



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA**

PRELIMINARY

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Aircraft Serious Incident Investigation Report

ALCI Aviation Ltd.

Douglas DC-3C; C-FTGX

**Sultan Aji Muhammad Sulaiman Sepinggan
International Airport (WALL)**

Republic of Indonesia

13 November 2022

2023

This Preliminary Report is published by the Komite Nasional Keselamatan Transportasi (KNKT), Transportation Building, 3rd Floor, Jalan Medan Merdeka Timur No. 5 Jakarta 10110, Indonesia.

The report is based upon the investigation carried out by the KNKT in accordance with Annex 13 to the Convention on International Civil Aviation, the Indonesian Aviation Act (UU No. 1/2009) and Government Regulation (PP No. 62/2013).

The preliminary report consists of factual information collected until the preliminary report published. This report will not include analysis and conclusion.

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Jakarta, 5 January 2023
**KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN**



SOERJANTO TIAHJONO

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ABBREVIATIONS AND DEFINITIONS

AGL	:	Above Ground Level
AOC	:	Air Operator Certificate
ATC	:	Air Traffic Controller
ATIS	:	Automatic Terminal Information Service
ATPL	:	Airline Transport Pilot License
BMKG	:	<i>Badan Meteorologi, Klimatologi, dan Geofisika</i>
CAR	:	Canadian Aviation Regulations
C of A	:	Certificate of Airworthiness
C of R	:	Certificate of Registration
CASR	:	Civil Aviation Safety Regulation
CPL	:	Commercial Pilot License
CVR	:	Cockpit Voice Recorder
DGCA	:	Directorate General of Civil Aviation
FAA	:	Federal Aviation Administration
FDR	:	Flight Data Recorder
FL	:	Flight Level
ICAO	:	International Civil Aviation Organization
KNKT	:	<i>Komite Nasional Keselamatan Transportasi</i>
PF	:	Pilot FLYing
PIC	:	Pilot in Command
PM	:	Pilot Monitoring
SIC	:	Second in Command
STC	:	Supplemental Type Certificate
TCCA	:	Transport Canada Civil Aviation
TSB	:	Transportation Safety Board of Canada
USA	:	United State of America
UTC	:	Universal Time Coordinated
VFR	:	Visual Flight Rules

SYNOPSIS

On 13 November 2022, a Douglas DC-3C aircraft, registered C-FTGX was being operated by ALCI Aviation Ltd. (ALCI) from Sultan Aji Muhammad Sulaiman Sepinggan International Airport (WALL), Balikpapan to complete calibration of science equipment which was recently installed on the aircraft. ALCI was contracted by Bell Geospace Ltd. (BellGeo) to operate the aircraft to perform a Full Tensor/Airborne Gravity and Magnetic survey.

The flight was conducted under Visual Flight Rules. The aircraft cruised at altitude of 7000 feet, performed the mission at the aircraft altitude between altitude of 250 feet above ground level and 12,000 feet, and flew back to Balikpapan. Prior to departure, the pilots conducted walk around and pre-flight preparation. There was no record of aircraft system malfunction.

At 0741 LT, the aircraft departed Balikpapan and nothing abnormal was indicated during takeoff. On board of the aircraft were two pilots and two BellGeo's engineers. PIC acted as Pilot Flying, and the SIC acted as Pilot Monitoring.

At the aircraft altitude of 12,000 feet, the pilot performed steep turns, clean and dirty stall maneuvers to check the vibrations of the science equipment. Afterwards, the pilot managed an idle descent to 7,000 feet and configured the aircraft for single engine climb test.

Upon completion of the test, the pilot contacted the Balikpapan tower controller to advise that the aircraft was coming back and asked for clearance for touch-and-go to check the science equipment installation under that condition. The Balikpapan tower controller confirmed the aircraft to perform touch-and-go on Runway 07 once and would come to a complete stop thereafter.

The aircraft touched down at 0958 LT. Subsequently, the pilot heard unusual noise from the right side of the aircraft, while at the same time the right wing rose up. The pilot used the aileron to lower the right wing. When the right wing leveled, the aircraft had veered off to the right side, and the right wheel impacted a runway light. The pilot applied left brake and thrust reverser of the left engine and managed to go back to the runway. No sparks or hydraulic leaks were visually indicated, but through the mirror, the pilot confirmed that the right tire was torn apart.

At 1000 LT the pilot informed the controller that the aircraft lost a tire and confirmed to be able to get off the taxiway without any assistance. The pilot continued taxi to the parking stand with the damaged right wheel and shutdown the engine at 1016 LT. No one injured in this occurrence.

The investigation is continuing, should any further relevant safety issues emerge during the course of the investigation, KNKT will immediately bring the issues to the attention of the relevant parties and publish as required.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 13 November 2022, a Douglas DC-3C aircraft, registered C-FTGX was being operated by ALCI Aviation Ltd. (ALCI¹) from Sultan Aji Muhammad Sulaiman Sepinggan International Airport (WALL), Balikpapan² to complete calibration of science equipment which was recently installed on the aircraft. ALCI was contracted by Bell Geospace Ltd. (BellGeo³) to operate the aircraft for the purpose of a Full Tensor/Airborne Gravity and Magnetic survey project.

According to the flight plan, the flight would be conducted under Visual Flight Rules (VFR). The aircraft would fly directly to Zone 3⁴, cruise at altitude of 7000 feet, perform the mission at the aircraft altitude between 250 feet Above Ground Level (AGL) and 12,000 feet (FL120), and fly back to Balikpapan. Prior to departure, the pilots conducted walk around and pre-flight preparation. There was no record of aircraft system malfunction.

At 2341 UTC (0741 LT⁵), on daylight condition, the aircraft departed Balikpapan to Zone 3 area as requested on the flight plan. Nothing abnormal was indicated during takeoff. On board of the aircraft were two pilots and two BellGeo's engineers. The Pilot in Command (PIC) acted as Pilot Flying (PF), and the Second in Command (SIC) acted as Pilot Monitoring (PM).

Arriving in the survey area, the pilot granted clearance from Balikpapan tower controller to climb to altitude of 12,000 feet. After reached the assigned altitude, the pilot performed steep turns, clean and dirty stall maneuvers to check the vibrations of the science equipment. Afterwards, the pilot managed an idle descent to 7,000 feet and configured the aircraft for single engine climb test.

Upon completion of the test and calibration at Zone 3, the aircraft headed back to Balikpapan. Both pilots were listening to Automatic Terminal Information Service (ATIS) broadcast information which indicated the wind was calm. The pilot contacted the Balikpapan tower controller to advise that the aircraft was coming back and asked for clearance for touch-and-go to check the science equipment installation under that condition. The controller confirmed the aircraft to perform touch-and-go once and would come to a complete stop thereafter.

Approximately five miles before touch down, the pilot conducted landing checks and selected the landing gear down. The landing gear indicators were normal and confirmed down through the rearview mirrors on the engine cowlings.

At (0957 LT), the pilot contacted the Balikpapan tower controller to inform that the aircraft was on final. The Balikpapan tower controller issued clearance for touch-and-go and advised the aircraft to join right circuit of Runway 07.

¹ ALCI Aviation Ltd. will be named as ALCI for the purpose of this report.

² Sultan Aji Muhammad Sulaiman Sepinggan International Airport (WALL), Balikpapan will be named as Balikpapan for the purpose of this report.

³ Bell Geospace Ltd. will be named as BellGeo for the purpose of this report.

⁴ Zone 3 was located approximately at 55 nm from Balikpapan on bearing 330°.

⁵ The 24-hours clock in Local Time (LT) is used in this report to describe the time as specific events occurred. Universal Time Coordinated is LT-8 hours.

The aircraft touched down at 0858 LT. Subsequently, the pilot heard unusual noise from the right side of the aircraft, while at the same time, the right wing rose up. The pilot used the aileron to lower the right wing. When the right wing leveled, the aircraft had veered off to the right side, and the right wheel impacted a runway light. The pilot applied left brake and thrust reverser of the left engine and managed to go back to the runway. No sparks or hydraulic leaks were visually indicated, but through the mirror the pilot confirmed that the right tire was torn apart.

At 1000 LT the pilot informed the controller that the aircraft lost a tire and confirmed to be able to get off the taxiway without any assistance. The pilot continued taxi to the parking stand with the damaged right wheel and shutdown the engine at 1016 LT.

1.2 Injuries to Persons

There were no injuries to persons as a result of this occurrence.

1.3 Damage to Aircraft

The aircraft's right landing gear was damaged due to a blown tire as shown in Figure 1. The tire was torn apart, the bead seat area of the wheel rim was broken into pieces (a), and the wheel flange was worn out (b) due to friction during taxi.



Figure 1: Damage to aircraft right landing gear

1.4 Other Damage

A runway edge light was damaged as shown in Figure 2. The light was impacted with the right wheel while the aircraft veered off to the right ran through the runway side strip. There were scratches on the runway, taxiway, and apron, as illustrated in Figure 3 since the aircraft continued taxi to the parking stand with the damaged right wheel.



Figure 2: Damage to runway edge light



Figure 3: Damage to runway surface

1.5 Personnel Information

1.5.1 Pilot in Command (PIC)

The PIC was Canadian nationality who held valid Airline Transport Pilot License (ATPL) and qualified as DC-3T pilot. The pilot also held valid Category 1 medical certificate with medical limitation to wear glasses. The last proficiency check for the pilot was conducted on October 2022.

The pilot had total flying hour of 3600 hours, included 2500 hours on DC-3T aircraft. The pilot had flown for 2.8 hours prior to the occurrence.

1.5.2 Second in Command (SIC)

The SIC was Canadian nationality who held valid Commercial Pilot License (CPL) and qualified as DC-3T pilot. The pilot also held valid Category 1 medical certificate without any medical limitation. The last proficiency check for the pilot was conducted on 6 October 2022.

The pilot had total flying hour of 734 hours, included 31 hours on DC-3T aircraft. The pilot had flown for 2.8 hours prior to the occurrence.

1.5.3 Air Traffic Controller (ATC)

The Balikpapan tower controller was Indonesian nationality who held valid Air Traffic Controller (ATC) licenses and qualified to perform aerodrome control at Balikpapan. The controller held valid third medical certificate without any limitation.

Prior to the occurrence, the air traffic controller had worked for six hours and had been on duty for four hours prior to the occurrence.

1.6 Aircraft Information

1.6.1 General

The Douglas DC3C, with serial number of 25769, was manufactured by Douglas Aircraft Company, United States, in 1943. Under Federal Aviation Administration (FAA) Supplemental Type Certificate (STC) SA00-9, the aircraft was remanufactured by Basler Turbo Conversions, LLC, Oshkosh Wisconsin, United State of America (USA) in 2010 and known as Basler BT-67. The aircraft had twin turboprop engines, new propellers, modified fuel system, revised electrical system, and forward fuselage extension in accordance with FAA STC SA4840NM. The engines installed on the aircraft were Pratt & Whitney PT6A-67R with 5 bladed Hartzell HC-B5MA-3 propellers.

The aircraft was registered in Canada under registration mark of C-FTGX. It had valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R). The aircraft total time since new was 24,723 hours, and total cycles since new was 2,387 cycles and maintained in accordance with Canadian Maintenance Standards.

On 13 September 2022, PT Smart Cakrawala Aviation (Smart Aviation⁶) proposed the utilization of the aircraft Basler BT-67 C-FTGX to Indonesia Directorate General of Civil Aviation (DGCA) in order to operate the aircraft in Indonesia territory while maintaining the original Canada registration.

On 29 September 2022, the DGCA Indonesia issued the no-objection letter for operation in Indonesia territory with the limitation as followings:

- The operation area is Kalimantan
- The aircraft is only utilized for the Full Tensor/Airborne Gravity and Magnetic Survey project.

On October 2022, the aircraft started the operation in Kalimantan.

1.6.2 Weight and Balance

According to the weight and balance sheet, the aircraft carried 400 lbs passengers, 3,282 lbs cargo, and 7,500 lbs fuel. The estimated weight of the aircraft was as follows:

Takeoff weight	: 28,718 lbs (maximum 28,750 lbs)
Landing weight	: 26,218 lbs (maximum 28,750 lbs)

The aircraft center of gravity estimation was 248.4 inch, while the limit range was 242.35 – 263.10 inches aft of the datum.

1.6.3 Tire

The main landing gear tire used Type III⁷ tire which was manufactured by Goodyear Tire and Rubber Company under part number of 176C26B1.

On 6 May 2022, the right wheel assembly was replaced during maintenance in accordance with applicable airworthiness requirements.

1.7 Meteorological Information

The meteorological report was provided by *Badan Meterologi, Klimatologi, dan Geofisika* (BMKG⁸) station Balikpapan at 30 minutes intervals or any significant changes and also published through the ATIS on frequency 127.6 MHz. The meteorological report issued on 13 November 2022 was as follows:

⁶ PT Smart Cakrawala Aviation will be named as Smart Aviation for the purpose of this report.

⁷ A common classification of aircraft tires is by type as classified by the United States Tire and Rim Association. Type III tires are low-pressure tires which typically used on light aircraft with maximum landing speeds of 160 mph.

⁸ BMKG is the agency of meteorology, climatology and geophysics of Indonesia.

Time (UTC)	0120	0157	0224
Wind (°/knots)	020/03	030/02	040/03
Visibility (km)	10	10	10
Weather	NIL	NIL	NIL
Cloud ⁹	FEW 2000 FT	FEW 2000 FT	FEW 2000 FT
Temp./Dew point (°C)	29/24	29/24	29/24
QNH ¹⁰ (mb/in Hg)	1009	1009	1009
QFE ¹¹ (mb/in Hg)	1009	1008	1008

1.8 Aids to Navigation

Ground-based navigation aids/onboard navigation aids/aerodrome visual ground aids and their serviceability was not a factor in this occurrence.

1.9 Communications

All communications between ATS and the crews were recorded by ground based automatic voice recording equipment. The quality of the aircraft's recorded transmissions was good.

1.10 Aerodrome Information

The Sultan Aji Muhammad Sulaiman Sepinggan International Airport (WALL) was operated by the PT Angkasa Pura I (Persero). The aerodrome chart is shown in Figure 4.

The airport had a runway with direction of 07/25 (067.03°/247.03°). The runway surface was asphalt with dimension of 2,500 meters in length and 45 meters in width. The airport elevation was 12 feet, and the aerodrome reference point was on coordinate 01°16'03"S 116°53'38"E.

⁹ Cloud amount is assessed in total which is the estimated total apparent area of the sky covered with cloud. The international unit for reporting cloud amount for Few (FEW) is when the clouds cover 1/8 up to 2/8 area of the sky and Broken (BKN) is when the clouds cover 5/8 up to 7/8 area of the sky.

¹⁰ QNH is the Q code indicating the atmospheric pressure adjusted to mean sea level.

¹¹ QFE is the Q code indicating atmospheric pressure at the current ground level.

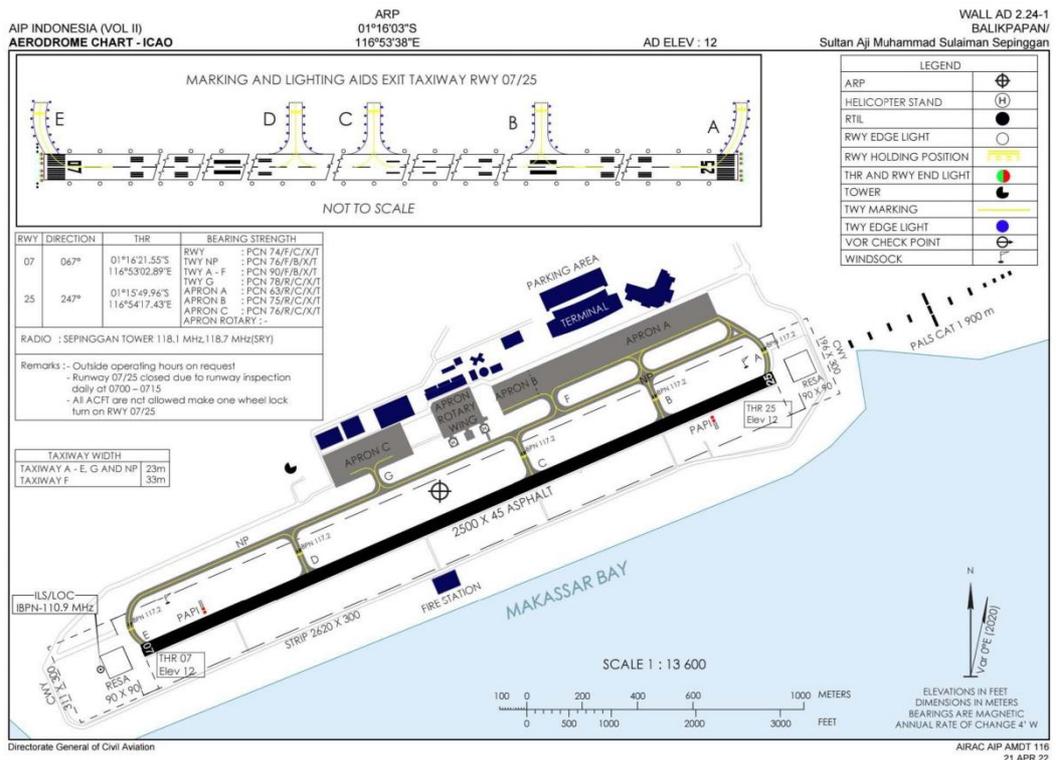


Figure 4: Balikpapan aerodrome chart

1.11 Flight Recorders

The aircraft was only fitted with Cockpit Voice Recorder (CVR). Flight Data Recorder (FDR) was not required by Canadian aviation regulations.

The CVR model was FA2100 manufactured by L3 Harris Communications under part number 2100-1020-02 and serial number 00306284. The recorder was transported to *Komite Nasional Keselamatan Transportasi* (KNKT) recorder facility for data processing. It recorded two hours and four minutes of good quality voices in the cockpit. The detail of the cockpit voice recorder will be included in the Final Report.

1.12 Wreckage and Impact Information

Based on the evidences on the runway, the aircraft trip and wreckage distribution was illustrated by Figure 5 (a) and described as follows:

1. The aircraft touched down mark was found on the runway before the taxiway D (Point-1) located about 680 meters from the beginning of Runway 07.
2. The aircraft veered off to the right, and the right wheel hit a runway light at Point-2 located approximately 240 m from taxiway D intersection.
3. Fragments of the rims and tires were found approximately 900 meters along the runway between Point-1 and Point-3 in accordance with the aircraft direction.
4. The aircraft continued taxi to the apron through taxiway C-NP-G and parked on parking stand number 41 illustrated as Point-4.

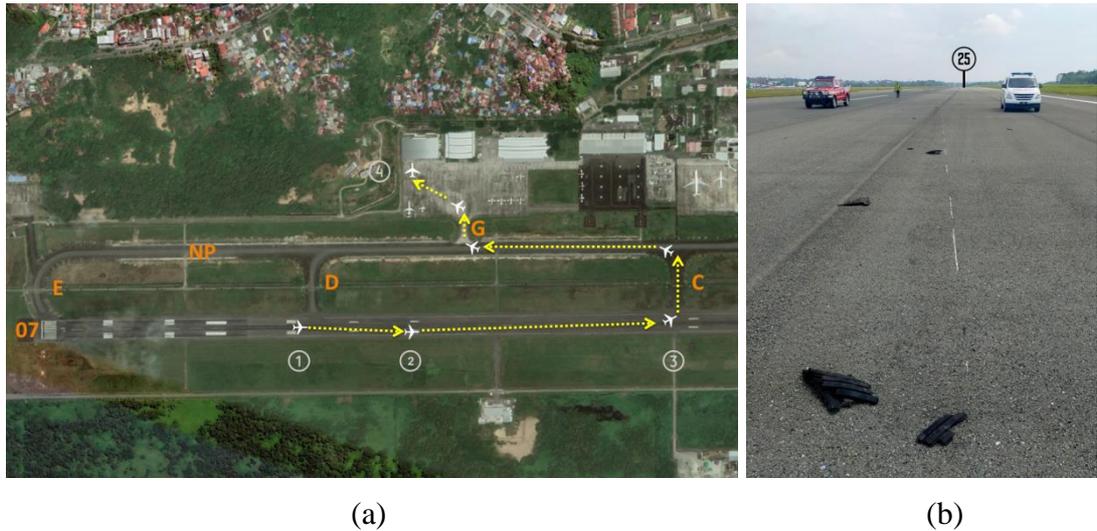


Figure 5: Aircraft trip and wreckage trail illustration

1.13 Medical and Pathological Information

No medical or pathological investigations were conducted as a result of this occurrence, nor were they required.

1.14 Fire

There was no evidence of in-flight or post-impact fire.

1.15 Tests and Research

Test and research information were not available at the time of the issuance of this report. Should any relevant tests and/or research information be obtained during this investigation, it will be included in the Final Report.

1.16 Organizational and Management Information

1.16.1 Bell Geospace Ltd.

BellGeo is an American company that develops a data acquisition platform intended to be used for mining and exploration. Through its Indonesian agent, PT. Rubotori Petrotech Indonesia, BellGeo was contracted by PT. Pertamina Hulu Energi (PHE¹²) for a Full Tensor/Airborne Gravity and Magnetic Survey project in Kutai-Barito, Kalimantan, Indonesia. BellGeo then made agreement with ALCI to carry out the aircraft operation for the project.

1.16.2 ALCI Aviation Ltd.

The aircraft was operated by ALCI which had valid Air Operator Certificate number 11028 issued by Transport Canada Civil Aviation (TCCA). ALCI was authorized to conduct air transportation carrying passengers and cargo in domestic and non-scheduled international operation outside Canada in accordance with Canadian Aviation Regulations (CAR) Part VII Subpart 704 – Commuter Operations.

¹² PT Pertamina Hulu Energi will be named as PHE for the purpose of this report

1.16.3 PT Smart Cakrawala Aviation

Smart Aviation is Indonesian aircraft operator that assists ALCI to handle the licensing and permit of C-FTGX aircraft in Indonesia. Smart Aviation had a valid Air Operator Certificate (AOC) number 135-062 issued by DGCA. Smart Aviation was authorized to conduct air transportation carrying passengers and cargo in scheduled and non-scheduled operation within and outside Indonesia for aircraft operations under Civil Aviation Safety Regulation (CASR) Part 135 – Certification and Operating Requirements: For Commuter and Charter Certificate Holders.

1.16.4 Regulation to Foreign Aircraft Operation

Operation of foreign civil aircraft within Indonesia territory is regulated by CASR 91 Subpart H quoted as follows:

91.711 Special Rules for Foreign Civil Aircraft

- (a) General. In addition to the other applicable regulations of this part, each person operating a foreign civil aircraft within Indonesia shall comply with this section.*
- (b) VFR. No person may conduct VFR operations which require two-way radio communications under this part unless at least one crewmember of that aircraft is able to conduct two-way radio communications in the English language and is on duty during that operation.*

...

91.715 Special Flight Authorizations for Foreign Civil Aircraft

- (a) Foreign civil aircraft may be operated without airworthiness certificates required under Section 91.203 if a special flight authorization for that operation is issued under this section. Application for a special flight authorization must be made to the DGCA.*
- (b) The DGCA may accepted a special flight authorization for a foreign civil aircraft issued by foreign authority subject to any condition and limitations that the DGCA considers necessary for safe operation in the Republic of Indonesia airspace.*

1.16.5 Aircraft Leases

On 20 June 2022, PHE made an agreement with PT Rubotori Petrotech Indonesia to conduct a Full Tensor/Airborne Gravity and Magnetic Survey project in Kutai-Barito, Kalimantan, Indonesia. The agreement duration was 91 days, starting in September 2022.

PT Rubotori Petrotech Indonesia made an agreement with BellGeo to perform the project. BellGeo carried out the project using Basler BT-67 aircraft with registration of C-FTGX, a remanufactured aircraft of Douglas DC-3C, which was operated by ALCI.

Since the aircraft was not registered in Indonesia, ALCI made an agreement with Smart Aviation for aircraft operation in Indonesia territory as regulated in CASR 91. The utilization of the aircraft was proposed by Smart Aviation to the Indonesia DGCA on 13 September 2022 which was approved on 29 September 2022.

Cooperation agreement was made between ALCI and Smart Aviation regarding operation of C-FTGX aircraft in Indonesia dated 25 August 2022 and valid until 31 December 2023. In this cooperation, ALCI obligated to provide the aircraft, supporting equipment, and crews who will operate and maintain the aircraft for the Full Tensor/Airborne Gravity and Magnetic Survey in Kalimantan, Indonesia. In the other hand, Smart Aviation obligated to assist ALCI in the licensing, permits, and approval required for the aircraft operational in Indonesia.

On 29 September 2022, Indonesian Directorate General of Civil Aviation (DGCA) issued Special Permit to foreign aircraft operation and crew, number AU.410/2/13/DPJU.DKPPU-2022, for DC-3C aircraft registration C-FTGX under following conditions:

- a. The aircraft will be operated under AOC of ALCI with the knowledge of TCCA and only to perform a Full Tensor/Airborne Gravity and Magnetic Survey operation in Kalimantan, Indonesia.
- b. The permit is valid until the aircraft's C of A expires or when the operating period ends on 31 December 2022, whichever comes first.
- c. Continued surveillance by Smart Aviation was required by appointing safety officer in Kalimantan, Indonesia.
- d. Prior to operating the aircraft, Smart Aviation is required to apply for security clearance to Ministry of Defense, crews' working permit to Ministry of Manpower, and flight approval to DGCA.
- e. Smart Aviation is required to report the realization of the flight according to the flight approval.
- f. After the aircraft operating period ends, Smart Aviation is required to bring out the aircraft and report it to DGCA.

1.16.6 Procedures for Survey/Science Operation

As quoted from ALCI's Douglas DC3T Standard Operating Procedures Section 5, survey operation shall follow following procedures:

5.1 Operating Limitations

When operating under CAR's 702 in the survey or science configurations the aircraft may only carry crew required for the operation of the survey or science equipment and qualified observers or trainers whose presence on board is essential during the flight. Passengers are not permitted. These additional crew members will require a briefing and training. The flight crew will also require 702 training for the specific 702 operation they are assigned to (eg. Bell Geo survey, Survey Bird and Winch Installation etc.) and have full knowledge of any applicable Flight Manual Supplements.

5.2 Normal Procedures

Any survey or science operation below 1000 feet AGL (low level survey) shall be done with increased vigilance. Any time the weather falls below VFR the flight will be terminated (2sm in uncontrolled airspace and 3sm in controlled

airspace). The following procedures apply to all survey and science flights when operated below 1000 feet AGL:

- 1) The minimum airspeed is 100KIAS propellers at 1500 to 1700 RPM and minimum altitude is 200 feet AGL and the maximum flap of flap 1 (10 degrees). The Pilot flying will maintain visual outside the aircraft with momentary scans of the flight instruments. The Pilot not flying will scan the flight instruments with momentary visual scans outside the aircraft.
- 2) The Pilot not flying will call out airspeed when below 100 or 10kts above target airspeed. The pilot not flying will also call out all obstacles (eg. tower 11 o'clock, birds,..)
- 3) The minimum lateral or vertical distance from any obstacle will be 200ft.
- 4) The minimum speed of 100kts can be increased for safety at the Captains discretion when flying over rough or mountainous terrain.
- 5) When equipped with led landing lights the landing lights will be left on during survey.
- 6) When flying low level Pilots shall be extra vigilant with poor horizon, reduced visibility in rain or smoke even if it is still VFR the flight may have to be terminated.
- 7) When operating in the Polar regions where sustained operations are over water the use of survival suits will be as follows:
 - a) Below 1000ft AGL survival suit must be on for all crew members.
 - b) Between 1000ft AGL and 3000 ft AGL it is recommended for the survival suits to be on for all crew members.
 - c) Above 3000ft AGL survival suits must be available for all crew members.
- 8) When operating low level survey the Bluesky flight tracker will be serviceable. The following messages will be sent from the aircraft bluesky flight phone by the pilots:
 - a) After take-off a short code 'take-off' message will be sent automatically.
 - b) Every hour after take-off a short code 'ops normal' message will be sent manually.
 - c) After landing a short code 'landed' message will be sent automatically.

These messages are displayed on the bluesky tracker website and will be sent to all the email addresses on the flight following list as they happen.

The following procedures are specific to the Bell Geo survey flights:

- 1) For the Bell Geo operation, if the track on the pico deviates more than 20 meters left or right then the Pilot not flying shall call out left or right of track. Same for altitudes + or - 15 meters.
- 2) The standard fuel load for the Bell Geo survey is full front tanks and full outboard tanks (in accordance to maximum weight and balance). During survey there shall be no fuel in the rear tanks due to sloshing of fuel which

gives erratic readings. There may be some fuel loaded in the rear tanks for transitioning to the survey site, but shall be emptied before surveying. Also the front tanks should be kept full when surveying when possible. After each survey line is completed transfer fuel from the outboard tanks to the front tanks. Normally the transfer will stop before the start of the next line but if it doesn't then manually turn off the transfer of fuel before the next survey line.

- 3) *It will be the pilot not flying that operates the pico, changing the lines or changing the screen. The pilot not flying shall also confirm with the operator what the next line is. The pilot not flying will then tell the pilot flying left or right turn to the next line. It is critical that the pilot flying stays focused visually outside when maneuvering to the next line.*

5.3 Emergency Procedures

All emergency procedures will be addressed as per the aircraft checklist and Aircraft Flight Manual with consideration to the following points:

- 1) *In case of an engine failure the fuel dump for the outboard tanks may be considered, ensuring that the fuel remaining in the inboard tanks are sufficient to safely land at the nearest suitable airport and following the AFM fuel dump supplement.*
- 2) *In case of an electrical/cabin smoke/fire the flight crew will ensure that the Bell operator turns all three breakers on the e-cabinet (blue cabinet) to the off position.*

1.17 Additional Information

The investigation involved the participation of Transportation Safety Board of Canada (TSB) as Canada is the State of Registry and Engines' manufacture. The TSB has appointed accredited representatives to assist the investigation in accordance with the provisions in International Civil Aviation Organization (ICAO) Annex 13.

The investigation is continuing and KNKT plans to complete the investigation within 12 months since the day of the occurrence. Should any further relevant safety issues emerge during the course of the investigation, KNKT will immediately bring the issues to the attention of the relevant parties and publish as required.

1.18 Useful or Effective Investigation Techniques

The investigation was conducted in accordance with the KNKT approved policies and procedures, and in accordance with the standards and recommended practices of Annex 13 to the Chicago Convention.

2 FINDINGS

The findings are statements of all significant conditions, events or circumstances in the accident sequence. The findings are significant steps in the accident sequence, but they are not always causal, or indicate deficiencies. Some findings point out the conditions that pre-existed the accident sequence, but they are usually essential to the understanding of the occurrence, usually in chronological order.

According to factual information during the preliminary investigation, KNKT identified initial findings as follows:

1. The aircraft was certified, equipped and maintained in accordance with Canada regulations and approved procedures. The DGCA Indonesia issued the no-objection with limitation for operation in Indonesia under Canada registration.
2. The mass and the center of gravity of the aircraft were within the prescribed limits.
3. There was no evidence of airframe failure or system malfunction prior to the occurrence.
4. The right wheel assembly was replaced six months prior to the occurrence.
5. The aircraft was only fitted with CVR, while FDR was not required by Canadian aviation regulations.
6. BellGeo contracted ALCI to carry out the aircraft operation for a Full Tensor/Airborne Gravity and Magnetic Survey project in Kalimantan, Indonesia.
7. ALCI had a lease agreement with Smart Aviation to operate the aircraft within Indonesia territory.
8. ALCI had a Special Permit from DGCA to perform a Full Tensor/Airborne Gravity and Magnetic Survey operation in Kalimantan, Indonesia.
9. The aircraft operation was intended to complete calibration for science equipment of a Full Tensor/Airborne Gravity and Magnetic Survey project in Kalimantan, Indonesia conducted by BellGeo.
10. During the time of occurrence, the weather was mostly sunny with visibility of 10 km, and the wind was calm coming from 30° direction.
11. The pilots were medically fit to operate the flight. The PIC had to wear glasses, and the SIC had no medical limitation.
12. There were two pilots and two BellGeo's engineers onboard of the aircraft.
13. The flight was conducted under VFR.
14. During the flight, the PIC acted as Pilot Flying, and the SIC acted as Pilot Monitoring.
15. The pilots' actions and statements indicated that their knowledge and understanding of the aircraft systems was adequate.

16. After take-off, the aircraft flew directly to Zone 3, cruise at altitude of 7000 feet, performed the mission at between altitude of 250 feet AGL and FL120, and flew back to Balikpapan in accordance to the flight plan.
17. The pilots carried out normal radio communications with the ATC.
18. The aircraft granted clearance from ATC to perform touch-and-go to check the science equipment installation.
19. The aircraft touched down at Runway 07. Right after touched down, the tire burst and the right wing rose up.
20. The pilot confirmed that the right tire was torn apart, and the wheel rim was broken through the side mirrors.
21. The aircraft veered off to the right side and hit a runway light. The aircraft went back to the runway and parked in designated parking stand without any assistance.
22. The aircraft movement was in accordance with the wreckage trail on the runway.
23. The pilot continued taxi to the parking stand with the damaged right wheel.
24. The wheel flange was worn out due to friction during taxi.
25. There was no evidence of in-flight or post-impact fire.
26. There were no injuries to persons as a result of this occurrence.
27. There were scratches on the runway, taxiway, and apron due to this occurrence.

3 SAFETY ACTION

At the time of issuing this draft Final Report, the KNKT had not been informed of any safety actions resulting from this occurrence.

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