



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA**

PRELIMINARY

KNKT.18.10.35.04

Aircraft Accident Investigation Report

**PT. Lion Mentari Airlines
Boeing 737-8 (MAX); PK-LQP
Tanjung Karawang, West Java
Republic of Indonesia
29 October 2018**

2018

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 initial 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, November 2018

**KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN**



SOERJANTO TJAHJONO

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ABBREVIATIONS AND DEFINITIONS

AC	:	Alternating Current
ACC	:	Area Control Center
AD	:	Airworthiness Directive
ADIRU	:	Air Data Inertial Reference Unit
ADM	:	Air Data Module
ADS-B	:	Automatic Dependent Surveillance – Broadcast
AFM	:	Aircraft Flight Manual
AFML	:	Aircraft Flight Maintenance Log
ALT	:	Altitude
AMM	:	Aircraft Maintenance Manual
AND	:	Aircraft Nose Down
ANU	:	Aircraft Nose Up
AoA	:	Angle of Attack
AOC	:	Air Operator Certificate
ARR	:	Arrival
ASD	:	Aircraft Situational Display
ATA	:	Air Transport Association of America
ATC	:	Air Traffic Controller
ATPL	:	Airline Transport Pilot Licence
ATS	:	Air Traffic Service
ATSB	:	Australian Transport Safety Bureau
BASARNAS	:	Badan SAR Nasional (National Search and Rescue Agency)
BAT	:	Batam Aero Technic
BITE	:	Built-in Test Equipment
BMKG	:	Badan Meteorologi Klimatologi dan Geofisika (Bureau of Meteorology, Climatology and Geophysics)
CB	:	Circuit Breaker
CDU	:	Control Display Unit
CFM International	:	Commercial Fan Moteur International
CPL	:	Civil Pilot License
CMIG	:	China Minsheng Investment Group
CRM	:	Cockpit Resource Management

CSMU	:	Crash Survivable Memory Unit
CVR	:	Cockpit Voice Recorder
DC	:	Direct Current
DFCS	:	Digital Flight Control System
DFDR	:	Digital Flight Data Recorder
DGCA	:	Directorate General of Civil Aviation
DMI	:	Deferred Maintenance Item
ECAM	:	Electronic Centralised Aircraft Monitoring
FAA	:	Federal Aviation Administration
FCOM	:	Flight Crew Operating Manual
FD	:	Flight Director
FRM	:	Fault Reporting Manual
ICAO	:	International Civil Aviation Organization
IAS	:	Indicated Air Speed
IFIM	:	Interactive Fault Isolation Manual
JATSC	:	Jakarta Air Traffic Services Centre
JICT	:	Jakarta International Container Terminal
KNKT	:	<i>Komite Nasional Keselamatan Transportasi</i> (National Transport Safety Committee)
LEAP	:	Leading Edge Aviation Propulsion
LPPNPI	:	<i>Lembaga Penyelenggara Pelayanan Navigasi Penerbangan Indonesia</i> (AirNav Indonesia) or the Air Traffic Services (ATS) Indonesia
LT	:	Local Time
MOM	:	Multi Operator Messages
NNC	:	Non-Normal Checklists
NTSB	:	National Transportation Safety Board of United States of America
OMB	:	Operation Manual Bulletin
OMF	:	On-board Maintenance Function
PFD	:	Primary Flight Display
PIC/SIC	:	Pilot in Command
QAR	:	Quick Access Recorder
ROV	:	Remotely Operated Vehicle
RVSM	:	Reduced Vertical Separation Minima
SIC	:	Second in Command

SID	:	Standard Instrument Departure
SMYD	:	Stall Management Yaw Damper
TE	:	Terminal East
TSIB	:	Transport Safety Investigation Bureau of Singapore
ULB	:	Under-water Locator Beacon
UTC	:	Universal Time Coordinated
UWM	:	Upper West Madura
UWS	:	Upper West Semarang

SYNOPSIS

On 28 October 2018, a Boeing 737-8 (MAX) aircraft registered PK-LQP was being operated by PT. Lion Mentari Airlines (Lion Air) as a scheduled passenger flight from I Gusti Ngurah Rai International Airport (WADD), Denpasar to Jakarta as LNI043. During pre-flight check, the PIC discussed with the engineer of the maintenance actions that had been performed including replacement of the AoA sensor and had been tested accordingly.

The aircraft departed at 1420 UTC (2220 LT) at night time, the DFDR showed the stick shaker activated during the rotation and remained active throughout the flight. About 400 feet, the PIC noticed on the PFD the IAS DISAGREE warning appeared. The PIC handed over control to the SIC and cross checked the PFDs with the standby instrument and determined that the left PFD had the problem. The PIC noticed the aircraft was automatically trimming AND. The PIC moved the STAB TRIM switches to CUT OUT and the SIC continued the flight with manual trim without auto-pilot until the end of the flight.

The PIC declared “PAN PAN” to the Denpasar Approach controller due to instrument failure and requested to maintain runway heading. The PIC performed three Non-Normal Checklists and none contained the instruction “Plan to land at the nearest suitable airport”.

The remainder of the flight was uneventful and the aircraft landed Jakarta about 1556 UTC. After parking, the PIC informed the engineer about the aircraft problem and entered IAS and ALT Disagree and FEEL DIFF PRESS problem on the AFML.

The engineer performed flushing the left Pitot Air Data Module (ADM) and static ADM to rectify the IAS and ALT disagree followed by operation test on ground and found satisfied. The Feel Differential Pressure was rectified by performed cleaned electrical connector plug of elevator feel computer. The test on ground found the problem had been solved.

At 2320 UTC, (0620 on 29 October 2018 LT), the aircraft departed from Jakarta with intended destination of Pangkal Pinang. The DFDR recorded a difference between left and right AoA of about 20° and continued until the end of recording. During rotation the left control column stick shaker activated and continued for most of the flight.

During the flight the SIC asked the controller to confirm the altitude of the aircraft and later also asked the speed as shown on the controller radar display. The SIC reported experienced „flight control problem“.

After the flaps retracted, the DFDR recorded automatic AND trim active followed by flight crew commanded ANU trim. The automatic AND trim stopped when the flaps extended. When the flaps retracted to 0, the automatic AND trim and flight crew commanded ANU trim began again and continued for the remainder of the flight. At 23:31:54 UTC, the DFDR stopped recording.

Until the publishing of this Preliminary Report, the CVR has not been recovered, the search for CVR is continuing. The investigation will perform several tests including the test of the AoA sensor and the aircraft simulator exercises in the Boeing engineering simulator. The investigation has received the QAR data for flight for analysis.

The investigation involved the NTSB of the United States of America as State of design and State of manufacturer, the TSIB of Singapore and the ATSB of Australia as State provide assistant that assigned accredited representatives according to ICAO Annex 13.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 29 October 2018, a Boeing 737-8 (MAX) aircraft registered PK-LQP was being operated by PT. Lion Mentari Airlines (Lion Air) as a scheduled passenger flight from Soekarno-Hatta International Airport (WIII), Jakarta¹ with intended destination of Depati Amir Airport (WIPK), Pangkal Pinang². The scheduled time of departure from Jakarta was 0545 LT (2245 UTC³ on 28 October 2018) as LNI610.

At 2320 UTC, the aircraft departed from Jakarta using runway 25L and intended cruising altitude was 27,000 feet. The LNI610 pilot was instructed to follow the Standard Instrument Departure (SID) of ABASA 1C⁴.

According to the weight and balance sheet, on board the aircraft were two pilots, five flight attendants and 181 passengers consisted of 178 adult, one child and two infants. The voyage report⁵ showed that the number of flight attendant on board was six flight attendants.

The Digital Flight Data Recorder (DFDR) recorded a difference between left and right Angle of Attack (AoA)⁶ of about 20° and continued until the end of recording. During rotation the left control column stick shaker⁷ activated and continued for most of the flight.

Shortly after departure, the Jakarta Tower controller instructed LNI610 to contact Terminal East (TE) controller. At 23:21:22 UTC, the LNI60 SIC made initial contact with the TE controller who responded that the aircraft was identified on the controller Aircraft Situational Display/ASD (radar display). Thereafter, the TE controller instructed the LNI610 to climb to altitude 27,000 feet.

At 23:21:28 UTC, the LNI610 SIC asked the TE controller to confirm the altitude of the aircraft as shown on the TE controller radar display. The TE controller responded that the aircraft altitude was 900 feet and was acknowledged by the LNI610 Second in Command (SIC).

At 23:21:53 UTC, the LNI610 SIC requested approval to the TE controller “to some holding point”. The TE controller asked the LNI610 the problem of the aircraft and the pilot responded “flight control problem”.

The LNI610 descended from altitude 1,700 to 1,600 feet and the TE controller then asked the LNI610 of the intended altitude. The LNI610 SIC advised the TE controller that the intended altitude was 5,000 feet.

1 Soekarno-Hatta International Airport (WIII), Jakarta will be named as Jakarta for the purpose of this report.

2 Depati Amir Airport (WIPK), Pangkal Pinang will be named as Pangkal Pinang 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 occurred. The Local Time (LT) is UTC +7 hours.

4 The detail of ABASA 1C Standard Instrument Departure (SID) is described in subchapter 1.8 Aids to Navigation.

5 Voyage report is the up to date crew names in each sector and available in the web based system named „Crewlink“.

6 Angle of Attack (AOA) is the angle between wing mean aerodynamic chord and direction of relative wind.

7 Stick shaker is an artificial warning device to alert the flight crew when airspeed is at a minimum operating speed and is close to a wing stall condition (Boeing 737-8 System Description Section of the Aircraft Maintenance Manual).

At 23:22:05 UTC, the DFDR recorded the aircraft altitude was approximately 2,150 feet and the flaps were retracted. After the flaps reached 0, the DFDR recorded automatic aircraft nose down (AND) trim active for 10 seconds followed by flight crew commanded aircraft nose up (ANU) trim.

At 23:22:31 UTC, the TE controller instructed the LNI610 to climb and maintain altitude of 5,000 feet and to turn left heading 050°. The instruction was acknowledged by the LNI610 SIC.

At 23:22:48 UTC, the flaps extended to 5 and the automatic AND trim stopped.

At 23:22:56 UTC, the LNI610 SIC asked the TE controller the speed as indicated on the radar display. The TE controller responded to the LNI610 that the ground speed of the aircraft shown on the radar display was 322 knots.

At 23:24:51 UTC, the TE controller added “FLIGHT CONT TROB” text for LNI610 target label on the controller radar system as reminder that the flight was experiencing flight control problem.

At 23:25:05 UTC, the TE controller instructed the LNI610 to turn left heading 350° and maintain altitude of 5,000 feet. The instruction was acknowledged by the LNI610 SIC.

At 23:25:18 UTC, the flaps retracted to 0. At 23:25:27 UTC, the automatic AND trim and flight crew commanded ANU trim recorded began again and continued for the remainder of the flight.

At 23:26:32 UTC, the TE controller instructed the LNI610 to turn right heading 050° and maintain altitude of 5,000 feet. The instruction was acknowledged by the LNI610 SIC.

At 23:26:59 UTC, the TE controller instructed the LNI610 to turn right heading 070° to avoid traffic. The LNI610 pilot did not respond to the TE controller’s instruction, thereafter, the controller called the LNI610 twice who responded at 23:27:13 UTC.

At 23:27:15 UTC, the TE controller instructed the LNI610 to turn right heading 090° which was acknowledged by the LNI610 SIC. A few second later, the TE controller revised the instruction to stop the turn and fly heading 070° which was acknowledged by the LNI610 SIC.

At 23:28:15 UTC, the TE controller provided traffic information to the LNI610 who responded “ZERO”. About 14 seconds later, the TE controller instructed the LNI610 to turn left heading 050° and maintain an altitude of 5,000 feet. The instruction was acknowledged by the LNI610 SIC.

At 23:29:37 UTC, the TE controller questioned the LNI610 whether the aircraft was descending as the TE controller noticed that the aircraft was descending. The LNI610 SIC advised the TE controller that they had a flight control problem and were flying the aircraft manually.

At 23:29:45 UTC, the TE controller instructed the LNI610 to maintain heading 050° and contact the Arrival (ARR) controller. The instruction was acknowledged by the LNI610 SIC.

At 23:30:03 UTC, the LNI610 contacted the ARR controller and advised that they were experiencing a flight control problem. The ARR controller advised LNI610 to prepare for landing on runway 25L and instructed them to fly heading 070°. The instruction was read back by the LNI610 SIC.

At 23:30:58 UTC, the LNI610 SIC stated “LNI650 due to weather request proceed to ESALA⁸” which was approved by the ARR controller.

At 23:31:09 UTC, the LNI610 PIC advised the ARR controller that the altitude of the aircraft could not be determined due to all aircraft instruments indicating different altitudes. The pilot used the call sign of LNI650 during the communication. The ARR controller acknowledged then stated “LNI610 no restriction”.

At 23:31:23 UTC, the LNI610 PIC requested the ARR controller to block altitude 3,000 feet above and below for traffic avoidance. The ARR controller asked what altitude the pilot wanted. At 23:31:35 UTC, the LNI610 PIC responded “five thou”. The ARR controller approved the pilot request.

At 23:31:54 UTC, the FDR stopped recording.

The ARR controller attempted to contact LNI610 twice with no response. At 23:32:19 UTC, the LNI610 target disappeared from the ASD and changed to flight plan track. The ARR controller and TE controller attempted to contact LNI610 four more times with no response.

The ARR controller then checked the last known coordinates of LNI610 and instructed the assistant to report the occurrence to the operations manager.

The ARR controller requested several aircraft to hold over the last known position of LNI610 and to conduct a visual search of the area.

About 0005 UTC (0705 LT), tug boat personnel found floating debris at 5°48'56.04"S; 107° 7'23.04"E which was about 33 Nm from Jakarta on bearing 56°. The debris was later identified as LNI610.

1.2 Injuries to Persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	8	181	189	-
Serious	-	-	-	-
Minor	-	-	-	-
None	-	-	-	-
TOTAL	8	181	189	

The Pilot in Command was Indian and one of passenger was Italian.

1.3 Damage to Aircraft

The aircraft was destroyed.

⁸ Waypoint ESALA is located on coordinate 5°57'42.00"S 107°19'0.00"E which about 40 Nm from Soekarno-Hatta Airport on bearing 75°.

1.4 Other Damage

No other damage to property and/or the environment.

1.5 Personnel Information

1.5.1 Pilot in Command

Gender : Male
Age : 31 years
Nationality : India
Date of joining company : 25 April 2011
License : ATPL
 Date of issue : 28 July 2016
 Aircraft type rating : Boeing 737
Instrument rating validity : 31 May 2019
Medical certificate : First Class
 Last of medical : 5 October 2018
 Validity : 5 April 2019
 Medical limitation : Pilot shall wear corrective lenses
Last line check : 19 January 2018
Last proficiency check : 7 October 2018

Flying experience

Total hours : 6,028 hours 45 minutes
Total on type : 5,176 hours
Last 90 days : 148 hours 15 minutes
Last 30 days : 81 hours 55 minutes
Last 7 days : 15 hours 45 minutes
This flight : About 11 minutes

1.5.2 Second in Command

Gender : Male
Age : 41 years
Nationality : Indonesia
Date of joining company : 31 October 2011
License : CPL
 Date of issue : 15 May 1997
 Aircraft type rating : Boeing 737
Instrument rating validity : 31 August 2019

Medical certificate : First Class
 Last of medical : 28 September 2019
 Validity : 28 March 2019
 Medical limitation : Pilot shall possess glasses that correct for near vision
 Last line check : 4 July 2017
 Last proficiency check : 25 August 2018
Flying experience
 Total hours : 5,174 hours 30 minutes
 Total on type : 4,286 hours
 Last 90 days : 187 hours 50 minutes
 Last 30 days : 32 hours 55 minutes
 Last 7 days : 20 hours 20 minutes
 This flight : About 11 minutes

1.5.3 Flight Attendants

All flight attendants held valid Flight Attendant Certificate with rating for Boeing 737 and valid medical examination certificate.

1.5.4 Air Traffic Controller

	Terminal East	Arrival
Gender	: Male	Male
Age	: 63 years	50 years
Nationality	: Indonesia	Indonesia
Year of joining company	: 2013	2013
License	: ATC	ATC
Date of issue	: 1 February 2015	1 February 2015
Type rating	: <ul style="list-style-type: none"> • Approach Control Surveillance • Approach Control Procedural 	<ul style="list-style-type: none"> • Approach Control Surveillance • Approach Control Procedural
Date of issue	: 17 June 2018	30 June 2018
Validity	: 17 December 2018	30 December 2018
Medical certificate	: Third Class	Third Class
Last of medical	: 11 January 2018	19 April 2018
Validity	: 11 January 2019	19 April 2019

Medical limitation	:	Holder shall possess glasses that correct for near vision	Holder shall wear corrective lenses
ICAO Language Proficiency	:	Level 4	Level 5
Date of issue	:	28 July 2018	30 November 2015
Validity	:	28 July 2021	30 November 2020
Working time⁹			
Last 7 days	:	22 hours	<ul style="list-style-type: none"> • 43 hours (office works acted as Operation Manager) • 1 hour 30 minutes (as controller)
Last 24 hours	:	1 hours	1 hour 30 minutes
Duty time¹⁰			
Last 7 days	:	12 hours	1 hour 30 minutes
Last 24 hours	:	1 hour	1 hour 30 minutes

1.6 Aircraft Information

1.6.1 General

Registration Mark	:	PK-LQP
Manufacturer	:	Boeing Company
Country of Manufacturer	:	United States of America
Type/Model	:	737-8
Serial Number	:	43000
Year of Manufacture	:	2018
Certificate of Airworthiness		
Issued	:	15 August 2018
Validity	:	14 August 2019
Category	:	Transport
Limitations	:	None
Certificate of Registration		
Number	:	43000
Issued	:	15 August 2018
Validity	:	14 August 2021
Time Since New	:	895 hours 21 minutes
Cycles Since New	:	443 cycles

⁹ The working time is the time period when the person attends their particular working shift.

¹⁰ The duty time is the time period when the person performs their duty to provide air traffic control service.

Last Major Check : None
 Last Minor Check : None

1.6.2 Engines

Manufacturer : CFM International
 Type/Model : LEAP-1B25
 Serial Number-1 engine : 602506

- Time Since New : 895 hours 21 minutes
- Cycles Since New : 443 cycles

 Serial Number-2 engine : 602534

- Time Since New : 895 hours 21 minutes
- Cycles Since New : 443 cycles

1.6.3 Aircraft Flight and Maintenance Log

The Aircraft Flight Maintenance Log (AFML) recorded that since 26 October 2018 until the occurrence date several problems occurred related to airspeed and altitude flag appeared on Captain (left) Primary Flight Display (PFD) three times, SPEED TRIM FAIL light illumination and MACH TRIM FAIL light illumination two times and IAS (Indicated Airspeed) and ALT (Altitude) Disagree shown on the flight Denpasar to Jakarta the day before the accident flight.

The summary of the aircraft defect recorded on AFML were as follows:

No	Reported Date	Route	Defect Description	Resolution Description
1	26 October 2018	Tianjin Binhai to Manado	Speed and Altitude Flag show on Captain Primary Flight Display (no speed and altitude indication)	Performed check Onboard Maintenance Function (OMF), found maintenance message 27-31000. Refer to Interactive Fault Isolation Manual (IFIM) 27-31000, performed Stall Management and Yaw Damper (SMYD) number 1 system test carried out, result normal.
			Maintenance light illuminate after landing	Performed check OMF, found message 27-31-000. Performed erase maintenance message check out maintenance light goes off.
2	27 October 2018	Denpasar to Manado	Speed and Altitude Flag show on Captain Primary Flight Display (no speed and altitude indication)	Ref. IFIM task 27-32-00-810-816 REV October 2018. Performed check OMF, found status message “Stall Warning System L”. Initial evaluation performed system test SMYD number 1, self-test result failed.

No	Reported Date	Route	Defect Description	Resolution Description
			SPEED TRIM FAIL light illuminate and MACH TRIM FAIL light illuminate	Check correlated message found message Air Data (AD) invalid 27-31012, 34-61263, 3421107, 34-61263, 34-21123. BITE ADIRS L via CDU found message ADR Data invalid (34-21007) and AOA SIGNAL FAIL (34-21023). Reset CBs ADIRU L DC and AC, and ADIRU L carried out, and performed system test SMYD number 1 result pass. Reconnect and clean electrical plug of data module, check message on OMF status not active.
3	27 October 2018	Manado to Denpasar	Speed and Altitude Flag show on Captain Primary Flight Display (no speed and altitude indication)	Refer to IFIM task 27-32-00-810-816 rev October 2018. Perform check OMF status found message "STALL WARNING SYS L". initial evaluation performed SMYD number 1 self-test result failed message 27-31-12 (AD data invalid) and 27-31015 (ADIRU data invalid). Check OMF existing fault (34) found message 34-21107 (AIR DATA SIGNAL INVALID) and 34-21123 (AOA SIGNAL OUT OF RANGE). BITE ADIRS L via CDU found message 34-21023 (AOA SIGNAL FAIL). Reset CB ADIRU L AC and DC and ADIRU L carried out. System test pass. DFCS BITE result PASS. Erase status message carried out and check message not active.
			SPEED TRIM FAIL light illuminate and MACH TRIM FAIL light illuminate	
			Auto-throttle Arm disconnect, during aircraft takeoff roll	
				For troubleshooting due to repetitive problem perform replaced angle of attack sensor in accordance with Aircraft Maintenance Manual (AMM) Task 34-21-05-000-001 and task 34-21-05-400-801 carried out. Installation test and heater system test result good.

No	Reported Date	Route	Defect Description	Resolution Description
4	28 October 2018	Denpasar to Jakarta	IAS and ALT Disagree shown after take off	(Refer to IFIM task 34-20-00-810-801 REV 15 June 2018). Performed flushing Left Pitot Air Data Module (ADM) and static ADM. Operation test on ground found satisfied.
			feel diff press light illuminate	Refer IFIM 27-31-00-810-803 Rev 15 June 2018, performed cleaned electrical connector plug of elevator feel computer carried out. test on ground found OK.

1.7 Meteorological Information

The *Badan Meteorologi Klimatologi dan Geofisika* (BMKG – Bureau of Meteorology, Climatology and Geophysics) provided enhanced infrared satellite images. The enhanced infrared satellite images at 2320 UTC (0620 LT) up to 2330 UTC (0630 LT) indicated that the temperature at the accident site (red circle) was from 0 up to 8°C.

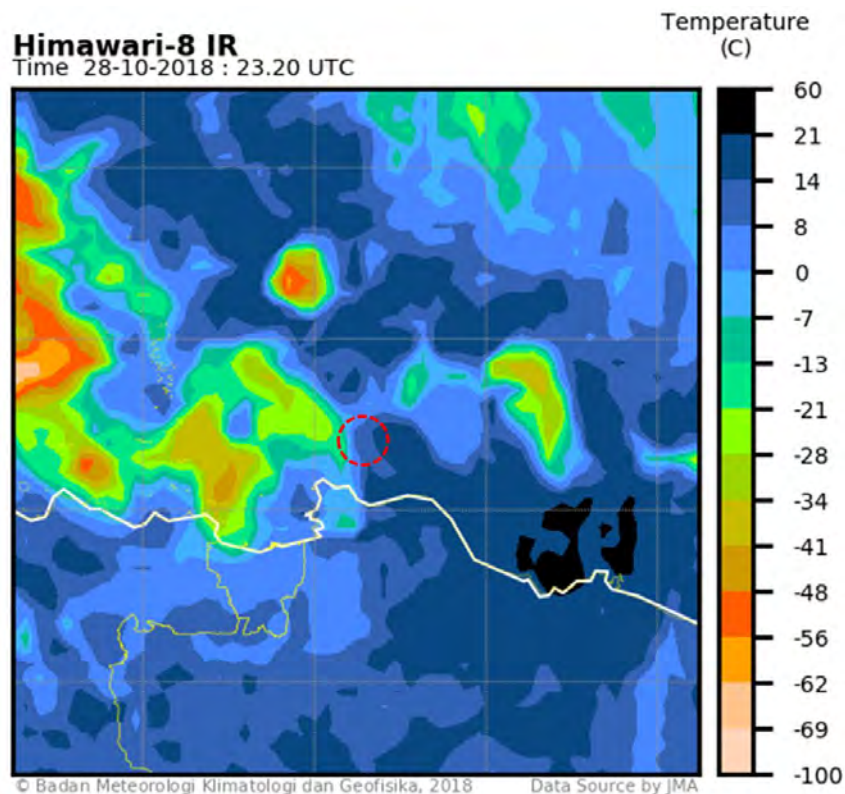


Figure 1: Enhanced infrared satellite image at 2320 UTC (0620 LT)

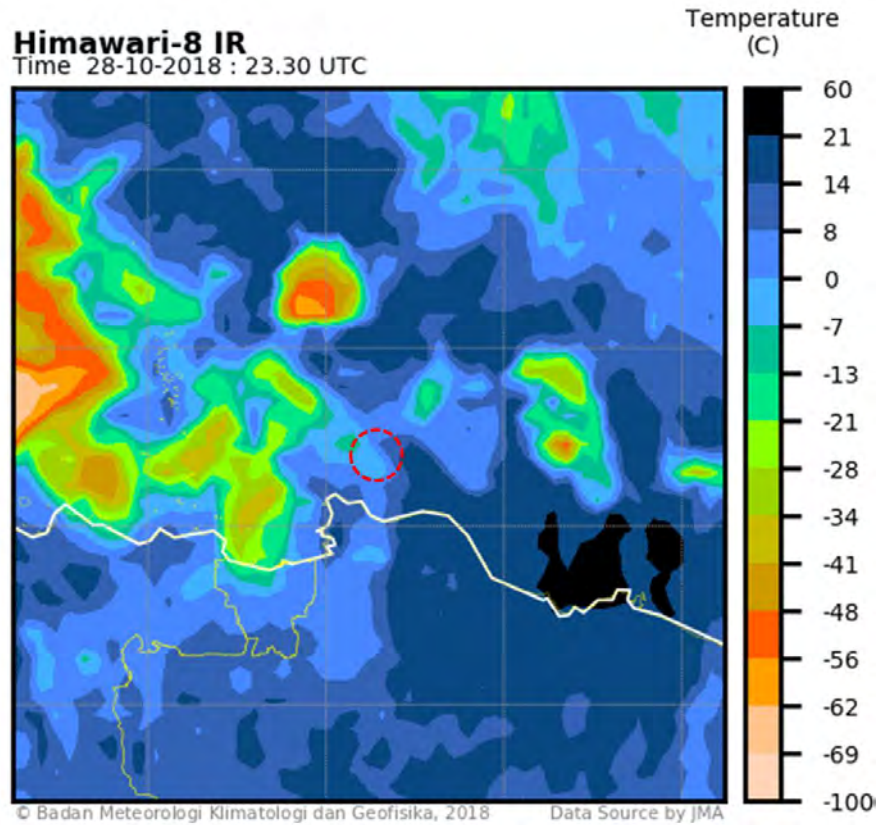


Figure 2: Enhanced infrared satellite image at 2330 UTC (0630 LT)

1.8 Aids to Navigation

The runway 25L utilized RNAV-1 Standard Instrument Departure (SID), one of the SID was ABASA 1C which is after departure the pilot has to climb on heading 248.4°, at or above 3,000 feet then turn left direct to BUNGA – RATIH – LARAS – TOMBO – ABASA (figure 3).

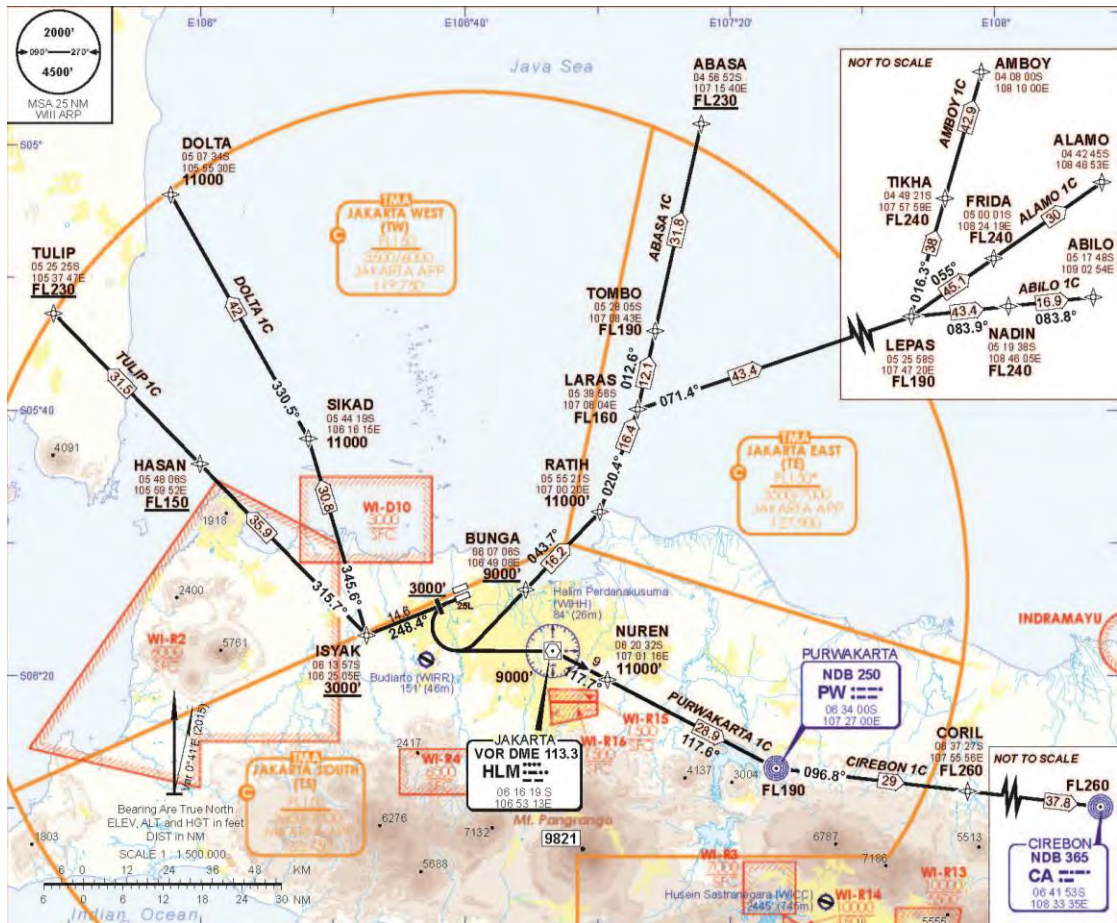


Figure 3: The RNAV-1 runway 25L (extract from AIP Volume II)

Automatic Dependent Surveillance – Broadcast

Automatic Dependent Surveillance – Broadcast (ADS-B) is a surveillance technology in which an aircraft determines its position via satellite navigation and periodically broadcasts it, enabling it to be tracked.

The “automatic” in the ADS-B means that the technology does not require pilot or external input. The “dependent” means its surveillance process depends on data on-board aircraft systems to provide surveillance information to the receiver and “broadcast” means the originating source has no knowledge of who receives the data and there is no interrogation or two-way contract.

Several receivers have been installed in several places including in the Jakarta Air Traffic Services Center (JATSC). The PK-LQP aircraft had ADS-B capability and the investigation retrieved the aircraft broadcasted data from the JATSC facility.

The flight track of the LNI610 based on the ADS-B data superimposed on Google Earth.



Figure 4: The flight track of LNI610 based on ADS-B

1.9 Communications

All communications between Jakarta air traffic control and the pilot were recorded by ground based automatic voice recording equipment. The quality of the aircraft recorded transmissions on the ground based automatic voice recording equipment was good.

1.10 Aerodrome Information

Not relevant to this accident.

1.11 Flight Recorders

The aircraft was equipped with Digital Flight Data Recorder (DFDR) and Cockpit Voice Recorder (CVR) which were located in the tail section of the aircraft.

The search for both DFDR and CVR was conducted by a team consisting of KNKT, Transport Safety Investigation Bureau (TSIB) of Singapore, National Transportation Safety Board (NTSB) of United States of America, *Badan SAR Nasional* (National Search and Rescue Agency) and Indonesia Navy divers.

The search area was determined based on the last recorded aircraft position from the ADS-B provided by the Air Traffic Services provider.

1.11.1 Digital Flight Data Recorder

The aircraft was fitted with a FA2100 DFDR manufactured by L3 Technologies with part number 2100-4945-22 and serial number 001261573.

On 1 November 2018, the Crash Survivable Memory Unit (CSMU) of the DFDR was recovered by the search team. The CSMU was transported to the KNKT recorder facility for data downloading. The read-out was performed by KNKT investigators with the participation of the Australian Transport Safety Bureau (ATSB), the National Transportation Safety Board (NTSB) of United States of America and Transport Safety Investigation Bureau (TSIB) of Singapore as Accredited Representatives.

The memory unit recorded 1,790 parameters and approximately 69 hours of aircraft operation, which contained 19 flights including the accident flight.

Several significant parameters of the DFDR are shown on the following figures.

PK-LQP Boeing 737-MAX8

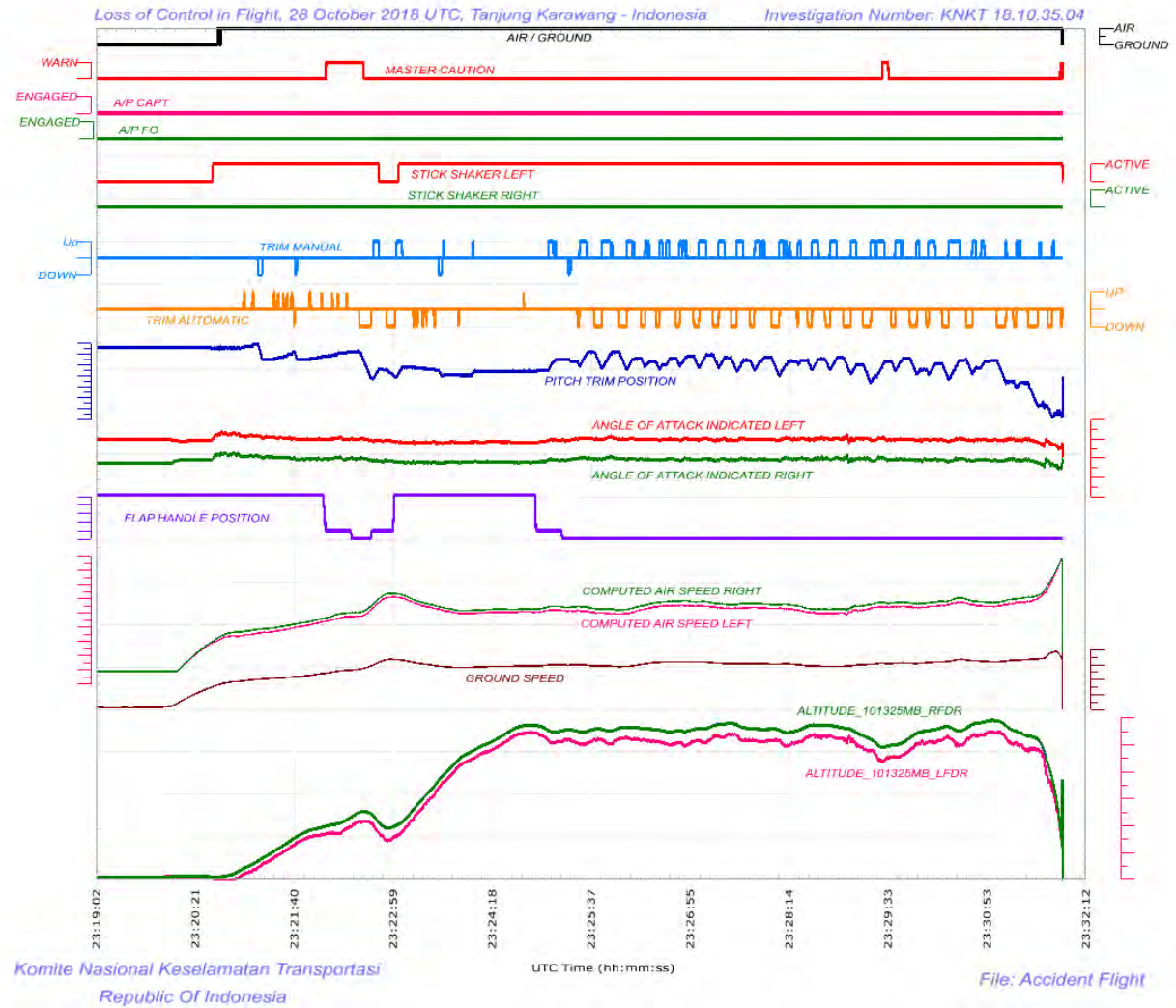


Figure 5: The significant parameters from the accident flight

PK-LQP Boeing 737-MAX8

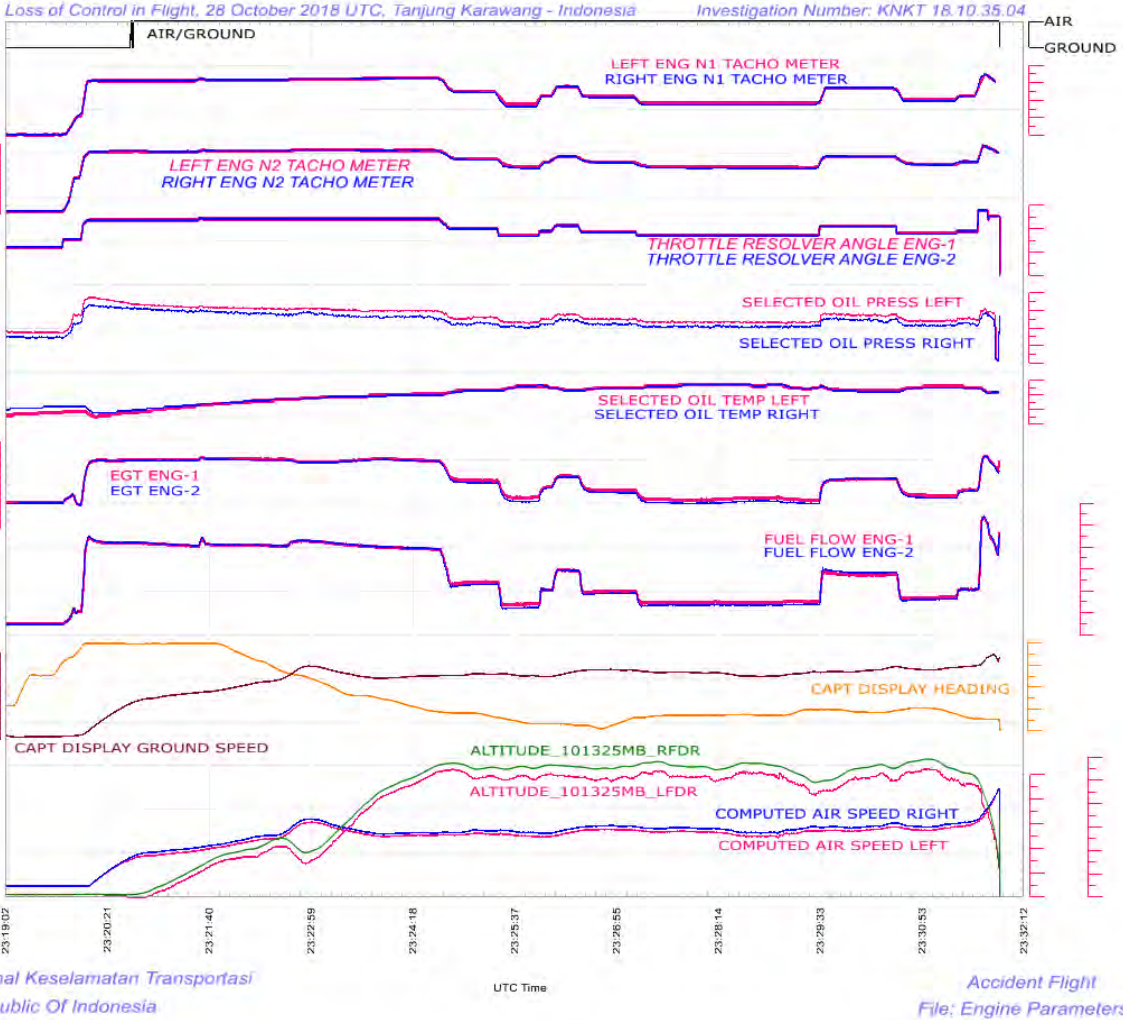


Figure 6: The engine parameters from the accident flight

PK-LQP Boeing 737-MAX8

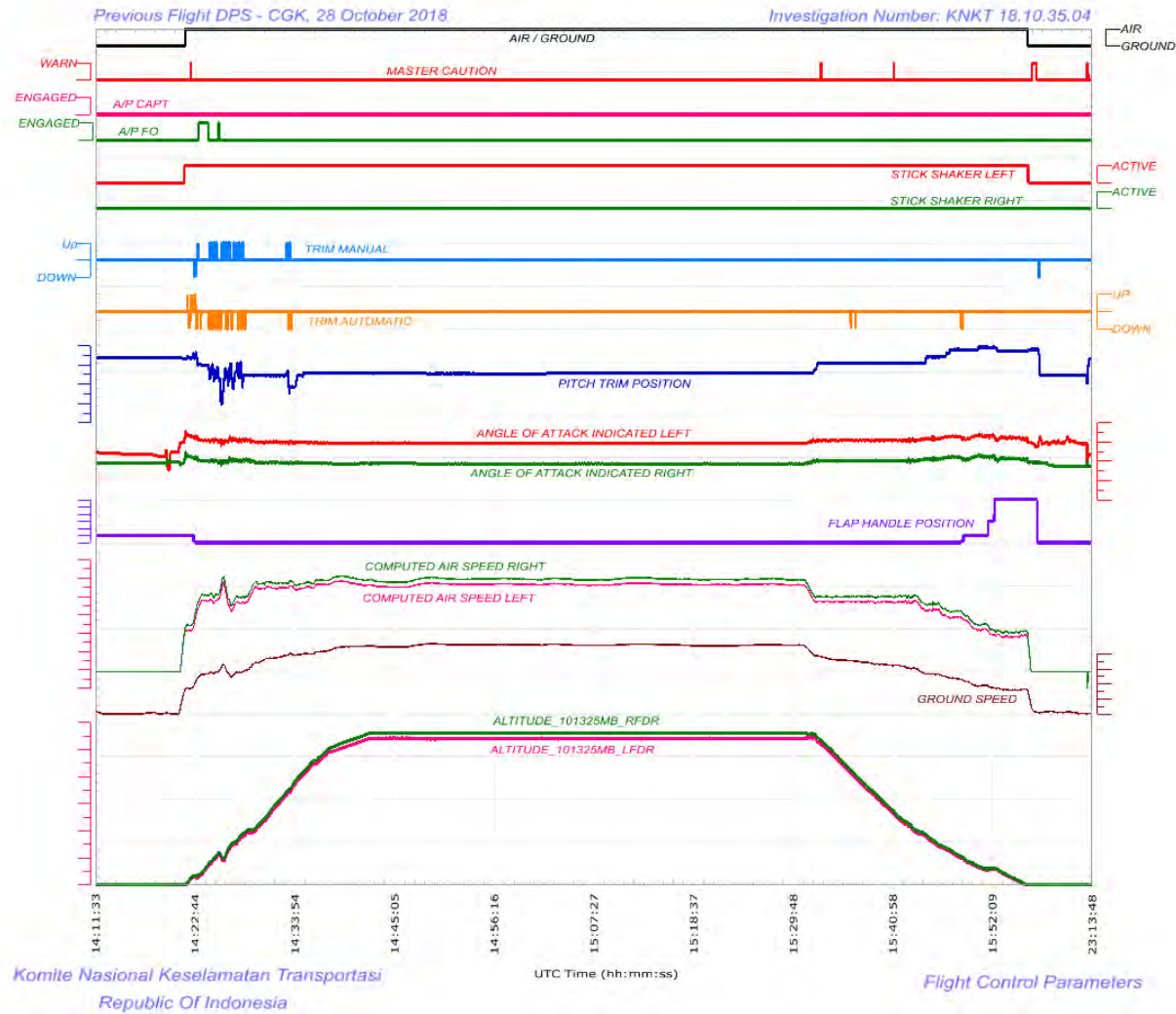


Figure 7: The significant parameters of the previous flight

1.11.2 Cockpit Voice Recorder

The aircraft was fitted with a FA2100 CVR manufactured by L3 Technologies with part number 2100-1925-22 and serial number 001257879. The CVR has not been recovered and search for the CVR is continuing.

1.12 Wreckage and Impact Information

The search team operated in conjunction with the Indonesia Search and Rescue team with the mission to collect the victims. The search team utilized a Remotely Operated Vehicle (ROV) equipped with an under-water camera, side scan sonar and 4 Under-water Locator Beacon (ULB) locators.

The search team identified the wreckage distribution in an area about 200 by 140 meters which was about 370 meters from the last aircraft position recorded on the DFDR.

The CSMU was found at 5°48'43.20"S 107°7'37.60"E which was within the wreckage distribution area. Several parts of the aircraft were recovered and transported to Jakarta International Container Terminal (JICT). The wreckage recovered was from all parts of the aircraft from the forward part to the aft part.

The recovered wreckage identified consisted of, but not limited to, the left and right engines, both main landing gears, parts of the empennage, parts of the forward and aft left passenger doors, parts of the wings, a flight crew oxygen bottle, and parts of a circuit breaker panel.

The damage to the aircraft suggested a high energy impact.

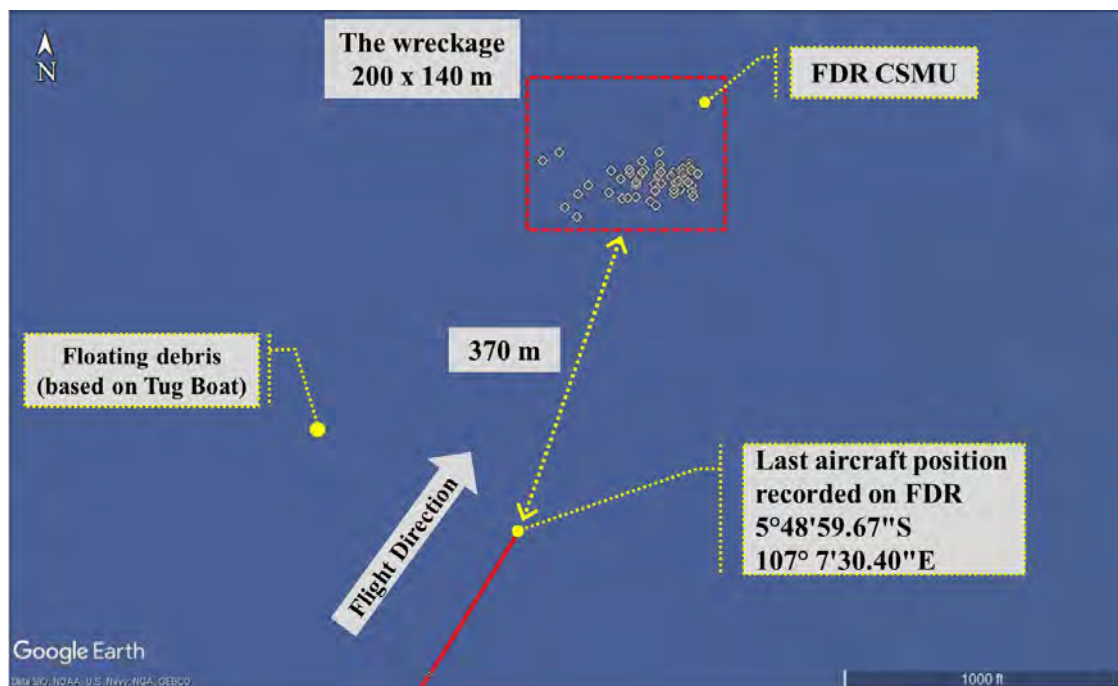


Figure 8: The wreckage distribution

1.13 Medical and Pathological Information

Not relevant to this accident.

1.14 Fire

There was no evidence of in-flight fire.

1.15 Survival Aspects

The accident was not survivable.

1.16 Tests and Research

The investigation team is in possession of the AoA sensor removed from the accident aircraft in Denpasar. The AoA sensor will undergo further testing and analysis under the supervision of the KNKT.

The investigation team plans to conduct aircraft simulator exercises in the Boeing engineering simulator configured for 737-8 (MAX).

The KNKT has received the Quick Access Recorder (QAR) data for the accident aircraft since its delivery to Lion Air for analysis.

1.17 Organizational and Management Information

1.17.1 Aircraft Operator

1.17.1.1 Aircraft Operator Information

Aircraft Owner	:	CMIG Aircraft Leasing Fifteen Ireland Limited
Address	:	No. 1 Ballsbridge, Building 3, 126 Pembroke Road, Dublin 4, Ireland
Aircraft Operator	:	PT. Lion Mentari Airlines (Lion Air)
Address	:	Jalan Gajah Mada No. 7, Jakarta Pusat, Indonesia
Operator Certificate Number	:	AOC 121-010

Lion Air operates a total of 117 aircraft consisting of 3 Airbus A330, 1 Boeing 747-400, 38 Boeing 737-800, 64 Boeing 737-900ER and 11 Boeing 737-8 (including the accident aircraft) and serves more than 120 destinations with up to 630 flights daily.

1.17.1.2 Operation Manual (OM)-part A Rev.5 Issued 3 dated 15 January 2018

1.4. AUTHORITY, DUTIES AND RESPONSIBILITIES OF THE PIC

1.4.2. SPECIFIC RESPONSIBILITIES

a) The Pilot in Command is directly and specifically responsible for, and is the final authority as to, the operation of the aircraft. Therefore, he:

- Is responsible for ensuring the aircraft is in condition for safe flight and must discontinue the flight when un-airworthy mechanical, electrical, or structural conditions occur.*

1.17.2 Air Traffic Services Provider

The *Perusahaan Umum Lembaga Penyelenggara Pelayanan Navigasi Penerbangan Indonesia* (AirNav Indonesia) is the Air Traffic Services (ATS) provider within Indonesia. The ATS in Jakarta is provided by AirNav Indonesia branch office Jakarta Air Traffic Service Center (JATSC) which held a valid Air Traffic Services provider certificate. The services provided were aerodrome control service, approach control service, aeronautical communication service, and flight information services.

The approach control service for LNI610 flight was provided by the Terminal East and Arrival controllers utilizing surveillance control (radar service).

1.17.3 Civil Aviation Safety Regulation (CASR)

CASR Part 91.7 Civil Aircraft Airworthiness

- (a) *No person may operate a civil aircraft unless it is in an airworthy condition.*
- (b) *The pilot in command of a civil aircraft is responsible for determining whether that aircraft is in condition for safe flight. The pilot in command shall discontinue the flight when un-airworthy mechanical, electrical, or structural conditions occur.*

1.18 Additional Information

1.18.1 PK-LQP Previous Flight

On 28 October 2018, the accident aircraft was operated as a passenger flight from I Gusti Ngurah Rai International Airport (WADD), Denpasar¹¹ to Jakarta as LNI043. The aircraft departed from Denpasar with two pilots, five flight attendants and 182 passengers.

During preflight check, the PIC discussed with the engineer the maintenance that had been performed on the aircraft. The engineer informed to the PIC that the AoA sensor had been replaced and tested accordingly. The PIC was convinced by the explanation from the engineer and the statement on the Aircraft Flight Maintenance Log (AFML) that the problem had been resolved.

The PIC conducted the crew briefing and stated that he would act as Pilot Flying on the flight to Jakarta. During the briefing the PIC mentioned the replacement of AoA sensor. The flight departed about 1420 UTC, and during takeoff the pilot did not notice any abnormalities. About two seconds after landing gear retraction, the Takeoff Configuration Warning¹² appeared then extinguished.

About 400 feet, the PIC noticed on the Primary Flight Display (PFD)¹³ that the IAS DISAGREE warning appeared and the stick shaker activated. The FDR showed the stick shaker activated during the rotation. Following that indication, the PIC maintained a pitch of 15° and the existing takeoff thrust setting. The stick shaker remained active throughout the flight.

¹¹ I Gusti Ngurah Rai International Airport (WADD), Denpasar will be named as Denpasar for the purpose of this report.

¹² Takeoff Configuration Warning is a safety device intended to ensure that takeoff is properly configured. An intermittent warning horn and the TAKEOFF CONFIG warning light illuminates when takeoff configuration warning activates.

¹³ Primary Flight Display (PFD) is primary reference for flight information which displays electromechanical instruments onto a single electronic display.

The PIC handed over control to the SIC and announced “memory item airspeed unreliable”. After the transfer of control, the PIC cross checked the PFDs with the standby instrument and determined that the left PFD had the problem. The PIC then switched on the right flight director (FD) so the SIC would have a normal display.

While handling the problem, the PIC instructed the SIC to continue acceleration and flap retraction as normal. The PIC commanded the SIC to follow FD command and re-trim the aircraft as required. The PIC noticed that as soon the SIC stopped trim input, the aircraft was automatically trimming aircraft nose down (AND).

After three automatic AND trim occurrences, the SIC commented that the control column was too heavy to hold back. At 14:25:46 UTC, the PIC declared “PAN PAN” to the Denpasar Approach controller due to instrument failure and requested to maintain runway heading. The Denpasar Approach controller acknowledged the message and approved the pilot request. A few second later, the Denpasar Approach controller asked the LNI043 whether he wanted to return to Denpasar and the pilot responded “standby”.

At 14:28:28 UTC, the PIC moved the STAB TRIM switches to CUT OUT. The PIC re-engaged the STAB TRIM switches to NORMAL, but almost immediately the problem re-appeared. The PIC then moved the STAB TRIM switches back to CUT OUT and continued with manual trim without auto-pilot until the end of the flight.

The pilot performed three Non-Normal Checklists (NNCs) consisting of Airspeed Unreliable, ALT DISAGREE, and Runaway Stabilizer. None of the NNCs performed contained the instruction “Plan to land at the nearest suitable airport”.

At 14:32:31 UTC, the LNI043 pilot advised the Denpasar Approach controller that the problem had been resolved and requested to continue flight at altitude of 29,000 feet without Reduced Vertical Separation Minima (RVSM). The Denpasar Approach controller then instructed the LNI043 pilot to climb to altitude of 28,000 feet and contact Makassar Area Control Center (ACC) for further air traffic control (ATC) services.

At 14:43:36 UTC, the Upper West Madura (UWM) controller of Makassar ACC instructed the LNI043 to climb to altitude of 38,000 feet.

At 14:48:27 UTC, the LNI043 pilot declared “PAN PAN” to the UWM controller and requested to maintain altitude of 28,000 feet due to instrument failure. The UWM controller acknowledged and approved the pilot request. At 14:54:07 UTC, the UWM controller instructed the LNI043 to contact Upper West Semarang (UWS) controller for further ATC services.

At 14:55:28 UTC, the LNI043 pilot made an initial call to the UWS controller and advised that the aircraft was maintaining altitude of 28,000 feet. The UWS controller acknowledged the pilot information and requested the detail of the instrument failure. The LNI043 pilot then advised an altitude and autopilot failure and requested the UWS controller to relay information to Jakarta controller that the LNI043 pilot requested an uninterrupted descent. The UWS controller acknowledged the LNI043 pilot request.

The remainder of the flight was uneventful and the aircraft landed using runway 25L about 1556 UTC.

After parking, the PIC informed the engineer about the aircraft problem and entered IAS (Indicated Air Speed) and ALT (altitude) Disagree and FEEL DIFF PRESS (Feel Differential Pressure) light problem on the Aircraft Flight Maintenance Log (AFML).

The PIC also reported the flight condition through the electronic reporting system of the company A-SHOR. The event was reported as follows:

Airspeed unreliable and ALT disagree shown after takeoff, STS also running to the wrong direction, suspected because of speed difference, identified that CAPT instrument was unreliable and handover control to FO. Continue NNC of Airspeed Unreliable and ALT disagree. Decide to continue flying to CGK at FL280, landed safely runway 25L.*

Note: STS = Speed Trim System

1.18.2 Investigation Process

The investigation involved the National Transportation Safety Board (NTSB) of the United States of America as State of design and State of manufacturer, the Transport Safety Investigation Bureau (TSIB) of Singapore and the Australian Transport Safety Bureau (ATSB) as State provide assistant that assigned accredited representatives according to ICAO Annex 13.

The investigation is continuing and, 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.

1.19 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 ICAO Annex 13.

2 FINDINGS¹⁴

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

- On 28 October 2018, a Boeing 737-8 (MAX) aircraft registered PK-LQP was operated as a scheduled passenger flight from Denpasar to Jakarta. Prior to the flight, the Angle of Attack (AoA) sensor had been replaced and tested.
- The DFDR showed the stick shaker activated during the rotation and remained active throughout the flight. About 400 feet, the PIC noticed on the Primary Flight Display (PFD) that the IAS DISAGREE warning appeared.
- The PIC cross checked both PFDs with the standby instrument and determined that the left PFD had the problem. The flight was handled by the SIC.
- The PIC noticed that as soon the SIC stopped trim input, the aircraft was automatically trimming aircraft nose down (AND). After three automatic AND trim occurrences, the SIC commented that the control column was too heavy to hold back. The PIC moved the STAB TRIM switches to CUT OUT.
- The pilot performed three Non-Normal Checklists (NNCs) consisting of Airspeed Unreliable, ALT DISAGREE, and Runaway Stabilizer. None of the NNCs performed contained the instruction “Plan to land at the nearest suitable airport”.
- After parking in Jakarta, the PIC informed the engineer about the aircraft problem and entered IAS (Indicated Air Speed) and ALT (altitude) Disagree and FEEL DIFF PRESS (Feel Differential Pressure) light problem on the Aircraft Flight Maintenance Log (AFML).
- The PIC also reported the flight condition through the electronic reporting system of the company A-SHOR.
- The engineer performed flushing the left Pitot Air Data Module (ADM) and static ADM to rectify the IAS and ALT disagree followed by operation test on ground and found satisfied. The Feel Differential Pressure was rectified by performed cleaned electrical connector plug of elevator feel computer. The test on ground found the problem had been solved.
- At 2320 UTC, (29 October 2018, 0620 LT) the aircraft departed from Jakarta using runway 25L and intended destination Pangkal Pinang. The DFDR recorded a difference between left and right Angle of Attack (AoA) of about 20° and continued until the end of recording. During rotation the left control column stick shaker activated and continued for most of the flight.
- According to the weight and balance sheet, on board the aircraft were two pilots, five flight attendants and 181 passengers consisted of 178 adult, one child and two infants. The voyage report showed that the number of flight attendant on board was six flight attendants.

¹⁴ 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.

- During the flight the LNI610 SIC asked the TE controller to confirm the altitude of the aircraft and later also asked the speed as shown on the TE controller radar display. The LNI610 SIC reported experienced „flight control problem“.
- After the flaps retracted, the FDR recorded automatic aircraft nose down (AND) trim active for 10 seconds followed by flight crew commanded aircraft nose up (ANU) trim. The flaps extended to 5 and the automatic AND trim stopped.
- At 23:25:18 UTC, the flaps retracted to 0 and several seconds later, the automatic AND trim and flight crew commanded ANU trim recorded began again and continued for the remainder of the flight.
- The LNI610 PIC advised the controller that the altitude of the aircraft could not be determined due to all aircraft instruments indicating different altitudes and requested to the controller to block altitude 3,000 feet above and below for traffic avoidance.
- The flight crew and the flight attendants held valid licenses and medical certificates and certified to operate B737.
- The Aircraft Flight Maintenance Log (AFML) recorded that since 26 October 2018 until the occurrence date, several problems occurred related to airspeed and altitude flag appeared on Captain (left) Primary Flight Display (PFD) three times, SPEED TRIM FAIL light illumination and MACH TRIM FAIL light illumination two times and IAS (Indicated Airspeed) and ALT (Altitude) Disagree shown on the flight Denpasar to Jakarta the day before the accident flight.

3 SAFETY ACTION

At the time of issuing this Preliminary Report, the KNKT had been informed of safety actions taken by several parties resulting from this accident.

3.1 Lion Air

On 29 October 2018, the Safety and Security Directorate issued safety reminder to all Boeing 737 pilots to review several procedures including memory items of airspeed unreliable and runaway stabilizer.

On 30 October 2018, issued information to all pilots which contained reminder to:

- Have a thoroughly understanding on Deferred Maintenance Item (DMI) for the aircraft to be use.
- Check any defect and the trouble shooting on Aircraft Maintenance Flight Log (AFML) from the previous flights.
- Be ready for any abnormal or emergency conditions by having Memory Items and maneuvers reviewed and have a good Cockpit Resource Management (CRM) to all counterparts.
- Write on the AFML for any malfunctions that happened during the flight. Brief the engineer on duty comprehensively about the malfunction happened in flight. Please refer to Fault Reporting Manual (FRM) provided in the aircraft.
- Send report to Safety and Security Directorate through all reporting methods that available as soon as practicable.

On 2 November 2018, the Safety and Security Directorate issued safety instruction:

For Operation Directorate:

- To instruct all B737 pilots to use the Fault Reporting Manual (FRM) in all their Aircraft Flight Maintenance Log (AFML) report. This measure shall be enforced by Operations, Training and Standard with immediate effect.
- To instruct all pilots to fill the AFML report with as much details as deem necessary to provide a full comprehensive description of the technical defect to the engineering team. This measure should be applied with immediate effect.
- To reinforce in the current simulator syllabus, the “Unreliable Airspeed” and “Stabilizer Runaway” maneuvers, with immediate effect to all fleets.
- To reinforce the role of Chief Pilot on Duty, in order to raise operational issue to IOCC/MCC should any significant notification has been received. This measure should be applied with immediate effect.
- To reinforce through Notice to Pilots, Ground Recurrent Training, and Simulator Sessions on Decision Making Process when the aircraft has declared and operating in abnormal (PAN-PAN) or emergency (MAYDAY-MAYDAY) condition.

For Maintenance Directorate:

- To ensure Batam Aero Technic (BAT) reinforce the role of technical specialist team as line maintenance support for more efficient troubleshooting process. This service should ensure that the “live” malfunctions are properly followed up until properly solved.
- To ensure Batam Aero Technic (BAT) through their TRAX system gives adequate alert on repetitive problem, even though reports for a malfunction may have been coded under different ATA references.
- To reinforce the MCC role in malfunction follow up and troubleshooting.

On 3 November 2018, the Chief Pilot issued Notice to Pilot which required all pilots to perform the following:

- Read and study the FRM (Fault Reporting Manual) and know how to utilize it. Any observed faults, status message, or cabin faults must be written down in the AFML, and ATA Number/Title of ECAM Shown (Fault) For A330. Should have any doubt, please contact the chief pilot or Quality Assurance Department via Mission Control (MC) – OM-A 8.6.8.
- Do not hesitate to describe in details about the defect that has been encountered. This is a good practice especially for the engineers to do the troubleshooting and for the next crew that will fly the aircraft.
- Review the memory item routinely during the briefing, and if applicable, review the course of actions that should be taken if particular situations occur in any phase of flight.

On 5 November 2018, the Training Manager issued Training Notice to Pilot which required all instructor pilots to make additional training of airspeed unreliable and runaway stabilizer.

On 7 November 2018, the Fleet Manager issued Notice to Pilot which required all pilots to improve reporting events of IAS disagree, ALT disagree, SPEED fail, and ALT fail as a serious occurrence.

On 8 November 2018, the Safety and Security Directorate issued Safety Instruction to all pilots to follow Boeing Flight Crew Operations Manual Bulletin Number TBC-19 and Number MLI-15.

On 12 November 2018, the Safety and Security Directorate issued Notice to all station and operation managers of the Emergency Flowchart revision which included occurrence involving urgency and distress call events to be reported through Emergency Response Report flow.

On 15 November 2018, the Safety and Security Directorate issued Safety Instruction to Safety Corporate Director and Batam Aero Technic (BAT) Director to implement Directorate General of Civil Aviation Airworthiness Directive number 18-11-011-U.

3.2 Batam Aero Technic

On 08 November 2018, the Batam Aero Technic (BAT) issued Engineering Information to revise Aircraft Flight Manual (AFM) of Boeing 737-8 (MAX) in accordance with Directorate General of Civil Aviation Airworthiness Directive number 18-11-011-U.

On 11 November 2018, the BAT conducted Angle of Attack installation test to all Boeing 737-8 (MAX) aircraft operated by Lion Air.

3.3 Boeing Company

On 6 November 2018, issued Flight Crew Operation Manual Bulletin (OMB) Number TBC-19 with subjected Un-commanded Nose Down Stabilizer Trim Due to Erroneous Angle of Attack (AOA) During Manual Flight Only to emphasize the procedures provided in the runaway stabilizer non-normal checklist (NNC). The detail of the FCOM Bulletin is available on the appendices 5.11.

On 11 November 2018, informed all 737NG/MAX Customers, Regional Directors, Regional Managers and Boeing Field Service Bases via Multi Operator Messages (MOM) with subject Information – Multi Model Stall Warning and Pitch Augmentation Operation. The detail of the MOM is available on the appendices 5.12

3.4 Federal Aviation Administration

On 7 November 2018, the Federal Aviation Administration (FAA) issued Emergency Airworthiness Directive (AD) Number 2018-23-51 for the owners and operators of the Boeing 737-8 and -9 aircraft. The detail of this Emergency AD is available on the appendices 5.13.

3.5 Directorate General of Civil Aviation

On 8 November 2018, the DGCA issued Airworthiness Directive (AD) Number 18-11-011-U applicable for the Boeing 737-8 and -9 aircraft certificated in any category. The detail of this AD is available on the appendices 5.14.

On 15 November 2018, the DGCA issued Safety Circular Number SE.39 tahun 2018 as guidance for aircraft operator and inspector to implement AD number 18-11-011-U.

4 SAFETY RECOMMENDATIONS

The KNKT acknowledges the safety actions taken by Lion Air and considered that the safety actions were relevant to improve safety, however there still safety issue remain to be considered. Therefore, the KNKT issued safety recommendations to address safety issues identified in this report.

4.1 Lion Air

04.O-2018-35.1

Refer to the CASR Part 91.7 Civil Aircraft Airworthiness and the Operation Manual part A subchapter 1.4.2, the pilot in command shall discontinue the flight when un-airworthy mechanical, electrical, or structural conditions occur.

The flight from Denpasar to Jakarta experienced stick shaker activation during the takeoff rotation and remained active throughout the flight. This condition is considered as un-airworthy condition and the flight shall not be continued.

KNKT recommend ensuring the implementation of the Operation Manual part A subchapter 1.4.2 in order to improve the safety culture and to enable the pilot to make proper decision to continue the flight.


04.O-2018-35.2

According to the weight and balance sheet, on board the aircraft were two pilots, five flight attendants and 181 passengers consisted of 178 adult, one child and two infants. The voyage report showed that the number of flight attendant on board was six flight attendants. This indicated that the weight and balance sheet did not contain actual information.

KNKT recommend ensuring all the operation documents are properly filled and documented.

5 APPENDICES

5.1 Safety Information to All Pilots Number 06/SS/SINF/X/2018

	SAFETY AND SECURITY DIRECTORATE	06/SS/SINF/X/2018
	INFORMATION	30/10/2018

Issued date	: October 30 th 2018
Applicability	: OF, OT
Distribution list	: DO, Deputy DO, Corp Safety
Prepared by	: FDA Team
Verified by	: SF
Approved by	: DS

Subject: **LNI 610 PK-LQP CGK-PGK ACCIDENT**



Dear All Pilots,


On behalf of Safety and Security Directorate, we are very sorry to inform all pilots that LNI 610 PK-LQP B737 MAX-8 on 29th October 29, 2018 had an accident when departing from CGK/WIII to PGK/WIKK. This accident is still on-going investigation by National Transportation Safety Committee (NTSC) and internal investigation by Safety and Security Directorate.

Lion Air Management wants to express our deepest condolence to all of you and to all the families of person on board that flight. However, Safety and Security Directorate would like to remind all pilots to:

- Have a thoroughly understanding on **Deferred Maintenance Item (DMI)** for the aircraft to be use.
- It is a good practice to **check any defect and the trouble shooting on Aircraft Maintenance Flight Log (AFML)** from the previous flights.
- Be ready for any **abnormal or emergency conditions by having Memory Items and maneuvers reviewed and have a good CRM to all counterparts.**
- Pilot shall **write on the AFML** for any malfunctions that happened during the flight. Brief the engineer on duty comprehensively about the malfunction happened in flight. Please refer to Fault Reporting Manual (FRM) provided in the aircraft.
- Send your **report to Safety and Security Directorate** through all reporting methods that available as soon as practicable.

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5.2 Safety Instruction Number 09/SS/SI/XI/2018

	SAFETY AND SECURITY DIRECTORATE	09/SS/SI/XI/2018
	INSTRUCTION	[02/Nov/2018]

Issued date	: 2 nd November 2018
Applicability	: DO, DE
Distribution list	: DO, DE
Prepared by	: FSO
Verified by	: SF
Approved by	: DS

Subject: **Safety Instruction after PK-LQP B737-8 MAX Accident**



Occurrence

Lion Air flight PK-LQP Boeing 737-8 MAX flying from Soekarno-Hatta International airport of Jakarta (WIII/CGK) to Depati Amir airport of Pangkal Pinang, on 29th October 2018 had an accident after 13 minutes of departure. There were eight crews (two pilots and six flight attendants), one Engineer on Board, and 181 passengers on boarded the aircraft.

Introduction

In the aftermath of tragedy, it is crucial for us to recover normal operation as soon as possible.

After the first analysis of the sequence of events it is time to start taking decisive and strong actions to prevent such an event to re-occurred. Even though the causes of the accidents are still unknown and still under investigation by Indonesian NTSC (KNKT), proper mitigations should be taken to strengthen our line of defenses.


The following actions should be taken immediately, targeting Operation Directorate and Maintenance Directorate.

Instructions:

For Operation Directorate:

1. To instruct all B737 pilots to use the Fault Reporting Manual (FRM) in all their Aircraft Flight Maintenance Log (AFML) report. This measure shall be enforced by Operations, Training and Standard with immediate effect.

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 <i>Safet<u>u</u> and Secur<u>i</u>ty</i>	SAFETY AND SECURITY DIRECTORATE	09/SS/SI/XI/2018
	SAFETY INSTRUCTION	[02/Nov/2018]


2. To instruct all pilots to fill the AFML report with as much details as deem necessary to provide a full comprehensive description of the technical defect to the engineering team. This measure should be applied with immediate effect.
3. To reinforce in the current simulator syllabus, the "Unreliable Airspeed" and "Stabilizer Runaway" maneuvers, with immediate effect to all fleets.
4. To reinforce the role of Chief Pilot on Duty, in order to raise operational issue to IOCC/MCC should any significant notification has been received. This measure should be applied with immediate effect.
5. To reinforce through Notice to Pilots, Ground Recurrent Training, and Simulator Sessions on Decision Making Process when the aircraft has declared and operating in abnormal (PAN-PAN) or emergency (MAYDAY-MAYDAY) condition.

For Maintenance Directorate:

1. To make sure that Batam Aerothecnic (BAT) is reinforcing the role of technical specialist team as line maintenance support for more efficient troubleshooting process. This service should ensure that the "live" malfunctions are properly followed up until properly solved.
2. To make sure that Batam Aerothecnic (BAT) through their TRAX system give adequate alert on repetitive problem, even though reports for a malfunction may have been coded under different ATA references.
3. To reinforce the MCC role in malfunction follow up and troubleshooting.

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5.3 Notice to Pilot Number 026/NTP/XI/2018

	NOTICE TO PILOT
SUBJECT: IMPROVEMENTS IN FAULT REPORTING	Notice Number : 026 / NTP / XI / 2018
	Applicability : All Pilots
	Date of issued : November 3 rd , 2018
	Date of effectiveness : November 3 rd , 2018
	Distribution List : DO/OR/OS/OFM/DS/SF

Dear colleagues,

In order to increase the quality of flight safety, we strongly urge our pilots to perform the following:


1. Read and study the **FRM (Fault Reporting Manual)** and know how to utilize it. Any observed faults, status message, or cabin faults must be written down in the AFML, and **ATA Number / Title of Ecam Shown (Fault) For A330**. Should have any doubt, please contact the chief pilot or Quality Assurance Department via Mission Control (MC) - OM A 8.6.8.
2. Do not hesitate to **describe in details about the defect** that has been encountered. This is a good practice especially for the engineers to do the troubleshooting and for the next crew that will fly the aircraft.
3. **Review the memory item routinely** during the briefing, and if applicable, **review the course of actions** that should be taken if particular situations occur in any phase of flight.

Thank you for your attention and cooperation. Have a SAFE flight!

Best Regards,

Chief Pilot / OF

5.4 Training Notice to Pilot Number 006/TNTP/XI/2018

	TRAINING NOTICE TO PILOT
SUBJECT: ADDITIONAL RECURRENT TRAINING	Notice Number : 006/TNTP/XI/2018
	Applicability : All INSTRUCTOR PILOTS
	Date of Issued : November 05 th , 2018
	Date of Effectiveness : November 05 th , 2018
	Distribution List : DO, DS, DQ, OF, OT, OR

Yth. Rekan-rekan Instructor & CCP,

Dengan adanya perkembangan terakhir di dunia penerbangan kita, Management memutuskan perlu adanya training tambahan yang akan dilakukan di session PPC 4 dikarenakan semester ini sedang berjalan dan alokasi waktu PPC yang lebih longgar daripada session REC. Training tambahan ini akan dilakukan mulai dari hari Senin 05/11/18 sampai dengan semester 5 yang akan habis di bulan Juni 2019. Namun untuk semester 5 2019 akan dilakukan di session REC.

Training tambahan ini berupa exercise mengenai Airspeed Unreliable & Runaway Stabilizer.

Dan untuk training tambahan ini dibuatkan EPE terpisah berupa EPE General. Silahkan di isi poin-poin yang memang di assess dengan comment bila ada. Hanya saja tidak mempengaruhi penilaian PPC nya.

Untuk semester 4 yang akan efektif 05/11/18, exercise tambahan ini akan dilakukan setelah session PPC selesai. Akan tetapi exercise PPC untuk Captain & FO akan dikurangi untuk menyediakan alokasi waktu, dengan rincian sebagai berikut:

Session Captain:

1. Setelah exercise Steep Turn, RNP Apch RW35 WARA ditiadakan (karena RNP Apch sudah dilakukan di session REC).
Reposition ke Final RW35 untuk visual landing. (Save flight position)
2. Untuk exercise N-1 Captain dilakukan lengkap.

Session FO:

1. Setelah exercise Steep Turn, RNP Apch RW35 WARA ditiadakan (karena RNP Apch sudah dilakukan di session REC).
Recall saved flight position Final RW35 untuk visual landing
2. Untuk N-1 operation hanya dilakukan:
 - N-1 Take Off until NNC is called for
 - Lalu repost to NIMAS for N-1 RNP Apch RW10 GA until After Take Off Checklist is called for.
 - Lalu repost to 12NM Final RW10 for N-1 RNP Apch LDG.

Untuk exercise Airspeed Unreliable & Runaway Stabilizer:

Karena tidak semua Simulator kita memiliki Menu Malfunction Pitot Probe Blocked, untuk penyamaan set up masih akan menggunakan icing condition. Dan emphasizing exercise ini dilakukan dengan manual flight.

1. Repost position Line Up position RW10 WARR
2. Set environment:
 - Weather Moderate RA
 - Severe Icing
 - OAT 0C (zero deg celcius)
 - Cloud Overcast
 - Low Cloud: base 1000ft, top 10.000ft
 - Upper Cloud: base 10.000ft, top FL200
 - Arm/Set Malfunction Captain PITOT PROBE HEAT FAIL at 1500ft
 - This will result in PROBE HEAT NNC then IAS DISAGREE NNC which will direct crew to Airspeed Unreliable NNC. (Crew may direct to Airspeed Unreliable Memory Item when IAS DISAGREE flag appear)
3. When A/P is disengaged during Airspeed Unreliable Memory Item:
 - Set Stabilizer Runaway Main Electric.

(Instruct crew untuk trim nose down (Stabilizer will run away at first actuation of trim switches, in the direction called for).

Continue this exercise until landing (RTB).

Dan karena syllabus semester 4 yang sedang berjalan tidak akan dilakukan revisi, informasi yang kami publish ini akan dianggap sebagai pengganti revisi.

Terima kasih atas perhatian dan kerjasamanya.

Salam sejahtera

Dear Instructors & CCP,

Following what has been arisen, Management feels that the needs of additional training for Pilots is urging. Since the 4th semester of REC PPC is undergoing and the REC syllabus is quite tight, so the additional training will be done in PPC session.

This additional training will start on 05/11/18 until next semester (5th semester) which will be completed on June 2019. So that all Pilots will carry out this additional training even though you have done your PPC 4. But on the 5th semester it will be conducted in REC session.

These additional training are Airspeed Unreliable & Runaway Stabilizer.

For these additional training, please make an additional General EPE for documentation. Fill in the grades and comments if any. But it won't affect the PPC grades.

To provide the time allocation on PPC session, some of the exercises for Captain & FO will be diminished with following details.

Captain session:

1. After Steep Turn exercise, RNP Apch RW35 WARA is cancelled because it's already done on REC session.
Repost to Final RW35 for Visual Landing. (Save flight position)
2. For Captain N-1 exercise will be done completely.

FO session:

1. After Steep Turn exercise, RNP Apch RW35 WARA is cancelled because it's already done on REC session.
Recall saved flight position on Final RW35 for Visual Landing.
2. For N-1 exercise will only be done as following:
 - N-1 Take Off until NNC is called for.
 - Then repost to NIMAS for RNP Apch RW10 GA until After Take Off Checklist is called for
 - Then repost to 12NM Final RW10 for N-1 RNP Apch LDG.

For Airspeed Unreliable & Runaway Stabilizer exercise:

Icing condition will be use since not all of the simulators have Pitot Probe Blocked. Manual Flight is necessary for emphasizing this exercises.

1. Repost Line Up position RW10 WARR
2. Set environment:
 - Weather Moderate RA
 - Severe Icing
 - OAT 0C (zero deg celcius)

- *Cloud Overcast*
 - *Low Cloud: base 1000ft, top 10.000ft*
 - *Upper Cloud: base 10.000ft, top FL200*
 - *Arm/Set Malfunction Captain PITOT PROBE HEAT FAIL at 1500ft*
 - *This will result in PROBE HEAT NNC then IAS DISAGREE NNC which will direct crew to Airspeed Unreliable NNC. (Crew may direct to Airspeed Unreliable Memory Item when IAS DISAGREE flag appear)*
3. *When A/P is disengaged during Airspeed Unreliable Memory Item:*
- *Set Stabilizer Runaway Main Electric.*


(Instruct crew to trim nose down (Stabilizer will run away at first actuation of trim switches, in the direction called for).

Continue this exercise until landing (RTB).

This NTPP will be considered as a replacement of the syllabus revision.

Thank you for the attention and cooperation.

5.5 Notice to Pilot Number 027/NTP/XI/2018

	NOTICE TO PILOT
SUBJECT: SERIOUS OCCURRENCES	Notice Number : 027 / NTP / XI / 2018
	Applicability : All Pilot
	Date of issued : November 7 th , 2018
	Date of effectiveness : November 7 th , 2018
	Distribution List : DO/OR/OS/OFM/DS/SF

Dear colleagues,

Regarding the Notice To Pilot: 026 / NTP / XI / 2018 concerning the IMPROVEMENTS IN FAULT REPORTING, Lion Air states that all events relating to:

- **IAS DISAGREE**
- **ALT DISAGREE**
- **SPEED FAIL**
- **ALT FAIL**

As a **SERIOUS occurrences** and need special attention and action from the chief pilot. If you find the incident please immediately contact and report to the chief pilot or the safety directorate and you must obtain feedback evidence that report has been received clearly.

Note: Crew must report any information related to safety events to the Radio Company Channel 131.32 mhz if time is available.

Thank you very much for your attention and cooperation. Have a SAFE flight!

5.6 Safety Instruction Number 12/SS/SI/XI/2018

	SAFETY AND SECURITY DIRECTORATE	12/SS/SI/XI/2018
	SAFETY INSTRUCTION	[08/Nov/2018]

Issued date: 8 November 2018	
Applicability: All Pilots	
Distribution list: DO, and all pilots	
Prepared by: FSO	
Verified by: SF	
Approved by: DS	
Subject: Safety Instruction	



Background Information

Based the on-going investigation conducted by Indonesian National Transport Safety Committee (NTSC/ KNKT), Boeing Company has issued Flight Crew Operations Manual Bulletin No. TBC-19, Dated November 6, 2018 (attached below):

Airplane Effectivity : 737-8 / -9 MAX

Subject : Un-commanded Nose Down Stabilizer Trim Due to Erroneous Angle of Attack (AOA) During Manual Flight Only

Reason : To Emphasize the Procedures Provided in the Runaway Stabilizer Non-Normal Checklist (NNC).

Following this FCOM Bulletin, Safety and Security Directorate would like to issue Safety Notice.


This Safety Notice shall be applied as soon as practicable to all Boeing Pilots at Lion Air.

Safety Instruction:

Dispatch Phase:

- Have thorough preparation. Check these areas, but not limited to: weather, NOTAM, and Deferred Maintenance Item (DMI)
- Have a good discussion between crew member, and dispatcher. Do not hesitate to call any Chief Pilots should there was doubt.
- Consult with the engineer on duty on any defect that has been rectified.

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	SAFETY AND SECURITY DIRECTORATE	12/SS/SI/XI/2018
	SAFETY INSTRUCTION	[08/Nov/2018]


- It is a good practice to look into the previous flights on the Aircraft Flight Maintenance Log (AFML) to have a complete understanding of the aircraft to be flown.

Inflight:

- Maintain a good vigilance, CRM and Situational Awareness throughout the flight.
- Be prepare for any abnormal furthermore emergency that may arise.
- In the event of erroneous AOA data, the pitch trim system can trim the stabilizer nose down in increments lasting up to 10 seconds. The nose down stabilizer trim movement can be stopped and reversed with the use of the electric stabilizer trim switches but may restart 5 seconds after the electric stabilizer trim switches are released. Repetitive cycles of uncommanded nose down stabilizer continue to occur unless the stabilizer trim system is deactivated through use of both STAB TRIM CUTOUT switches in accordance with the existing procedures in the Runaway Stabilizer NNC. It is possible for the stabilizer to reach the nose down limit unless the system inputs are counteracted completely by pilot trim inputs and both STAB TRIM CUTOUT switches are moved to CUTOUT.

Runaway Stabilizer	
Condition: Uncommanded stabilizer trim movement occurs continuously.	
1 Control column.	Hold firmly
2 Autopilot (if engaged)	Disengage Do not re-engage the autopilot. Control airplane pitch attitude manually with control column and main electric trim as needed.
3 Autothrottle (if engaged).	Disengage Do not re-engage the autothrottle.
4 If the runaway stops after the autopilot is disengaged:	■ ■ ■ ■
5 If the runaway continues after the autopilot is disengaged:	STAB TRIM CUTOUT switches (both) CUTOUT If the runaway continues: Stabilizer trim wheel Grasp and hold

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	SAFETY AND SECURITY DIRECTORATE	12/SS/SI/XI/2018
	SAFETY INSTRUCTION	[08/Nov/2018]


- Additionally, pilots are reminded that an erroneous AOA can cause some or all of the following indications and effects:
 - Continuous or intermittent stick shaker on the affected side only.
 - Minimum speed bar (red and black) on the affected side only.
 - Increasing nose down control forces.
 - Inability to engage autopilot.
 - Automatic disengagement of autopilot.
 - IAS DISAGREE alert.
 - ALT DISAGREE alert
 - AOA DISAGREE alert (if the AOA indicator option is installed).
 - FEEL DIFF PRESS light.
- Should you experienced but not limited to those conditions mentioned above Pilot in Command shall report any urgency or distress message via company channel as soon as practicable for the Emergency Response procedure can be started.

Post flight

- PIC shall write down on the AFML any fault and defect happened. Please refer to the Fault Reporting Manual (FRM) the fault code and the respective text.
- Do not hesitate to describe in the AFML the conditions that you have encountered. It is good for the engineers to have a good picture for the troubleshooting and your fellow pilots that will fly the aircraft later.
- Coordinate with Chief Pilot on duty and company channel, inform the urgency/ distress message and the condition experienced in flight.
- As soon as practicable file a report to Safety and Security Directorate only.

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5.7 Safety Instruction Number 13/SS/SI/XI/2018

	SAFETY AND SECURITY DIRECTORATE	13/SS/SI/XI/2018
	SAFETY INSTRUCTION	[08/Nov/2018]

Issued date: 8 November 2018
Applicability: All Pilots
Distribution list: DO, and all pilots
Prepared by: FSO
Verified by: SF
Approved by: DS
Subject: Safety Instruction



Background Information

Based on the on-going investigation conducted by Indonesian National Transport Safety Committee (NTSC/ KNKT), Boeing Company has issued Flight Crew Operations Manual Bulletin No. MLI-15, Dated November 6, 2018 (attached below):

Airplane Effectivity : 737-8 / -9 MAX

Subject : Un-commanded Nose Down Stabilizer Trim Due to Erroneous Angle of Attack (AOA) During Manual Flight Only

Reason : To Emphasize the Procedures Provided in the Runaway Stabilizer Non-Normal Checklist (NNC).

Following this FCOM Bulletin, Safety and Security Directorate would like to issue Safety Notice.

This Safety Notice shall be applied as soon as practicable to all Boeing Pilots at Lion Air.

Safety Instruction:

Dispatch Phase:

- Have thorough preparation. Check these areas, but not limited to: weather, NOTAM, and Deferred Maintenance Item (DMI)
- Have a good discussion between crew member, and dispatcher. Do not hesitate to call any Chief Pilots should there was doubt.
- Consult with the engineer on duty on any defect that has been rectified.

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	SAFETY AND SECURITY DIRECTORATE	13/SS/SI/XI/2018
	SAFETY INSTRUCTION	[08/Nov/2018]

- It is a good practice to look into the previous flights on the Aircraft Flight Maintenance Log (AFML) to have a complete understanding of the aircraft to be flown.

Inflight:

- Maintain a good vigilance, CRM and Situational Awareness throughout the flight.
- Be prepare for any abnormal furthermore emergency that may arise.
- In the event of erroneous AOA data, the pitch trim system can trim the stabilizer nose down in increments lasting up to 10 seconds. The nose down stabilizer trim movement can be stopped and reversed with the use of the electric stabilizer trim switches but may restart 5 seconds after the electric stabilizer trim switches are released. Repetitive cycles of uncommanded nose down stabilizer continue to occur unless the stabilizer trim system is deactivated through use of both STAB TRIM CUTOUT switches in accordance with the existing procedures in the Runaway Stabilizer NNC. It is possible for the stabilizer to reach the nose down limit unless the system inputs are counteracted completely by pilot trim inputs and both STAB TRIM CUTOUT switches are moved to CUTOUT.

9.1


 737 Flight Crew Operations Manual

Runaway Stabilizer

Condition: Uncommanded stabilizer trim movement occurs continuously.

- 1 Control column. Hold firmly
- 2 Autopilot (if engaged) Disengage
Do **not** re-engage the autopilot.
Control airplane pitch attitude manually with control column and main electric trim as needed.
- 3 Autothrottle (if engaged). Disengage
Do **not** re-engage the autothrottle.
- 4 **If the runaway stops** after the autopilot is disengaged:

■ ■ ■ ■
- 5 **If the runaway continues** after the autopilot is disengaged:
 STAB TRIM CUTOUT
 switches (both) CUTOUT
If the runaway continues:
 Stabilizer
 trim wheel Grasp and hold

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 Lion air <i>Safety and Security</i>	SAFETY AND SECURITY DIRECTORATE	13/SS/SI/XI/2018
	SAFETY INSTRUCTION	[08/Nov/2018]


- Additionally, pilots are reminded that an erroneous AOA can cause some or all of the following indications and effects:
 - Continuous or intermittent stick shaker on the affected side only.
 - Minimum speed bar (red and black) on the affected side only.
 - Increasing nose down control forces.
 - Inability to engage autopilot.
 - Automatic disengagement of autopilot.
 - IAS DISAGREE alert.
 - ALT DISAGREE alert
 - AOA DISAGREE alert (if the AOA indicator option is installed).
 - FEEL DIFF PRESS light.
- Should you experienced but not limited to those conditions mentioned above Pilot in Command shall report any urgency or distress message via company channel as soon as practicable for the Emergency Response procedure can be started.

Post flight

- PIC shall write down on the AFML any fault and defect happened. Please refer to the Fault Reporting Manual (FRM) the fault code and the respective text.
- Do not hesitate to describe in the AFML the conditions that you have encountered. It is good for the engineers to have a good picture for the troubleshooting and your fellow pilots that will fly the aircraft later.
- Coordinate with Chief Pilot on duty and company channel, inform the urgency/ distress message and the condition experienced in flight.
- As soon as practicable file a report to Safety and Security Directorate only.

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5.8 Safety Notice Number 16/SS/SN/XI/2018

	SAFETY AND SECURITY DIRECTORATE	16/SS/SN/XI/2018
	NOTICE	[12/11/2018]

Issued date:	12 nd Nov, 2018
Applicability:	All Station & Operational Managers
Distribution list:	Corp. Safety, Board of Directors
Prepared by:	SD
Verified by:	SF
Approved by:	DS
Subject:	Lion Air Emergency Flowchart – Revision Nov 2018




To All Station Managers and Related Units,
Kepada seluruh station manager (KK) Lion Air dan unit terkait,

To all related parties we noticed that Lion Air's Operation Control Center (OCC) line phone is changed.
Dengan ini kami memberitahukan kepada seluruh pihak terkait bahwa nomor telepon Operation Control Center Lion Air (OCC) yang tercantum pada Emergency Phone List telah berganti.

Hereby Safety & Security (SS) Directorate publish the revision of Lion Air Emergency Flowchart and would like to remind the actions should be taken in emergency situation, as follows:
Bersama ini Direktorat Safety & Security (SS) menerbitkan revisi Emergency Flowchart Lion Air, juga ingin mengingatkan kembali tentang tindakan yang harus dilakukan dalam menangani situasi darurat, sebagai berikut:

1. All Station Managers and Operational Managers shall know and understand the reporting flowchart and actions checklist (refer to ERM Chapter 1.2: Lion Air Emergency Flowchart).
Seluruh KK dan Manajer Operasional harus mengetahui dan memahami alur pelaporan dan tindakan yang tertera di dalam ERM Chapter 1.2: Lion Air Emergency Flowchart.
2. All Station Managers and Operational Managers shall socialize ERM Chapter 1.2: Lion Air Emergency Flowchart to every staff in his/her department.
Seluruh KK dan Manajer Operasional harus mensosialisasikan ERM Chapter 1.2: Lion Air Emergency Flowchart kepada jajaran/ stafnya masing-masing.
3. Every station and related units shall attach Emergency Phone List updated in Station's Operation room (visible place).
Setiap station dan unit-unit terkait harus mencantumkan/ menempel Emergency Phone List yang terbaru (updated) pada ruang operasi stasiun masing-masing (ditempat yang mudah terlihat).
4. Station Manager and related units shall understand the steps and action checklist to be performed in emergency situation (refer to ERM chapter 2 Call Out and Notification procedures and ERM appedix I Action Plan Checklist).
Seluruh KK dan unit- unit terkait harus memahami langkah-langkah yang harus dilaksanakan pada keadaan darurat (action checklist) refer kepada ERM Chapter 2 Call Out and Notification procedures and ERM Appedix I Action Plan Check list).

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	SAFETY AND SECURITY DIRECTORATE	16/SS/SN/XI/2018
	NOTICE	[12/11/2018]

5. Notification of Accident, Serious Incident refer to CASR 830 :

Pemberitahuan mengenai Accident, Serious Incident yang mengacu pada CASR 830

A. ACCIDENT

An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which:

Kecelakaan: Sebuah kejadian yang berhubungan dengan pengoperasian pesawat terbang yang terjadi pada setiap orang telah berada di dalam pesawat yang hendak terbang hingga penumpang turun dari pesawat, antara lain:

a) a person is fatally or seriously injured as a result of:

Seseorang terluka parah yang disebabkan oleh:

- being in the aircraft, or

Berada di dalam pesawat atau

- direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or

Kontak langsung dengan bagian pesawat terbang termasuk bagian yang menempel dengan pesawat atau

- direct exposure to jet blast

Kontak langsung dengan mesin pesawat terbang

except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

Kecuali ketika luka terjadi karena penyebab alami, luka yang disebabkan oleh diri sendiri atau orang lain, atau luka disebabkan oleh benda asing yang berada di luar area jangkauan penumpang dan kru; atau

b) the aircraft sustains damage of structural failure which:

Pesawat mengalami kerusakan struktur, antara lain:

- adversely affects the structural strength, performance or flight characteristics of the aircraft, and

Berakibat fatal pada kekuatan struktur, kinerja atau ciri terbang pada sebuah pesawat terbang, dan


- would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to the engine, its cowlings or accessories; or for damage limited to propellers, wing tips, antennas, brakes, fairings, small dents or puncture holes in the aircraft skin; or

biasanya akan membutuhkan banyak perbaikan atau penggantian pada komponen yang terkena dampak, kecuali untuk kegagalan atau kerusakan mesin, ketika kerusakan terjadi pada mesin, cowling atau perlengkapan mesin; atau untuk kerusakan terjadi pada baling-baling, ujung sayap, antena, rem, fairings, adanya lubang atau penyok pada dinding pesawat; atau

c) the aircraft is missing or is completely inaccessible.

Pesawat udara hilang atau tidak dapat diakses

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	SAFETY AND SECURITY DIRECTORATE	16/SS/SN/XI/2018
	NOTICE	[12/11/2018]

B. SERIOUS INCIDENT

An circumstances indicating that there was a high probability of an accident and associated with the operation of an aircraft.

Insiden serius: Sebuah keadaan yang menunjukkan adanya kemungkinan besar terjadinya kecelakaan dan berhubungan dengan pengoperasian sebuah pesawat terbang.

List of examples of Serious Incident

Contoh insiden serius adalah:

1. Near collisions requiring an avoidance maneuver to avoid a collision or an unsafe situation or when an avoidance action would have been appropriate.
Near collisions membutuhkan sebuah manuver untuk menghindari tabrakan atau situasi yang tidak aman atau ketika tindakan penghindaran sudah tepat.
2. Collisions not classified as accidents.
Collisions tidak diklasifikasikan sebagai kecelakaan.
3. Controlled flight into terrain only marginally avoided.
Controlled flight into terrain hanya ketika pesawat dapat menghindar.
4. Aborted take-offs on a closed or engaged runway, on a taxiway (excluding authorized operation by helicopter) or unassigned runway.
Aborted take-offs pada landasan pesawat yang sedang dipakai atau ditutup, di taxiway (kecuali, pengoperasian resmi helikopter) atau landasan yang tidak dioperasikan.
5. Take-offs from a closed or engaged runway, from a taxiway (excluding authorized operation by helicopter) or unassigned runway.
Take-off dari landasan yang ditutup atau sedang dipakai, dari taxiway (kecuali, pengoperasian resmi oleh helikopter) atau landasan yang tidak dioperasikan.
6. Landings or attempted landings on a closed or engaged runway, on a taxiway (excluding authorized operation by helicopter) or unassigned runway.
Pendaratan atau percobaan pendaratan pada landasan yang ditutup atau sedang dipakai, di taxiway (kecuali, pengoperasian resmi oleh helikopter) atau landasan yang tidak dioperasikan.
7. Gross failures to achieve predicted performance during take-off or initial climb.
Kegagalan pada pengangkutan beban untuk mencapai kinerja yang diprediksi pada saat lepas landas atau initial climb
8. Fires and/or smoke in the cockpit, in the passenger compartment, in cargo compartments or engine fires, even though such fires were extinguished by the use of extinguishing agents.
Api dan/atau asap di dalam kokpit, di dalam kompartemen penumpang, di dalam kompartemen kargo atau mesin yang terbakar, walaupun api dapat dipadamkan dengan menggunakan alat pemadam.
9. Events requiring the emergency use of oxygen by the flight crew.
Kejadian yang membutuhkan penggunaan oksigen darurat oleh kru pesawat
10. Aircraft structural failures or engine disintegrations, including uncontained turbine engine failures, not classified as an accident.
Kegagalan struktur pesawat atau kerusakan mesin termasuk kegagalan mesin turbin, tidak termasuk sebagai kecelakaan

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	SAFETY AND SECURITY DIRECTORATE	16/SS/SN/XI/2018
	NOTICE	[12/11/2018]


11. Multiple malfunctions of one or more aircraft systems seriously affecting the operation of the aircraft.
Tidak berfungsinya satu atau banyak sistem pesawat yang dapat berakibat serius pada pengoperasian pesawat udara.
12. Flight crew incapacitation in flight.
Ketidakcakapan kru saat penerbangan
13. Fuel quantity level or distribution situations requiring the declaration of an emergency by the pilot, such as insufficient fuel, fuel exhaustion, fuel starvation, or inability to use all usable fuel on board.
Situasi yang terjadi karena jumlah atau pendistribusian bahan bakar yang membutuhkan adanya pernyataan darurat oleh pilot, seperti kekurangan bahan bakar, kehabisan bahan bakar atau bahan bakar tidak dapat digunakan sepenuhnya selama penerbangan.
14. Runway incursions classified with severity A. The ICAO Document 9870: Manual on the Prevention of Runway Incursions contains information on the severity classifications.
Runway Incursion yang termasuk kategori A. Dokumen ICAO 9870: Manual on the Prevention of Runway Incursions contains information on the severity classifications.
15. Take-off or landing incidents. Incidents such as under-shooting, overrunning or running off the side of runways.
Insiden saat lepas landas atau mendarat. Insiden seperti under-shooting, overrunning atau pesawat keluar dari landasan.
16. System failures, weather phenomena, operations outside the approved flight envelope or other occurrences which caused or could have caused difficulties controlling the aircraft.
Kegagalan sistem, fenomena cuaca, pengoperasian penerbangan diluar persetujuan atau kejadian lainnya yang disebabkan atau dapat menyebabkan pesawat susah untuk dikendalikan.
17. Failures of more than one system in a redundancy system mandatory for flight guidance and navigation.
Kegagalan dari satu atau lebih sistem dalam sistem wajib untuk panduan dan navigasi penerbangan
18. The unintentional or, as an emergency measure, the intentional release of a slung load or any other load carried external to the aircraft.
Ketidaksengajaan atau sebagai pertimbangan darurat, kesengajaan perizinan membawa beban yang tergantung atau beban bawaan di luar pesawat udara.

Note:

Occurrences involving urgency call PAN PAN and or distress call MAYDAY are included and to be required into this EMERGENCY RESPONSE REPORT FLOW.

Kejadian – kejadian yang termasuk dalam panggilan darurat PAN PAN dan atau panggilan keadaan bahaya MAYDAY wajib dan diharuskan lapor ke dalam alur tanggap darurat (EMERGENCY RESPONSE).

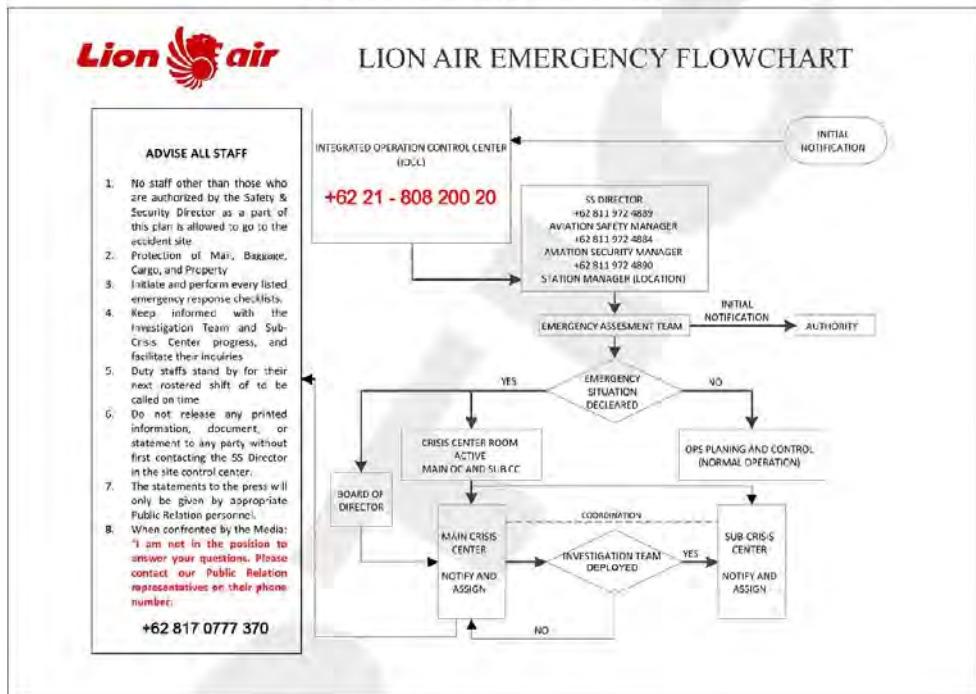
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	SAFETY AND SECURITY DIRECTORATE	16/SS/SN/XI/2018
	NOTICE	[12/11/2018]

The Emergency Response Manual (ERM) can be accessed and downloaded via Lion Air's intranet File Management System: <http://192.168.180.10/filemanagement/> with individual user account that has been distributed.


Emergency Response Manual (ERM) dapat diakses dan diunduh melalui intranet Lion Air File Management System: <http://192.168.180.10/filemanagement/> dengan akun pribadi yang telah didistribusikan.

LION AIR EMERGENCY FLOWCHART



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5.9 Safety Instruction Number 14/SS/SI/XI/2018

	SAFETY AND SECURITY DIRECTORATE	14/SS/SI/XI/2018
	INSTRUCTION	[15-11-2018]

Issued date:	15 th November 2018	
Applicability:	DO, DE, DQ	
Distribution list:	Safety Corporate, BAT	
Prepared by:	Safety Officer	Signature 
Verified by:	SF	
Approved by:	DS	
Subject: Indonesia DGCA Airworthiness Directive No. 18-11-011-U		



Dear Directors unit concern,

Lion Air Safety and Security Directorate would like to all unit concern to implement Airworthiness Directive No. 18-11-011-U with applicability and subject compliance as mention below.

To ensure:

1. This emergency AD has been inserted into AFM of B-737-8 MAX
2. AFM will be revised

Thank you for your kind attention

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5.10 Engineering Information Number B737MAX-EI-27-053 R1



ENGINEERING INFORMATION				
SUBJECT: REVISE AFM REQUIRED BY DGCA AD 18-11-011-U	NO.	: B737MAX-EI-27-053 R1		
	DATE	: 08 November 2018		
	REFERENCE	: SEE REFERENCE		
	APPLICABILITY	: B737MAX		
	ATTENTION	: Operation-JT, QA-JT, PTS-JT		
<u>REASON OF REVISION</u> Replace the subject and add DGCA AD 18-11-011-U as reference.				
<u>REASON</u> The Indonesian National Transportation Safety Committee has indicated that Lion Air flight 610 experienced erroneous AOA data. Boeing would like to call attention to an AOA failure condition that can occur during manual flight only .				
<u>DESCRIPTION</u> This AD was prompted by analysis performed by the manufacturer showing that if an erroneously high single angle of attack (AOA) sensor input is received by the flight control system, there is a potential for repeated nose-down trim commands of the horizontal stabilizer. We are issuing this AD to address this potential resulting nose-down trim, which could cause the flight crew to have difficulty controlling the airplane, and lead to excessive nose-down attitude, significant altitude loss, and possible impact with terrain.				
<u>REFERENCE</u> <ol style="list-style-type: none"> 1) DGCA AD 18-11-011-U 2) FAA Emergency AD 2018-23-51, November 7, 2018. 3) Flight Crew Operations Manual Bulletin Number TBC-19, November 6, 2018. 4) Aircraft Flight Manual B737-8, October 4, 2018. 				
<u>INFORMATION</u> Based on Emergency AD 2018-23-51 within 3 days after receipt of this AD , this Engineering Information give instruction to revise Aircraft Flight Manual in reference [3] for the Certificate Limitations chapter and add Operating Procedures chapter as applicable required by this AD, refer to Figure 1 and Figure 2 below.				
DISTRIBUTION	Operation	QA	Pts JT	FILE
BT-ENF-004/R0, Issued date April 2014			PAGE 1 OF 2	

ENGINEERING INFORMATION

No : B737MAX-EI-27-053 R1

Date: November 08, 2018

Required by AD 2018-23-51

Runaway Stabilizer

In the event of an uncommanded horizontal stabilizer trim movement, combined with any of the following potential effects or indications resulting from an erroneous Angle of Attack (AOA) input, the flight crew must comply with the Runaway Stabilizer procedure in the Operating Procedures chapter of this manual:

- Continuous or intermittent stick shaker on the affected side only.
- Minimum speed bar (red and black) on the affected side only.
- Increasing nose down control forces.
- IAS DISAGREE alert.
- ALT DISAGREE alert.
- AOA DISAGREE alert (if the option is installed).
- FEEL DIFF PRESS light.
- Autopilot may disengage.
- Inability to engage autopilot.

Figure 1. paragraph (g) of this AD – Certificate Limitations

Required by AD 2018-23-51

Runaway Stabilizer

Disengage autopilot and control airplane pitch attitude with control column and main electric trim as required. If relaxing the column causes the trim to move, set stabilizer trim switches to CUTOUT. If runaway continues, hold the stabilizer trim wheel against rotation and trim the airplane manually.

Note: The 737-8/-9 uses a Flight Control Computer command of pitch trim to improve longitudinal handling characteristics. In the event of erroneous Angle of Attack (AOA) input, the pitch trim system can trim the stabilizer nose down in increments lasting up to 10 seconds.

In the event an uncommanded nose down stabilizer trim is experienced on the 737-8/-9, in conjunction with one or more of the indications or effects listed below, do the existing AFM Runaway Stabilizer procedure above, ensuring that the STAB TRIM CUTOUT switches are set to CUTOUT and stay in the CUTOUT position for the remainder of the flight.

An erroneous AOA input can cause some or all of the following indications and effects:

- Continuous or intermittent stick shaker on the affected side only.
- Minimum speed bar (red and black) on the affected side only.
- Increasing nose down control forces.
- IAS DISAGREE alert.
- ALT DISAGREE alert.
- AOA DISAGREE alert (if the option is installed).
- FEEL DIFF PRESS light.
- Autopilot may disengage.
- Inability to engage autopilot.

Initially, higher control forces may be needed to overcome any stabilizer nose down trim already applied. Electric stabilizer trim can be used to neutralize control column pitch forces before moving the STAB TRIM CUTOUT switches to CUTOUT. Manual stabilizer trim can be used before and after the STAB TRIM CUTOUT switches are moved to CUTOUT.

Figure 2. paragraph (h) of this AD – Operating Procedures

5.11 Boeing Flight Crew Operations Manual Bulletin number TBC-19



Flight Crew Operations Manual Bulletin for The Boeing Company

The Boeing Company
Seattle, Washington 98124-2207



Number: TBC-19

IssueDate: November 6, 2018

Airplane Effectivity: 737-8 / -9

Subject: Uncommanded Nose Down Stabilizer Trim Due to Erroneous Angle of Attack (AOA) During Manual Flight Only

Reason: To Emphasize the Procedures Provided in the Runaway Stabilizer Non-Normal Checklist (NNC).

Information in this bulletin is recommended by The Boeing Company, but may not be FAA approved at the time of writing. In the event of conflict with the FAA approved Airplane Flight Manual (AFM), the AFM shall supersede. The Boeing Company regards the information or procedures described herein as having a direct or indirect bearing on the safe operation of this model airplane.

THE FOLLOWING PROCEDURE AND/OR INFORMATION IS EFFECTIVE UPON RECEIPT

Background Information

The Indonesian National Transportation Safety Committee has indicated that Lion Air flight 610 experienced erroneous AOA data. Boeing would like to call attention to an AOA failure condition that can occur **during manual flight only**. This bulletin directs flight crews to existing procedures to address this condition.

In the event of erroneous AOA data, the pitch trim system can trim the stabilizer nose down in increments lasting up to 10 seconds. The nose down stabilizer trim movement can be stopped and reversed with the use of the electric stabilizer trim switches but may restart 5 seconds after the electric stabilizer trim switches are released. Repetitive cycles of uncommanded nose down stabilizer continue to occur unless the stabilizer trim system is deactivated through use of both STAB TRIM CUTOUT switches in accordance with the existing procedures in the Runaway Stabilizer NNC. It is possible for the stabilizer to reach the nose down limit unless the system inputs are counteracted completely by pilot trim inputs and both STAB TRIM CUTOUT switches are moved to CUTOUT.

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November 6, 2018

D6-27370-MAX-TBCNFF

B-19 Page 1 of 2

Additionally, pilots are reminded that an erroneous AOA can cause some or all of the following indications and effects:

- Continuous or intermittent stick shaker on the affected side only.
- Minimum speed bar (red and black) on the affected side only.
- Increasing nose down control forces.
- Inability to engage autopilot.
- Automatic disengagement of autopilot.
- IAS DISAGREE alert.
- ALT DISAGREE alert.
- AOA DISAGREE alert (if the AOA indicator option is installed)
- FEEL DIFF PRESS light.

Operating Instructions

In the event an uncommanded nose down stabilizer trim is experienced on the 737-8 /-9, in conjunction with one or more of the above indications or effects, do the Runaway Stabilizer NNC ensuring that the STAB TRIM CUTOUT switches are set to CUTOUT and stay in the CUTOUT position for the remainder of the flight.

Note: Initially, higher control forces may be needed to overcome any stabilizer nose down trim already applied. Electric stabilizer trim can be used to neutralize control column pitch forces before moving the STAB TRIM CUTOUT switches to CUTOUT. Manual stabilizer trim can be used after the STAB TRIM CUTOUT switches are moved to CUTOUT.

Administrative Information

Insert this bulletin behind the Bulletin Record page in Volume 1 of your Flight Crew Operations Manual (FCOM). Amend the FCOM Bulletin Record page to show bulletin TBC-19 "In Effect" (IE).

This Bulletin remains in effect until Boeing provides additional information on system updates that may allow this Bulletin to be canceled.

Please send all correspondence regarding Flight Crew Operations Manual Bulletin status, to the 737 Manager, Flight Technical Data, through the Service Requests Application (SR App) on the MyBoeingFleet home page.

5.12 Boeing Correspondence: Multi Operator Messages

FROM: THE BOEING COMPANY
TO: Boeing Correspondence (MOM)
[MESSAGE NUMBER:MOM-MOM-18-0664-01B] Multi Operator Message
MESSAGE DATE: 10 Nov 2018 1810 US PACIFIC TIME / 11 Nov 2018 0210 GMT

This message is sent to all 737NG/MAX Customers, Regional Directors, Regional Managers and Boeing Field Service Bases.

CATEGORY: Maintenance, Engineering, Flight Operations, Management, Safety

SERVICE REQUEST ID: 4-4298138108
ACCOUNT: Boeing Correspondence (MOM)
DUE DATE: No Action Required
PRODUCT TYPE: Airplane
PRODUCT LINE: 737
PRODUCT: SEVERAL
ATA: 0000-57

SUBJECT: Information - Multi-Model Stall Warning and Pitch Augmentation Operation

REFERENCES:
/A/ MOM-MOM-18-0655-01B

SUMMARY:

Boeing has received many requests for the same information from 737 fleet operators in response to the reference /A/ message. This message provides technical information and operational details.

DESCRIPTION:

A pitch augmentation system function called "Maneuvering Characteristics Augmentation System" (MCAS) is implemented on the 737-8, -9 (MAX) to enhance pitch characteristics with flaps UP and at elevated angles of attack. The MCAS function commands nose down stabilizer to enhance pitch characteristics during steep turns with elevated load factors and during flaps up flight at airspeeds approaching stall. MCAS is activated without pilot input and only operates in manual, flaps up flight. The system is designed to allow the flight crew to use column trim switch or stabilizer aisle stand cutout switches to override MCAS input. The function is commanded by the Flight Control computer using input data from sensors and other airplane systems.

The MCAS function becomes active when the airplane Angle of Attack exceeds a threshold based on airspeed and altitude. Stabilizer incremental commands are limited to 2.5 degrees and are provided at a rate of 0.27 degrees per second. The magnitude of the stabilizer input is lower at high Mach number and greater at low Mach numbers. The function is reset once angle of attack falls below the Angle of Attack threshold or if manual stabilizer commands are provided by the flight crew. If the original elevated AOA condition persists, the MCAS function commands another incremental stabilizer nose down command according to current aircraft Mach number at actuation.

The MCAS function is not incorporated on 737NG airplanes.

If you have further questions, you may contact the appropriate Airline Support Manager.

Customer Support
The Boeing Company

5.13 FAA Emergency Airworthiness Directive (AD) Number 2018-23-51



FAA
Aviation Safety

EMERGENCY AIRWORTHINESS DIRECTIVE

www.faa.gov/aircraft/safety/alerts/

DATE: November 7, 2018
AD #: 2018-23-51

Emergency Airworthiness Directive (AD) 2018-23-51 is sent to owners and operators of The Boeing Company Model 737-8 and -9 airplanes.

Background

This emergency AD was prompted by analysis performed by the manufacturer showing that if an erroneously high single angle of attack (AOA) sensor input is received by the flight control system, there is a potential for repeated nose-down trim commands of the horizontal stabilizer. This condition, if not addressed, could cause the flight crew to have difficulty controlling the airplane, and lead to excessive nose-down attitude, significant altitude loss, and possible impact with terrain.

FAA's Determination

We are issuing this AD because we evaluated all the relevant information and determined the unsafe condition described previously is likely to exist or develop in other products of the same type design. Due to the need to correct an urgent safety of flight situation, good cause exists to make this AD effective in less than 30 days.

AD Requirements

This AD requires revising certificate limitations and operating procedures of the airplane flight manual (AFM) to provide the flight crew with runaway horizontal stabilizer trim procedures to follow under certain conditions.

Interim Action

We consider this AD interim action. If final action is later identified, we might consider further rulemaking then.

Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, Section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

This AD is issued in accordance with authority delegated by the Executive Director, Aircraft Certification Service, as authorized by FAA Order 8000.51C. In accordance with that order, issuance of ADs is normally a function of the Compliance and Airworthiness Division, but during this transition period, the Executive Director has delegated the authority to issue ADs applicable to transport category airplanes and associated appliances to the Director of the System Oversight Division.

Presentation of the Actual AD

We are issuing this AD under 49 U.S.C. Section 44701 according to the authority delegated to me by the Administrator.

2018-23-51 The Boeing Company: Product Identifier 2018-NM-151-AD.

(a) Effective Date

This Emergency AD is effective upon receipt.

(b) Affected ADs

None.

(c) Applicability

This AD applies to all The Boeing Company Model 737-8 and -9 airplanes, certificated in any category.

(d) Subject

Air Transport Association (ATA) of America Code 27, Flight controls.

(e) Unsafe Condition

This AD was prompted by analysis performed by the manufacturer showing that if an erroneously high single angle of attack (AOA) sensor input is received by the flight control system, there is a potential for repeated nose-down trim commands of the horizontal stabilizer. We are issuing this AD to address this potential resulting nose-down trim, which could cause the flight crew to have difficulty controlling the airplane, and lead to excessive nose-down attitude, significant altitude loss, and possible impact with terrain.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Revision of Airplane Flight Manual (AFM): Certificate Limitations

Within 3 days after receipt of this AD, revise the Certificate Limitations chapter of the applicable AFM to include the information in figure 1 to paragraph (g) of this AD.

Figure 1 to paragraph (g) of this AD – *Certificate Limitations*

Required by AD 2018-23-51
<u>Runaway Stabilizer</u>
In the event of an uncommanded horizontal stabilizer trim movement, combined with any of the following potential effects or indications resulting from an erroneous Angle of Attack (AOA) input, the flight crew must comply with the Runaway Stabilizer procedure in the Operating Procedures chapter of this manual:
<ul style="list-style-type: none">• Continuous or intermittent stick shaker on the affected side only.• Minimum speed bar (red and black) on the affected side only.• Increasing nose down control forces.• IAS DISAGREE alert.• ALT DISAGREE alert.• AOA DISAGREE alert (if the option is installed).• FEEL DIFF PRESS light.• Autopilot may disengage.• Inability to engage autopilot.

(h) AFM Revision: Operating Procedures

Within 3 days after receipt of this AD, revise the Operating Procedures chapter of the applicable AFM to include the information in figure 2 to paragraph (h) of this AD.

Figure 2 to paragraph (h) of this AD – Operating Procedures

Required by AD 2018-23-51
<u>Runaway Stabilizer</u>
Disengage autopilot and control airplane pitch attitude with control column and main electric trim as required. If relaxing the column causes the trim to move, set stabilizer trim switches to CUTOUT. If runaway continues, hold the stabilizer trim wheel against rotation and trim the airplane manually.
Note: The 737-8/-9 uses a Flight Control Computer command of pitch trim to improve longitudinal handling characteristics. In the event of erroneous Angle of Attack (AOA) input, the pitch trim system can trim the stabilizer nose down in increments lasting up to 10 seconds.
In the event an uncommanded nose down stabilizer trim is experienced on the 737-8/-9, in conjunction with one or more of the indications or effects listed below, do the existing AFM Runaway Stabilizer procedure above, ensuring that the STAB TRIM CUTOUT switches are set to CUTOUT and stay in the CUTOUT position for the remainder of the flight.
An erroneous AOA input can cause some or all of the following indications and effects:
<ul style="list-style-type: none">• Continuous or intermittent stick shaker on the affected side only.• Minimum speed bar (red and black) on the affected side only.• Increasing nose down control forces.• IAS DISAGREE alert.• ALT DISAGREE alert.• AOA DISAGREE alert (if the option is installed).• FEEL DIFF PRESS light.• Autopilot may disengage.• Inability to engage autopilot.
Initially, higher control forces may be needed to overcome any stabilizer nose down trim already applied. Electric stabilizer trim can be used to neutralize control column pitch forces before moving the STAB TRIM CUTOUT switches to CUTOUT. Manual stabilizer trim can be used before and after the STAB TRIM CUTOUT switches are moved to CUTOUT.

(i) Alternative Methods of Compliance (AMOCs)

(1) The Manager, Seattle ACO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (j) of this AD. Information may be emailed to: 9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(j) Related Information

For further information about this AD, contact Douglas Tsuji, Senior Aerospace Engineer, Systems and Equipment Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3548; email: Douglas.Tsuji@faa.gov.

Issued in Des Moines, Washington, on November 7, 2018.

System Oversight Division,
Aircraft Certification Service.

5.14 DGCA Airworthiness Directive (AD) Number 18-11-011-U



Republic of Indonesia - Ministry of Transportation Directorate General of Civil Aviation

Airworthiness Directive

This Airworthiness Directive (AD) is issued by DGCA in accordance with the requirements of CARS Part 39. ADs effect aviation safety and are regulations which require immediate attention. Part 39 of CASR is amended by adding the following new AD. No Person may operate a product to which an AD applies except in accordance with the requirements of that AD.

NOTE : A ferry flight permit to fly the aircraft to a location where the requirements of this directive can be accomplished, may be granted by application to DGCA. Report and inquiring concerning this AD should be addressed to the DGCA. Alternative means of compliance with this directive may be used only if approved by the Director General.

DAAO FORM 39-02

NUMBER: 18-11-011-U

DATE OF ISSUE: 08 November 2018

APPLICABILITY:

Boeing Company Model 737-8 and -9 airplanes, certificated in any category.

REFERENCE:

FAA AD 2018-23-51

SUBJECT/DESCRIPTION:

Air Transport Association (ATA) of America Code 27, Flight controls.

This emergency AD was prompted by analysis performed by the manufacturer showing that if an erroneously high single angle of attack (AOA) sensor input is received by the flight control system, there is a potential for repeated nose-down trim commands of the horizontal stabilizer. This condition, if not addressed, could cause the flight crew to have difficulty controlling the airplane, and lead to excessive nose-down attitude, significant altitude loss, and possible impact with terrain.

This AD requires revising certificate limitations and operating procedures of the airplane flight manual (AFM) to provide the flight crew with runaway horizontal stabilizer trim procedures to follow under certain conditions.

COMPLIANCE:

Required as indicated, unless accomplished previously, in accordance with "Required Action(s) and Compliance Time(s)" section in reference AD.

ACCOMPLISHMENT:

This AD shall be accomplished in accordance with the reference AD.

EFFECTIVE DATE: 08 November 2018

NOTE: Due to the need to correct an urgent safety of flight situation, good cause exists to make this AD effective in less than 30 days.

On behalf of Director General of Civil Aviation

Director of Airworthiness and Aircraft Operations



**FAA
Aviation Safety**

EMERGENCY AIRWORTHINESS DIRECTIVE

www.faa.gov/aircraft/safety/alerts/

**DATE: November 7, 2018
AD #: 2018-23-51**

Emergency Airworthiness Directive (AD) 2018-23-51 is sent to owners and operators of The Boeing Company Model 737-8 and -9 airplanes.

Background

This emergency AD was prompted by analysis performed by the manufacturer showing that if an erroneously high single angle of attack (AOA) sensor input is received by the flight control system, there is a potential for repeated nose-down trim commands of the horizontal stabilizer. This condition, if not addressed, could cause the flight crew to have difficulty controlling the airplane, and lead to excessive nose-down attitude, significant altitude loss, and possible impact with terrain.

FAA's Determination

We are issuing this AD because we evaluated all the relevant information and determined the unsafe condition described previously is likely to exist or develop in other products of the same type design. Due to the need to correct an urgent safety of flight situation, good cause exists to make this AD effective in less than 30 days.

AD Requirements

This AD requires revising certificate limitations and operating procedures of the airplane flight manual (AFM) to provide the flight crew with runaway horizontal stabilizer trim procedures to follow under certain conditions.

Interim Action

We consider this AD interim action. If final action is later identified, we might consider further rulemaking then.

Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, Section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

This AD is issued in accordance with authority delegated by the Executive Director, Aircraft Certification Service, as authorized by FAA Order 8000.51C. In accordance with that order, issuance of ADs is normally a function of the Compliance and Airworthiness Division, but during this transition period, the Executive Director has delegated the authority to issue ADs applicable to transport category airplanes and associated appliances to the Director of the System Oversight Division.

Presentation of the Actual AD

We are issuing this AD under 49 U.S.C. Section 44701 according to the authority delegated to me by the Administrator.

2018-23-51 The Boeing Company: Product Identifier 2018-NM-151-AD.

(a) Effective Date

This Emergency AD is effective upon receipt.

(b) Affected ADs

None.

(c) Applicability

This AD applies to all The Boeing Company Model 737-8 and -9 airplanes, certificated in any category.

(d) Subject

Air Transport Association (ATA) of America Code 27, Flight controls.

(e) Unsafe Condition

This AD was prompted by analysis performed by the manufacturer showing that if an erroneously high single angle of attack (AOA) sensor input is received by the flight control system, there is a potential for repeated nose-down trim commands of the horizontal stabilizer. We are issuing this AD to address this potential resulting nose-down trim, which could cause the flight crew to have difficulty controlling the airplane, and lead to excessive nose-down attitude, significant altitude loss, and possible impact with terrain.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Revision of Airplane Flight Manual (AFM): Certificate Limitations

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Figure 1 to paragraph (g) of this AD – *Certificate Limitations*

Required by AD 2018-23-51
<u>Runaway Stabilizer</u>
In the event of an uncommanded horizontal stabilizer trim movement, combined with any of the following potential effects or indications resulting from an erroneous Angle of Attack (AOA) input, the flight crew must comply with the Runaway Stabilizer procedure in the Operating Procedures chapter of this manual:
<ul style="list-style-type: none">• Continuous or intermittent stick shaker on the affected side only.• Minimum speed bar (red and black) on the affected side only.• Increasing nose down control forces.• IAS DISAGREE alert.• ALT DISAGREE alert.• AOA DISAGREE alert (if the option is installed).• FEEL DIFF PRESS light.• Autopilot may disengage.• Inability to engage autopilot.

(h) AFM Revision: Operating Procedures

Within 3 days after receipt of this AD, revise the Operating Procedures chapter of the applicable AFM to include the information in figure 2 to paragraph (h) of this AD.

Figure 2 to paragraph (h) of this AD – Operating Procedures

Required by AD 2018-23-51
<u>Runaway Stabilizer</u>
Disengage autopilot and control airplane pitch attitude with control column and main electric trim as required. If relaxing the column causes the trim to move, set stabilizer trim switches to CUTOUT. If runaway continues, hold the stabilizer trim wheel against rotation and trim the airplane manually.
Note: The 737-8/-9 uses a Flight Control Computer command of pitch trim to improve longitudinal handling characteristics. In the event of erroneous Angle of Attack (AOA) input, the pitch trim system can trim the stabilizer nose down in increments lasting up to 10 seconds.
In the event an uncommanded nose down stabilizer trim is experienced on the 737-8/-9, in conjunction with one or more of the indications or effects listed below, do the existing AFM Runaway Stabilizer procedure above, ensuring that the STAB TRIM CUTOUT switches are set to CUTOUT and stay in the CUTOUT position for the remainder of the flight.
An erroneous AOA input can cause some or all of the following indications and effects:
<ul style="list-style-type: none">• Continuous or intermittent stick shaker on the affected side only.• Minimum speed bar (red and black) on the affected side only.• Increasing nose down control forces.• IAS DISAGREE alert.• ALT DISAGREE alert.• AOA DISAGREE alert (if the option is installed).• FEEL DIFF PRESS light.• Autopilot may disengage.• Inability to engage autopilot.
Initially, higher control forces may be needed to overcome any stabilizer nose down trim already applied. Electric stabilizer trim can be used to neutralize control column pitch forces before moving the STAB TRIM CUTOUT switches to CUTOUT. Manual stabilizer trim can be used before and after the STAB TRIM CUTOUT switches are moved to CUTOUT.

(i) Alternative Methods of Compliance (AMOCs)

(1) The Manager, Seattle ACO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (j) of this AD. Information may be emailed to: 9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(j) Related Information

For further information about this AD, contact Douglas Tsuji, Senior Aerospace Engineer, Systems and Equipment Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3548; email: Douglas.Tsuji@faa.gov.

Issued in Des Moines, Washington, on November 7, 2018.

System Oversight Division,
Aircraft Certification Service.

5.15 DGCA Safety Circular Number SE.39 Tahun 2018



KEMENTERIAN PERHUBUNGAN DIREKTORAT JENDERAL PERHUBUNGAN UDARA

Jalan Medan Merdeka Barat No. 8
Jakarta 10110

Telepon : 3505136 – 3505137
3811308

Fax : 3505135 – 3505139
3507144

EDARAN KESELAMATAN (SAFETY CIRCULAR)

Nomor: SE. 39 Tahun 2018

TENTANG IMPLEMENTASI AIRWORTHINESS DIRECTIVE NO: AD#: 18-11-011-U

1. Perihal
Implementasi Airworthiness Directive no: AD#: 18-11-011-U
2. Keberlakuan
Operator pemegang OC 91, AOC 121, dan AOC 135 yang mengoperasikan pesawat Boeing 737-8.
3. Acuan dan ketentuan
 - a. CASR 91 *General Operating and Flight Rules*;
 - b. CASR 121 *Certification and Operating Requirement: Domestic, Flag, and Supplemental Air Carrier*;
 - c. CASR 135 *Certification and Operating Requirement for Commuter and Charter Air Carrier*;
 - d. AD# 18-11-011-U
4. Latar belakang
Safety Circular ini dipublikasi sebagai acuan bagi operator dan inspektor untuk melaksanakan implementasi Airworthiness Directive (AD) no. 18-11-011-U dimana Maskapai Penerbangan tidak dibatasi dalam mengambil langkah-langkah mitigasi dan pencegahan untuk melaksanakan implementasi AD ini.
5. Ketentuan dan langkah-langkah tindakan pencegahan
 - a. **Kondisi tidak aman (*unsafe condition*)**

AD darurat ini diterbitkan berdasarkan analisis yang dilakukan oleh pabrik yang menunjukkan bahwa jika kesalahan masukan tunggal sensor angle of attack (AOA) diterima oleh sistem kontrol penerbangan, ada potensi pengulangan perintah nose-down trim pada horizontal stabilizer (repeated nose-down trim commands of the horizontal stabilizer).

Kondisi ini, jika tidak ditangani, dapat menyebabkan pilot mengalami kesulitan dalam mengendalikan pesawat, dan menyebabkan hidung pesawat mengarah ke bawah secara berlebihan, kehilangan ketinggian yang signifikan, dan kemungkinan berdampak menabrak permukaan (to excessive nose-down attitude, significant altitude loss, and possible impact with terrain).

Langkah-langkah Pencegahan

Maskapai Penerbangan yang mengoperasikan Boeing 737-8 harus melakukan monitoring, apabila mengalami permasalahan pada angle of attack (AOA) dan melaporkan kepada DKPPU.

DKPPU akan melakukan pemeriksaan terhadap pesawat yang mengalami permasalahan pada angle of attack (AOA).

b. Revision of Airplane Flight Manual (AFM): Certificate Limitations

Runaway Stabilizer

In the event of an uncommanded horizontal stabilizer trim movement, combined with any of the following potential effects or indications resulting from an erroneous Angle of Attack (AOA) input, the flight crew must comply with the Runaway Stabilizer procedure in the Operating Procedures chapter of this manual:

- Continuous or intermittent stick shaker on the affected side only.
- Minimum speed bar (red and black) on the affected side only.
- Increasing nose down control forces.
- IAS DISAGREE alert.
- ALT DISAGREE alert.
- AOA DISAGREE alert (if the option is installed).
- FEEL DIFF PRESS light.
- Autopilot may disengage.
- Inability to engage autopilot.

Langkah-langkah Pencegahan

Maskapai Penerbangan harus memastikan:

- Sudah menerima revisi AFM yang update dalam system internal operator dan di portal DKPPU.
- Baik dipesawat, stasiun dimana pesawat transit maupun overnight harus sudah tersedia AFM yang telah di update sesuai dengan requirement AD#18-11-011-U (ref. FAA AD#2018-23-51).
- Menerbitkan *notice to pilot* terkait adanya revisi baru di AFM dan FCOM.
- Safety department agar melaksanakan internal surveillance terkait langkah-langkah implementasi revisi AFM dan FCOM.

DKPPU:

DKPPU melalui POI dan PAI akan terus melakukan pemeriksaan dan pengawasan terhadap implementasi AFM dan Airworthiness Directives.

c. AFM Revision: Operating Procedures

Runaway Stabilizer

Disengage autopilot and control airplane pitch attitude with control column and main electric trim as required. If relaxing the column causes the trim to move, set stabilizer trim switches to CUTOOUT. If runaway continues, hold the stabilizer trim wheel against rotation and trim the airplane manually.

Note: The 737-8/-9 uses a Flight Control Computer command of pitch trim to improve longitudinal handling characteristics. In the event of erroneous Angle of Attack (AOA) input, the pitch trim system can trim the stabilizer nose down in increments lasting up to 10 seconds.

In the event an uncommanded nose down stabilizer trim is experienced on the 737-8/-9, in conjunction with one or more of the indications or effects listed below, do the existing AFM Runaway Stabilizer procedure above, ensuring that the STAB TRIM CUTOOUT switches are set to CUTOOUT and stay in the CUTOOUT position for the remainder of the flight.

An erroneous AOA input can cause some or all of the following indications and effects:

- Continuous or intermittent stick shaker on the affected side only.
- Minimum speed bar (red and black) on the affected side only.
- Increasing nose down control forces.
- IAS DISAGREE alert.
- ALT DISAGREE alert.
- AOA DISAGREE alert (if the option is installed).
- FEEL DIFF PRESS light.
- Autopilot may disengage.
- Inability to engage autopilot.

Initially, higher control forces may be needed to overcome any stabilizer nose down trim already applied. Electric stabilizer trim can be used to neutralize control column pitch forces before moving the STAB TRIM CUTOOUT switches to CUTOOUT. Manual stabilizer trim can be used before and after the STAB TRIM CUTOOUT switches are moved to CUTOOUT.

Langkah-langkah Pencegahan

Maskapai Penerbangan harus memastikan:

- Membuat *Notice to Pilot* terkait revisi baru dari FCOM terkait rekomendasi dari BOEING.
- Revisi FCOM dari *MyBoeing Fleet* dan mendistribusikan kepada *flight crew* serta *instructor*.
- Revisi FCOM terbaru sudah *onboard* diseluruh B737-8 yang dioperasikan.
- Memasukkan scenario (studi kasus *alt disagree* dan *speed disagree / speed flag* and *alt flag disagree* serta *runaway stabilizer trim*) kedalam *crew*

resource management (CRM) recurrent training, annual type recurrent training serta *pilot proficiency check (PPC)* untuk periode 2018-2019, sebagai segmen silabus wajib.

- Prosedur komunikasi (pilot to teknik, pilot to *chief pilot*, teknik to pilot, teknik to *maintenance control center*) dalam operasional yang tergolong *serious incident* menjadikan wajib di sampaikan pada kesempatan pertama melalui media / *system* yg ditetapkan oleh operator.
- *Safety department* agar melaksanakan internal surveillance terkait langkah-langkah implementasi revisi AFM, FCOM dan Airworthiness Directive.

DKPPU:

- DKPPU (POI dan PAI) bekerjasama dengan operator akan melakukan simulasi check pada flight simulator B737-8 pada kesempatan pertama terkait kondisi tertentu sesuai dengan Boeing AFM, FCOM dan Airworthiness Directive, untuk memastikan aplikasi dari AFM, FCOM dan AD dimaksud.
- DKPPU (POI dan PAI) akan terus melakukan pemeriksaan dan pengawasan terhadap implementasi AFM, FCOM dan Airworthiness Directives

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4. Para Direktur Utama Operator Penerbangan Pemegang AOC 121 dan AOC 135;
5. Para Pemegang OC 91.

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