AI2013-5

AIRCRAFT SERIOUS INCIDENT

INVESTIGATION REPORT

NOEVIR AVIATION CO., LTD.
J A 3 5 B B
JAPAN AIR COMMUTER CO., LTD.
J A 8 4 9 C

December 20, 2013

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

1. NOEVIR AVIATION CO., LTD.
EUROCOPTER AS 350 B3, JA35BB

2. JAPAN AIR COMMUTER CO., LTD.
BOMBARDIER DHC-8-402, JA849C

A TAKE-OFF FROM THE ENGAGED RUNWAY BY THE OTHER AIRCRAFT
ON RUNWAY OF YAKUSHIMA AIRPORT
AT 11:18 JST, OCTOBER 31, 2012

November 22, 2013

Adopted by the Japan Transport Safety Board

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

SYINOPSIS

＜Summary of the Accident＞

At 11:18 JST on Wednesday, October 31, 2012, a Eurocopter AS 350 B3, registered JA35BB, operated by Noevir Aviation Co., Ltd. entered Runway 32 of Yakushima Airport to conduct a familiarization flight to Tanegashima Airport and took off from the said runway before a Bombardier DHC-8-402, registered JA849C, operated by Japan Air Commuter Co., Ltd., which had already landed vacated the runway.

JA35BB was boarded by a pilot, while JA849C by 38 persons (a pilot, three crew members, and 34 passengers). No one suffered injury and two aircraft had no damage.

＜Probable Causes＞

This serious incident occurred as the helicopter that entered the runway took off before the landed airplane vacate the runway.

It is probable that the helicopter pilot's assumption that the runway was clear of the airplane lead to the air-taxiing into the runway skipping the outside watch; however, resultant panicking caused by the unexpected face-to-face encounter with the airplane on the runway lead to the confused rash decision to take-off.

It is probable that the degraded ATC communication/monitoring and outside watch resulted in his assumption that the runway was clear of the airplane as his attention was overly directed to the equipment check during the apron holding.

Abbreviations used in this report are as follows:

ATC: Air Traffic Control
CVR: Cockpit Voice Recorder
DFDR: Digital Flight Data Recorder
FSC: Flight Service Center
PF: Pilot Flying
PM: Pilot Monitoring
RAG: Remote Air Ground communication facility
REP: Reporting Point
TACAN: Tactical Air Navigation System
VFR: Visual Flight Rules
VHF: Very High Frequency
VOR: Very High Frequency Omni-Directional Radio Range
VORTAC: VOR and TACAN

Unit Conversion Table
1ft: 0.3048m
1kt：1.852km/h(0.5144m/s)
1nm: 1,852m

1. PROCESS AND PROGRESS OF THE INVESTIGATION

1.1 Summary of the Serious Incident

The occurrence covered by this report falls under the category of “A take-off from the engaged runway by the other aircraft" as stipulated in Clause 1, Article 166-4 of the Ordinance for Enforcement of the Civil Aeronautics Act of Japan and is classified as an aircraft serious incident.

At 11:18 JST on Wednesday, October 31, 2012, a Eurocopter AS 350 B3, registered JA35BB, operated by Noevir Aviation Co., Ltd. entered Runway 32 of Yakushima Airport to conduct a familiarization flight to Tanegashima Airport and took off from the said runway before a Bombardier DHC-8-402, registered JA849C, operated by Japan Air Commuter Co., Ltd., which had already landed vacated the runway.

JA35BB was boarded by a pilot, while JA849C by 38 persons (a pilot, three crew members, and 34 passengers). No one suffered injury and two aircraft had no damage.

1.2 Outline of the Serious Incident Investigation

1.2.1 Investigative Organization

On October 31, 2012, the Japan Transport Safety Board (JTSB) designated an investigator-in-charge and two other investigators to investigate this serious incident.

1.2.2 Representatives from Foreign Authorities

The JTSB notified the occurrence of this serious incident to France and Canada as the States of Design and Manufacture of the aircraft involved in this serious incident. An accredited representative of France participated in the investigation, while Canada did not designate any accredited representative.

1.2.3 Implementation of the Investigation

November 1 to 3, 2012	On-site investigation and interviews
November 30, 2012	Interviews
December 11, 2012	Interviews

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

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

1.2.5 Comments from the Relevant States

Comments were invited from the relevant States.

2. FACTUAL INFORMATION

2.1 History of the Flight

On October 31, 2012, a Eurocopter AS 350 B3, registered JA35BB, operated by Noevir Aviation Co., Ltd. (hereinafter referred to as "the Company"), received an advice at Yakushima Airport to enter Runway 32 from the remote air ground communication facility (RAG[1]) (hereinafter the station in a flight service center (FSC) which operates an RAG is referred to as "the Remote") and started air-taxiing[2] to the runway for a flight from the Airport to Tanegashima Airport.

The outline of the helicopter's flight plan was as follows.

Flight rules: Visual Flight Rules (VFR)

Departure aerodrome: Yakushima Airport

Estimated off-block time: 11:15 (JST)

Cruising speed: 120kt

Cruising altitude: VFR

Route: DIRECT

Destination aerodrome: Tanegashima Airport

Total estimated elapsed time: 20 minutes

Purpose of flight: Company Flight

Fuel load expressed in endurance: 3 hours 30 minutes

In the cockpit of the helicopter, a pilot sat in the right seat.

Meanwhile, a Bombardier DHC-8-402, registered JA849C operated by Japan Air Commuter Co.,Ltd., was taxiing on the runway toward the apron after making a 180° turn at the runway end. It landed at 11:16 as a scheduled flight 3745 from Kagoshima Airport.

The outline of the airplane's flight plan was as follows.

Flight rules: Instrument Flight Rules (IFR)

Departure aerodrome: Kagoshima Airport

Estimated off-block time: 10:45 (JST)

Cruising speed: 338kt

Cruising altitude: FL140

Route: SOGIE(REP) － HKC (Kagoshima VORTAC) － AMMON(REP) －

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[1] RAG is remotely operated by the presiding FSC. FSCs are stationed at eight major airports (New Chitose, Sendai, Tokyo, Chubu, Osaka, Fukuoka, Kagoshima and Naha). Air-to-ground communication facilities are operated by the air traffic services flight information officers in order to provide operational information and alerting service in case of emergency.

[2] "Air-taxing" refers to the movement of a helicopter above the surface of an aerodrome, normally at in-ground-effect altitude and at a ground speed normally less than 20kt

ONSKE(REP)－JOMON(REP)

Destination aerodrome: Yakushima Airport

Total estimated elapsed time: 23 minutes

Fuel load expressed in endurance: 3 hours 59 minutes

In the cockpit of the airplane, a pilot sat in the left seat as the PF and the co-pilot in the right seat as the PM.

According to the records of communications, tracking radar, digital flight data recorder (DFDR) of the airplane, video subsystem for RAG, and statements of the helicopter pilot, both flight crew of the airplane, and the air traffic services flight information officer in charge of the Yakushima Remote (hereinafter referred to as "the Officer"), the developments involving two aircraft up to the serious incident is summarized in 2.1.1.

2.1.1 History of the Flights Based on the Records of Communications, Records of DFDR, and Video Records

Sections in brackets indicate apron activities captured by a video camera directed to the apron, and the times are corrected and synchronized as described in 2.8.

11:15:30	The helicopter requested the Remote for taxi information for take-off. The Remote advised to hold short of Runway 32 as the airplane was on the final approach course providing information on the wind, temperature, and QNH[3]. The helicopter read back the QNH and the intention of holding short of the runway.
[11:15:56-	The helicopter stayed in the apron.]
11:16:02	The airplane landed.
11:16:23	The airplane reported to the Remote that it landed at 11:16. The Remote requested the airplane to report vacating the runway. It read back the request.
11:16:42	The Remote advised the helicopter to enter Runway 32 establishing visual safe separation from the airplane and requested to report when ready for take-off. It read back that it would enter the runway.
[11:17:06	The helicopter hovered and started air-taxiing.]
11:17:09	The helicopter reported to the Remote that it was ready for take-off.

[3] "QNH" refers to a pressure value to be set on the pressure altimeter to get the above-mean-sea-level elevation when an aircraft is on the ground.

11:17:13	The Remote advised the helicopter to line up and wait on the runway. (Until 11:17:18)
[11:17:14	The helicopter went out of the field of view of the video camera.]
11:17:19	The helicopter transmitted the acknowledgement, and this was followed by its intention that it would return to the apron as it found an airplane on the runway. (Until 11:17:27)
[11:17:20	Video camera started to be trained to the right.]
[11:17:26	The camera captured the helicopter entering the runway.]
11:17:30	The Remote acknowledged the report.
11:17:35	The helicopter reported to the Remote that it would directly take off from the runway to the northeast direction.
[11:17:41	The helicopter took off.]
11:17:47	The Remote asked the helicopter whether it meant to wait in the apron. It responded to the Remote that it had already taken off as it found a passenger airplane on the runway.
[11:17:53	The helicopter went out of the field view of the video camera.]
11:18:04	The Remote warned the helicopter that it could not depart until the arrival airplane vacates the runway. The helicopter responded that it took off as it had faced the airplane on the runway.
11:18:54	The airplane reported to the Remote that it had vacated the runway. The Remote acknowledged the report.
11:19:17	The Remote requested the helicopter to provide the current situation. It reported to the Remote that it was 1.5 nm northeast of the airport at an altitude of 1,200 ft.
11:20:23	The Remote requested it to report at 5 nm. It read this back and reported of its take-off at 11:17.

2.1.2 Statements of the Persons Concerned with the Serious Incident

(1) Helicopter pilot

The helicopter took off from the temporary helipad on Nakanoshima Island, Toshima Village, Kagoshima Prefecture (Tokara Islands) for familiarization flight, landed at Yakushima Airport at 10:16, and parked on the north side of the apron. It was the first time for the helicopter pilot to fly to the Airport.

He filed the flight plan for a flight to Tanegashima Airport to the Fukuoka

Airport Office over the telephone approximately few minutes before the estimated departure time. He performed pre-flight inspection, started the engine, checked instruments readings and requested the Remote for take-off information. Although the Remote advised him to hold short of the runway, he decided to stay on the spot due to the turbulent air during arrival. He did not remember the traffic information on the airplane provided by the Remote.

He spotted a white aircraft making a landing roll on the runway in his right field of view while checking the instrument reading. However, it quickly went beyond the mound and trees in front of the helicopter.

Subsequently the Remote advised saying "TAXI DOWN RUNWAY 32", but it took time to hover because of his repeated before-take-off check and cautious transition to a hovering considering the turbulent air. He thought that the airplane should have already been in the apron at the time of the hovering.

After the hovering, he backed up a little, slowly turned right, and started air-taxiing to the runway. Before entering the runway he stopped short of the runway holding position marking[4] on the taxiway, checked the downwind leg, base leg and final for incoming aircraft to be clear.

He entered the runway along the taxiway center line and turned left to align the helicopter to Runway 32, and found the airplane which was taxiing to him. He panicked because this contradicted his assumption of no aircraft on the runway and it was the first time to face another aircraft on the runway.

He decided to return to the apron and conveyed his intention to the Remote; however, there was no immediate reply. He felt that the airplane was nearing more in the meantime. He thought his immediate take-off would be less troublesome for the airplane rather than taking time taxiing back to the apron in rough air condition. He reported saying that he would take off from the runway and took off diagonally to the right to avoid the airplane.

He started flying AS 350 B3 in July this year. His previous type of helicopter was the one with piston engine. As he normally flew another AS 350 B3, he had only one hour and 50 minutes of experience on the incident helicopter. The different equipment configuration and flight characteristics of the incident helicopter required careful operation.

(2) Flight crew of the airplane

[4] "Runway holding position marking" refers to the marking painted on the taxiway to show the location to stop before entering the runway.

The pilot and co-pilot were monitoring the communications between the helicopter and the Remote; accordingly, they knew the presence of the helicopter before landing.

After the landing, they saw the helicopter enter the runway while they were making a 180° turn at the runway end. They increased the taxiing speed to 16-17 kt for quick exit of the runway not to have the helicopter wait. However, they decelerated as the helicopter appeared to be in the vicinity of the runway exit.

The helicopter reported to the Remote that it would return to the apron when they were about to request the helicopter to back up, thinking that they would need more separation from the helicopter in order to enter the taxiway. However, after the reply from the Remote, it reported that it would take off to the northeast and continued ascent.

At the time of the take-off of the helicopter, the airplane was in front of the runway distance marker light[5] No.4. As the helicopter took off from the vicinity of the runway distance marker light No.2; accordingly, the airplane was distanced from the helicopter by approximately 700 m. The flight crew felt no danger as the helicopter took off diagonally from the runway. Later, the communication monitoring between the helicopter and the Remote assured them to believe that the helicopter would fly toward Tanegashima Airport, so they continued taxiing to the apron.

The pilot of the airplane had encountered several cases where a helicopter blocked his course as this incident at other RAG airports, and he had requested it to back up in such cases.

(3) The Officer

The Officer assumed her duties for the Kikai/Yakushima station at 8:45.

She received the flight plan of the helicopter approximately five minutes before the estimated off-block time. She operated the video camera to see the take-off preparations of helicopter. It was in the spot sitting parallel to Runway 32 in the north end of the apron.

She figured that the airplane was on the final approach course when the helicopter made the first call-in, she transmitted "RADIO ADVISES, HOLD SHORT OF RUNWAY 32 DUE TO ARRIVAL TRAFFIC SHORT ON FINAL RUNWAY 32." It appeared that it was hovering in the apron while reading back the

[5] "Runway distance marker lights" refers to the lights installed on the runway to indicate the remaining length to the runway end. The numeral 4 indicates approximately 4,000ft, and 2 approximately 2,000ft.

message.

Immediately after seeing the landing roll of the airplane on the monitor screen, it reported its landing time. She planned to advance the helicopter into the runway while the airplane was making a 180° turn and coming to the intersection, and depart the helicopter immediately after the airplane vacated the runway. She advised saying "RADIO ADVISES, MAKE VISUAL SEPARATION, TAXI DOWN RUNWAY 32."

She assumed that the helicopter would taxi on the runway in the opposite direction from the airplane.

The helicopter reported saying "READY" immediately after it started taxiing. As the airplane was on the runway, she advised saying "LINE UP AND WAIT."

She tried to train the video camera on the moving helicopter; it disappeared from the view as the camera couldn't start moving quickly enough. The helicopter transmitted "RETURNING TO SPOT" a moment after its disappearance, but she could not figure out the reason. As returning posed no problem, she replied saying "ROGER". Her reply was immediately followed by the transmission of the helicopter with sole audible part "NORTHEAST-BOUND." As the intention of the helicopter was unclear, she asked saying "DO YOU MEAN TO HOLD IN THE APRON? (This part in Japanese.)" The helicopter replied saying "ALREADY DEPARTED. (This part in Japanese.)"

Neither the Yakushima Remote nor Kikai Remote was communicating with another aircraft during this time period.

She had experience of handling the coexisted arrival and departure airplanes on the runway when scheduled passenger airplanes were involved; however, this was the first experience for her with a helicopter involved. In addition, Kagoshima FSC rarely handles helicopters under remote mobile communication environment.

In addition, she did not know that the Runway 32 end was not visible from the spot where the helicopter was parked and nobody had informed her of it.

As the video image was grainy, she zoomed in on the helicopter considerably for better image. The camera operation is done by touching the control panel on the monitor screen; however, its actual operation lags by some seconds.

This serious incident occurred on the runway of the Airport at 11:18 JST on October 31, 2012.

(See attached Figure: Estimated Routes of the Helicopter and the Airplane, Attachment:

Video Imagery Analysis/ Record of Communications)

2.2 Injuries to Persons

No one was injured.

2.3 Information on Damage to the Aircraft

There was no damage to both aircraft.

2.4 Personnel Information

(1) The pilot of the helicopter Male, Age 33

Commercial pilot certificate (Rotorcraft)	
Type rating for single-engine turbine (land)	May 7, 2002
Class 1 Aviation Medical Certificate	
Validity	Until January 15, 2013
Total flight time	1,829 hr 57 min
Flight time in the last 30 days	28 hr 00 min
Total flight time on the type of aircraft	96 hr 35 min
Flight time in the last 30 days	28 hr 00 min

(2) The pilot of the Airplane Male, Age 62

Airline transport pilot certificate	June 12, 1978
Type Rating for Bombardier DHC-8	May 22, 2006
Class 1 Aviation Medical Certificate	
Validity	Until May 20, 2013
Total flight time	22,118 hr 18 min
Flight time in the last 30 days	64hr 21 min
Total flight time on the type of aircraft	4,304 hr 06 min
Flight time in the last 30 days	64 hr 21 min

(3) The co-pilot of the Airplane Male, Age 34

Commercial Pilot Certificate	April 28, 2006
Type Rating for Bombardier DHC-8	December 20, 2007
Instrument flight certificate	August 30, 2006
Class 1 Aviation Medical Certificate	
Validity	Until December 1, 2012

Total flight time	3,404 hr 33 min
Flight time in the last 30 days	54hr 02 min
Total flight time on the type of aircraft	3,075 hr 49 min
Flight time in the last 30 days	54 hr 02 min

2.5 Aircraft Information

2.5.1 the Helicopter

Type	Eurocopter AS 350 B3
Serial number	4201
Date of manufacture	March 23, 2007
Certificate of airworthiness	No.Dai-2011-515
Validity	Until December 21, 2012
Category of airworthiness	Rotorcraft, Normal N
Total flight time	824 hr 19 min
Flight time since last periodical check (100 hours inspection, August 10, 2012)	20 hr 45 min

2.5.2 Weight and Balance of the helicopter

When this serious incident occurred, the weight of the helicopter was estimated to have been 1,713 kg and the position of the center of gravity (CG) was estimated to have been 3,409 mm aft of the longitudinal reference plane and 31 mm to the right of the lateral reference plane, both of which were estimated to have been within the allowable range (maximum takeoff weight was 2,250 kg, and the CG range corresponding to the weight at the time of this serious incident was 3,170-3,500 mm aft from the longitudinal reference line, and 190 mm left to 150 mm right of the lateral reference plane).

2.6 Information regarding the Officer

Officer Female, Age 22

Air Traffic Services Flight Information Officer Certificate

Mobile communication service August 1, 2012

2.7 Meteorological Information

Aviation weather reports for Yakushima Airport around the time of the serious incident were as follows.

11:00 Wind direction 310°; Wind velocity 15 kt; Visibility 10 km or more;
Cloud: Amount 1/8 - 2/8, Cloud base 3,500 ft

Amount 5/8 – 7/8, Cloud base Unknown

Temperature 20°C; Dew point 11°C

Altimeter setting (QNH) 29.95 inHg

2.8 Information on DFDR, Cockpit Voice Recorders and Video Camera Image

The airplane was equipped with a DFDR (part number: 980-4700-027) and a cockpit voice recorder (CVR) (part number: 980-6022-011) manufactured by Honeywell of the United States of America. As it was obvious that the two-hour duration CVR was overwritten after the serious incident as the operation continued, it was not removed from the airplane.

The DFDR time was corrected by correlating the VHF transmission key record with the time signals recorded on the communications records.

The time for the video footage was determined based on the position of the airplane in the video footage, DFDR records, the communications records, and the statement of the helicopter pilot.

2.9 Information regarding the Airport

2.9.1 Mobile Communication Service at the Airport

No air traffic controller or air traffic services flight information officer is manned at the Airport. An officer at Kagoshima FSC provides mobile communication services, such as relaying of air traffic control messages, provision of flight information, and other required services for aircraft that fly to/from or near the Airport through the RAG.

2.9.2 Runway and Taxiway

The Airport has a 1,500 m long by 45 m wide runway (direction 14/32) with a perpendicular short taxiway.

As it has no parallel taxiway, the taxi route after landing and before take-off is as follows.

(1) Scheduled Flight

For an arrived airplane, its landing roll is followed by a 180° turn at the runway end and taxiing to the apron via taxiway intersection.

For a departing airplane, it enters the runway via taxiway intersection. It taxies to the take-off position, makes a 180° turn there for a take-off roll.

(2) Helicopter

Helicopters take off from and land at the runway without using its entire length; hence, they do not have to taxi in the opposite direction on the runway. A

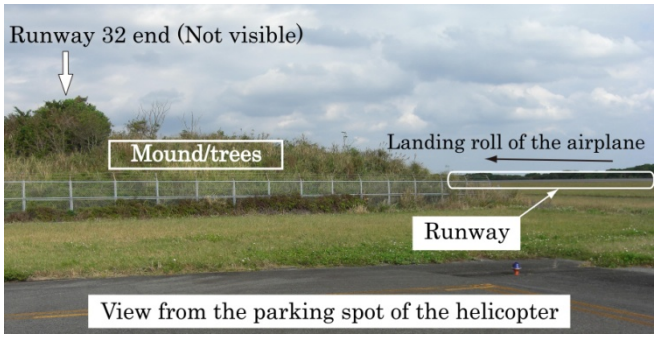
take-off is usually an intersection departure[6]: helicopters enter the runway via the taxiway and take off near the taxiway intersection.

(3) When two scheduled airplanes are involved.

When an airplane departs after another airplane arrives, the small apron forces them to switch traffic on the runway. A departing airplane usually holds short of the runway (on the taxiway), and enters the runway after an arrived airplane rolls past the intersection. The departing airplane taxies on the runway to the take-off position, makes a 180° turn there, and starts a take-off roll after the arrived airplane vacates the runway.

2.9.3 View from the Apron

There are small mounds to the south and north of the apron, and low trees grow on them. They make it impossible to see the Runway 32 end, where the airplane made a 180° turn.



The JTSB checked the view from the point about 5 m above the apron, simulating the helicopter's hovering; however, the Runway 32 end was not visible.

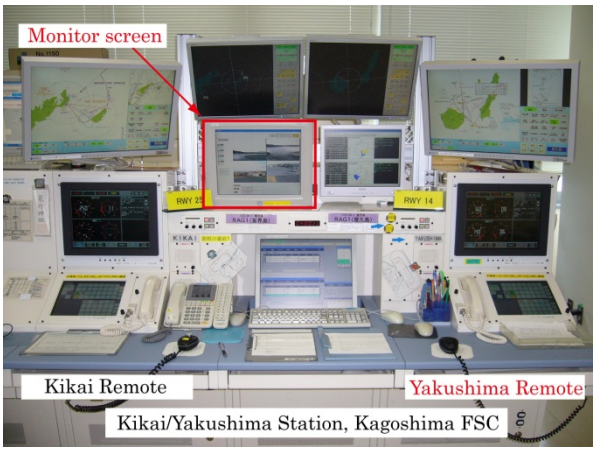
The Runway 32 end is visible from the runway holding position marking on the taxiway.

2.10 Information regarding the RAG

2.10.1 Kagoshima FSC

Kagoshima FSC operates five RAGs: at Kikai Airport, Tokunoshima Airport, Yoron Airport, and Okinoerabu Airport in addition to Yakushima Airport.

The duty stations of FSC for RAGs are manned by three officers and each officer takes care of two airports. An officer in charge of the Airport handles Kikai Airport at the Kikai/Yakushima station.



6 "Intersection departure" refers to a take-off procedure in which a helicopter starts a take-off roll from any intersection except the runway end without using the whole runway length.

2.10.2 Video subsystem for RAG

(1) Purpose

As officers cannot acquire direct visuals through RAG; therefore, the video subsystem have been introduced. The subsystem contributes to the better operational safety through comprehensive obstacle confirmation on the runway, and the movements of aircraft on the ground in case of emergency.

(2) Operational regulations

Flight Information Service Procedure Handbook[7] stipulates the operation of the video subsystem in (III) Airport remote mobile communication, IV mobile communication services (hereinafter referred to as "the Mobile Communication Handbook").

(Excerpt)

8. Operation of video subsystem for RAG

(1) General principle

The video subsystem is operated as the supplementary means to get: visuals of obstacles on the runway; visuals of the runway, taxiway, and apron at the remote airport based on the information that an aircraft is in an emergency there.

(2) Operational method

a In case of a visual confirmation of an obstacle on a runway, forward the information to the airport management organization and request the physical confirmation.

b In case of a visual confirmation of an emergency aircraft at a remote airport, forward the information to the airport management organization and request the physical confirmation.

c In providing the information to aircraft on the obstacle on the runway based on the visuals, officers do so after the confirmation stipulated in above "a" was done.

(Note: At Yakushima Airport, "Airport management organization" mentioned in "a" and "b" refers to the Yakushima Airport Management Office (commissioned to the Yakushima-cho municipal office by the Kagoshima prefectural government).)

As described above, the subsystem is a supplementary equipment to confirm obstacles on the runway, and it is not for getting the visuals of aircraft itself.

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[7] "Flight Information Service Procedure Handbook "is part of the Air Traffic Service Procedure Handbook (Notification by the Director General of the Civil Aviation Bureau, No.Kuso-130, dated March 13, 1967) and refers to regulations regarding flight information services duties.

(3) Visual terminal at the station

The video subsystem incorporates all-weather day/night-use general-purpose cameras with zooming and movement functions, and a monitor. An officer can operate the camera by touching the function panel on the monitor screen.

Two monitor cameras are installed at each remote airport, and one monitor screen can show up to four camera feeds from two airports.

When this serious incident occurred, one camera was trained to the apron and the other to the final approach course of Runway 32. As the Kikai Remote had no handling aircraft, the Officer was doing her duties by displaying the video feed of the apron on the monitor screen.

View of the Yakushima Airport shown on the screen

(4) Equipment operation manual

Although the Kagoshima FSC had training materials which describe the video subsystem, no documented operational method existed. The operation was left to the discretion of individual officer.

2.11 Additional Information

2.11.1 Handling of Flight Information by Officers

Mobile Communication Handbook stipulates handling of flight information in (I) General Principle as follows.

(Excerpt)

6 Handling of flight information

(1) The objective of flight information duties is to support aircraft operation by providing flight information and relevant advice.

(Omitted)

(3) General principle of flight information duties

a Provided information shall be the one visually confirmed by air traffic services flight information officers and the one acquired from the reliable sources such as above mentioned officers, air traffic service organizations, meteorological organizations, aircraft, and airport management offices.

(Omitted)

(5) Provision of information

(Omitted)

b Air traffic services flight information officers provide specified information, requested information from aircraft, and other information deemed necessary for the safety of operation in a timely manner.

According to the above description and the description in 2.10.2 (2), information on visually confirmed aircraft through the camera is not provided to the other aircraft unless the former is deemed to pose a threat as an obstacle.

2.11.2 Phraseology to be Used

(1) The Mobile Communication Handbook stipulates the phraseology to be used in (II) Airport mobile communication as follows:

(Excerpt)

7 Guidelines for information provision

(7) Phraseology for information provision

(Omitted)

c. If an aircraft operation is deemed to be a threat to the other aircraft with the right-of-way, an air traffic services flight information officer advises the pilot of former aircraft to take necessary actions by using the following phraseology.

RADIO ADVISES, [actions].

d. An officer shall advise using air traffic service phraseology. The reasons which necessitate the advice shall be added as much as possible.

Example: Radio advises, hold short of runway for A-300 on final.

(The rest is omitted)

(2) "Taxi down runway [runway number]

This phraseology is commonly used in mobile communication services to mean "Enter the runway [runway number]".

In addition, Ⅲ Standards for Air Traffic Control Procedure (hereinafter referred to as "Standards for ATC Procedure"), Air Traffic Control Services Procedure Handbook[8]specifies "BACKTRACK RUNWAY [runway number]" as the phraseology to have an aircraft taxi on the runway in the opposite direction of the using runway.

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8 "Air Traffic Control Services Procedure Handbook" is part of the Air Traffic Service Procedure Handbook (Notification by the Director General of the Civil Aviation Bureau, No. Kuso-130, dated March 13, 1967) and refers to regulations regarding air traffic control service duties.

3. ANALYSIS

3.1 Airman Competence Certificates and Others

The helicopter pilot and the two flight crew of the airplane held both valid airman competence certificates and effective aviation medical certificates.

3.2 Air Traffic Services Flight Information Officer's certificate

The Officer at the mobile communication station possessed a necessary Certificate for Air Traffic Services Flight Information Officer.

3.3 Meteorological Conditions

According to the statement in 2.1.2 (1), the helicopter pilot stated that he experienced air disturbance during the arrival and that the air was rough before take-off.

Judging from the description in 2.7 and the records of communication, it is probable that the northwest wind at 15-17 kt hit the small mound described in 2.9.3, causing slight air disturbance in the apron, taxiway and the runway downwind from it.

3.4 Situation of the Helicopter

3.4.1 Flight Experience of the Helicopter Pilot

According to the statement in 2.1.2 (1), the helicopter pilot stated that the different equipment configuration and flight characteristics of the helicopter, unlike his usual helicopter, required careful operation although the type is the same.

According to the statements in 2.1.2 (1) and the description in 2.4 (1), his flight time on the same type of helicopter was approximately 97 hours, of which 1 hour and 50 minutes was on the incident helicopter.

It is possible that his slightly short experience with the type helicopter and the difference in equipment configuration and flight characteristics of the incident helicopter affected his situation awareness and judgment.

3.4.2 Helicopter Pilot's Assumption

According to the description 2.1.1 and statement in 2.1.2 (1), the helicopter pilot did not remember the traffic information on the airplane although it was provided by the Remote in the first communication. It is highly probable that he had heard the communication from the Remote as he read back the advice on the holding and QNH, which were provided at the same time. It is probable that only the selected information

remained in his memory when he communicated with the Remote as he was paying attention to instruments and equipment check.

These facts suggest that he failed to recognize the airplane then. It is highly probable that his first recognition was when he saw the landing roll of the airplane while waiting on the spot.

However, according to the statement in 2.1.2 (1), the white airplane which was rolling down the runway came into his right field of view but very soon went out of the view being blocked by the mound and trees in front. It is possible that short period of airplane recognition and mental focus on the equipment check made the landed airplane unimpressive to him.

Although the Remote advised saying "RADIO ADVISES, MAKE VISUAL SEPARATION, TAXI DOWN RUNWAY 32, REPORT READY," it is probable that the helicopter pilot only remembered the phrases of "TAXI DOWN RUNWAY 32" and "REPORT READY," which were necessary for take-off, as he communicated paying attention to instruments and equipment in the same manner as the first communication. As it took time for him to hover rechecking the instruments and that he did not pay attention to the landing aircraft, it is probable that he assumed that the airplane had already entered the apron and that there was no airplane on the runway.

It is probable that with this assumption he taxied into the runway for an intersection departure after hastily reporting "READY" to the Remote without doing an outside watch after it hovered and consequently encountered the airplane on the runway.

It is probable that the outside watch before air-taxiing notified him of the absence of the airplane in the apron, and if he had made a runway check at the runway holding position marking on the taxiway as described in 2.9.3, he could have noticed the airplane and taken calmer actions.

3.4.3 Helicopter Pilot's Judgment on the Runway

According to the statement in 2.1.2 (1), the first face-to-face encounter with another aircraft on the runway surprised the helicopter pilot and threw him into panic.

It suddenly occurred to him to taxi back to the apron and conveyed his intention to the Remote. However, he probably further panicked as he: received no immediate reply from the Remote; thought his immediate take-off would be less troublesome for the airplane rather than taking time taxiing back to the apron in rough air; felt further proximity to the airplane. It is probable that all these confused him more and he made a rash decision to take-off.

Although there was an option to move to the south side (opposite direction), it is probable that his utter confusion prevented him from getting that idea.

3.5 Activities of the Officer

3.5.1 Provision of Traffic Information to the Helicopter

According to the description in 2.1.1, the Officer provided the traffic information on the airplane in the first communication with the helicopter but did not provide it in the later communication.

It is probable that the Officer judged that omitting the traffic information would pose no problem as the situation remained almost the same over a short period of time and that both aircraft could see with each other.

However, according to the statement in 2.1.2 (1) and the description in 2.9.3, the helicopter pilot was not able to have continued view of the airplane from his spot.

According to the statement in 2.1.2 (3), the Officer was not aware of this fact, and no one had informed her of it. Therefore, it is highly probable that the certificate training program did not include this information. The Kagoshima FSC should have included it in the training program to make sure that she can provide detailed traffic information.

3.5.2 Advice to the Helicopter

According to the statement in 2.1.2 (3), the Officer advised the helicopter saying "RADIO ADVISES, MAKE VISUAL SEPARATION, TAXI DOWN RUNWAY 32" based on her plan to advance the helicopter into the runway while the airplane was coming to the intersection, and to depart the helicopter immediately after the airplane vacated the runway. She assumed that the helicopter would taxi on the runway in the opposite direction from the airplane. Also, she had experience of handling the coexisted arrival and departure airplanes on the runway when scheduled passenger airplanes were involved.

However, as described in 2.11.3 (3), the phrase "TAXI DOWN RUNWAY 32" is commonly used in mobile communication services to mean "Enter runway 32" and is not always used to mean "Taxi in the opposite direction from the using direction."

It is highly probable that the following reasons accounts for the non-problematic operation where scheduled flights are involved: a scheduled flight airplane needs to taxi to the take-off position at the opposite end of the using runway as described in 2.9.2; pilots flying scheduled airplanes are accustomed to busy situation and they can recognize the situation without specific phraseology.

According to the statement in 2.1.2 (3), this was the first time for the Officer to

handle a case involving a helicopter. It is highly probable that her intention was not understood by the helicopter pilot with the same phrase that is used for handling two scheduled flights.

The Officer should have used more specific phrase for the helicopter considering its operational characteristics such as intersection departure and air-taxiing.

It is probable that the Officer was not used to handling helicopters judging from: the description in 2.6 that she was not well experienced; her statement in 2.1.2 (3) that Kagoshima FSC rarely handled helicopters under remote mobile communication environment. She could have taken appropriate actions responding to the situation if she had acquired the knowledge about helicopter flight characteristics during the training and if specific handling of helicopters had been included in guidelines.

3.5.3 Delay in Reply to the Helicopter

According to the statement in 2.1.2 (3), the Officer tried to train the video camera at the moving helicopter; it disappeared from the view as the camera couldn't start moving quickly enough. The helicopter called a moment after its disappearance saying "Returning to spot," but she could not figure out the reason.

These suggest that the Officer was late in replying to the transmission of the helicopter of "Returning to spot" as she could not fully understand its intention due to lack of experience and that she could not comprehend its movements as it disappeared from the field of camera view.

3.5.4 Video Camera Operation

The Officer's statement in 2.1.2 (3) that she used the video subsystem to get visuals of the helicopter suggests she used the video subsystem to grasp the airport activities on a regular basis.

However, the subsystem is a supplementary visual equipment to confirm obstacles on the runway and is not for getting visuals of aircraft itself as described in 2.10.2 (2). The video subsystem provides grainy imagery with poor operational performance as statement in 2.1.2 (3), no clearly stated video subsystem operational method existed at the Kagoshima FSC as described in 2.10.2 (4).

As the officers are deprived of direct aircraft visuals at the station, it is very useful to use video subsystem to know airport activities without delay; however, too much dependent on the subsystem with low performance would lead to the possible failure of grasping fluid aircraft activities.

3.6 Severity of the Serious Incident

According to the helicopter pilot's statement in 2.1.2 (1), he took off diagonally to avoid the airplane, while the statements of flight crew in the airplane in 2.1.2 (2) say that both crew felt no danger as the distance between the two aircraft was approximately 700 m when the helicopter took off diagonally.

In addition, the weather condition allowed each other's visual recognition, and the airplane was taxiing at the speed capable of quick stop in case of danger according to the description in 2.7 and the statements in 2.1.2 (2)

In light of above mentioned facts, it is highly probable that no danger existed in this serious incident.

4. PROBABLE CAUSES

This serious incident occurred as the helicopter that entered the runway took off before the landed airplane vacate the runway.

It is probable that the helicopter pilot's assumption that the runway was clear of the airplane lead to the air-taxiing into the runway skipping the outside watch; however, resultant panicking caused by the unexpected face-to-face encounter with the airplane on the runway lead to the confused rash decision to take-off.

It is probable that the degraded ATC communication/monitoring and outside watch resulted in his assumption that the runway was clear of the airplane as his attention was overly directed to the equipment check during the apron holding.

5. SAFETY ACTIONS

5.1 Safety Actions Taken

5.1.1 Safety Actions Taken by the Company

The pilot secured the training on the following subjects.

(1) Aerodrome control procedure stipulated in the Standards for ATC Procedure.

(2) Obligations of pilots stipulated in the Civil Aeronautics Act.

In addition to the above mentioned training, the Company had other pilots discuss the serious incident and give them the same lessons on the above mentioned subjects.

5.1.2 Safety Actions Taken by the Civil Aviation Bureau

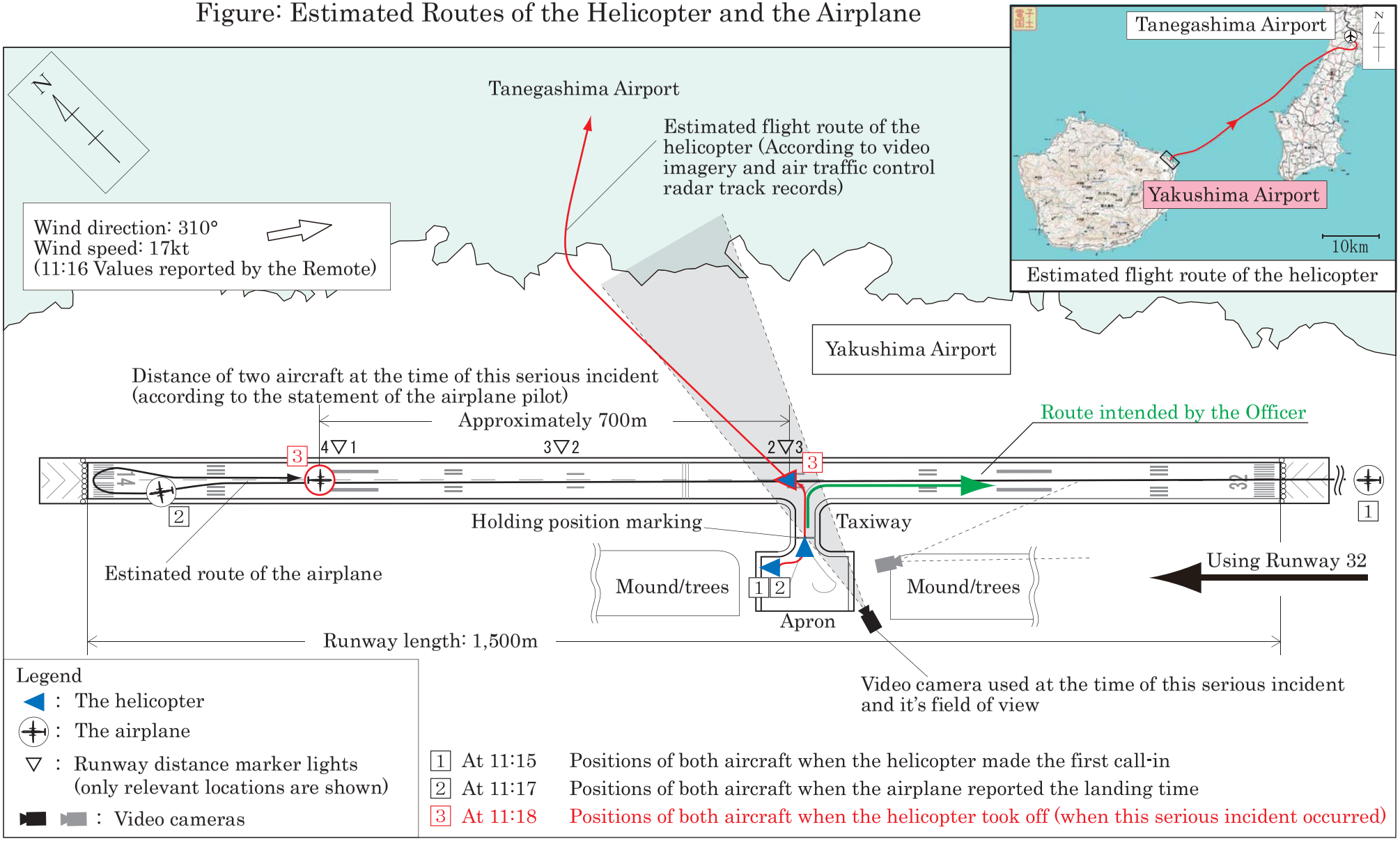
In response to the occurrence of the serious incident, Operation Division of the Air Navigation Services Department of the Civil Aviation Bureau of the Ministry of Land, Infrastructure, Transport and Tourism issued the notice titled "Airport remote mobile communication duties and on-site special training on the said duties (dated December 26, 2012)" to offices concerned. The notice directs to: confirm true intentions of pilots concerned; notify the considerations for improved communication to air traffic services flight information officers; conduct on-the-job training including operational characteristics of helicopters.

5.1.3 Safety Actions Taken by the Kagoshima Airport Office

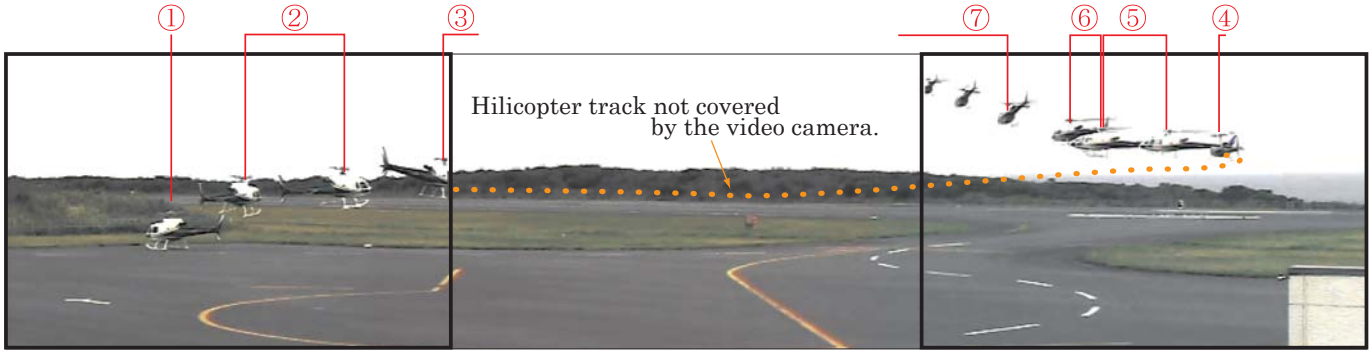
In response to the occurrence of the serious incident, the Kagoshima Airport Office, Osaka Regional Civil Aviation Bureau has notified air traffic services flight information officers in the bureau to provide information in such ways that would prevent misunderstanding with pilots and shared unusual past cases where officers in the bureau had involved as part of the efforts to enrich the training quality.

After the reception of the notice mentioned in 5.1.2, the office revised the training procedures and the guidelines for the duty operations.

Figure: Estimated Routes of the Helicopter and the Airplane



Attachment: Video Imagery Analysis/Records of Communications



Initial field of view of the video camera　　Video field of view at the time of the serious incident

*The above image was created by stitching to gather the extracted images from the video record.

Helicopter Position on the above image (*1)	JST hh:mm:ss	Station	Contents
①	11:15:21	JA35BB	TANEGASHIMA REMOTE, JA35BB.
↓	11:15:26	REMOTE	JA35BB, YAKUSHIMA REMOTE, go ahead.
↓	11:15:30	JA35BB	YAKUSHIMA REMOTE, sorry 35BB request taxi for departure, after airborn northeast-bound.
↓	11:15:38	REMOTE	JA35BB, roger, RADIO ADVISES, hold short of runway 32 due to arrival traffic now short on final runway 32, wind 310 degrees 17 knots, temperature 20, QNH 2995 inches.
↓	11:15:56	JA35BB	2995, hold short of runway32 35BC.
	...JAC3745 Landed at 11:16:02(according to DFDR)		
	11:16:23	JAC3745	YAKUSHIMA REMOTE, JAC3745 down time AT 16.
	11:16:28	REMOTE	JAC3745 DOWN 16 Roger, report runway vacated.
	11:16:34	JAC3745	Roger, report runway vacated JAC3745.
↓	11:16:42	REMOTE	JA35BB, RADIO ADVISES, make visual separation, taxi down runway 32, report ready.
↓	11:16:51	JA35BB	Roger, taxi down runway 32, report ready, 35BB.
	Approximately 10 seconds after the completion of the communication(*2), the helicopter hovered.		
②	11:17:09	JA35BB	YAKUSHIMA REMOTE, 35BB, ready.
③	11:17:13	REMOTE	JA35BB, roger line up and wait please.
④	11:17:19	JA35BB	ah～roger…YAKUSHIMA REMOTE, sorry taxi back to spot due to on the runway traffic. (Images not shown for approximately 16 seconds)
⑤	11:17:30	REMOTE	JA35BB, roger.
⑥	11:17:35	JA35BB	ah～YAKUSHIMA REMOTE, sorry direct northeast-bound on the runway.
	...JA35BB airborne at 11:17:41(*3)		Serious incident occurred
⑦	11:17:47	REMOTE	(In Japanese) JA35BB, er, I will speak in Japanese. Do you mean to hold in the apron?
	11:17:54	JA35BB	(In Japanese) Yes, I have already departed because an airplane on the runway.
	11:18:04	REMOTE	(In Japanese) JA35BB, er, I will speak in Japanese. Er, you cannot depart until departure aircraft, ah, arrival aircraft vacates the runway. Over.
	11:18:15	JA35BB	(In Japanese) Er, we have an encounter on the runway, so I gave way.
	11:18:26	REMOTE	JA35BB, ah～standby.
	11:18:54	JAC3745	YAKUSHIMA REMOTE, JAC3745, runway vacated. see you.
	11:18:59	REMOTE	JAC3745, roger see you.
	11:19:17	REMOTE	(In Japanese) JA35BB, er, the current situation, please.
	11:19:21	JA35BB	(In Japanese) Er, curently 15, ah, 1.5nm north north, ah, correction northeast altitude 1,200 feet.
	11:19:33	REMOTE	(In Japanese) JA35BB, er, roger. Please wait a moment.
	11:20:23	REMOTE	(In Japanese) JA35BB, Thank you for waiting. Er, report 5nm out.
	11:20:29	JA35BB	Roger, report 5nm out also airborne at 17.

JA35BB : The helicopter　JAC3745 : The airplane　REMOTE : Yakushima Remote

: Periods when the helicopter was not tracked by the video camera (*4)

(*1) (*2) (*3) (*4) : The time for the ITV video was determined from the positions of the airplane in the video images, DFDR data, the records of communications, and the statement of the helicopter pilot.