
21:00:04			SKY730	PUSH BACK APPROVED FACE TO NORTH SKY730.
21:04:07			SKY730	CHITOSE GROUND SKY730 REQUEST TAXI.
21:04:11			GND	SKY730 RUNWAY 19R TAXI VIA T1 H5 D AND A2.
21:04:16			SKY730	T1 H5 D A2 SKY730.
21:04:22	ANA79	CHITOSE TOWER ANA79 APPROACHING MAOIE.		
21:04:26	TWR	ANA79 CHITOSE TOWER RUNWAY 19L CLEARED TO LAND WIND 080 AT 2 QNH 2974 AND TRAFFIC 767 WILL DEPART FROM RUNWAY 19R.		
21:04:37	ANA79	ANA79 CLEARED TO LAND RUNWAY 19L.		
21:06:28			GND	SKY730 CONTACT TOWER 118.8 GOOD NIGHT.
21:06:33			SKY730	CONTACT TOWER 118.8 SKY730 GOOD NIGHT.
21:06:51	SKY730	CHITOSE TOWER SKY730 READY.		
21:06:54	TWR	SKY730 CHITOSE TOWER WIND 090 AT 2 RUNWAY 19R CLEARED FOR TAKE OFF.		
21:07:00	SKY730	RUNWAY 19R CLEARED FOR TAKE OFF SKY730.		



Local control (TWR)		Ground control (GND)
21:07:50	TWR ANA79 CROSS RUNWAY 19R CONTACT GROUND 121.6.	
21:07:55	ANA79 CROSS 19R AND 121.6 ANA79.	
21:08:03	ANA729 CHITOSE TOWER ANA729 APPROACHING HAYAKITA.	
21:08:06		ANA79 CHITOSE GROUND ANA79 CROSSING RUNWAY 19R SPOT 7.
21:08:08	TWR NA729 CHITOSE TOWER ROGER, TOWER HAS INSIGHT REPORT BASE RUNWAY 19L WIND 130 AT 1 QNH 2974.	
21:08:13		GND ANA79 GROUND ROGER CONTINUE TAXI H6 AND J HOLD SHORT OF H5.
21:08:18	ANA729 2974 REPORT RIGHT...LEFT BASE 19L ANA729.	
21:08:19		ANA79 H6 J HOLD SHORT OF H5 ANA79.
21:09:17	SKY730 CHITOSE TOWER...SKY730 REJECTED ON THE RUNWAY DUE TO CROSSING TRAFFIC RUNWAY 19R.	
21:09:26	TWR SKY730 ROGER.	
21:09:33	SKY730 We11...SKY730 WE NEED SOME TIME ON RUNWAY.	
21:09:37	TWR We11...SKY730 HOLD CORRECTION TURN RIGHT ANY AVAILABLE TAXIWAY HOLD SHORT OF D.	
21:09:45	SKY730 We11...SRRY WE NEED 3 MINUTES TO CHECK A BRAKE TEMPERATURE.	
21:09:49	TWR ROGER.	

Local control (TWR)		Ground control (GND)
21:11:17	ANA729 CHITOSE TOWER ANA729 TURNING BASE.	
21:11:20	TWR ANA729 CHECK GEAR DOWN RUNWAY 19L CLEARED TO LAND WIND 140 AT 1.	
21:11:26	ANA729 RUNWAY 19L CLEARED TO LAND ANA729.	
21:11:30		GND ANA79 THIS TIME TAXI TO SPOT 7 VIA D AND H3.
21:11:36		ANA79 D H3 ANA79.
21:11:43		ANA79 CONFIRM D H3 ANA79.
21:11:47		GND ANA79 AFFIRM D H3 TO SPOT 7.
21:11:49		ANA79 THANK YOU.
21:11:59	SKY730 CHITOSE TWR SKY730 NOW WE COMMENCE TAXI PICK UP A6 well...CONFIRM HOLD SHORT OF D?	
21:12:07	TWR SKY730 ROGER TAXI VIA A6 CONTINUE TAXI.	
21:12:11	SKY ROGER CONTINUE TAXI AND WE REQUEST GOING BACK TO SPOT.	
21:12:18	TWR ROGER.	
21:13:03	TWR SKY730 CONTACT GROUND 121.6.	
21:13:07	SKY GROUND 121.6 SKY730.	
21:13:54		GND SKY730 COPY well... THIS TIME TAXI TO SPOT 18 H6 T2.

	Local control (TWR)	Ground control (GND)
21:14:02		SKY730 ROGER H6 T2 TO SPOT 18 SKY730.
21:18:38		GND SKY730 GROUND.
21:18:43		SKY730 STAND BY PLEASE.
21:19:26		SKY730 GROUND SKY730 GO AHEAD PLEASE.
21:19:29		GND SKY730 HOW ABOUT FLIGHT PLAN AND CLEARANCE.
21:19:42		SKY730 Well... 730 well... PLEASE REMAIN KEEP well... FLIGHT PLAN.
21:19:46		GND SKY730 FLIGHT PLAN HOLD COPY. HOW ABOUT CLEARANCE.
21:20:05		SKY730 Yes, I say in Japanese, SKY730 well...I call you later, well... stand by please.
21:20:13		GND Roger, then will hold flight plan and clearance.
21:20:20		SKY730 That's fine, SKY730.