

AI2011-6

**AIRCRAFT SERIOUS INCIDENT
INVESTIGATION REPORT**

QATAR AIRWAYS

A 7 B A E

September 30, 2011

Japan Transport Safety Board

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

Norihiro Goto
Chairman,
Japan Transport Safety Board

Note:

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

AIRCRAFT SERIOUS INCIDENT INVESTIGATION REPORT

**QATAR AIRWAYS
BOEING 777-300, A7BAE
ABOUT AN ALTITUDE OF 1,000 FT, 3.8 NM NORTHEAST OF
RUNWAY 24R, KANSAI INTERNATIONAL AIRPORT, JAPAN
AT ABOUT 21:55 JST, AUGUST 30, 2010**

September 16, 2011

Adopted by the Japan Transport Safety Board

Chairman	Norihiro Goto
Member	Shinsuke Endoh
Member	Toshiyuki Ishikawa
Member	Sadao Tamura
Member	Yuki Shuto
Member	Toshiaki Shinagawa

1. PROCESS AND PROGRESS OF THE AIRCRAFT SERIOUS INCIDENT INVESTIGATION

1.1 Summary of the Serious Incident

The occurrence covered by this report falls under the category of “Attempted landing on a closed runway” as stipulated in Clause 2, Article 166-4 of the Civil Aeronautics Regulations of Japan, and is classified as a serious incident.

On August 30 (Monday), 2010, a Boeing 777-300, registered A7BAE, operated by Qatar Airways, took off from Narita International Airport at 20:59 Japan Standard Time (JST: UTC+ 9hr, unless otherwise stated all times are indicated in JST using a 24-hour clock). At about 21:55, when the aircraft was approaching Kansai International Airport, it attempted to land on runway 24R, which was closed. Thereafter, the aircraft made a go-around and touched down on runway 24L at 22:07.

There were 124 people on board, including the Captain, 16 crewmembers, and 107 passengers but no one was injured.

1.2 Outline of the Serious Incident Investigation

1.2.1 Investigation Organization

On August 31, 2010, the Japan Transport Safety Board designated an investigator-in-charge and two other investigators to investigate this serious incident.

1.2.2 Representative from Foreign Authorities

This serious incident was notified to the United States of America, as the State of Design and Manufacture of the aircraft involved in the serious incident, and Qatar, as the State of Registry and the Operator of the aircraft, but they did not designate their accredited representatives.

1.2.3 Implementation of the Investigation

August 31 and September 1, 2010: Aircraft examination and interviews

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

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

1.2.5 Comments from the Related States

Comments on the draft report were invited from the related States.

2. FACTUAL INFORMATION

2.1 History of the Flight

On August 30, 2010, the Boeing 777-300, registered A7BAE (hereinafter referred to as “the Aircraft”), operated as the regular flight 803 by Qatar Airways (hereinafter referred to as “the Company”), took off from Narita International Airport for Kansai International Airport (hereinafter referred to “the Airport”).

The flight plan was outlined below:

Flight rules:	Instrument flight rules (IFR)
Departure aerodrome:	Narita International Airport
Estimated off-block time:	20:50
Cruising speed:	501 kt
Cruising altitude:	FL320
Route:	(Omitted)–DINAH (Position reporting point)–GBE (Gobo VOR/DME)–EDDIE (Position reporting point)
Destination aerodrome:	Kansai International Airport
Total estimated elapsed time:	47 minutes
Fuel load expressed in endurance:	2 h and 8 min
Persons on board:	124

At the time of the serious incident, the Captain sat in the left seat as PM (pilot monitoring: pilot mainly in charge of duties other than flying) and the First Officer sat in the right seat as PF (pilot flying: pilot mainly in charge of flying).

The flight history of the Aircraft up to the time of the serious incident is outlined below according to the air traffic control communications records, records of the digital flight data recorder (hereinafter referred to as “the DFDR”), records of the cockpit voice recorder (hereinafter referred to as “the CVR”), records of light on/off operation of approach related lighting systems, as well as the statements of the flight crewmembers, air traffic controllers (hereinafter referred to as “controller(s)”), and a member of staff in charge of operations and maintenance of airport lighting systems (hereinafter referred to as “lighting staff”) of Kansai International Airport Co., Ltd. (KIAC).

2.1.1 History of the Flight Based on Air Traffic Control Communications Records, DFDR Records, CVR Records, and Records of Light On/Off Operation of Approach Related Lighting Systems.

Around 21:33: The flight crewmembers started landing briefing. At that point, the flight planned to carry out an ILS (Instrument Landing System) approach for runway 24L (hereinafter referred to as “24L”).

- 21:48:22: The Radar Approach Control Facility of Kansai Airport (hereinafter referred to as “the Approach”) informed the Aircraft that visual approach was available and requested it to express its intention.
- 21:48:39: The Aircraft responded to the Approach that it would accept the visual approach.
- 21:49:34: The Approach instructed the Aircraft to fly heading of 100° and started to vector the Aircraft to downwind leg, and the Aircraft followed the instructions.
- 21:50:25: The Aircraft reported to the Approach that the runway was in sight.
- 21:50:34: The Approach cleared the Aircraft for a visual approach and instructed the Aircraft to contact the Aerodrome Control Tower of Kansai Airport (hereinafter referred to as “the Tower”), and the Aircraft read back the instructions.
- 21:51:19: The First Officer suggested a traffic pattern would be width of 4 to 5 nm from the runway to the Captain, and the Captain accepted the suggestion.
- 21:52:20: The Aircraft reported to the Tower that it had entered the downwind leg.
- 21:52:37: The precision approach lighting system (hereinafter referred to as “PALS”¹), the sequenced flashing lights (hereinafter referred to as “SFL”²), and the precision approach path indicator (hereinafter referred to as “PAPI”³) of runway 24R (hereinafter referred to as “24R”) were turned on.
- 21:53:11: The SFL of 24R was turned off.
- 21:53:35: The autopilot of the Aircraft was set to vertical speed (V/S) mode with a descent rate of 200 ft/min (hereinafter referred to as “fpm”) selected.
- 21:53:46: A descent rate of 500 fpm was selected for the Aircraft.
- 21:53:55: A descent rate of 700 fpm was selected for the Aircraft.
- 21:54:22: A descent rate of 900 fpm was selected for the Aircraft.
- 21:54:33: The Captain said, "Three reds, one white."
- 21:54:35: A descent rate of 500 fpm was selected for the Aircraft.
- 21:54:42: The Tower cleared the Aircraft to land on 24L and the Aircraft read back the clearance to land on 24L.
- 21:54:50: The autopilot of the Aircraft was disconnected manually.
- 21:55:08: The First Officer as PF instructed the Captain to perform landing checklist, and the Captain performed it.
- 21:55:11: The Tower pointed out that the Aircraft was approaching 24R, and asked whether it was possible to make a left turn to approach 24L.

¹ Precision Approach Lighting System (PALS): A lighting system installed on the approach end of an airport runway that accepts precision approaches for instrument landing.

² Sequenced Flashing Lights (SFL): A series of flashing lights that flash twice a second in sequence in the approach direction of an airport runway to the runway end.

³ Precision Approach Path Indicator (PAPI): A visual aid that provides guidance information to help a pilot acquire and maintain the correct approach (with red, red, white, and white lights in a row) to an aerodrome or an airport. It is generally located on one or both sides of the runway.

The Aircraft reported to the Tower that the Aircraft would make a go-around because the Aircraft was unable to approach 24L.

21:56:14: The PALS and PAPI on 24R were turned off.

2.1.2 Statements of Flight Crewmembers

(1) Captain

The Captain learned from the Automatic Terminal Information Service (hereinafter referred to as “ATIS”⁴) that the runway to be used was 24L and that 24R was closed. Just before LILAC (position reporting point), as the Aircraft was heading for MAYAH (position reporting point) from Awaji VOR/DME (AJE), the Approach advised him that a visual approach was available and asked his intention. The First Officer told him that the first officer could accept if he trusted the First Officer and he answered that he could accept visual approach.

The Approach gave him instructions about magnetic heading. The navigation display (hereinafter referred to as “ND”⁵) indicated that the Aircraft was 10 nm away from the runway. The Aircraft approached the Airport on the instructed magnetic heading and entered the downwind leg at a width of approximately 5 nm from the runway. A visual approach to the Airport is very difficult at night due to a lack of light in the vicinity. Therefore, he asked the First Officer whether the First Officer would be all right. The First Officer told him OK. He could only see a little light outside on the First Officer’s side. When the Aircraft entered the base turn from the downwind leg, the First Officer instructed him Flaps 30. Since it was still early, he decided to set the landing flaps at the turning final. He was performing the final checks mainly by looking the instruments, thinking about the go-around procedure for the visual approach and so on. He had to do many things in a short period of time. The ND was set to 24L. The First Officer was making a turn with the autopilot turned off because overshooting resulted during the final approach. By this point, the flaps were set to landing position. The First Officer and he saw the PAPI for the final approach and thought that the runway that the Aircraft was approaching was 24L.

When the First Officer aligned the Aircraft onto the final approach course, they saw the

⁴ Automatic Terminal Information Service (ATIS): A continuous broadcast of airport area information necessary to aircraft taking off or landing, such as weather information including the temperature, wind direction, wind velocity, and visibility of the area, which runways are active, available approaches, available navigational aid facilities, and any other information required by the pilots.

⁵ Navigation Display (ND): A cockpit display showing images created by a symbol generator according to navigational data stored in the flight management system (FMS) on airports, runways, navigational aid facilities (e.g., VHF omnidirectional radio range (VOR) systems and distance measuring equipment (DME)), airways, and flight routes. The ND also displays the wind direction and wind velocity in and around the airport where the aircraft is approaching or departing, the distance to the next destination, and expected arrival time at the destination. The ND also allows the overlapped display of a meteorological radar image.

ILS settings preselected for the ND, and noticed from the ILS reading that they were approaching the wrong runway. They had already realized that they were on the wrong approach before the Tower pointed it out to them. At an altitude of approximately 800 ft and a distance of approximately 3 nm to the final approach course, the Tower asked them whether they could get to 24L. However, they were unable to land on 24L, and so they made a go-around. Then, they had landed by a visual approach again in accordance with the instructions of the magnetic heading and altitude.

He was perfectly familiar with the Airport, but he had never previously made a visual approach at night, and he was not able to give proper instructions to the First Officer. When he looked outside after the First Officer turned off the Autopilot, it was dark, and there were no visual references to the surface landmarks.

He did not see the two runways and the approach lights on 24L in the final approach course. He does not think that First Officer had any experience of making a visual approach to the Airport at night either.

(2) First Officer

The First Officer had approached the Airport in the afternoon of the previous day for the first time as PM. He was unfamiliar with the Airport, and so he was grateful for the early descent instructions. When the Aircraft was flying for MAYAH for ILS approach to 24L, at an altitude of approximately 4,000 ft and a distance of 10 to 15 nm to MAYAH, the Approach asked them that a visual approach was available, and requested to express their intentions. After talking with the Captain, they decided to accept the suggestion. He was the PF, and he saw the runway on his side. The Approach gave them instruction to proceed to the downwind leg, and he reconfirmed their intention to make a visual approach.

A normal downwind leg has a width of 2.5 nm, but he set it to 4 to 5 nm because he wanted to approach with a margin secured.

He reduced speed after entering the downwind leg, and set the flaps to 5 abeam the touchdown point. Then he extended landing gears, set the flaps to 20, and began the base turn. Because of the margin on the downwind width, when the Aircraft had turned 90°, he returned it to the horizontal. After checking the ND, he started a right turn. At that time, the Captain was communicating with a controller.

While the Aircraft was turning right, the outside was dark, which confused him, but he saw the runway and the PAPI. At that point, the Aircraft seemed to be overshooting so he turned off the autopilot before starting the approach. When the Aircraft was stabilized, he noticed that the ILS reading on the ND was abnormal. Almost simultaneously, the controller pointed out them that the Aircraft was approaching the wrong runway. Because they had made the base turn 5 nm from the runway, approximately 3 nm of the final

approach remained. However, it would have been difficult to touch down on 24L, and so he made a go-around.

From the NOTAM⁶ and ATIS, I knew that 24R was closed.

2.1.3 Statements of Controllers

(1) The Tower

The Aircraft was on a visual approach to 24L. The preceding aircraft was approximately 3 nm to the final approach course. Therefore, the Tower instructed the Aircraft to continue approach. The preceding aircraft landed and two departure aircraft taxied out. He was sure that the first departure aircraft would take off safely in good time, and issued a departure clearance to the departure aircraft. At the same time when the departure aircraft took off, he cleared the Aircraft, was turning the base leg to land. After confirming that the departure aircraft had lifted off, he checked the position of the Aircraft, and saw that it was clearly approaching to 24R not 24L. Therefore, he asked the Aircraft if they proceeded to 24R and they could leave turn runway 24L approach. The Aircraft answered him Yes, but then, immediately afterwards, unable, they went around. He instructed the Aircraft to fly heading 240, maintain 2,000. The departure aircraft was still at approximately 1,800 to 1,900 ft. He provided the visual separation between them, and when departure aircraft was above 3,000 ft, he had the Aircraft contact the Departure Control.

It is for the Approach to decide whether ILS approach or visual approach. It is his understanding that if a runway is closed, SFL, PALS, and PAPI should be off, but it is not important whether the runway edge lights are off or not. Later, he heard that the PALS (24L) were turned on.

(2) Coordinator

Regarding the operation of airport lighting systems during maintenance work, based on a condition that the approach related lighting systems on closed runway are turned off, controllers usually allow lighting staff to omit prior notification on lighting-up to them. In such case, they leave the timing of lighting-up to the discretion of the lighting staff. However, the lighting staff occasionally turns on the approach lights during inspections, etc. Therefore, controllers pay attention to the movements of all aircraft to ensure that they do not approach the wrong runway. Controllers on site were informed that lighting staff was allowed to omit the prior notification stipulated in an agreement (to be described in 2.9.6).

⁶ Notice to Airman (NOTAM): Information issued for safety air navigation by the Civil Aviation Bureau to parties concerned with aviation. NOTAMs includes temporal ones and emergency ones concerning airports, air navigation aid facilities, changes in operation-related job systems, and dangers in the sky such as military exercises.

2.1.4 Statements of Lighting Staff

The Lighting Staffs conduct light checks (inspections of lighting systems) on 06R/24L and 06L/24R on a daily basis regardless of the runways are closed or open. Usually, they check 06L/24R and 06R/24L between 21:00 and 00:00 and between 00:00 to 03:00, respectively. They notify to the Tower on the operation of the lights in each direction before turning the lights on and off. Similarly, they notify to the Tower on the operation of the lights before turning the lights on and off when they conduct maintenance or inspection work. There is a hotline (a direct telephone line connecting the Tower and the Power Distribution Monitoring Room) independently on the side of the control panel on each runway.

They started the light checks of the day with the 06L side and they moved to the 24R side. They turned on the PALS, SFL, and PAPI on 24R at 21:52. They turned off the SFL at 21:54 and the PAPI and PALS at 21:56. All the approach related lighting systems on 24R were off in all periods other than the above-mentioned ones.

At the time, the rights to control all the lights on 06L/24R had been transferred from the Tower to the Power Distribution Monitoring Room. Even when they have the control rights, the rules require that they get approval from the Tower over the hotline before turning on approach lighting systems or the like. On that day, however, at the time they received the control rights, the Tower said that they were allowed to omit the prior notification of turning on the lights. This is not to say that the omission of the prior notification has become usual. In some cases, they will contact the Tower immediately before turning on the lights to obtain permission.

The onsite workers said that they were completely unaware that the Aircraft made the go-around. The runway edge lights are useful for preventing accidents during night work. Therefore, the lights are always turned on regardless of whether the runways are open or closed. Furthermore, the marine lights (blinking lights) on the piers for the approach lighting systems are always on for the safe navigation of ships regardless of whether the runways are open or closed.

There is an agreement between the Kansai International Airport Office of the Osaka Civil Aviation Bureau (hereinafter referred to as "Kansai Airport Office") and KIAC. The agreement stipulates that the approach related lights are turned off during runway is closed and the lights are turned on with approval from the Tower if necessary for inspection purposes.

This serious incident occurred at an altitude of approximately 1,000 ft, approximately 3.8 nm northeast of the approach end of 24R at Kansai International Airport at around 21:55.

(See Figure 1—Estimated Flight Route-1; Figure 2—Estimated Flight Route-2; Figure 3—Lighting Arrangement; Figure 4—Three Angle of BOEING 777-300; Figure 5—DFDR Records; Photo 1—Serous Incident Aircraft; Attachment: ATC , CVR and DFDR Records)

2.2 Damage to the Aircraft

There was no damage to the Aircraft.

2.3 Information on Pilots and Crewmembers Pilot

2.3.1 Personnel Information

(1) Captain, Male, Age 47

Airline transport pilot certificate(Airplane)	April 16, 2009
Type rating for BOEING 777	
Class 1 aviation medical certificate	
Term of validity	May 31, 2011
Total flight time	11,000 h 00 min
Flight time in the last 30 days	82 h 00 min
Total flight time on the type of aircraft	910 h 00 min
Flight time in the last 30 days	82 h 00 min

(2) First Officer, Male, Age 30

Airline transport pilot certificate(Airplane)	August 14, 2010
Type rating for BOEING 777	
Class 1 aviation medical certificate	
Term of validity	February 28, 2011
Total flight time	4,247 h 17 min
Flight time in the last 30 days	54 h 42 min
Total flight time on the type of aircraft	172 h 12 min
Flight time in the last 30 days	54 h 42 min

2.3.2 Captain and First Officer's Experience in Landing to the Airport

- (1) The Captain landed at the Airport six times between 2006 and 2008. In 2010, he landed at the Airport in the afternoon of the day before the serious incident as PF.
- (2) The First Officer landed at the Airport once in the afternoon of the day before of the serious incident as PM .

2.4 Aircraft Information

Type BOEING 777-300

Serial number	36104
Date of manufacture	February 23, 2009
Certificate of airworthiness	195
Term of validity	Valid until the aviation authority invalidates the certificate
Total flight time	7,593 h 07 min
Flight time since last periodical check (C check on August 1, 2010)	464 h 37 min

2.5 Meteorological Information

Aeronautical weather observations for the Airport around the time of the serious incident were as follows:

21:30	Wind direction 160°; Wind velocity 6 kt; Visibility 40 km Cloud Amount FEW (1/8 to 2/8); Type: Cumulus; Cloud base: 1,000 ft Amount BKN (5/8 to 7/8); Type: Unknown; Cloud base: Unknown Temperature: 29°C; Dew point: 24°C Altimeter setting (QNH) 29.90 inHg
22:00	Wind direction 180°; Wind velocity 8 kt; Visibility 40 km Cloud Amount FEW (1/8 to 2/8); Type: Cumulus; Cloud base: 1,000 ft Cloud BKN (5/8 to 7/8); Type: Unknown; Cloud base: Unknown Temperature: 29°C; Dew point: 24°C Altimeter setting (QNH): 29.90 inHg

2.6 Information on Communication

At the time of this serious incident, the communication of the Aircraft communicated with the Approach and Tower normally. (see Attachment ATC , CVR and DFDR Records).

2.7 Information on the Airport and Ground Facilities

2.7.1 Overview of the Airport

The Airport has two runways, i.e., 06R/24L (runway A) with a length of 3,500 m and a width of 60 m on the east side of the Tower and terminal building and 06L/24R (runway B) with a length of 4,000 m and a width of 60 m located 2,303 m away to the west side across the Tower and Terminal building. When the serious incident occurred, runway B was closed for maintenance.

2.7.2 Aerodrome Lighting Conditions

(1) 24L side

The PALS, SFL, PAPI, runway touchdown zone lights, runway edge lights, and runway

centerline lights were lit normally.

(2) 24R side

The SFL was lit between 21:52 and 21:53 and the PALS and PAPI were lit between 21:52 and 21:56.

The runway edge lights and runway touchdown zone lights were turned on in order to secure safety for the maintenance work but the runway centerline lights were turned off.

2.8 Information on DFDR and DVR

The Aircraft was equipped with U.S. Honeywell-made DFDR (parts number 980-4700-042) and CVR (parts number 980-6022-001)

Records at the time of the serious incident were retained in the DFDR and CVR. The time was determined by collating the recorded VHF transmission keying signals on the DFDR and the time log of ATC communications.

2.9 Additional Information

2.9.1 Information on Navigation Equipment

According to the DFDR records, an ILS frequency of 24L was selected at the time of the serious incident.

2.9.2 ATC (Air Traffic Control) Standard Procedure

ATC Standard procedure IV, Air Traffic Service Manual III of the Civil Aviation Bureau of the Ministry of Land, Infrastructure, Transport and Tourism (hereinafter referred to as “the Civil Aviation Bureau”) specify the following rules on visual approaches.

(Excerpt)

8-1 Visual Approach (Control System Standards IV-8-3)

Application

- (1) *A radar approach control facility may apply aircraft to make a visual approach under the following conditions if the height obtained by adding the ceiling and field elevation is 500 ft or more higher than the minimum vectoring altitude and the ground visibility is 5 km or longer.*

Issuance Timing of Approach Permit

(Omitted)

- (3) *A radar approach control facility shall apply arriving aircraft to make a visual approach after notifying the aircraft with vector instructions to the traffic pattern of the landing runway and descend to the minimum vectoring altitude under the following conditions.*

** Cleared for visual approach runway (number).*

2.9.3 Description of Aeronautical Information Publication

ENR1.6-6 1.9 Visual Approach in the Aeronautical Information Publication (AIP) issued by the Civil Aviation Bureau describes as follows.

(Excerpt)

- 1.9.1 A visual approach is an approach by an IFR aircraft under control of the radar approach control facility wherein the aircraft deviating the prescribed instrument approach procedure, and proceed to the destination airport by visual reference to the surface.*
- 1.9.2 Visual approach will be approved by the radar approach control facility as one method to expedite the traffic flow when the arriving aircraft has the destination airport or notified preceding aircraft in sight, can maintain the visual reference to the terrain, can fly maintaining VMC (Visual Meteorological Condition) after the approach clearance was issued. (Omitted)*

2.9.4 Company's Operation Manual

- (1) Approach Procedure

The manual describes the following approach procedure.

777 Flight Crew Operation Manual

Approach Procedure

The Approach Procedure is normally started at transition level.

Complete the Approach Procedure before:

- The initial approach fix, or*
- The start of radar vectors to the final approach course, or*
- The start of a visual approach*

When Flaps 1 is selected, PM will cycle SEAT BELT sign, to notify cabin crew/supernumeraries that landing is imminent.

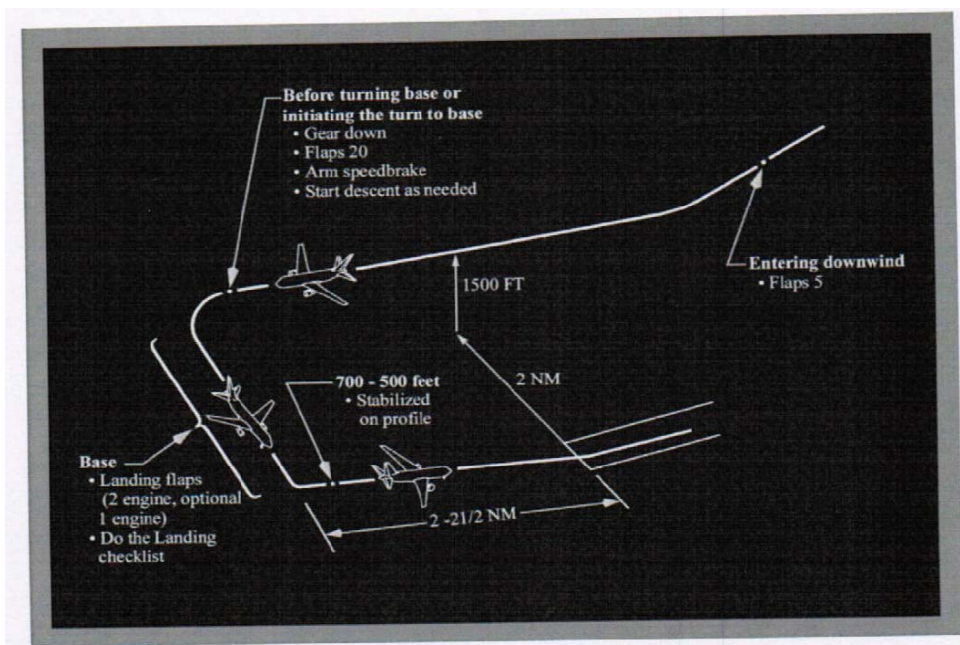
Pilot Flying	Pilot Monitoring
	At or above 10,000 feet AAL. Set the LANDING, TAXI, RUNWAY TURNOFF light switches to ON (if applicable)
At transition level, set and crosscheck the altimeters.	
Update changes to the arrival and approach procedures as needed, Update changes to the RNP as needed.	
Update the approach briefing as needed.	
Call "APPROACH CHECKLIST."	Do the APPROACH checklist.

(2) Traffic Pattern

The manual describes standard traffic pattern as follows.

777 Flight Crew Operations Manual

Visual Traffic Pattern



(3) Approach Briefing

The manual describing the approach briefing is as follows:

777 Flight Crew Operations Manual

The descent and approach briefing should contain, but not be limited to, the following list of items which should be reviewed, where practical and appropriate for the arrival conditions.

- *Aircraft Status -Review the aircraft STATUS-*
- *ATIS -Review and discuss runway in use (type of approach)-*
- *NOTAMs -Review and discuss enroute and terminal NOTAMs.-*
- *Approach -Review and discuss the intended use of automation for the approach type.*

Review and discuss runway length, width and slope, approach and runway lighting, any other expected visual references, and intended runway exit.-

(4) Information on the Airport

The Company provides the flight crewmembers with the following information.

(Excerpt)

Operation Manual PART C Route and Aerodrome Instructions and Information (Airfield Briefings Category A airfields)

6.4.46 OSAKA (RJBB)-JAPAN

6.4.46.2 General Warning, Cautions and Notes

Caution: Visibility is often poor in haze/smog.

Caution: Low level windshear and turbulence in strong winds.

Caution: Pay particular attention that you position for the correct RWY if flying a visual approach to RWY 24 side.

2.9.5 Instructions of the Civil Aviation Bureau on Lighting Systems on Closed Runway

Following the incident of allowing an aircraft to land on a closed runway at Tokyo International Airport on April 29, 2005, the Director-General of the Engineering Department of the Civil Aviation Bureau gave the following instructions on the extinction of the lighting systems on closed runways on May 13, 2005.

(Excerpt)

2. Complete Extinction of Lights on Closed Runways

At the time of closing a runway, the air traffic controller shall turn off the precision approach path indicator and approach lighting system of the runway. The aerodrome lighting staff in charge shall communicate with the air traffic controller and confirm the extinction of the lights.

2.9.6 Agreement on Lighting Systems between Kansai Airport Office and KIAC

Following the instructions described in 2.9.5, the Kansai Airport Office and KIAC reached an agreement on May 19, 2005 concerning the partial extinction of airport lighting systems of Kansai International Airport at the time of runway closure (hereinafter referred to as “the Agreement”). When the Agreement was reached, the Airport was operating with a single runway. (Excerpt)

1. The air traffic controller shall turn off the precision approach path indicator and approach lighting system (including the flashing lights) on the runway, and notify the aerodrome lighting staff of the extinction of the lights.

2. The aerodrome lighting staff shall inquire to the air traffic controller about the closure of the runway if the extinction of the lights specified in 1. cannot be confirmed at the

closing time of the runway.

- 3. The aerodrome lighting staff shall request the air traffic controller to turn on the lights specified in 1. only if it is necessary for the purpose of work on the runway. If the aerodrome lighting staff has the control rights of the airway lighting console, the staff shall notify the air traffic controller before turning on the lights.*

3. ANALYSIS

3.1 Qualifications of Flight Crew

Both Captain and First Officer held valid airman competence certificates and valid aviation medical certificates.

3.2 Airworthiness Certificate

The Aircraft had a valid airworthiness certificate and had been maintained and inspected as prescribed.

3.3 Relation to Meteorological Conditions

It is considered highly probable that the meteorological conditions at the time of the accident had no relation to the occurrence of the serious incident.

3.4 Visual Approach Situations

3.4.1 Piloting Analysis

- (1) Based on the statements in 2.1.2, it is considered highly probable that the Captain and First Officer were aware that 24R was closed.
- (2) As described in 2.9.4 (2), standard traffic pattern has a width of 2 nm. Based on the statements in 2.1.2 (2), it is considered probable that the First Officer tried to have leeway to approach and decided to take a 4 to 5 nm wide traffic pattern. However, it is considered probable that the First Officer had to navigate while paying much greater attention than usual to timing corrections to descending and flap control because the traffic pattern was wider than usual.
- (3) According to the DFDR records, the autopilot was switched to V/S mode when the Aircraft started the base turn (21:53:35). Then, the Aircraft started descending. It is considered probable that the First Officer tried to descent slowly at the rate of 200 fpm because the runway was invisible at that point and there was no reference object visible on the sea. It is considered probable that the First Officer then increased the rate of descent to 500, 700, and 900 fpm gradually in order to adjust the Aircraft to the appropriate approach angle of the runway as it became visible. As described in 2.1.1, the Captain uttered, "Three reds one white." It is considered highly probable that the PAPI lamps were lit red, red, red, and white (i.e., the approach altitude was slightly low) then, when the First Officer judged from the PAPI that the rate of descent was slightly high, that the First Officer selected the rate to 500 fpm from 900 fpm.
- (4) It is considered probable that the First Officer then turned off the autopilot and entered

24R, which was closed at that time, because there was a little overshooting for the entrance to the final approach course of the runway that he assumed to be 24L.

- (5) The First Officer took the traffic pattern wider than the standard width specified in 2.9.4 (2) in order to have leeway to fly. It is considered probable that this was not the direct cause of the false recognition of the runway. However, the traffic pattern was made above the sea, the visual approach was made at night with limited visual reference objects visible, and the downwind leg was close to the standard traffic pattern for 24R. Therefore, it is considered probable that, after the runway once became invisible in the downwind leg, when the Aircraft made the base turn, the First Officer saw a runway and a PAPI close to the position where they were normally seen, assumed it was the right runway, and entered 24R mistakenly.

3.4.2 Roles and Cooperation of Flight Crew

- (1) According to the statements in 2.1.2 (1), the Captain considered that the visual approach at night was difficult and asked the First Officer whether it would be all right and he did not agree when the First Officer instructed him “Flaps 30”. From these, it is considered somewhat likely that the Captain was distracted by the First Officer’s maneuvering which he felt unsure about, and could not play the role as PM sufficiently well, and that his checking did not function properly.
- (2) Communication gap between the Captain and First Officer is less likely on the timing of maneuvering of flap and gear, descent and so on if the traffic pattern is approximately 2 nm as described in 2.9.4 (2). It is considered somewhat likely that the wider traffic pattern taken made it difficult for the Captain and First Officer to share common perceptions.
- (3) As described in 2.9.3, a visual approach is an approach by an IFR (Instrument Flight Rules) aircraft proceeding to the destination airport by visual references to the surface. It is considered highly probable that it was not easy for the Captain or First Officer to recognize the runway (24L) located beyond the bright lights around the terminal building while the Aircraft was in the traffic pattern, and that the runway (24R) located in the front was easier to see. However, the Captain and the First Officer were aware that 24R, which is one of the two runways of the Airport, was closed as described in 3.4.1 (1). There was a good visibility. The PAPI, PALS and SFL on the 24L, where the Aircraft was supposed to touch down, were lit. Therefore, it is considered probable that the false recognition of the runway would have been avoided if the Captain and the First Officer had recognized the two runways in a wider field of vision.
- (4) According to the description in 2.1.2 (1), the Captain stated, “The ND was set to 24L.” Therefore, it is considered probable that the Captain would have noticed it earlier that the

Aircraft was approaching 24R if the Captain as PM had checked the position of the Aircraft with visual references to the surface landmarks and the display of the ND. The traffic pattern of the Airport was not set for the FMS (Flight Management System) on the Aircraft. Therefore, no autopilot guidance to 24L would have been possible even if the ILS frequency had been set to 24L.

- (5) From the above, it is considered probable that the visual recognition of the runway (24L) was insufficient because neither the Captain nor First Officer played their roles as PM and PF appropriately and they did not complement each other sufficiently.

3.4.3 Experience in Landing at the Airport

As described in 2.3.2, the Captain and the First Officer landed at the Airport on the day before the serious incident as PF and PM respectively. But it was the Captain's first landing in the last two years and the First Officer as PF landed at the Airport for the first time. And it was the first visual approach to the Airport at night for both the Captain and the First Officer. It is considered probable that their landing experiences at the Airport was not sufficient. With consideration of the circumstance, it would have been desirable for them to take a standard traffic pattern or make an ILS approach as originally planned instead of the visual approach.

3.4.4 Information on the Airport

According to the Company's information on the Airport as described in 2.9.4 (4), flight crewmembers are to pay particular attention that they position for the correct runway if flying a visual approach to runway 24 side. It is considered probable that identification of the runway by the Captain and the First Officer was inadequate.

3.5 Operation of Airport Lighting Systems

- (1) As described in 2.9.6, the lighting staff shall notify controller before turning on the PALS and PAPI. According to the statements in 2.1.4, the rights to control the lighting console including the operation of the PALS and PAPI had been transferred from the Tower to the lighting staff at the time of the serious incident. Furthermore, the lighting staff was allowed to omit the prior notification to controllers. Therefore, it is considered highly probable that the lighting staff turned on the lights without notifying to controllers in advance.
- (2) As described in 2.7.2, the PALS and PAPI on 24R were turned on when the Aircraft was flying in the downwind leg in the traffic pattern. It is considered probable that the PAPI was on while there were no visual references on the sea was a contributing factor that the Captain and the First Officer to take 24R as 24L.

- (3) According to the statements in 2.1.3 (2), controllers pay attention to the movements of all aircraft when the rights to control the lights of the PALS and PAPI had been transferred to the lighting staff and that the prior notification was allowed to omit. The extinction of the approach-related lighting systems on the closed runway, however, is an effective measure to prevent wrong approaches. Therefore, the lighting systems should have been controlled in accordance with the Agreement without omitting the prior notification.
- (4) As described in 2.9.6, the Agreement was reached in 2005, when the Airport was operating with a single runway, as safety measures on the Controller side following the incident that occurred at Tokyo International Airport. In those days, since only a single runway was used, there were no landing aircraft when the runway was closed, which eliminated the necessity for prior notification. Therefore, it is considered probable that the Agreement had not always been observed by controllers who sometimes allowed omitting the prior notification. After the completion of the second runway provided for the Airport, there was a possible situation that a runway is in operation and the other one is closed and not in operation, which caused a possibility of wrong approaches. Under these situational changes, there was a need to keep controllers informed about the purpose of the Agreement thoroughly.

3.6 Controller's Response to the Incident

As described in 2.1.1, it is considered highly probable that, when the Aircraft entered the final approach course to 24R which the flight crewmembers of the Aircraft assumed to be 24L, the Tower realized early enough that the Aircraft was approaching to the closed runway and then asked clarification of which contributed to the prevention of the Aircraft landing on the closed runway.

4. PROBABLE CAUSES

It is considered highly probable that the serious incident occurred because the Captain and the First Officer assumed 24R to be 24L and approached 24R by mistake after the Aircraft received a landing clearance to 24L while the Aircraft was conducting visual approach to the Airport.

It is considered probable that the Captain and the First Officer assumed 24R to be 24L because their visual recognition of the runway was insufficient and the PALS and PAPI on 24R were turned on. It is considered probable that the traffic pattern they flew was close to the standard traffic pattern for 24R contributed to the occurrence.

5. ACTIONS TAKEN

5.1 Arrangements of Kansai Airport Office

The Kansai Airport Office took the following safety measures after the occurrence of the serious incident:

The Kansai Airport Office informed the controllers at the Airport with respect to reaffirming the extinction of the approach lighting system and the precision approach path indicator on closed runways and thoroughgoing observance of the Agreement with the lighting staff. With regard to the thoroughgoing observance of the Agreement with the Aerodrome Lighting Department, in particular, the Kansai Airport Office reminded the controllers of the Airport that prior notification of turning on the lights includes coordination when the rights to control lighting systems are transferred to the lighting staff. Kansai Airport Office also reminded the controllers that they should notify the lighting staff of the possibility and period of lighting with consideration of the traffic condition of the Airport, pay attention to the visual approaches, and reconsider the importance of external observance.

Furthermore, with regard to the turning on the lights on closed runways, in case the rights to control the lighting systems are transferred to the lighting staff, the description specified in the Agreement was revised from “notify the air traffic controller before turning on the lights” to “coordinate with the air traffic controller before turning on the lights” and “the air traffic controllers select an appropriate period” regarding controllers’ response when they are asked to allow turning on the lighting systems on closed runway.

5.2 Arrangements of Air Traffic Control Division, Air Traffic Services Department of Civil Aviation Bureau

The Air Traffic Control Division, Air Traffic Services Department of Civil Aviation Bureau instructed the Tokyo and Osaka Regional Civil Aviation Bureaus through an intra-office memo on the lighting control of closed runways that the controller in charge should determine the lighting of the precision approach path indicator and approach lighting systems on closed runways for a proper period with consideration of the air traffic condition of the airport as a result of the possible functional problems in the safety measures issued in 2005.

5.3 Arrangements of KIAC

In response to the notification on the lighting control of closed runways issued by the Osaka Regional Civil Aviation Bureau, the KIAC reminded the staff in charge reaffirming the strict sharing of aerodrome information on closed runways, the Agreement on the partial extinction of airport lighting systems on closed runways at Kansai International Airport, and a written

confirmation on the operation of airport lighting systems.

Figure 1 Estimated Flight Route -1

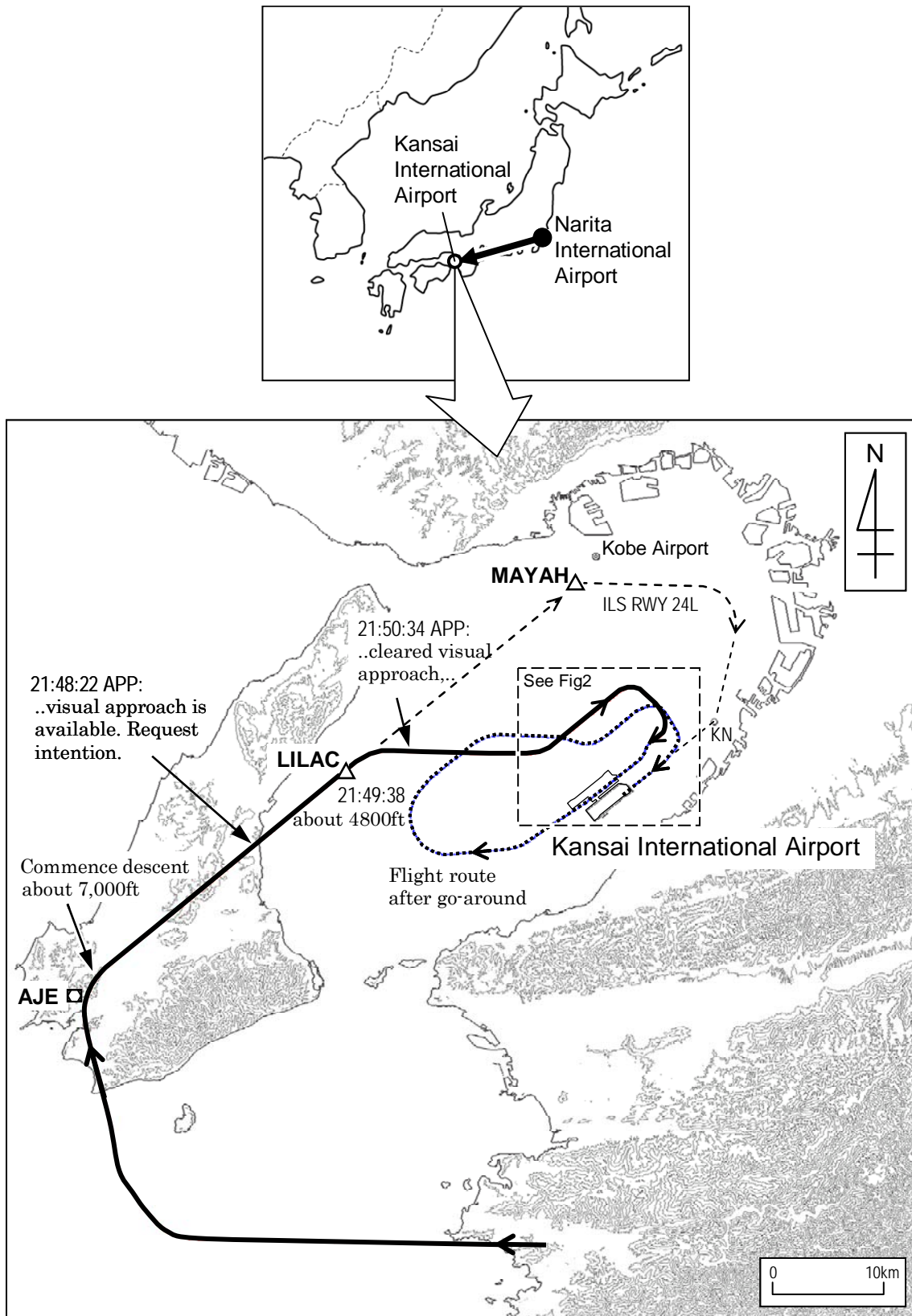


Figure 2 Estimated Flight Route -2



1:25,000 Scale Topographic Map by Geographical Survey Institute

Figure 3 Lighting Arrangements

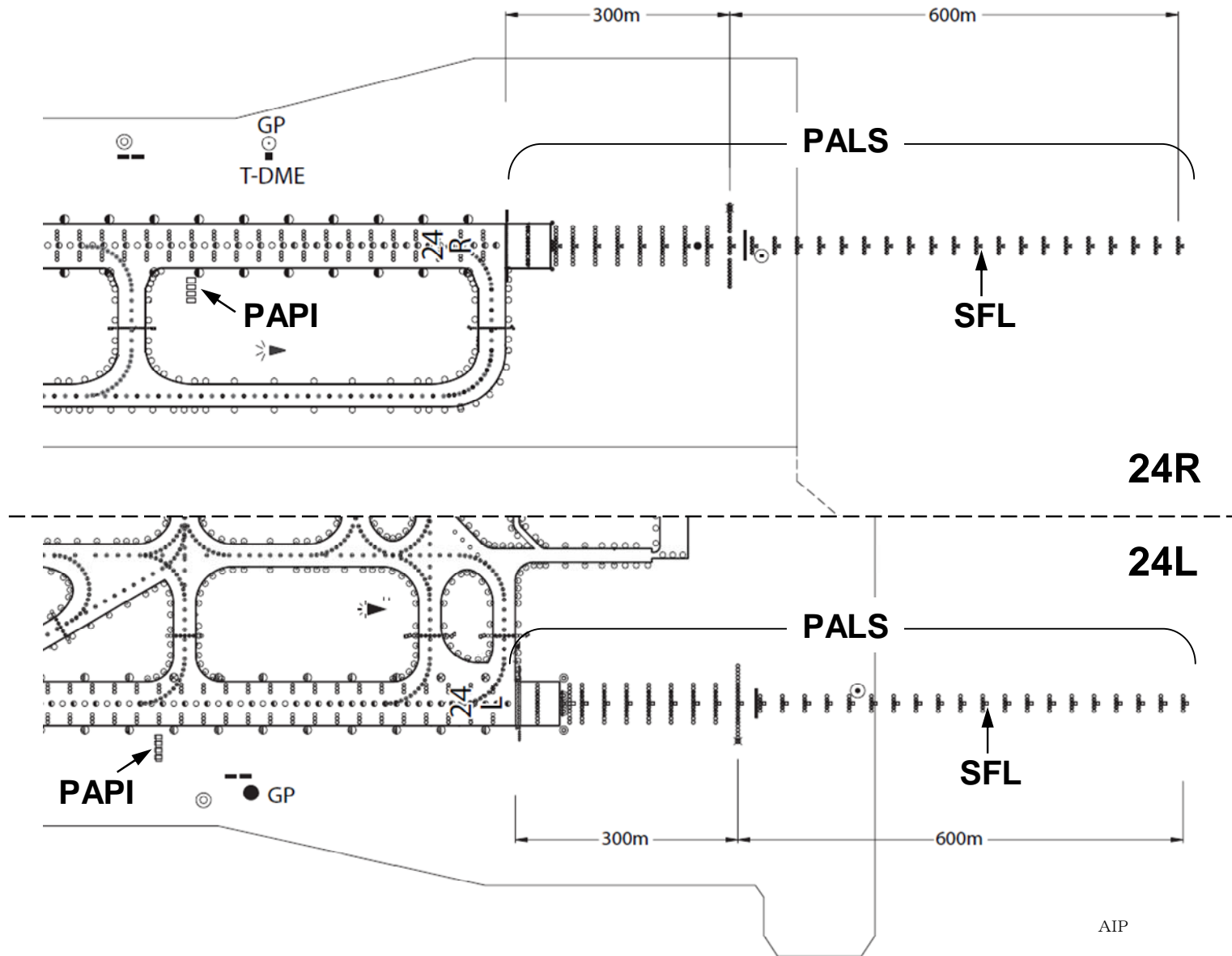


Figure 4 Three Angle View of Boeing 777-300

Unit : m

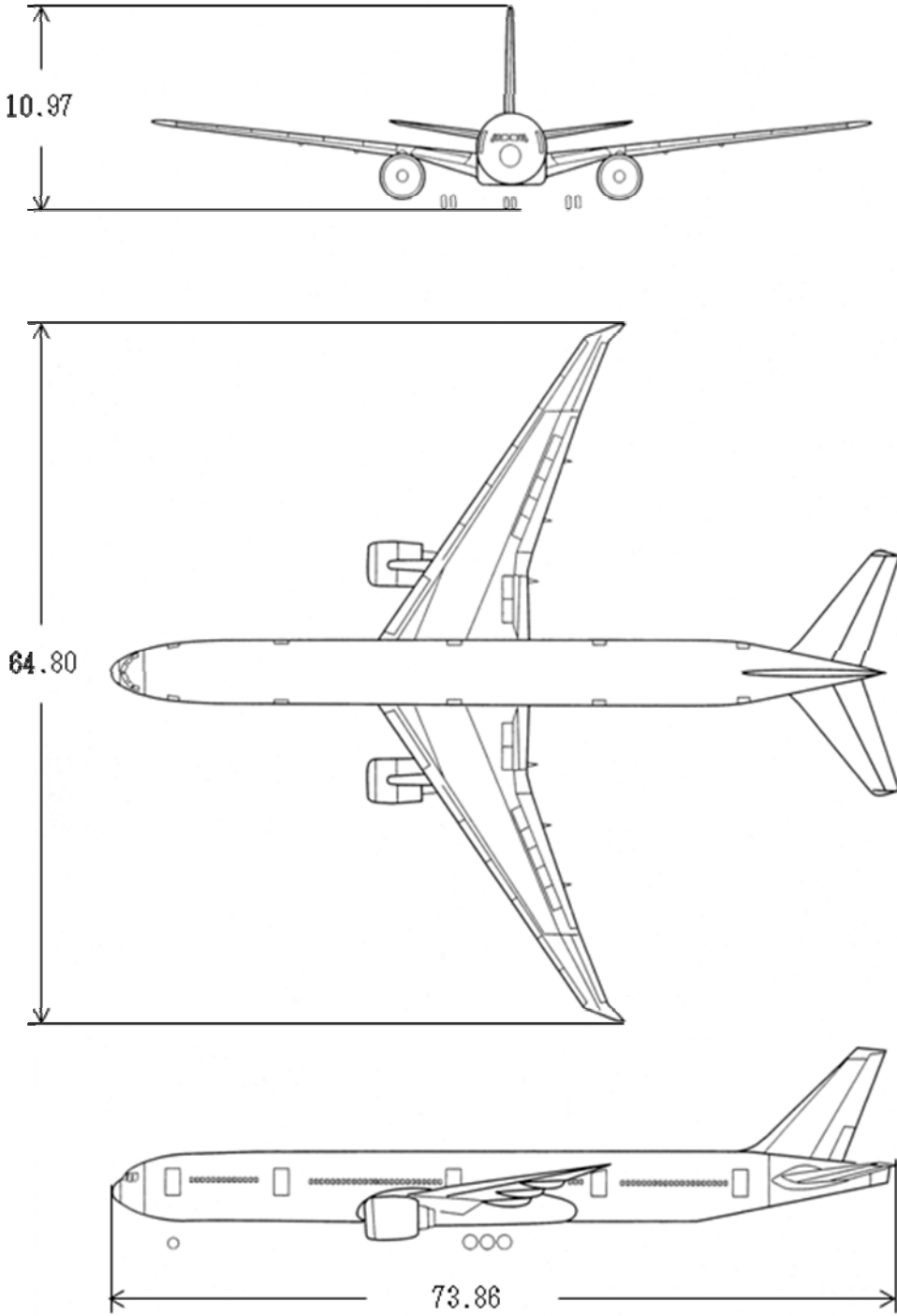


Figure 5 DFDR Records

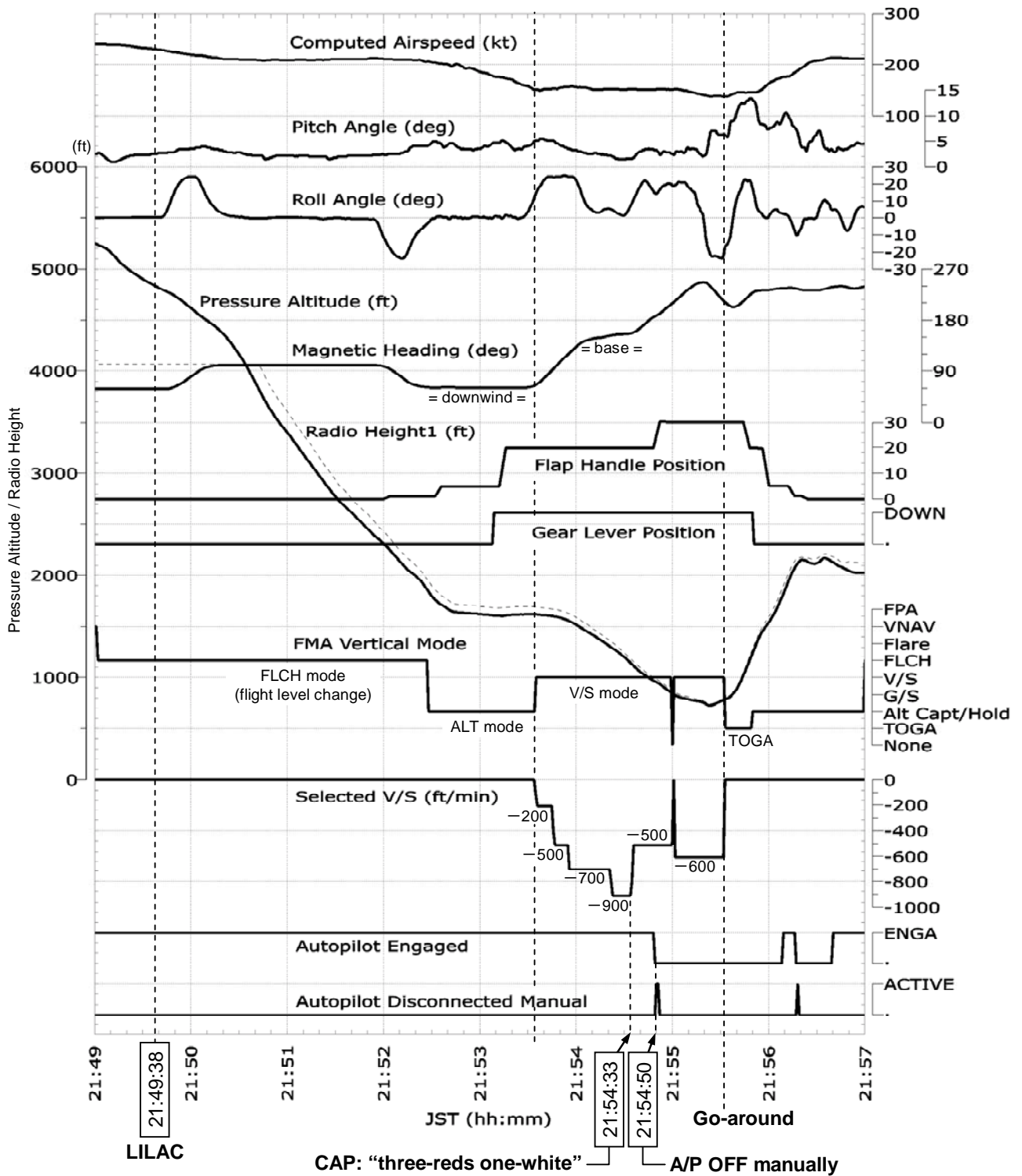


Photo 1 Serious Incident Aircraft



Attachment

ATC , CVR and DFDR Records

JST	Origin	Contents
		From AJE to LILAC in decending
21:48:22	APP	Qatari-803, visual approach is available. Request intention.
21:48:27	CAP	You do..you accept all you do..
21:48:29	F/O	I can accept that if you --- trust me ---
21:48:34	APP2	Qatari-803, visual approach runway 24L is available. Request intention.
21:48:39	QR803	Ah, we can accept visual approach, Qatari-803.
21:48:44	APP	Qatari-803, descend and maintain three-thousand. Expect visual approach runway 24L.
21:48:50	QR803	Descend three-thousand, expect approach 24L, Qatari-803.
21:49:34	APP	Qatari-803, turn..fly heading..one-zero-zero, vector to right downwind.
21:49:41	QR803	Fly heading one-hundred, vector for right downwind, Qatari-803.
21:50:15	APP	Qatari-803, No.1 traffic 12 o'clock..13miles, Boeing 737, 3 miles on final runway 24L. Report traffic insight.
21:50:25	QR803	We have the traffic and runway insight, we call you established in..proper downwind for runway 24L, Qatari-803.
21:50:34	APP	Qatari-803, cleared visual approach, runway 24L, follow the traffic, contact Kansai Tower 118 decimal 2.
21:50:41	QR803	Cleared for visual approach 24L, Tower 1182, good night. Thank you, ma'am.
21:50:47	APP	Thanks.
21:50:53	QR803	Tower, good evening, Qatari-803, ah..on heading one-hundred, establish on the right downwind for runway 24..24L.
21:51:05	TWR	Qatari-803, Kansai Tower, report right downwind.
21:51:08	QR803	Call you right downwind 24L, Qatari-803.
21:51:15	F/O	Let me get about 5 miles of turn --- downwind heading --- would be nice 2 and half or 3 miles of downwind.
21:51:19	CAP	Yeah, yeah. 5 you start to --- 5 or 4. It's better than..OK, so that we're..
21:51:58		Twenty-five hundred. (Automatic Altitude Callout)
21:52:20	QR803	We established on the right downwind, runway 24L, Qatari-803.
21:52:26	TWR	Qatari-803, roger. Report turnig base.
21:52:30	QR803	Report turning base, Qatari-803.
21:53:38	F/O	Flaps 30, please.
21:53:39	CAP	Speed check, we leave them for the last turn, it's better be..
21:53:43	F/O	OK. You can leave --- the short while ---..
21:53:44	CAP	We leave them for.. just before.. before the last turn, OK?
21:53:52	QR803	Qatari-803 is on right base for ruway 24L.
21:53:58	TWR	Qatari-803, roger. Continue approach. Traffic now departing.
21:54:02	QR803	Continue approach, Qatari-803.

21:54:33	CAP	---.. OK.. Do you have two and halves? Track, ..you have --- three reds one white.
21:54:42	TWR	Qatari-803, Airbus 320 rolling. Runway 24L. Cleared to land, wind 190 at 10.
21:54:48	QR803	Cleared to land, .. 24L, Qatari-803.
21:54:50		One thousand. (Automatic Altitude Callout)
21:54:50		Sound (Autopilot off)
21:54:53	F/O	Flaps 30, please.
21:54:54	CAP	So, you have the flaps.
21:54:55	F/O	Sorry, autopilot's coming out. Just to try turn a little.
21:54:56	CAP	Yes, check that for the FDs ON --- mind, OK?
21:55:00	F/O	OK, and set --- thirty please.
21:55:02	CAP	Yes, so, yes coming. Speed brakes will arm.
21:55:08	F/O	And landing checks ready.
21:55:08	CAP	And landing checklist is.. completed.
21:55:11	TWR	Qatari-803, are you proceed 24R and can you left turn runway 24L approach?
21:55:19	QR803	Yes, 803, yes.
21:55:21	F/O	Sorry I.. check..
21:55:22	CAP	Yes, just lev..level off.
21:55:23	TWR	Qatari-803, left break runway 24-Lima.
21:55:28	QR803	803 unable. We go around.
21:55:31	F/O	Yeah.
21:55:32	TWR	Qatari-803, roger. Fly heading 240, heading 240, maintain two-thousand.
21:55:40	QR803	240 and maintain two-thousand ft, Qatari-803.
21:55:43	TWR	Affirm.
21:55:44	F/O	Go-around, flaps.. 20 please.

CAP Captain
 F/O First Officer
 APP Kansai Approach (120.25MHz)
 APP2 Kansai Approach (120.25MHz) other Controller
 TWR Kansai Tower (118.2MHz)
 QR803 Qatar Airways-803 (Captain spoke)
 Blank line Other aircraft speaking
 --- It was not clearly to hear.

Remarks *The time was corrected by the time tone using ATC records.

*CVR Records were only described related parts.