KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA

FINAL

KNKT.18.05.18.04

Aircraft Serious Incident Investigation Report

Garuda Indonesia
CRJ 1000; PK-GRJ

and

Wings Air
ATR 72-500; PK-WFW

Left Downwind Runway 10, Tambolaka Airport
Republic of Indonesia

11 May 2018

2020

This Final Report was 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 Organization, the Indonesian Aviation Act (UU No. 1/2009) and Government Regulation (PP No. 62/2013).

This short summary investigation report does not contain analysis and only highlights safety message as lesson learnt to improve aviation safety.

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However, the KNKT fully recognizes that the implementation of recommendations arising from its investigations will in some cases incur a cost to the industry.

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Jakarta, 10 July 2020

KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN

SOERJANTO TJAHJONO

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ABBREVIATIONS AND DEFINITIONS

ACO	:	Aeronautical Communication Officer
AFIS	:	Aerodrome Flight Information Service
AFIZ	:	Aerodrome Flight Information Zone
AOC	:	Air Operator Certificate
ARP	:	Aerodrome Reference Point
ATS	:	Air Traffic Services
CASR	:	Civil Aviation Safety Regulation
CPL	:	Commercial Pilot License
CVR	:	Cockpit Voice Recorder
DGCA	:	Directorate General of Civil Aviation
FCU	:	Flight Control Unit
FDR	:	Flight Data Recorder
FOQA	:	Flight Operation Quality Assurance
ft	:	feet
ICAO	:	International Civil Aviation Organization
KNKT	:	*Komite Nasional Keselamatan Transportasi*/National Transportation Safety Committee
LT	:	Local Time
Nm	:	Nautical Mile
OM	:	Operation Manual
PF	:	Pilot Flying
PIC	:	Pilot in Command
PM	:	Pilot Monitoring
QNH	:	An aeronautical code Q code, indicating the atmospheric pressure adjusted to mean sea level
RA	:	Resolution Advisory
SIC	:	Second in Command
SOP	:	Standard Operation Procedure
TA	:	Traffic Advisory
TCAS	:	Traffic Collision Avoidance System
UTC	:	Universal Time Coordinated

SYNOPSIS

On 11 May 2018, an ATR 72-500 aircraft registered PK-WFW was being operated by PT. Wings Abadi Airlines (Wings Air) on a scheduled passenger flight from El Tari International Airport (WATT), Kupang to Waikabubak Airport, Tambolaka (WADT), Nusa Tenggara Timur with flight number WON1921.

On the same day, a Bombardier CRJ1000 aircraft registered PK-GRJ was being operated by PT. Garuda Indonesia (Garuda Indonesia) on a scheduled passenger flight from Tambolaka to Kupang with flight number of GIA460. The Pilot in Command (PIC) acted as Pilot Flying (PF), and the Second in Command (SIC) acted as Pilot Monitoring (PM).

The WON1921 pilot provided several position report and intention to join left downwind runway 10 in the Tambolaka Aeronautical Communication Officer (ACO).

The GIA460 was taxied to runway 10 and prior the departure, the GIA460 PF briefed to the PM that departure would be conducted to climb about 400 feet then turn to the left to join airways W43. During the backtrack, the GIA460 PF advised the PM that WON1921 would join right downwind runway 10.

At 1441 LT, the GIA460 PM broadcasted that the aircraft was rolling for takeoff. The WON1921 pilot then responded: “WINGS ABADI ONE NINER TWO ONE monitor traffic rolling GARUDA and we are joining left downwind runway ONE ZERO runway in sight via coastline”. The GIA460 replied:“roger WINGS ABADI ONE NINER TWO ONE call left downwind”.

At 14:41:47 LT, the GIA460 airborne and then about 600 feet the PF turned the aircraft to the left.

The Traffic Collision Alert System Resolution Advisory (TCAS RA) of both aircraft were active. Both WON1921 and GIA460 pilots followed the Resolution Advisory until clear of conflict.

There was no one injured and no damage on both aircraft.

Before the departure, there was no record or report of aircraft system malfunction. The pilots and the ACO described that during the occurrence, there was no indication of a communication transmission problem. Therefore, the analysis will discuss the relevant issues of the aircraft movement and flight information services.

The investigation concluded the contributing factor of the occurrence was pilot justification based on available information of WON1921 that were not properly assessed and without proper crew coordination resulted in the GIA460 departed following the common practice to turn left after departure.

The KNKT had been informed safety actions taken by the related parties and the KNKT issued safety recommendations to the Air Traffic Services provider and the aircraft operators to address safety issues identified in this report.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 11 May 2018, an ATR 72-500 aircraft registered PK-WFW was being operated by PT. Wings Abadi Airlines (Wings Air) on a scheduled passenger flight from El Tari International Airport (WATT), Kupang[1] to Waikabubak Airport, Tambolaka (WADT), Nusa Tenggara Timur[2] with flight number WON1921.

On the same day, a Bombardier CRJ1000 aircraft registered PK-GRJ was being operated by PT. Garuda Indonesia (Garuda Indonesia) on a scheduled passenger flight from Tambolaka to Kupang with flight number of GIA460. The Pilot in Command (PIC) acted as Pilot Flying (PF), and the Second in Command (SIC) acted as Pilot Monitoring (PM).

At 0629 UTC[3] (1429 LT), the WON1921 pilot made initial contact with the Tambolaka Aeronautical Communication Officer (ACO) and was responded: *"WINGS ABADI ONE NINER TWO ONE Tambolaka go ahead"*. The WON1921 then advised that the flight was about 56 Nm from Tambolaka, maintaining altitude of 14,500 feet, and the estimated time arrival at Tambolaka would be 0645 UTC (1445 LT). The ACO acknowledged the information and advised meteorological information of Tambolaka to the pilot which generally clear.

The GIA460 PF briefed to the PM that departure would be conducted to climb about 400 feet then turn to the left to join airways W43. The GIA460 PF described to the KNKT that the departure followed the Garuda Indonesia departure procedure of Tambolaka.

At 1433 LT, the GIA460 PM made initial contact with the ACO, which then responded: *"FOWER SIX ZERO Tambolaka go ahead"*. The GIA460 PM advised that the flight would depart to Kupang, requested engine start and altitude clearance of 25,000 feet to the ACO and was approved to start the engines.

At 1434 LT, the WON1921 pilot reported to the ACO that the aircraft position was 38 Nm from Tambolaka and was acknowledged. A few seconds later, the WON1921 pilot advised the ACO that the aircraft position was 36 Nm from Tambolaka and ready to descend. The ACO then responded: "*THREE SIX NAUTICAL MILES a... continue descend to ONE ZERO THOUSAND, next call reaching*".

1 El Tari International Airport (WATT), Kupang will be named as Kupang for the purpose of this report.

2 Waikabubak Airport, Tambolaka (WADT), Nusa Tenggara Timur will be named as Tambolaka for the purpose of this report.

3 The 24-hours clock in Universal Time Coordinated (UTC) is used in this report to describe the local time as specific events occured. Local time is UTC+8 hours.

At 1437 LT, the GIA460 PM informed ready to taxi to the ACO and was instructed to taxi to runway 10 and to report when ready for departure. One minute later, the ACO requested the aircraft position to the WON1921 pilot and was responded that the aircraft was about 23 Nm on radial 096° from Tambolaka and was passing altitude of 11,500 feet. The ACO acknowledged the information and informed to the WON1921 pilot that there was a CRJ1000 aircraft with call sign GIA460 that was entering backtrack runway 10. The WON1921 pilot responded: "*copied, confirm we are initially TEN THOUSAND*". Afterward, the ACO responded: *"Wings Abadi ONE NINER TWO ONE descend to circuit altitude join to left downwind runway ONE ZERO".* After that, the WON1921 pilot then readback the ACO instruction.

During the backtrack, the GIA460 PF advised the PM that WON1921 would join right downwind runway 10.

At 1439 LT, the GIA460 PM advised ready to receive air traffic control clearance, which then responded to standby by the ACO. Afterward, the ACO asked to the WON1921 pilot of the aircraft position and was responded that the aircraft was 14 Nm crossed radial 096° from Tambolaka, and was passing altitude of 8,000 feet. The ACO acknowledged the position report, and then the WON1921 pilot advised would join the left downwind of runway 10.

At 1440 LT, the GIA460 PM advised to the ACO that the aircraft had been lined up and ready for departure. The ACO then responded: *"GARUDA FOWER SIX ZERO clear to Kupang level TWO FIVE ZERO squawk number FIVE SIX ONE FIVE runway is clear",* which later was readback by the GIA460 PM. After that, the ACO confirmed the GIA460: "*GARUDA FOWER SIX ZERO confirm copied traffic WINGS ABADI ONE NINER TWO ONE,"* which then was responded: *"affirm".*

At 1441 LT, the GIA460 PM broadcasted that the aircraft was rolling for takeoff. The WON1921 pilot then responded: *"WINGS ABADI ONE NINER TWO ONE monitor traffic rolling GARUDA and we are joining left downwind runway ONE ZERO runway in sight via coastline".* The GIA460 replied: *"roger WINGS ABADI ONE NINER TWO ONE call left downwind".*

At 14:41:47 LT, the GIA460 airborne and then about 600 feet the PF turned the aircraft to the left.

At 14:42:49 LT, the Traffic Collision Alert System Resolution Alert (TCAS RA)[4] of WON1921 were activated and three seconds later the TCAS RA of GIA460 were activated. Both WON1921 and GIA460 pilots followed the Resolution Alert until clear of conflict.

There was no one injured and no damage on both aircraft.

4 Traffic Collision Alert System (TCAS) is an airborne collision avoidance system which designed to reduce the incidence of mid-air collisions between aircraft. The Resolution Advisory (RA) is an indication given to the flight crew recommending a maneuver intended to provide separation from all threats; or a maneuver restriction intended to maintain existing separation.

1.2 Personnel Information

1.2.1 GIA460 Pilot

The PIC is Indonesian, 31 years old who held valid Airline Transport Pilot License (ATPL) and first-class medical certificate with limitation to wear corrective lenses to correct distant vision. The PIC qualified as CRJ1000 aircraft with total flying hours of 5,776.41 hours.

One day before the day of occurrence, the PIC felt unfit, and after finished his duty about 1200 LT, the PIC rested at the hotel. On the day of the occurrence, the PIC felt better. The following day after the occurrence, the PIC hospitalized and diagnosed had typhoid.

The SIC is Indonesian, 27 years old, who held valid Commercial Pilot License (CPL) and first-class medical certificate with no limitation. The SIC qualified as CRJ1000 aircraft with total flying hours of 795.34 hours.

1.2.2 WON1921 Pilot

The WON1921 pilots are Indonesian qualified as ATR 72-500 pilots who had valid licenses and first-class medical certificates.

1.2.3 Aeronautical Communication Officer

The Aeronautical Communication Officer (ACO) is Indonesian, 29 years old who held valid ACO license, and third-class medical certificate without any limitation. The ACO had worked in Tambolaka since 2009. During the occurrence, the ACO had been performed duty for 2 hours and 42 minutes. In the last 24 hours, the ACO had 7 hours duty time.

1.3 Aircraft Information

Both aircraft had valid Certificate of Airworthiness and Certificate of Registration. There was no report or record of aircraft system malfunction during the occurrence.

Both aircraft were equipped with Traffic Collision Avoidance System (TCAS), which provides Resolution Advisories (RAs) in addition to Traffic Advisories (TAs). TCAS on both aircraft were serviceable.

1.4 Communications

All communications between ACO and pilots were recorded by ground-based automatic voice recording equipment for the duration of the flight. The quality of the recording transmissions was good. The significant excerpt of communication was as follows:

Time (LT)	Event
14:29:59	The WON1921 pilot made initial contact with the Tambolaka Aeronautical Communication Officer (ACO) and was responded: *"Wings Abadi ONE NINER TWO ONE Tambolaka go ahead"*.
14:30:09	The WON1921 pilot advised that the flight was about 56 Nm from Tambolaka, maintaining an altitude of 14,500 feet, and the estimated time arrival at Tambolaka would be 0645 UTC (1445 LT).
14:30:38	The ACO acknowledged the information and advised meteorological information of Tambolaka to the pilot.
14:33:57	The GIA460 PM made initial contact with the ACO, which then responded: *"FOWER SIX ZERO Tambolaka go ahead"*.
14:34:15	The GIA460 PM advised that the flight would depart to Kupang and requested engine start and altitude clearance of 25,000 feet to the ACO and was approved.
14:34:37	The WON1921 pilot reported to the ACO that the aircraft position was 38 Nm from Tambolaka and was acknowledged.
14:35:10	The WON1921 pilot advised the ACO that the aircraft position was 36 Nm from Tambolaka and ready to descend.
14:35:23	The ACO responded: "*THREE SIX NAUTICAL MILES a... continue descend to ONE ZERO THOUSAND, next call reaching"*.
14:37:15	The GIA460 PM informed ready to taxi to the ACO and was instructed to taxi to runway 10.
14:38:00	The ACO requested to the WON1921 pilot of the aircraft position and was responded that the aircraft was at 23 Nm on radial 096° of Tambolaka and was passing altitude of 11,500 feet.
14:38:26	The ACO acknowledged the information and informed the WON1921 pilot that there was a CRJ1000 aircraft with call sign GIA460, which was entering backtrack runway 10.
14:38:35	The WON1921 pilot responded: "*copied, confirm we are initially TEN THOUSAND*".
14:38:40	The ACO responded: *"WINGS ABADI ONE NINER TWO ONE descend to circuit altitude join to left downwind runway ONE ZERO"*. The WON1921 pilot readback the ACO instruction.

Time (LT)	Event
14:39:16	The GIA460 PM advised ready to receive air traffic control clearance, which then responded to standby by the ACO.
14:39:59	The ACO asked the WON1921 pilot of the aircraft location and was responded that the aircraft was 14 Nm, crossed radial 096° from Tambolaka, and passed altitude of 8,000 feet. The ACO acknowledged the position report.
14:40:18	The WON1921 pilot advised would join the left downwind runway 10.
14:40:38	The GIA460 PM advised to the ACO that the aircraft had lined up and was ready for departure.
14:40:44	The ACO responded: *"GARUDA FOWER SIX ZERO clear to Kupang level TWO FIVE ZERO squawk number FIVE SIX ONE FIVE runway is clear."* which then was readback by the GIA460 PM.
14:41:01	The ACO confirmed to the GIA460: *"GARUDA FOWER SIX ZERO confirm copied traffic WINGS ABADI ONE NINER TWO ONE".*
14:41:07	The GIA460 PM responded: *"affirm."*
14:41:10	The GIA460 PM broadcasted that the aircraft was rolling for takeoff.
14:41:13	The WON1921 pilot then responded: *"WINGS ABADI ONE NINER TWO ONE monitor traffic rolling GARUDA and we are joining left downwind runway ONE ZERO runway in sight via coastline."*
14:41:25	The GIA460 PM responded: *"Roger WINGS ABADI ONE NINER TWO ONE call left downwind."*
14:42:51	The TCAS RA of WON1921 with climb instruction heard in the radio frequency.
14:42:55	The GIA460 PM broadcasted experiencing TCAS RA.

1.5 Flight Recorders

Both aircraft were equipped with Cockpit Voice Recorder (CVR) and Flight Data Recorder (FDR). The recorded voice communication on both CVRs had overwritten and investigation did not download the CVR of both aircraft. The aircraft operators provided to the KNKT the FDR raw data that were downloaded by the Flight Operation Quality Assurance (FOQA) system.

The significant recorded parameters of the FDRs were as follows:

Time (LT)	GIA460	WON1921	Separation[5]
14:40:38	• The aircraft ground speed was reduced to 0 knots. • The aircraft heading was 095°. • The target altitude selector on the Flight Control Unit (FCU) was 25,000 feet.	• The aircraft was descending and passed an altitude of 7,071 feet. • The aircraft heading was 290°. • The autopilot engaged.	Horizontal: 12.5 Nm
14:41:15	• The aircraft initiated takeoff roll on heading 095°.	• The aircraft was descending and passed an altitude of 5,829 feet. • The aircraft heading was 290°. •	Horizontal: 10.1 Nm
14:41:47	• The aircraft was airborne on heading of 095°.	• The aircraft was descending and passed altitude of 4,749 feet. • The aircraft heading was 290°.	Horizontal: 7.5 Nm
14:42:01	• The aircraft was climbing and passed altitude of 656 feet. • The target heading selector on the FCU was changed from 094° to 060°. • The aircraft was starting to turn to the left and passed heading 093°.	• The aircraft was descending and passed altitude of 4,290 feet. • The aircraft heading was 290°.	• Horizontal: 6.1 Nm • Vertical: 3,634 feet
14:42:10	• The aircraft was climbing and passed altitude of 1,100 feet. • The autopilot engaged. • The aircraft heading is reducing and passed 078° (aircraft was turning to the left).	• The aircraft was descending and passed altitude of 3,993 feet. • The aircraft heading was 290°.	• Horizontal: 5.3 Nm • Vertical: 2,893 feet

5 The separation was calculated from the recorded coordinates of both aircraft on the FDR.

Time (LT)	GIA460	WON1921	Separation[5]
14:42:15	• The aircraft was climbing and passed altitude of 1,284 feet. • The target heading selector on the FCU was changed from 060° to 048°. • The aircraft was turning to the left and passed heading 062°.	• The aircraft was descending and passed altitude of 3,826 feet. • The aircraft heading was 290°.	• Horizontal: 4.8 Nm • Vertical: 2,542 feet
14:42:17	• The aircraft was climbing and passed altitude of 1,284 feet. • The target heading selector on the FCU was changed from 048° to 041°. • The aircraft was turning to the left and passed heading 057°.	• The aircraft was descending and passed altitude of 3,754 feet. • The aircraft heading was 290°.	• Horizontal: 4.6 Nm • Vertical: 2,403 feet
14:42:24	• The aircraft was climbing and passed altitude of 1,547 feet. • The aircraft was turning to the left and passed heading 048°.	• The aircraft was descending and passed altitude of 3,514 feet. • The aircraft was turning to the left and passed heading 289°.	• Horizontal: 4 Nm • Vertical: 1,967 feet
14:42:35	• The aircraft was climbing and passed altitude of 1,846 feet. • The target heading selector on the FCU was changed from 041° to 024°. • The aircraft was turning to the left and passed heading 041°.	• The aircraft was descending and passed altitude of 3,158 feet. • The aircraft was turning to the left and passed heading 284°.	• Horizontal: 3 Nm • Vertical: 1,312 feet
14:42:40	• The aircraft was climbing and passed altitude of 1,953 feet. • The aircraft was turning to the left and passed heading 039°. • The TCAS TA activated	• The aircraft was descending and passed altitude of 3,005 feet. • The aircraft was turning to the left and passed heading 283°.	• Horizontal: 2.6 Nm • Vertical: 1,052 feet

Time (LT)	GIA460	WON1921	Separation[5]
14:42:42	• The aircraft was climbing and passed altitude 1,978 feet. • The aircraft was turning to the left and passed heading 037°.	• The aircraft was descending and passed altitude of 2,921 feet. • The aircraft started to turn to the right and passed heading 284°.	• Horizontal: 2.4 Nm • Vertical: 943 feet
14:42:47	• The aircraft was climbing and passed altitude 1,999 feet. • The target heading selector on the FCU was changed from 024° to 007°. • The aircraft was turning to the left and passed heading 027°.	• The aircraft was descending and passed altitude of 2,748 feet. • The aircraft was turning to the right and passed heading 286°.	• Horizontal: 2 Nm • Vertical: 749 feet
14:42:49	• The aircraft was climbing and passed altitude 2,018 feet. • The aircraft was turning to the left and passed heading 024°.	• The aircraft was descending and passed altitude of 2,678 feet (). • The aircraft was turning to the right and passed heading 289°. • The TCAS RA activated with “DON’T DESCEND” instruction.	• Horizontal: 1.8 Nm • Vertical: 660 feet
14:42:51	• The aircraft was climbing and passed altitude 2,046 feet. • The aircraft was turning to the left and passed heading 021°. • The autopilot was disengaged.	• The aircraft was descending and passed altitude 2,607 feet. • The aircraft was turning to the right and passed heading 294°. • The TCAS RA instruction changed to “CLIMB.”	• Horizontal: 1.6 Nm • Vertical: 561 feet
14:42:52	• The aircraft was climbing and passed altitude 2,063 feet. • The aircraft was turning to the left and passed heading 020°. • The TCAS RA activated.	• The aircraft was descending and passed altitude of 2,569 feet. • The aircraft was turning to the right and passed heading 297°. • The autopilot was disengaged.	• Horizontal: 1.5 Nm • Vertical: 506 feet

Time (LT)	GIA460	WON1921	Separation[5]
14:42:55	• The aircraft started to descend from altitude 2,093 feet. • The aircraft was turning to the left and passed heading 017°.	• The aircraft was descending and passed altitude 2,521 feet. • The aircraft was turning to the right and passed heading 207°.	• Horizontal: 1.3 Nm • Vertical: 428 feet
14:42:58	• The aircraft was descending and passed altitude of 2,062 feet. • The aircraft was turning to the left and passed heading 013°.	• The aircraft was climbing from altitude of 2,527 feet. • The aircraft was turning to the right and passed heading 323°. • The TCAS RA ended.	• Horizontal: 1.2 Nm • Vertical: 459 feet
14:43:02	• The aircraft was descending and passed altitude of 1,937 feet. • The aircraft was turning to the left and passed heading 012°.	• The aircraft started to descend from altitude of 2,531 feet. • The aircraft was turning to the right and passed heading 336°.	• Horizontal: 1 Nm • Vertical: 594 feet
14:43:06	• The aircraft was descending and passed altitude of 1,812 feet. • The aircraft was turning to the right from heading 011°.	• The aircraft was descending and passed altitude of 2,512 feet. • The aircraft was turning to the right and passed heading 345°.	• Horizontal: 0.9 Nm • Vertical: 700 feet
14:43:16	• The aircraft was descending and passed altitude of 1,638 feet. • The aircraft was turning to the right and passed heading 014°.	• The aircraft was descending and passed altitude of 2,488 feet. • The aircraft was turning to the left from heading 353°.	• Horizontal: 0.8 Nm • Vertical: 850 feet
14:43:38	• The aircraft was descending and passed altitude of 1,624 feet. • The aircraft was turning to the right and passed heading 043°. • The TCAS RA changed to TCAS TA.	• The aircraft was descending and passed altitude of 2,304 feet. • The aircraft was turning to the left and passed heading 299°.	• Horizontal: 0.8 Nm • Vertical: 680 feet.

Time (LT)	GIA460	WON1921	Separation[5]
14:43:43	• The aircraft was descending and passed altitude of 1,579 feet. • The aircraft was turning to the right and passed heading 046°.	• The aircraft was descending and passed altitude of 2,245 feet. • The aircraft was turning to the left and passed heading 285°.	• Horizontal: 1.1 Nm and continued to increase. • Vertical: 666 feet
14:43:48	• The aircraft started to climb from altitude 1,584 feet. • The aircraft was turning to the right and passed heading 050°.	• The aircraft was descending and passed altitude of 2,147 feet. • The aircraft was turning to the left and passed heading 213°.	• Horizontal: 1.5 Nm Vertical: 563 feet.

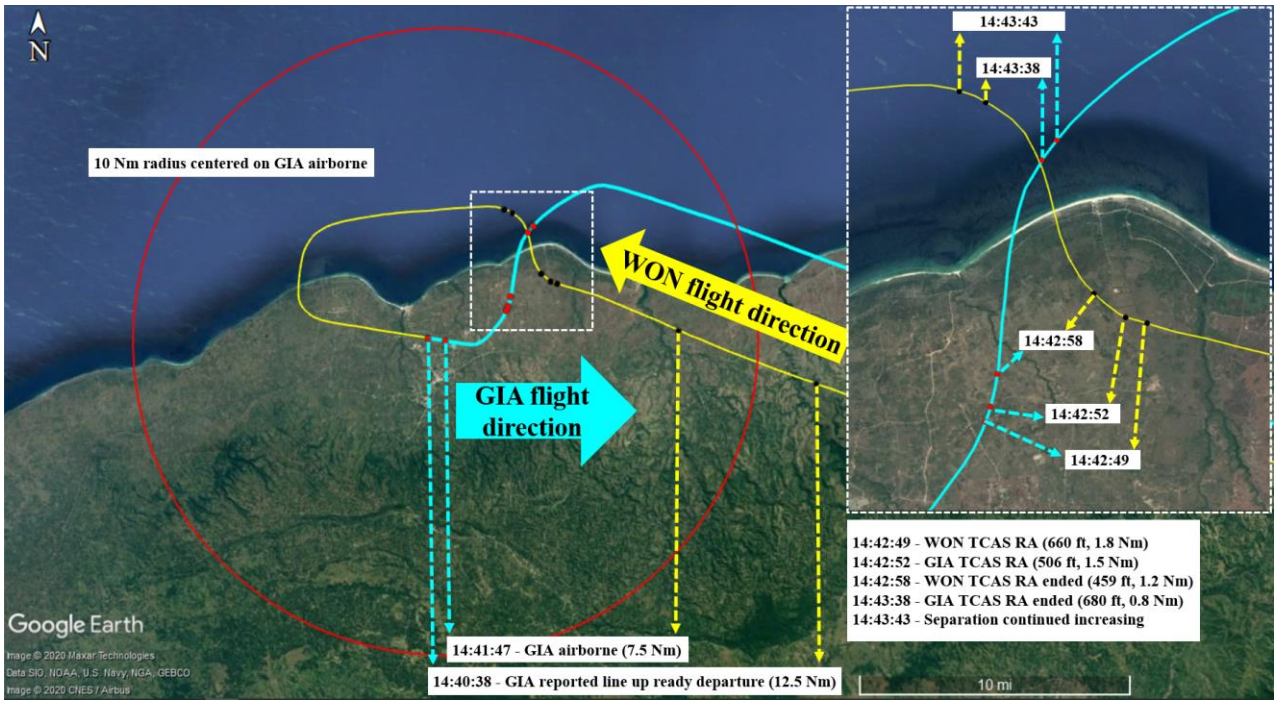

Figure 1: The flight profile based on FDR data superimposed on Google Earth

1.6 Organizational and Management Information

1.6.1 Air Traffic Service Provider

The *Perusahaan Umum Lembaga Penyelenggara Pelayanan Navigasi Penerbangan Indonesia* (AirNav Indonesia) is the Air Traffic Services (ATS) provider in Indonesia included in the Tambolaka Aerodrome Flight Information Zone (AFIZ). The ATS in Tambolaka is provided by AirNav Indonesia branch office Tambolaka which held a valid Air Traffic Services provider certificate. The services provided were flight information, alerting, and, if required, air traffic advisory services.

The Tambolaka Flight Information Service is provided within the Tambolaka AFIZ with a vertical limit from the ground up to 4,000 feet and a horizontal limit up to 5 Nm from TBK DVOR. The Tambolaka AFIZ is class G airspace.

Standard Operation Procedure of Flight Information Service

The Standard Operation Procedure (SOP) of Tambolaka ATS subchapter 4.2 described the Flight Information Service provided to an aircraft must contain information which included:

…

c. information on known aircraft, vehicles or personnel on or near the maneuvering area or aircraft operating in the vicinity of the aerodrome, which may constitute a hazard to the aircraft concerned;

…

g. any other information contributes to safety

The ATS SOP subchapter 8.4.2 described that the ACO must provide traffic information for the departure aircraft, which have potential conflict traffic with other aircraft.

The ATS SOP subchapter 8.4.5 described that traffic information on known aircraft, vehicles or personnel on or near the maneuvering area or aircraft operating in the vicinity aerodrome must consist information of:

a. the aircraft direction;
b. the aircraft type and wake turbulence category (if available);
c. the aircraft altitude includes the altitude change;
d. the aircraft estimate time on certain point;
e. other useful information.

The ATS SOP subchapter 11.1 described the phraseologies standard to be used by ACO on Tambolaka. The relevant standards were as follows:

h. For easy identification of service being provided, AFIS unit initial call sign is name of aerodrome followed by "AERODROME INFORMATION".

Example: "TAMBOLAKA AERODROME INFORMATION"

i. When contact with the aircraft has been established, AFIS Unit call sign may be the name of aerodrome followed by "INFORMATION"

Example: "TAMBOLAKA INFORMATION"

Phraseology regarding the provision of information:

Circumstances	***Pilot Phraseology***	***AFIS***
Traffic information		*b) TRAFFIC (information)* *- (aircraft type)* *- (position)* *- [time]* *- [altitude/level]* *- (intentions)*

Circumstances	***Pilot Phraseology***	***AFIS***
Relaying clearance		*a) (ATC unit) CLEARS (details of clearance)* *b) READBACK CORRECT (or NEGATIVE [I SAY AGAIN] (as appropriate)*
Take-off	*READY FOR DEPARTURE*	*a) WIND (condition) RUNWAY [number] IS CLEAR* *b) RUNWAY [number] OCCUPIED (reason)*
Approach and landing procedures		*a) SURFACE WIND (degrees and knot), VISIBILITY (meters/kilometers), TEMPERATURE (centigrade), DUE POINT (centigrade), QNH (millibars)*
	b) WILL USE RUNWAY (number)	
		c) ADVICE JOINING AERODROME TRAFFIC CIRCUIT (CROSSWIND LEG/ DOWNWIND/BASE LEG/FINAL)
	d) POSITION JOINING AERODROME TRAFFIC CIRCUIT (CROSSWIND LEG/DOWN WIND/ BASE LEG/FINAL)	*e) ADVICE REPORT FINAL*
	f) POSITION FINAL	*j) SURFACE WIND (degrees and knot), QNH (millibars) RUNWAY IS CLEAR* *k) RUNWAY [number] OCCUPIED (reason)*

1.6.2 Aircraft Operator of GIA460

The GIA460 was operated by PT. Garuda Indonesia (Garuda Indonesia), which held a valid Air Operator Certificate (AOC) number 121-001. Information of Tambolaka Airport is included in the Garuda Indonesia Operation Manual Part C (OM-Part C) revision 6. The information also contained the Air Traffic Services provided at Tambolaka was Flight Information Services, and the Minimum Sector Altitude on the south of Tambolaka was 5,100 feet. The OM-Part C described the departure procedure for Tambolaka was in the Garuda Airways Manual TGIA 11, 21 Tambolaka charts. However, these charts did not include a departure procedure from Tambolaka to Kupang.

Pilot Medical Condition

The procedure and policy regarding pilot medical condition described in the OM-Part A revision 5. The relevant subchapters were as follows:

Subchapter 5.1.01 described:

> *Every crewmember must maintain their utmost performance in Knowledge, Skill as well as Physical and Mental Fitness appropriate to their functions.*

Subchapter 5.3 described that the Garuda Indonesia prohibit aircrew from flying if:

- *They are not fit for duty;*
- *Alcohol and psychoactive substance use; see OM-A Chapter 2.1.6;*
- *Pregnancy; she shall not fly for duty as soon as determined pregnant by doctor;*
- *Illness or use of medication(s), unless certified by doctor;*
- *Minimum 14 days following Internal Surgery;*
- *Fatigue occurring in one flight, successive flights or accumulated over a period of time, beyond Flight Duty Time limits according OM-A Chapter 7.*

Subchapter 7.1.06 described that pilot can refuse their duty if there are medical reasons agrees by the Company Doctor. In addition, the *Pedoman Awak Pesawat* (Flight Crew Guidance) subchapter 3.1.1.4 described that to expedite the flight rescheduling process, the pilot may submit an unfit statement letter to the crew scheduling unit. Thereafter, the pilot goes to the Company Doctor or other doctor to get medical recommendation.

Crew Resource Management

The relevant description of Crew Resource Management was described in the OM-Part A subchapter 11.1.1 as follows:

> *One of the basic fundamental of the Crew Resource Management is that each crewmember must be able to supplement or act as a back-up for the other crewmember. Proper adherence to Standard Operating Procedures and Standard Call Outs are an essential element of well managed Flight Deck.*
>
> *…*
>
> *To enable subordinate flight crewmembers to intervene effectively, a structured intervention models using a precise language shall be used to successfully cope with the extremely rare but potentially lethal performance break down of the Captain.*

1.6.3 Aircraft Operator of WON1921

The WON1921 was operated by PT. Wings Abadi Airlines (Wings Air), which held valid AOC number 121-012.

The Wings Air OM-Part A subchapter 12.2.2 described that pilot must follow rules of the air that was described in the Jeppesen Airway Manual. The Class G airspace in the Jeppesen Airway Manual subchapter 2.6 is classified and designated as airspace that:

> *IFR and VFR flights are permitted and receive flight information service if requested.*

Class	*Type of flight*	*Separation provided*	*Service provided*	*Speed limitation**	*Radio communication requirement*	*Subject to an ATC clearance*
"G"	*IFR*	*NIL*	*Flight information service*	*250 KT IAS below 3,050 m (10,000 ft) AMSL*	*Continuous two-way*	*No*
	VFR	*NIL*	*Flight information service*	*250 KT IAS below 3,050 m (10,000 ft) AMSL*	*No*	*No*
** When the height of the transition altitude is lower than 3,050m (10,000 ft) AMSL, FL 100 should be used in lieu of 10,000 ft.*						

1.6.4 Indonesia Civil Aviation Authority

The civil aviation in Indonesia is regulated by the Directorate General of Civil Aviation (DGCA), which is a government agency under the Ministry of Transportation. The DGCA developed Civil Aviation Safety Regulations (CASR)s to ensure that civil aviation in Indonesia is conducted safely and meets with the International Civil Aviation Organization (ICAO) standards.

1.6.5 Indonesia Regulation for Flight Information Service

The CASR part 170 described uncontrolled airspace as airspace which only provides flight information service, alerting service, and air traffic advisory service without any air traffic control service. According to the CASR part 170 subchapter 1.7, the Aerodrome Flight Information Zone (AFIZ) is included as uncontrolled airspace which has vertical limit from ground/water up to 4,000 feet and horizontal limit up to 5 Nm from Aerodrome Reference Point (ARP) or ground-based navigation aid coordinate.

The CASR part 170 subchapter 1.7 also described Class G airspace as airspace that do not have air traffic control service to separate aircraft. However, according to the subchapter 4.2 requires a flight information service in Class G airspace to provide information about hazard or traffic information to prevent aircraft collision.

1.7 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 ANALYSIS

Before the departure, there was no record or report of aircraft system malfunction. The pilots and the ACO described that during the occurrence, there was no indication of a communication transmission problem. Therefore, the analysis will discuss the relevant issues of the aircraft movement and flight information services.

2.1 The Aircraft Movements

The GIA460 PF briefed to the PM that departure would be conducted to climb about 400 feet then turn to the left to join airways W43. The GIA460 PF described to the KNKT that the departure followed the Garuda Indonesia departure procedure of Tambolaka. The investigation was unable to find this departure procedure in the Garuda Indonesia operation documents. The KNKT considered this departure procedure was a common practice among pilots since there was terrain in the right or south of Tambolaka airport.

Since the GIA460 was entering backtrack runway 10 until the aircraft had been lined up and ready for departure, the WON1921 pilot had advised three times in the ACO frequency that the aircraft would join the left downwind runway 10. The last advice was provided when the GIA460 was on rolling takeoff and the GIA460 PM was readback the WON1921 pilot advice. The readback indicated that the GIA460 PM acknowledged that the WON1921 would join the left downwind. When the aircraft was making backtrack, the GIA460 PF advised the PM that WON1921 would join right downwind runway 10, this information made the PM followed the PF assumption and disregarded the WON1921 information. There was no further discussion between GIA460 pilots related to the WON1921 flight that might affect to the GIA460 flight.

Before the GIA460 departure, the ACO advised that the runway was clear followed by relaying departure clearance to fly at altitude 25,000 feet to Kupang. The relayed clearance did not contain sentence which indicated that the clearance was provided by Kupang approach when entered the Kupang airspace. The runway was clear advice from the ACO combined with a relayed clearance might have made the GIA460 pilot assumed that the GIA460 approved to continue climb to altitude 25,000 feet without restriction. It is also supported that the target altitude selector on the Flight Control Unit (FCU) was set to 25,000 feet.

The WON1921 was flying on radial 096° of Tambolaka and the aircraft position repeatedly informed by the WON1921 pilot. The GIA460 departed Tambolaka airport used runway 10 and the FDR recorded aircraft heading during takeoff was 095°. When the GIA460 aircraft had been line up and ready for departure, the WON1921 had turned slightly to the right to join left downwind runway 10. Based on this information the WON1921 was always in front or slightly to the left of GIA460 during rolling takeoff. The Navigation Display/TCAS display would have been indicated that the WON1921 position was on the left side of GIA460 takeoff path.

With all the available information provided by WON1921 pilot, the ACO and Navigation Display/TCAS display, the GIA460 PF considered that the GIA460 was able to depart as planned without conflicted with the WON1921 flight.

One day before the day of the occurrence, the GIA460 PF was felt unfit and on the following day after the occurrence, the PIC was hospitalized. The investigation considered that on the day of the occurrence the PIC medical condition might reduce his performance. The OM-Part A of Garuda Indonesia described that pilot must maintain their performance in physical fitness and pilot was prohibited to fly when unfit. According to the *Pedoman Awak Pesawat* (Flight Crew Guidance), pilot might submit an unfit statement letter to the crew scheduling unit and refused the flight schedule.

The continuation to perform the duty indicated that the pilot did not consider that his medical condition might degrade his performance.

The GIA460 PF justified that he would be able to depart as planned and would not conflict with the WON1921 flight. The justification of the PF might be affected by the degraded performance as a result of his medical condition. The GIA460 PM followed the PF justification and did not make confirmation of the WON1921 flight. The absence of pilot discussion to assess of WON1921 flight properly indicated that Crew Resource Management was not implemented properly.

Pilot justification based on available information of WON1921 that were not properly assessed and without proper crew coordination resulted in the GIA460 departed following the common practice to turn left after departure.

2.2 The Flight Information Services

The Air Traffic Services (ATS) provided in Tambolaka Aerodrome Flight Information Zone (AFIZ) were flight information, alerting, and, if required, air traffic advisory services. The Tambolaka ATS provider did not provide air traffic control services that contain clearance and/or instructions.

The initial call of the Tambolaka ACO to the pilot did not include the complete callsign of *"Tambolaka Aerodrome Information"* to indicate the service status given by the unit as described in the ATS SOP of Tambolaka subchapter 11.1. The absence of complete callsign might make the pilot confuse about the type of service provided by the Tambolaka ATS provider.

After the GIA460 advised ready for departure, the ACO relayed clearance from Kupang Approach combined with information that the runway to the GIA460 pilot. The relayed clearance did not contain sentence which indicated that the clearance was relayed from other Air Traffic Service unit as described in the ATS SOP of Tambolaka subchapter 11.1. The runway was clear advice from the ACO that was combined with a relayed clearance without mentioned that the clearance was from Kupang approach might have made the GIA460 pilot assumed that the GIA460 approved to continue climb to altitude 25,000 feet without restriction. It is also supported that the target altitude selector on the Flight Control Unit (FCU) was set to 25,000 feet.

The ACO confirmed to the GIA460 pilot whether they were aware of traffic WON1921. The ACO did not provide traffic information in detail as required in the ATS SOP of the Tambolaka subchapter 8.4.5. The ACO assumed that the GIA460 had already known the WON1921 traffic information as the communication was using the same frequency.

Some advice from the ACO given to the pilot used instruction phraseology, and the pilot sometimes requested a clearance to the ACO. These mixed-up communications indicated unclear determination of service status between air traffic control services and flight information services. The unclear determination might result in the pilot assumed that the flights would be separated by the ATS provider.

3 CONCLUSIONS

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.

3.1 Findings

1. The GIA460 and WON1920 aircraft had valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R). No report or record of aircraft system malfunctions on the aircraft prior to the occurrence.
2. The pilots of GIA460 and WON1920 held valid pilot licenses and first-class medical certificates.
3. The Aeronautical Communication Officer (ACO) held valid license and third-class medical certificate.
4. One day before the day of occurrence, the GIA460 PF felt unfit, and after finished his duty, the PF rested at the hotel. On the day of the occurrence, the PF felt better. The following day after the occurrence, the PF hospitalized and diagnosed having typhoid.
5. The investigation considered that on the day of the occurrence the PIC medical condition might reduce his performance. The continuation to perform the duty indicated that the pilot did not consider that his medical condition might degrade his performance.
6. The OM-Part A of Garuda Indonesia described that pilot must maintain their performance in physical fitness and pilot was prohibited to fly when unfit. According to the *Pedoman Awak Pesawat* (Flight Crew Guidance), pilot might submit an unfit statement letter to the crew scheduling unit and refused the flight schedule.
7. The pilots and the ACO described that during the occurrence, there was no indication of communication transmission problem.
8. The Air Traffic Services (ATS) provided in the Tambolaka Aerodrome Flight Information Zone (AFIZ) were flight information, alerting, and, if required, air traffic advisory services. The Tambolaka ATS provider did not provide air traffic control services that contain clearance and/or instructions.
9. Some advice from the ACO given to the pilot used instruction phraseology, and the pilot sometimes requested a clearance to the ACO. These mixed-up communications indicated unclear determination of service status between air traffic control services and flight information services. The unclear determination might make the pilot assumed that the flights would be separated by the ATS provider.

10. The GIA460 PF briefed to the PM that departure would be conducted to climb about 400 feet then turn to the left to join airways W43. The GIA460 PF described to the KNKT that the departure followed the Garuda Indonesia departure procedure of Tambolaka. The investigation was unable to find the departure procedure from Tambolaka to Kupang in the Garuda Indonesia operation documents. The KNKT considered this departure procedure was a common practice among pilots since there was terrain in the right or south of Tambolaka.
11. Since the GIA460 was entering backtrack runway 10 until the aircraft had been lined up and ready for departure, the WON1921 pilot had advised three times in the ACO frequency that the aircraft would join the left downwind runway 10.
12. The last advice was provided when the GIA460 was on rolling takeoff and the GIA460 PM readback the WON1921 pilot advice. The readback indicated that the GIA460 PM acknowledged that the WON1921 would join the left downwind.
13. When the aircraft was making backtrack, the GIA460 PF advised the PM that WON1921 would join right downwind runway 10, this PF assumption was agreed by the PM and disregarded the WON1921 information. There was no further discussion between GIA460 pilots related to the WON1921 flight that might affect to the GIA460 flight.
14. The GIA460 PF justified that he would be able to depart as planned and would not conflict with the WON1921 flight. The justification of the PF might be affected by the degraded performance as a result of his medical condition.
15. The GIA460 PM followed the PF justification and did not make confirmation of the WON1921 flight. The absence of pilot's discussion to assess of WON1921 flight properly indicated that Crew Resource Management was not implemented properly.
16. After the GIA460 advised ready for departure, the ACO relayed clearance from Kupang Approach combined with information that the runway to the GIA460 pilot. The relayed clearance did not contain sentence which indicated that the clearance was relayed from other Air Traffic Service unit as described in the ATS SOP of Tambolaka subchapter 11.1. Without mentioning that the clearance was from Kupang approach might have made the GIA460 pilot assumed that the GIA460 approved to continue climb to altitude 25,000 feet without restriction.
17. When the GIA460 aircraft had been line up and ready for departure, the WON1921 had turned slightly to the right to join left downwind runway 10. Based on this information the WON1921 was always in front or slightly to the left of GIA460 during rolling takeoff. The Navigation Display/TCAS display would have been indicated that the WON1921 position was on the left side of GIA460 takeoff path.
18. Pilot justification based on available information of WON1921 that were not properly assessed and without proper crew coordination resulted in the GIA460 departed following the common practice to turn left after departure.

3.2 Contributing Factors

Contributing factors is defined as actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident or incident occurring, or mitigated the severity of the consequences of the accident or incident.

The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil or criminal liability. The presentation of the contributing factors is based on chronological order and not to show the degree of contribution.

The KNKT concluded the contributing factors as follows:

Pilot justification based on available information of WON1921 that were not properly assessed and without proper crew coordination resulted in the GIA460 departed following the common practice to turn left after departure.

4 SAFETY ACTION

At the time of issuing this draft Final Report, the KNKT had been informed of safety actions taking by the related parties resulting from this occurrence.

4.1 Directorate General of Civil Aviation

- On 8 August 2018, the Directorate General of Civil Aviation (DGCA) reviewed the occurrence in the aircraft proximity meeting and reminded the involved parties to implement the requirement standard and improve the awareness during flight operation.
- In 2019, the DGCA conducted surveillance to several Aerodrome Flight Information Service to ensure the implementation of the requirement standard.

4.2 Garuda Indonesia

On 6 June 2018, the Garuda Indonesia issued notice to pilot to improve situational awareness especially in the uncontrolled airspace and to remind pilot to implement the standard operating procedure of radiotelephony.

5 SAFETY RECOMMENDATIONS

5.1 AirNav Indonesia

The AirNav Indonesia is the Air Traffic Services (ATS) provider which have several branch units in Indonesia included Tambolaka branch office. The safety issue identified during providing flight information services in this occurrence may have a possibility to reoccur in the other unit which provides the same services. Therefore, the recommendation in this section is addressed to the AirNav Indonesia and not exclusively addressed to the AirNav Indonesia branch office Tambolaka.

04.A-2018-18.01

The Air Traffic Services (ATS) provided in Tambolaka Aerodrome Flight Information Zone (AFIZ) were flight information, alerting, and, if required, air traffic advisory services. The Tambolaka ATS provider did not provide air traffic control services that contain clearance and/or instructions, as the airspace of the Tambolaka was Class G airspace.

Some advice from the ACO given to the pilot used instruction phraseology, and the pilot sometimes requested a clearance to the ACO. These mixed-up communications indicated unclear determination of service status between air traffic control services and flight information services. The unclear determination might make the pilot assumed that the flights separation would be provided by the ATS provider.

Therefore, the KNKT recommend all phraseology used while providing flight information services are conducted in accordance with the ATS SOP to make clear determination of service status air traffic control services and flight information services.

5.2 Garuda Indonesia

- **04.O-2018-18.02**

  One day before the day of the occurrence, the GIA460 PF was felt unfit and on the following day after the occurrence, the PIC was hospitalized. The investigation considered that on the day of the occurrence the PIC medical condition might reduce his performance.

  The OM-Part A of Garuda Indonesia described that pilot must maintain their performance in physical fitness and pilot is prohibited to fly when unfit. The pilot may refuse their duty if unfit by submitting an unfit statement letter according to the *Pedoman Awak Pesawat* (Flight Crew Guidance).

  The continuation to perform the duty indicated that the pilot did not consider that his medical condition might degrade his performance.

  Therefore, the KNKT recommend to emphasize the reporting system including self-assessment report for ensuring medical condition that may degrade the pilot performance can be identified and mitigated in timely manner.

- **04.O-2018-18.03**

  The readback from GIA460 PM that the WON1921 would join left downwind runway 10 indicated that the PM had acknowledged the WON1921 pilot intention. However, when the GIA460 PF advised the PM that WON1921 would join right downwind runway 10, made the PM followed the PF assumption and disregarded the WON1921 information. The absence of pilot's discussion to assess of WON1921 flight properly indicated that Crew Resource Management was not implemented properly.

  The OM-Part A subchapter 11.11.1 described that Crew Resource Management requires each pilot to be able supplement or act as back-up for the other pilot.

  Therefore, the KNKT recommend to ensure all pilot to implement Crew Resource Management described in the OM-Part A.

- **04.O-2018-18.04**

  The Air Traffic Services (ATS) provided in Tambolaka Aerodrome Flight Information Zone (AFIZ) were flight information, alerting, and, if required, air traffic advisory services. The Tambolaka ATS provider did not provide air traffic control services that contain clearance and/or instructions, as the airspace of the Tambolaka was Class G airspace.

  However, some advice from the ACO given to the pilot used instruction phraseology, and the pilot sometimes requested a clearance to the ACO. These mixed-up communications indicated unclear determination of service status between air traffic control services and flight information services. The unclear determination might make the pilot assumed that the flights would be separated by the ATS provider.

  Therefore, the KNKT recommend to ensure all pilot are aware that air traffic control service includes traffic separation is not provided in the Class G airspace. The separation between aircraft is responsibility of each pilot based on their decision.

5.3 Wings Air

- **04.O-2018-18.05**

  The Air Traffic Services (ATS) provided in Tambolaka Aerodrome Flight Information Zone (AFIZ) were flight information, alerting, and, if required, air traffic advisory services. The Tambolaka ATS provider did not provide air traffic control services that contain clearance and/or instructions, as the airspace of the Tambolaka was Class G airspace.

  However, some advice from the ACO given to the pilot used instruction phraseology, and the pilot sometimes requested a clearance to the ACO. These mixed-up communications indicated unclear determination of service status between air traffic control services and flight information services. The unclear determination might make the pilot assumed that the flights would be separated by the ATS provider.

  Therefore, the KNKT recommend to ensure all pilot are aware that air traffic control service includes traffic separation is not provided in the Class G airspace. The separation between aircraft is responsibility of each pilot based on their decision.

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