AA2013-9

AIRCRAFT ACCIDENT
INVESTIGATION REPORT

OBIHIRO BRANCH SCHOOL OF THE CIVIL AVIATION COLLEGE

J A 4 2 1 5

December 20, 2013

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 determine the causes of an accident and damage incidental to such an accident, thereby preventing future accidents and reducing damage. 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 ACCIDENT INVESTIGATION REPORT

CRASH INTO THE MOUNTAIN SLOPE
OBIHIRO BRANCH SCHOOL OF THE CIVIL AVIATION COLLEGE,
BEECHCRAFT A36, JA4215
Mt. TSURUGI, MEMURO-CHO, KASAI-GUN, HOKKAIDO, JAPAN
AT ABOUT 09:22 JST, JULY 28, 2011

November 22, 2013

Adopted by the Japan Transport Safety Board

SYNOPSIS

<Summary of the Accident>

On Thursday, July 28, 2011, a Beechcraft A36, registered JA4215, operated by the Obihiro Branch School of the Independent Administrative Institution Civil Aviation College, took off from Obihiro Airport for flight training at 09:11 Japan Standard Time. At around 09:22, when practicing basic instrument flight in the training and testing area, the airplane crashed into the slope of Mt. Tsurugi in Memuro-cho, Kasai-gun, Hokkaido.

On board the airplane were four persons: an instructor who was captain, two students, and an instructor in educational and research flight. Three of them: the captain, one of the students, and other instructor suffered fatal injuries, and the remaining student sustained serious injury.

The airplane was destroyed and a post-crash fire broke out.

<Probable Causes>

It is highly probable that the accident occurred as follows: The airplane conducting VFR BIF training operated by a hooded student was instructed by his instructor to fly into the mountainous area; It then flew into clouds or close to the clouds that covered the mountains, losing sight of ground references and approached the ground very close against the instructor's expectation; The instructor took the controls from the student and attempted to evade the mountains, but the airplane failed to change its course to an appropriate direction and crashed into the slope of the mountain.

It is somewhat likely that the instructor flew close to or into the clouds which covered the mountain with some intention; however, his death denied us the clarification his intention.

It is somewhat likely that the basic safety policy of the College was not instilled into the field instructors, and that there was a gap in safety awareness between management and field instructors. It is also somewhat likely that behind the accident was a problem that involved the entire organization of the College—a work environment/organizational culture that consequently allowed unsafe behaviors.

<Recommendations>

1 Recommendations for the Minister of Land, Infrastructure, Transport and Tourism

Based on the result of the accident investigation, in order to prevent the recurrence of similar accidents, the Japan Transport Safety Board recommends pursuant to the provision of Paragraph 1 of the Article 26 of the Act for Establishment of the Japan Transport Safety Board that Minister of Land, Infrastructure, Transport and Tourism should take the following measures.

The Minister should grasp reliably the actual condition of efforts towards improvement of the safety management system of the College, check the implementation status whether such various safety measures set by the College based on the medium-term plans, etc. are carried out continuously and certainly by such as periodically audits in the field and provide more guidance depending on the results until the College becomes able to operate a safety management system autonomously and steadily. Moreover, in setting safety-related medium-term goals as prescribed in the Act on General Rules for Independent Administrative Agencies, the Minister should consider how the College's medium-term goals should be, such as setting specific goals to ensure

that a safety culture is brewed and safety activity is implement surely and continuously, including reviewing in timely manner, based on the organizational climate cannot be built in a day but also it is brewed by daily ongoing activity.

2 Recommendations for the Independent Administrative Institution Civil Aviation College

Based on the result of the accident investigation, in order to contribute to preventing the recurrence of similar accidents, the Japan Transport Safety Board recommends pursuant to the provision of Paragraph 1 of the Article 27 of the Act for Establishment of the Japan Transport Safety Board that the Independent Administrative Institution Civil Aviation College should consider the matters described below and take necessary measures.

(1) Review of the Training Procedures

In the accident, it is somewhat likely that the airplane of the College was into or close to clouds during VFR training, and that another instructor onboard the airplane gave no advice about this behavior.

The College should aim to create an opened educational environment that enables observer instructors and students to give advice on safety issues in the training airplane without hesitation if necessary. Therefore, it should also consider to introduce effective methods, such as utilizing of installed video cameras in the airplane, etc..

(2) Strengthening of the Safety Management System

The College should establish a system for grasping the actual condition of instructors' teaching methods and provide them with appropriate guidance and supervision.

The possible contributing factors to the accident occurrence are that the safety management of the College actually deviated from its philosophy in its Safety Management Regulations and that there was a gap in safety awareness between management and field instructors, creating a work environment/organizational culture that allowed unsafe acts—a problem that involved the entire organization.

Thus in order to prevent recurrence of such situation and brew and keep an appropriate organizational climate, the College needs to establish a safety management system with the commitment of the all personnel from the General Safety Manager to field instructors and to properly operate it with continued reviewing.

(3) Review of medium-term plans and other related plans

In order to make sure to carry out the initiatives recommended in (1) and (2) above and make them an integral part of its administration, the College should review the medium-term and annual plans and reflect these initiatives on the plans.

This report uses the following abbreviations:

AGL:	Above Ground Level
BIF:	Basic Instrument Flight
CAC:	Civil Aviation College
CAVOK:	Ceiling and Visibility OK
CFIT:	Controlled Flight Into Terrain
COSPAS:	Space System for the Search of Vessels in Distress (The original is in Russian)
CRM:	Crew Resource Management
DFDR:	Digital Flight Data Recorder
ELT:	Emergency Locator Transmitter
GPWS:	Ground Proximity Warning System
IAS:	Indicated Air Speed
ICAO:	International Civil Aviation Organization
NTSB:	National Transportation Safety Board
PDCA:	Plan Do Check Act
RCC:	Rescue Co-ordination Center
SARSAT:	Search And Rescue Satellite Aided Tracking
SMS:	Safety Management System
TAS:	True Air Speed
VMC:	Visual Meteorological Condition

Conversion table

1 lb:	0.4536 kg
1 ft:	0.3048 m
1 kt:	1.852 km/h (0.5144 m/s)
1 nm:	1,852 m
1 ft/min:	0.3048 m/min
1 atm:	29.92 inHg (1013.25 hPa)

Contents

1. PROCESS AND PROGRESS OF THE AIRCRAFT ACCIDENT

1.1 Summary of the Accident

On Thursday, July 28, 2011, a Beechcraft A36, registered JA4215, operated by the Obihiro Branch School of the Independent Administrative Institution Civil Aviation College, took off from Obihiro Airport for flight training at 09:11 Japan Standard Time (JST: UTC+9 hours, all times are indicated in JST on a 24-hour clock). At around 09:22, when practicing basic instrument flight in the training and testing area, the airplane crashed into the slope of Mt. Tsurugi in Memuro-cho, Kasai-gun, Hokkaido.

On board the airplane were four persons: an instructor who was captain, two students, and an instructor in educational and research flight. Three of them: the captain, one of the students, and other instructor suffered fatal injuries, and the remaining student sustained serious injury.

The airplane was destroyed and a post-crash fire broke out.

1.2 Outline of the Accident Investigation

1.2.1 Investigation Organization

On July 28, 2011, the Japan Transport Safety Board (JTSB) designated an investigator-in-charge (IIC) and an investigator to investigate this accident.

1.2.2 Representative of the Relevant State

An accredited representative of the United States of America, as the State of Design and Manufacture of the airplane involved in this accident, participated in the investigation.

1.2.3 Implementation of the Investigation

July 29-August 3, 2011	Interviews, airplane examination and on-site investigation
September 1, 2011	Interviews
September 11-15, 2011	Interviews, airplane examination and on-site investigation
October 3, 2011	Interviews
November 9-13, 2011	Interviews, airplane examination and on-site investigation
February 3, 2012	Interviews
July 2, 2013	Flight examination boarding the same type of the airplane

1.2.4 Provision of Factual Information to the Civil Aviation Bureau

On December 19, 2011, as part of its aviation safety information, the Japan Transport Safety Board provided the Civil Aviation Bureau (CAB), Ministry of Land, Infrastructure, Transport and Tourism (MLIT) with factual information on the captain's aviation medical examination, which had been obtained during the fact-finding investigations.

1.2.5 Comments from the Parties Relevant to the Cause of the Accident

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

1.2.6 Comment from the Relevant State

Comment was invited from the relevant State.

2. FACTUAL INFORMATION

2.1 History of the Flight

At 09:11 on July 28, 2011, a Beechcraft A36, registered JA4215 and operated by the Obihiro Branch School (hereinafter referred to as "the Branch School") of the Independent Administrative Institution Civil Aviation College (hereinafter referred to as "the College") took off from the Obihiro Airport for flight with four persons on board. The four persons were seated as follows: an instructor in the right front seat as captain(hereinafter referred to as "Instructor A"); a student in the left front seat, who was flying the airplane (hereinafter referred to as "Student A"); another student in the right aft seat, a next trainee after Student A (hereinafter referred to as "Student B"); and an instructor in the left aft seat, who was on board for educational and research flight*1 (hereinafter referred to as "Instructor B"). After the take-off, the airplane conducted basic instrument flight training (BIF)*2, one of the maneuver training, in the airspace called Civil Training and Testing Area HK2-7 (-20, -40, and -60) and 2-8 (-20, -40, and -60) (hereinafter referred to as "the Training Areas"), both abut the west side of the Obihiro Airport control zone.

The flight plan for the airplane was summarized as follows:

Flight rules: Visual Flight Rules (VFR)
Departure aerodrome: Obihiro Airport
Estimated off-block time: 09:00
Cruising speed: 140 kt
Cruising altitude: VFR
Route: Nakasatsunai (visual reporting point) - the Training Areas - Nakasatsunai
Destination aerodrome: Obihiro Airport
Total estimated elapsed time: One hour and 45 minutes
Purpose of flight: training
Fuel load expressed in endurance: Four hours and 30 minutes
Persons on board: Four
Other information: Will contact the Sapporo Air Traffic Control Center on 128.35 MHz for flight training in the Training Areas.

The history of the flight up to the accident is summarized as follows according to the radar trajectory records from the Sapporo Area Control Center (hereinafter referred to as "the Sapporo Control"), communication records from the Obihiro Airport Control Tower (hereinafter referred to as "the Tower") and the Sapporo Control, and the statements of Student A, an air traffic controller at the Obihiro Airport Branch Office (hereinafter referred to as "the Controller"), an operation engineer at the Branch School, and an eyewitness.

(See Figure 1 "Training Areas")

*1 The purpose of the "educational and research flight" at the College are research for flight training and its standardization, as well as observing the other instructor's training from standardization point of view.

*2 "Basic instrument flight training" denotes basic training for instrument flying in which a pilot uses instruments to measure an attitude, altitude, position, and course. A trainee wears a hood to restrict his field of view from outside ground reference.

2.1.1 History of the Flight based on Radar Trajectory Records

The radar trajectory records from the Sapporo Control illustrates the flight trajectory of an airplane which appeared to be the accident airplane from 09:13:45 to 09:16:55 as follows:

The flight trajectory was 295° originating from the location (4.3 nm, 320° (hereinafter bearing is a magnetic bearing unless otherwise specified) from the Obihiro Airport) to another location (10.9 nm, 305° from the Airport). Its ground speed (GS) was 130 kt and its altitude was about 2,500 ft.

(See Figure 2 "Estimated Flight Route")

2.1.2 History of the Flight based on Air Traffic Control Communication Records

After the airplane took off from the Obihiro Airport, it reported to the Obihiro Tower and the Sapporo Control as follows:

At 09:12:11, it reported to the Obihiro Tower saying "Break traffic."

At 09:14:21, it reported to the Obihiro Tower saying "Leave control zone."

At 09:14:30, it reported to the Sapporo Control saying "Enter the Training Areas."

2.1.3 Statement of Student A

Student A's flight training boarding an airplane at the Branch School commenced in April 2011. Instructor A became responsible for Students A and B on July 1, 2011. On the day of the accident, he planned to have Student A fly first during the first half of the training period followed by the Student B in the second half. Student A was to have low-altitude maneuver training*3 followed by the third BIF session, then the Student B was to receive the training. In spite of the predicted weather that the visibility would become better as time passed, Instructor A decided in the morning's briefing that BIF would be conducted first. Student A confirmed the fastened seat belts and shoulder harnesses of all occupants twice during "Before Start Check" and "Before Takeoff Check."

After the takeoff from Runway 35, the airplane turned to 305° at about 1.5 nm from the threshold and reported to the Obihiro Tower, saying that it was breaking the traffic pattern. Thereafter, Instructor A, taking the controls, directed the Student A to wear a hood*4. Student A remembers that when he was ready for BIF training and got the controls to start the subject, the airplane was flying at 2.500 ft, 134 kt and heading 300°. When he stabilized the airplane Instructor A directed to turn left to roll out 270°, followed by a right turn to roll out 360°, and lastly to 270°. But Student A does not remember whether he was directed to turn to the left or right. He remembered that it was not the short turn which takes as long as 30 seconds. In accordance with the student training procedures, Student A banked the airplane 15° for the first

*3 "Low-altitude maneuver training" refers to a course of training in which a student flies at a low altitude along a route set using ground references as standards.

*4 The hood referred here is a hood a student wears on his/her head for instrument flight training to restrict his/her field of view to instruments from outside ground reference. (See the photo above)

turn to 270° and 21° for subsequent turns. Up to that time, he made these turns at 2,500 ft, and after the last turn, Instructor A instructed him to climb. After asking Instructor A to confirm the safety of the upper air, the Student A began to climb with full throttle after hearing Instructor A's call "Clear." Since part of the left window was in his field of view in spite of the hooded condition, he saw white clouds whizz away through the window.

Just before the crash, Instructor A shouted "Ah!" and pulled the control wheel. The Student A saw the verdant mountain slope beyond the hood with a raised head, and then the airplane collided with trees. Student A was holding the control wheel with his left hand and the throttle with his right hand putting his feet on the rudder pedals. He does not remember how the airplane was controlled except for the fact that Instructor A pulled the control wheel.

Immediately after the airplane halted on the ground, flames were just in front of him and were coming into the cockpit through the front opening created when the windshield fell off. Student A quickly unfastened his restraints, and he jumped out of the airplane through the opening feeling searing heat as the flames came in. When he evacuated from the airplane, its front airframe was burning, and the flames soon spread to the entire fuselage. Student A called the names of the other three, but there was no reply, and then he left the accident site for help.

During the hooded BIF, Student A flew the airplane following Instructor A's instructions, and the instructor was in charge of staying in the Training Areas, outside watch, and avoiding obstacles. Whenever Student A asked Instructor A for outside watch, the latter replied, "Clear." During the training, Student A constantly received detailed instructions until the moment before the occurrence of the accident. While he was flying, Student A did not hear the voices of Instructor B and Student B even once.

During the flight, Student A found no anomalies in the airplane.

In the past training sessions, Student A had not heard another instructor give advice to him, who was on board the airplane for educational and research purpose (hereinafter referred to as "Observer Instructor"). When the Student A was in the rear seat, he informed the other student in the front seat of obstacles such as other airplanes and birds the latter did not notice, but he had not confirmed safety together with the instructor at the instruction of the student flying. On these occasions, Student A had usually concentrated his attention on how the other student flied the airplane and how it was manifested on the instrument reading.

Student A had experience using the Training Areas but had not trained in the western part of the airspace over the mountains.

2.1.4 Statement of the Controller

The airplane was the sole airplane that was flying in the Training Areas. At first, Student A was in charge of the radio communications, but when the airplane left the control zone, Instructor A took it over. At that time, the secondary radar indicated that the airplane was flying just outside of the Obihiro control zone, close to 6 nm northwest of the Obihiro Airport, at 2,500 ft.

At the Airport, the wind direction ranged from 240° to 260°, and the wind velocity was low, less than 5 kt. There was no cloud in the sky. Skiing grounds in Shin-arashi, located about 12 nms northwest of the Obihiro Airport, were visible, but mountains further west there were invisible as they were veiled by spring haze.

2.1.5 Statement of the Operation Engineer

The Operation Engineer at the Branch School received reports from the airplane that it had

taken off at 09:11 and that it had entered the Training Areas at about 09:15. The engineer was unaware of the emergency situation of the airplane until he received the call from the Rescue Coordination Center (RCC), Civil Aviation Bureau (CAB), Ministry of Land, Infrastructure, Transport and Tourism (MLIT) at about 09:40 that the airplane's emergency locator transmitter (hereinafter referred to as the "ELT*5") had been emitting distress signals. At 09:42 he called the airplane over the radio, but there was no reply.

On the day of the accident, the ridges of the mountains were slightly covered with clouds, but the wind was weak, and no unusual meteorological phenomenon was observed.

2.1.6 Statement of the Eyewitness

At about 09:20, when the eyewitness was pedaling near her house in Kamibisei, Memuro-cho, Kasai-gun, she saw the Branch School airplane fly from the east, slowly turn to the right just above her showing its belly, and head northward.

The accident occurred about 910 meters above sea level in Mt. Tsurugi in Memuro-cho, Kasai-gun, Hokkaido (42° 50' 21" N, 142° 53' 16" E) at about 09:22.

(See Figure 2 "Estimated Flight Route" and Photo 1 "Accident Site")

2.2 Injuries to Persons

Instructor A, Instructor B, and Student B suffered fatal injuries while the Student A suffered serious injury.

2.3 Damage to the Airplane

2.3.1 Extent of Damage

Destroyed

2.3.2 Damage to the Airplane Components

Fuselage:	Separated, broken, and burnout
Wings:	Separated and destroyed
Empennage:	Broken
Engine:	Broken
Propeller:	All three blades were bent backward.

2.4 Personnel Information

(1) Captain (Instructor A) Male, Age 44

Commercial pilot certificate (airplane)	
Type rating for single-engine (land)	October 3, 2007
Flight instructor certificate	October 3, 2007
Class 1 aviation medical certificate	
Validity	February 16, 2012
Total flight time	4,843 hrs 45 min

*5 In cases of distress, a crash and so forth, an ELT emits a distress signal (on 121.5 MHz, 243.0 MHz, and 406 MHz waveband) to help locating the distress site.

Flight time in the last 30 days	41 hrs 55 min
Total flight time on the type of airplane	1,810 hrs 35 min
Flight time in the last 30 days	41 hrs 55 min

The days when Instructor A flew during the seven-month period preceding the day of the accident are as listed in Attachment 1 "Flight Days for Instructor A and the Allowable Medicine Intake per Month".

(2) Instructor B Male, Age 45

Commercial pilot certificate (airplane)	
Type rating for single-engine (land)	August 12, 1994
Flight instructor certificate	July 23, 2009
Class 1 aviation medical certificate	
Validity	May 5, 2012
Total flight time	9,572 hrs 23 min
Flight time in the last 30 days	25 hrs 30 min
Total flight time on the type of airplane	1,040 hrs 50 min
Flight time in the last 30 days	25 hrs 30 min

(3) Student A Male, Age 23

Student pilot permission	
Validity	March 15, 2012
Total flight time	54 hrs 30 min
Flight time in the last 30 days	19 hrs 20 min
Total flight time on the type of airplane	54 hrs 30 min
Flight time in the last 30 days	19 hrs 20 min

(4) Student B Male, Age 23

Student pilot permission	
Validity	March 15, 2012
Total flight time	45 hrs 30 min
Flight time in the last 30 days	20 hrs 40 min
Total flight time on the type of airplane	45 hrs 30 min
Flight time in the last 30 days	20 hrs 40 min

2.5 Airplane Information

2.5.1 Airplane

Type	Beechcraft A36
Serial number	E-2843
Date of manufacture	January 26, 1994
Certificate of airworthiness	DAI TO-22-469
Validity	December 20, 2011
Category of airworthiness	Airplane Utility, U
Total flight time	9,199 hrs 30 min
Flight time since last periodical check (100 hours check on June 20, 2011)	47 hrs 49 min

(See Figure 3 "Three-View Drawing of a Beechcraft A36")

2.5.2 Weight and Balance

When the accident occurred, the weight of the airplane was estimated to have been 3,589 pounds, and that the position of center of gravity (CG) was estimated to have been at 81.06 inches aft of the reference plane. It is therefore highly probable that both the weight and the center of gravity were within the allowable range (the maximum take-off weight: 3,650 pounds; the CG range that corresponds to the weight at the time of the accident: 79.82 to 87.70 inches).

2.5.3 Fuel and Lubricating Oil

The fuel and lubricant used were aviation gasoline 100 and Phillips MT20W-50, respectively.

2.6 Meteorological Information

2.6.1 Overview

According to the Asia Pacific Surface Analysis Chart at 09:00 on July 28, as a stationary front extending from east to west stayed over the Tohoku region. Hokkaido and its vicinity were covered by a south-bound slowly moving high-pressure system with its center located over the eastern part of Hokkaido.

According to the 850-hpa upper-level weather chart (at an altitude of about 1,500 meters) at 09:00 on July 28, in Wakkanai, the southwest wind was blowing at 5 kt with the dew-point depression (temperature minus the dew point) at 4.6 °C. In Sapporo, the southeast wind was blowing at 5 kt with the dew-point depression at 4.8 °C. In Kushiro, the east-southeast wind was blowing at 5 kt or less with the dew-point depression at 4.9 °C. With the wind blowing weakly there, the sky above Hokkaido at about 1,500 meters above sea level was not included in the wet area (the dew-point depression less than 3 °C).

(See Figure 4 "Weather Maps")

2.6.2 Information from the Wind Profiler

The information from the wind profiler above Obihiro (42.92° N, 143.21° E) during the time period when the accident occurred is as listed below.

Table 1: Observed Values by the Wind Profiler

Altitude	1 km (about 3,300 ft)		2 km (about 6,700 ft)	
Wind	Wind direction	Wind velocity (m/s)	Wind direction	Wind velocity (m/s)
09:00	Northeast	1	South	4
10:00	East-southeast	2	West	2

2.6.3 Aeronautical Weather Information at Obihiro Airport

The aviation weather values observed at the Obihiro Airport Branch, New Chitose Aviation Weather Station, located about 30 km southeast of the accident site, during the time period when the accident occurred, are as listed below.

09:00 Wind direction: variable; wind velocity: 1 kt; CAVOK; prevailing visibility: 20 km;
Cloud: Amount 7/8, Type Altocumuli, Cloud base 9,000 ft
Temperature 22°C; Dew point 18°C
Altimeter setting (QNH) 29.91 inHg

10:00 Wind direction: variable; wind velocity: 2 kt; CAVOK; prevailing visibility: 20 km;
Cloud: Amount 1/8, Type Stratus, Cloud base 4,000 ft
Amount 6/8, Type Altocumuli, Cloud base 9,000 ft
Temperature 24°C; Dew point 20°C
Altimeter setting (QNH) 29.88 inHg

2.6.4 Information from Regional Agricultural Weather Information System

Memuro-cho (Kasai-gun, Hokkaido), where the Training Areas falls on, has automated meteorological observation equipment as part of its regional agricultural weather information system. The observation data obtained at locations of Kamibisei, Shibuyama, Kamifushiko, and Bisei, all close to the mountain included in Figure 2, is listed below as follows:

Table 2: Observation Data from Memuro-cho's Regional Agricultural Weather Information Facilities

Location	Time (Hour)	Precipitation (mm)	Wind direction	Wind velocity (m/sec)	Temperature (°C)	Humidity (%)	Sunshine duration (min)	Amount of solar radiation (kW/m²)
Kamibisei	09:00	0	East-southeast	0.5	23.0	73.5	0	0.22
	10:00	0	North	0.6	25.3	68.2	36	1.44
	11:00	0	Northeast	0.9	26.2	78.0	60	1.81
Shibuyama	09:00	0	Southeast	1.0	22.7	70.9	0	1.02
	10:00	0	East-southeast	1.6	25.4	62.4	55	2.02
	11:00	0	Northeast	1.8	26.5	62.4	60	2.70
Kamifushiko	09:00	0	East-southeast	1.3	23.5	74.4	5	1.09
	10:00	0	West-southwest	1.3	24.6	68.6	60	2.04
	11:00	0	East	2.3	27.8	59.6	60	2.64
Bisei	09:00	0	Southeast	0.9	22.2	75.2	0	0.97
	10:00	0	Southeast	0.6	23.9	63.3	33	1.81
	11:00	0	East-northeast	0.8	26.2	61.2	60	2.61

2.6.5 Other Meteorological Information

(1) Information from Monitoring Camera at Nearby Business Site

A business site located about 9 km southeast of the accident site had a rotating

monitoring camera shown in Figure 2 which took one still picture once in every second. The images were recorded in a VTR.

The image recorded at 09:22:05 on the day of the accident shows that the upper half of Mt. Tsurugi was covered with clouds. Its top was invisible, and these clouds had spread to its surrounding areas. At 10:04:45, blue skies were seen around the mountain although the top was covered with low cumuli.

The built-in VTR clock was five minutes and 11 seconds faster than the actual time (The times listed above are corrected ones).

(2) Information from a climber of Mt. Tsurugi

At about 10:05 on the day of the accident, the climber was at the top of Mt. Tsurugi and took photographs. The top was above the clouds. When he looked down, he could see only the part of the far scenery due to the cloud cover beneath him. Cloud cover touching the top of the mountain spread east.

(See Figure 5 "Clouds Observed at the Time of the Accident", Photo 3 "Near the Top of Mt. Tsurugi (1) (taken at about 10:05; by courtesy of a climber of Mt. Tsurugi)", Photo 4 "Near the Top of Mt. Tsurugi (2) (taken at about 10:05; by courtesy of a climber of Mt. Tsurugi)" and Photo 5 "Image from the Monitoring Camera (at about 10:04:45, time corrected)")

2.7 Information on Communications

2.7.1 Airplane

The airplane was normally communicating with air traffic controllers, and there was no abnormality in the communications.

2.7.2 Position Report and Operation Status Report

The student training procedures (detailed procedures for the Obihiro curriculum) established by the Branch School carries the following chapters (excerpts):

Chapter 3 Implementation of Flight Training

6. Use of the Training Area and Examples of Communication Terms Used When Passing through the Area

(Omitted)

An airplane shall monitor "Obihiro" on 123.4 MHz by COM2[6] and report the position and the status of its operation roughly once every 30 minutes.* (The rest is omitted)

2.8 Accident Site and Wreckage Information

2.8.1 Accident Site

Mt. Tsurugi (elevation 1,205.1 meters) is located about 30 km northwest of Obihiro Airport extending into the Tokachi Plains. The mountain sits at the eastern end of the Hidaka Mountain range which consists of mountains most of them more than 2,000 meters. The accident site was on the east side of a ridge that extends south from Mt. Tsurugi (hereinafter referred to as "Ridge 4"). Further to the east of Ridge 4 are three more ridges (Ridge 3, Ridge 2, and Ridge 1), all stretching southward. The fuselage was found on the south slope with a 40-degree inclination, about 1,080 meters south-southeast of Mt. Tsurugi top and about 910 meters above sea level. The area around

*6 COM2 is a radio used at the Branch School for communications with the training airplanes.

the accident site is comprised of 10-meter high trees with its ground covered with bamboo grass and shrubs as well as exposed rocks at some places.

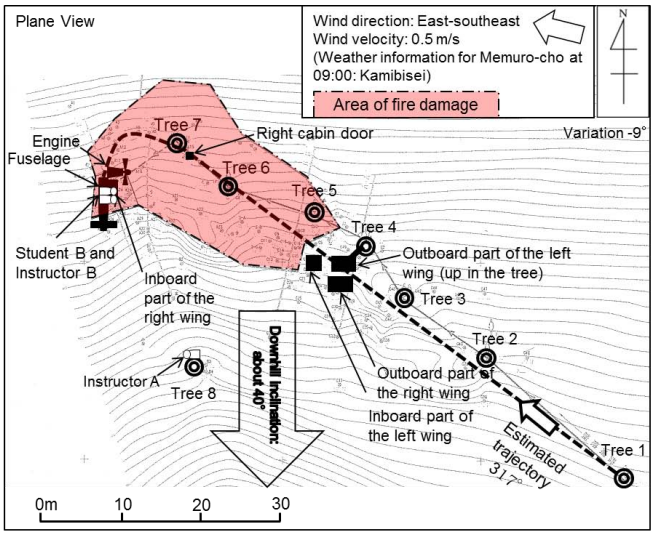
Both wings had come off and had been heavily damaged; besides most of its cabin had been consumed by fire.

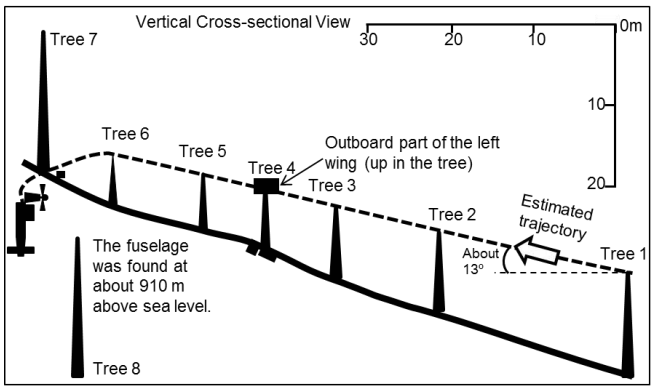
At the accident site, due to the fire, bamboo grass was charred in an area of about 20 meters in width by about 30 meters in length which corresponds to the area near the place where the both wings were located to the one where the fuselage was located. Parts of trees in this area were charred also. The engine sat on the ground upside down, and there was no trace of fire to the part having been in contact with ground surface.

(See the figure below, Figure 2 "Estimated Flight Route," Photo 1 "Accident Site," and Photo 2 "Wreckage of the Airplane")

2.8.2 Tree Locations and Damage Caused by the Airplane

About five meters northeast of the airplane's fuselage there was Tree 7 (as shown in the right figure), and the fragmented wreckage of the airplane scattered around the base of the trunk. The right door was lying about three meters southeast of the Tree 7. Further to the southeast there were Trees 6 and 5. Their tops were damaged and the surface of their trunks was scorched black up to several meters from the ground. On the southeast side of the two trees there was Tree 4 which had no trace of fire. The detached outboard part of the left wing was dangling from the tree with part of it stuck into it. The inboard part of the left wing and the outboard part of the right wing were lying near the base of Tree 4. Southeast of Tree 4 there were Trees 3, 2, and 1, lining up in an almost straight line with their tops broken. These trees had no trace of fire.





Study of each location of Trees 1 to 7 and the height of the tree damage caused by the airplane indicated that Tree 7 stands about 70 meters and 317 degrees from Tree 1. The angle of ascent from Tree 1 to 6 was 13 degrees.

2.8.3 Detailed Airplane Damage

2.8.3.1 Fuselage

The fuselage was separated into three parts: the engine, cabin, and empennage. The engine was separated from the fuselage aft of the fire wall, and the upper part of the cabin exterior was

deformed by fire. The empennage was separated from the fuselage in front of the dorsal fin.

2.8.3.2 Wings

The left wing was separated from the fuselage and was further divided into two sections: the outboard and inboard sections. The outboard section had deep dents across the leading edge; a tree branch dug into the wing as far as a spar at 1.4 meters from its wingtip. Exterior skin was folded like bellows along the spar. The inboard section was separated from the fuselage at the wing root, and was deformed to have lost original shape. The retracted main landing gear was separated and was found on the ground. The cross-section of the separated wing had irregular deformation with severe damage.

The right wing was separated into two sections along the line two meters from its wingtip (the boundary between the flap and the aileron). The outboard section had dents across the leading edge. Spars were pushed back along the separation line. Nearby leading edge had large deformation with rivets headed, which secure the leading edge in place. The inboard section, being consumed by fire, lay upside down beneath the fuselage facing aft.

2.8.3.3 Empennage

The vertical fin was separated from its root and its leading edge was deformed backward; however, the rudder was still attached. The right and left horizontal stabilizers and elevators had irregular deformation and cracks; the outboard half of the left elevator was gone.

2.8.3.4 Engine

The alternator and the battery's cover, both mounted on the right-hand side of the engine was gone, and the head cover for the fifth cylinder located in the right front of the six-cylinder engine was broken.

Each cylinder has two ignition plugs, one at its top and the other at its bottom, and only the ignition plug at the bottom of the fifth cylinder was separated outside the portion of the plug that had been attached to the cylinder. A visual inspection of all ignition plugs removed from the cylinders found no sign of abnormal combustion.

The connectivity of control cables was confirmed for the throttle, the mixture, and the governor which controls the propeller rotation. Each control opening was: the throttle, fully open; the mixture, full-rich; and the propeller, high revolution.

2.8.3.5 Propeller

None of the three propeller blades were broken or destroyed, but all of them were twisted irregularly and bent backward.

The spinner was severely deformed due to the force that had been applied from the front, but there was no concentric circular scratch indicative of propeller rotation.

(See Photo 6 "Damage to the Propeller")

2.8.3.6 Instruments

The fire consumed most of the instruments. The fire damaged the vertical speed indicator, but it retained the condition that enabled to confirm that the airplane had been climbing at about 800 ft/min.

(See Photo 7 "Vertical Speed Indicator")

2.9 Medical Information

2.9.1 Information on Deaths and Injuries

The autopsy conducted by the Obihiro Police Station indicated that Instructor A had died from head injury caused by banging with 80% of his skin suffering from burn injuries. Instructor B and Student B were burnt to death. Instructor A's blood tested negative for alcohol and drugs.

Student A had severe burn injury.

2.9.2 Information on Aviation Medical Examinations for Instructor A

(1) Information on the Aviation Medical Certificate Application

When Instructor A submitted the application form for annual aviation medical examination on January 24, 2011 he filled the field of current medication (including external medicine and hypnotics) writing Onon[*7]. An appointed doctor for Aviation Medical Examination filled the comment field stating that "Allergic rhinitis would not hinder the performance of aviation duties." The doctor's comment for the year 2009 was: It was diagnosed that the medication for allergic rhinitis would not hinder the performance of aviation duties. That for the year 2010 application was: It was diagnosed that treatment for allergic rhinitis would not hinder the performance of aviation duties. These doctors were different persons.

(2) Information on Standards for Aviation Medical Examinations

<1> Attached Table 4 "Standards for Medical Examinations" of the Ordinance for Enforcement of the Civil Aeronautics Act (established on July 31, 1952; Ministry of Transport Ordinance No. 56) states as follows (excerpts):

1. General

(Omitted)

(7) Pilots shall not have any allergic diseases that may hinder the performance of aviation duties. (The rest is omitted.)

<2> Notification by the Director-General of the Civil Aviation Bureau "Manual for Aviation Medical Examinations" (issued on March 2, 2007; Kokukujo No. 531) states as follows (excerpts):

II. General Notes and Procedures for Aviation Medical Examinations and Certification

(Omitted)

3. Methods of Medical Examinations

3-1 Appointed doctors or doctors who are engaged in examinations at institutions appointed for aviation medical examinations (hereinafter referred to as "Examination Doctors") must strive to confirm facts about the medical history, use of medical and pharmaceutical products, and so forth declared by applicants by interviewing them. In such cases, with the consent of the applicants, the appointed doctors or Examination Doctors must strive to obtain a clear understanding of the medical history, use of such products, and so forth by obtaining required information from doctors in charge of the daily health care of

*7 Onon (product name) is a drug to treat bronchial asthma and allergic rhinitis (leukotriene receptor antagonist). One of its side effects is sleepiness.

the applicants, their families, and other appropriate persons as necessary.

(Omitted)

III. Aviation Medical Examination Items, and so forth

1. General

(Omitted)

1-7 Allergic Diseases

1. Standards for Medical Examinations

Pilots shall not have any allergic diseases that may hinder the performance of aviation duties.

2. Non-conformity

2-1 Allergic rhinitis with a high level of nasal obstruction

(Omitted)

3. Examination Methods and Notes for Examinations

(Omitted)

3-2 If non-conformity as stipulated in 2 is suspected mainly through medical history and interviews, it shall carefully be examined and confirmed through diagnoses by ENT doctors, ophthalmologists, and dermatologists as necessary.

4. Notes for evaluations

4-1 Notwithstanding the provision of non-conformity in 2 above, if symptoms such as itchiness, lacrimation, and a runny nose are minor and are unlikely to hinder the performance of aviation duties, they shall be considered as suitable for the performance of aviation duties.

4-2 If allergic symptoms are controlled using medicines for external application (such as nasal spray, eye lotions, ointment, cream, and aerosol) or hyposensitization therapies, they shall be considered as suitable for the performance of aviation duties. If internal medicines are taken, they shall be considered as suitable if they are non-sedative antihistaminic agents (limited to the second generation of antihistaminic agents) or anti-allergic agents, and if it is confirmed by an appointed doctor or the airline's industrial physician familiar with aviation medicine based on the past use experience that they do not have side effects such as sleepiness and decline in concentration. Pilots shall not be engaged in the performance of aviation duties, however, until at least twice as long as the ordinary interval of administration passes after the internal medicine is taken. (The rest is omitted.)

<3> Notification by the Director of the Personnel Licensing Division, Engineering Department, Civil Aviation Bureau, Ministry of Land, Infrastructure, Transport and Tourism "Guidelines for the Handling of Medical and Pharmaceutical Products Used by Airplane Crew" (issued on March 30, 2005; Kokukujo No. 491; hereinafter referred to as the "Guidelines for the Handling of Medical and Pharmaceutical Products") states as follows (excerpts):

3. Operational Guidelines for Use of Medical and Pharmaceutical Products

(Omitted)

B. Medical and Pharmaceutical Products That Require Individual Evaluations by an

Appointed Doctor or Aviation Industrial Physician When Used during the Performance of Aviation Duties

If they use any of the medical and pharmaceutical products listed below, airplane crew members must not be engaged in the performance of aviation duties unless, from the viewpoint of the effects of such products on the normal operation of airplane and conformity to the standards for medical examinations, an appointed doctor or an aviation industrial physician confirms the degree of diseases for which they are used, their side effects, and other factors.

(Omitted)

- *Non-sedative antihistaminic agents (limited to the second generation of antihistaminic agents) and anti-allergic agents*

  It must be confirmed by an appointed doctor or an aviation industrial physician based on the past use experience that these agents do not have side effects such as sleepiness and decline in concentration. Airplane crew members shall not be engaged in the performance of aviation duties, however, until at least twice as long as the ordinary interval of administration passes after the internal medicine is taken (16 hours if the agent is prescribed so that it is taken three times a day and 24 hours if the agent is prescribed so that it is taken twice a day).

(3) Information from the Designated Aviation Medical Examiner for Instructor A

On January 31, 2011, following the submission of the application for an aviation medical certificate mentioned above, the designated aviation medical examiner who conducted aviation medical examinations for Instructor A (hereinafter referred to as the "Designated Examiner") determined that Instructor A was suitable for such a certificate, issued an aviation medical certificate to him, and returned the application form to him.

The Designated Examiner heard from Instructor A that the he was taking Onon capsules but that he was in a good condition; but did not confirm the prescription.

(4) Information from the doctor who prescribed the medicine for Instructor A

The doctor who prescribed the medicine for Instructor A instructed him to take four 112.5-mg Onon capsules a day, two in the morning and the rest in the evening, to treat allergic rhinitis. At first, the doctor prescribed the medicine for two weeks, but since Instructor A always visited the doctor's hospital without fail when he was almost running out of the medicine, the doctor recently wrote a prescription for three months. The last day when Instructor A visited the clinic was June 11, 2011, and the day when he saw the doctor prior to the last was March 12, 2011. The doctor firmly believed that Instructor A was taking the medicine as prescribed because the instructor would not have visited the clinic if he still had had extra capsules. In April 2007, when he visited the clinic for the first time, he told the doctor that he was a pilot, and the doctor prescribed Onon believing that it has no side effect of sleepiness.

(5) Information from the Medical Officer at the Secretariat of the JTSB

It is non-problematic if a flight crew takes Onon internally according to the Manual for Aviation Medical Examinations at an interval that suits the schedules for flight operations. But if he/she continues to take four capsules of Onon a day in two doses without having an interval, he/she would not pass aviation medical examinations.

General medical practitioners at least know that pilots must not feel sleepy while on

duty, but may inadvertently prescribe medicines without knowing the detailed regulations with which aviation workers are required to comply. Few doctors understand details of the aviation medical examinations.

(6) Interpretation on Medical Drugs and Response made by the Flight Standards Division, Aviation Safety and Security Department, CAB

<1> The designated aviation medical examiner appointed for aviation medical examinations may determine that Instructor A passes aviation medical examinations if it is confirmed based on the past use experience that Onon does not have side effects such as sleepiness and degraded concentration on the instructor.

<2> If he takes a medicine for internal application as prescribed, Instructor A is not allowed to be engaged in the aviation duties unless at least twice as long as the ordinary interval of administration passes after he takes the medicine.

<3> Guidelines for the Handling of Medical and Pharmaceutical Products stipulates that it must be confirmed by an appointed doctor or an aviation industrial physician based on the past use experience that such products do not have side effects such as sleepiness and degraded concentration, with provisory clause that aircrew must not be engaged in the aviation duties until at least twice as long as the ordinary interval of administration passes after the dosage is taken (16 hours if the dosage is prescribed to take three times a day and 24 hours if the dosage is prescribed to take twice a day). When these guidelines were established and revised, the Ministry of Land, Infrastructure, Transport and Tourism made these guidelines known to flight crew members through designated domestic air carriers, All Japan Air Transport and Service Association Co., Ltd., Japan Aircraft Pilot Association, and Japan Soaring Association.

<4> Medical drugs are used for remedies against diseases and aircrew have access to effective medical treatment using drugs. When aircrew use medical drugs for treatment, his/her medical competence should be judged under the effect of medical drugs—no medical examination is necessary under medicine-effect-free conditions. If he/she becomes physically unfit to the medical standards after the termination of chronic medicine use, article 71, Civil Aeronautics Act prohibits his/her aviation duties.

Such anti-allergic agent involved in this event falls under the group B in Guidelines for the Handling of Medical and Pharmaceutical Products. Onon is considered to be a general prescription for light symptoms and its consumption has no effect on the result of aviation medical examination.

(7) Interpretation on handling of medical drugs by the College at the time of the interview

At the hearing of opinions held at the JTSB on June 17, 2013, the College expressed that "Pilots are not doctors. If you are told that you should understand the contents of the "Guidelines for the Handling of Medical and Pharmaceutical Products", it is difficult without receiving clear explanation from a doctor. It is reality."

2.10 Search and Rescue

At 09:28 on the day of the accident, the search and rescue satellite COSPAS-SARSAT picked up ELT signals from the airplane, and then at 09:36, the Tokyo RCC obtained that information from the search and rescue system. Later, the airplane was searched through communications, and the police authorities, Japan Coast Guard, Self-Defense Forces, and the Branch School joined

the search using aircraft and ground personnel.

At 12:46, Student A was discovered by a patrolling police officer as he climbed down the mountain by his own efforts. At 12:50, the Obihiro Fire Station received a request for emergency mobilization, and at 12:54, it dispatched an ambulance. The ambulance attendant picked up Student A at 13:08 and drove him to a hospital at 13:42.

At 13:54, a Self-Defense Forces aircraft spotted the airplane. At 15:30, police officers who were airlifted to the accident site by aircraft confirmed the registration number of the airplane. At 15:55, Student B and Instructor B were found in the cabin and Instructor A at the base of Tree 8, about 25 meters downhill from Tree 7. All bodies were airlifted to hospitals and other facilities.

(See the horizontal plane map on page 10.)

2.11 Tests and Research

A flight examination was conducted to analyze the reliability of the estimated flight route from 10:30 to 11:30, July 2, 2013. One JTSB member and the IIC boarded an airplane flown by an instructor of the Branch School. The results are as follows:

(1) Weather conditions during the flight examination

<a> The aviation weather values observed at the Obihiro Airport

11:00 Wind direction: variable; wind velocity: 3 kt; prevailing visibility: 15km;
Cloud: Amount 1/8, Type Cumuli, Cloud base 4,000 ft
Temperature 24°C; Dew point 19°C
Altimeter setting (QNH) 29.94 inHg

<b> View from the control tower

A silhouette of Mt. Shin-arashi was visible, but skiing grounds there were not due to haze. Mountains farther west were not visible, either.

<c> Flight visibility

At an altitude of 2,500 ft Mt. Tsurugi was visible from every location on the flight route. The in-flight weather conditions were favorable for flight training.

(2) Examination of the estimated flight route

The flight tracking the estimated flight route started after giving an instruction to the instructor to take evasive maneuvers in case of safety uncertainty in order to maintain VMC and minimum safe altitude.

After flying 270° at 2,500 ft the airplane reached the location where the eyewitness was and made a right turn to 360° with 21° angle of bank. Upon starting the right turn Mt. Tsurugi came into view in front of the airplane causing the instructor to climb. Before the next run on the same track, the instructor was advised to maintain 2,500 ft and take a right evasive maneuver in case of safety uncertainty. In the second time, the instructor also started the right turn to 360° over the eyewitness location as he did previously. The ridge protruding from Mt. Tsurugi came into view in front blocking the its path forcing the airplane to veer to the right at vicinity of the east of the accident site.

In order to simulate the last leg of the estimated route the climbing flight started in 270°

at 2,500 ft. Mt. Tsurugi came into view in front blocking its path forcing the airplane to veer to the north before reaching the ridge.

(3) Low altitude maneuver in the designated area

Simulated low altitude maneuvers were done using geographical features in the Training Areas used by the School. The weather condition did not affect the training.

(4) Expanse of the training airspace

A simulated BIF was performed flying due south from the northern edge of the Training Areas. The airspace east of Mt. Shin-arashi had enough space for the training. No other airplane flew in the airspace.

(5) View from forward right seat

The member sat in the seat rounding off the back to the height of Instructor B. During the level straight flight upper edge of the glare shield was seen overlapping the horizon 20° to the right from the front. Although the glare shield blocks the horizon during the climb, the scenery in front of it was visible by shifting the visual point upwards. As the right door window extends below the glare shield, good field of view is possible in the area further to the right from 20° from the front regardless of the visual point.

(6) View from the rear seat

Due to the low setting of the rear seat and forward seatback, forward field view is limited. The lateral field of view covers from diagonally forward to aft except the area blocked by the right wing. The field of view of the left side of the airplane was also good.

2.12 Information on Organization and Management

2.12.1 Training Information Described by the Deputy Head Instructor at the Branch School

In addition to its main school, the Civil Aviation College has branch schools in Obihiro and Sendai. Students can obtain a commercial pilot license for multi-engine airplane and an instrument flight certificate when they graduate after completing all required courses at each school. The BIF is done simulating low visibility conditions by wearing hood around student's head in order to fly the airplane acquiring airplane's attitude, altitude, velocity, and course depending only on instrument readings. There is no argument that this training must be conducted while maintaining visual meteorological condition. During BIF, the student does not know his/her present position because he/she cannot see any outside objects nor does he/she have the ability to measure the position of airplane using aeronautical radio navigation aids. Therefore, his/ her instructor must take full responsibility for such as staying in the Training Areas, radio communications with ATC. In BIF, on the other hand, the instructor confirms the position of the airplane mainly using local targets because he needs to tell the student such targets though he has the ability to use aeronautical radio navigation aids. With long experience in teaching at the Branch School, Instructor A was familiar with the geography of the Training Areas.

The Observer Instructor boards the training airplane to standardize teaching methods and study other instructors' teaching techniques in order to use them for his/her own teaching

methods, and during the flight, he/she seldom makes comments on teaching. On the other hand, the Observer Instructor is not required by law for outside watch, but if he/she feels a danger, he/she should naturally give safety advice.

During BIF, the airplane climbs at 110 kt in accordance with the student training procedures, and during such climb, usual rate of climb is about 600-700 ft/min. Specific procedure is: the instructor gives an climb instruction during cruising (134 kt), student repeats the instruction, raises the pitch attitude by about eight degrees and wait for the air speed to decrease, upon reaching 115 kt, increases engine output to full power to climb at 110 kt. It takes about ten seconds from the instructor's instruction to the completion of the student's read-back, and another ten seconds or so before the climbing is completed. During this time period, the airplane gains about 100 ft.

On the morning of the day of the accident, the deputy head instructor heard the voice of Instructor A resound in the briefing room and felt that Instructor A was as physically and emotionally healthy as usual. The deputy head instructor did not know Instructor A's health problems or his medication.

The College had established Safety Management Regulation, Independent Administrative Institution Civil Aviation College, (hereinafter referred to as "the Safety Management Manual" and introduced a safety management system headed by the deputy head instructor, as an acting chairman of the Branch School's Safety Committee. When it receives safety reports such as pilot reports, maintenance reports, and potential incident reports, the Safety Committee examines them, works out countermeasures, and manages risks in order to ensure the safety of training. The opinions of students are collected through questionnaire survey of anonymous when they complete each course; however, in most cases, students comment on teaching methods and student welfare rather than safety issues. A suggestion box is installed in the hallway so that students can easily submit potential incident reports. Thus, the College is striving to cultivate a culture of reporting.
(See Attachment 2 "Organizational Chart of the Independent Administrative Institution Civil Aviation College (When the Accident Occurred)")

2.12.2 Statement of Instructor C—the Head Instructor at the Branch School

The head instructor was in a position of supervising Instructor A; however, he did not go as far as to instruct him not to enter clouds during training based on VFR, an act that is usually avoided from a common sense point of view, assuming that Instructor A had airman's common sense as he possessed a commercial pilot certificate and a flight instructor certificate. The head instructor was not aware that Instructor A had committed the thoughtless act of entering clouds during VFR training (as described in 2.12.3(1)) because neither students nor other instructors kept him out of the loop.

The head instructor also assumed that as an airman, Instructor A followed common sense to take medicines. All he knew was that Instructor A underwent aviation medical examinations, and since there were no regulations requiring the head instructor to confirm the application for certification of aviation medical examinations, he did not know that Instructor A was taking Onon regularly.

Instructor C gave his personal comments as follows: During BIF, students can see small portion of the outside scenery through left window even under hooded condition, so they notice

even a small movement of the airplane, which usually is not discernable under instrument flight. Probably because of this, the airplane tends to become stable under good visibility while it loses stability under poor visibility. Entering clouds during BIF is out of the question and extremely a dangerous act. There is no means of sensing proximity to the ground because the airplane is not equipped with a ground proximity warning system (GPWS).

2.12.3 Information from the College Students

The statements of several students at the College, who were taught by Instructor A, are as follows:

(1) Experience of entering clouds during training with Instructor A

<1> Several students had experience of entering clouds during VFR training with Instructor A, and all students who received BIF had experience of entering clouds at least once. Those clouds were small clouds, wispy clouds or thin clouds.

<2> Students who entered clouds during BIF were instructed by Instructor A to change their training plan from non-BIF to BIF on cloudy days and from BIF to non-BIF on fine days in the pre-flight briefing. Instructor A did not avoid clouds even if he saw them ahead saying "Clear" so that students assumed that Instructor A intentionally entered clouds. When they entered clouds, the students became uneasy because everything around them became white. They thought that it was dangerous to do so, and wondered whether they were permitted by the regulations. But Instructor A told the students never to enter clouds except during BIF.

<3> During training other than BIF, when approaching small clouds, students tried to avoid them, but Instructor A told them to keep flying straight, and then the students momentarily entered the clouds. Afterward, Instructor A told them that visibility would become zero when they entered clouds, and that the airplane would jolt in the clouds. Students knew that the regulations prohibited them from entering clouds, but they entered clouds believing in Instructor A.

<4> Instructor A told all students who did not have experience of entering clouds that they must not enter clouds because it was illegal to do so.

(2) Training Areas

According to the students, since the western half of the Training Areas was mountainous, students trained above the plains on the east side of the area and did not fly to the west of Mt. Shin-arashi.

(3) Observer Instructor

According to the students, during flights, the Observer Instructor practically did not speak.

(4) Utilization of the reporting system

Students also submitted potential incident reports, showing cases of mistaken operation of landing gear and unsafe flights on the airfield traffic pattern. However, students found it difficult to report entering clouds during VFR flight training as a potential incident report, and didn't submit even by another type of report.

(5) Impressions of Instructor A

According to the students, impressions of Instructor A were: passionate, caring, very attentive to students, quick tempered, safety first, healthy, eager to instill

safety and emergency procedures, thoughtful to students, strict, angry, funny, micro managing and difficult to talk to.

2.12.4 Number of Accidents in Which the College is Involved

The number of accidents that occurred at the College in 1974 and thereafter, for which statistical data were available, and the number of such accidents per 100,000 flight hours are as shown in the table below.

Table 3: Number of Accidents That Occurred at the College and the Number of Such Accidents per 100,000 Flight Hours

Period	Flight hours	Fatal accidents		Other accidents		Total	
		Number of accidents	Per 100,000 hours	Number of accidents	Per 100,000 hours	Number of accidents	Per 100,000 hours
1974-1981 (Eight years)	200,040 (Estimated)	1	0.50	7	3.50	8	4.00
1982-1991 (Ten years)	246,300 (Estimated)	0	0	4	1.62	4	1.62
1992-2001 (Ten years)	224,210 (Estimated)	0	0	2	0.89	2	0.89
2002-2011 (Ten years)	166,817	3 (2002) (2003) (2011)	1.80	2 (2009) (2010)	1.20	5	3.00
Total	837,367 (Estimated)	4	0.48	15	1.79	19	2.27

* Since records of estimated flight hours for the period before 2001 disappeared, the number of flight hours is obtained by multiplying the expected number of flight hours per student per year by the prescribed number of students for each year.

2.12.5 Information on the Safety Management Manual

The College is an independent administrative institution and its competent minister is the Minister of Land, Infrastructure, Transport and Tourism. On August 2, 2010, in order to become a model for other businesses, it revised the Safety Management Manual, established a safety management system, and announced adoption of the safety management system in its midium-term plan (5-year plan from fiscal 2011) based on the Act on General Rules for Independent Administrative Agency (Law No. 103 of 1999). This action preceded the application of the ICAO Annex1 amendment on November 18, 2010, which requires the introduction of a safety management system. The College also formulated the Basic Safety Policy (Attachment 3) based on the items listed below, which are included in the safety policy in the Safety Management Manual.

(1) Safety is the top priority matter for business administration.

(2) Absolute prevention of accidents and dangerous behaviors is the goal of the College

and it will make every effort to do so.

(3) All executives and employees must always recognize the importance of safety and their responsibility for ensuring and promoting safety. This recognition must be known to the entire organization.

(4) All executives and employees must abide by all relevant Japanese laws and ordinances such as the Civil Aeronautics Act and all regulations of the College, and in case of nonconformity to laws and regulations, swift corrective actions must be taken.

(5) Correct understanding of unsafe elements for safety improvement is an essential function to ensure safety, and to that end, all executives and employees must strive to collect and make the most of safety reports.

2.12.6 Information on Safety Management at the College Based on the Statement of its General Safety Manager

The statement of the President at the College, the General Safety Manager appointed in accordance with the Safety Management Manual, is as follows:

(1) Organization of the College

The primary objective of the College is to produce excellent pilots, who are capable of playing a central role in air transport in Japan, and in order to attain this goal, it is important to ensure safe operation. The College introduced a safety management system in August 2010.

The Minister of Land, Infrastructure, Transport and Tourism has approved the College's annual plan to train 72 pilots.

In case of in-flight anomaly, it is reported to executives such as the General Safety Manager with phone or text message, and safety reports such as pilot reports and maintenance reports are subsequently submitted. Based on these reports, countermeasures are taken. Safety reports are analyzed by the General Safety Promotion Conference or each school's Safety Committee.

Following the fatal accident involving the Main School on July 11, 2003, the College designated July 11 as the Safety Memorial Day of CAC in its Basic Safety Policy. It designates the week which includes July 11 as the "CAC Safety Week." The General Safety Manager takes every opportunity to give a lecture to employees and students to instill the importance of safety into them.

The Main School and each branch school have safety audit regulations, and they cross-audit once a year. The Civil Aviation Bureau conducts audits on an irregular basis on special occasions such as accident. These audits are not intended to inspect the overall safety management systems of the organization but are focused on the safety measures related to individual accidents and so forth.

The General Safety Manager believes that airline companies, for which the College produces capable pilots, have conducted operations giving safety the first priority and do not think safety has to be more or less sacrificed to increase effectiveness of training. For this reason the College conducts instructor recruitment examination, periodical

training/check, and instructor cross observation. He always encourages each instructor and student to submit one potential incident report each year because the reporting system had just started and the recognition among employees and students had not been enough with the fact that he received only 14-15 reports annually.

The College makes the Safety Management Manual known to not only its employees but its students as well.

(2) Safety Management activities regarding the accident

<1> First actions taken after the information on the accident was obtained

On the day of the accident, the General Safety Manager was in Tokyo on a business trip. He received the first report in the train to the effect that the airplane had emitted ELT distress signals and that the Branch School could not establish radio contact with it. He flew to the Branch School. The Main and Branch Schools respectively set up response headquarters as stipulated in the Regulations.

<2> Medical examinations for Instructor A

The College regulation stipulated that each instructor should acquire a medical examination certificate; that it should obtain a clear understanding of what conditions were added to the certificate; and that it should not allow instructors to be engaged in the performance of aviation duties if they were in poor physical condition. The College also made the Guidelines for the Handling of Medical and Pharmaceutical Products known to all instructors.

<3> Instructor A's flight into clouds

The General Safety Manager did not believe that Instructor A was the type of person who ignores safety, nor was he aware of students' stories of flying into clouds.

2.12.7 Introduction of Safety Management Systems at Designated Training Schools

Like the College, designated airmen training schools (hereinafter referred to as "Designated Training Schools) are exempted from whole or part of the examination for airmen competence certification in accordance with the provisions of Article 29 Ⅳ, Paragraph 4, Civil Aeronautics Act. As for their safety management systems, on October 12, 2010, the Procedures for Applications for Designation as an Airman Training School and Examinations Thereof (October 11, 2000; Kokukujo No. 1,197) were partially revised to include establishment of safety management system and so forth in the standards for designation. These standards include the collection of reports and on-site inspections conducted by the Minister of Land, Infrastructure, Transport and Tourism at Designated Training Schools in accordance with Article 134, Paragraphs 1 and 2, Civil Aeronautics Act as necessary. Inspections conducted as necessary consist of inspections of documents and on-site inspections, and it is stipulated that on-site inspections for specified Japanese air carriers shall be conducted about once a year and those for organizations other than specified Japanese air carriers about once every two years.

In addition, the Director of the Personnel Licensing Division, Engineering Department, CAB, MLIT issued the Guidelines for Establishing Safety Management Systems at Designated Airman Training School (October 12, 2010; Kokukujo No. 351). These guidelines stipulate that those who establish Designated Training School shall document matters necessary to establish safety management systems such as management policy and goals for safety initiatives, authority vested in managerial positions, methods for identifying hazards and analyzing risks, and

evaluation and improvement of safety management systems, organize such matters into Safety Management Regulation, and make them known to their entire organization.

These standards do not apply to the College because it is not a designated training school; however, the College has built a safety management system as described in 2.12.5.

2.12.8 Introduction of Safety Management Systems by Air Carriers

In early 2005, operators of public transport caused many accidents attributed to human errors, and in order to investigate the causes and backgrounds of such accidents and consider policy for precluding the recurrence of similar accidents, MLIT established a Committee to Consider Measures for Preventing Public Transport from Causing Accidents Attributed to Human Factors. In the Committee meeting, members pointed out that there were "intentional unsafe behaviors" performed with risks being recognized by the people involved, and that there were "work environments and organizational cultures" that allow such unsafe behaviors. They also pointed out that in order to prevent such unsafe behaviors, transport operators needed to establish safety management systems through united efforts involving all personnel from management to field employees, and that the government needed to introduce safety management evaluations in which it assessed how such systems were implemented.

Based on what was pointed out at the Committee, Article 103-2 of the Civil Aeronautics Act required air carriers to establish safety management systems, documents Safety Management Manual that described established safety management systems, and notify such manuals to the Minister of Land, Infrastructure and Transport. It also required them to appoint authorized General Safety Managers who were responsible for establishing and improving safety management systems and notify their names to the Minister. In addition to collecting reports related to Safety Management Regulation and conducting on-site inspections, the Minister has formulated basic policy for collecting such reports and conducting such inspections, submitted it to the Transport Council for deliberation, and carried out transport safety management evaluations.

The Act does not apply to the College because it is not an air carrier.

2.12.9 Business Administration at the College as an Independent Administrative Agency

(1) Business Administration System of the College

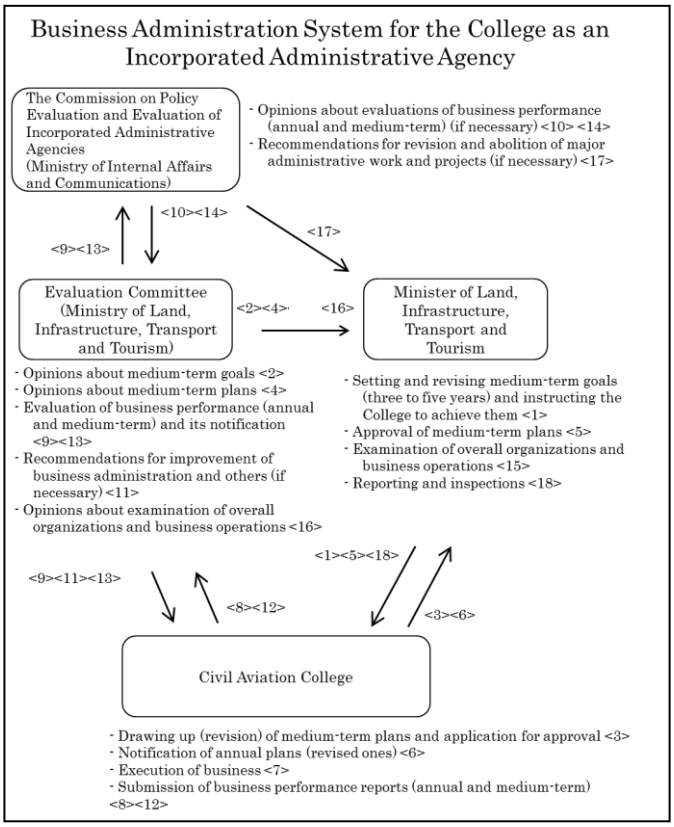
As part of the reform of central government agencies based on the Basic Act on Central Government Reform (Act No. 103 of 1998), the College was separated from the state administrative agencies and became an independent administrative agency on April 1, 2001. The business administration system for the College became subjected to the application of the Act on General Rules for Independent Administrative Agency (Act No. 103 of 1999), Act on the Independent Administrative Institution Civil Aviation College, (Act No. 215 of 1999), which was enacted for this particular agency, and the Ministerial Ordinance concerning the Independent Administrative Institution Civil Aviation College (Ministry of Land, Infrastructure and Transport Ordinance No. 53 of 2001). This system is as shown in the figure below.

It is stipulated that the purpose of the establishment of the College is to ensure stable air transport by providing knowledge and skills on airplane operation to students and train

them into able pilots.

The Minister of Land, Infrastructure, Transport and Tourism, who supervises the College, sets(or revises) the midium-term goals that the College should achieve during a period of three to five years, which is his/her choosing, and instructs the College to attain the goals (<1> in the figure below; the same applies in the following sentences). The College draws up a medium-term plan that embodies the goals and applies for approval from the Minister (<3>), and the Minister approves it (<5>). The College works out annual plans that constitute the medium-term plan and notifies them to the Minister (<6>). It conducts its business in accordance with these plans. These interactions represent "P" (plan) and "D" (do) in the PDCA cycle.

Then the Ministry's Evaluation Committee for Independent Administrative Agencies (hereinafter referred to as the "Evaluation Committee") evaluates the business performance of the College for each business year and the medium-term-goal period and informs the results of evaluation to the College and the Commission on Policy Evaluation and Evaluation of Incorporated Administrative Agencies established within the Ministry of Internal Affairs and Communications (<9> and <13>). The Minister of Land, Infrastructure, Transport and Tourism can request the College to report the status of its business, assets, and liabilities or instruct the Ministry's personnel to visit the offices of the College and inspect the status of its business as well as books, documents and other necessary properties if he or she deems it as necessary to do so (<18>). These interactions represent "C" (check) in the PDCA cycle, and the results of this process are reflected on the College's business administration for subsequent years "A" (action).



(2) Actual Business Administration at the College

<1> College's Medium-term Goals

The medium-term goals established by the Minister of MLIT for the College for the two five-year periods (April 1, 2006 to March 31, 2011 and April 1, 2011 to March 31, 2016) describe the detailed matters related to achievement of greater operational efficiency, improvement of the quality of public services and other operations, and improvement of finances, and the safety-related matters included in the goals are as described below.

When a sentence in column (b) is the same as that found in column (a), it is replaced by the expression "The same as on the left." The same applies to tables in <2> and <3>.

(a) From April 1, 2006 to March 31, 2011	(b) From April 1, 2011 to March 31, 2016
3. Matters related to the improvement of the quality of services provided to people and other operations	*3. Matters related to the improvement of the quality of public services and other operations*
(1) Improvement of the quality of education	*(1) Improvement of the quality of education*
The College's continuous production of able pilots who play an important roll in air transport contributes to ensuring stable air transport in Japan. In view of this, the College will strive to improve the quality of its education by taking the following measures:	*(The same as on the left.)*
<1> Identify the knowledge, skills, and other requirements expected of airline pilots precisely and enrich educational programs, educational systems, and so forth. Also improve and standardize teaching techniques for crew training, and so forth.	*<1> (The same as on the left.)*
(Omitted)	(Omitted)
<3> Research and study teaching and evaluation methods for crew training, research the actual condition of training facilities in Japan, and research and study international standards. Reflect the results of research and studies on future training and educational programs.	*<3> (The same as on the left.)*
(Omitted)	(Omitted)
(2) Enrichment of education and training in air safety and other activities	*(3) Enrichment of education and training in air safety and other activities*
Preventing the occurrence of aircraft accidents and serious incidents is an important issue to be addressed in air safety administration, and the College will strive to ensure safe operation by taking the following actions:	*(The same as on the left.)*

<1> Make the need to have the awareness of giving top priority to safety known to all instructors and students and improve methods for taking necessary safety measures such as appropriate communication within the organization and sharing of safety information.	*<1> (The same as <3> on the left.)*
<2> Conduct periodic safety audits for the units directly involved in the operation of training airplane (including maintenance contractors) and make doubly sure that safety measures are taken appropriately.	*<2> Based on the safety management system (SMS) introduced during the previous midium-term-goal period, (the remaining part is as the same as <1> on the left.)*
<3> Provide safety training from the early stage of training to improve safety training for students, implant safety awareness, including the law-abiding spirit, in the minds of students, and promote a better understanding of the systems of training airplane in order to ensure consistency with operation procedures	*<3> (The same as <2> on the left.)*
<4> Provide safety training using external lecturers and other experts in order to create greater safety awareness among all executives and employees. Also promote activities aimed at investigations and studies to ensure the safe operation of training airplane as well as at making safety information known to all personnel and students.	*<4> (The same as on the left.)*
(The rest is omitted.)	(The rest is omitted.)

<2> College's Medium-term Plan

In order to achieve the medium-term goals described in <1>, the College drew up a medium-term plan and obtained approval for it from the Minister of MLIT The safety-related matters in the plan are as described below.

(a) From April 1, 2006 to March 31, 2011	(b) From April 1, 2011 to March 31, 2016

2. Measures to be taken to achieve matters related to the improvement of the quality of services provided to people and other operations	*2. Measures to be taken to achieve matters related to the improvement of the quality of services provided to people and other operations*
(1) Improvement of the quality of education	*(1) Improvement of the quality of education*
<1> Identify the knowledge, skills, and other requirements expected of airline pilots mainly by actively exchanging opinions with airline companies. Also invite those who have experience working as an airline pilot in order to improve educational programs, educational systems, and so forth. Provide periodic training to instructors to improve their teaching techniques and other abilities and annually conduct skill examinations for pilot trainers.	*<1> (The same as on the left.)*
(Omitted)	(Omitted)
<3> Improve the quality of education and achieve greater educational efficiency by conducting the investigations and studies listed below and reflecting their results on education and training.	*<3> (The same as on the left.)*
(Omitted)	(Omitted)
e. Investigations and studies related to aviation safety, including actions taken for problems that involve human factors	*d. Investigations and studies related to aviation safety, including actions taken for problems that involve human factors using the safety management system (SMS)*
(Omitted)	(Omitted)
(2) Enrichment of aviation safety education and training	*(3) (The same as on the left.)*
<1> View ensuring safe operation as the most important task for business	*<1> (The same as <3> on the left.) Also make the most of the safety*

administration, formulate safety promotion policy under the leadership of the Chairman of the Board of Directors, and work out and implement a safety operation plan for each business year based on this policy.	*management system (SMS) to create a firm awareness of the imperative to prevent aircraft accidents among all students.*
<2> Develop safety audit programs at the General Safety Promotion Conference and conduct safety audits for the operation of training airplane once a year.	*<2> Based on the safety management system (SMS), (The same as <1> on the left .)*
<3> Start safety training for students before shifting to flight training. Provide aviation safety training such as teaching the relationships between aircraft accidents and human factors using examples of past accidents for ten hours before and 40 hours after the start of flight training.	*<3> (The same as <2> on the left.)*
<4> Provide safety training for executives and employees annually using external lecturers such as experts and aircraft accident investigators. Also conduct investigations and studies to ensure the safe operation of training airplane and hold a meeting of the Safety Committee at each school once a month mainly in order to make safety information known to all executives and employees.	*<4> (The same as on the left.)*
(The rest is omitted)	(The rest is omitted)

<3> College's Annual Plans

In accordance with the medium-term plan described in <2>, the College drew up a plan for fiscal 2010 and 2011 and notified them to the Minister of MLIT. The safety-related matters in these plans are as described below.

(a) Fiscal 2010 plan	(b) Fiscal 2011 plan
2. Annual plan to improve the quality of	*2. Annual plan to improve the quality of*

services provided to people and other operations *(1) Annual plan to improve the quality of education* *<1> - Hold a meeting to exchange opinions with airline companies once a year or more often in order to identify knowledge and skills expected of airline pilots.* *- Invite those who have experience working as an airline pilot to teach at the College.* *- Improve instructor training by encouraging instructors to participate in various lecture meetings, seminars, and other educational events.* (Omitted) *<3> Conduct the researches and studies specified below in a systematic way mainly to improve the quality of education and achieve greater educational efficiency, and reflect their results on educational and training programs.* (Omitted) *e. Advance researches and studies of pilot-related human factors and operational safety utilizing past case examples, including those from the College.* (Omitted) *(2) Annual plan to enrich aviation safety training and other programs* *<1> View ensuring safe operation as the most important task for business administration, draw up a safety*	*services provided to people and other operations* *(1) (The same as on the left.)* *<1> - (The same as on the left.)* *- (The same as on the left.)* *- Encourage instructors to participate in various training programs, lecture meetings, seminars, and other educational events at least once a year.* (Omitted) *<3> Conduct the researches and studies specified below in a systematic way mainly to improve the quality of education and achieve greater educational efficiency, and reflect their results on educational and training programs.* (Omitted) *d. Make the most of the safety management system (SMS) to advance researches and studies of aviation safety, including actions taken to cope with problems involving human factors.* (Omitted) *(3) Annual plan to enrich aviation safety training and other programs* *<1> Start safety training for students before shifting to flight training. Provide aviation safety*

operation plan for fiscal 2010 in accordance with the general safety promotion policy, and push forward with activities aimed at creating a greater safety awareness among students and school personnel under the leadership of each school's Safety Committee. Also conduct an annual drill to handle an aircraft accident at each school on the assumption that a training airplane has caused an accident or a similar disaster has occurred.	*training such as teaching the relationships between aircraft accidents and human factors using examples of past accidents for ten hours before and 40 hours after the start of flight training. Also make the most of the safety management system (SMS) to create a firm awareness of the imperative to prevent aircraft accidents among all students.*
<2> Conduct safety audits for the operation of training airplane once a year in accordance with the safety audit program developed by the General Safety Promotion Conference.	*<2> Based on the safety management system (SMS), view ensuring safe operation as the most important task for business administration, formulate safety promotion policy under the leadership of the Chairman of the Board of Directors, and work out and implement a safety operation plan for each business year based on this policy.*
<3> Continue to provide safety training (ten hours for the Miyazaki classroom courses, 20 hours for Obihiro flight courses, ten hours for Miyazaki flight courses, and ten hours for Sendai flight courses) for students prior to shifting to flight training in a systematic way in order to ensure aviation safety.	*<3> Develop a safety audit program at the General Safety Promotion Conference and conduct safety audits for the operation of training airplane once a year.*
<4> Provide executives and employees with safety training by external lecturers once a year in order to create a greater safety awareness	*<4> Provide executives and employees with safety training once a year inviting external lecturers such as experts and aircraft accidents*

among all personnel in the organization. Also hold a meeting of the Safety Committee at each school once a month, conduct researches and studies to ensure the safe operation of training airplane, and make safety information known to all instructors and students. (The rest is omitted)	*investigators. Also Conduct researches and studies to ensure the safe operation of training airplane and hold a meeting of the Safety Committee at each school once a month in order to make safety information known to all instructors and students.* (The rest is omitted)

<4> Business Performance

With respect to the safety-related matters in the fiscal 2010 plan described in <3>a, the business performance report for the 2010 business year states as follows:

(results and initiatives that correspond to 2.(1)<1>)

- *Meetings to exchange opinions with the College graduates were held in Sendai in April, in Miyazaki in May, and in Obihiro in June.*
- *In October, as part of the training, instructors and students visited airline companies to observe the actual operations of airplanes*
- *Former airline pilot were newly adopted as an instructor at the Obihiro Branch.*
- *The College had its instructors participate in the following lecture meetings, seminars, and other educational events:*
  - *Safety lecture by those who had experience working as an aircraft accident investigator (July 2010)*
  - *Aviation safety seminar for small airplane (February 2011)*
  - *Crew Resource Management (CRM) training for airline pilots (November 2010)*
  - *Special lectures by lecturer from the Japan Institute of Human Factors (July 2010)*
  - *Meetings of the Total Flight Operation System Study Group (TFOS.SG)*
  - *ATC symposium (November 2010)*
  - *Safety training at the Japan Airlines Safety Promotion Center and the ANA Safety Education Center (March 2011)*
- *Conduct periodic skill examinations for each instructor pilot to improve and standardize teaching techniques.*

(Initiatives that correspond to 2.(1)<3>e)

e. Revise the Safety Management Manual, introduce a safety management system (SMS), and analyze and evaluate pilot and other reports at each school's Safety Committee.

(Results and initiatives that correspond to 2.(2)<1>)

- *In accordance with the safety operation plan for fiscal 2010, each school's Safety Committee took leadership in announcing a safety slogan each month and carrying out activities to create a greater safety awareness among students, employees, and so on. In addition, in July and October, each school conducted an aircraft accident drill. Other initiatives included participation in fire-fighting and rescue drills conducted by airport authorities in June and November.*
- *In order to introduce a safety management system (SMS), the College revised its Safety Management Manual, and when implementing SMS, it formulated basic safety policy based on the revised manual, set safety goals, and established a system that enabled it to achieve them in an systematic way. It evaluated the safety goals periodically.*
- *On November 5, 2010, the College's training airplane became immobile on the runway of the Miyazaki Airport. Immediately after this accident, the College conducted special inspections of all its airplanes, provided safety training to all instructors and students, and took measures to prevent the recurrence of similar accidents such as the clarification of decision-making procedures for approach and landing and the tightening of the standards for student solo flight. Later, it explained these measures to the Civil Aviation Bureau as well as local communities and other stakeholders. On November 18, the Civil Aviation Bureau conducted safety audits (on-site inspections) at the College to confirm that it had taken appropriate measures to prevent the recurrence of similar accidents. In particular, in view of the fact that students caused accidents for two consecutive years during the approach and landing phase of solo flight, the College took safety measures such as reviewing the approach procedures and the number of solo flight training hours required for students. In the future, it would reconsider these safety measures appropriately when necessary taking into consideration the progress in the investigations of the accidents by the Japan Transport Safety Board and their results.*
- *The Japan Transport Safety Board published the accident investigation report on October 30, 2009 in which the College's airplane became immobile at Kagoshima Airport. Immediately after this publication, the College provided its students, instructors, and personnel with safety training and reconfirmed the safety measures it had taken earlier.*

(Results and initiatives that correspond to 2.(2)<2>)

- *The General Safety Promotion Conference developed a safety audit program and conducted safety audits at each school in accordance with this program (at the Obihiro Branch in October, 2010, at the Sendai Branch in December, 2010, and at*

the Miyazaki Main School in February 2011).

(Results and initiatives that correspond to 2.(2)<3>)

- The College provided safety training according to its syllabuses.

- Immediately after the accident in which the College's airplane became immobile on the runway at Miyazaki Airport and after the publication of the report on the College's airplane becoming immobile on the runway at Kagoshima Airport, in order to prevent the recurrence of similar accidents, the College provided all its students, instructors, and personnel with safety training, emphasizing the need to prevent porpoising and other inappropriate ways of landing and the importance of landing gear.

(Results and initiatives that correspond to 2.(2)<4>)

- In June 2011, an external instructor was invited to the Miyazaki Main School to provide safety training to school personnel. The instructor's lecture on "Outsourced Management" was simultaneously given to Obihiro and Miyazaki personnel utilizing a teleconferencing system (This event was originally scheduled for March 2011 but postponed due to the Great East Japan Earthquake).

- Each school held a meeting of the Safety Committee once a month to push forward with activities to ensure the safety of training airplane.

- As part of its efforts to ensure safety management based on the safety management system (SMS), the College periodically evaluated its safety goals based on the basic safety policy.

- In March 2011, each school sent its personnel to the JAL Safety Promotion Center and the ANA Safety Education Center for safety training to further raise their safety awareness.

- In addition, the College hosted the exchange of opinions with air traffic controllers, aeronautical information officers, and air navigation services engineers in Miyazaki in November and December, in Sendai in September and November, and in Obihiro in November.

(3) Evaluations of the College's Business Performance

The business performance of the College in fiscal 2010 and that for the medium-term-goal period from April 1, 2006 to March 31, 2011 were evaluated at the 20th meeting of the Educational Agency Subcommittee of the Ministry of Land, Infrastructure, Transport and Tourism's Evaluation Committee for Independent Administrative Agencies, which was convened on July 28, 2011, and at the 14th meeting of the Evaluation Committee, which was held on September 12, 2011, as described below.

It should be noted that the Subcommittee and the Committee used a five-grade scale for each and overall evaluation items as follows:

SS: Evaluated as outstanding in achieving the medium-term goals and deserving

special mention

S Evaluated as excellent in achieving the medium-term goals

A Evaluated as steadily achieving the medium-term goals

B: Evaluated as almost steadily achieving the medium-term goals

C: Not evaluated as steadily achieving the medium-term goals

<1> Evaluations of Business Performance in Fiscal 2010

According to the record on evaluations of business performance in fiscal 2010, the business performance of the College during the 2010 business year received S or A ratings for the safety-related matters in its fiscal 2010 plan described in (2)<3>, except the B rating for the actions taken to ensure safe operation in 2.(2)<1>.

With respect to 2.(2)<1>, the evaluators made the following comments:

- *The College viewed ensuring safe operation as the most important task for business administration and inspected all its safety management systems and regulations, and this is favorably evaluated. But it is urged to accept the fact seriously that occurrence of another accident in fiscal 2010 following the previous year and to improve its training and other programs for prevention of the similar accidents.*

In relation to this comments, the evaluators' opinions about challenges, points to be improved, and business administration in their overall evaluations were as follows:

- *No matter how much the College strives to ensure safety and security, it is highly likely that technically inexperienced students will cause accidents similar to the one in fiscal 2010 in which the College's airplane became immobile on the runway. However, the College is urged to take the fact seriously that another accident occurred following the crash-landing in fiscal 2009 and to improve its training and other programs to prevent the recurrence of similar accidents. In particular, the evaluators hope that efforts to achieve greater operational efficiency will not degrade the safety of airplane operation.*

<2> Record on Evaluations of Business Performance for the Medium-term-goal Period

According to the record on evaluations of business performance during the medium-term-goal period from April 1, 2006 to March 31, 2011, the College received S or A ratings for the safety-related matters in its medium-term goals described in (2)<1>, except the B rating for the actions taken for safe measures in 3.(2)<1>.

With respect to 3.(2)<1>, the evaluators made the following comments:

- *The College viewed ensuring safe operation as the most important task for business administration, promoted appropriate communication in the organization, and carried out a series of activities to take safety measures such as the drawing up of safety operation plans, the permanent establishment of a*

crisis management office, and the introduction of SMS, and this is favorably evaluated. But it is urged to take seriously the fact that in fiscal 2010, as in fiscal 2009, it caused an accident in which its airplane belly-landed and improve its educational and other programs to prevent the recurrence of similar accidents.

- *Since absolute safety cannot be achieved in airplane operation, it is important for the College to strive to create an organizational culture that urges its instructors and students to have an awareness of potential dangers at all times and eliminate danger factors before accidents occur.*

In this relation, the evaluators' opinions about challenges, points to be improved, and business administration in their overall evaluations were as follows:

- *No matter how much the College strives to ensure safety and security, it is highly likely that technically inexperienced students will cause accidents like the one in fiscal 2009 in which its airplane belly-landed and the one in fiscal 2010 in which its airplane became immobile on the runway, but the College is urged to take seriously the fact that it consecutively caused accidents in the fourth and fifth years of the medium-term-goal period and to improve its educational and other programs to prevent the recurrence of similar accidents. Ensuring safety is the most important point for corporations that are responsible for flight training, and the evaluators hope that during the next medium-term-goal period, the College will continue to put particular emphasis on this point.*

2.13 Other Necessary Information

2.13.1 Regulations Related to Meteorological Conditions

(1) The Civil Aeronautics Act stipulates as follows:

(Definitions) Article 2

15 The term "Instrument meteorological conditions" as referred to in this Act relate to meteorological conditions with low meteorological visibility as stipulated by the Ministry of Land, Infrastructure, Transport and Tourism ordinance taking into consideration the conditions of visibility and clouds.

(Flights under Instrument Meteorological Conditions)

Article 94

(Flights under Instrument Meteorological Conditions)

Article 94 Any aircraft under instrument meteorological conditions shall be navigated in accordance with instrument flight rules within an air traffic control area, an air traffic control zone or air traffic information zone, and shall not fly in any other airspace; provided, however, that the same shall not apply when there is an

unforeseeable rapid deterioration in weather conditions or other compelling reasons, or when permitted by the Minister of Land, Infrastructure, Transport and Tourism.

(2) The Ordinance for Enforcement of the Civil Aeronautics Act stipulates as follows:

(Instrument Meteorological Conditions)

Article 5

Low meteorological visibility as specified by Ordinances of the Ministry of Land, Infrastructure, Transport and Tourism set forth in paragraph (15), of Article 2 of the Act shall be meteorological conditions (hereinafter referred to as "visual meteorological condition") other than those listed in the following items according to the classification of articles listed in the following items:

(i) (omitted)

(ii)Aircraft that files at an altitude less than 3,000 meters (excluding aircrafts listed in the following item and item (iv)): Each listed weather condition according to the classification of aircrafts listed in the following items

(a) (omitted)

(b) that aircraft flies in the airspace other than control area, control zone and information zone: Weather conditions that meet requirements;

1. that flight visibility is over 1,500 meters.

2. that no cloud is within the vertical distance of 150 meters above and 300 meters below the aircraft.

3. that no cloud is within the horizontal distance of 600 meters from the aircraft.

2.13.2 Regulations Related to Intoxicant, Narcotics, etc. and Physical Deficiencies

The Civil Aeronautics Act stipulates as follows:

(Intoxicants, etc)

Article 70

No member of the aircrew shall engage in the air navigation services while he/she is under the influence of alcohol or drugs or other chemical agents which are likely to impair in anyway his/her ability to perform normal operations of aircraft.

(Physical Disabilities)

Article 71

No member of the aircrew of an aircraft shall, when he/she becomes physically unfit to the medical examination standards under Article 31 paragraph (3), engage in air navigation service, even if his/her aviation medical certificate issued under Article 32 is still valid.

2.13.3 Climb Performance Based on Flight Manual

If the weight of the airplane was 3,589 lb as described in 2.5.2, and if, based on meteorological data at Obihiro Airport (490 ft above sea level) at 09:00 and 10:00 as described in 2.6.3, the temperature at an altitude of 3,000 ft was 18°C, the ascent rate for the airplane with all its flaps and landing gear retracted at a velocity of 100 kt and at continuous maximum output was estimated at about 1,020 ft/min. At that time, the climb gradient was 8.4%, and the climb angle was 4.8°.

3. ANALYSIS

3.1 Qualifications of Personnel

Instructor A held both valid airman competence certificate and valid aviation medical certificate. Student A held a student pilot permission.

3.2 Airworthiness Certificates

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

3.3 Meteorological Conditions in the Training Areas

When the accident occurred, the wind was weak, visibility was good, and there were only a few clouds at the planned altitude as indicated by the statements of the Controller and other person, according to the statements in 2.1.4 and 2.1.5, and by the aviation weather observation values at the Obihiro Airport, which are described in 2.6.3. It is highly probable that the airplane could conduct training as planned without hindrance with clouds over the mountainous area to the west of the Airport. As described in 2.11, on the day of the flight examination conducted by JTSB, the simulated low altitude maneuver training was possible even under worse ground visibility than it was at the time of the accident. No visibility obstruction phenomena in the air hindered the flight.

According to the information from the regional agricultural weather information facilities in 2.6.4 and the information from the monitoring camera and the climber of Mt. Tsurugi in 2.6.5, it is highly probable that the clouds that had existed near Mt. Tsurugi until 09:00 dissipated quickly by about 10:00, but that even at about 10:05, there were still clouds near its Top that almost touched the surface of the mountain.

3.4 Altitude of the Cloud Bottom near the Accident Site

As described in 2.6.5(1), the image of Mt. Tsurugi recorded by the monitoring camera at 09:22:05 on the day of the accident is as shown in "C: Image from the monitoring camera (09:22:05; corrected time)" of Figure 5 "Clouds Observed at the Time of the Accident." The upper half of Mt. Tsurugi was covered with clouds. The image of the entire mountain up to its peak is shown in "B: Image from the Monitoring Camera (when the Top could be seen)" of Figure 5. The 3D images of Mt. Tsurugi with the view point at five meters above the ground, where the monitoring camera was installed, and 1,000 meters above sea level, which were created using digital maps issued by the Geospatial Information Authority, are as shown in "A: Digital map 3D image (As Seen from Five Meters)" and "D: Combined digital map 3D image and topographic information (As Seen from 1,000 Meters above Sea Level)" of Figure 5.

In Figure 5 the images of A, B, C, and D are arranged to align the following in a straight line: top of Mt. Tsurugi, the 505-meter-high ridge (a conspicuous geographic feature of the mountain), and the tree close to the monitoring camera. According to the Image D and the Image E that is an enlarged plane view of the former, the line between the cloud bottom and the ridgeline crosses the 720-meter contour line. Though the cloud base is constantly changing and it is obscured in many cases, judging from each image of Figure 5, it is somewhat likely that at around the time when the accident occurred, Mt. Tsurugi and its vicinity were covered with clouds

whose bottom was at an altitude of nearly 720 meters (about 2,400 ft).

3.5 Estimated Flight Route of the Airplane and the Time of the Accident

The estimated flight route, time and other details were not the actual ones which include errors, because the airplane didn't have an onboard digital flight data recorder (DFDR) and some data were calculated by estimation. According to the radar trajectory records described in 2.1.1 and the statements of Student A and other persons described in 2.1.3, 2.1.4, and 2.1.5, it is highly probable that the airplane operated by Student A took off from the Runway 35 of Obihiro Airport at 09:11, made a climbing turn to northwest at about 1.5 nm from the threshold. Upon reaching 2,500 ft and after Student A finished wearing a hood for BIF, it went into a straight and level flight in 300° at 134 kt. According to the statement in 2.1.6, it is also highly probable that as the airplane flew right over the eyewitness, it maintained its altitude of 2,500 ft, turned left 30° left to 270°, and then, turned right 90° to 360°.

It is probable that the last turn was right 270° turn because: just before the accident, the airplane was climbing leaving track of 270° and if it had been a left 90° turn it would have crashed into the mountain; and Student A recalled that the last turn was not the one of short duration as long as 30 seconds. Based on this assumption, the estimated flight route after 09:16:55, the last confirmed point on the radar trajectory records, was generated as shown in Figure 2.

The time and related elements at each point in the estimated flight route are as listed in Table 4. It is somewhat likely that the accident occurred at about 09:22.

As described in 2.6.1, 2.6.2, 2.6.3, and 2.6.4, the wind on the ground and in the sky was weak when the accident occurred; and therefore, the effects of winds are not included in the calculations.

Table 4: List of Estimated Times and Other Details at Each Point in the Estimated Flight Route

Point	IAS (kt)	TAS (kt, m/s)	Ascend rate (ft/min)	Altitude (ft)	Distance (meter)	Time (sec)	Estimated time (h:m:s)
Last point in the radar trajectory records <1>	134	141, 73	0	2,500			09:16:55
					5,100	70	
Start a 90-degree turn <2>							09:18:05
					Omitted	30	
Finish a 90-degree turn <3>							09:18:35
					4,200	58	
Start the last turn <4>							09:19:33
					Omitted	90	
Finish the last turn <5>							09:21:03
					730	10	
Finish repeating the instruction to ascend <6>							09:21:13
	(122)	(128, 66)	Omitted		660	10	
Establish the				2,600			09:21:23

attitude of airplane to ascend <7>	110	116, 60	650		1,010	17	
Ridge 1 <8> (2,590 ft)				2,780	350	6	09:21:40
Ridge 2 <9> (2,660 ft)				2,850	290	5	09:21:46
Ridge 3 <10> (2,820 ft)	(89)	(94, 48)	Omitted	2,910	350	7	09:21:51
Accident site				3,000			09:21:58

* TAS is calculated on the assumption that the outside air temperature was 17°C.
* Figures in parentheses indicate the averaged IAS and TAS when they were being changed.
* Since actual roll-in and roll-out combined takes 7 seconds, the estimated times calculated from the estimated flight route do not indicate the time when the actual turning started and finished.
* All calculations in the above table are based on the assumption that the airplane flew along the prescribed course at the prescribed altitude and speed. It is somewhat likely that there were errors in the course, altitude, and velocity of the airplane, which were comparable to those acceptance criteria in the flight tests for private airplane pilots (±10° for the heading, ±100 ft for the altitude, and ±10 kt for the velocity).

(See Figure 2: "Estimated Flight Route")

3.6 Selection of the Training Areas

According to the estimated flight route described in 3.5 illustrates, the airplane flew over the edge of the mountainous area further west from Mt. Shin-arashi after heading 270° from the last know point on the radar trajectory records. It is highly probable that this area was not used much due to the mountainous area in the Training Areas as stated in the statements of students described in 2.12.3(2). Moreover, it is highly probable that some clouds were being occurred in the mountainous area, west of the airport, where the airplane flew north (360°) as described in 3.3.

For these reasons, it is highly probable that Instructor A selected the training area in the vicinity of the cloud base where AGL distance was getting small at the edge of the mountainous area, not the airspace east of Mt. Shin-arashi, which was usually used.

3.7 Airplane Condition Just Before the Crash into the Mountain Slope

According to the statement of Student A described in 2.1.3, it is highly probable that the airplane, as part of the BIF training, flew heading 270° toward vicinity of the accident site while climbing. In addition, according to the conditions of cut-off Trees 1 to 7 as described in 2.8.2, it is highly probable that just before it crashed into the trees, the airplane was climbing at an angle of about 13° while heading 317°.

Ridge 3 stretches to the south about 350 meters from the accident site in the direction of 137°: the opposite direction of the airplane's heading. The airplane is estimated to have passed over Ridge 3 which is at about 860 meters or 2,820 ft above sea level on the map. According to the estimated flight route in 3.5, it is probable that the airplane passed Ridge 3 at an altitude of about 2,910 ft, approaching obstacles on the ground to the point only about 90 ft above, it almost came

into contact with them. Therefore, it is somewhat likely that Instructor A shouted "Ah!" and pulled the control wheel as described in Student A's statement because the instructor realized that the airplane had become too close to Ridge 3 and took the control from Student A to evade it. It is probable that Instructor A changed the airplane's course to the right from 270° to 317° and tried to evade the mountain ridge climbing along the mountain slope.

As shown by the information from the deputy head instructor at the Branch School, which is included in 2.12.1, it is highly probable that the airplane climbed up to Ridge 3 with max power using about 110 kt IAS, about 117 kt TAS(60 m/s), and the rate of climb of about 650 ft/min (3.3 m/s). In this case, the climb angle is estimated to have been about 3.1 degrees. As described in 2.13.3, the climb angle at 3,000 ft and 100 kt with continuous max power is about 4.8°. Accordingly, it is highly probable that the airplane finally climbed at about 13 degrees because it attempted to climb by raising its nose substantially in order to gain altitude temporarily even though its speed was reduced.

As described in 3.5, it is also probable that the airplane passed over Ridge 1 (elevation about 790 meters (2,590 ft) above sea level) at about 2,780 ft, and Ridge 2 (elevation about 810 meters (2,660 ft)) at 2,850 ft. In this case, it is also somewhat likely that when it flew over Ridges 1 and 2 the airplane was abnormally close to the mountain with clearance of only about 190 ft.

3.8 Airplane Condition at the Time of Crash

As described in 2.1.3, Student A found no anomalies in the airplane during the flight, and as described in 2.8.3.4, the ignition plugs had no sign of abnormal combustion. Consequently, it is highly probable that the airplane had flown normally until it collided with the trees.

As described in 2.8.2 and 2.8.3.2, both the wings of the airplane, separated from the fuselage and divided into the outboard and inboard parts, were found up in Tree 4 and at its base with their leading edge deeply dented and their external plates longitudinally bent and folded like bellows. Judging from this, it is highly probable that the airplane continued to fly while touching the top of Trees 1, 2, and 3, and that both of its wings came off when it collided with sturdy branches of Tree 4. At this time, it is highly probable that the fuel systems extending from the fuel tanks installed in the wings were also broken, therefore, the fuel supply for the engine stopped, bringing engine operation to a stop. Moreover, it is highly probable that the fuselage continued to fly by inertia while scattering fuel from the broken fuel systems, and that after it collided with Trees 5 and 6, it collided violently into the base of Tree 7. At this time, as described in 2.8.3.4, the engine and the right side of the fuselage around it were probably damaged, causing the right cabin door to drop. It is also probable that a force worked on the fuselage from the front right, and that that impact divided the fuselage into three parts. As described in 2.9.1 and 2.10, it is somewhat likely that this impact was fatal to cause head injuries to Instructor A, and as the fire spread to the cabin making it difficult to hold his body in the cabin; consequently letting him to fall down to Tree 8.

As described in 2.8.3.5, the three propeller blades were all twisted irregularly and bent backward, and the spinner had no sign of spinning and colliding with something. Judging from these, it is probable that the propeller stopped its rotation immediately after it hit obstacles such as trees when it was spinning slowly due to cut-off fuel supply. It is possible that the airplane's vertical speed indicator needle pointing to about 800 fpm climb as described in 2.8.3.6 became stuck due to the shock or fire when it was returning to the resting position.

3.9 Fastening of Seat Belts and Shoulder Harnesses

According to the statement of Student A in 2.1.3, he confirmed twice before takeoff that all occupants had fastened their seat belts and shoulder harnesses. Consequently, it is probable that all occupants were secured in their seats when the airplane departed from the airport. However, as described in 3.8, it is possible that Instructor A was not fastening his shoulder harness when the accident occurred and the airplane collided with Tree 7 as he suffered fatal injuries to his head as described in 2.9.1.

3.10 Fire on the Airplane

According to the statement of Student A in 2.1.3 and as described in 2.8.1, there was no sign of fire on the upper part of the engine which sat on the ground upside down. Consequently, it is highly probable that the fire broke out upon crash of the airplane into the mountain slope, and it spread to the aviation gasoline which had been scattered on trees, bamboo grass on its last trajectory, on and after the wings were separated.

3.11 Condition of the Surrounding Mountains and Clouds of the Airplane

The radar trajectory records show that the airplane's trajectory was 295° towards Mt. Shin-arashi after the takeoff. As the mountain was visible from the Airport and the airplane maintained its heading for about three minutes, it is somewhat likely that Instructor A knew he was approaching the mountainous area.

When its heading was set to 270°, it was on the western end of the usual training area. The airplane flew into the mountainous area maintaining 270°. It was close to the mountains and it is possible that clouds there should have been easily discernible with just a glance. Even if he was concentrated on the training, he could have possibly grasped the surrounding situation.

As the eyewitness saw the airplane's belly when it turned to 360° over her, it is highly probable that it was not in the clouds. As described in 2.11(2), the flight examination demonstrated that the airplane made a turn to north from 270° to 360° at 2,500 ft over the location of eyewitness, and then Mt. Tsurugi loomed up. The airplane continued flight to the north without evasive action of the mountain; therefore, it is somewhat likely that Instructor A did not see it in the clouds.

In the flight examination flying north was abandoned because the AGL distance was getting smaller as described in 2.11. It is somewhat likely that Instructor A did not see the ridge ahead. The examination flight proved that straight flight was impossible even with climbing on the last leg towards the accident site. It is possible that Instructor A did not recognize the approaching terrain ahead due to the clouds covering Mt. Tsurugi.

It is highly probable that the airplane was flying, at least when it was flying northwards and on the last leg to the accident site, near or in the clouds because: as described in 2.1.3 Student A saw white clouds whizzed past through the window; and as described in 3.4, Mt. Tsurugi was covered by clouds whose base was 2,400 ft.

As described in 2.1.3, Instructor A replied "Clear" responding to Student A's request to checkup ahead. As described in 2.11(2) when the airplane flew heading 270° towards the accident site climbing 2,500 ft, Mt. Tsurugi came into view ahead. Therefore it is highly probable that Instructor A uttered "Clear" without being able to confirm the safety the area of up ahead because he could not see Mt. Tsurugi due to clouds; the airplane was about to be placed in an in-cloud

condition or was already in-cloud.

When it passed over Ridge 3, it saw no obstacle on its left-hand side while it saw mountains approaching on its right-hand side with Ridge 4 blocking its course. Despite these geographic features, it is highly probable that as described in 3.7, the airplane changed its course to the right and flew toward the steep slope of Ridge 4, which blocked its course. A possible reason for this maneuver is the situation, where Instructor A could not see anything ahead and on his left-hand side due to clouds, forced him to resort to flying along the mountainside on the right overlooking trees, but his death denied clarifying the reason of this maneuver.

3.12 Airplane's Approaching or Entering Clouds

As described in 2.13.1, the airplane had to maintain VMC because the training was under VFR; therefore, even during BIF, it was not allowed to fly into or close to the clouds. In this case, the airplane shall fly by maintaining a distance of 150 meters vertically above and 300 meters below and 600 meters horizontally from clouds. As described in 2.12.2, in-cloud flight or flying close to clouds under VFR is extremely dangerous because doing so makes it impossible to keep a safe distance from other airplane and obstacles.

3.13 Instructor A's Decision on Approaching and Entering Clouds

(1) According to the statements in 2.12. 3(1), it is highly probable that Instructor A understood that in-cloud flight or approaching clouds under VFR is a violation of the Civil Aeronautics Act as described in 2.13.1.

(2) The following shows that it is somewhat likely that Instructor A flew close to or into the clouds with some intention such as to have students experience in-cloud conditions or to be able to continue training; however, his death denied us the clarification of his intention.

<1> As students' statements described in 2.12.3, it is highly probable that Instructor A not always but sometimes entered small clouds even during post-BIF flights.

<2> On the day of the accident, according to the statement of Student A in 2.1.3, Instructor A changed the training subject to BIF before the weather recovery. Air maneuver training done at high altitude is difficult under low visibility conditions due to blurred horizon so that training subject is often changed to BIF depending on student's skill level. However, the planned training, low altitude air maneuver, was doable under then weather conditions judging from the examination flight described in 2.11. It is possible that Instructor A's reasoning to change the subjects did not match the reason to do so.

<3> As described in 3.3, it was possible for the airplane to conduct training as planned on the east side of the Training Areas, and there was no reason to fly towards mountainous area where clouds were being generated.

3.14 Instructor A's Recognition on Approaching the Mountain

As described in 2.12.1, it is highly probable that during BIF, until Instructor A pulled the

control wheel, Student A did not recognize that the airplane was approaching the mountains because he did not know the present position. On the other hand, it is highly probable that Instructor A, who had the ability to use aeronautical radio navigation aids and was familiar with the geography of the Training Areas, became disoriented and unaware that he was closer to the mountains than he thought as the airplane became very close to or in-cloud and lost outside reference.

The airplane was not equipped with GPWS.

3.15 Advices from Instructor B and Student B

According to the statement in 2.1.3, Student A did not hear Instructor B and Student B give advices to him at all. With the assumption of the flight along the estimated flight route, it is probable that no advice was given from Instructor B or Student B when the airplane was flying close to or in the clouds. The possible reasons for this were as follows:

(1) Relationship between Instructors A and B

Instructor A presided over the flight training as the captain of the airplane. On the other hand, Instructor B was an observer instructor whose objective and authority were, as described in 2.12.1, to study other instructors' teaching techniques, and he did not have the duty and authority to ensure the safety of the training. Therefore, it is somewhat likely that Instructor B refrained from objecting to the training presided over by Instructor A. It is also somewhat likely that the existence of students helped shun the advice from the Instructor B.

(2) Relationship between Instructor A and Student B

The relationship between the student and the instructor is that the former is instructed and evaluated by the latter, and there is a wide gap in flight experience between the two. Therefore, it is highly probable that there was clearly an "authority gradient*8" between them. Therefore, it is highly probable that it was difficult for Student B to raise an objection to Instructor A in the cockpit even if he had an anxiety about flying into clouds. As described in 2.1.3, it is also possible that Student B, who concentrated his attention on reading the instruments and watching the operation of Student A, was not aware that the airplane had entered clouds.

3.16 Monitoring of Training Airplane

As described in 2.1.5 and 2.7.2, the student training procedures (detailed procedures for the Obihiro curriculum) established by the Branch School stipulate that "*an airplane shall report the position and the status of its operation roughly once every 30 minutes*" and it is probable that the airplane of the Branch School normally reported their position and other conditions before 30 minutes passed. As described in 2.1.5, it is highly probable that the person in charge of operation at the Branch school was notified by RCC about 27 minutes after the last radio contact with the airplane and then called it.

*8 "Authority gradient" refers to psychological power relationships derived from seniority, human relationships, and other factors. Too large or small gradient hinders appropriate communication.

3.17 Aviation Medical Examinations

(1) Aviation Medical Examinations of Instructor A

As indicated in Instructor A's medical certificate applications described in 2.9.2(1), it is highly probable that the examiners in charge of Instructor A in 2009, 2010 and 2011 confirmed his intake of anti-allergic agents in III.4.4-2 in the Manual for Aviation Medical Examinations described in 2.9.2(2)<2> and judged them to have been adopted.

As described in 2.9.2(1) to (4), Instructor A's doctor had prescribed Onon for Instructor A to treat rhinitis for more than four years so that he took the medicine twice a day, once in the morning and once in the evening. The designated examiner heard that Instructor A was taking Onon and was in a good condition, and issued an aviation medical certificate to Instructor A. It is highly probable that these medical examinations were conducted according to the note when evaluating allergic diseases as included in the Manual for Aviation Medical Examinations: *If internal medicines are taken, they shall be considered as suitable if they are non-sedative antihistaminic agents (limited to the second generation of antihistaminic agents) or anti-allergic agents, and if it is confirmed by an appointed doctor or the airline's industrial physician familiar with aviation medicine based on the past use experience that they do not have side effects such as sleepiness and degraded concentration*.

(2) Interval during Which Instructor A Should Not Perform Aviation Duties

As described in 2.9.2(2) aviation duties are prohibited at least twice as long as the ordinary interval of administration after the internal medicine is taken (in the case of Instructor A, 24 hours). The flight days for Instructor A and the number of allowable medicine intake from January 1 to July 28, 2011 are as shown in Attachment 1 "Flight Days for Instructor A and the Allowable Medicine Intake per Month." The number of allowable medicine intake accounted for about 50% of the prescribed doses. If he had limited the frequency of taking the medicine as prescribed by the standards not performing aviation duties for 24 fours after the medicine intake, it would have taken twice as much time before he ran out of the prescribed doses. But as described in 2.9.2(4), Instructor A visited the clinic to pick up the medicine at the prescribed interval. Given this fact, it is highly probable that Instructor A usually took the medicine as prescribed and performed aviation duties without taking twice as much time as the ordinary interval of administration.

As described in 2.12.6(2)<2>, Instructor A was required to know that he must not engage in the aviation duties for prescribed hours after the medicine intake because the Guidelines for the Handling of Medical and Pharmaceutical Products were known to all instructors at the College. Therefore it is possible that he knowingly engaged in aviation duties without allowing the prescribed amount of time to elapse after the medicine intake. But as described in 2.9.2(7), it is possible that unless a doctor provides clear explanation of remedial medicines, it is difficult for flight crew to understand the contents of the "Manual for Aviation Medical Examinations" and "Guidelines for the Handling of Medical and Pharmaceutical Products." Therefore it is also possible that Instructor A did not understand he was not allowed aviation duties for prescribed time after his consumption of the medicine.

(3) Impacts of the Medicine on the Accident

As described in 2.1.3, Student A had incessantly received detailed guidance from Instructor A until the last minute, it is highly probable that Instructor A was not affected by sleepiness, one of the side effects of the medicine.

(4) Well known of the Guidelines for the Handling of Medical and Pharmaceutical Products

As described in 2.13.2, no member of aircrew shall engage in the air navigation services while: he is under the influence of alcohol or anesthetics or other chemical agents which impairs in anyway his ability to perform normal operation of an aircraft; or in the event that he becomes physically unfit. As stated above the judgment is in the hands of aircrew.

But as described in 2.9.2(6), when they were established or revised, the Guidelines for the Handling of Medical and Pharmaceutical Products were notified to some of the pertinent organizations, but they were not made known to all other aircrew. Moreover, as described above, it is possible that aircrew have difficulties to have clear understanding of the Guidelines. Given these facts it may be necessary to establish a system that enables the correct information on the handling of medical and pharmaceutical products to be known to all aircrew concerned by the trained examiners.

(5) Supervision by Managers at the College

According to the statements in 2.12.6(2), it is highly probable that the College has made the Guidelines for the Handling of Medical and Pharmaceutical Products known to all instructors, and that Instructor A, a regular user of Onon, was in the capable environment to know the content of the Guidelines. As described in 2.12.1 and 2.12.2, however, it is highly probable that the head instructor and the deputy head instructor, both of whom supervised Instructor A, did not know Instructor A's chronic illness and the medicine he regularly took.

3.18 Safety Management System at the College

(1) Tendency of Accidents Occurring at the College

As described in 2.12.4, three of the four fatal accidents involving the College occurred in the last decade from 2002 to 2011. Each year after 2009 had an accident, with this fatal one in 2011. The number of accidents per 100,000 flight hours indicates the increment of accidents, with outstanding increase of fatal accidents during the decade from 2002 to 2011, a period after the College became an independent administrative institution as described in 2.12. 9(1). It is necessary for the Minister of Land, Infrastructure, Transport and Tourism and the College to focus on this fact, identify and address the problems in the business administration system for the College as an independent administrative agency.

(2) Safety Management System at the College

As described in 2.12.5 and 2.12.7, the safety management system standards for Designated Training Schools do not apply to the College, but since before the Civil Aviation Bureau promoted the introduction of safety management systems to Designated Training Schools, the College had voluntarily revised the Safety Management Manual and established a safety management system in accordance with its basic safety policy. In the Safety Management Manual, the College states a philosophy of "giving top priority to safety in its business administration, striving to prevent accidents and dangerous acts by all means, and sparing no effort to achieve the goal."

According to the statement in 2.12.6, the General Safety Manager of the College recognizes that the primary objective of the College is to produce excellent pilots, and that safe operation is more important than anything else to attain the objective and has made the importance of safety management known to not only personnel but also students mainly by taking every opportunity to give personnel and students lectures to educate

them in safety. In addition, the General Safety Manager encouraged instructors and students to submit potential incident reports with the target of one submission per year per person, because this report system had just started and only 14-15 such reports were actually submitted annually.

As described in 2.12.1 and 2.12.2, neither the head instructor nor the deputy head instructor knew about the unsafe behaviors Instructor A habitually taken, but both of them understood that they must maintain VMC during the training under VFR. Therefore, if the head instructor or the deputy head instructor had known Instructor A's unsafe behaviors in advance, it is highly probable that either of the two would have appropriately guided or supervised Instructor A; accordingly, it is somewhat likely that the accident could have been precluded.

In order to ensure the functioning safety management system based on the PDCA cycle, each member should submit sufficient number of safety reports. As described in 2.12.3(4), the students of the College also made the most of its potential incident reporting system, but they found it difficult to submit a potential incident report on entering clouds. In fact, none of them submitted a report on this issue even in alternative means. It is probable that the College's reporting system including the potential incident report did not work sufficiently and alternative reporting means were limited.

If, as in this accident, the captain performs an unsafe behavior in the airplane but it is difficult for his/her colleagues and students to give advice to the captain there, it is desirable to utilize information on such a behavior for safety management using other techniques such as informing the head instructor or deputy head instructor or other appropriate officers of the captain's unsafe behavior after landing. Possible ways of achieving this goal include creating an atmosphere that enables instructors and students to express their free opinions and utilizing various systems and methods such as reporting systems that are not bound by formalities or allow anonymous reporting and pay attention to reporters so that they do not sustain a disadvantage, periodic interviews by the head instructor or deputy head instructor or other appropriate officers with instructors or students, and safety report systems in which third parties that have no stake in the system receive reports. The head instructor or deputy head instructor, together with the General Safety Manager, needs to consider and implement effective methods that meet the actual situation of the College.

(3) Analysis of Unsafe Behaviors at the College from the Viewpoint of Human Factors

At the College, the investigation revealed the following five unsafe behaviors in the past, and it is possible that at least four behaviors (<1> to <4>) were intentional behaviors underestimating the danger judging from the viewpoint of human factors.

<1> As described in 3.1.1, it is highly probable that Instructor A approached the mountain and went inside or close to the clouds during the VFR accident flight.

<2> As described in 3.11, it is somewhat likely that the airplane was near or in the clouds, but Instructor A said "Clear" in response to the request to check up ahead. It is possible that he did not provide the student with the correct information.

<3> As described in 2.12.3, it is highly probable that Instructor A flew into clouds during VFR.

<4> If the airplane was flying along the estimated flight route, it is somewhat likely that Instructor B gave no advice on approaching or entering the clouds.

<5> It is probable that Instructor A performed aviation duties without taking prescribed off-duty time after the consumption of the medicine.

These behaviors contravene the basic policy of "Safety first," and it is possible that this policy had not instilled throughout the organization.

As described in (2), it is probable that the reporting system including potential incident reports did not fully work, and unsafe acts were performed as mentioned above. Judging from these, it is probable that the College's basic safety policy had not instilled into field instructors and that there was a gap in safety awareness between top management and field instructors.

Judging from the habitual intentional unsafe behaviors and a gap in safety awareness between management and field instructors, it is possible that behind the accident was a problem that involved the entire organization of the College—a work environment/organizational culture that allowed unsafe behaviors as described in 2.12.8, against the intension of the executives from the President on down. In other words there was no organizational recognition of unsafe behaviors or if some knew them, nobody points out or reports them among instructors, and between instructors and students, the unsafe behaviors continued to exist without being corrected. In a nut shell it was possible a work environment/culture which consequently allowed unsafe behaviors existed.

(4) Audits of the safety management system of the College

As described in 2.12.7, the establishment of a safety management system constitutes part of the standards for designating training facilities as Designated Training Schools, and it is stipulated that the Minister of Land, Infrastructure, Transport and Tourism shall conduct inspections of documents of and on-site inspections at Designated Training Schools as necessary. In addition, as described in 2.12.8, air carriers are required by the Civil Aeronautics Act to establish a safety management system and meet other requirements, and the Minister collects reports from air carriers and conducts on-site inspections and transport safety management evaluations.

As described in 2.12.6(1), the Main School and Branch Schools of the College conducted cross safety audits annually, but these audits failed to correct the unsafe acts mentioned in (3) above. In addition, after each accident caused by the College, the CAB conducted extraordinary audits of the College in order to confirm the status of improvement before the College resumed training. However, no external audits were carried out to look at the status of daily operations. Judging from these, it is highly probable that an objective checking mechanism for the safety management system at all levels of organization was not fully utilized.

(5) Evaluation of the College as an Independent Administrative Agency

As described in 2.12.9, the operations of the College, an independent administrative agency, are planned and carried out according to the goals established by the Minister of Land, Infrastructure, Transport and Tourism, and the performance of its operations are evaluated by the Evaluation Committee. Thus the College was operated under such an objective, transparent business administration system. Its medium-term goals included safety-related ones, and the College worked out specific plans to achieve the goals. The performance of its operations in fiscal 2010 and during the medium-term-goal period from April 1, 2006 to March 31, 2011 was evaluated by the Evaluation Committee.

As the result of the evaluation, the College received high ratings such as "S" and "A"

except that “B” was given to one item. The reason for the B rating was that Committee members took seriously the fact that the College continuously caused accidents in fiscal 2009 and 2010 and expressed opinions requiring the College to take measures such as improving its education and training to prevent the recurrence of similar accidents and creating an organizational culture that urged all instructors and students to have an awareness of potential dangers at all times.

The College was harshly evaluated for having caused accidents, but has received high ratings for all other items. Therefore, it is highly probable that this was because the College worked on its business under the business administration system for independent administrative agencies.

(6) Safety Problems in the Business Administration System at the College as an Independent Administrative Agency

As described in 2.12.9(1), the College was separated from the state’s administrative structure and became an independent administrative agency on April 1, 2001. The overall business administration system for the College works as follows: the Minister of Land, Infrastructure, Transport and Tourism sets medium-term goals and instructs the College to achieve them. The College formulates a specific medium-term plan to achieve the goals, and the Minister approves it. The College draws up annual plans that constitute the medium-term plan and notifies them to the Minister. It conducts its business according to these plans, and the performance of its operations is evaluated by the Evaluation Committee, which informs the results of evaluation to the College and the Committee for Policy Evaluation and Evaluation of Independent Administrative Agencies established within the Ministry of Internal Affairs and Communications. The Minister of Land, Infrastructure, Transport and Tourism may request the College to submit a report and instruct its personnel to visit the College for inspections when he/she deems it as necessary to do so. Thus it is highly probable that the PDCA cycle was at work among the College, the Minister, and the Evaluation Committee under the business administration system for the College as an independent administrative agency.

As described in 2.12.9(2), in one of its medium-term goals---matters related to the improvement of the quality of services provided to people and other operations---the College states that preventing the occurrence of aircraft accidents and serious incidents is an important issue to be addressed in air safety administration, and that it will strive to ensure safe operation by taking the following actions. This means that the business administration system for the College as an independent administrative agency also works as a system to ensure aviation safety at the College. Judging from the fact that this accident occurred in the year following the period during which the College caused accidents for two consecutive years, it is highly probable that there was still room for improvements in the safety measures at the College.

(7) Safety Measures under the Business Administration System for the College as an Independent Administrative Agency

As described in 2.12.9(3)<2>, in their evaluations for the medium-term-goal period, submitted following the consecutive accidents, members of the Evaluation Committee pointed out the necessity of creating an organizational culture that urged all instructors and students to have an awareness of potential dangers at all times and eliminate danger

factors before accidents occurred. It is probable that needs to consider how the College's medium-term goals should be, such as setting specific goals to ensure that a safety culture is brewed and safety activity is implement surely and continuously, including reviewing in timely manner, based on the organizational climate cannot be built in a day but also it is brewed by daily ongoing activity

The idea of independent administrative agencies intrinsically requires them to administer their business independently of other organizations, and their system is created to meet this philosophy. The College had to implement the PDCA cycle as part of its administrative activities and make continuous improvements to ensure safe airplane operation, but in spite of its efforts, it failed to prevent the accident. The Minister needs to grasp reliably the actual condition of efforts towards improvement of the safety management system of the College, check the implementation status whether such various safety measures set by the College based on the medium-term plans, etc. are carried out continuously and certainly by such as periodically audits in the field and provide more guidance depending on the results until the College becomes able to operate a safety management system autonomously and steadily.

4. CONCLUSION

4.1 Summary of Analysis

(1) Meteorological Conditions

<1> It is highly probable that the airplane could conduct training as planned without hindrance with clouds over the mountainous area to the west of the Airport. It is also highly probable that the clouds that had existed near Mt. Tsurugi until 09:00 or so dissipated quickly by about 10:00. (3.3)

<2> At around the time when the accident occurred, it is somewhat likely that Mt. Tsurugi and its vicinity were covered with clouds whose bottom was at an altitude of nearly 720 meters (about 2,400 ft). (3.4)

(2) Estimated Flight Route of the Airplane

<1> It is highly probable that the airplane took off from the Runway 35 of Obihiro Airport at 09:11, and Student A at the controls began BIF after wearing a hood. It is somewhat likely that the airplane flew toward the accident site, heading 270°, while climbing, and that the accident occurred at about 09:22. (3.5)

<2> It is highly probable that Instructor A selected the training area in the vicinity of the cloud base where AGL distance was getting small at the edge of the mountainous area, not the airspace east of Mt. Shin-arashi, which was usually used. (3.6)

<3> It is highly probable that above Ridge 3, the airplane came so close to obstacles on the ground that it almost touched them. It is somewhat likely that the reason Instructor A shouted “Ah!” and pulled the control wheel was that the instructor, who noticed the proximity to the obstacles, took the controls from Student A and attempted to evade Ridge 3. It is probable that Instructor A attempted to evade the mountain while changing the course of the airplane to the right to climb along the slope of the mountain. It is highly probable the last climb was attempted to get temporary altitude increase by raising its nose substantially. It is also somewhat likely that when it flew over Ridges 1 and 2, the airplane was abnormally close to the mountain with clearance of only about 190 ft AGL. (3.7)

(3) Airplane’s Crash into the Mountainside

<1> It is highly probable that the airplane had flown normally until it collided with the trees. It is also highly probable that due to its collision with several trees, the wings were destroyed and its engine stopped; that its fuselage continued to move forward with inertial force while scattering fuel and violently crashed into the base of Tree 7 after colliding with Trees 5 and 6. It is somewhat likely that this impact was fatal to cause head injury to Instructor A, and as the fire spread to the cabin

making it difficult to hold his body in the cabin; consequently letting him to fall down to Tree 8. (3.8)

<2> It is possible that Instructor A was not fastening his shoulder harness when the accident occurred. (3.9)

<3> It is highly probable that the fire broke out upon crash of the airplane into the mountain slope. (3.10)

(4) Instructor A's Decision to Fly Close to Clouds and Mountains or Fly into Clouds

<1> It is highly probable the airplane intermittently flew into clouds along the north-bound route and final leg to the accident site. It is also highly probable Instructor A uttered "Clear" without being able to confirm the safety of the area up ahead because; he could not see Mt. Tsurugi due to clouds; the airplane was about to be placed in an in-cloud condition or already in-cloud. There was no obstacle on its left-hand side, while mountains were approaching on its right-hand side and in front with the Ridge 4 blocking its course, and that despite these geographic features, it is highly probable that the airplane changed its course to the right and flew toward the steep slope of Ridge 4. A possible reason for this maneuver is the situation, where Instructor A could not see anything ahead and on his left-hand side due to clouds, forced him to resort to flying along the mountainside on the right overlooking trees, but his death denied clarifying the reason of this maneuver. (3.11)

<2> The airplane, which was conducting VFR training, was not allowed to fly into or close to clouds. In-cloud flight or close to clouds under VFR flight is extremely dangerous because the pilot cannot keep a safe distance from other airplanes or obstacles. (3.12)

<3> It is highly probable that Instructor A understood that in-cloud flight or approaching clouds under VFR training was a violation of the Civil Aeronautics Act. It is somewhat likely that Instructor A flew close to or into the clouds with some intention such as to have students experience in-cloud conditions or to be able to continue training; however, his death denied us the clarification of his intention.(3.13)

<4> It is highly probable that Student A did not recognize that the airplane was approaching the mountains until Instructor A pulled the control wheel. It's also highly probable that Instructor A became disoriented and unaware that he was closer to the mountains than he thought as the airplane became very close to or in-cloud and lost outside reference. (3.14)

(5) Advices from Instructor B and Student B

With the assumption of the flight along the estimated flight route, it is probable that

no advice was given from Instructor B or Student B when the airplane was flying close to or in the clouds. It is possible that Instructor B did not give advice because he refrained from objecting to the training presided over by Instructor A. It is somewhat likely that Student B did not give advice because there was an authority gradient between Instructor A and the student. (3.15)

(6) Aviation Medical Examinations and Effects of Medicine

<1> It is highly probable that aviation medical examinations for Instructor A were conducted according to the note when evaluating allergic diseases as included in the Manual for Aviation Medical Examinations. (3.17(1))

<2> It is probable that Instructor A performed aviation duties without taking twice as much time as the ordinary interval of administration after using the medicine internally. Instructor A was required to know that he must not engage in aviation duties for the prescribed number of hours after the medicine intake because the Guidelines for the Handling of Medical and Pharmaceutical Products were known to all instructors at the College. Therefore it is possible that he knowingly engaged in aviation duties without allowing the prescribed amount of time to elapse after the medicine intake. But, it is also possible that he did not understand the restriction. (3.17(2))

<3> It is highly probable that Instructor A was not affected by one of the medicine's side effects— sleepiness. (3.17(3))

<4> The Guidelines for the Handling of Medical and Pharmaceutical Products were not known to all the aircrew concerned. As the possibility exists that the Guidelines for the Handling of Medical and Pharmaceutical Products was difficult to understand without trained examiner's clear explanation, it is necessary to establish a system that enables correct information on the handling of medical and pharmaceutical products to be disseminated to all personnel concerned by the trained doctor. (3.17(4))

<5> It is highly probable that the head instructor and the deputy head instructor, both of whom supervised Instructor A, did not know Instructor A's chronic illness and the medicine he regularly took. (3.17(5))

(7) Safety Management System at the College

<1> The number of accidents caused by the College grew sharply after it became an independent administrative agency, and the growth of fatal accidents was particularly outstanding. It is necessary for the Minister of Land, Infrastructure, Transport and Tourism and the College to focus on this fact and identify problems in the business administration system for the latter as an independent administrative institution and solve them appropriately. (3.18(1))

<2> The College introduced a safety management system at its own initiative, and that its General Safety Manager has made the importance of safety management known to not only all employees but also all its students. If the head instructor or the deputy head instructor had known Instructor A's habitual unsafe behaviors in advance, it is highly probable that either of them could have appropriately guided and supervised him and the accident could have been precluded. It is probable that the College's reporting system including potential incident reports did not work sufficiently and alternative reporting means were limited. Since there are cases where it is difficult to give in flight advice, it is necessary that the College contemplates and implements an effective reporting method that suits the situation. (3.18(2))

<3> At the College, the investigation revealed at least five unsafe acts, and of which it is possible that at least four of them were intentional ones in which their performer underestimated the danger from the viewpoint of human factors. It is possible that the basic safety policy of the College was not instilled into the field instructors, and that there was a gap in safety awareness between management and field instructors. It is also possible that behind the accident was a problem that involved the entire organization of the College—a work environment/organizational culture that allowed unsafe behaviors. (3.18(3))

<4> The College has its Main and Branch Schools conduct cross safety audits annually, and the CAB conducted extraordinary audits of the College after each of the accidents caused by the College, but there was no external audit aimed at examining the status of its daily operations. Judging from these, it is highly probable that the system of objectively checking mechanism for the safety management system at all levels of organization was not fully utilized. (3.18(4))

<5> The College was harshly evaluated for having caused accidents, but has received high ratings for all other items. Therefore, it is highly probable that this was because the College worked on its business under the business administration system for independent administrative agencies. (3.18(5))

<6> It is highly probable that the PDCA cycle was at work among the College, the Minister, and the Evaluation Committee under the business administration system for the College as an independent administrative agency. The business administration system for the College as an independent administrative agency also works as a system to ensure aviation safety at the College. Judging from the fact that this accident occurred in the year following the period during which the College caused accidents for two consecutive years, it is highly probable that there was still room for improvements in the safety measures at the College. (3.18(6))

<7> In their evaluations for the medium-term-goal period, members of the Evaluation Committee pointed out the necessity of creating an organizational culture that urged all instructors and students to have an awareness of potential dangers at all times and eliminate danger factors before accidents occurred. It is probable that needs to consider how the College's medium-term goals should be, such as setting specific goals to ensure that a safety culture is brewed and safety activity is implement surely and continuously, including reviewing in timely manner, based on the organizational climate cannot be built in a day but also it is brewed by daily ongoing activity. The Minister also needs to grasp reliably the actual condition of efforts towards improvement of the safety management system of the College, check the implementation status whether such various safety measures set by the College based on the medium-term plans, etc. are carried out continuously and certainly by such as periodically audits in the field and provide more guidance depending on the results until the College becomes able to operate a safety management system autonomously and steadily. (3.18(7))

4.2 Probable Causes

It is highly probable that the accident occurred as follows: The airplane conducting VFR BIF training operated by a hooded student was instructed by his instructor to fly into the mountainous area; It then flew into clouds or close to the clouds that covered the mountains, losing sight of ground references and approached the ground very close against the instructor's expectation; The instructor took the controls from the student and attempted to evade the mountains, but the airplane failed to change its course to an appropriate direction and crashed into the slope of the mountain.

It is somewhat likely that the instructor flew close to or into the clouds which covered the mountain with some intention; however, his death denied us the clarification of his intention.

It is somewhat likely that the basic safety policy of the College was not instilled into the field instructors, and that there was a gap in safety awareness between management and field instructors. It is also somewhat likely that behind the accident was a problem that involved the entire organization of the College—a work environment/organizational culture that consequently allowed unsafe behaviors.

4.3 Other Safety Related Findings

The designated examiner determined that Instructor A, who had taken Onon for more than four years to treat allergic rhinitis, had passed the aviation medical examinations, and the Flight Standards Division of the Civil Aviation Bureau also accepted the examiner's decision. Investigations of this accident revealed, however, that the aviation medical examinations of Instructor A had the following problems:

<1> It is possible that Instructor A regularly took the medicine as prescribed and performed aviation duties without taking twice as much time as the ordinary interval of administration after taking the medicine.

<2> Guidelines for the Handling of Medical and Pharmaceutical Products were not known to all aircrew concerned. It is somewhat likely that it was difficult to understand the guideline without trained examiner's clear explanation.

5. SAFETY ACTIONS

5.1 Safety Actions Taken

5.1.1 Safety Actions Taken by the Civil Aviation College

5.1.1.1 Actions to Resume Student Training

(1) Making the Need to Comply with Laws, Ordinances, and Regulations Known to All Employees and Students Again

(2) Provision of Safety Training to Instructors and Students

In order to prevent controlled flight into terrain (CFIT) due to pilots' errors, the College emphasized the importance of (1) complying with laws and regulations, (2) avoiding localized attention, and (3) utilizing CRM, and reconfirmed that it should make the concept of CRM an integral part of its pilot training. Specifically speaking the College did as follows: In order to (1) ensure compliance with laws and regulations, the College confirmed that instructors and students should appropriately perform the duty to watch, maintain visual meteorological conditions, and observe the minimum safety altitude. As a measure to (2) avoid concentration on a single point, it confirmed that since keeping a watch for the outside would be neglected if two crew members concentrated on training, both of them needed to pay attention to the situation around them at all times. As an initiative to (3) make the most of CRM, it confirmed the importance of giving clear advice (assertion) particularly if unsafe factors were detected, creating an atmosphere that allowed instructors and students to express their free opinions, and listening to others.

(Crew resource management (CRM) refers to making efficient use of all available human resources, hardware, and information in order to ensure safe and efficient airplane operation.)

(3) Confirmation of Emergency Operation Procedures Using Flight Training Equipment

In order to make the points emphasized in the safety training in (2) above an integral part of instructors' and students' knowledge, the College created situations that required emergency operation using flight training equipment in order to confirm emergency operation procedures such as dividing roles between the student and the instructor to keep a watch for the outside and giving clear advice (assertion) when unsafe factors were detected.

(4) Provision of Safety Training to Maintenance Personnel and Maintenance Contractors

The College provided safety training to prevent human errors related to maintenance.

(5) Reconfirmation of Safe Training Altitudes and Other Requirements in the Training Areas and Making the Need to Meet These Requirements Known to All Instructors and Students

The College defined the minimum safe training altitudes for each training subject using newly created detailed training area maps (grid maps), and clarified that other training areas should be used or training discontinued if such altitudes could not be maintained.

(6) Clarification of Systems to Observe Instructors' Teaching Methods

The College stipulated that instructors observing other instructors' teaching methods should make all-out efforts to keep a watch for the outside and give clear advice (assertion) if they detected unsafe factors. In addition to the abilities required for captains and teaching and guidance methods, it confirmed the appropriate operational coordination

capabilities required for captains (such as decisions on training altitudes, areas that suited weather forecasts, training subjects, and so on, and provision of training based on such decisions).

(7) Counseling for Instructors and Students

The College provided mental care to instructors and students mainly through individual interviews. It continued counseling for them and gave lectures on stress management.

(8) Extraordinary Examinations of Instructors' Abilities

The College first provided all personnel employed as instructors with flight training to maintain their abilities, and then, by having the head instructors and deputy head instructors conduct extraordinary examinations of the instructors' abilities (interviews and skill tests), it confirmed that all instructors were capable of providing training in accordance with its airplane operation regulations.

(9) Verification of Training's Safety through Simulation Exercises

After unsafe factors that might arise during training were assumed for each training subject, simulated pre-flight briefings, training flights, and post-flight briefings were conducted. Thus the College confirmed that there was no safety problem in each training subject.

5.1.1.2 Actions Taken after the Resumption of Student Training

(1) Since April 2012, the College has assigned a person who had experience of aircraft accident investigation to the position to assist the General Safety Manager in order to comprehensively review its safety management system and take drastic safety measures.

(2) In addition to the anonymous questionnaire surveys carried out when students completed all courses, the College held direct dialogues between the President and students. It also assigned the supervisor who was former airline pilot as a contact person for the students. The College required students to submit complete questionnaires directly to the President after each training flight. It reflected the opinions collected from students through these initiatives on its training curriculum in order to improve the safety of training. One example of feedback was that the College guided instructors to create an environment that allowed giving clear advice (assertion). After they were put together, the results of these initiatives were applied to other operations of the College using the Joint Safety Committee and other organizations.

(3) The College ensured appropriate operation of its safety management system by reviewing the Safety Management Manual and risk evaluation methods. Reviews of such methods included the clarification of periods covered by risk evaluations and methods for calculating risks that might become realized.

(4) The College set up a group dedicated to receiving potential incident reports. The group eliminated reporting-related troubles by making all-out efforts to protect reporters and made them anonymous and bolstered the reporting system so that it could analyze such reports in a systematic way and that information on the reports could be shared among all parties concerned. This bolstered system has officially been implemented since fiscal 2012 (implemented in fiscal 2011 on a trial basis). As described above, potential incident reports were analyzed with the anonymity of their submitters kept and published in CAC Safety Reports so that they were widely read among instructors and students (A total of 17 reports had been issued by August 31, 2013).

(5) In fiscal 2012, in order to improve students' safety management abilities, the College launched CRM training as part of the Sendai flight courses and this training includes teaching the importance of CRM. Starting fiscal 2013, the College plans to further enrich this training program to meet the Detailed Rules of Examination Procedures of Aircraft Operation Manual established by the CAB, MLIT (Kuko No. 78 of January 28, 2000). It is also implemented to provide CRM training as part of the Miyazaki and Obihiro courses so that instructors and students obtain a deeper understanding of CRM through training at these schools, thus contributing to safe airplane operation.

(6) In order to develop a safety culture, the College provided safety training to all employees and students by inviting external experts periodically as follows:

- Safety training by the vice president of the Japan Aircraft Pilot Association (January to February 2012)
- Safety training by an expert in human factors (July 2012)
- Safety training by an aircraft accident investigator from the Japan Transport Safety Board (January 2013)
- Safety training by airline pilot on active service (July 2013)

(7) Starting fiscal 2012, the College designated July as the CAC Safety Month and carried out mainly the following initiatives:

- At the Main School, the President gave a lecture on safety to employees and students, and at the Branch Schools, the principal did so.
- Experts in human factor were invited to provide safety training (as mentioned above).
- Each school conducted general safety inspections to confirm that business was conducted appropriately.
- The Main School and the Obihiro Branch held a joint drill to handle accidents to consider how to cope with accidents when they occurred.
- The College designated July as a month to step up potential incident report. It produced posters to encourage instructors and students to submit such reports. In order to promote a deeper understanding of the importance of potential incident reports, it also held meetings to exchange opinions between supervisors and instructors or students.
- In order to raise the safety awareness of employees and students, the College hosted a safety slogan contest invited from employees and students. Accepted slogans were posted in the schools as monthly safety slogans one after another.

(8) The College urged all instructors to declare their health conditions before their daily flights.

(9) Records using GPS logger are utilized due to check the flight trajectory about all training flights from June 2013 after considering safety, such as getting confirmation of Civil Aviation Bureau about using this during takeoff and landing phase. Video cameras and IC recorders were taken into aircrafts and operated for trials from July 2013.

5.1.2 Safety Actions Taken by the CAB, MLIT

On December 19, 2011, following the provision of aviation safety information on the captain's aviation medical examination by the Japan Transport Safety Board, the CAB, MLIT instructed the College to investigate the detailed facts of the accident and consider measures to prevent the recurrence of similar accidents.

Moreover, on December 22 of the same year, from the viewpoint of eliminating the effects of

medical and pharmaceutical products on normal airplane operation and ensuring conformity to the medical examination standards, the Bureau again requested designated domestic air carriers, All Japan Air Transport and Service Association Co., Ltd., Japan Aircraft Pilot Association, and Japan Soaring Association as well as the Scheduled Airlines Association of Japan, Japan Coast Guard, National Police Agency, and Fire and Disaster Management Agency to comply with the Guidelines for the Handling of Medical and Pharmaceutical Products when using such products known to all airplane crew members that belonged to these organizations. It also requested all institutions engaged in aviation medical examinations and designated examiners for such examinations to make the Guidelines for the Handling of Medical and Pharmaceutical Products known to airplane crew members in the years to come when they underwent the examinations or sought advice thereon.

5.1.3 Safety Actions Taken by the College after the CAB Instructions as Described in 5.1.2 to Investigate the Facts and Consider Measures to Prevent the Recurrence of Similar Accidents

(1) Ensuring a Thorough Understanding of How to Use Medical and Pharmaceutical Products among Instructors in Charge of Flight Training

The College made the content of the Guidelines for the Handling of Medical and Pharmaceutical Products known to all instructors. It stipulated that if it was difficult to determine whether they could take medicine before working as a crew member, instructors should not perform aviation duties before confirmation by a designated examiner, and included this provision in its airplane operation regulations. Moreover, at the time of adopting instructors and conducting periodic examinations, it required examiners to confirm that instructors had appropriate knowledge of handling medical and pharmaceutical products.

(2) Improvement of Grasping the Flight Instructors' Health Conditions and Their Use of Medical and Pharmaceutical Products

The College revised its airplane operation regulations to include the provision that instructors should not perform aviation duties when they are mentally or physically degraded due to sickness or other reasons and required them to report to their manager in such cases. It also required instructors to report to their manager if medicines were prescribed for them or they purchased on-the-shelf medicines and use them internally.

(3) Grasping the Situation at the Time of Aviation Medical Examinations

The College required instructors to report to their manager the declarations made at the aviation medical examinations, the doctor's findings and comments, and so forth. Thus it made all-out efforts to obtain a clear understanding of the aviation medical examinations conducted, particularly the declared medicines that instructors regularly and the doctor's comments.

5.2 Safety Actions Required

5.2.1 Examination of Training Procedures

(1) Establishment of Opened Educational Environments

The College is urged to establish an opened educational environment that enables observer instructors and students to give advice without hesitation during the flight training when necessary.

(2) Visualization of Training

In order to make sure of opened educational environments and improve educational effects, etc. the College is required to introduce effective methods, such as utilizing of installed video cameras and other devices in the airplane.

5.2.2 Strengthening of the Safety Management System

(1) Improvement of the College's Instructor Management System

The instructor management system of the College failed to identify the unsafe acts habitually performed by instructors. The College needs to establish a system for grasping the actual condition of instructors' teaching methods and provide them with appropriate guidance and supervision.

(2) Solution of Organizational Problems at the College

In order to fill the gap in safety awareness between management and field instructors and improve the work environment and organizational culture that allow unsafe acts, the College needs to establish a safety management system with the commitment of the all personnel from management to field instructors and to properly operate it with continued reviewing.

(3) Safety Actions Taken under the Business Administration System for the College as an Independent Administrative Agency

At the College, the business administration system for independent administrative agencies works as a system for ensuring aviation safety, but it is highly probable that there was still room for improvement in the safety actions taken by the College.

In their evaluations, members of the Evaluation Committee pointed out that the College should create an organizational culture that urges all its members to have an awareness of potential dangers at all times and eliminate risk factors before accidents occur. The Minister of Land, Infrastructure, Transport and Tourism needs to consider how the medium-term goals should be, such as setting specific goals to ensure that a safety culture is brewed and safety activity is implement surely and continuously, including reviewing in timely manner, based on the organizational climate cannot be built in a day but also it is brewed by daily ongoing activity.

The Minister needs to grasp reliably the actual condition of efforts towards improvement of the safety management system of the College, check the implementation status whether such various safety measures set by the College based on the medium-term plans, etc. are carried out continuously and certainly by such as periodically audits in the field and provide more guidance depending on the results until the College becomes able to operate a safety management system autonomously and steadily.

5.2.3 Establishment of Effective Use of Aviation Medical Examinations

It is highly probable that the instructor, as a captain, did not comply with restrictions on the internal use of the medicine. It is required to reform the system so that every flight crew concerned can take medicine according to the Manual for Aviation Medical Examinations after getting correct medicine information from the doctor with expertise.

6. RECOMMENDATIONS

6.1 Recommendations for the Minister of Land, Infrastructure, Transport and Tourism

It is highly probable that this accident, involving the Independent Administrative Institution Civil Aviation College, occurred as follows: The airplane conducting VFR BIF training operated by a hooded student was instructed by his instructor to fly into the mountainous area; It then flew into or close to the clouds that covered the mountains, losing sight of ground references and approached the ground very close against the instructor's expectation; The instructor took the controls from the student and attempted to evade the mountains, but the airplane failed to change its course to an appropriate direction and crashed into the slope of the mountain. It is somewhat likely that the instructor flew close to or into the clouds which covered the mountain with some intention; however, his death denied us the clarification of his intention. The possible contributing factors for this accident at the College are that its safety management system failed to work appropriately, and that as some of the personnel deviated from the philosophy of the College, generating a gap in safety awareness between management and the field instructors, creating a work environment/organizational culture that consequently allowed unsafe acts.

Based on the result of the accident investigation, in order to prevent the recurrence of similar accidents, the Japan Transport Safety Board recommends pursuant to the provision of Paragraph 1 of the Article 26 of the Act for Establishment of the Japan Transport Safety Board that Minister of Land, Infrastructure, Transport and Tourism should take the following measures.

The Minister should grasp reliably the actual condition of efforts towards improvement of the safety management system of the College, check the implementation status whether such various safety measures set by the College based on the medium-term plans, etc. are carried out continuously and certainly by such as periodically audits in the field and provide more guidance depending on the results until the College becomes able to operate a safety management system autonomously and steadily. Moreover, in setting safety-related medium-term goals as prescribed in the Act on General Rules for Independent Administrative Agencies, the Minister should consider how the College's medium-term goals should be, such as setting specific goals to ensure that a safety culture is brewed and safety activity is implement surely and continuously, including reviewing in timely manner, based on the organizational climate cannot be built in a day but also it is brewed by daily ongoing activity.

6.2 Recommendations for the Independent Administrative Institution Civil Aviation College

Based on the result of the accident investigation, in order to contribute to preventing the recurrence of similar accidents, the Japan Transport Safety Board recommends pursuant to the provision of Paragraph 1 of the Article 27 of the Act for Establishment of the Japan Transport Safety Board that the Independent Administrative Institution Civil Aviation College should consider the matters described below and take necessary measures.

(1) Review of the Training Procedures

In the accident, it is somewhat likely that the airplane of the College was into or close

to clouds during VFR training, and that another instructor onboard the airplane gave no advice about this behavior.

The College should aim to create an opened educational environment that enables observer instructors and students to give advice on safety issues in the training airplane without hesitation if necessary. Therefore, it should also consider to introduce effective methods, such as utilizing of installed video cameras in the airplane, etc..

(2) Strengthening of the Safety Management System

The College should establish a system for grasping the actual condition of instructors' teaching methods and provide them with appropriate guidance and supervision.

The possible contributing factors to the accident occurrence are that the safety management of the College actually deviated from its philosophy in its Safety Management Regulations and that there was a gap in safety awareness between management and field instructors, creating a work environment/organizational culture that allowed unsafe acts—a problem that involved the entire organization.

Thus in order to prevent recurrence of such situation and brew and keep an appropriate organizational climate, the College needs to establish a safety management system with the commitment of the all personnel from the General Safety Manager to field instructors and to properly operate it with continued reviewing.

(3) Review of medium-term plans and other related plans

In order to make sure to carry out the initiatives recommended in (1) and (2) above and make them an integral part of its administration, the College should review the medium-term and annual plans and reflect these initiatives on the plans.

Figure 1: Training Areas

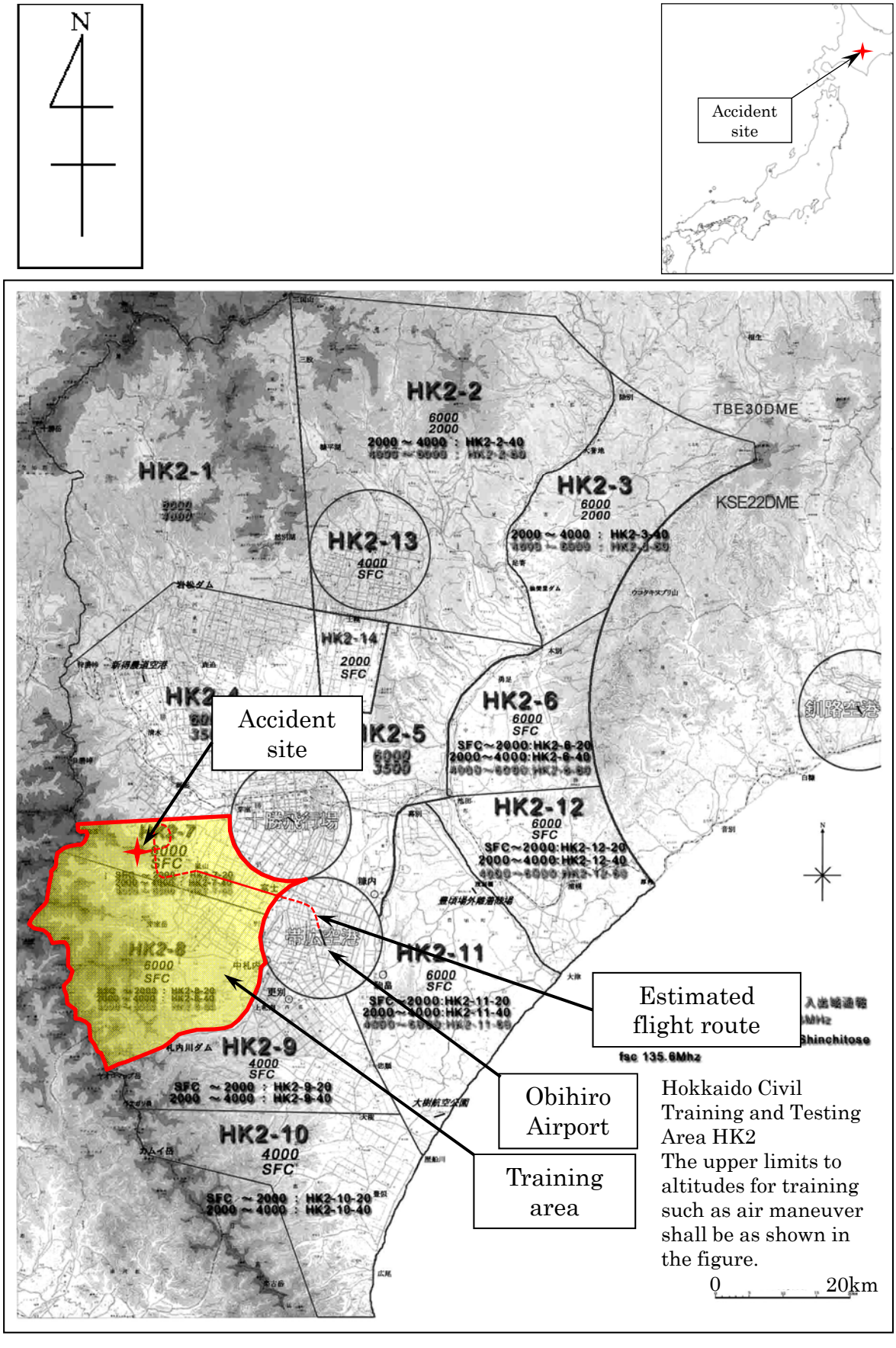
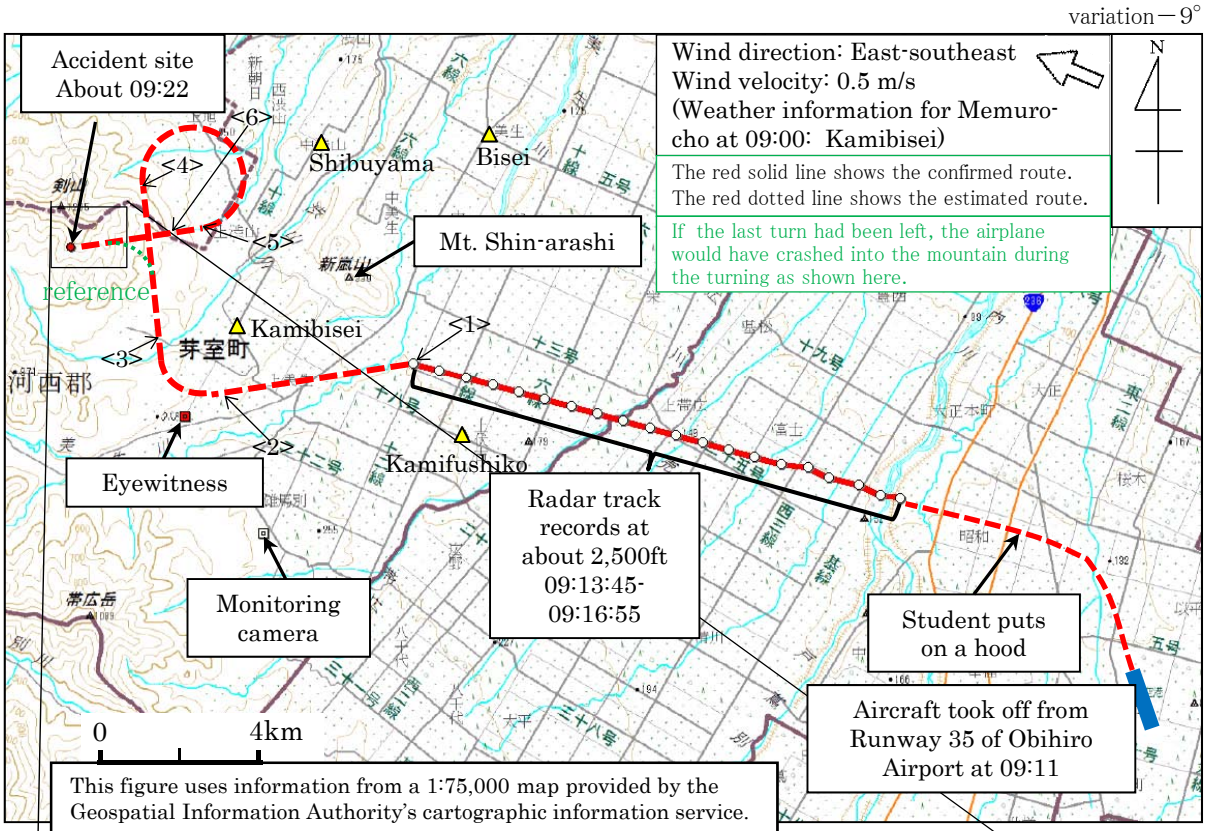
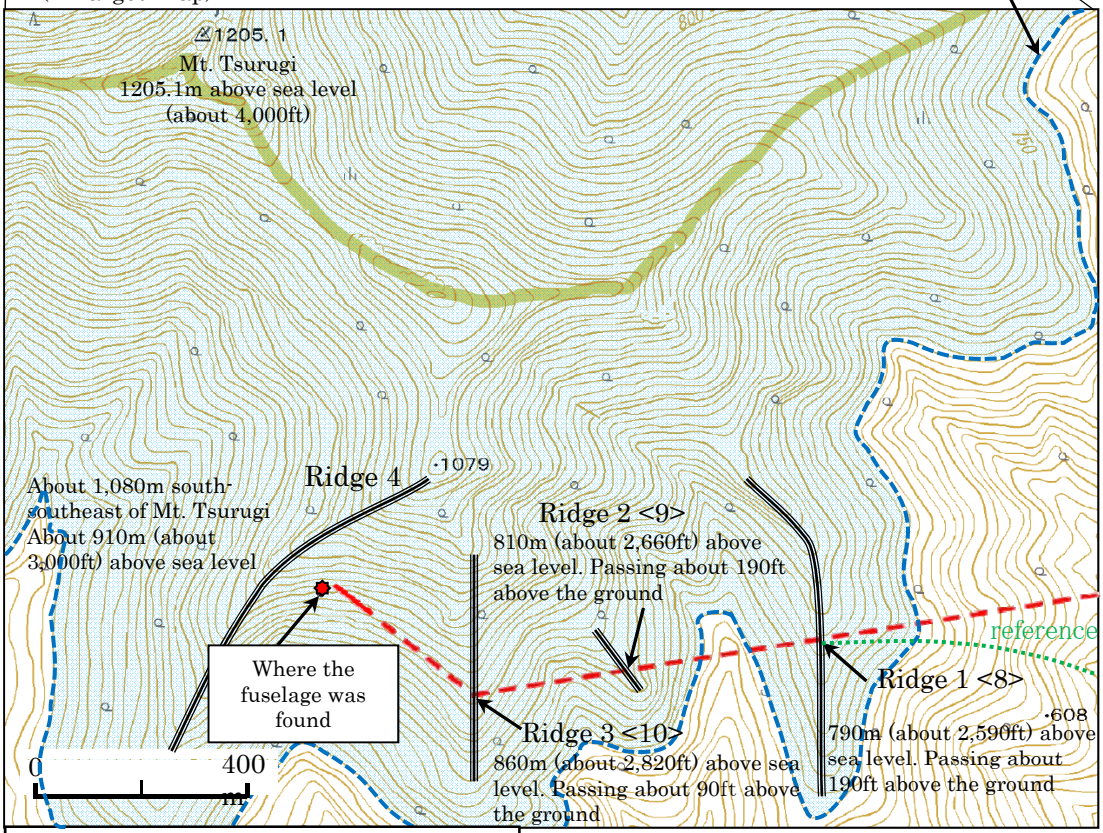


Figure 2: Estimated Flight Route



(Enlarged map)



This figure uses information from a 1:4,500 map provided by the Geospatial Information Authority's cartographic information service.

Figure 3: Three-view Drawing of a Beechcraft A36

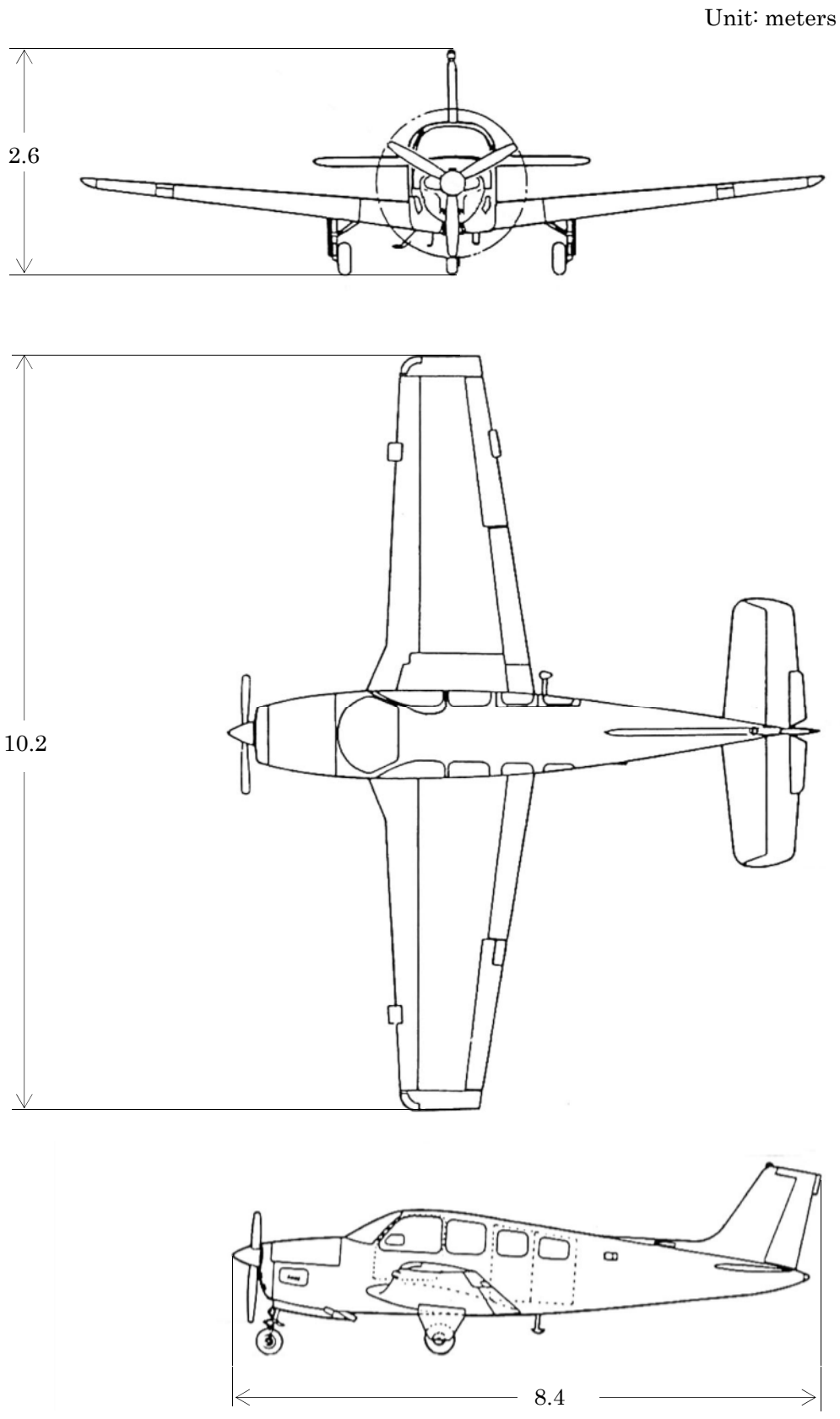
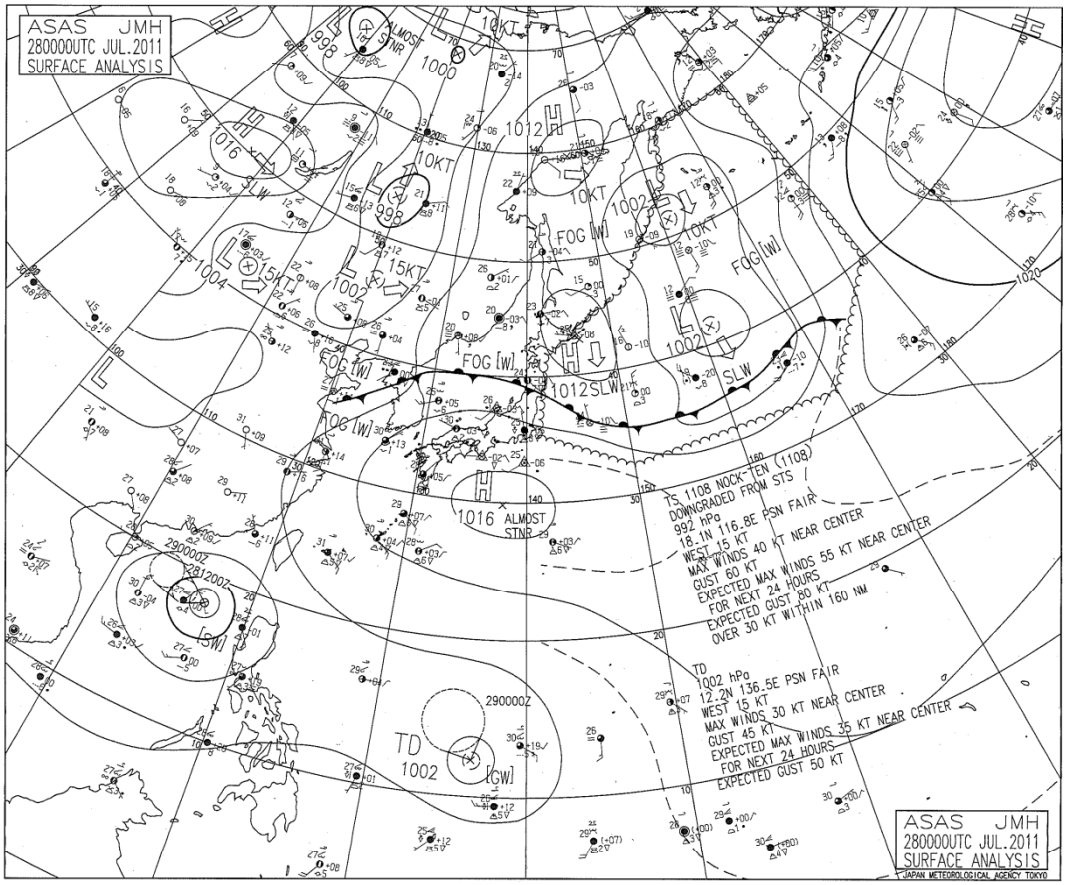


Figure 4: Weather Maps

Asia Pacific Surface Analysis Chart as of 09:00 on July 28, 2011



Upper-level Weather Chart (850hPa) as of 09:00 on July 28, 2011

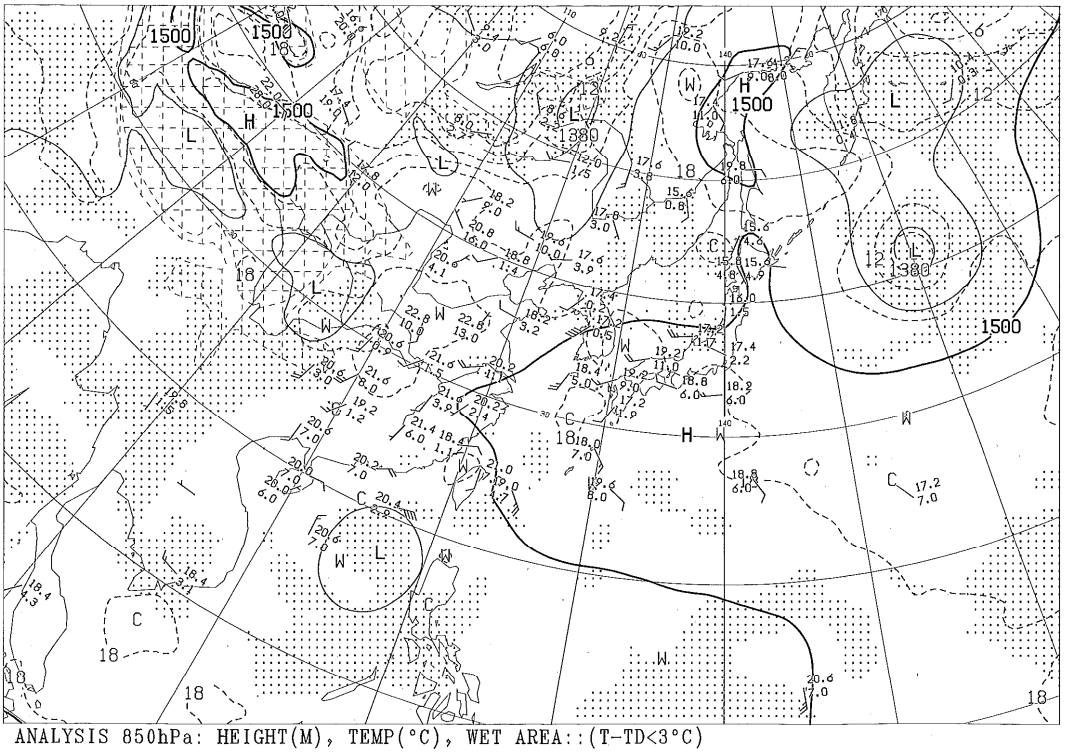
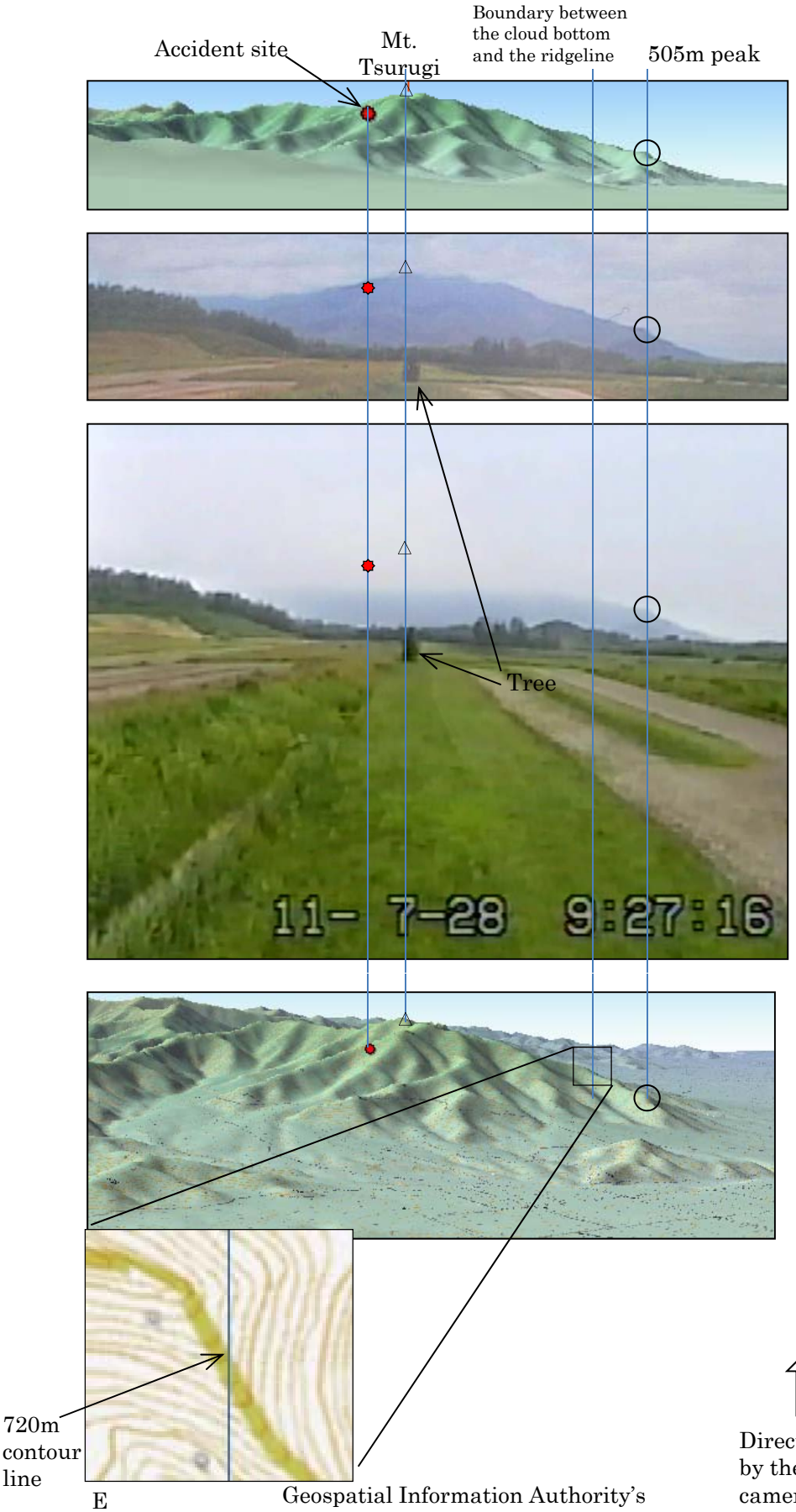


Figure 5: Clouds Observed at the Time of the Accident



A
Digital map 3D image
(As seen from 5m above the ground)

B
Image from the monitoring camera
(When the summit could be seen)

C
Image from the monitoring camera
(09:22:05; corrected time)

D
Combined digital map 3D image and topographic information
(As seen from 1,000m above sea level)

E
Enlarged plane view

Geospatial Information Authority's 1:25,000 topographic map

Direction of photography by the monitoring camera: 330°

Photo 1: Accident Site

Photo 2: Wreckage of the Airplane

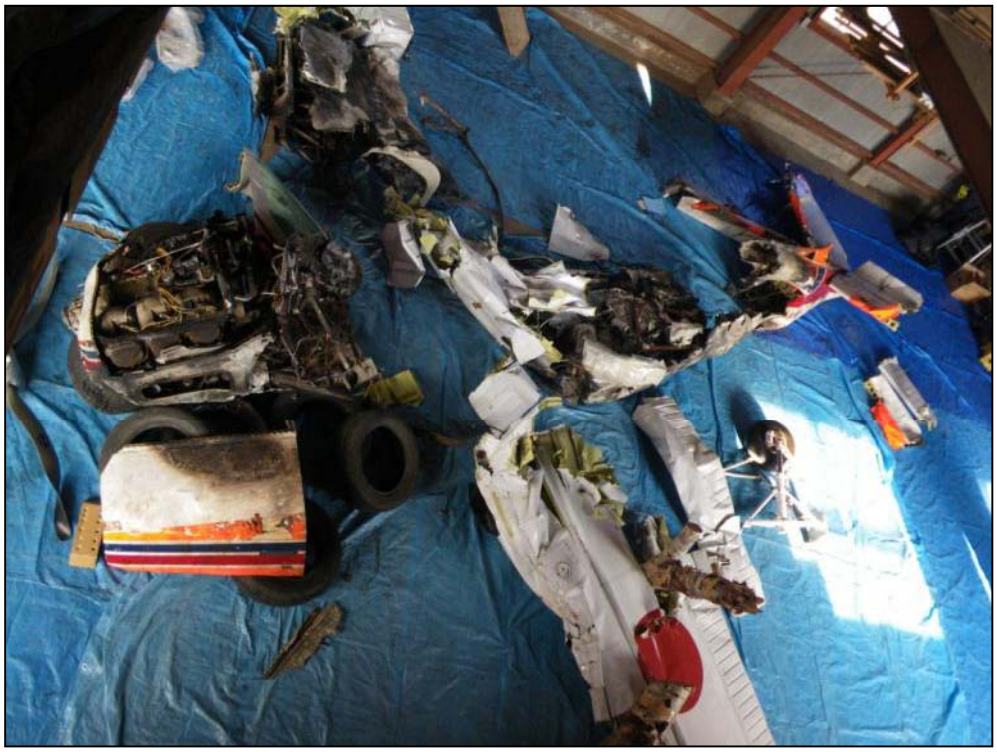


Photo 3: Near the Top of Mt. Tsurugi (1) (taken at about 10:05; by courtesy of a climber of Mt. Tsurugi)

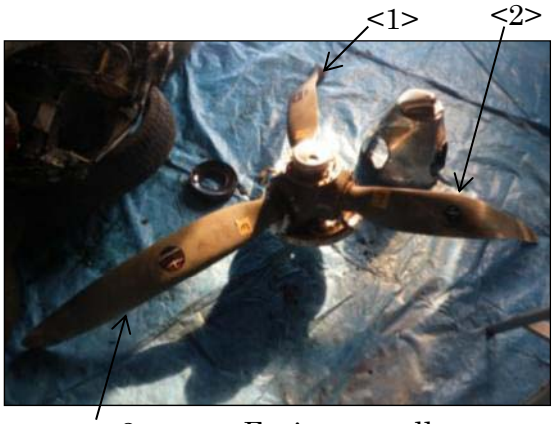
Photo 4: Near the Top of Mt. Tsurugi (2) (taken at about 10:05; by courtesy of a climber of Mt. Tsurugi)

Photo 5: Image from the Monitoring Camera (taken at about 10:04:45; time corrected)

Photo 6: Damage to the Propeller

Accident site

(Numbers indicate the number for each propeller blade)



Entire propeller

<1>

<2>

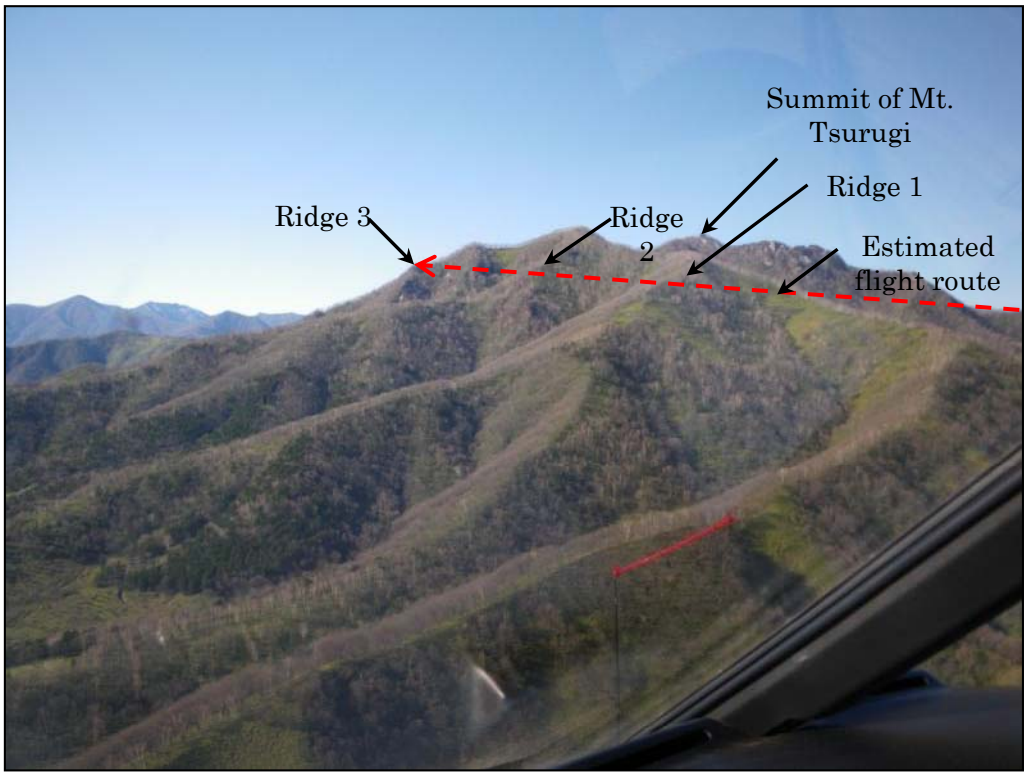
<3>

Spinner

Photo 7: Vertical Speed Indicator

(VSI from airplane
of the same type)

Photo 8: View of the Southeast Slope of Mt. Tsurugi
(Taken about 2,200ft above sea level)



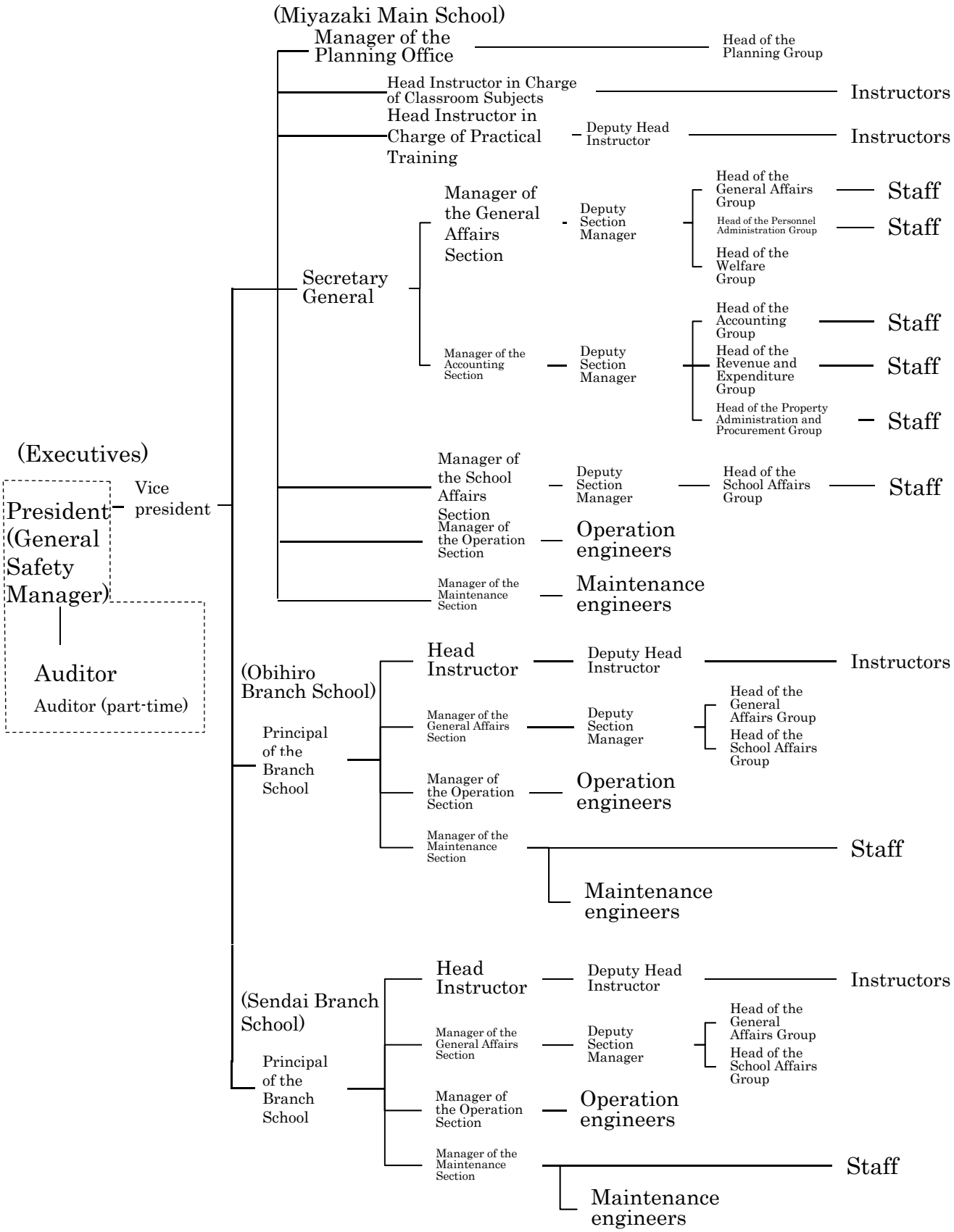
Flight Days for Instructor A and the Allowable Medicine Intake per Month (January 1 to July 28, 2011)

Month / date	January		February		March		April		May		June		July	
	Flight	Medicine	Flight	Medicine	Flight	Medicine	Flight	Medicine	Flight	Medicine	Flight	Medicine	Flight	Medicine
1		2	○	0		1		0		2	○	1	○	1
2		2	○	0	○	0		0		2		2		2
3		1	○	0	○	1		1		2	○	1		2
4	○	1	○	1		2	○	0		2		2		1
5		1		2		2	○	1		2		1	○	0
6	○	0		1		1		2		2	○	0	○	0
7	○	1	○	0	○	0		1		2	○	0	○	1
8		2	○	0	○	0	○	1		1	○	0		2
9		2	○	0	○	0		0	○	0	○	1		2
10		1	○	1	○	0		1	○	0		2		1
11	○	0		2	○	1	○	0	○	0		2	○	0
12	○	0		2		2	○	0	○	1		2	○	0
13	○	0		1		1	○	0		2		2	○	1
14	○	1	○	0	○	0	○	0		2		1		2
15		2	○	0	○	0	○	1		1	○	1		2
16		1	○	1	○	0		1	○	0		1		2
17	○	0		2	○	0		1	○	0	○	1		2
18	○	0		2	○	1	○	0	○	0		2		1
19	○	0		2		2	○	1	○	0		1	○	0
20	○	0		2		2	○	1	○	1	○	0	○	0
21	○	1		2		2		1		2	○	0	○	0
22		2		2		2	○	1		2	○	1	○	1
23		2		2		2		2		2		2		2
24		1		1		2		1		1		2		1
25	○	0	○	1		2	○	1	○	0		2	○	0
26	○	0		2		2		2	○	0		1	○	0
27	○	0		1		2		2	○	1	○	0	○	0
28	○	1	○	1		1		2		2	○	0	○	0
29		2			○	0		2		2	○	0		
30		1			○	0		2		1	○	0		
31	○	0			○	1			○	0				
Sum	17	27	13	31	15	32	13	28	13	35	15	31	15	26
%	55	44	46	55	48	52	43	47	42	56	50	52	54	47

* Circles indicate days when the Instructor flew.
* For the number of times the Instructor was allowed to take the medicine, “2” indicates the day when the Instructor was allowed to take the medicine both in the morning and evening, “1” the day when he was allowed to do so only in the morning or evening, and “0” the day when he was not allowed do so at all. The Instructor was allowed to take the medicine only in the morning on the day before the flight day, and only in the evening on the day when he flew but did not plan to fly on the following day.
* The five consecutive flight days are highlighted in red and the four in yellow.

Attachment 2

Organizational Chart of the Independent Administrative Institute Civil Aviation College (When the Accident Occurred)



Attachment 3

The Basic Safety Policy

The Civil Aviation College establishes the following principles for better safety environment.

Public pledge
- With the philosophy "Safety prevails over everything," the executives, faculty members and students will consciously attain better aviation safety while materializing the lessons learned from the past aircraft accidents.

Establishment of Safety
- Aviation safety is attained by building a safety management system and raised safety awareness of those concerned.

Compliance with laws and ordinances
- All executives, faculty members and students abide by relevant regulations such as the Civil Aeronautics Act, related Japanese laws and ordinances, and the College regulations.
- The Civil Aviation College is ready to amend the regulations in case of nonconformity with the Civil Aeronautics Act, related Japanese laws and ordinances.

Establishment of a safety management system
- The College reviews school organizations, systems, regulations, and procedures and modifies the safety management system for better and smooth execution of the business with the close cooperation of relevant departments. Trained safety managers will be assigned.
- Instructors, maintenance/operations personnel maintain aviation safety through reasonable planning, good preparation, and flawless ordinary works.

Raised safety awareness
- Human factors account for the better part of the accident causes. All executives, faculty members and students should be alert to safety matters on a daily basis. The School maintains and raises their safety awareness through safety training, lectures, and so forth.
- All executives should recognize the importance of their commitments to safety initiatives, their roles, and their responsibility for ensuring safety. They should pursuit front-line safety and raise local safety awareness by encouraging safety proposals for daily operations, followed by evaluation and flexible use of them as future safety measures.

Day of prayer
- The College designates July 11 as the CAC's Day of Prayer for Safety and the week the Day falls into as the CAC's Safety Week so that all executives, faculty members, and students renew their resolutions of aviation safety.

Safety training for students
- Through the training the College enlightens students on their responsibility for safe flights as pilot in command during solo flights. The College also provides them (would-be airline pilots) with fundamental knowledge and skills for aviation safety and encourages cultivating their safety awareness.

Contribution to promotion of aviation safety
- The College intends to play a part for enhancing the safety of pilot training in Japan through active interactions with small aircraft operators and other parties concerned by exchanging safety information distinctive to each of them.

Collection of safety information
- Correct analysis of unsafe factors to learn lessons is one of the indispensable functions to maintain higher level of safety. In this regard the College collects safety reports.
- The use of collected safety information is limited to aviation safety purpose only. The College takes appropriate measures to protect reporters from disadvantageous treatment.

August 2, 2010
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