AI2023-3

AIRCRAFT SERIOUS INCIDENT
INVESTIGATION REPORT

The Educational Corporation Kimigafuchi Gakuen (Sojo University)
J A 3 1 U K

The Kumamoto Prefectural Disaster Prevention Fire Fighting Aviation Unit
J A 9 0 M T

March 30, 2023

JTSB Japan Transport Safety Board

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

TAKEDA Nobuo
Chairperson
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.

《Reference》

The terms used to describe the results of the analysis in "3. ANALYSIS" of this report are as follows.

i) In case of being able to determine, the term "certain" or "certainly" is used.
ii) In case of being unable to determine but being almost certain, the term "highly probable" or "most likely" is used.
iii) In case of higher possibility, the term "probable" or "more likely" is used.
iv) In a case that there is a possibility, the term "likely" or "possible" is used.

AIRCRAFT SERIOUS INCIDENT INVESTIGATION REPORT

LANDING ON A RUNWAY BEING USED BY OTHER AIRCRAFT

1. EDUCATIONAL CORPORTATION KIMIGAFUCHI GAKUEN

(SOJO UNIVERSITY)

CESSNA 172S, JA31UK

2. KUMAMOTO PREFECTURAL DISASTER PREVENTION

FIRE FIGHTING AVIATION UNIT

AIRBUS HELICOPTERS AS365N3 (ROTORCRAFT), JA90MT

KUMAMOTO AIRPORT

AROUND 13:05 JST, AUGUST 26, 2021

February 24, 2023
Adopted by the Japan Transport Safety Board

1. PROCESS AND PROGRESS OF THE AIRCRAFT SERIOUS INCIDENT INVESTIGATION

1.1 Summary of the serious incident	On Thursday, August 26, 2021, at Kumamoto Airport, a Cessna 172S, JA31UK, operated by the Educational Corporation Kimigafuchi Gakuen (Sojo University), executed a touch-and-go*1 on the runway being used by a departure aircraft, Airbus Helicopters AS365N3, JA90MT, operated by the Kumamoto Prefectural Disaster Prevention Fire Fighting Aviation Unit, although the air traffic controller instructed JA31UK to go around as JA90MT rejected its take-off when it was on the final approach to Runway 25 after being cleared to land (touch-and-go).

*1 "Touch-and-go" is an aircraft maneuver that the aircraft takes off again without stopping on the runway or evacuating the runway after landing.

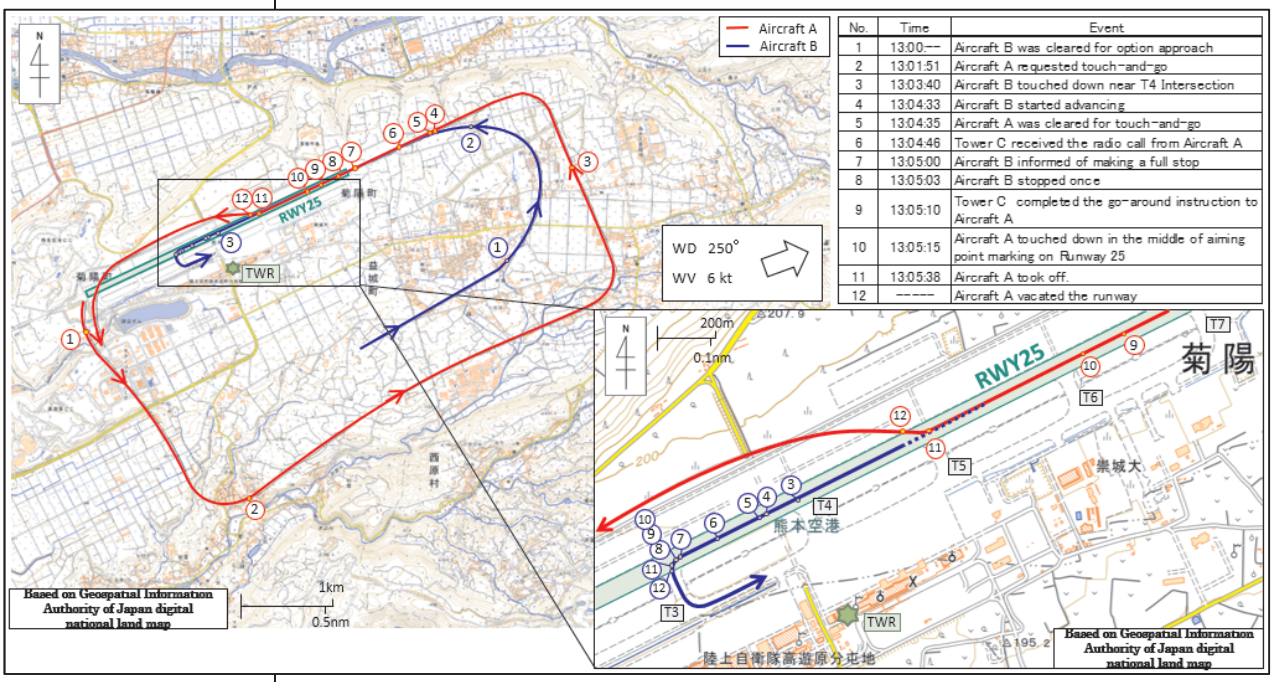
1.2 Outline of the serious incident investigation	The occurrence covered by this report falls under the category of "Landing on a runway being used by other aircraft" as stipulated in Article 166-4, item (ii) of the Ordinance for Enforcement of Civil Aeronautics Act (Ordinance of Ministry of Transport No. 56 of 1952), and is classified as a serious incident. On August 26, 2021, the Japan Transport Safety Board (JTSB) designated an investigator-in-charge and three other investigators to investigate this serious incident. The French Republic as the State of Design and Manufacture of the aircraft (JA90MT) involved in the serious incident, designated an accredited representative and advisers. Comments on the draft Final Report were invited from parties relevant to the cause of the serious incident and the Relevant States.

2. FACTUAL INFORMATION

2.1 History of the Flight	According to the statements of the captain who was a flight instructor (hereinafter referred to as "Captain A") of Cessna 172S, JA31UK (hereinafter referred to as "Aircraft A"), operated by the Educational Corporation Kimigafuchi Gakuen (Sojo University) (hereinafter referred to as "the University"), the student pilot who flew Aircraft A (hereinafter referred to as "Trainee A"), the trainee who was in the rear seat of Aircraft A (hereinafter referred to as "Observer A"), the captain (hereinafter referred to as "Captain B) of Airbus Helicopters AS365N3, JA90MT (hereinafter referred to as "Aircraft B"), operated by the Kumamoto Prefectural Disaster Prevention Fire Fighting Aviation Unit, the pilot of Aircraft B (hereinafter referred to as "Pilot B"), the air traffic controller who was at the tower control position of Kumamoto Airport Traffic Control Tower when the serious incident occurred (hereinafter referred to as "Tower C"), and the air traffic controller who was at the tower control position before being relieved by Tower C (hereinafter referred to as "Tower D"), as well as the voice records recorded in Aircraft A, the records of Aircraft B's cockpit voice recorder/flight data recorder, the ATC communication records, the radar track records, and the video records of surveillance cameras installed in the Airport, the history of the serious incident is summarized as follows. (See Attached Table: Progress Chart of the Serious Incident.)  Figure 1: Aircraft A  Figure 2: Aircraft B When this serious incident occurred, in Aircraft B, Captain B sat in the

right pilot seat, Pilot B sat in the left pilot seat, and the inspector of airmen licensing of the Ministry of Land, Infrastructure, Transport and Tourism(hereinafter referred to as "the Examiner") sat in the aft left seat, and they planned to fly at and around the Airport in order to conduct a practical pilot examination upon the change of rating on the pilot competence certificate for Captain B (hereinafter referred to as "the Exam"). Pilot B was responsible for assisting the implementation of the Exam and in charge of deciding the implementation timing for each examination subject related to take-off and landing. Aircraft B took off from the Airport at 12:06 (JST: UTC+9 hours; unless otherwise noted, all times are indicated in JST in this report on a 24-hour clock), once performed a flight for the Exam related to air operations outside the air traffic control zone of the Airport, then at about 12:26, returned to the air traffic control zone of the Airport, and was flying for the Exam related to take-off and landing while circling the traffic pattern*2 on the north side and then on the south side. Aircraft B was flying with the anti-collision flashlights (red) and constant navigation lights (starboard light (green), port light (red), and tail light (white)) turned on.

Aircraft A was planned to perform take-off and landing training for Trainee A's private pilot certificate, with the Captain A seated on the right, Trainee A on the left in the cockpit, and Observer A in the aft left seat, each wearing a headset. At 12:57, Aircraft A established communication with Tower D and took off from Runway 25 at about 12:59. Aircraft A had the anti-collision flashlights (vertical stabilizer top (red) and wing-tips (white)) and a constant landing light (white) on.



No.	Time	Event
1	13:00:--	Aircraft B was cleared for option approach
2	13:01:51	Aircraft A requested touch-and-go
3	13:03:40	Aircraft B touched down near T4 Intersection
4	13:04:33	Aircraft B started advancing
5	13:04:35	Aircraft A was cleared for touch-and-go
6	13:04:46	Tower C received the radio call from Aircraft A
7	13:05:00	Aircraft B informed of making a full stop
8	13:05:03	Aircraft B stopped once
9	13:05:10	Tower C completed the go-around instruction to Aircraft A
10	13:05:15	Aircraft A touched down in the middle of aiming point marking on Runway 25
11	13:05:38	Aircraft A took off.
12	-----	Aircraft A vacated the runway

Figure 3: Situation at the time of the serious incident

At 13:00, Aircraft B was cleared for an option approach (described later

*2 "Traffic pattern" is, in order to adjust the flow of an arriving aircraft, an established route of flight in the vicinity of the runway made up of the upwind leg, crosswind leg, downwind leg, base leg and the final approach.

	in 2.7 (3)) by Tower D (at the position of ① in Figure 3). And when reading it back, Aircraft B informed Tower D that it would return to the south traffic pattern after the option approach. Captain A listened to the radio communication between Aircraft B and Tower D before and after the take-off, recognizing that Aircraft B would perform an optional approach that would occupy the runway for longer than usual and then return to the south traffic pattern. Aircraft A entered the south traffic pattern of the Airport after taking off and requested a touch-and-go clearance to Tower D on the downwind leg at 13:01:51 (at the position of ② in Figure 3). In response to the request, Tower D instructed Aircraft A to continue the approach, and provided the traffic information*3 that Aircraft B was turning to the final approach (at the position of ② in Figure 3). Upon receiving this information, Captain A and Trainee A tried to visually recognize Aircraft B, but were unable to do so. Captain A thought that there would be sufficient distance between Aircraft B and Aircraft A even taking into consideration that Aircraft B would perform an option approach. In addition, Captain A thought that the visibility was not so good because they could not visually recognize Aircraft B, however, Captain A judged that it would not be a problem to continue the training for Trainee A. After being instructed by Tower D to continue the approach, Captain A concentrated on instructing Trainee A, was unable to visually recognize preceding Aircraft B, and new information about Aircraft B was not provided, as a result, Captain A became less and less aware of the presence of Aircraft B. At about 13:03, Tower D transferred the aerodrome control service to Tower C. At this time, Tower C was unable to visually recognize Aircraft A, therefore, confirmed the position of Aircraft A on the Tower Display*4. Aircraft B touched down in the vicinity of T4 Intersection on Runway 25 (the position of ③ in Figure 3) at 13:03:40, and soon stopped. After stopping for approximately 20 seconds, Aircraft B became airborne again, and at 13:04:33, started proceeding (at the position of ④ in Figure 3). Tower C, who had visually recognized that Aircraft B took off (airborne again and proceeding), confirmed that Aircraft A was on the final approach course about 0.5 nm (about 926 m) from the runway threshold on the Tower Display, and issued a touch-and-go clearance to Aircraft A by applying "Reduced Separation" (later described in 2.7 (5)) at 13:04:35 (at the position of ⑤ in Figure 3). Pilot B heard the radio communication, felt that the timing for the clearance was too early although he was not sure of the position of Aircraft A, and thought the distance between Aircraft A and Aircraft B would be

*3 "Traffic information" is information on other aircraft thought to influence the flight of an aircraft gained from radar, observation or another method. Normally air traffic controllers provide the information within the possible scope of operation in consideration of air traffic capacity, operation capacity and communication capacity.
*4 The "Tower Display" refers to a screen that can display radar information used to confirm the whereabouts of aircraft flying in the control zone and surrounding areas in an airport traffic control tower. And it can be used when the whereabouts of aircraft flying in the control zone and surrounding areas must be confirmed and necessary information must be provided to these aircraft and at the same time, when this can be judged to be necessary for performing ATC services.

considerably small. Captain A did not notice Aircraft B on the runway even when he received the touch-and-go clearance.

As being able to visually recognize Aircraft A before long, Tower C was going to confirm the condition of the runway again, but received the radio call from Aircraft A at 13:04:46, therefore turned to the final approach side (at the position of ⑥ in Figure 3).

In order to conduct an "Aborted Take-off" out of the Exam subjects, Aircraft B descended immediately after the take-off and touched down again on Runway 25 at 13:04:50. This "Aborted Take-off" is an examination item that assumes an engine failure at the time of take-off, but Captain B, who was an examinee, had not been informed of it in advance.

After finishing communication with Aircraft A, Tower C confirmed the condition of the runway again, visually recognized that Aircraft B aborted take-off and was taxing slowly on the runway, and thus was going to instruct Aircraft A to go around. At about the same time, 13:05:00, Aircraft B informed Tower C that it aborted the take-off and would make a full stop, and requested the clearance to taxi to the apron (at the position of ⑦ in Figure 3). At 13:05:03, Aircraft B once stopped on Runway 25 (at the position of ⑧ in Figure 3). At 13:05:08, Tower C instructed Aircraft B not to make the next transmission, and immediately in continuous transmission, instructed Aircraft A to go around. It was at 13:05:10 when the go-around instruction was completed (at the position of ⑨ in Figure 3), but there was no read-back from Aircraft A. Tower C was puzzled that Aircraft A continued the final approach without reading back the go-around instruction, but thought there was a possibility that Aircraft A might actually be on its way to go around.

While orally instructing Trainee A about touchdown maneuvers, Captain A felt that he heard some kind of radio call, but was unable to recognize it was the go-around instruction from Tower C to Aircraft A, and neither did Trainee A. Observer A felt like that a go-around was instructed, but was not sure. When receiving a go-around instruction from Tower C, Aircraft A was about to touch down (about five seconds before the touchdown (about 28 ft AGL)) after passing above the Runway 25 threshold, and Trainee A had already initiated a flare maneuver. At about 13:05:15, without executing the go-around, Aircraft A touched down in the middle of aiming point marking on Runway 25 (in the vicinity of T6 Intersection) (at the position of ⑩ in Figure 3, Distance between both aircraft was about 1,550 m (about 0.83 nm)), and continued the touch-and-go.

Soon after the nose wheel of Aircraft A touched down and Trainee A started maneuvers for take-off, Captain A visually recognized a red constant light slightly to the left of the centerline and not so close ahead, and thought for moment it might be Aircraft B whose traffic information was provided on the downwind leg. Captain A took over the control from Trainee A at about 13:05:34. Captain A thought it might be possible to stop safely short of the aircraft that was believed to be Aircraft B, but at that point, Trainee A had

	already set the engine power and flaps to the take-off position, therefore, Captain A judged that continuing the touch-and-go might be safer than stopping, and continued the take-off roll. At about 13:05:38, Aircraft A took off from near T5 Intersection on the runway (at the position of ⑪ in Figure 3). After the take-off, judging that it would not be good if passing immediately over the aircraft that was believed to be Aircraft B like that, Captain A slightly changed the course to the right to turn above the runway (at the position of ⑫ in Figure 3, Distance between both aircraft was about 920 m (about 0.50 nm)), and continued to climb while flying in parallel with the runway. When looking down to the left during the climb, Captain A was able to visually recognize a helicopter, which was believed to be Aircraft B immediately after vacating the runway, on Taxiway T3.
2.2 Injuries to Persons	None
2.3 Damage to the Aircraft	None
2.4 Personnel Information	(1) Captain A Commercial pilot certificate (Airplane) November 14,1983 Rating for single-engine land November 14,1983 Rating for multi-engine land July 29, 2010 Flight instructor certification October 9, 2003 Instrument flight certificate March 26, 2015 Class 1 aviation medical certificate Validity: March 13, 2022 Total flight time 6,648 hours 57 minutes Flight time in the last 30 days 18 hours 30 minutes Total flight time on the type of aircraft 2,397 hours 07 minutes Flight time in the last 30 days 18 hours 30 minutes Flight time of student training at the University 205 hours 40 minutes Of these, flight time of training for the students in the private pilot course 30 hours 10 minutes (2) Trainee A Flight training certificate (Airplane) Validity: March 31, 2022 Total flight time 10 hours 05 minutes Flight time in the last 30 days 7 hours 55 minutes Total flight time on the type of aircraft 10 hours 05 minutes Flight time in the last 30 days 7 hours 55 minutes (3) Captain B Commercial pilot certificate (Rotorcraft) August 24, 1992 Rating for multi-engine turbine land April 24, 2007 Instrument flight certificate June 8, 2004 Class 1 aviation medical certificate Validity: August 18, 2022 Total flight time 6,494 hours 54 minutes Flight time in the last 30 days 7 hours 30 minutes Total flight time on the type of aircraft 22 hours 30 minutes Flight time in the last 30 days 7 hours 30 minutes

	(4) Pilot B Commercial pilot certificate (Rotorcraft) January 27, 2006 Rating for multi-engine turbine land January 27, 2006 Type rating for Aerospatiale SA365 October 29, 2019 Class 1 aviation medical certificate Validity: April 23, 2022 Total flight time 3,176 hours 23 minutes Flight time in the last 30 days 13 hours 04 minutes Total flight time on the type of aircraft 342 hours 48 minutes Flight time in the last 30 days 13 hours 04 minutes (5) Tower C Air Traffic Control Certificate December 1, 2017 Aerodrome control service December 1, 2017 Medical Certificate Validity: July 1, 2022
2.5 Aircraft Information	(1) Aircraft A Aircraft type: Cessna 172S Serial number: 6444 Date of manufacture: December 7, 2008 Airworthiness Certificate: Dai-2021-221 (2) Aircraft B Aircraft type: Airbus Helicopters AS365N3 Serial number: 7009 Date of manufacture: June 16, 2017 Airworthiness Certificate: Dai-2021-143
2.6 Meteorological Information	The observation data in the aviation routine weather report at the Airport around the time of the serious incident was as follows 13:00 Wind direction 250°; Wind velocity 6 kt; Prevailing visibility 10 km or more Northeastward visibility 4,000 m Current weather Light shower rain Cloud: Amount 1/8; Type Stratus; Cloud base 500 ft; Cloud: Amount 3/8; Type Cumulus; Cloud base 2,000 ft; Cloud: Amount 7/8; Type Cumulus; Cloud base 3,500 ft; Temperature 26℃; Dew point 25℃; Altimeter setting (QNH): 30.02 inHg
2.7 Additional Information	(1) Runway of the Airport The Airport has a runway 07/25 (magnetic bearing 071° / 251°) of 3,000 m in length and 45 m in width, and the control Tower is located almost on the south side of the center of the runway. (2) Captain A and Trainee A By the time this serious incident occurred, Captain A had experience instructing three students in the commercial pilot course and three students in the private pilot course in the University, as well as eight year previous experience as a flight instructor in other pilot training facilities. In July 2021, Captain A started instructing as a flight instructor in charge of three trainees for the private pilot course including Trainee A.

Trainee A had flown the traffic pattern for two days on August 6 and 23 in 2021 before this serious incident occurred.

(3) Option approach

Option approach is an aircraft maneuver of either touch-and-go, low approach, stop-and-go or landing (full stop), that is conducted subsequent to the approach that will be performed on a request from the aircraft. Option approach may be performed for training and examination flight purpose. A flight instructor etc. instructs the trainee to continue an approach until just before the runway threshold without indicating further maneuver in order to check the response from the trainee, which may result in longer runway occupancy times.

For the change of rating on the pilot competence certificate, Captain B had started a training overseas from June 2021 and had been conducting the training with Pilot B, who was a person in charge of the training, in and around the Airport from August 20, 2021. The take-off and landing procedures conducted by Aircraft B in the training and the exam took a longer runway occupancy time than that for the usual option approach because it included "Aborted Take-off" in order to simulate the operation method peculiar to multi-engine helicopters in the event of engine failure. Although this was expected to affect the runway operations at the Airport, there was no agreement with the air traffic control facility, therefore, Pilot B explained the training and the Exam procedures to the personnel in charge of operation and coordination at Kumamoto Airport Traffic Control Tower on August 11, 2021. Both parties agreed that if Aircraft B performs the take-off and landing in accordance with the procedures by clearly specifying this in the flight plan, Kumamoto Airport Traffic Control Tower shall regard the take-off and landing procedures as an option approach. Consequently, the personnel in charge of operation and coordination briefed all air traffic controllers (hereinafter referred to as "controllers") working at the air traffic control tower on the procedures by the start date of the training for Aircraft B. In addition, the agreement between Pilot B and the personnel in charge of operation and coordination, etc. did not specifically set forth the reporting rules when Aircraft B "aborts take-off" and makes a full stop.

Aircraft B conducted flight training including the option approach on August 20, 21, 22 and 25 in 2021 before the serious incident occurred. In addition to the "Aborted Take-off" performed on all these days, Aircraft B conducted the training, reporting each time in advance that it would return to the traffic pattern or make a full stop after performing optional approach, and there were no particular problems affecting other aircraft.

(4) Procedures of the Civil Aviation Bureau (regarding the visual observation of aircraft)

PART III Standards for Air Traffic Control Procedures, Air Traffic Control Services Procedure Handbook set forth by the Civil Aviation Bureau of Japan (hereinafter referred to as "the ATC Standard") stipulate that airport traffic control towers shall maintain continuous visual observation on

aircraft etc. and when incapable of visual observation on the aircraft, airport traffic control towers shall confirm the positions of the aircraft concerned and relevant aircraft by means of Tower Display etc. and encourage mutual visual observation between the aircraft. The Standard also stipulates that the separation related to runways between aircraft executing take-off/landing shall be specified by visual observation.

(5) Procedures of the Civil Aviation Bureau (regarding "Reduced Separation")

① Following descriptions concerning the separation between aircraft using the same runway are included in the ATC Standard. (Excerpt)

The separation between aircraft using the same runway shall be according to the following standards.

The succeeding arriving aircraft shall not pass the runway threshold until the leading aircraft is in the following state (omission):

The preceding departure has passed the runway end or turned above the runway, thereby eliminating danger of collision.

② Regarding the case where the reduced separation can be applied, following descriptions are included in the ATC Standard. (Excerpt)

Notwithstanding the above provisions, in the case where a controller can confirm the separation on a runway by means of ground markers etc., the following reduced separation can be applied to aircraft to take off and land using the same runway.

Between a departure and an arriving aircraft: In the case where the preceding departure has taken off to pass the following distance from the runway threshold, the successive arriving aircraft may pass the runway threshold.

*Between category I aircraft** [5] (omission)*: 900 meters* (Figure 4).

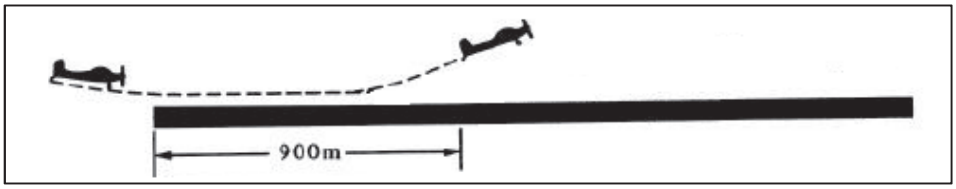


Figure 4: "Reduced Separation" (Between category I aircraft)

③ Regarding the handling aircraft to execute a touch-and-go, following descriptions are included in the ATC Standard. (Excerpt)

Aircraft cleared for a touch-and-go are regarded as arriving aircraft, until touching the runway, and regarded as departure thereafter.

According to ① to ③ above, ② can be applied to the separation between the preceding aircraft to take off and the succeeding aircraft to execute a touch-and-go. As for the separation between the preceding aircraft to make a full stop (including the case of the preceding aircraft

*5 "Category I aircraft" refers to single propeller aircraft and all helicopters.

	performing an option approach to potentially make a full stop) and the succeeding aircraft to execute a touch-and-go, the "Reduced Separation" cannot be applied to. (6) Procedures of the Civil Aviation Bureau (regarding provision of traffic information for arriving aircraft) The ATC Standard stipulates that in the case where a landing clearance cannot be issued even when the arriving aircraft via a traffic pattern enters the final approach, traffic information related to the preceding aircraft shall be issued as far as possible. (7) Procedures of the Civil Aviation Bureau (regarding the decision of go-around instruction) The ATC Standard stipulates that, irrespective of timing of issuing the landing clearance, in the case where it is determined that a separation on the runway cannot be established when the arriving aircraft passes the runway threshold, go-around shall be instructed. (8) Procedures of the Civil Aviation Bureau (regarding the best discretion) It is stipulated that controllers shall handle the service using their best discretion in case they encounter situations that are not provided for in the ATC Standard.

3. ANALYSIS

3.1 Involvement of Weather	None
3.2 Involvement of Pilot	Yes
3.3 Involvement of Aircraft	None
3.4 Analysis of Findings	(1) Go-around instruction heard by Aircraft A The JTSB concludes that Aircraft A was most likely unable to hear the go-around instruction from Tower C, and thus executed a touch-and-go, which had been initially cleared for. The reason why Aircraft A was unable to hear the go-around instruction is probably because Captain A thought that there would be sufficient distance between Aircraft B and Aircraft A when the traffic information related to Aircraft B was provided by Tower D on the downwind leg, and was unable to visually recognize Aircraft B, and because new traffic information related to Aircraft B was not provided afterward, as a result, Captain A became less and less aware of the presence of Aircraft B, but then the go-around instruction was issued by Tower C immediately before the touchdown when Captain A was concentrating on instruction especially regarding touchdown maneuvers for Trainee A. Traffic information are normally provided up to the discretion of controllers within the possible scope of operation in consideration of air traffic capacity, operation capacity and communication

capacity, however in this case, providing new traffic information related to Aircraft B was more likely effective for Captain A to grasp the condition of the runway.

When the go-around instruction by Tower C was completed, Aircraft A was at the position of about 5 seconds before touchdown (horizontal distance: about 148 m, AGL: about 28 ft). Therefore, from the point of view of the aircraft performance, Aircraft A could probably have been able to execute a go-around if it had heard the go-around instruction.

It is essential for the University to once again let all concerned in the University know the importance of placing safety first and especially to re-emphasize the basic principle of placing safety first even during landing, when it is easy to concentrate on pilot maneuvers and its instruction. Besides, encouraging active assertions by all persons on board even in training is considered effective in ensuring a safe environment.

(2) Timing for the issuance of the go-around

The JTSB concludes that the go-around instruction to Aircraft A being issued immediately before the touchdown more likely contributed to the failure to hear the go-around instruction, as shown in (1). It is probable that following factors contributed to the fact that the go-around instruction was issued to Aircraft A immediately before the touchdown.

① Monitoring of Aircraft A and Aircraft B

It is probable that after issuing a touch-and-go clearance to Aircraft A, Tower C was paying attention more to the final approach side in order to visually recognize Aircraft A rather than to Aircraft B on the runway.

After visually recognizing Aircraft A, Tower C was going to confirm the condition of the runway, but then received a radio call from Aircraft A, as a result, Tower C's attention was more likely drawn to the final approach side of Runway 25 again. Therefore, Tower C was likely delayed more than usual in noticing that Aircraft B, which had taken off from near the middle of T3 and T4 Intersections and aborted its take-off. After noticing that Aircraft B aborted its take-off, Tower C most likely judged that the separation*6 between Aircraft A and Aircraft B could lack when Aircraft A passes the runway threshold. For that reason, Tower C was going to instruct Aircraft A to execute a go-around, however, Tower C was more likely delayed more than usual in giving the instruction to Aircraft A because Tower C received a radio call from Aircraft B at the same time.

② Application of the "Reduced Separation"

It is probable that Tower C judged that the Exam subject to be conducted in this option approach should be related to landing procedures and Aircraft B would take off afterward, and did not expect that Aircraft B would "abort take-off" and make a full stop after its take-off, because Aircraft B initially informed that it would return to the south traffic pattern after performing this option approach and Aircraft B stopped on

*6 "Separation" is the minimum space between aircraft to be maintained by air traffic management officers or controllers in order to facilitate safe and orderly flow of air traffic.

the runway after the first touchdown.

It is highly probable Tower C judged that the necessary separation could be established between Aircraft A and Aircraft B by applying the "Reduced Separation" when visually recognizing the take-off (airborne again and proceeding) of Aircraft B, and thus gave the touch-and-go clearance to Aircraft A. At the time of this serious incident, Aircraft B intentionally aborted its take-off in order to conduct the Exam, however, Tower C, which applied the "Reduced Separation", should have grasped the movements of both aircraft definitely and continuously. In the case where the preceding aircraft is a departure, whether to apply the "Reduced Separation" or not shall be judged carefully in consideration of operation methods of the relevant aircraft and the weather conditions, because the said departing aircraft may abort its take-off even after its take-off. It is desirable for the Civil Aviation Bureau to use this serious incident as an example and share the special characteristics of helicopters, which generically can abort take-off with a shorter runway length than fixed-wing aircraft can, among all concerned.

③ Aborted take-off by Aircraft B

Pilot B and the personnel in charge of operation communication coordination coordinated in advance in order to conduct the Exam of Aircraft B and its training, but did not specifically set forth the reporting rules when "aborting take-off" or making a full stop. In consideration of the influence on air traffic control by the operation method peculiar to multi-engine helicopters conducting the examination and its trainings, it is considered effective that the specific reporting rules have been agreed to inhibit risks. Besides, as in this case where special flights are planned to be performed, it is desirable for controllers to mutually remind themselves of the flight contents in their briefing etc. on the day and make efforts of risk identification in advance.

It is probable that although Pilot B, who was entrusted by the Examiner to determine the implementation timing of each of the Exam subject related to take-off and landing, assumed the possibility that there would not be enough distance between Aircraft A, which was the succeeding aircraft, and Aircraft B, Aircraft B aborted take-off and made a full stop. It is desirable for operators to consider the flight conditions of other aircraft as much as possible even during examinations so as not to disturb the smooth traffic flow and increase risks, as the Airport is used by many scheduled flights and other training aircraft.

(3) Classification of Severity

The JTSB concludes that the closest distance between Aircraft A and Aircraft B was most likely approximately 920 m (about 0.50 nm), when Aircraft A executed the touch-and-go and approached Aircraft B.

The serious incident certainly falls under the severity classification of Category C (An incident characterized by ample time and/or distance to avoid a collision) of "the Manual on the Prevention of Runway Incursions" of ICAO

	with classification tools provided by ICAO. (See Attachment "Severity Classifications of Runway Incursions").

4. PROBABLE CAUSES

The JTSB concludes that the probable cause of this serious incident was that although Tower C instructed Aircraft A, the succeeding arriving aircraft, to execute a go-around, when visually recognizing that Aircraft B, the preceding departure aircraft, had aborted its take-off, Aircraft A was most likely unable to hear the go-around instruction and executed a touch-and-go.

The reason why Aircraft A was unable to hear the go-around instruction is probably because Captain A was concentrating on instructing Trainee A.

5. SAFETY ACTIONS

(1) In the wake of the occurrence of this serious incident, the University took the following safety actions.

① Specified the followings in the training guidelines for flight instructors as of September 21, 2021.

- To always have a clear overview of the entire flight and make efforts to ensure safety without getting absorbed in the technical guidance only.
- To be sure to confirm that the runway is clear especially before take-off and landing.
- To try to grasp the situation and information on other aircraft related to the operation of its own aircraft, including the positional information.
- To keep the training at a low altitude during take-off and landing, especially during final approach, to the minimum necessary, putting safety first in the training.

② Set forth the procedures to confirm that there are no obstacles on the runway before take-off and landing in the Cessna 172S "Training Guide" as of August 28, 2021.

③ Specified the importance of listening to the communication between ATC facilities and other aircraft in a student textbook, "ATC Handbook", as of September 21, 2021.

(2) In the wake of the occurrence of this serious incident, the controllers at Kumamoto Airport Office and Kumamoto Prefectural Disaster Prevention Fire Fighting Aviation Unit agreed on the specific reporting rules when "aborting take-off" or making a full stop in next pilot practical examinations and its trainings for multi-engine helicopters. In addition, the contents of this agreement were also explained to the University and others in order to alert other operators.

(3) In addition to the above, Air Traffic Control Division, Air Navigation Services Department of Civil Aviation Bureau took following measures by taking into consideration the current situation where the number of VFR aircraft (training aircraft) is increasing at Kumamoto Airport.

- To discuss specific measures related to the safety of runway operations along with operators using Kumamoto Airport. Consequently, Kumamoto Airport Office launched the "Runway Safety Measures Conference" on June 21, 2022, and has been holding regular meetings since July 2022. So far, in the Conference, failure cases of each operator were shared and alerted as a whole. In addition, the information on the operating hours of scheduled flights and VFR training aircraft was shared.
- To strengthen a double-watch and assertion to controllers at the tower control position and the ground control position.

Attached Table: Progress Chart of the Serious Incident

Time	Aircraft A	Aircraft B	Tower control position	
			Tower C	Tower D
About 12:06		Take off Left the control zone		
About 12:26		Return to the control zone and circled the traffic pattern		
About 12:59	Take off To the traffic pattern			
About 13:00		Cleared option approach Informed of returning to the traffic pattern after the option		Issued the option approach clearance to Aircraft B
About 13:01	Requested touch and go on the downwind Unable to have Aircraft B in	Turning to the final approach		Instructed Aircraft A to continue the approach and provide the traffic information regarding Aircraft B
About 13:03	Base leg	Touched down at around T4 Intersection	Tower D transferred the control service to Tower C Unable to have Aircraft A in sight	
About 13:04	Final approach Cleared touch and go Informed of its intention after take-off	Once stopped Take off (airborne again and proceed) "Aborted take-off" Touched down again Taxiing slowly	Issued the touch and go clearance to Aircraft A Has Aircraft A in sight Turned to the Aircraft A side again Has aborting Aircraft A in sight	
About 13:05	Failed to hear the go-around **Touched down at the aiming point** Has a constant light in red ahead in sight Captain A took over the control from Trainee A Took off at around T5 intersection **Turned above the runway**	Informed of making a full stop Stopped again	Instructed Aircraft A to go around	
About 13:06	Has Aircraft B in sight			

: Aircraft behavior
: ATC communication
: Operations inside aircraft/the control tower※
※ Of these, the operations in the dotted box indicate those they failed to perform

Attachment

Severity Classifications of Runway Incursions

Severity classifications described in ICAO "the Manual on the Prevention of Runway Incursions" (Doc 9870) are as described in the table below

Table 6-1 Severity classification scheme

Severity classification	*Description*＊＊1
A	*A serious incident in which a collision is narrowly avoided.*
B	*An incident in which separation decreases and there is significant potential for collision, which may result in a time-critical corrective/evasive response to avoid a collision.*
C ＊＊2	*An incident characterized by ample time and/or distance to avoid a collision.*
D	*An incident that meets the definition of runway incursion such as the incorrect presence of a single vehicle, person or aircraft on the protected area of a surface designated for the take-off and landing of aircraft but with no immediate safety consequences.*
E	*Insufficient information or inconclusive or conflicting evidence precludes a severity assessment.*

＊＊1 See the definition of "incident" of Annex 13.

＊＊2 Shaded to show the pertinent classification of the serious incident.