AIRCRAFT ACCIDENT REPORT

AASL/2019/01/03/F

Accident Investigation Bureau

Final Report on the serious incident involving Boeing 737-500 Aircraft with nationality and registration marks 5N-AIS, operated by Azman Air Services Limited, which occurred at Port-Harcourt; Nigeria on 3rd January, 2019

This report was produced by the Accident Investigation Bureau, Nigeria (AIB), Nnamdi Azikiwe International Airport, Abuja.

The report was based upon the investigation carried out by AIB, in accordance with Annex 13 to the Convention on International Civil Aviation, Civil Aviation Act 2006 and Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 2019. In accordance with Annex 13 to the Convention on International Civil Aviation, it is not the purpose of aircraft accident/serious incident investigations to apportion blame or liability.

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Safety Recommendations in this report are addressed to the Regulatory Authority of the State, as well as other stakeholders, as appropriate. The Regulatory Authority is the authority that ensures implementation and enforcement.

Printed in Nigeria for the Accident Investigation Bureau (AIB)

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GLOSSARY OF ABBREVIATIONS USED IN THIS REPORT

A/P	Autopilot
A/T	Auto Throttle
AASL	Azman Air Services Limited
AD	Airworthiness Directive
AGB	Accessory Gearbox
AGL	Above Ground Level
AIB	Accident Investigation Bureau
AMM	Aircraft Maintenance Manual
AOC	Air Operator Certificate
APU	Auxiliary Power Unit
ARFFS	Aerodrome Rescue and Fire Fighting Service
ATC	Air Traffic Control
ATPL	Airline Transport Pilot License
AVM	Airborne Vibration Monitoring
BSI	Borescope Inspection
CDU	Control Display Unit
CL	Classic
CRM	Crew Resource Management
CRS	Certificate of Release to Service

CVR	Cockpit Voice Recorder
DME	Distance Measuring Equipment
DNMM	Murtala Muhammed International Airport
DNPO	Port Harcourt International Airport
ECAM	Electronic Centralized Aircraft Monitor
EICAS	Engine Indicating and Crew-Alerting System
ENG	Engine
EPR	Engine Pressure Ratio
FAAN	Federal Airports Authority of Nigeria
FCT	Federal Capital Territory
FDA	Flight Data Analysis
FDM	Flight Data Monitoring
FDR	Flight Data Recorder
FL	Flight Level
FMC	Flight Management Computer
FOB	Fuel on Board
FOD	Foreign Object Damage/ Foreign Object Debris
FOQA	Flight Operations Quality Assurance
FP	Flight Purser
FPM	Feet Per Minutes
GS	Glide Slope

h	Hour
HPC	High Pressure Compressor
HPR	High Pressure Ratio
HPT	High Pressure Turbine
Hrs	Hours
IFR	Instrument Flight Rules
IFSD	In flight Shut Down
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
Kt	Knots
LPC	Low Pressure Compressor
LPT	Low Pressure Turbine
LRC	Long Range Cruise
MA	Missed Approach
MCD	Magnetic Chip Detector
MCP	Mode Control Panel
MHz	Mega Hertz
MOPSC	Maximum Operational Passenger Seating Capacity
MSA	Minimum Safe Altitude
N1	Fan rotor speed in percent rpm
N2	High rotor speed in percent rpm

NGV	Nozzle Guide Vanes
Nig. CARs	Nigeria Civil Aviation Regulations
NM	Nautical Miles
OEI	One-Engine Inoperative
OFDM	Operational Flight Data Monitoring
PF	Pilot Flying
PM	Pilot Monitoring
POT APP	Port Harcourt Approach
RPM (rpm)	Rotations per Minute
RADALT	Radio Altimeter
RWY	Runway
SA	Situational Awareness
SMM	Safety Management Manual
SMS	Safety Management System
TA	Traffic Advisory
TAS	True Air Speed
TGB	Transfer Gearbox
TO/GA	Take-off/Go around
UTC	Coordinated Universal Time
VHF	Very High Frequency Omni Directional Range
VREF	Landing Reference Speed

VSV	Variable Stator Vanes

Aircraft accident report number:	AAS/2019/01/03/F
Registered owner and operator:	Azman Air Services Limited
Manufacturer:	Boeing Aircraft Company, USA
Aircraft type and model:	Boeing 737-500
Year of manufacture:	1998
Serial number:	29235
Nationality and registration marks:	5N-AIS
Location:	Final Approach to Port-Harcourt International Airport
Date and Time:	3rd January, 2019 at about 11:19 h, (All times in this report are local time (UTC +1) unless otherwise stated)

SYNOPSIS

The Accident Investigation Bureau (AIB) was notified of the occurrence by Azman Air Services Limited (AASL) on 3rd January, 2019. A team of investigators were dispatched to the site the next day and commenced investigation.

On 3rd January, 2019 at about 10:10 h, a Boeing 737-500 aircraft with nationality and registration marks 5N-AIS operated by Azman Air Services Limited on a scheduled flight AZM 2316, departed Murtala Mohammed International Airport Ikeja, Lagos (DNMM); Nigeria for Port Harcourt International Airport, Port Harcourt (DNPO); Nigeria on an Instrument Flight Rules (IFR) Flight Plan. On board were 114 persons including of two cockpit crew, three cabin crew and a fuel endurance of three hours.

About six minutes after take-off, the number two engine turbine vibration began to rise and within 40 seconds it reached a peaked of 5.26 unit, stayed for about 40 seconds then gradually decreased and settled at 3.0 units within a period of 90 seconds. AZM 2316 levelled off at FL 290 in cruise with both engines operating at N1 of 85% RPM. Two minutes later, the number two engine N1 dropped to 68% and within five seconds it returned to 85%. This coincided with the time when the flight crew heard a loud bang from the right side which caused airframe vibration and yaw to the right. The flight crew concluded that the noise might be as a result of cargo shift as the parameters of engines indicated normal.

AZM 2316 established contact with POT Approach and obtained inbound clearance to POT for ILS/DME Approach RWY 21. About 13 minutes later, the aircraft began descent, reported passing FL235 for FL210 and 98 NM on radial 285 inbound. AZ2316 configured for landing, gears down, flaps set at 15°, 150 kts both engines stable and symmetrical with N1 at approximately 57%. About a minute later, the number two engine N1 started decreasing and within five seconds it dropped to 47% causing asymmetric engine power while the number two turbine vibration began to increase. At this time, the flight crew reported hearing another loud bang from the right side accompanied by severe vibration and a yaw to the right. The number two engine turbine vibration reached 9.90 units. The Approach became unstable, the Autopilot disengaged, TO/GA was engaged accompanied by Autopilot warning. About 25 seconds later, the number two engine N1 further decreased to 30%, its fan vibration and Low pressure compressor vibration increased to 4 units respectively. The flight crew executed a Missed Approach and AZM 2316 was vectored to fly heading 350⁰ by the ATC.

The number two engine Oil Filter Bypass Light illuminated during the Go-Around. The flight crew carried out a precautionary shutdown of number two engine in accordance with the ENGINE OIL FILTER BYPASS checklist. The flight crew declared emergency and AZM 2316 was vectored by ATC for the ILS RWY 21. The flight crew stated that, they got preoccupied by the limitation of 10° bank and map shift, they

did not align with the runway centreline passing through 500 ft RADALT while experiencing high vibrations in number one engine. The aircraft crossed the localizer extremely late at 150 ft AGL and one dot high. The Approach became unstable again and flight crew executed a second Missed Approach.

The aircraft aligned properly on profile during the third landing attempt before reaching the final approach fix. At 11:35 h, AZM 2316 landed on runway 21.

Causal factor

The failure of number 4 and 5 bearings of engine number 2 leading to loss of power during approach.

Contributory factors

1. The failure to recognise the abnormal engine conditions (surge) during cruise phase and hence, not making appropriate decision. This might have been connected to the insufficient technical knowledge and loss of situational awareness.
2. Non implementation of the Flight Data Monitoring programme in accordance with 2.2.5.1 of Azman Air Safety Management System Manual.
3. Non rectification of the number two engine vibration anomalies recorded over a period of 8 months.
4. Inadequate regulatory oversight of the Azman Air Safety Management System.

The AIB issued one immediate safety recommendation to the Nigerian Civil Aviation Authority in the preliminary report.

Seven further Safety Recommendations were issued in this Final Report.

1.0 FACTUAL INFORMATION

1.1 History of the flight

On 3rd January, 2019 at about 10:10 h, a Boeing 737-500 aircraft with nationality and registration marks 5N-AIS operated by Azman Air Services Limited on a scheduled flight AZM2316, departed Murtala Muhammed International Airport Ikeja, Lagos (DNMM); Nigeria for Port Harcourt International Airport, Port Harcourt (DNPO); Nigeria on an Instrument Flight Rules (IFR) Flight Plan. On board were 114 persons including of two cockpit crew and three cabin crew with a fuel endurance of three hours. The Pilot was the pilot flying (PF) and the Co-pilot was the pilot monitoring (PM).

According to the crew, Lagos Air Traffic Control (ATC) cleared AZM2316 to cruise at flight level FL290.

At 10:15:36 h, Flight Data Recorder (FDR) information showed that the number two engine turbine vibration started to increase gradually over a period of 40 seconds reaching a peak of 5.26 units. At 10:17 h, the turbine vibration gradually decreased over a period of 90 seconds stabilizing at approximately 3.0 units.

At 10:22 h, AZM2316 established contact with Port Harcourt (POT) Air Traffic Control (ATC) Approach and was given inbound clearance to POT for ILS/DME Approach Runway (RWY) 21. At 10:26 h, AZM2316 levelled off at FL290. Both engines appeared to be operating normally at the rotational speed of the low speed spool (N1) of 85%. At 10:28 h, the number two engine N1 decreased to 68% and then increased to 85% within a period of 5 seconds.

According to the flight crew, at about 20-25 minutes into the flight during cruise, there was a sudden loud bang from the right side of the aircraft which caused vibrations that lasted for less than 5 seconds followed by a yaw to the right. The flight crew also stated that engine parameter indications were within normal range with the Autopilot (A/P) and Auto Throttle (A/T) still engaged. The flight crew

enquired from the Purser if the noise was heard in the cabin. The Purser confirmed they heard it too. The flight crew then instructed the Purser to walk through the cabin and check if there was anything unusual. He returned to inform the flight crew that everything seemed normal. The flight crew then assumed the noise might be as a result of cargo shift.

At 10:33 h, AZM2316 reported passing FL235 for FL210 as released by Lagos Area Control. POT ATC acknowledged and then further cleared the aircraft to continue descent to FL110 then requested AZM2316 to report distance and inbound radial to POT. The crew reported 98 miles on radial 285 inbound.

At 10:52 h, AZM2316 commenced a right turn for finals DNPO RWY 21. Landing gears were down, 150 kts and Flaps were set to 15°, both engines were stable and symmetrical with N1 at approximately 57%. At 10:53:47 h, engine number 2 N1 started decreasing to 47% within a period of five seconds and its turbine vibration started to increase. According to the flight crew, at about 4.5 NM AZM2316, was already configured for landing when they heard a very loud deafening bang and severe vibration from the number two engine. The aircraft yawed to the right and the autopilot disengaged. The PF manually took over control to stabilise the aircraft by applying left rudder. The PM reported asymmetric thrust even though the Auto-Throttle was ON. The PF stabilised the aircraft and handed over controls to the Co-pilot to enable him assess the situation. The pilot then confirmed the asymmetric thrust and took back controls and elected to execute a missed approach. At 10:53:51 h, the A/P was disengaged and the TO/GA[1] was engaged accompanied by an A/P warning. The number two engine's turbine vibration indicated severe vibrations of 9.90 units. At 10:54:16 h, the number two engine fan vibration increased to 4 units. At 10:55 h the crew then executed a missed approach and were vectored to fly heading 350º by the ATC.

[1] TO/GA (Take-off/Go-around) is an auto pilot/auto throttle setting activating take-off or go-around thrust. Depending upon aircraft type, it may be activated by depressing a switch or by manually moving the thrust levers to the appropriate position.

The crew stated that, while reading the ENGINE FIRE or ENGINE SEVERE DAMAGE or SEPARATION checklist of the B737 Quick Reference Handbook (QRH) during the Go-Around, the number two engine Oil Filter Bypass Light illuminated. At about 10:59 h, the crew carried out a precautionary shutdown of number two engine in accordance with the ENGINE OIL FILTER BYPASS Checklist of the B737 QRH. The aircraft was vectored again by ATC for the ILS RWY 21; the crew further stated that, they got preoccupied by the limitation of 10° bank and map shift, they did not align with the runway centreline. At about 11:19 h, the flight crew declared emergency. POT ATC Tower advised the Aerodrome Rescue and Fire Fighting Service (ARFFS) to be on standby. At 11.21 h, during the second landing attempt, the aircraft did not intercept the runway centreline passing through 500 ft RADALT while experiencing high vibrations in number one engine, AZM2316 crossed the localizer extremely late at a 150 ft AGL (Above Ground Level) and one dot high on the glide slope. The Approach became unstable again. At about 11.22 h, the TO/GA was activated and the flight crew executed a second Missed Approach.

During the second Go-Around, the crew reported field in sight, they decided to turn around and conduct a visual approach for RWY 03. At 11:26 h, after turning left, they realised that they were far off to the right of the extended centreline RWY 03, so they requested to extend downwind and position for ILS on RWY 21.

According to the crew, as they started configuring the aircraft for the third approach, they noticed that the vibration indication for number one engine was rising from 1 to 3 and opted to delay the deployment of flaps in case of loss of number one engine. The aircraft got back on profile before reaching the final approach fix. At 11:35 h, the aircraft landed on runway 21. The aircraft taxied to the ramp, parked and all occupants disembarked unassisted and uninjured. The incident occurred in day time in instrument meteorological condition.

1.2 Injuries to persons

Injuries	Crew	Passengers	Total in aircraft
Fatal	Nil	Nil	Nil
Serious	Nil	Nil	Nil
Minor	Nil	Nil	Nil
None	5	109	114
Total	5	109	114

1.3 Damage to aircraft

The aircraft was not damaged

1.4 Other damage

Nil

1.5 Personnel information

1.5.1 Pilot

Nationality:	Nigerian
Age:	43 years
Licence number:	Airline Transport Pilot Licence (A)
Licence validity:	5th March, 2020
Aircraft ratings:	Boeing 737-300/500, Hawker Siddeley 125/800XP, Embraer 170/190
Medical validity:	25th November, 2019
Simulator validity:	29th April, 2019

Route/Line check:	9th December, 2018
Total flying time:	3, 724 h
Total flying time (PIC):	996 h
Total on type:	92 h
Total on type (PIC)	92 h
Last 90 days:	92 h
Last 28 days:	92 h
Last 24 hours:	0 h

The Pilot joined Azman Air Services Limited on 9th December, 2018 with zero hour on Boeing 737. The pilot recent experience had been flying HS125 in corporate aviation before joining Azman Air.

1.5.2 Co-Pilot

Nationality:	Nigerian
Age:	24 years
Licence type:	Commercial Pilot Licence (A)
Licence validity:	18th January, 2023
Aircraft ratings:	Boeing 737-300/500
Medical validity:	9th December, 2019
Simulator validity:	28th March, 2019
Total flying time:	629 h
Total on type:	431 h
Last 90 days:	122 h
Last 28 days:	25 h
Last 24 hours:	0 h

The Co-Pilot completed his Boeing 737 type training in March, 2018 and commenced line training in June, 2018.

1.6 Aircraft information

1.6.1 General information

Type:	B737-500
Manufacturer:	Boeing Aircraft Company USA
Date of manufacture:	1998
Serial number:	29235
Certificate of Airworthiness validity:	30th November, 2019
Certificate of Insurance validity:	25th January, 2019
Certificate of Registration:	Issued on 30th November, 2016
Noise Certificate:	Issued on 30th November, 2016
Airframe time:	34, 675 h

1.6.2 Power plant

Engines	**Number one**	**Number two**
Engine model	CFM56-3C-1	CFM56-3C-1
Serial number	722299	858813
Time since new	60,143 h	44,143 h
Cycles since new	36,412	30,658

1.6.2.1 CFM56 Engine description and operation

1. General

The CFM56-3 is a high bypass, dual-rotor, axial flow turbofan engine. The integrated fan and booster (low pressure compressor - LPC) is driven by a 4 stage low pressure

turbine (LPT). A single-stage high pressure turbine (HPT) drives the 9 stage high pressure compressor (HPC). The two rotors are mechanically independent of each other. Air entering the engine is divided into a primary (inner) airstream and a secondary (outer) airstream after the primary airstream has been compressed by the LPC and HPC, combustion of fuel in the annular combustion chamber increases the HPC discharge air velocity to drive the high and low pressure turbines. An accessory drive system off the N2 rotor drives engine and airplane accessory components. The engine consists of 4 major sections: fan major module, core engine major module, LPT major module and accessory drive system. It also includes the following components which are not included in any section: spinner front cone, LPT shaft plug and coupling nut, aft rotating air/oil separator, and oil inlet cover.

2. Engine

The engine is a dual-rotor, axial flow turbofan of high compression ratio and high bypass ratio. The engine incorporates two multistage turbine-driven compressors utilizing concentric shafting. The integrated fan and low pressure compressor, consisting of one fan stage and three compressor (booster) stages is driven by a four-stage low pressure turbine. The nine-stage high pressure compressor is driven by a single-stage high pressure turbine. The engine starting system provides the means for rotating the high pressure rotor (HPR) to establish airflow through the engine. Rotation of the HPR drives the engine fuel pump and main engine control and delivers metered fuel under pressure to the combustion chamber. The ignition system is a high energy capacitor discharge system consisting of two electrically and physically independent circuits serving separate igniter plugs. The engine includes a complete self-contained oil system for lubrication and cooling of internal parts. Thrust reverser mechanisms are utilized at the engine fan discharge to provide a means of further decelerating the airplane during its landing roll. Various remote transmitting devices are installed on the engine to provide indication in the flight compartment of engine performance and condition. Source Boeing 737-300/400/500 Aircraft Maintenance Manual CFM56 Engines (CFM56-3)

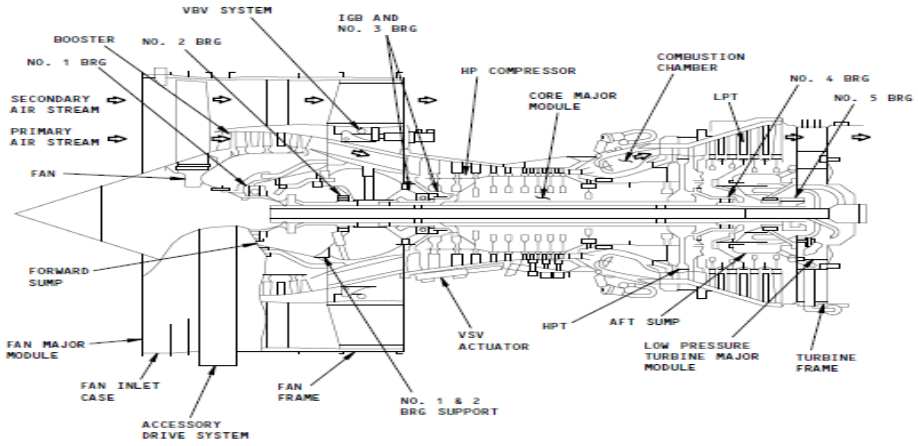

Figure 1: CFM56-3 engine major section component location

1.6.2.2 CFM56-3 Oil System

Description and Operation

1. General

A. The engine oil system is a self-contained, centervented and recirculating type system. Each engine has an independant oil system to provide lubrication and cooling for the engine main bearings, radial driveshaft bearings and gears and bearings in the transfer gearbox (TGB) and accessory gearbox (AGB).

B. The oil system is comprised of oil storage, distribution, and indicating systems.

C. Indicating systems provide measurements of oil quantity, pressure, and oil temperature. Warning lights also provide a low oil pressure warning, and oil filter bypass warning. The condition of the engine oil system and the performance of associated engine components are determined by visual indication of these systems in the flight compartment.

Oil distribution - description and operation

The oil distribution system consists of the supply system and the scavenge system. The supply system provides oil for lubrication and cooling to the main bearings, radial driveshaft bearings, and transfer and accessory gearboxes (TGB/AGB). The

scavenge system recovers the oil from the forward and aft sumps and the AGB/TGB sump for filtering, cooling and recirculation.

The lubrication unit is located on the AGB near the bottom of the fan case on the left side. It contains the following:

(1) Four positive displacement pumps (three scavenge pumps and the supply pump).

(2) Oil supply filter, check valve and bypass valve with clogging indicator.

(3) Pressure relief valve located on the oil supply pump discharge side of the unit.

(4) Three magnetic chip detectors (MCD).

2. Operation

A. The oil tank provides storage of oil for continuous distribution by the supply system. Oil flows from the tank to the supply pump in the lubrication unit on the AGB. The oil is pressurized and is pumped through the oil supply filter to the main bearings, radial driveshaft and gearboxes.

B. After distribution, oil is returned to the lubrication unit from three sumps. The forward sump services the No. 1, No. 2 and No. 3 main bearings. The aft sump services the No. 4 and No. 5 main bearings. The gearbox sump for the AGB also collects oil through an external tube from the TGB.

C. The lubrication unit contains a scavenge pump for each sump. The oil is drawn through one of three magnetic chip detectors (MCD) in the lubrication unit and is pumped through the scavenge oil filter to the main oil/fuel heat exchanger. Cooled oil is returned to the oil tank.

D. A drain is provided at the forward and aft bearing compartment for possible oil leaking past the stationary air/oil seal. The forward seal drain exits through the 8 o'clock fan frame strut. The aft seal drain exits through the 6 o'clock turbine frame strut.

E. The bearing sumps and gearboxes are interconnected to collect oil vapors before air/oil separation and venting. The oil tank vent and the TGB/AGB sump are connected to the forward sump. Vapors from the forward and aft sumps pass through rotating air/oil separators into the main shaft center vent tube to be vented out the exhaust. The separated oil is returned to the sumps.

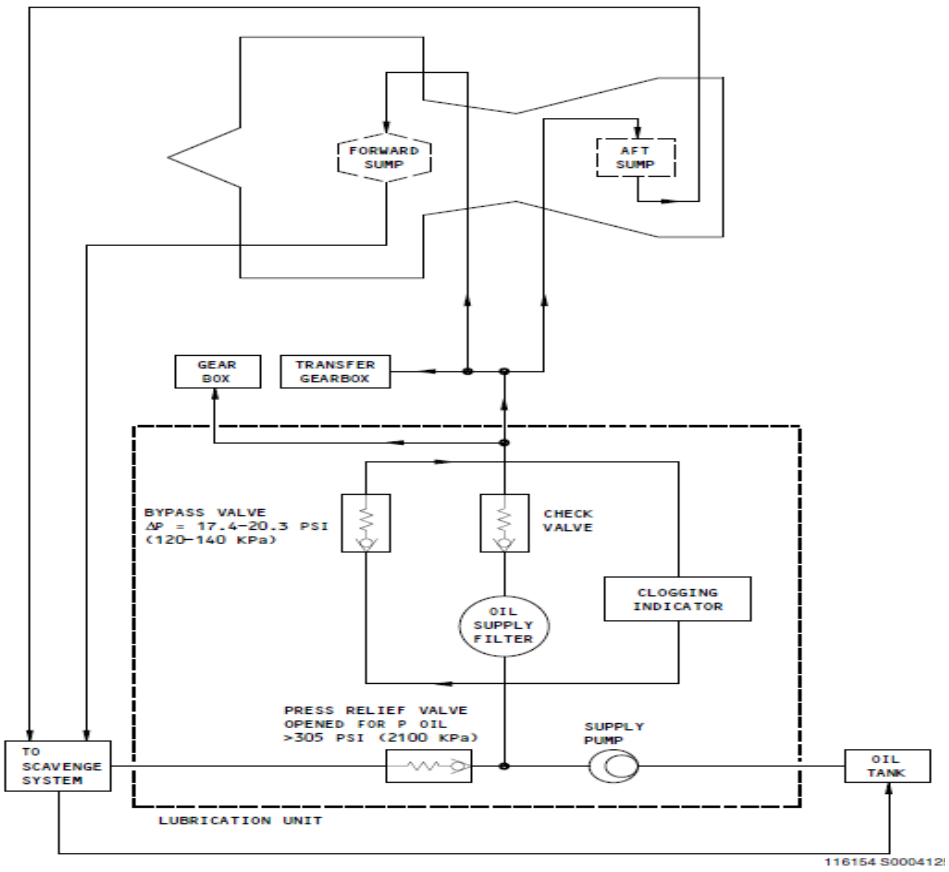

Figure 2: Oil supply system schematic

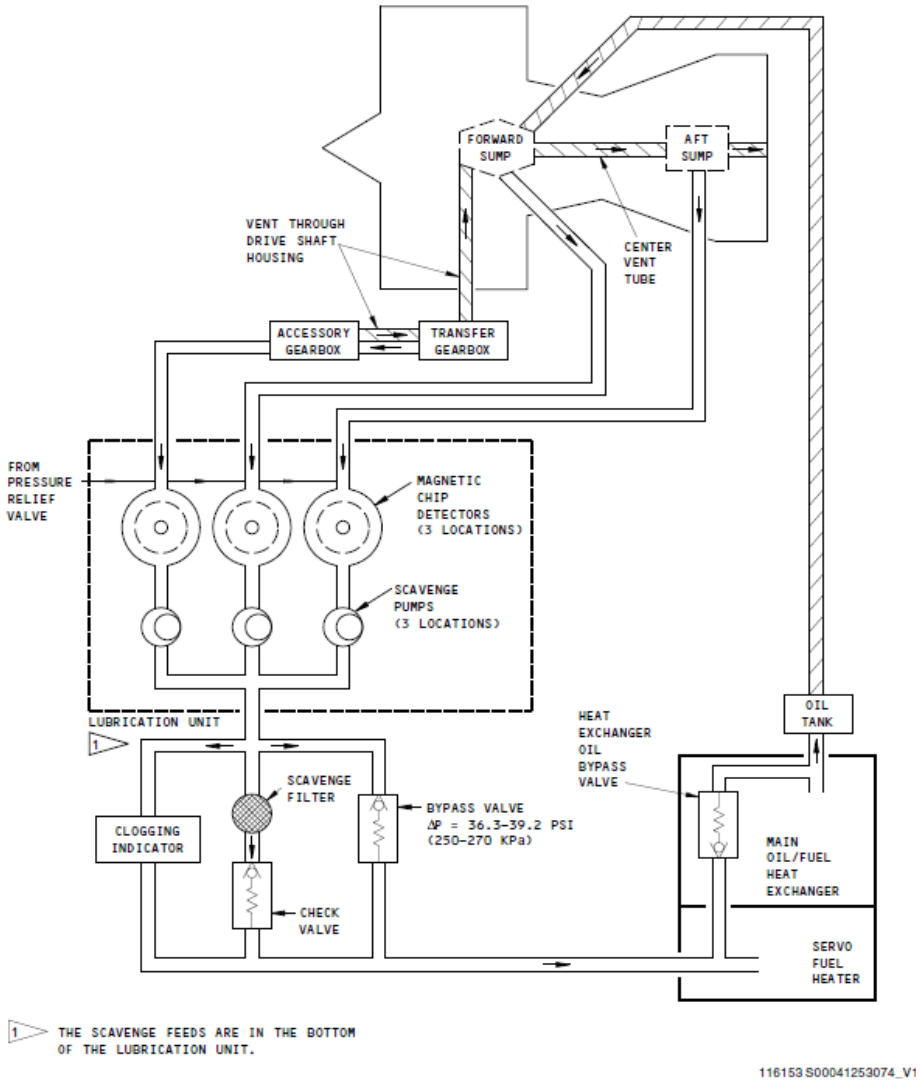

Figure 3: Oil scavenge and vent system

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Oil filter bypass warning system

Description and operation

1. General

A. The oil filter bypass warning system provides an indication in the flight compartment of a clogged scavenge oil filter element and an impending filter

bypass. The system consists of an oil filter differential pressure switch and an oil filter bypass warning light for each engine.

2. Oil filter differential pressure switch

A. The oil filter differential pressure switch is a snap-action pressure sensitive switch. The high pressure side of the switch is connected to the oil inlet side of the scavenge filter housing. The low pressure side is connected to the scavenge filter outlet tube. The oil filter differential pressure switch is attached to a bracket mounted on the lubrication unit.

3. Oil filter bypass warning light

A. Two amber oil filter bypass warning lights, one for each engine, are located on the pilot's center instrument panel, P2. Lights illuminate to indicate oil scavenge filter bypass.

4. Operation

A. 28 volts dc power is supplied to the oil filter bypass warning system from the P6-3 breaker panel.

B. As the scavenge filter becomes clogged, the pressure differential across the switch increases.

C. When it gets to 25 to 27 psig, the switch closes to complete the warning light circuit and the warning light for the oil filter bypass comes on.

NOTE: During the first start of the day or during cold weather starts, the oil pressure can go above the normal range and the oil filter bypass light can come on. Operate the engine at idle power; the filter bypass light should go off as the oil warms and the pressure returns to normal.

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Oil consumption limits

Normal oil consumption is less than 0.4 U.S. quarts/hour or 0.1 U.S. gallons/hour (0.38 liters/hour). If you find increased oil consumption that meets the conditions

that follow, you must find the cause and take corrective action; do the engine oil trouble shooting procedure:
(a) Oil consumption that shows a gradually increasing trend.
(b) Oil consumption that shows a sudden step increase.
(c) Oil consumption that is more than 0.8 U.S. quarts/hour or 0.2 U.S. gallons/hour (0.76liters/hour). Oil consumption must not be more than a maximum of 1.6 U.S. quarts/hour or 0.4 U.S. gallons/hour (1.5 liters/hour).

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Magnetic Chip Detectors (MCD)

Three magnetic chip detectors are used on the lubrication unit, one on the inlet of each scavenge pump. Each has a removable magnetic plug and a scavenge screen. They trap particulates before entering the lubrication unit.

Metal contamination can be an indication of distress of the parts in the oil lubricated parts of the engine. However, the MCD's can collect material not related to engine parts. The materials can be shot peen material of approximately 0.008 inch (0.29 mm), tool parts, and machine particles. See figure 603

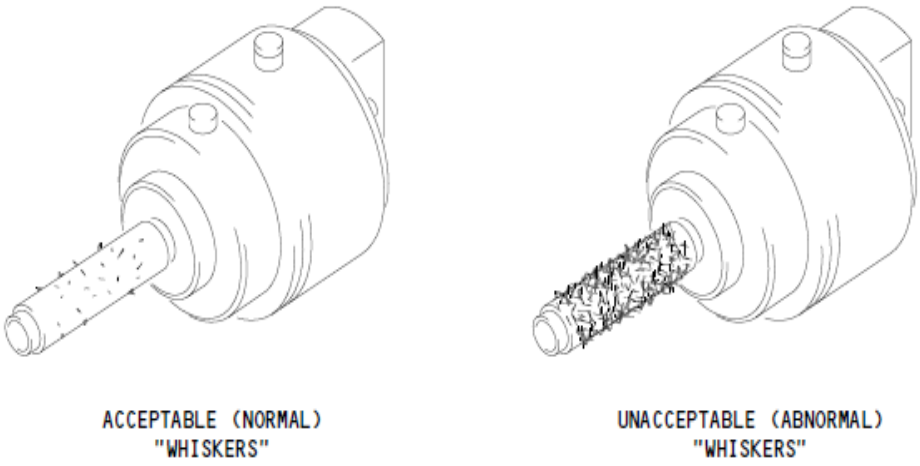

Figure 4: Magnetic Chip Detector inspection

1.6.2.3 Airborne Vibration Monitoring (AVM) system

Description and operation

1. General

The airborne vibration monitoring (AVM) system continuously shows the engine vibration level. The system consists of two accelerometers (vibration sensors) and a vibration indicator for each engine and an AVM signal conditioner. Power for the system is 115 volts ac supplied from transfer bus 1.

Abnormal engine vibration, sudden or progressive, is a positive indication of engine malfunction. Abnormal vibration can be caused by compressor or turbine blade damage, rotor imbalance, or other problems. Early warning of engine malfunction permits corrective action before extensive damage results.

With the engine operating, the engine accelerometers generate signals proportional to engine motion in radial direction. These signals are received by the AVM signal conditioner, where they are converted to signals suitable for indicator operation. Signals are then sent to the vibration indicator. The AVM indicator is shown on the secondary display as a simulated electro-mechanical device.

2. Engine Vibration Sensors

The engine accelerometers sense engine vibration in terms of engine acceleration in a radial direction and generate electrical signals proportional to the engine acceleration. The accelerometers are of the piezoelectric type.

3. AVM Signal Conditioner

The AVM signal conditioner processes inputs from vibration sensors, N1 and N2 speed sensors. The monitor unit is programmed to determine the N1 and N2 rotor vibration from the fan and core sensors. The unit is a microprocessor with BITE, self-test and flight data history functions. Have a linear scale for flight compartment indication. The scale from 0 - 5 scalar units can be compared to a scale of 0 - 10 mils DA (Double Amplitude) of vibration.

4. AVM Indicator

The AVM indicator shows the vibration level of the two engines.

The AVM indicator displays constantly the highest measured vibration values of the Fan or High Pressure Compressor (HPC). The indicator value for the Fan is normalized (converted to scaler units) and the HPC value is linear. The indicator values are displayed in scaler units (s.u.) from 0 to 5 s.u.

The AVM indicator is shown on the secondary EIS display as a simulated electro-mechanical device.

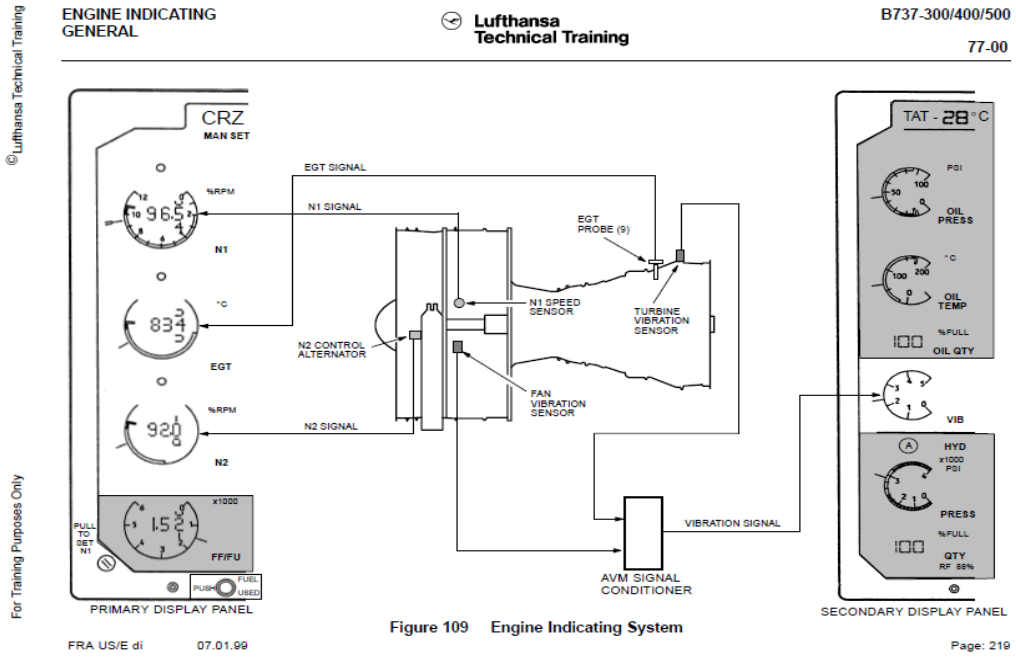

Figure 5: Engine indicating system

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Engine vibration guidelines

(1) If the momentary vibration level is greater than 4 units but less than 1 minute in duration:

(a) No maintenance action is necessary, but only if the vibration indication is not associated with the aircraft vibration felt by the flight crew and the indication did not repeat during the flight or during subsequent flights.

(2) If the vibration level is equal to or less than 4 units, use the AVM flight history to determine the source of the vibration.

(a) If the source of the AVM indication is fan vibration:

1) If engine noise or vibration is felt in the cabin or flight deck during climb or cruise conditions and the AVM indications are due to fan vibration:

a) No maintenance action is necessary. It is recommended that you do one of these applicable fan trim balance task.

<1> In-Flight Data Trim Balance Procedure,

<2> In-Flight Data Trim Balance Procedure,

<3> Fan Trim Balance Procedure (Analyzer Method),

<4> Trim Balance Procedure (3-Shot Plot Method),

2) If the vibration level is equal to or less than 3 units:

a) No maintenance action is necessary. You can reduce the vibration levels if you do one of these applicable fan trim balance task:

<1> In-Flight Data Trim Balance Procedure,

<2> In-Flight Data Trim Balance Procedure,

<3> Fan Trim Balance Procedure (Analyzer Method),

<4> Trim Balance Procedure (3-Shot Plot Method),

3) If the vibration level is more than 3 units:

a) It is recommended that you do one of these fan trim balance task.

<1> In-Flight Data Trim Balance Procedure,

<2> In-Flight Data Trim Balance Procedure,

<3> Fan Trim Balance Procedure (Analyzer Method),

<4> Trim Balance Procedure (3-Shot Plot Method),

(b) If the source of the AVM indication is core vibration:

1) If the vibration level is equal to or less than 3 units:

a) No maintenance action is necessary.

2) If the vibration level is more than 3 units:

a) It is recommended that you do the High Vibration Indication Trouble Shooting (Miscellaneous Observed Problems) procedure within 25 cycles

b) If you do not find the source of the vibration, do a vibration survey and contact CFM for confirmation of the correct vibration levels

c) Monitor the engine every cycle for any change in the core vibration level.

(3) If the vibration level is more than 4 units:

(a) Do the High Vibration Trouble Shooting (Miscellaneous Observed Problems) procedure

before the next flight

(b) Use the AVM flight history to determine the source of the vibration.

1) If the source of the AVM indication is fan vibration:

a) Do one of these applicable fan trim balance task:

<1> In-Flight Data Trim Balance Procedure,

<2> In-Flight Data Trim Balance Procedure,

<3> Fan Trim Balance Procedure (Analyzer Method),

<4> Trim Balance Procedure (3-Shot Plot Method),

2) If the source of the AVM indication is core vibration:

a) Do the High Vibration Trouble Shooting (Miscellaneous Observed Problems) procedure

b) If you do not find the source of the core vibration, do a vibration survey and contact CFM for vibration level confirmation to replace the engine

1.6.2.4 Compressor Surge and Stall

Compressor stalls are caused by an aerodynamic disruption of the usually smooth airflow through the compressor stages. The disruption of the air flow can be caused by these conditions:

(a) There is foreign object ingestion or damage (FOD).

(b) The airfoils are distorted.

(c) The variable stator vanes (VSV) are off schedule.

A compressor stall may be indicated by these conditions:

(a) Abnormal engine noises.

(b) Flames from the engine exhaust and possibly from the engine inlet in severe cases.

(c) Fluctuating engine performance parameters.

(d) Slow throttle response or no throttle response.

(e) High EGT, or a quick EGT increase when throttle is advanced.

(4) If there is a compressor stall, do these steps:

(a) Quickly (in 1 to 2 seconds) move the forward thrust lever rearward to idle power to clear the stall.

1) Make sure the EGT and the N2% rpm decreases to normal idle indications.

2) Make sure the engine vibration levels are normal.

1.6.3 Maintenance records of the number two engine

Azman Air uses B737-300/400/500 Approved Maintenance Program (AMP) for the inspection and maintenance of the aircraft (5N-AIS) and its components. A review of the aircraft maintenance records indicated that all the required maintenance/inspections were carried out as at when due. The Certificate of Release to Service (CRS) for the last C-check (C1) was issued on 14th May, 2018. The last A-check (1A) was carried out on 23rd December, 2018.

The last shop visit of the number two engine was on the 19th October, 2016 (at engine time since new 41,200 h and 27551 cycles). The engine life limited part report has been updated and all the parts were within limit.

A review of the Airworthiness Directives (ADs) compliance records of the engine did not reveal any outstanding AD. Also, the oil consumption records over a period of four months prior to the date of occurrence did not reveal significant oil consumption.

Borescope Inspection (BSI) of the engine was required to be carried out at 4A, 8A and C-check intervals in accordance with the Azman Air B737-300/400/500 Approved Maintenance Programme. The investigation team retrieved the following Borescope inspection records of the number two engine:

1. BSI carried out carried on 28th November, 2017 during 4A/8A inspections revealed no significant defect.

2. BSI carried out on 19th March, 2018 during the last C-Check found no significant defects.
3. BSI carried out on 3rd November, 2018 during 4A inspection found no significant defects

Note: Details of the BSI carried out on the number two engine after the occurrence are in section 1.16 Test & Research.

1.7 Meteorological information

Time:	**0900 UTC**
Wind:	08 kts
Visibility:	5km
Weather:	Dust Haze
Cloud:	No Significant Cloud
Temperature/ Dew point:	27.6°C/6.9°C
Time:	**1000 UTC**
Wind:	08 kts
Visibility:	5km
Weather:	Dust Haze
Cloud:	No Significant Cloud
Temperature/ Dew point:	29.4°C/8°C
Time:	**1100 UTC**
Wind:	08 kts
Visibility:	5km
Weather:	Dust Haze

Cloud:	No Significant Cloud
Temperature/Dew point:	31.4°C/8.4°C

1.8 Aids to navigation

The navigational aids available at DNPO at the time of the incident were as follows:

'POT' VOR/DME	113.5 MHz	Serviceable
'IPC' ILS/DME	110.3 MHz	Serviceable
Radio:		Serviceable
HF 124.9 MHz (Approach)		Serviceable
VHF 119.2 MHz (Tower mains)		Serviceable
VHF 118.6 MHz (Tower secondary)		Unserviceable
VHF 122.3 MHz (ATIS)		Serviceable
VHF 121.7 MHz (Domestic)		Serviceable
VHF 121.5 MHz (Emergency)		Serviceable

1.9 Communications

There was effective communication between the aircraft and Air Traffic Control (ATC).

1.10 Aerodrome information

Port Harcourt International Airport is fully operated by Federal Airports Authority of Nigeria (FAAN). It is located 32 km west of the city and has a single runway with an orientation of 03/21 which is 3000 m long and 60 m wide, located at coordinates

latitude 05°00'56"N and longitude 006°56'58"E, and at an elevation of 87 ft Above Sea Level. There is also a single taxi way parallel to the runway with two exit points.

1.11 Flight recorders

The aircraft was fitted with a Flight Data Recorder (FDR) and a Cockpit Voice Recorder (CVR). The recorders were retrieved and taken to the AIB Flight Safety Laboratory at Abuja, where inspection and download were carried out. The data related to the incident on the CVR was found overwritten.

The FDR and CVR particulars are as below:

Recorders	**Flight Data Recorders**	**Cockpit Voice Recorders**
Manufacturer	Honeywell International Inc.	Fairchild
Part number	980-4700-042	S200-0012-00
Serial number	6798	01156
Model	SSFDR	A200SCVR
Duration	25 hours	2 hours

1.11.2 Flight Data Recorder report

The Flight Data Recorder (FDR) was downloaded and analysed at the AIB safety laboratory in Abuja. The data was fully recovered.

At 10:10 h, AZM2316 took-off from DNMM for a commercial flight heading to DNPO. At 10:15:36 h, Engine 2 turbine vibration started to increase gradually over a period of 40 seconds reaching a peak of 5.26 units (*typically, vibration >3 is considered abnormal and >4 is considered critical*).

At 10:17 h, the Engine 2 turbine vibration gradually decreased over a period of 90 seconds stabilizing at approximately 3.0 units.

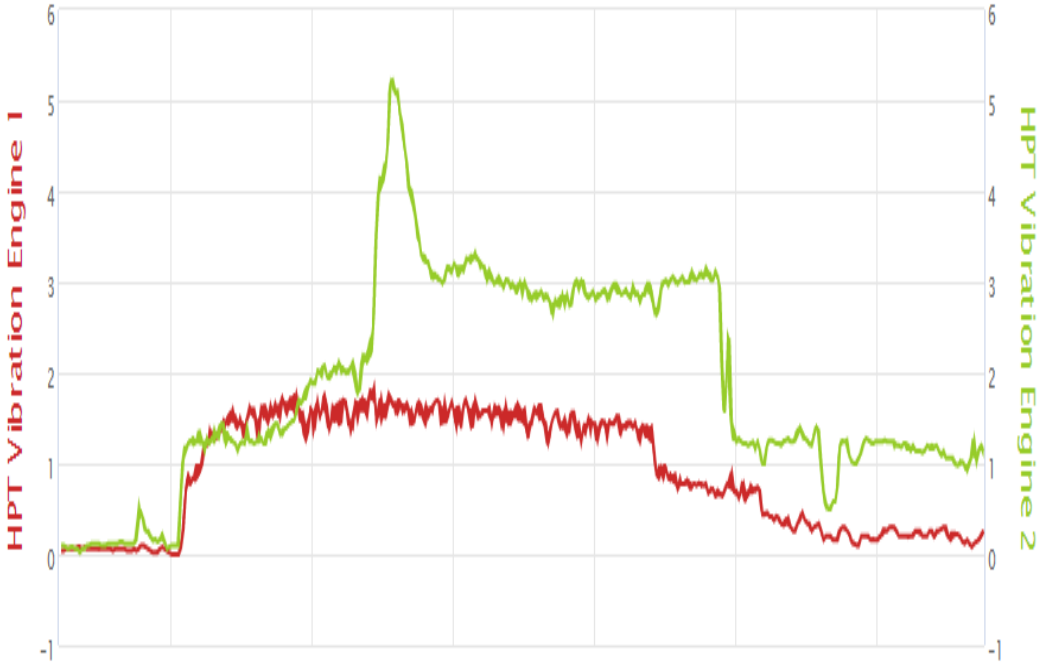

Figure 6: High pressure turbine vibration of number two engine

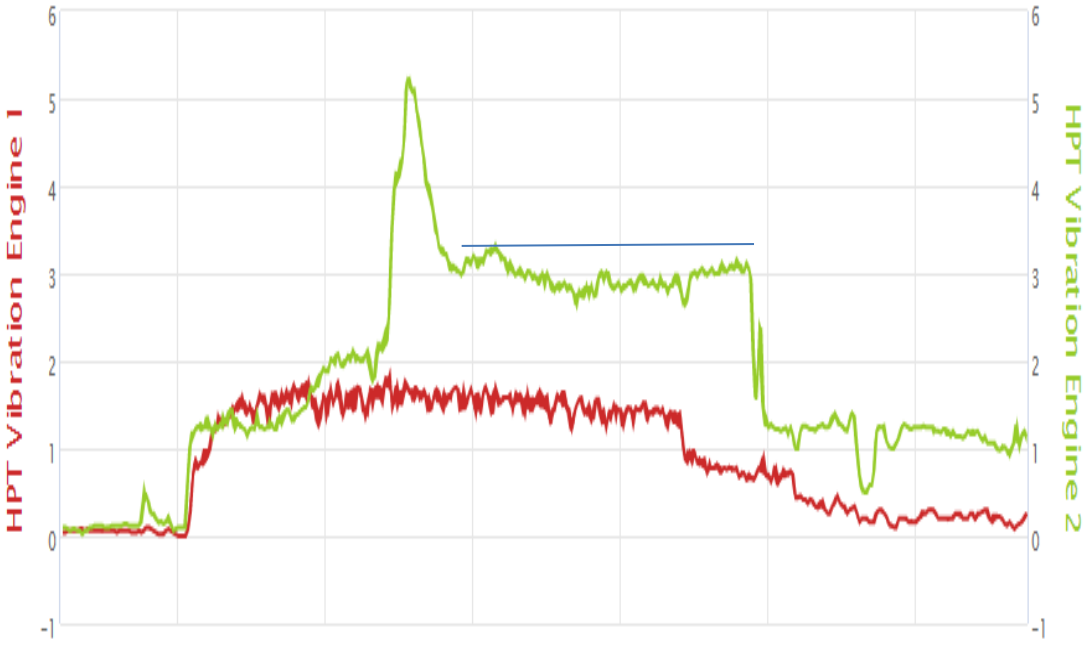

Figure 7: The Engine 2 High pressure turbine vibration gradually decreased over a period of 90 seconds

At 10:26 h, the aircraft levelled off at FL290. Engines 1 & 2 N1 showed to be operating normally at 85%.

At 10:28 h, engine 2 N1 decreased to 68% uncommanded [sic] and then increased to 85% over a period of 5 seconds uncommanded [sic].

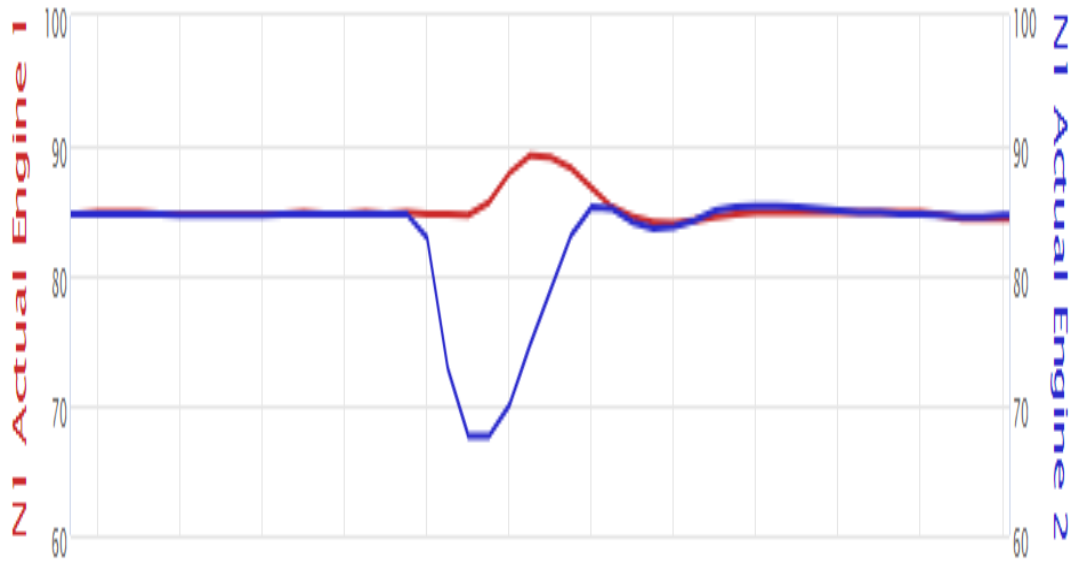

Figure 8: Engine 2 N1 decreased to 68% and then increased to 85% over a period of 5 sec.

At 10:52 h, AZM2316 commenced a right turn for finals DNPO RWY 21. Gear was down and Flaps were set to 15°, Engine 1 & 2 were stable and symmetrical at approximately 57%.

At 10:53:47 h, engine 2 N1 started decreasing to 47% over a period of 5 seconds causing asymmetric engine power. Engine 2 turbine vibration started to increase.

At 10:53:51 h, the A/P was disengaged and the TO/GA [2]was engaged accompanied by an A/P warning. The Engine 2 turbine vibration showed severe vibration of 9.90 units.

At 10:54:16 h, Engine 2 Fan Vibration increased to 4 units.

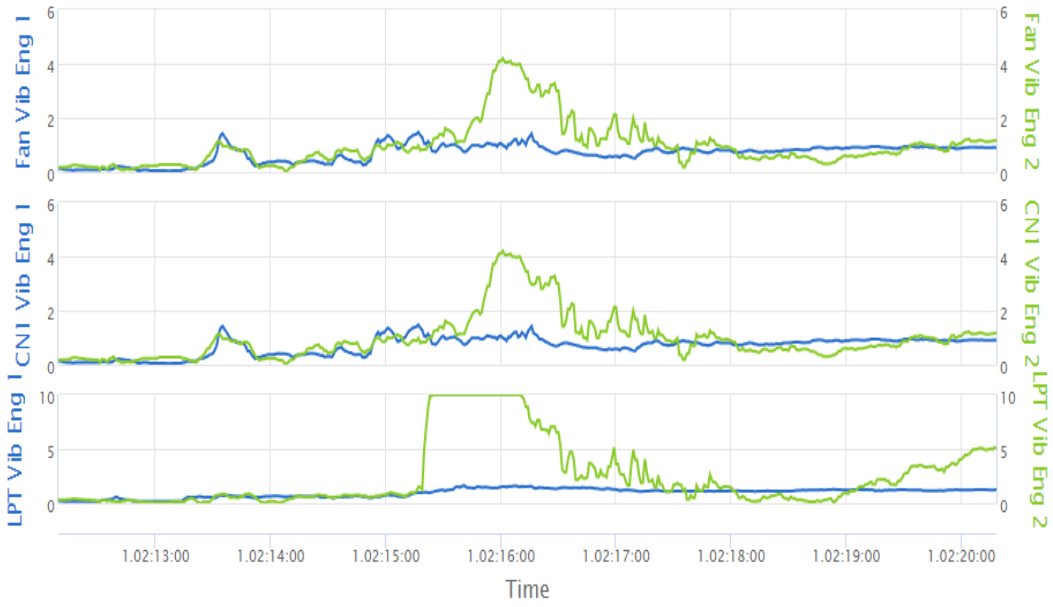

Figure 9: Engine 2 fan, compressor and turbine vibration.

At 10:59 h, Engine 2 Cut-off parameter toggled.

[2] TO/GA (Take-off/Go-around) is an auto pilot/auto throttle setting activating take-off or go-around thrust. Depending upon aircraft type, it may be activated by depressing a switch or by manually moving the thrust levers to the appropriate position.

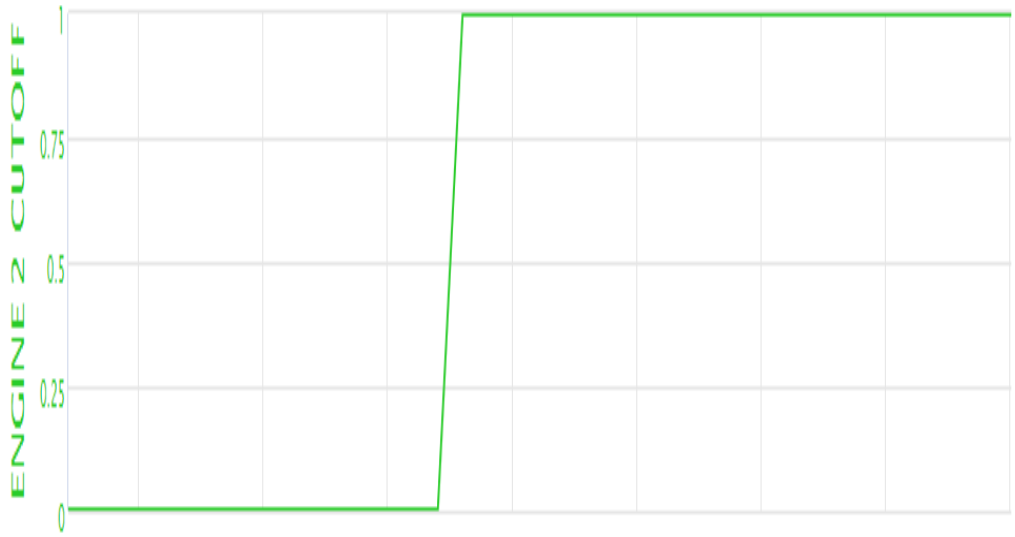

Figure 10: Engine 2 Cut-off parameter toggled

At 11:21 h, during the second landing attempt, the aircraft did not intercept the runway centerline passing through 500 ft RADALT while experiencing high vibrations in Engine 1. At 11:22 h, During the second landing attempt the aircraft crossed the localizer extremely late at a 150 ft AGL and one dot high. 10 seconds later the TO/GA was activated.

At 11:34 h, the aircraft was set for a third landing attempt. Descending through 500 ft RADALT the aircraft was on the Localizer, 0.25 dots below the Glideslope with Flaps 15° and Landing Gear DOWN. At 11:34 h, the aircraft landed uneventfully on runway 21 DNPO.

The Flight path of AZM2316 showing two Go-Arounds with a successful landing on the third approach into Port Harcourt International Airport

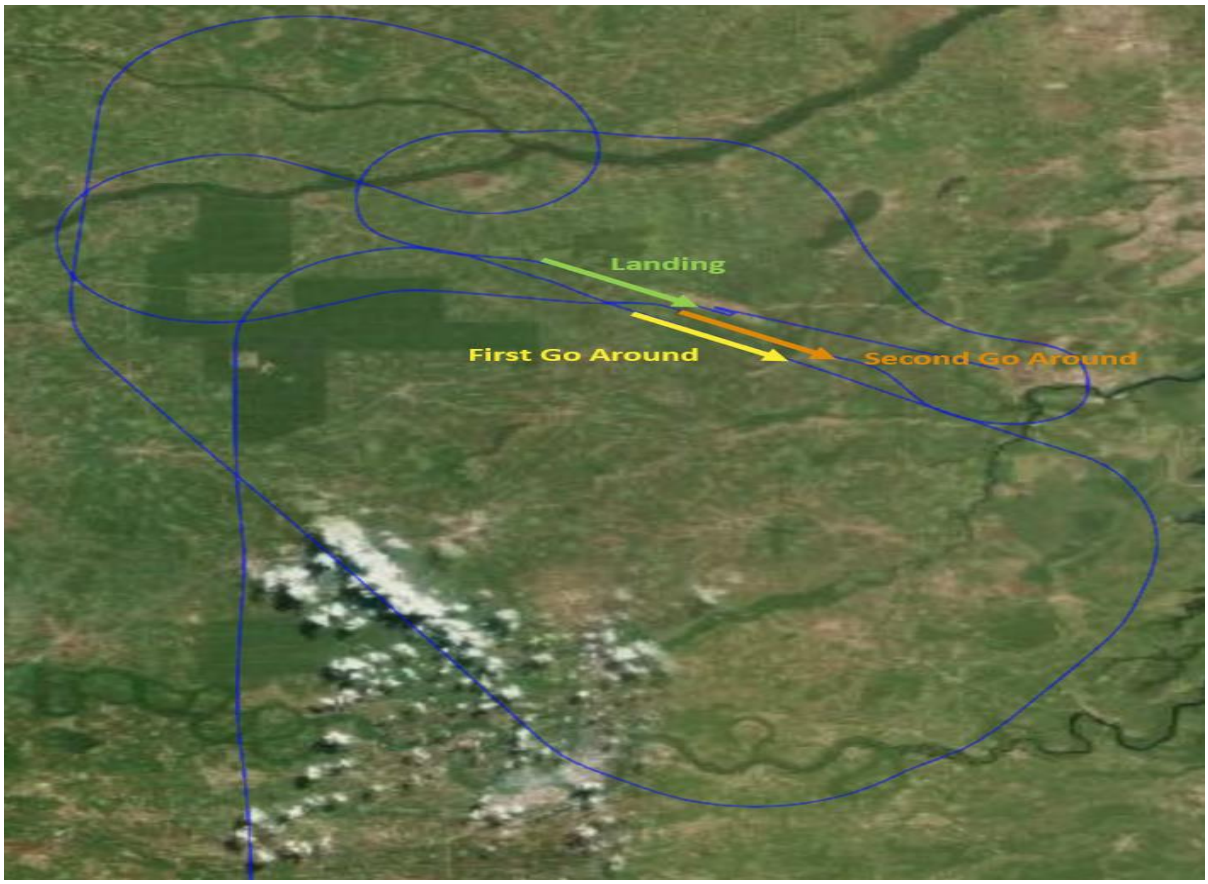

Figure 11: The Flight path of AZM 2316 showing two Go-Arounds with a successful landing on the third approach

1.12 Wreckage and impact information

The aircraft landed safely on runway 21 and taxied to the apron with no physical damage.

Figure 12: The aircraft after the incident

1.13 Medical and pathological information

No medical or pathological tests were conducted on the crew.

1.14 Fire

There was no pre or post incident fire.

1.15 Survival aspects

The aircraft landed safely on runway 21 after the third attempt.

The Aerodrome Rescue and Fire Fighting Service (ARFFS) had already positioned close to runway 21. After landing, the aircraft taxied to the apron, escorted by the ARFFS where the occupants disembarked unassisted and uninjured.

1.16 Test and research

1.16.1 Borescope inspection report on number two engine

Soon after the occurrence, a Borescope Inspection (BSI) was carried out on the number two engine by Aero Contractors Nigeria limited.

The result of the BSI is as presented below:

S/N	Item	Location	Number	Findings	Remark
1	Fan Blade	Inlet	38	All fan blades dirty	Serviceable
2	Combustion Chamber	S10-S15		Dome discoloration and carbon deposit	Serviceable
3	HPT Nozzle Guide Vanes	S10-S15	46	Burns and missing material on L/E of NGVs NGV T/E Slots delamination White metallic chips around most NGVs	Not Serviceable
4	HPT Blades	S17, S18	72	Missing Codep coating mainly on L/E of all blades burned, missing pieces and rubbing discourager seal	Not Serviceable

Notes:

- This engine experienced an In-Flight Shutdown due vibrations

- Oil spillage found on inner side of the turbine exhaust sleeve and the flame arrestor found missing
- After full video of borescope inspections, we could suspect number 4 and number 5 bearing failure. See Appendix 1: Borescope inspection report on number two engine.

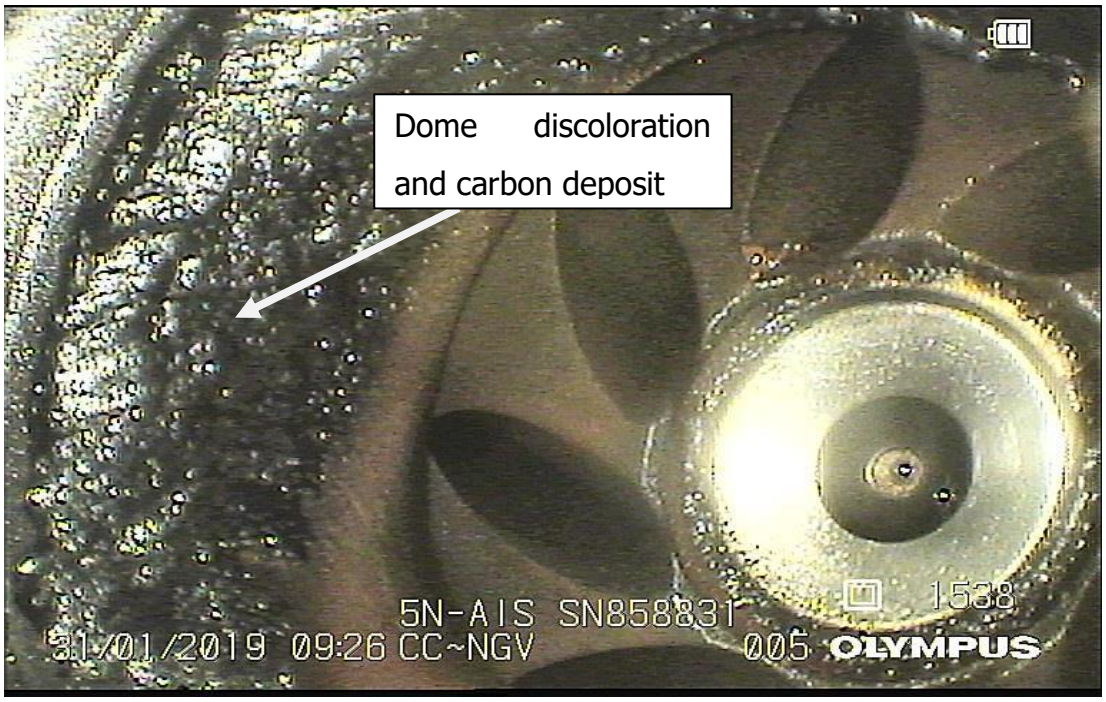

Figure 13: Combustor Nozzle- Dome discoloration and carbon deposit around the Nozzle Guide Vane

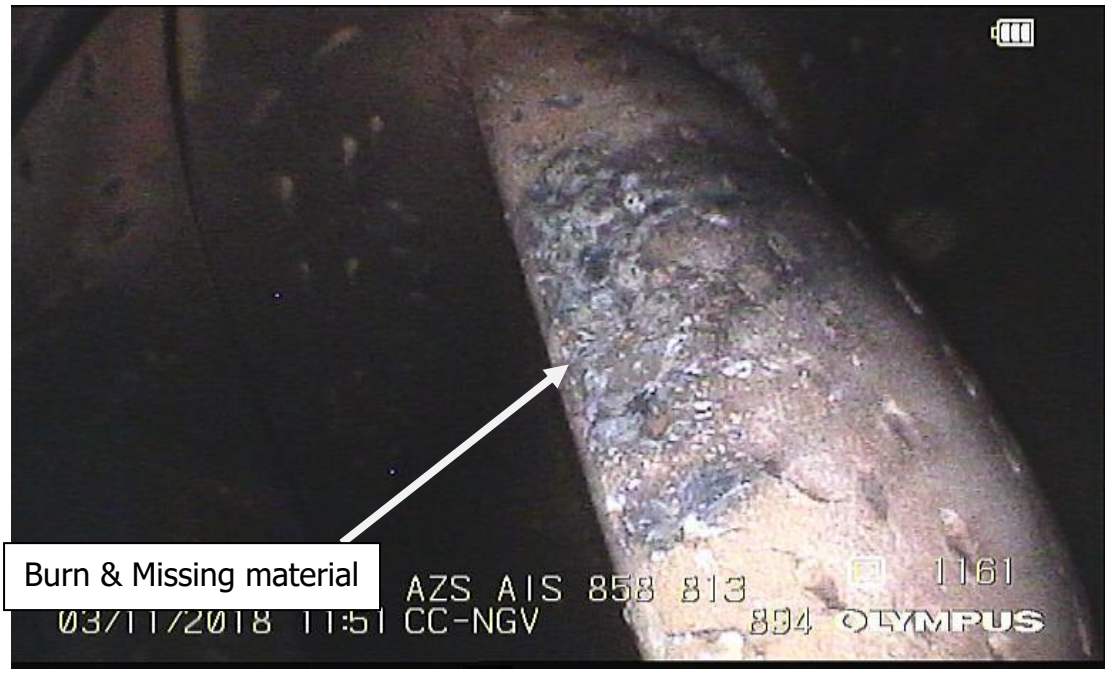

Figure 14: Burn and missing material of the HPT nozzle

Figure 15: Trailing edge slots delamination and missing codep coating of HPT blade

Figure 16: Nozzle Guide Vanes Leading edge and Preservation Oil

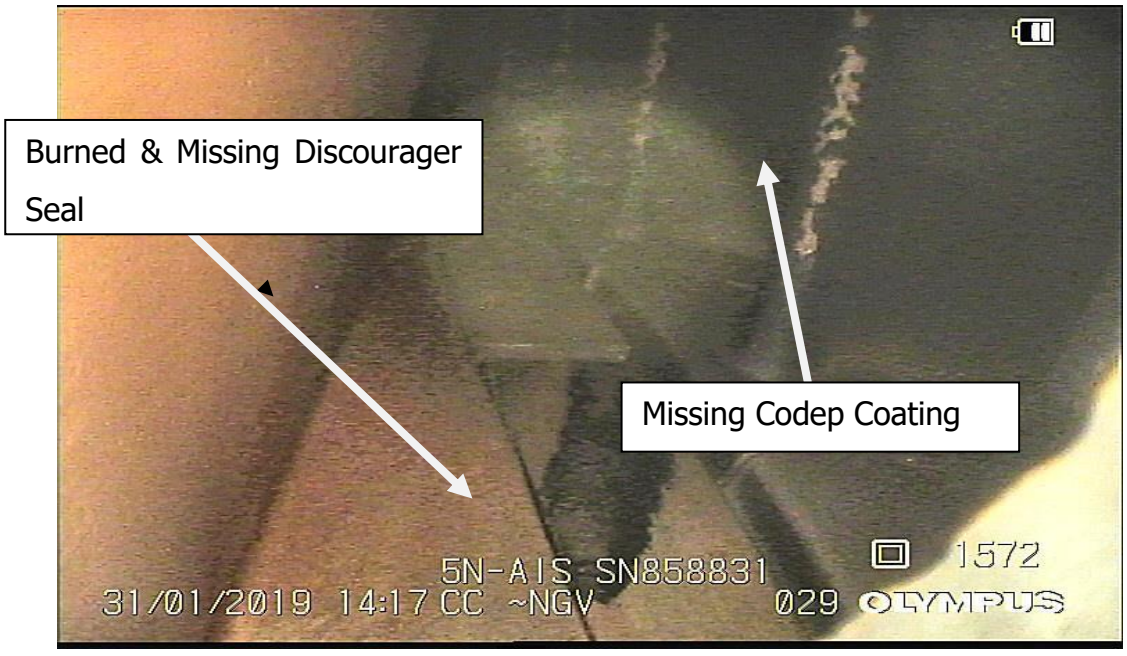

Figure 17: Burned and missing discourager seal

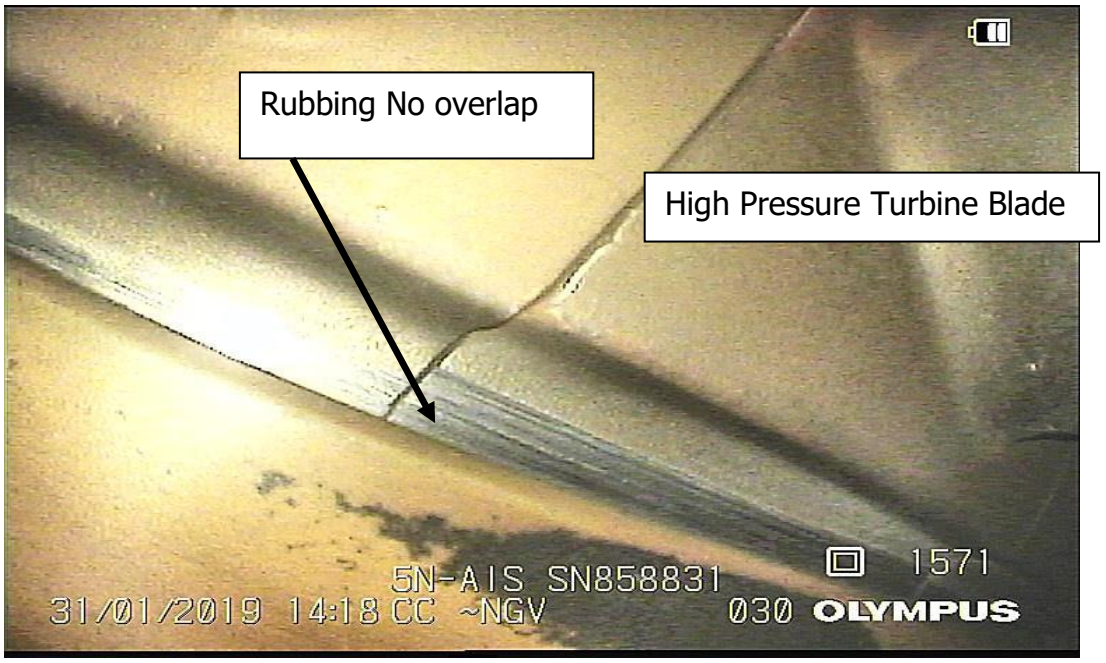

Figure 18: Rubbing no overlap of high pressure turbine blade

1.16.2 Condition of the magnetic chip detector after the occurrence

Metallic particles were found on the number two engine magnetic chip detector Aft Sump after the occurrence.

Figure 19: Number two engine Magnetic Chip Detector aft sump showing metallic particles

1.16.3 Number 2 engine shop disassembly report

After the occurrence Azman Air took the engine to Skybus Aviation Inc. maintenance and repair facility based at Bournemouth International Airport in the United Kingdom for exchange. Below is the initial engine disassembly report[3]:

High Pressure Compressor (HPC) Rotor

Blades stages 1-9 found heavy tip rub see following pictures.

[3] The report sent was the initial report, as the engine was deemed beyond economical repair and the cost to do the full strip down on this engine would be in the region of US $100,000 the decision was made not continue.

Figure 20: High Pressure Compressor Blades stages 1-9 heavy tip rub

Figure 21: High Pressure Compressor Blades tip rub

High pressure Compressor (HPC) front cases

Heavy rub noted on cases and stationary Air seals Stage 1-5 due to HPC rotor and Blades making contact with cases after No.4 Bearing failure. See Pictures below.

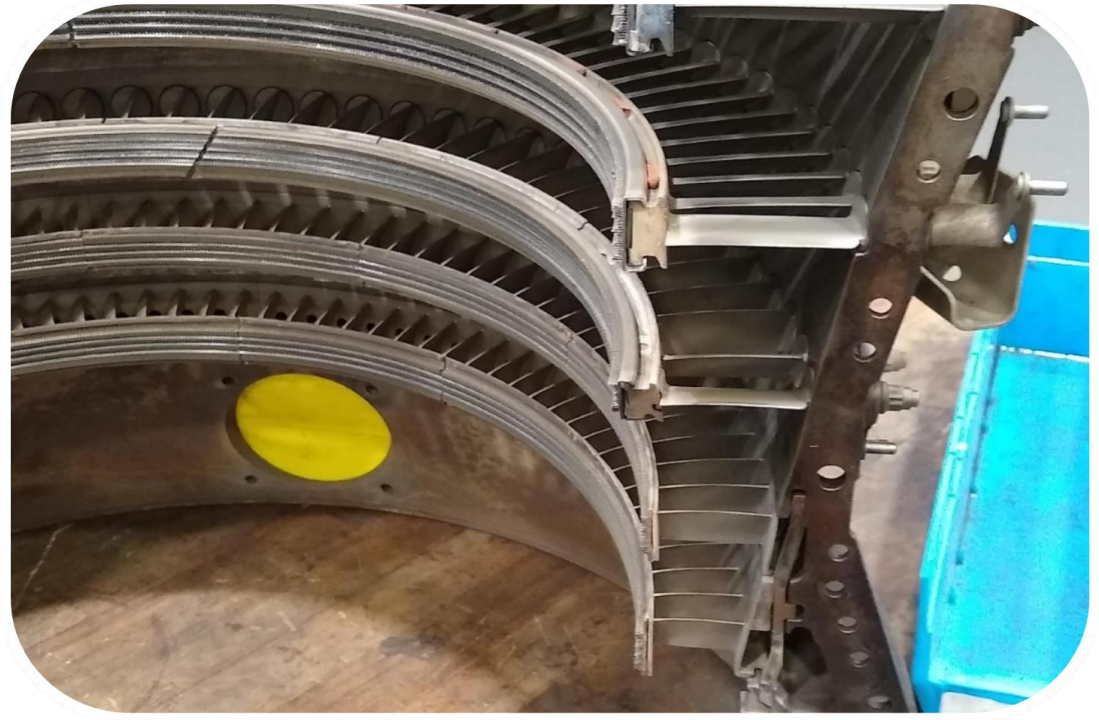

Figure 22: High pressure Compressor Heavy rub on Cases and stationary Air seals Stage 1-5

Figure 23: High pressure Compressor Heavy rub on Cases

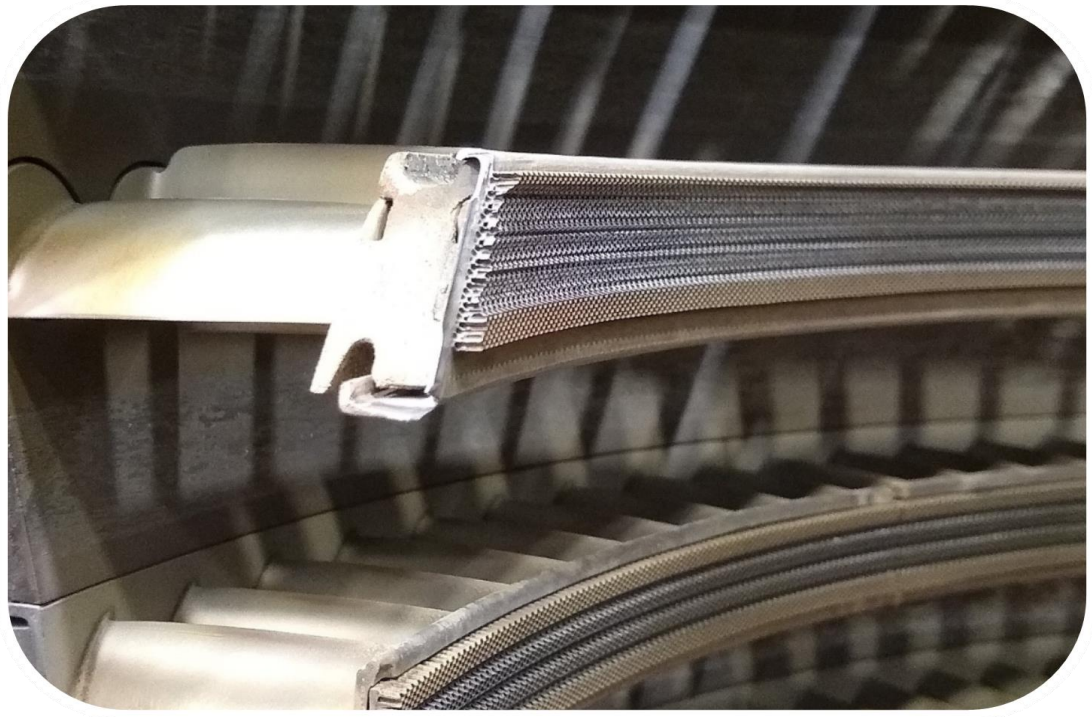

Figure 24: High pressure Compressor rub on Cases

High pressure Compressor (HPC) rear cases heavy rub noted on cases due to HPC rotor and blades making contact with cases after No.4 bearing failure.

See Pictures below.

Figure 25: High pressure Compressor (HPC) blades rear cases heavy rub

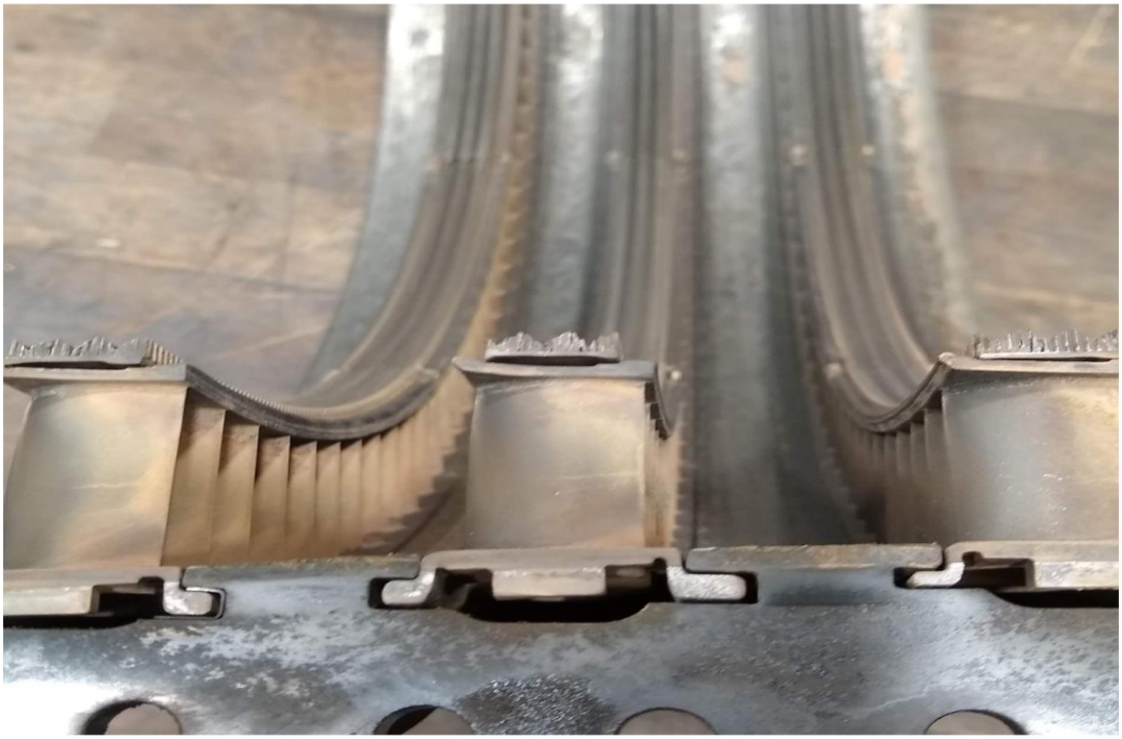

Figure 26: High pressure Compressor (HPC) blades rear cases rub

High Pressure Turbine (HPT) Rotor

Heavy Blade Tip Rub noted due to HPT Blades coming in contact with Shroud segments and also extensive damage to rear shaft. No restrictions found in HPT Rear shaft oil holes

HPT Shroud support and Stage 1 LPT Nozzle

Heavy rub noted on shroud segments due to HPT Rotor Blade contact post No.4 Bearing failure.

Lube Unit Chip Detectors.

AFT Sump – Metal found (post No.4 Bearing Failure).

Forward Sump - Found Clear.

Accessory Gear Box (AGB)/Transfer Gear Box (TGB) - Found Clear.

Oil Type - To be confirmed by customer.

1.17 Organizational and management information

1.17.1 Azman Air Services Limited

Azman Air Services Limited is a privately owned Nigerian Airline founded in 2010. The company was issued Air Operators Certificate (AOC) on 12th May, 2014 with No. AAS/AOC/05-14/01 in accordance with the Nigeria Civil Aviation Regulations (Nig. CARs).

The Airline commenced operation on 15th May, 2014. The Operation and Principal Maintenance base is located in Kano where it maintains operational and airworthiness support facilities appropriate for the area and type of operation.

Azman Air Services currently operates scheduled domestic flights. The Airline has five (5) aircraft in its fleet, comprising of two Boeing 737-500, two Boeing 737-300 and an Airbus A340.

1.17.1.1 Crew Composition

Excerpts from Azman Air Services Operations Manual Part A Chapter 5

5.1.3 Crew Scheduling

A flight crew member is prohibited from operating an aircraft if not qualified for duty in accordance with the requirements specified in Chapter 6 of the airline's Operations Manual. Azman Air's crew assignment process:

a) ensures that flight crew will operate in compliance with the following:

i) flight crew qualifications requirements and any additional requirements of the NCAA, as applicable

ii) crew composition requirements;

iii) flight/duty time limitations;

iv) inexperienced flight crew pairing limitations;

v) fitness for duty.

1.17.1.2 Flight crew qualification requirements

Excerpts from Azman Air Services Operations Manual Part A Chapter 6

qualification requirements

6.2 FLIGHT CREW
6.2.1 COMMANDERS
6.2.1.1 The minimum qualification and experience requirements for pilots to act as Commanders of Azman Air operated commercial flights are:

a) An Airline Transport Pilot's Licence (Aeroplane), Age below 65 years;

b) Successful completion of an appropriate command course if upgrading;

c) Attainment of a specified minimum experience level for those pilots upgrading to Commander from within the company or for those going as direct entry Commanders;

d) Valid Instrument rating;

e) Valid recurrent checks;

f) Valid route and aerodrome competence

g) To be a Commander on the Azman Air Aircraft with upgrade from within Azman these are the requirements:

i) License ATPL

ii) Medical First Class Fitness

iii) Total Flying Hours 3,000 hours

iv) Minimum Jet aircraft hours 1,500 hours

v) Hours on Type 500 hours

h) In addition to (g) Captains newly employed by Azman Air are expected to have a minimum of 500 hours Pilot In Command Time on type.

1.17. 1.3 737 Classic Quick Reference Handbook Flight Crew Operations Manual

7.2 Engine Limit or Surge or Stall

1 Autothrottle (if engaged) . . . . . Disengage

2 Thrust lever

(affected engine) . . . . Confirm. . . . . Retard until engine indications stay within limits or the thrust lever is closed

3 Choose one: Engine Limit or Surge or Stall Condition: One or more of these occur:

•Engine indications are abnormal

•Engine indications are rapidly approaching or exceeding limits

•Abnormal engine noises are heard, possibly with airframe vibration

•There is no response to thrust lever movement or the response is abnormal

•Flames in the engine inlet or exhaust are reported.

Objective: To attempt to recover normal engine operation or shut down the engine if recovery is not possible.

Engine indications are stabilized and EGT is stabilized or decreasing:

►►Go to step 4

Engine indications are abnormal or EGT continues to increase:

►►Go to step 7

4 Thrust lever

(affected engine). . . . . Advance slowly

Check that RPM and EGT follow thrust lever movement.

5 Run the engine normally or at a reduced thrust setting that is surge and stall free.

6 Choose one:

Engine runs normally:

Engine runs at reduced thrust:

Transponder mode selector. . . . . TA This step prevents climb commands which can exceed reduced thrust performance capability.

7 Engine start lever (affected engine) . . . . Confirm. . . . . CUTOFF

8 PACK switch (affected side) . . . . . OFF

This causes the operating pack to regulate to high flow in flight with flaps up.

9 Choose one:

APU is available for start:

APU . . . . . START When APU is running:

APU GEN switch

(affected side) . . . . . .ON

►►Go to step 10

APU is not available:

►►Go to step 10

10 Balance fuel as needed.

11 Transponder mode selector . . . . . TA

This step prevents climb commands which can exceed single engine performance capability.

12 ISOLATION VALVE switch . . . . . Verify AUTO

This will ensure bleed air is available to both wings if wing anti-ice is needed.

13 A restart may be attempted if there is N1 rotation and no abnormal airframe vibration.

14 Choose one:

Restart will be attempted:

►►Go to the Engine In-Flight Start checklist on page 7.22

Restart will not be attempted:

►►Go to step 15

15 Plan to land at the nearest suitable airport.

►►Go to the One Engine Inoperative Landing checklist on page 7.29

ENGINE OVERHEAT ►►8.5
Engine Tailpipe Fire ►►8.6
■ ■ ■ ■

1.17. 1.4 737 Classic Quick Reference Handbook Flight Crew Operations Manual

7.27 Engine Oil Filter Bypass

Condition: Oil filter contamination can cause oil to bypass the oil filter.

1 Autothrottle (if engaged). . . . . .Disengage

2 Thrust lever (affected engine) . . . . . Confirm . . . . . Retard slowly until the OIL FILTER BYPASS light extinguishes or the thrust lever is closed

3 Choose one:

OIL FILTER BYPASS light extinguishes:

►►Go to step 4

OIL FILTER BYPASS light stays illuminated:

►►Go to the Engine Failure or Shutdown checklist on page 7.14

■ ■ ■ ■

4 Run the engine at reduced thrust to keep the light extinguished.

5 Transponder mode selector . . . . . TA

This step prevents climb commands which can exceed reduced thrust performance capability.

■ ■ ■ ■

1.17.2.4 737 Flight Crew Operations Manual

7.20 Engine High Vibration

Condition: The vibration level is more than 4.0 units.

Airframe vibration may or may not be felt.

1 Choose one:

*In **icing** conditions:*

►►Go to step 2

***Not** in icing conditions:*

►►Go to step 6

Do the following on one engine at a time.

4 Thrust lever (affected engine) . . . . . Retard to 45% N1for five seconds, then slowly advance to a minimum of 80% N1while monitoring engine vibration

*Vibration **decreases**:*

Continue normal operation.

■ ■ ■ ■

*Vibration does **not** decrease:*

►►Go to step 7

6 Autothrottle (if engaged). . . . . .Disengage)

7 Thrust lever (affected engine) . . . . Confirm. . . . . Retard to maintain vibration levels below 4 units or until the thrust lever is closed

8 Transponder mode selector . . . . . TA

This step prevents climb commands which can exceed reduced thrust performance capability.

■ ■ ■ ■

1.17.1.5 737 Flight Crew Operations Manual Part B Non-Normal Checklist Section 8, pages 8.2 thru 8.4

ENGINE FIRE or Engine Severe Damage or Separation

ENGINE FIRE or Engine Severe Damage or Separation Condition:

One or more of these occur:

•Engine fire warning

•Airframe vibrations with abnormal engine indications

•Engine separation.

FIRE WARN and Engine 1 - Fire

FIRE WARN and Engine 2 - Fire

Engine 1 - Fire and FIRE WARN

Engine 2 - Fire and FIRE WARN

1 Auto throttle (if engaged). . . . . .Disengage

2 Thrust lever (affected engine) . . . . . Confirm . . . . . Close

3 Engine start lever (affected engine) . . . . . Confirm . . . CUTOFF

4 Engine fire switch (affected engine) . . . . . Confirm . . . . . Pull to manually unlock the engine fire switch, press the override and pull.

5 If the engine fire switch or ENG OVERHEAT light is illuminated:

Engine fire switch . . . . . Rotate to the stop and hold for 1 second

If after 30 seconds the engine fire switch or ENG OVERHEAT light stays illuminated:

Engine fire switch. . . . . Rotate to the other stop and hold for 1 second - - - - - - - - - - - - - - - - - -

ENGINE FIRE or Engine Severe Damage or Separation

ENGINE FIRE or Engine Severe Damage or Separation Condition:

One or more of these occur:

•Engine fire warning

•Airframe vibrations with abnormal engine indications

•Engine separation.

6 Choose one:

7 ISOLATION VALVE switch . . . . . CLOSE

8 PACK switch (affected side) . . . . . OFF

This causes the operating pack to regulate to high flow in flight with the flaps up.

9 APU BLEED air switch . . . . . OFF

High airframe vibration occurs and continues after the engine is shut down:

Without delay, reduce airspeed and descend to a safe altitude which results in an acceptable vibration level.

Note: If high vibration returns and further airspeed reduction and descent are not practical, increasing airspeed may reduce the vibration.

►► *Go to step 7*

High airframe vibration does not occur or does not continue after the engine is shut down:

►► *Go to step 7*

10 Choose one:

11 Balance fuel as needed.

12 Transponder mode selector . . . . . TA

This step prevents climb commands which can exceed single engine performance capability.

13 ISOLATION VALVE switch (after the fire has been extinguished) . . . . . AUTO

This ensures bleed air is available to both wings if wing anti-ice is needed.

14 Plan to land at the nearest suitable airport.

►► *Go to the One Engine Inoperative Landing checklist on page 7.29*

■ ■ ■ ■

1.17.1.6 Flight Crew Operations Manual Part B section 7, pages 7.29 thru 7.30

One Engine Inoperative Landing

Condition: Landing must be made with one engine inoperative.

1 Plan a flaps 15 landing.

2 Set VREF 15.

3 Check the Non-Normal Configuration Landing Distance table in the Advisory Information section of the Performance In flight chapter.

4 Maintain VREF 15 + wind additive on final approach to assure sufficient maneuver margin and speed for go-around. The minimum wind additive is 5 knots.

5 When engine anti-ice is needed, use on the operating engine only.

6 Checklist Complete Except Deferred Items

Descent Checklist CPCS airplanes Pressurization . . . . . CAB ALT ___, LAND ALT ___

DCPCS airplanes Pressurization . . . . . LAND ALT ___

Recall . . . . . Checked

Autobrake . . . . . ___

Landing data . . . . . VREF 15 ___, Minimums ___

Approach briefing . . . . . Completed

▼ *Continued on next page* ▼

One Engine Inoperative Landing Condition: Landing must be made with one engine inoperative.

Deferred Items
Additional Go-Around Thrust

Choose one:

No Engine Bleed Landing When below 10,000 feet: WING ANTI-ICE switch . . . . . OFF ISOLATION VALVE switch . . . . . CLOSE

BLEED 1 air switch . . . . . OFF

Left PACK switch . . . . . AUTO

BLEED 2 air switch . . . . . OFF

Go-Around Procedure Review Do the normal go–around procedure except: Use flaps 1.

▼*One Engine Inoperative Landing continued*▼

Additional go-around thrust is needed:

►►*Go to No Engine Bleed Landing below*

Additional go-around thrust is not needed:

►►*Go to Go-Around Procedure Review below*

Do not open the APU bleed air valve if the engine fire switch is illuminated.

APU BLEED air switch . . . . . ON

Maintain VREF 15 + 5 knots until reaching flap retraction altitude.

Limit bank angle to 15° when airspeed is less than VREF 15 + 15 knots or the minimum maneuver speed, whichever is lower.

Accelerate to flaps 1 maneuvering speed before flap retraction.

Approach Checklist Altimeters . . . . . .

Additional Deferred Item GROUND PROXIMITY FLAP INHIBIT switch. . . . FLAP INHIBIT

Landing Checklist ENGINE START switch (operating engine) . . . . . CONT

Speed brake . . . . . .ARMED

Landing gear . . . . . Down

Flaps. . . . . .15, Green light

1.17.1.7 Azman Air Flight Data Monitoring (FDM) programme

Excerpts from Azman Air Safety Management System Manual

2.2.5 Flight Safety Analysis Program

Safety department is allocated responsibility for the development and management of the Flight Safety Program. The Flight Safety Officer reports directly to the Safety Manager on issues relating to flight safety (the Flight Safety Officer is an active line pilot). The Safety Manager is designated as the independent manager who is responsible for the performance of the Flight Safety Analysis Program. The Flight Safety Program includes acquisition of safety information to include the Flight Data Monitoring system during flight operations, where hazards and potentially hazardous conditions are monitored and subsequent corrective or preventive actions respectively are implemented, and regular communication and liaison with operational managers will be conducted in relation to the flight safety program to ensure continuous review of the safety of operations. The following listed provide for the systematic acquisition, correlation and analysis of flight safety information:

- *Aircraft flight data recorder (FDR) readouts;*
- *Confidential flight and cabin crew operational safety reports;*
- *Flight and cabin crew interviews;*
- *Results from Safety audits;*
- *Flight and cabin crew evaluation reports;*
- *Aircraft engineering and maintenance reports;*
- *FDR and CVR readouts.*

The Flight Safety Program provides for the regular analytical information and data sharing with the relevant operational managers to ensure that any potential hazards are addressed. The Flight Safety Analysis Program works in conjunction with all other safety programs within the organization. The Safety department shall keep a hazard database which provides for historical analysis and trend monitoring. As safety management is consistently implemented throughout the organization, on equivalent basis with all the other management system of the organization, all operational managers share the same responsibility to ensure that any hazards are eliminated or mitigation efforts are conducted to ensure that the risk of operation is kept to a level that is acceptable. Relevant information from the Flight Safety Program shall be distributed to appropriate personnel to ensure that the recommended corrective actions are timely conducted. The information is disseminated to the operational personnel through the Safety communication system as documented in the SMS Manual. Significant issues emanating from the Flight Safety Program will be tabled by the Safety department to Senior and Executive Management through the management review process. This information should be timely shared and actioned on such that timely continual improvement is implemented. Safety Department shall provide, through the shared computer, a depository for all electronic safety data. The data shall be securely protected with regular backup on storage devices to ensure the availability of safety data whenever it is required. Backup of the Safety computer shall be conducted in accordance with the organizational backup system. Where it is necessary, Safety department shall conduct investigations of accidents and incidents, and this information will be used to ensure continual improvement and the provision of the necessary defences to avoid future occurrence. Investigation will also be conducted in accordance with the same process. The accident investigation process will be conducted in accordance with the procedures detailed in Section 2.3.5.0 of this manual.

2.2.5.1 Flight Data Monitoring Program

An additional source of operational data for Azman Air comes from our Flight Data Monitoring (FDM) program. FDM is the routine downloading and systematic analysis of data collected from our aircraft Flight Data Recorders (FDR) for quality assurance purposes. FDM is a Flight Data Analysis (FDA) program.

The purpose of our FDM program is to detect latent patterns of behavior amongst flight crews, weaknesses in the ATC system, and anomalies in aircraft performance which can cause aircraft accidents. The main objective of the program is to improve safety by identifying trends, not individual acts. Our FDM program encourages adherence to Standard Operating Procedures and deters non-standard behavior to enhance flight safety. It confirms the effectiveness of Azman Air training program. It detects adverse trends in any part of the flight regime and thereby facilitates the investigation of minor events that would otherwise go unreported. The FDM program is managed by the Safety Department. The data is downloaded from the FDR of each aircraft by Maintenance every seven (7) days on a line check and uploaded to the Azman Air Service Provider for processing.

After processing the processed information is made available on a web site for consulting purposes. A full statistic report of the events for each fleet is then presented periodically to Azman Air. The Safety Department accesses the website periodically. When an anomaly is detected, information is sent to the Manager, Flight Operations and Chief Pilot, to prepare corrective action. This is then entered into our Safety Risk Management process. After receiving the full report for each fleet, a meeting is arranged with Flight Operations to discuss the report and the relevant issues, together with proposed corrective and preventive actions. Information from the Flight Safety Analysis program will be distributed to all relevant operational personnel to ensure timely implementation of corrective action. The program is non-punitive, confidential, anonymous, and does not jeopardize a crew member's career. The program is founded on a bond of trust between our Senior Management, flight crew and the Safety Department. This trust is an integral component of the positive

safety culture at Azman Air. Any significant issues arising from the Flight Safety Analysis program shall be presented for senior management review to be considered where executive management input is required.

1.17.1.7.2 Azman Air Flight Data Monitoring (FDM) reports

FLTECHNICS provided the FDM services to Azman Air for its fleet of B737 aircraft. The investigation reviewed the FDM reports for 5N-AIS and two other B737 aircraft in the fleet of the operator covering a period from 18th May, 2018 to 2nd January, 2019.

The flight data monitoring reports of 5N-AIS pertinent to this occurrence specifically concerning the number two engine vibration limit guide revealed the following:

S/N	Period	Fan vibration Limit Guide recorded	Code	Compressor/Turbine vibration Limit Guide recorded	Code
1	18-23 May 2018 (21 flights)	10 times	BTA1013	Nil	Nil
2	30 September - 03 October 2018 (21 flights)	Nil	Nil	41 times (LPT vibration limit guide occurred in all the 21 flights)	BTA1011
3	05 – 08 October 2018 (23 flights)			Turbine vibration limit guide occurred in all the 23 flights	BTA 1011
4	12-24 October, 2018 (43 flights)	Nil	Nil	27 times (turbine vibration limit guide occurred in 13 flights)	BTA1011
5	24-31 October 2018 (23 flights)	3 times	BTA1013	Nil	Nil
6	14-18 December 2018 (23 flights)	Nil	Nil	40 times	BTA 1011

Note: The engine vibration limit guide incidences occurred more than once in a flight in many of the instances.

In addition to the number two engine vibration limit guide, the FDM reports also indicated that 117 fan vibration limit guide of number one engine occurred in 65 flights that the airline operated between 1st November, 2018 and 2nd January, 2019. The FDM reports also indicated anomalies including multiple ILS deviation warnings, Localiser deviation warnings, ground proximity warnings, GPWS sink rate, High rate of descent below 2000 ft, Low power on approach, Speed brake not armed below 800 and Approach speed high below 500 ft. See Appendix 1: Flight Data Monitoring Report.

The operator did not provide any evidence of rectification actions as per 2.2.5.1 of its SMS Manual to address the anomalies contained in the FDM reports submitted to it by FLTECHNICS.

1.17.2 Nigerian Civil Aviation Authority (NCAA)

NCAA is the government agency saddled with the regulation and oversight of aviation activities in Nigeria. The NCAA is set up by the Nigerian Civil Aviation Act (2006) which enables the Director General of NCAA to make regulations in aviation. The current regulations are as enshrined in the Nigeria Civil Aviation Regulations Nig. CARs 2015. Relevant sections of the Nig. CARs guide activities of personnel and service providers in the aviation industry. Oversight activities are achieved by continuous and periodic audits by inspectors of the NCAA.

1.17.2.1 Nig. CARs 2009 Safety management system with FDM requirement for Air Operator Certificate holders

9.2.2.11 SAFETY MANAGEMENT SYSTEM

(a) An AOC holder shall establish and maintain a safety management system.

(b) An AOC holder that operates aircraft with a maximum certificated take-off mass of more than 27,000 kg shall include a flight data monitoring programme as part of its safety management system.

(c) The AOC holder's flight data analysis programme shall be non-punitive and contain adequate safeguards [SIC] to protect the source(s) of the data.

1.17.2.2 Nig. CARs 2015 Safety Management System without FDM requirement for Air Operator Certificate holders

Safety Management System

9.2.2.10—(a) An AOC holder shall implement a safety management system acceptable to the Authority as outlined in Nig. CARs Part 20

(b) The AOC holder's flight data analysis programme shall be non-punitive [SIC] and contain adequate safeguards to protect the source(s) of data.

1.18 Additional information

1.18.1 Flight Data Monitoring/Flight Data Analysis programme

1.18.1.1 Definitions

Flight Data Analysis is founded on **Operational Flight Data Monitoring (OFDM)** which in North America has become known as **Flight Operations Quality Assurance (FOQA).** It is a process which routinely captures and analyses recorded data in order to improve the safety of flight operations.

Flight Data Analysis. A process of analysing recorded flight data in order to improve the safety of flight operations (ICAO Annex 6 – Operation of aircraft).

Operational Flight Data Monitoring

(OFDM) is the pro-active use of recorded flight data from routine operations to improve aviation safety.

1.18.1.2 Description of OFDM

The aviation community is under constant pressure to achieve safety improvement. Operational Flight Data Monitoring (OFDM) offers an efficient solution to this challenge. OFDM is to some extent a quality assurance process but also has a vital safety Management dimension. It involves the downloading and analysis of aircraft flight recorder data on a regular and routine basis. It is widely used by aircraft operators throughout the world to inform and facilitate corrective actions in a range of operational areas by offering the ability to track and evaluate flight operations trends, identify risk precursors, and take the appropriate remedial action. The potential of OFDM programmes has been materially enhanced by the rapid expansion in the number of data parameters which can be captured using digital recorders now routinely carried on aircraft.

1.18.1.3 Benefits of OFDM

FDM strongly contributes to increased flight safety and operational efficiency by:

- Providing data to help in the prevention of incidents and accidents. Fewer flight accidents not only reduce material costs, but also keep passengers' confidence high.
- Improved operational insight: providing the means to identify potential risks and to modify pilot training programs accordingly.
- Improved fuel consumption: FDM provides the ability to identify and make adjustments to company operating procedures or specific aircraft with unusually high fuel burn rates.
- Reduction in unnecessary maintenance and repairs: FDM data can be used to help reduce the need for unscheduled maintenance resulting in lower maintenance costs and increased aircraft availability.
- Improved ground conditions and airports: in certain cases, airlines can use the data captured from their FDM program to support requested changes to air traffic control and airport procedures.

- Reduced number of ACARS messages: non-critical data (e.g. take-off reports, stable cruise reports) that are sent via ACARS messages can be acquired, recorded and transmitted via flight data monitoring equipment.
- Reduced reliance on flight data recording: flight-monitoring data can be transmitted automatically over the internet and be analyzed without delay.
- Adherence to noise restrictions: flight data monitoring helps airlines demonstrate adherence to noise restrictions in terms of being able to verify or deny actual infringement, and avoid incurring fines.
- Improved monitoring of flight crew's cosmic radiation exposure: flight data monitoring can assist in tracking radiation exposure.
- Flight data Monitoring (FDM) programmes provide a powerful tool for the proactive hazard identification.

Reference: www.skybrary.aero/index.php/Flight_Data_Monitoring_(FDM)

1.18.2 Safety management requirements of Annex 6

3.3 Safety management

Note. —Annex 19 includes safety management provisions for air operators. Further guidance is contained in the Safety Management Manual (SMM) (Doc 9859).

3.3.2 An operator of an aeroplane of a maximum certificated take-off mass in excess of 27 000 kg shall establish and maintain a flight data analysis programme as part of its safety management system.

Note. —An operator may contract the operation of a flight data analysis programme to another party while retaining overall responsibility for the maintenance of such a programme.

3.3.3 A flight data analysis programme shall be non-punitive and contain adequate safeguards to protect the source(s) of the data.

Note 1. —Guidance on the establishment of flight data analysis programmes is included in the Manual on Flight Data Analysis Programmes (FDAP) (Doc 10000).

Reference: Annex 6 to the Convention on International Civil Aviation (Operations of Aircraft), Part I – International Commercial Air Transport – Aeroplanes ninth edition July 2010 Amendment 38 of 13 November 2014.

1.18.3 Situation Awareness (SA)

Situation Awareness SA is defined as the continuous extraction of environmental information, the integration of this information with previous knowledge to form a coherent mental picture, and the use of that picture in directing further perception and anticipating future events.

Situational Awareness (SA) means appreciating all you need to know about what is going on when the full scope of your task - flying, controlling or maintaining an aircraft is taken into account. More specifically and in the context of complex operational environments, SA is concerned with the person's knowledge of particular task-related events and phenomena. For example, for a fighter pilot SA means knowing about the threats and intentions of enemy forces as well as the status of his/her own aircraft. Therefore, in operational terms, SA means having an understanding of the current state and dynamics of a system and being able to anticipate future change and developments.

A general definition of SA is that it is the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning and the projection of their status in the near future

https://www.skybrary.aero/index.php/Situational_Awareness

2.0 ANALYSIS

2.1 General

The aircraft had a valid Certificate of Airworthiness.

A review of the number two engine's Airworthiness Directives compliance record, previous oil filter changes, three previous Borescope Inspections and the oil consumption records over a period of four months prior to the date of occurrence did not reveal any discrepancy.

The CVR data related to the incident was found overwritten.

This analysis focuses mainly on the flight crew qualification and composition, conduct of the flight, number two engine vibration, surge and oil filter by-pass; and the implementation of Azman Air Flight Data Monitoring (FDM) programme.

2.2 Flight crew qualification and composition

Azman Air Services Operations Manual Part A chapter 6 qualification requirements states that, captains newly employed by Azman Air are expected to have a minimum of 500 hours Pilot-In-Command time on type.

However, the Pilot had 92 hours on aircraft type. Therefore, the Pilot did not meet the minimum Azman Air qualification requirement to be a Pilot-In-Command.

In addition, the flight crew pairing for the flight, exhibited a weakness of the flight crew experience level on the aircraft type (B737); with the Pilot-in-command having 92 hours on type and the Co-pilot having 431 hours on type respectively.

Azman Air Operations Manual Part A section 5.1.3 (Crew Scheduling) states that a flight crew member is prohibited from operating an aircraft if not qualified for duty in accordance with the requirements specified in Chapter 6 of the airline's Operations

Manual. Azman Air crew assignment process includes crew composition requirements and inexperienced flight crew composition limitations amongst others. However, the operations manual does not specify the criteria for determining the experience level required for crew composition.

Therefore, the investigation could not establish the criteria used in the crew composition as the Azman Air Operations Manual Part A was not specific.

2.3 Conduct of the flight

At 10:10 h, AZM2316 departed DNMM for DNPO. About six minutes after airborne, the number two engine indicated turbine vibration of 5.26 units (vibration >3 is considered abnormal and >4 is considered critical) over a period of 40 seconds. It decreased and stabilised at 3 units over a period of 90 seconds which was not noticed by the crew. Five minutes later, AZM2316 levelled off at FL290 with both engines operating normally at 85% N1.

FDR information showed that at about 18 minutes after take-off, the number two engine N1 decreased to 68% and then increased to 85% over a period of 5 seconds uncommanded. This corresponds to the point at which the crew heard a loud bang with airframe vibration and a yaw to the right. There was enough time for good instrument scan to spot any abnormal indications for making appropriate decision or taking necessary actions immediately. However, the scan was not enough to detect the abnormal indications immediately from the take-off phase.

The investigation believed that the crew did not maintain continuous scan on the engine instruments from take-off to the time they heard the bang from the number two engine.

The flight crew did not recognise that there was a surge in the number two engine, even with the loud bang, airframe vibration and subsequent yaw of the aircraft. This might have been connected to loss of situational awareness. Had the flight crew

utilised available technical resources on-board, the condition could have been fixed by referring to appropriate (Engine limits or surge or stall) checklist prescribed in the company's Quick Reference Handbook (QRH) pages 7.2 through 7.5 in which an engine shutdown was recommended if the problem could not be fixed and eventually landing was imminent as soon as practicable. In this case, a return to departure airport was recommended because the aerodrome of departure is the first alternate aerodrome as AZM2316 was still in communication with Lagos Area Control at the time.

As the flight progressed to DNPO, AZM 2316 commenced a right turn for finals RWY 21, both engines were stable and symmetrical at approximately 57% N1. At about 4.5 NM, AZM2316 was configured for landing (gears down, flap 15°, 150 kts). About a minute later number two engine N1 decreased to 47% within a period of 5 seconds causing asymmetric engine power and the turbine vibration to increase. At this point, the crew heard a loud deafening bang accompanied by severe vibration and a yaw to the right. Four seconds later, the number two engine turbine vibration showed severe vibration of 9.90 units, the autopilot disengaged as the TO/GA engaged accompanied by autopilot warning. About 25 seconds later, the number two engine N1 further decreased to 30%, its fan vibration increased to 4 units. The crew then executed a missed approach and were vectored to fly heading 350° by the ATC.

During the Go-Around, as the flight crew executed the "ENGINE FIRE or Engine Severe Damage or Separation" checklist, the number two engine Oil Filter Bypass Light illuminated which led the crew to abandon the ENGINE FIRE or Engine Severe Damage or Separation" checklist and carried out a precautionary shutdown of number two engine in accordance with the ENGINE OIL FILTER BYPASS checklist. A good airmanship dictates to always go for the most appropriate checklist and accomplish it to the end before switching to another checklist. Had the flight crew accomplished the "Engine Limit Surge or Stall" checklist, it would have directed them to shut down the number two engine without necessarily going through the Oil Filter

Bypass procedures, thereby saving their time, easing the tensions in the cockpit at that time and also prepare them for landing through the appropriate landing and Go-Around checklists.

During the second landing attempt, the crew were preoccupied by the limitation of 10° bank, the aircraft failed to intercept the runway centerline passing through 500 ft RADALT (Radio Altimeter) while experiencing high vibrations in number one engine. Subsequently, the aircraft crossed the localizer extremely late at 150 ft AGL (Above Ground Level) and one dot high. As the approach became unstable the crew executed another missed approach. About 40 minutes after the first approach, AZM2316 landed on RWY 21 on the third attempt.

2.4 Number two engine vibration, engine surge and oil filter by-pass

Abnormal engine vibration, sudden or progressive, is a positive indication of engine malfunction. Abnormal vibration can be caused by compressor or turbine blade damage, rotor imbalance, or other problems. Early warning of engine malfunction permits corrective action before extensive damage results.

According to the B737 Airplane Maintenance Manual (AMM) 71-00-47/101, severe vibration of the engine core (compressor or turbine) will eventually lead to the removal of the engine from service to save it from severe damage.

In this case, the Azman Air Flight Data Monitoring (FDM) reports showed trends of severe levels of Compressor/Turbine vibration guide occurring over a period of eight months prior to the date of this occurrence. The operator did not provide any evidence of taking the recommended corrective actions when FDM anomalies were found in accordance with the company's FDM programme.

As the operator continued operation of the number two engine without carrying out the necessary corrective actions to save the engine, on this incident flight, about six minutes after take-off, the number two engine experienced severe turbine vibration

of 5.6 units. About 12 minutes later, while the aircraft already in cruise phase, there was a compressor surge or stall of the number two engine which was occasioned by a momentary drop of N1 from 85% to 68% accompanied by a loud bang, yaw to the right and airframe vibration. The N1 returned to normal five seconds later and the flight continued to Port Harcourt. However, as the aircraft was configured for landing runway 21, the number two engine N1 momentarily dropped again, this time from 57% to 47% causing asymmetric engine power, accompanied by another loud bang, severe vibrations and yaw to the right. At this time, the number two engine's turbine vibration began rising. About 25 seconds later, the number 2 engine N1 further decrease to 30%, its Fan vibration reached 4.0 units. The number two engine at this point was losing power as the N1 continued decreasing. As the flight progressed into a Go-Around, not later than five minutes, the number two engine oil filter bypass light came on. This was an indication of a clogged scavenge oil filter element and an impending filter bypass. The crew followed relevant QRH and shut the number two engine in flight.

As there was severe turbine vibration, it is probable that, the number 4 and number 5 bearings, which are located in the aft sump of the engine, gave in. Consequently, pieces of particles from the damaged bearings or seals clogged the aft scavenge oil filter leading to the illumination of the oil filter bypass warning light in flight.

Azman's FDM programme reports had already revealed the trend of the status of 5N-AIS engine number 2 but not all the recommended maintenance actions in the early stages were implemented. The implementation of these would have saved the number two engine from the severe damage.

The post occurrence Borescope Inspection carried out on the engine suspected possible damage of the number 4 and number 5 bearings. The post-occurrence inspection of the Magnetic Chip Detector located in the aft sump also indicated trapped metallic particles. This could be an indication of bearing failure in the aft sump of the engine. The initial number 2 engine disassembly report confirmed that

the number 4 bearing was damaged and there were signs of rubbing of the HPC and HPT blade tips on the engine casing. Consequently, the engine suffered severe vibration leading to its malfunction during the approach phase of the incident flight.

2.5 Flight Data Monitoring (FDM) programme

Flight Data Monitoring (FDM) or Flight Data Analysis (FDA) is a pro-active process which routinely captures and analyses flight data in order to improve the safety of flight operations. FDM programme forms part of an Air Operator Certificate (AOC) holder's safety management system. It is widely used by aircraft operators throughout the world to inform and facilitate corrective actions in a range of operational areas by offering the ability to track and evaluate flight operations trends, identify risk precursors, and take the appropriate remedial action. FDM strongly contributes to increased flight safety and operational efficiency by providing data to help in the prevention of incidents and accidents, providing the means to identify potential risks and to modify pilot training programs accordingly and as a powerful tool for the proactive hazard identification, amongst other benefits.

2.5.1 Azman Air Flight Data Monitoring (FDM) programme

Azman Air has documented an FDM programme as part of its Safety Management System (SMS) manual. The FDM programme entails the following activities:

- Download of the FDR of each aircraft is carried out every seven (7) days on a line check and uploaded to FLTECHNICS server for processing.
- A full statistic report of the events for each fleet is then presented periodically to Azman Air.
- After receiving the full report for each fleet, a meeting is arranged with Flight Operations to discuss the report and the relevant issues, together with proposed corrective and preventive actions.

- Information from the Flight Safety Analysis program will be distributed to all relevant operational personnel to ensure timely implementation of corrective action.
- When an anomaly is detected, information is sent to the Manager, Flight Operations and Chief Pilot, to prepare corrective action. This is then entered into the Safety Risk Management process.
- Any significant issues arising from the Flight Safety Analysis program shall be presented for senior management review to be considered where executive management input is required.

Azman Air might have implemented the analysis portion of its FDM programme, but failed to appropriately utilise the FDM reports to take the recommended remedial actions to improve safety of its flights. In almost the whole period from 5th to 24th October 2018, the FDM reports showed that the Compressor/Turbine vibration limit guide of number two engine occurred in all the 66 flights this aircraft operated. Between 14th and 18th December 2018, less than 2 weeks to the occurrence, the number two engine compressor/turbine vibration occurred 40 times in all the 23 flights. It is imperative to note that in just one flight, the vibration limit guides occurred several times.

In addition to the number two engine vibration limit guide, the FDM reports also indicated that 117 fan vibration limit guide of number one engine occurred in 65 flights that the airline operated between 1st November, 2018 and 2nd January, 2019. The FDM reports also indicated anomalies including multiple ILS deviation warnings, Localiser deviation warnings, ground proximity warnings, GPWS sink rate, High rate of descent below 2000 ft, Low power on approach, Speed brake not armed below 800 and Approach speed high below 500 ft.

However, despite the glaring anomalies observed in the various FDM reports obtained for about a period of eight months prior to this occurrence, Azman Air did

not provide evidence of any action towards rectification of the anomalies as stated in subsection 2.2.5.1 of its SMS manual.

Unfortunately, this did not raise the necessary alarm to trigger corrective actions by the management. It appears the incidences of engine vibration and other deviations reported by the FDM became "a new normal" and neither the flight crew nor the airline management paid attention anymore. This attitude negates the principles of safety culture as stated in Azman Air Safety Policy.

2.5.2 Oversight of Azman Air's Flight Data Monitoring program

The Azman Air's FDM report of 18th to 13rd May 2018 was part of the documents submitted to the Nigerian Civil Aviation Authority (NCAA) during the renewal of the certificate of airworthiness (C of A) of 5N-AIS. The said FDM report contained a number of anomalies which should have been considered prior to the C of A renewal. There should have been questions relating to the actions taken by the operator to address the anomalies in the said FDM report. Furthermore, there is no evidence of safety audit of the operator's safety management system to ascertain the level of its implementation and the operator's compliance with the safety management requirements of Nigeria Civil Aviation Regulations.

2.5.3 Regulatory requirements of Flight Data Monitoring program

This investigation observed that paragraph 9.2.2.11(b) of the defunct Nigeria Civil Aviation Regulations (Nig. CARs) 2009 contained provisions which mandated an AOC holder that operated aircraft with a maximum certificated take-off mass of more than 27,000 kg to include a flight data monitoring programme as part of its safety management system. However, paragraph 9.2.2.10 of the Nig. CARs 2015 somehow omitted the provision that mandates an AOC holder that operates aircraft with a maximum certificated take-off mass of more than 27,000 kg to include a flight data monitoring programme as part of its safety management system.

This forms a difference with paragraph 3.3.2 of the International Civil Aviation Organisation (ICAO) Standards and Recommended Practices (SARPs) as contained in Annex 6, Part I of the Convention to the International Civil Aviation.

3.0 CONCLUSION

3.1 Findings

1. The Pilot had 92 hours on the aircraft type while the Co-Pilot had 431 hours on the aircraft type.
2. The Pilot did not meet the 500 hour minimum on type Azman Air qualification requirement to be a Pilot-In-Command.
3. The aircraft had a valid Certificate of Airworthiness.
4. At about six minutes after takeoff, the number two engine indicated turbine vibration over a period of 40 seconds after which it decreased and stabilised over a period of 90 seconds.
5. The turbine vibrations were not recognised by the crew.
6. At about 18 minutes after take-off, the number two Engine N1 decreased to 68% with a loud bang followed by a yaw to the right and then increased to 85% over a period of 5 seconds.
7. On approach into DNPO number two engine N1 decreased to 47% within a period of 5 seconds causing asymmetric engine power and the low turbine vibration increased.
8. At about 4.5 NM to DNPO, the flight crew heard a loud bang again with number two engine turbine vibration of 9.90 units. The aircraft yawed violently to the right and the autopilot disconnected.
9. The flight crew did not recognise the operational status of the number two engine even with the loud bang, airframe vibration and subsequent yaw of the aircraft.
10. The Pilot stabilised the aircraft and handed over controls to the Co-pilot to enable him assess the situation.
11. The pilot took back controls and elected to execute a missed approach.
12. The flight crew applied the "Engine Limit Surge or Stall" checklist, when they noticed the Oil Filter Bypass light ON.

13. The flight crew discontinued the "Engine Limit Surge or Stall" checklist and switched to the "Oil Filter Bypass Light" checklist.
14. The flight crew carried out a precautionary shut down of No. 2 engine.
15. The crew declared emergency to the ATC.
16. During the second landing attempt, the aircraft failed to intercept the runway centerline passing through 500 ft RADALT (Radio Altimeter).
17. There was also high vibration in number 1 engine.
18. The flight crew executed two missed approaches and landed on the third attempt, 40 minutes after the first approach.
19. The CVR was overwritten.
20. Azman Air Operations Manual Part A does not specify the criteria for determining the experience level required for crew composition.
21. The FDM reports within the period of 8 months preceding the occurrence showed trends of vibrations on the number two engine.
22. Post-occurrence inspection of the aft sump Magnetic Chip Detector showed trapped metallic particles.
23. Oil filter bypass light illuminated in flight leading to the precautionary in-flight shutdown of number two engine during the first Go-around.
24. Paragraph 9.2.2.10 of the Nig. CARs 2015 somehow omitted the provision that mandates an AOC holder that operates aircraft with a maximum certificated take-off mass of more than 27,000 kg to include a flight data monitoring programme as part of its safety management system in difference with 3.3.2 of ICAO Annex 6, Part I.
25. The operator did not provide any evidence of rectification actions as per 2.2.5.1 of its SMS Manual to address the anomalies contained in the FDM reports submitted to it by FLTECHNICS.
26. There was no evidence of safety audit of Azman Air's safety management system to ascertain the level of its implementation and the operator's compliance with the safety management requirements of the Nigeria Civil Aviation Regulations.

3.2 Causal factor

The failure of number 4 and 5 bearings of engine number 2 leading to loss of power during approach.

3.3 Contributory factors

1. The failure to recognise the abnormal engine conditions (surge) during cruise phase and hence, not making appropriate decision. This might have been connected to the loss of situational awareness.
2. Non implementation of the Flight Data Monitoring programme in accordance with section 2.2.5.1 of Azman Air Safety Management System Manual.
3. Non rectification of the number two engine vibration anomalies recorded over a period of 8 months.
4. Inadequate regulatory oversight of the Azman Air Safety Management System.

4.0 SAFETY RECOMMENDATIONS

4.1 Interim Safety Recommendations issued in the Preliminary Report

4.1.1 Immediate Safety Recommendation (issued 4th February, 2019)

NCAA should ensure Azman Air Services Limited immediately takes further necessary step to ensure that it reviews the training of the incident flight crew in order to be able to understand and recognise engine failure/malfunctions and its effect (s) at every phase of flight before they are allowed to resume flight duties.

No Action taken by the NCAA

4.2 Safety Recommendations issued in this report

4.2.1 Safety Recommendation 2021-001

Azman Air Services Limited should implement fully, the Flight Data Monitoring programme as stipulated in 2.2.5 of the Azman Air Safety Management System Manual, including holding regular FDM meetings, timely corrective actions on the anomalies identified in FDM reports, distribution to all concerned personnel for timely corrective actions, entering the anomalies into the safety risk management process and presentation during the senior management review, if relevant.

4.2.2 Safety Recommendation 2021-002

Azman Air Services Limited should review relevant portions of its Operations Manual, including 5.1.3 of Azman Air Ltd Operations Manual Part A to specify the criteria for determining the experience level required for crew composition.

4.2.3 Safety Recommendation 2021-003

Azman Air Services Limited should ensure that all its flight crew possess the requisite qualification as contained in Azman Air Services Operations Manual Part A chapter 6 before they are assigned flight duties/responsibilities.

4.2.4 Safety Recommendation 2021-004

Azman Air Services Limited should develop strategies to implement its safety policy, including the propagation of safety culture in the organisation.

4.2.5 Safety Recommendation 2021-005

Azman Air should include the one/single engine out manoeuvre during approach in its simulator curriculum.

4.2.6 Safety Recommendation 2021-006

Nigerian Civil Aviation Authority should carry out safety audit of Azman Air Ltd to ensure all the elements of safety management system are implemented accordingly.

4.2.7 Safety Recommendation 2021-007

Nigerian Civil Aviation Authority should review the Nigeria Civil Aviation Regulation (Nig. CARs) 2015 to meet the International Standards and Recommended Practices as contained in the Annexes to the Chicago Conventions, including 9.2.2.10 to incorporate the provisions that mandated an AOC holder that operates aircraft with a maximum certificated take-off mass of more than 27,000 kg to include a flight data monitoring programme as part of its safety management system.

APPENDICES

Appendix 1: Flight Data Monitoring (FDM) Report

FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	**992/28-05-18**		
Company:	***"AZMAN AIR"***		
Aircraft - Model:	B737-5L9	**Tail: 5N-AIS**	**MSN: 29235**
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 18.05.2018 - 23.05.2018 (21 flt.)		
FDR Removal Date:	23.05.2018		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
18-May-18	5N-AIS	ZQ2336	DNBK - ABV	15:03 - 15:58		WARN072,WARN073,43B
18-May-18	5N-AIS	ZQ2327	ABV - LOS	16:41 - 17:40		43B
18-May-18	5N-AIS	ZQ0000	LOS - KAN	18:47 - 20:18		BTA1013,56B,43B
20-May-18	5N-AIS	ZQ2310	KAN - LOS	06:39 - 07:57		43B
20-May-18	5N-AIS	ZQ2313	LOS - KAN	08:57 - 10:31		ok
20-May-18	5N-AIS	ZQ2332	KAN - ABV	11:16 - 12:06		BTA1013,56B
20-May-18	5N-AIS	ZQ2335	ABV - DNBK	12:43 - 13:42		BTA1013,WARN007,WARN051,22G,43B
20-May-18	5N-AIS	ZQ2336	DNBK - ABV	14:26 - 15:24		BTA1013,43B
20-May-18	5N-AIS	ZQ2327	ABV - LOS	16:01 - 16:58		ok
20-May-18	5N-AIS	ZQ2315	LOS - KAN	17:58 - 19:33		BTA1013,30A
21-May-18	5N-AIS	ZQ2332	KAN - ABV	12:44 - 13:25		43B
21-May-18	5N-AIS	ZQ2331	ABV - KAN	13:54 - 14:44		BTA1013
21-May-18	5N-AIS	ZQ2312	KAN - LOS	15:18 - 16:32		43B
21-May-18	5N-AIS	ZQ2315	LOS - KAN	17:00 - 18:28		BTA1013
22-May-18	5N-AIS	ZQ2310	KAN - LOS	06:33 - 07:51		43B,WARN024
22-May-18	5N-AIS	ZQ2313	LOS - KAN	09:02 - 10:32		WARN024,43B
22-May-18	5N-AIS	ZQ2332	KAN - ABV	11:20 - 12:07		BTA1013,06A,06B,43B,WARN024
22-May-18	5N-AIS	ZQ2331	ABV - KAN	13:37 - 14:29		43B,WARN024
22-May-18	5N-AIS	ZQ2312	KAN - LOS	15:15 - 17:13		22G,WARN007,WARN051,56B,06B,56C,75A,43B,WARN024,BTA1013
22-May-18	5N-AIS	ZQ2311	LOS - KAN	18:35 - 20:13		43B,WARN024
23-May-18	5N-AIS	ZQ2310	KAN - LOS	06:31 - 09:22		BTA1013,43B

DONE BY:			
Name:	I.Saveljev	**Signature:**	**Date (dd/mm/aa):**
Registry:	FDR Processing & Analysis Group		28.05.2018

CONTENTS

Date	A/C Type	A/C Reg.	Flight No	Route	Pilot	Event No	Event Descript.	Attach.Graf. Numeric
18-May-18	B737-500	5N-AIS	ZQ2336	DNBK - ABV		WARN072	ILS DEV WARNING	√
18-May-18	B737-500	5N-AIS	ZQ2336	DNBK - ABV		WARN073	LOC DEV WARNING	√
18-May-18	B737-500	5N-AIS	ZQ2336	DNBK - ABV		43B	Speedbrake not armed below 800 & Flaps	√
18-May-18	B737-500	5N-AIS	ZQ2327	ABV - LOS		43B	Speedbrake not armed below 800 & Flaps	√
18-May-18	B737-500	5N-AIS	ZQ0000	LOS - KAN		BTA1013	Fan Vibration Limit Guide Eng.Right	√
18-May-18	B737-500	5N-AIS	ZQ0000	LOS - KAN		56B	Deviation above glideslope [dots]	√
18-May-18	B737-500	5N-AIS	ZQ0000	LOS - KAN		43B	Speedbrake not armed below 800 & Flaps	√
20-May-18	B737-500	5N-AIS	ZQ2310	KAN - LOS		43B	Speedbrake not armed below 800 & Flaps	√
20-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		BTA1013	Fan Vibration Limit Guide Eng.Right	√
20-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		56B	Deviation above glideslope [dots]	√
20-May-18	B737-500	5N-AIS	ZQ2335	ABV - DNBK		BTA1013	Fan Vibration Limit Guide Eng.Right	√
20-May-18	B737-500	5N-AIS	ZQ2335	ABV - DNBK		WARN007	Ground Proximity Warning	√
20-May-18	B737-500	5N-AIS	ZQ2335	ABV - DNBK		WARN051	GPWS SINK RATE	√
20-May-18	B737-500	5N-AIS	ZQ2335	ABV - DNBK		22G	High rate of descent below 2000 ft.	√
20-May-18	B737-500	5N-AIS	ZQ2335	ABV - DNBK		43B	Speedbrake not armed below 800 & Flaps	√
20-May-18	B737-500	5N-AIS	ZQ2336	DNBK - ABV		BTA1013	Fan Vibration Limit Guide Eng.Right	√
20-May-18	B737-500	5N-AIS	ZQ2336	DNBK - ABV		43B	Speedbrake not armed below 800 & Flaps	√
20-May-18	B737-500	5N-AIS	ZQ2315	LOS - KAN		BTA1013	Fan Vibration Limit Guide Eng.Right	√
20-May-18	B737-500	5N-AIS	ZQ2315	LOS - KAN		30A	AP desengage at the Alt. below 140ft.	√
21-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		43B	Speedbrake not armed below 800 & Flaps	√
21-May-18	B737-500	5N-AIS	ZQ2331	ABV - KAN		BTA1013	Fan Vibration Limit Guide Eng.Right	√
21-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		43B	Speedbrake not armed below 800 & Flaps	√
21-May-18	B737-500	5N-AIS	ZQ2315	LOS - KAN		BTA1013	Fan Vibration Limit Guide Eng.Right	√
22-May-18	B737-500	5N-AIS	ZQ2310	KAN - LOS		43B	Speedbrake not armed below 800 & Flaps	√
22-May-18	B737-500	5N-AIS	ZQ2310	KAN - LOS		WARN024	Terrain Aware Not Available Warning	√
22-May-18	B737-500	5N-AIS	ZQ2313	LOS - KAN		WARN024	Terrain Aware Not Available Warning	√
22-May-18	B737-500	5N-AIS	ZQ2313	LOS - KAN		43B	Speedbrake not armed below 800 & Flaps	√
22-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		BTA1013	Fan Vibration Limit Guide Eng.Right	√
22-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		06A	Appr. Speed high withing 90sec. of TD	√
22-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		06B	Approach Speed high below 500ft.	√
22-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		43B	Speedbrake not armed below 800 & Flaps	√
22-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		WARN024	Terrain Aware Not Available Warning	√
22-May-18	B737-500	5N-AIS	ZQ2331	ABV - KAN		43B	Speedbrake not armed below 800 & Flaps	√
22-May-18	B737-500	5N-AIS	ZQ2331	ABV - KAN		WARN024	Terrain Aware Not Available Warning	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		22G	High rate of descent below 2000 ft.	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		WARN051	GPWS SINK RATE	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		WARN007	Ground Proximity Warning	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		56B	Deviation above glideslope [dots]	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		06B	Approach Speed high below 500ft.	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		56C	LOC deviation during ILS Approach	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		75A	Low power on approach	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		43B	Speedbrake not armed below 800 & Flaps	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		WARN024	Terrain Aware Not Available Warning	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		BTA1013	Fan Vibration Limit Guide Eng.Right	√
22-May-18	B737-500	5N-AIS	ZQ2311	LOS - KAN		43B	Speedbrake not armed below 800 & Flaps	√
22-May-18	B737-500	5N-AIS	ZQ2311	LOS - KAN		WARN024	Terrain Aware Not Available Warning	√
23-May-18	B737-500	5N-AIS	ZQ2310	KAN - LOS		BTA1013	Fan Vibration Limit Guide Eng.Right	√
23-May-18	B737-500	5N-AIS	ZQ2310	KAN - LOS		43B	Speedbrake not armed below 800 & Flaps	√

Contents

FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	128/1/07-09-18		
Company:	*"AZMAN AIR"*		
Aircraft - Model:	B737-5L9	Tail: 5N-AIS	MSN: 29235
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 28.08.2018 - 05.09.2018 (22 flt.)		
FDR Removal Date:	05-09-18		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
No read-out flight data 29.08-01.09.2018						
1-Sep-18	5N-AIS	ZQ2325	ABV - LOS	16:15 - 16:34		No T/O, cruise, descent data
2-Sep-18	5N-AIS	ZQ2319	LOS - KAD	06:04 - 07:15		ok
2-Sep-18	5N-AIS	ZQ2318	KAD - LOS	07:48 - 08:50		ok
2-Sep-18	5N-AIS	ZQ2324	LOS - ABV	09:46 - 10:55		ok
2-Sep-18	5N-AIS	ZQ2337	ABV - MIU	11:40 - 13:07		ok
2-Sep-18	5N-AIS	ZQ2338	MIU - ABV	13:41 - 14:54		ok
2-Sep-18	5N-AIS	ZQ2331	ABV - KAN	15:37 - 16:31		ok
2-Sep-18	5N-AIS	ZQ2312	KAN - LOS	17:17 - 18:49		ok
3-Sep-18	5N-AIS	ZQ2319	LOS - KAD	06:00 - 07:12		ok
3-Sep-18	5N-AIS	ZQ2318	KAD - LOS	07:38 - 08:43		ok
3-Sep-18	5N-AIS	ZQ2324	LOS - ABV	09:59 - 11:13		ok
3-Sep-18	5N-AIS	ZQ2337	ABV - MIU	11:51 - 13:09		ok
3-Sep-18	5N-AIS	ZQ2338	MIU - ABV	13:42 - 14:51		ok
3-Sep-18	5N-AIS	ZQ2325	ABV - LOS	15:23 - 16:22		ok
4-Sep-18	5N-AIS	ZQ2317	LOS - KAD	06:01 - 07:19		ok
4-Sep-18	5N-AIS	ZQ2318	KAD - LOS	07:48 - 08:54		ok
4-Sep-18	5N-AIS	ZQ2324	LOS - ABV	09:44 - 11:04		ok
4-Sep-18	5N-AIS	ZQ2337	ABV - MIU	11:46 - 13:05		ok
4-Sep-18	5N-AIS	ZQ2338	MIU - ABV	13:42 - 14:50		30A
4-Sep-18	5N-AIS	ZQ2325	ABV - LOS	15:38 - 16:46		ok
5-Sep-18	5N-AIS	ZQ2319	LOS - KAD	06:09 - 07:28		ok
5-Sep-18	5N-AIS	ZQ2318	KAD - LOS	07:59 - 09:10		ok

FDS version 10.0.11 ##Str.

08-09-2018 16:19

Job Nr.1281

LFL: AIS A/C: 5N-AIS Flight: ZQ2338 MIU-ABV Date: 04-09-2018 Time: 13:42-14:50

AFPA analysis results

AFPA 5
4 30A AP desengage at the Alt. below 140ft. 65.00 14:48:00
2018-09-04 Duration: 14:48:00 - 14:48:00
CAS: 139.0 RADALT: 65
AIRGRDMAIN: 0 APCMDA: 0 APCMDB: 0 APCWSA: 0 APCWSB: 0

FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	1821/20-09-18		
Company:	*"AZMAN AIR"*		
Aircraft - Model:	B737-5L9	Tail: 6N-AI8	MSN: 28286
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 12.09.2018 - 19.09.2018 (21 flt.)		
FDR Removal Date:	19-09-18		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
No read-out flight data 12.09-18.09.2018						
16-Sep-18	5N-AIS	ZQ2318	KAD - LOS	08:18 - 08:54		No take-off,cruise data, 06D
16-Sep-18	5N-AIS	ZQ2324	LOS - ABV	09:50 - 10:58		ok
16-Sep-18	5N-AIS	ZQ2337	ABV - MIU	11:38 - 13:04		ok
16-Sep-18	5N-AIS	ZQ2338	MIU - ABV	13:54 - 15:07		06D
16-Sep-18	5N-AIS	ZQ2331	ABV - KAN	15:43 - 17:07		ok
16-Sep-18	5N-AIS	ZQ2312	KAN - LOS	17:47 - 19:12		ok
16-Sep-18	5N-AIS	ZQ2315	LOS - KAN	20:00 - 21:37		ok
17-Sep-18	5N-AIS	ZQ2310	KAN - LOS	06:40 - 07:58		ok
17-Sep-18	5N-AIS	ZQ2313	LOS - KAN	08:58 - 10:23		ok
17-Sep-18	5N-AIS	ZQ2332	KAN - ABV	11:13 - 12:00		ok
17-Sep-18	5N-AIS	ZQ2328	ABV - GMO	13:00 - 14:05		22H
17-Sep-18	5N-AIS	ZQ2326	GMO - ABV	14:53 - 15:41		ok
17-Sep-18	5N-AIS	ZQ2325	ABV - LOS	16:37 - 17:35		43A
17-Sep-18	5N-AIS	ZQ2315	LOS - KAN	18:37 - 20:09		ok
18-Sep-18	5N-AIS	ZQ2310	KAN - LOS	06:38 - 08:02		ok
18-Sep-18	5N-AIS	ZQ2313	LOS - KAN	09:02 - 10:33		ok
18-Sep-18	5N-AIS	ZQ2332	KAN - ABV	11:24 - 12:08		ok
18-Sep-18	5N-AIS	ZQ2331	ABV - KAN	13:30 - 14:24		ok
18-Sep-18	5N-AIS	ZQ2312	KAN - LOS	15:24 - 16:55		ok
18-Sep-18	5N-AIS	ZQ2315	LOS - KAN	17:38 - 19:08		ok
19-Sep-18	5N-AIS	ZQ2310	KAN - LOS	06:53 - 08:20		ok

FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	**992/28-05-18**		
Company:	***"AZMAN AIR"***		
Aircraft - Model:	B737-5L9	**Tail: 5N-AIS**	**MSN: 29235**
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 18.05.2018 - 23.05.2018 (21 flt.)		
FDR Removal Date:	23.05.2018		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
18-May-18	5N-AIS	ZQ2336	DNBK - ABV	15:03 - 15:58		**WARN072,WARN073,43B**
18-May-18	5N-AIS	ZQ2327	ABV - LOS	16:41 - 17:40		**43B**
18-May-18	5N-AIS	ZQ0000	LOS - KAN	18:47 - 20:18		**BTA1013,56B,43B**
20-May-18	5N-AIS	ZQ2310	KAN - LOS	06:39 - 07:57		**43B**
20-May-18	5N-AIS	ZQ2313	LOS - KAN	08:57 - 10:31		**ok**
20-May-18	5N-AIS	ZQ2332	KAN - ABV	11:16 - 12:06		**BTA1013,56B**
20-May-18	5N-AIS	ZQ2335	ABV - DNBK	12:43 - 13:42		**BTA1013,WARN007,WARN051,22G,43B**
20-May-18	5N-AIS	ZQ2336	DNBK - ABV	14:26 - 15:24		**BTA1013,43B**
20-May-18	5N-AIS	ZQ2327	ABV - LOS	16:01 - 16:58		**ok**
20-May-18	5N-AIS	ZQ2315	LOS - KAN	17:58 - 19:33		**BTA1013,30A**
21-May-18	5N-AIS	ZQ2332	KAN - ABV	12:44 - 13:25		**43B**
21-May-18	5N-AIS	ZQ2331	ABV - KAN	13:54 - 14:44		**BTA1013**
21-May-18	5N-AIS	ZQ2312	KAN - LOS	15:18 - 16:32		**43B**
21-May-18	5N-AIS	ZQ2315	LOS - KAN	17:00 - 18:28		**BTA1013**
22-May-18	5N-AIS	ZQ2310	KAN - LOS	06:33 - 07:51		**43B,WARN024**
22-May-18	5N-AIS	ZQ2313	LOS - KAN	09:02 - 10:32		**WARN024,43B**
22-May-18	5N-AIS	ZQ2332	KAN - ABV	11:20 - 12:07		**BTA1013,06A,06B,43B,WARN024**
22-May-18	5N-AIS	ZQ2331	ABV - KAN	13:37 - 14:29		**43B,WARN024**
22-May-18	5N-AIS	ZQ2312	KAN - LOS	15:15 - 17:13		**22G,WARN007,WARN051,56B,06B,56C,75A,43B,WARN024,BTA1013**
22-May-18	5N-AIS	ZQ2311	LOS - KAN	18:35 - 20:13		**43B,WARN024**
23-May-18	5N-AIS	ZQ2310	KAN - LOS	06:31 - 09:22		**BTA1013,43B**

DONE BY:			
Name:	I.Saveljev	**Signature:**	**Date (dd/mm/aa):**
Registry:	FDR Processing & Analysis Group		28.05.2018

CONTENTS

Date	A/C Type	A/C Reg.	Flight No	Route	Pilot	Event No	Event Descript.	Attach.Graf. Numeric
18-May-18	B737-500	5N-AIS	ZQ2336	DNBK - ABV		WARN072	ILS DEV WARNING	√
18-May-18	B737-500	5N-AIS	ZQ2336	DNBK - ABV		WARN073	LOC DEV WARNING	√
18-May-18	B737-500	5N-AIS	ZQ2336	DNBK - ABV		43B	Speedbrake not armed below 800 & Flaps	√
18-May-18	B737-500	5N-AIS	ZQ2327	ABV - LOS		43B	Speedbrake not armed below 800 & Flaps	√
18-May-18	B737-500	5N-AIS	ZQ0000	LOS - KAN		BTA1013	Fan Vibration Limit Guide Eng.Right	√
18-May-18	B737-500	5N-AIS	ZQ0000	LOS - KAN		56B	Deviation above glideslope [dots]	√
18-May-18	B737-500	5N-AIS	ZQ0000	LOS - KAN		43B	Speedbrake not armed below 800 & Flaps	√
20-May-18	B737-500	5N-AIS	ZQ2310	KAN - LOS		43B	Speedbrake not armed below 800 & Flaps	√
20-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		BTA1013	Fan Vibration Limit Guide Eng.Right	√
20-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		56B	Deviation above glideslope [dots]	√
20-May-18	B737-500	5N-AIS	ZQ2335	ABV - DNBK		BTA1013	Fan Vibration Limit Guide Eng.Right	√
20-May-18	B737-500	5N-AIS	ZQ2335	ABV - DNBK		WARN007	Ground Proximity Warning	√
20-May-18	B737-500	5N-AIS	ZQ2335	ABV - DNBK		WARN051	GPWS SINK RATE	√
20-May-18	B737-500	5N-AIS	ZQ2335	ABV - DNBK		22G	High rate of descent below 2000 ft.	√
20-May-18	B737-500	5N-AIS	ZQ2335	ABV - DNBK		43B	Speedbrake not armed below 800 & Flaps	√
20-May-18	B737-500	5N-AIS	ZQ2336	DNBK - ABV		BTA1013	Fan Vibration Limit Guide Eng.Right	√
20-May-18	B737-500	5N-AIS	ZQ2336	DNBK - ABV		43B	Speedbrake not armed below 800 & Flaps	√
20-May-18	B737-500	5N-AIS	ZQ2315	LOS - KAN		BTA1013	Fan Vibration Limit Guide Eng.Right	√
20-May-18	B737-500	5N-AIS	ZQ2315	LOS - KAN		30A	AP desengage at the Alt. below 140ft.	√
21-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		43B	Speedbrake not armed below 800 & Flaps	√
21-May-18	B737-500	5N-AIS	ZQ2331	ABV - KAN		BTA1013	Fan Vibration Limit Guide Eng.Right	√
21-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		43B	Speedbrake not armed below 800 & Flaps	√
21-May-18	B737-500	5N-AIS	ZQ2315	LOS - KAN		BTA1013	Fan Vibration Limit Guide Eng.Right	√
22-May-18	B737-500	5N-AIS	ZQ2310	KAN - LOS		43B	Speedbrake not armed below 800 & Flaps	√
22-May-18	B737-500	5N-AIS	ZQ2310	KAN - LOS		WARN024	Terrain Aware Not Available Warning	√
22-May-18	B737-500	5N-AIS	ZQ2313	LOS - KAN		WARN024	Terrain Aware Not Available Warning	√
22-May-18	B737-500	5N-AIS	ZQ2313	LOS - KAN		43B	Speedbrake not armed below 800 & Flaps	√
22-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		BTA1013	Fan Vibration Limit Guide Eng.Right	√
22-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		06A	Appr. Speed high withing 90sec. of TD	√
22-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		06B	Approach Speed high below 500ft.	√
22-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		43B	Speedbrake not armed below 800 & Flaps	√
22-May-18	B737-500	5N-AIS	ZQ2332	KAN - ABV		WARN024	Terrain Aware Not Available Warning	√
22-May-18	B737-500	5N-AIS	ZQ2331	ABV - KAN		43B	Speedbrake not armed below 800 & Flaps	√
22-May-18	B737-500	5N-AIS	ZQ2331	ABV - KAN		WARN024	Terrain Aware Not Available Warning	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		22G	High rate of descent below 2000 ft.	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		WARN051	GPWS SINK RATE	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		WARN007	Ground Proximity Warning	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		56B	Deviation above glideslope [dots]	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		06B	Approach Speed high below 500ft.	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		56C	LOC deviation during ILS Approach	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		75A	Low power on approach	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		43B	Speedbrake not armed below 800 & Flaps	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		WARN024	Terrain Aware Not Available Warning	√
22-May-18	B737-500	5N-AIS	ZQ2312	KAN - LOS		BTA1013	Fan Vibration Limit Guide Eng.Right	√
22-May-18	B737-500	5N-AIS	ZQ2311	LOS - KAN		43B	Speedbrake not armed below 800 & Flaps	√
22-May-18	B737-500	5N-AIS	ZQ2311	LOS - KAN		WARN024	Terrain Aware Not Available Warning	√
23-May-18	B737-500	5N-AIS	ZQ2310	KAN - LOS		BTA1013	Fan Vibration Limit Guide Eng.Right	√
23-May-18	B737-500	5N-AIS	ZQ2310	KAN - LOS		43B	Speedbrake not armed below 800 & Flaps	√

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FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	128/1/07-09-18		
Company:	*"AZMAN AIR"*		
Aircraft - Model:	B737-5L9	Tail: 5N-AIS	MSN: 29235
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 28.08.2018 - 05.09.2018 (22 flt.)		
FDR Removal Date:	05-09-18		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
No read-out flight data 29.08-01.09.2018						
1-Sep-18	5N-AIS	ZQ2325	ABV - LOS	16:15 - 16:34		No T/O, cruise, descent data
2-Sep-18	5N-AIS	ZQ2319	LOS - KAD	06:04 - 07:15		ok
2-Sep-18	5N-AIS	ZQ2318	KAD - LOS	07:48 - 08:50		ok
2-Sep-18	5N-AIS	ZQ2324	LOS - ABV	09:46 - 10:55		ok
2-Sep-18	5N-AIS	ZQ2337	ABV - MIU	11:40 - 13:07		ok
2-Sep-18	5N-AIS	ZQ2338	MIU - ABV	13:41 - 14:54		ok
2-Sep-18	5N-AIS	ZQ2331	ABV - KAN	15:37 - 16:31		ok
2-Sep-18	5N-AIS	ZQ2312	KAN - LOS	17:17 - 18:49		ok
3-Sep-18	5N-AIS	ZQ2319	LOS - KAD	06:00 - 07:12		ok
3-Sep-18	5N-AIS	ZQ2318	KAD - LOS	07:38 - 08:43		ok
3-Sep-18	5N-AIS	ZQ2324	LOS - ABV	09:59 - 11:13		ok
3-Sep-18	5N-AIS	ZQ2337	ABV - MIU	11:51 - 13:09		ok
3-Sep-18	5N-AIS	ZQ2338	MIU - ABV	13:42 - 14:51		ok
3-Sep-18	5N-AIS	ZQ2325	ABV - LOS	15:23 - 16:22		ok
4-Sep-18	5N-AIS	ZQ2317	LOS - KAD	06:01 - 07:19		ok
4-Sep-18	5N-AIS	ZQ2318	KAD - LOS	07:48 - 08:54		ok
4-Sep-18	5N-AIS	ZQ2324	LOS - ABV	09:44 - 11:04		ok
4-Sep-18	5N-AIS	ZQ2337	ABV - MIU	11:46 - 13:05		ok
4-Sep-18	5N-AIS	ZQ2338	MIU - ABV	13:42 - 14:50		30A
4-Sep-18	5N-AIS	ZQ2325	ABV - LOS	15:38 - 16:46		ok
5-Sep-18	5N-AIS	ZQ2319	LOS - KAD	06:09 - 07:28		ok
5-Sep-18	5N-AIS	ZQ2318	KAD - LOS	07:59 - 09:10		ok

FDS version 10.0.11 ##Str.

08-09-2018 16:19

Job Nr.1281

LFL: AIS A/C: 5N-AIS Flight: ZQ2338 MIU-ABV Date: 04-09-2018 Time: 13:42-14:50

AFPA analysis results

AFPA 5
4 30A AP desengage at the Alt. below 140ft. 65.00 14:48:00
2018-09-04 Duration: 14:48:00 - 14:48:00
CAS: 139.0 RADALT: 65
AIRGRDMAIN: 0 APCMDA: 0 APCMDB: 0 APCWSA: 0 APCWSB: 0

FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	1821/20-09-18		
Company:	*"AZMAN AIR"*		
Aircraft - Model:	B737-5L9	Tail: 6N-AIS	MSN: 28236
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 12.09.2018 - 19.09.2018 (21 flt.)		
FDR Removal Date:	19-09-18		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
No read-out flight data 12.09-18.09.2018						
16-Sep-18	5N-AIS	ZQ2318	KAD - LOS	08:18 - 08:54		No take-off,cruise data, 06D
16-Sep-18	5N-AIS	ZQ2324	LOS - ABV	09:50 - 10:56		ok
16-Sep-18	5N-AIS	ZQ2337	ABV - MIU	11:38 - 13:04		ok
16-Sep-18	5N-AIS	ZQ2338	MIU - ABV	13:54 - 15:07		06D
16-Sep-18	5N-AIS	ZQ2331	ABV - KAN	15:43 - 17:07		ok
16-Sep-18	5N-AIS	ZQ2312	KAN - LOS	17:47 - 19:12		ok
16-Sep-18	5N-AIS	ZQ2315	LOS - KAN	20:00 - 21:37		ok
17-Sep-18	5N-AIS	ZQ2310	KAN - LOS	06:40 - 07:56		ok
17-Sep-18	5N-AIS	ZQ2313	LOS - KAN	08:58 - 10:23		ok
17-Sep-18	5N-AIS	ZQ2332	KAN - ABV	11:13 - 12:00		ok
17-Sep-18	5N-AIS	ZQ2328	ABV - QMO	13:00 - 14:05		22H
17-Sep-18	5N-AIS	ZQ2329	QMO - ABV	14:53 - 15:41		ok
17-Sep-18	5N-AIS	ZQ2325	ABV - LOS	16:37 - 17:35		43A
17-Sep-18	5N-AIS	ZQ2315	LOS - KAN	18:37 - 20:09		ok
18-Sep-18	5N-AIS	ZQ2310	KAN - LOS	06:38 - 08:02		ok
18-Sep-18	5N-AIS	ZQ2313	LOS - KAN	09:02 - 10:33		ok
18-Sep-18	5N-AIS	ZQ2332	KAN - ABV	11:24 - 12:08		ok
18-Sep-18	5N-AIS	ZQ2331	ABV - KAN	13:30 - 14:24		ok
18-Sep-18	5N-AIS	ZQ2312	KAN - LOS	15:24 - 16:55		ok
18-Sep-18	5N-AIS	ZQ2315	LOS - KAN	17:38 - 19:08		ok
19-Sep-18	5N-AIS	ZQ2310	KAN - LOS	06:53 - 08:20		ok

CONTENTS

Date	A/C Type	A/C Reg.	Flight No	Route	Pilot	Event No	Event Descript.	Abnormal Numeric	Notes
16-Sep-18	B737-300	5N-AIS	ZQ2318	KAD - LOS		06D	CAS>300 ALT 10000ft. to ALT 9000ft.	√	
16-Sep-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		06D	CAS>300 ALT 10000ft. to ALT 9000ft.	√	
17-Sep-18	B737-300	5N-AIS	ZQ2326	ABV - QMO		22H	High rate of approach below 40 ft.	√	
17-Sep-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		43A	Speedbrake on approach below 1000 ft	√	

FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	**1369/08-10-18**		
Company:	***"AZMAN AIR"***		
Aircraft - Model:	B737-5L9	**Tail: 5N-AIS**	**MSN: 29235**
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 26.09.2018 - 03.10.2018 (21 flt.)		
FDR Removal Date:	03.10.2018		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
BTA1011 (E2VIBLPT) (Compr/Turb Vibr. Limit Guide Eng.RIGHT) in ALL FLIGHTS						
No read-out flight data 26.09.2018-30.09.2018						
30-09-18	5N-AIS	ZQ2313	LOS - KAN	08:47 - 10:11		ok
30-09-18	5N-AIS	ZQ2332	KAN - ABV	10:56 - 11:42		ok
30-09-18	5N-AIS	ZQ2335	ABV - DNBK	13:08 - 14:07		ok
30-09-18	5N-AIS	ZQ2336	DNBK - ABV	14:37 - 15:37		ok
30-09-18	5N-AIS	ZQ2331	ABV - KAN	16:20 - 17:18		ok
30-09-18	5N-AIS	ZQ2312	KAN - LOS	17:54 - 19:23		ok
01-10-18	5N-AIS	ZQ2319	LOS - KAD	06:05 - 07:30		ok
01-10-18	5N-AIS	ZQ0000	KAD - LOS	07:54 - 09:05		ok
01-10-18	5N-AIS	ZQ2324	LOS - ABV	10:01 - 11:22		ok
01-10-18	5N-AIS	ZQ2337	ABV - MIU	12:00 - 13:15		ok
01-10-18	5N-AIS	ZQ2338	MIU - ABV	13:48 - 15:04		ok
01-10-18	5N-AIS	ZQ2331	ABV - KAN	15:43 - 16:37		ok
01-10-18	5N-AIS	ZQ2312	KAN - LOS	17:13 - 18:40		ok
02-10-18	5N-AIS	ZQ2319	LOS - KAD	05:54 - 07:00		ok
02-10-18	5N-AIS	ZQ2318	KAD - LOS	07:32 - 08:34		ok
02-10-18	5N-AIS	ZQ2324	LOS - ABV	09:32 - 10:43		ok
02-10-18	5N-AIS	ZQ2337	ABV - MIU	11:25 - 12:46		ok
02-10-18	5N-AIS	ZQ2338	MIU - ABV	13:19 - 14:30		ok
02-10-18	5N-AIS	ZQ2325	ABV - LOS	15:00 - 16:01		ok
02-10-18	5N-AIS	ZQ2315	LOS - KAN	18:06 - 19:39		ok
03-10-18	5N-AIS	ZQ2310	KAN - LOS	06:39 - 08:01		ok

DONE BY:			
Name:	J.Zaicev	**Signature:**	**Date (dd/mm/aa):**
Registry:	FDR Processing & Analysis Group		09.10.2018

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Date	A/C Type	A/C Reg.	Flight No	Route	Pilot	Event No	Event Descript.	Attach.Graf. Numeric	Notes
30-Sep-18	B737-300	5N-AIS	ZQ2313	LOS - KAN		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
30-Sep-18	B737-300	5N-AIS	ZQ2332	KAN - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
30-Sep-18	B737-300	5N-AIS	ZQ2332	KAN - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
30-Sep-18	B737-300	5N-AIS	ZQ2335	ABV - DNBK		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
30-Sep-18	B737-300	5N-AIS	ZQ2335	ABV - DNBK		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
30-Sep-18	B737-300	5N-AIS	ZQ2336	DNBK - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
30-Sep-18	B737-300	5N-AIS	ZQ2336	DNBK - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
30-Sep-18	B737-300	5N-AIS	ZQ2336	DNBK - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
30-Sep-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
30-Sep-18	B737-300	5N-AIS	ZQ2312	KAN - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ2319	LOS - KAD		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ0000	KAD - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ0000	KAD - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ2324	LOS - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ2324	LOS - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ2337	ABV - MIU		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ2337	ABV - MIU		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ2337	ABV - MIU		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ2337	ABV - MIU		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
01-Oct-18	B737-300	5N-AIS	ZQ2312	KAN - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
02-Oct-18	B737-300	5N-AIS	ZQ2324	LOS - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
02-Oct-18	B737-300	5N-AIS	ZQ2324	LOS - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
02-Oct-18	B737-300	5N-AIS	ZQ2324	LOS - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
02-Oct-18	B737-300	5N-AIS	ZQ2324	LOS - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
02-Oct-18	B737-300	5N-AIS	ZQ2337	ABV - MIU		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
02-Oct-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
02-Oct-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
02-Oct-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
02-Oct-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right	√	
02-Oct-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right	√	
02-Oct-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right	√	
02-Oct-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right	√	
02-Oct-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right	√	
02-Oct-18	B737-300	5N-AIS	ZQ2315	LOS - KAN		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		

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FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	**1398/16-10-18**		
Company:	***"AZMAN AIR"***		
Aircraft - Model:	B737-5L9	**Tail: 5N-AIS**	**MSN: 29235**
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 03.10.2018 - 08.10.2018 (23 flt.)		
FDR Removal Date:	08.10.2018		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
BTA1011 (E2VIBLPT) (Compr/Turb Vibr. Limit Guide Eng.RIGHT) in ALL FLIGHTS						
No read-out flight data 03.10.2018-05.10.2018						
05-10-18	5N-AIS	ZQ2313	LOS - KAN	09:55 - 11:26		ok
05-10-18	5N-AIS	ZQ2332	KAN - ABV	12:03 - 12:49		ok
05-10-18	5N-AIS	ZQ2335	ABV - DNBK	13:24 - 14:25		ok
05-10-18	5N-AIS	ZQ2336	DNBK - ABV	15:04 - 16:00		ok
05-10-18	5N-AIS	ZQ2327	ABV - LOS	16:44 - 17:55		ok
05-10-18	5N-AIS	ZQ2315	LOS - KAN	18:37 - 20:02		ok
06-10-18	5N-AIS	ZQ2310	KAN - LOS	06:47 - 08:15		ok
06-10-18	5N-AIS	ZQ2313	LOS - KAN	09:28 - 10:51		ok
06-10-18	5N-AIS	ZQ2332	KAN - ABV	11:29 - 12:18		ok
06-10-18	5N-AIS	ZQ2328	ABV - GMO	13:25 - 14:21		ok
06-10-18	5N-AIS	ZQ2326	GMO - ABV	14:59 - 15:52		ok
06-10-18	5N-AIS	ZQ2325	ABV - LOS	16:32 - 17:28		06D,13(Ny=1.78g Roll=0)
07-10-18	5N-AIS	ZQ2322	LOS - ABV	06:53 - 08:03		ok
07-10-18	5N-AIS	ZQ2323	ABV - LOS	08:47 - 09:48		ok
07-10-18	5N-AIS	ZQ2326	LOS - ABV	12:39 - 13:44		ok
07-10-18	5N-AIS	ZQ2323	ABV - LOS	14:32 - 15:43		01B
07-10-18	5N-AIS	ZQ2315	LOS - KAN	18:40 - 20:16		ok
08-10-18	5N-AIS	ZQ2310	KAN - LOS	06:36 - 07:58		ok
08-10-18	5N-AIS	ZQ2313	LOS - KAN	08:57 - 10:23		ok
08-10-18	5N-AIS	ZQ2332	KAN - ABV	11:09 - 11:59		ok
08-10-18	5N-AIS	ZQ2328	ABV - GMO	12:42 - 13:44		ok
08-10-18	5N-AIS	ZQ2326	GMO - ABV	14:27 - 15:17		ok
08-10-18	5N-AIS	ZQ2325	ABV - LOS	16:31 - 17:33		ok

DONE BY:			
Name:	J.Zaicev	**Signature:**	**Date (dd/mm/aa):**
Registry:	FDR Processing & Analysis Group		17.10.2018

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FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	**1416/25-10-18**		
Company:	***"AZMAN AIR"***		
Aircraft - Model:	B737-5L9	**Tail: 5N-AIS**	**MSN: 29235**
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 08.10.2018 - 24.10.2018 (43 flt.)		
FDR Removal Date:	24.10.2018		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
			No read-out flight data 11.10.2018-12.10.2018			
12-10-18	5N-AIS	ZQ2333	KAN - ABV	17:05 - 17:49		BTA1011
12-10-18	5N-AIS	ZQ2325	ABV - LOS	18:26 - 19:40		BTA1011
13-10-18	5N-AIS	ZQ2322	LOS - ABV	07:47 - 08:55		BTA1011
13-10-18	5N-AIS	ZQ2323	ABV - LOS	09:34 - 10:40		BTA1011
14-10-18	5N-AIS	ZQ2319	LOS - KAD	06:11 - 07:20		BTA1011,WARN024,WARN048
14-10-18	5N-AIS	ZQ2318	KAD - LOS	07:56 - 09:03		BTA1011
14-10-18	5N-AIS	ZQ2324	LOS - ABV	10:03 - 11:14		BTA1011
14-10-18	5N-AIS	ZQ2337	ABV - MIU	12:02 - 13:24		BTA1011
14-10-18	5N-AIS	ZQ2338	MIU - ABV	13:56 - 15:10		BTA1011
14-10-18	5N-AIS	ZQ2331	ABV - KAN	15:41 - 16:43		BTA1011
14-10-18	5N-AIS	ZQ2312	KAN - LOS	17:13 - 18:50		BTA1011
15-10-18	5N-AIS	ZQ2319	LOS - KAD	05:58 - 07:15		ok
15-10-18	5N-AIS	ZQ2318	KAD - LOS	13:07 - 14:13		ok
16-10-18	5N-AIS	ZQ2322	LOS - ABV	06:53 - 08:09		ok
16-10-18	5N-AIS	ZQ2323	ABV - LOS	08:40 - 09:46		ok
16-10-18	5N-AIS	ZQ2326	LOS - ABV	12:23 - 13:44		ok
16-10-18	5N-AIS	ZQ2325	ABV - LOS	14:20 - 15:25		BTA1011
17-10-18	5N-AIS	ZQ2313	LOS - KAN	09:01 - 10:29		ok
17-10-18	5N-AIS	ZQ2332	KAN - ABV	11:24 - 12:14		ok
17-10-18	5N-AIS	ZQ2335	ABV - DNBK	13:00 - 14:05		ok
17-10-18	5N-AIS	ZQ2336	DNBK - ABV	15:32 - 16:43		ok
17-10-18	5N-AIS	ZQ2325	ABV - LOS	17:25 - 18:35		ok
			No read-out flight data 18.10.2018(3flt.)			
18-10-18	5N-AIS	ZQ2327	ABV - LOS	14:13 - 15:29		22G,56B
19-10-18	5N-AIS	ZQ2322	LOS - ABV	06:58 - 08:07		ok
19-10-18	5N-AIS	ZQ2323	ABV - LOS	08:54 - 09:52		BTA1011
19-10-18	5N-AIS	ZQ2326	LOS - ABV	13:18 - 14:26		ok
19-10-18	5N-AIS	ZQ2325	ABV - LOS	15:07 - 16:09		06D
20-10-18	5N-AIS	ZQ2322	LOS - ABV	07:07 - 08:21		ok
20-10-18	5N-AIS	ZQ2323	ABV - LOS	09:03 - 10:00		48A,06A,06B,75A
21-10-18	5N-AIS	ZQ2322	LOS - ABV	07:06 - 08:13		ok
21-10-18	5N-AIS	ZQ2323	ABV - LOS	08:52 - 09:49		ok
21-10-18	5N-AIS	ZQ2326	LOS - ABV	12:25 - 13:49		ok
21-10-18	5N-AIS	ZQ2325	ABV - LOS	14:24 - 15:24		ok
22-10-18	5N-AIS	ZQ2322	LOS - ABV	07:01 - 08:10		ok
22-10-18	5N-AIS	ZQ2323	ABV - LOS	08:46 - 09:43		ok

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22-10-18	5N-AIS	ZQ2326	LOS - ABV	12:30 - 13:43	**ok**
22-10-18	5N-AIS	ZQ2325	ABV - LOS	14:25 - 15:29	**ok**
23-10-18	5N-AIS	ZQ2324	LOS - ABV	10:01 - 11:18	**21G**
23-10-18	5N-AIS	ZQ2335	ABV - MIU	11:54 - 13:13	**ok**
23-10-18	5N-AIS	ZQ2338	MIU - ABV	13:48 - 15:01	**ok**
23-10-18	5N-AIS	ZQ2325	ABV - LOS	15:32 - 16:38	**ok**
24-10-18	5N-AIS	ZQ2322	LOS - ABV	06:51 - 08:16	**ok**
24-10-18	5N-AIS	ZQ2323	ABV - LOS	08:56 - 09:52	**ok**

DONE BY:			
Name:	J.Zaicev	**Signature:**	**Date (dd/mm/aa):**
Registry:	FDR Processing & Analysis Group		25.10.2018

CONTENTS

Date	A/C Type	A/C Reg.	Flight No	Route	Pilot	Event No	Event Descript.	Attach.Graf. Numeric	Notes
12-Oct-18	B737-300	5N-AIS	ZQ2333	KAN - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
12-Oct-18	B737-300	5N-AIS	ZQ2333	KAN - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
12-Oct-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
12-Oct-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
12-Oct-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
13-Oct-18	B737-300	5N-AIS	ZQ2322	LOS - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
13-Oct-18	B737-300	5N-AIS	ZQ2322	LOS - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
13-Oct-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Oct-18	B737-300	5N-AIS	ZQ2319	LOS - KAD		WARN048	GPWS FAILURE	√	
14-Oct-18	B737-300	5N-AIS	ZQ2319	LOS - KAD		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right	√	
14-Oct-18	B737-300	5N-AIS	ZQ2319	LOS - KAD		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right	√	
14-Oct-18	B737-300	5N-AIS	ZQ2319	LOS - KAD		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right	√	
14-Oct-18	B737-300	5N-AIS	ZQ2319	LOS - KAD		WARN048	GPWS FAILURE	√	
14-Oct-18	B737-300	5N-AIS	ZQ2319	LOS - KAD		WARN048	GPWS FAILURE	√	
14-Oct-18	B737-300	5N-AIS	ZQ2319	LOS - KAD		WARN024	Terrain Aware Not Available Warning	√	
14-Oct-18	B737-300	5N-AIS	ZQ2319	LOS - KAD		WARN048	GPWS FAILURE	√	
14-Oct-18	B737-300	5N-AIS	ZQ2319	LOS - KAD		WARN024	Terrain Aware Not Available Warning	√	
14-Oct-18	B737-300	5N-AIS	ZQ2319	LOS - KAD		WARN048	GPWS FAILURE	√	
14-Oct-18	B737-300	5N-AIS	ZQ2318	KAD - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Oct-18	B737-300	5N-AIS	ZQ2318	KAD - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Oct-18	B737-300	5N-AIS	ZQ2324	LOS - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Oct-18	B737-300	5N-AIS	ZQ2337	ABV - MIU		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Oct-18	B737-300	5N-AIS	ZQ2337	ABV - MIU		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Oct-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Oct-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Oct-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Oct-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Oct-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Oct-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Oct-18	B737-300	5N-AIS	ZQ2312	KAN - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Oct-18	B737-300	5N-AIS	ZQ2312	KAN - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Oct-18	B737-300	5N-AIS	ZQ2312	KAN - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
16-Oct-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
18-Oct-18	B737-300	5N-AIS	ZQ2327	ABV - LOS		22G	High rate of descent below 2000 ft.	√	
18-Oct-18	B737-300	5N-AIS	ZQ2327	ABV - LOS		56B	Deviation above glideslope [dots]	√	
19-Oct-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
19-Oct-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		06D	CAS>300 ALT 10000ft. to ALT 3000ft.	√	
20-Oct-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		48A	Not maitained Landing procedure Alt.	√	
20-Oct-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		06A	Appr. Speed high withing 90sec. of TD	√	
20-Oct-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		06B	Approach Speed high below 500ft.	√	
20-Oct-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		75A	Low power on approach	√	
23-Oct-18	B737-300	5N-AIS	ZQ2324	LOS - ABV		21G	Exceeding Roll 15 up to V2+15 & flaps5	√	

FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	1450/07-11-18		
Company:	*"AZMAN AIR"*		
Aircraft - Model:	B737-5L9	Tail: 5N-AIS	MSN: 29235
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 24.10.2018 - 31.10.2018 (23 flt.)		
FDR Removal Date:	31.10.2018		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
No read-out flight data 24.10.2018-25.10.2018						
26-Oct-18	5N-AIS	ZQ2326	LOS - ABV	12:52 - 13:37		No data on takeoff, climbout
26-Oct-18	5N-AIS	ZQ2327	ABV - LOS	13:37 - 15:22		ok
27-Oct-18	5N-AIS	ZQ2322	LOS - ABV	07:03 - 08:23		ok
27-Oct-18	5N-AIS	ZQ2323	ABV - LOS	09:03 - 10:02		ok
28-Oct-18	5N-AIS	ZQ2322	LOS - ABV	07:01 - 08:14		ok
28-Oct-18	5N-AIS	ZQ2323	ABV - LOS	08:58 - 09:57		BTA1013
28-Oct-18	5N-AIS	ZQ2326	LOS - ABV	12:20 - 13:31		06A,06B
28-Oct-18	5N-AIS	ZQ2325	ABV - LOS	14:16 - 15:32		21G,BTA1013
29-Oct-18	5N-AIS	ZQ2322	LOS - ABV	07:02 - 08:16		ok
29-Oct-18	5N-AIS	ZQ2323	ABV - LOS	08:56 - 09:59		ok
29-Oct-18	5N-AIS	ZQ2326	LOS - ABV	12:10 - 13:17		ok
29-Oct-18	5N-AIS	ZQ2328	ABV - GMO	14:05 - 15:01		ok
29-Oct-18	5N-AIS	ZQ2329	GMO - ABV	15:44 - 16:33		ok
29-Oct-18	5N-AIS	ZQ2327	ABV - LOS	17:28 - 18:40		01C
30-Oct-18	5N-AIS	ZQ2322	LOS - ABV	08:22 - 09:41		ok
30-Oct-18	5N-AIS	ZQ2323	ABV - LOS	10:21 - 11:30		ok
30-Oct-18	5N-AIS	ZQ2326	LOS - ABV	12:42 - 14:01		ok
30-Oct-18	5N-AIS	ZQ2331	ABV - KAN	14:50 - 15:43		ok
30-Oct-18	5N-AIS	ZQ2312	KAN - LOS	16:19 - 17:47		ok
31-Oct-18	5N-AIS	ZQ2322	LOS - ABV	06:57 - 08:16		BTA1013
31-Oct-18	5N-AIS	ZQ2323	ABV - LOS	08:46 - 10:03		WARN072,WARN073,06A
31-Oct-18	5N-AIS	ZQ2326	LOS - ABV	12:28 - 13:39		56B,56C,21B
31-Oct-18	5N-AIS	ZQ2325	ABV - LOS	14:20 - 15:21		BTA1012

DONE BY:			
Name:	I.Saveljev	Signature:	Date (dd/mm/aa):
Registry:	FDR Processing & Analysis Group		08.11.2018

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Date	A/C Type	A/C Reg.	Flight No	Route	Pilot	Event No	Event Descript.	Attach.Graf. Numeric	Notes
28-Oct-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1013	Fan Vibration Limit Guide Eng.Right	√	
28-Oct-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		06A	Appr. Speed high withing 90sec. of TD	√	
28-Oct-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		06B	Approach Speed high below 500ft.	√	
28-Oct-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		21G	Exceeding Roll 15 up to V2+15 & flaps5	√	
28-Oct-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1013	Fan Vibration Limit Guide Eng.Right	√	
29-Oct-18	B737-300	5N-AIS	ZQ2327	ABV - LOS		01C	HIGH GROUND SPEED AFTER LANDIND	√	
31-Oct-18	B737-300	5N-AIS	ZQ2322	LOS - ABV		BTA1013	Fan Vibration Limit Guide Eng.Right	√	
31-Oct-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		WARN072	ILS DEV WARNING	√	
31-Oct-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		WARN073	LOC DEV WARNING	√	
31-Oct-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		06A	Appr. Speed high withing 90sec. of TD	√	
31-Oct-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		56B	Deviation above glideslope [dots]	√	
31-Oct-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		56C	LOC deviation during ILS Approach	√	
31-Oct-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		21B	Excessive bank 100ft. to 500ft. >25	√	
31-Oct-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		56B	Deviation above glideslope [dots]	√	
31-Oct-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left	√	

FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	**1461/14-11-18**		
Company:	***"AZMAN AIR"***		
Aircraft - Model:	B737-5L9	**Tail: 5N-AIS**	**MSN: 29235**
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 31.10.2018 - 14.11.2018 (42 flt.)		
FDR Removal Date:	14.11.2018		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
1-Nov-18	5N-AIS	ZQ2322	LOS - ABV	07:10 - 08:18		ok
1-Nov-18	5N-AIS	ZQ2323	ABV - LOS	09:00 - 10:12		BTA1012
1-Nov-18	5N-AIS	ZQ2326	LOS - ABV	12:31 - 13:49		ok
1-Nov-18	5N-AIS	ZQ2325	ABV - LOS	14:28 - 15:43		ok
2-Nov-18	5N-AIS	ZQ2322	LOS - ABV	06:54 - 08:06		ok
2-Nov-18	5N-AIS	ZQ2323	ABV - LOS	08:42 - 09:52		ok
2-Nov-18	5N-AIS	ZQ2326	LOS - ABV	12:37 - 13:48		ok
2-Nov-18	5N-AIS	ZQ2325	ABV - LOS	14:26 - 15:31		BTA1012
5-Nov-18	5N-AIS	ZQ2322	LOS - ABV	07:18 - 08:30		BTA1012
5-Nov-18	5N-AIS	ZQ2323	ABV - LOS	09:12 - 10:14		BTA1012
5-Nov-18	5N-AIS	ZQ2326	LOS - ABV	12:40 - 13:59		BTA1012
5-Nov-18	5N-AIS	ZQ2325	ABV - LOS	14:43 - 15:53		BTA1012
6-Nov-18	5N-AIS	ZQ2319	LOS - KAD	06:10 - 07:23		BTA1012
6-Nov-18	5N-AIS	ZQ2318	KAD - LOS	07:50 - 08:59		BTA1012
6-Nov-18	5N-AIS	ZQ2324	LOS - ABV	09:47 - 11:04		BTA1012
6-Nov-18	5N-AIS	ZQ2337	ABV - MIU	11:45 - 13:08		BTA1012
6-Nov-18	5N-AIS	ZQ2338	MIU - ABV	13:42 - 15:08		BTA1012
6-Nov-18	5N-AIS	ZQ2327	ABV - LOS	15:45 - 17:09		BTA1012
7-Nov-18	5N-AIS	ZQ2319	LOS - KAD	05:59 - 07:18		BTA1012
7-Nov-18	5N-AIS	ZQ2318	KAD - LOS	07:47 - 08:56		ok
			No read-out flight data 07.11.2018-09.11.2018			
9-Nov-18	5N-AIS	ZQ2324	LOS - ABV	10:01 - 11:04		BTA1012
9-Nov-18	5N-AIS	ZQ2337	ABV - MIU	11:36 - 12:55		BTA1012
9-Nov-18	5N-AIS	ZQ2338	MIU - ABV	13:26 - 14:40		BTA1012
9-Nov-18	5N-AIS	ZQ2331	ABV - KAN	15:23 - 16:21		BTA1012
9-Nov-18	5N-AIS	ZQ2312	KAN - LOS	17:00 - 18:27		BTA1012
10-Nov-18	5N-AIS	ZQ2322	LOS - ABV	07:03 - 08:09		BTA1012
10-Nov-18	5N-AIS	ZQ2323	ABV - LOS	09:04 - 10:25		BTA1012
11-Nov-18	5N-AIS	ZQ2322	LOS - ABV	07:01 - 08:06		BTA1012
11-Nov-18	5N-AIS	ZQ2323	ABV - LOS	08:44 - 09:52		BTA1012
11-Nov-18	5N-AIS	ZQ2326	LOS - ABV	12:33 - 13:42		BTA1012
11-Nov-18	5N-AIS	ZQ2325	ABV - LOS	14:21 - 15:25		BTA1012
12-Nov-18	5N-AIS	ZQ2322	LOS - ABV	06:59 - 08:09		BTA1012
12-Nov-18	5N-AIS	ZQ2323	ABV - LOS	08:44 - 09:54		BTA1012

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12-Nov-18	5N-AIS	ZQ2326	LOS - ABV	12:33 - 13:39	**ok**
12-Nov-18	5N-AIS	ZQ2325	ABV - LOS	14:17 - 15:31	**ok**
13-Nov-18	5N-AIS	ZQ2322	LOS - ABV	07:02 - 08:13	**BTA1012**
13-Nov-18	5N-AIS	ZQ2323	ABV - LOS	08:51 - 10:02	**BTA1012**
13-Nov-18	5N-AIS	ZQ2326	LOS - ABV	12:01 - 13:08	**ok**
13-Nov-18	5N-AIS	ZQ2331	ABV - KAN	13:45 - 14:38	**BTA1012**
13-Nov-18	5N-AIS	ZQ2312	KAN - LOS	15:17 - 16:48	**BTA1012**
14-Nov-18	5N-AIS	ZQ2322	LOS - ABV	06:52 - 08:06	**BTA1012**
14-Nov-18	5N-AIS	ZQ2323	ABV - LOS	08:44 - 09:53	**BTA1012**

DONE BY:			
Name:	J.Zaicev	**Signature:**	**Date (dd/mm/aa):**
Registry:	FDR Processing & Analysis Group		15.11.2018

CONTENTS

Date	A/C Type	A/C Reg.	Flight No	Route	Pilot	Event No	Event Descript.	Attach.Graf. Numeric	Notes
01-Nov-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left	√	
02-Nov-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
05-Nov-18	B737-300	5N-AIS	ZQ2322	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
05-Nov-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
05-Nov-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
05-Nov-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
05-Nov-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
06-Nov-18	B737-300	5N-AIS	ZQ2319	LOS - KAD		BTA1012	Fan Vibration Limit Guide Eng.Left		
06-Nov-18	B737-300	5N-AIS	ZQ2318	KAD - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
06-Nov-18	B737-300	5N-AIS	ZQ2318	KAD - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
06-Nov-18	B737-300	5N-AIS	ZQ2318	KAD - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
06-Nov-18	B737-300	5N-AIS	ZQ2324	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
06-Nov-18	B737-300	5N-AIS	ZQ2337	ABV - MIU		BTA1012	Fan Vibration Limit Guide Eng.Left		
06-Nov-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
06-Nov-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
06-Nov-18	B737-300	5N-AIS	ZQ2327	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
06-Nov-18	B737-300	5N-AIS	ZQ2327	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
07-Nov-18	B737-300	5N-AIS	ZQ2319	LOS - KAD		BTA1012	Fan Vibration Limit Guide Eng.Left		
07-Nov-18	B737-300	5N-AIS	ZQ2319	LOS - KAD		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Nov-18	B737-300	5N-AIS	ZQ2324	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Nov-18	B737-300	5N-AIS	ZQ2324	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Nov-18	B737-300	5N-AIS	ZQ2337	ABV - MIU		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Nov-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Nov-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Nov-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Nov-18	B737-300	5N-AIS	ZQ2312	KAN - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Nov-18	B737-300	5N-AIS	ZQ2312	KAN - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
10-Nov-18	B737-300	5N-AIS	ZQ2322	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
10-Nov-18	B737-300	5N-AIS	ZQ2322	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
10-Nov-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
11-Nov-18	B737-300	5N-AIS	ZQ2322	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
11-Nov-18	B737-300	5N-AIS	ZQ2322	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
11-Nov-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
11-Nov-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
11-Nov-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
11-Nov-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
11-Nov-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
11-Nov-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
11-Nov-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
12-Nov-18	B737-300	5N-AIS	ZQ2322	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
12-Nov-18	B737-300	5N-AIS	ZQ2322	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
12-Nov-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
13-Nov-18	B737-300	5N-AIS	ZQ2322	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
13-Nov-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
13-Nov-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
13-Nov-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1012	Fan Vibration Limit Guide Eng.Left		
13-Nov-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1012	Fan Vibration Limit Guide Eng.Left		
13-Nov-18	B737-300	5N-AIS	ZQ2312	KAN - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
13-Nov-18	B737-300	5N-AIS	ZQ2312	KAN - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		

13-Nov-18	B737-300	5N-AIS	ZQ2312	KAN - LOS	**BTA1012**	Fan Vibration Limit Guide Eng.Left	
14-Nov-18	B737-300	5N-AIS	ZQ2322	LOS - ABV	**BTA1012**	Fan Vibration Limit Guide Eng.Left	
14-Nov-18	B737-300	5N-AIS	ZQ2322	LOS - ABV	**BTA1012**	Fan Vibration Limit Guide Eng.Left	
14-Nov-18	B737-300	5N-AIS	ZQ2323	ABV - LOS	**BTA1012**	Fan Vibration Limit Guide Eng.Left	√

FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	1476/23-11-18		
Company:	*"AZMAN AIR"*		
Aircraft - Model:	B737-5L9	Tail: 5N-AIS	MSN: 29235
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 14.11.2018 - 21.11.2018 (22 flt.)		
FDR Removal Date:	21.11.2018		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
No read-out flight data 14.11.2018-16.11.2018						
17-Nov-18	5N-AIS	ZQ2310	KAN - LOS	07:05 - 08:20		No data on takeoff
17-Nov-18	5N-AIS	ZQ2313	LOS - KAN	09:11 - 10:30		BTA1012
17-Nov-18	5N-AIS	ZQ2332	KAN - ABV	11:17 - 12:03		BTA1012
17-Nov-18	5N-AIS	ZQ2328	ABV - GMO	12:43 - 13:39		ok
17-Nov-18	5N-AIS	ZQ2329	GMO - ABV	14:16 - 15:08		ok
17-Nov-18	5N-AIS	ZQ2325	ABV - LOS	16:09 - 17:22		BTA1012
18-Nov-18	5N-AIS	ZQ2322	LOS - ABV	06:56 - 08:10		BTA1012
18-Nov-18	5N-AIS	ZQ2323	ABV - LOS	08:48 - 09:51		BTA1012
18-Nov-18	5N-AIS	ZQ2326	LOS - ABV	12:28 - 13:45		BTA1012
18-Nov-18	5N-AIS	ZQ2325	ABV - LOS	14:24 - 15:30		01C
19-Nov-18	5N-AIS	ZQ2322	LOS - ABV	07:04 - 08:12		ok
19-Nov-18	5N-AIS	ZQ2323	ABV - LOS	08:47 - 09:58		BTA1012
19-Nov-18	5N-AIS	ZQ2326	LOS - ABV	12:26 - 13:39		BTA1012
19-Nov-18	5N-AIS	ZQ2325	ABV - LOS	14:19 - 15:29		ok
20-Nov-18	5N-AIS	ZQ2319	LOS - KAD	06:04 - 07:20		ok
20-Nov-18	5N-AIS	ZQ2318	KAD - LOS	07:49 - 09:06		ok
20-Nov-18	5N-AIS	ZQ2324	LOS - ABV	10:25 - 11:35		BTA1012
20-Nov-18	5N-AIS	ZQ2337	ABV - MIU	12:10 - 13:26		ok
20-Nov-18	5N-AIS	ZQ2338	MIU - ABV	14:03 - 15:14		43C
20-Nov-18	5N-AIS	ZQ2327	ABV - LOS	15:48 - 17:01		BTA1012
21-Nov-18	5N-AIS	ZQ2322	LOS - ABV	07:05 - 08:17		ok
21-Nov-18	5N-AIS	ZQ2323	ABV - LOS	08:51 - 10:04		ok

DONE BY:			
Name:	I.Saveljev	Signature:	Date (dd/mm/aa):
Registry:	FDR Processing & Analysis Group		24.11.2018

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CONTENTS

Date	A/C Type	A/C Reg.	Flight No	Route	Pilot	Event No	Event Descript.	Attach.Graf. Numeric	Notes
17-Nov-18	B737-300	5N-AIS	ZQ2313	LOS - KAN		BTA1012	Fan Vibration Limit Guide Eng.Left		
17-Nov-18	B737-300	5N-AIS	ZQ2332	KAN - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left	√	
17-Nov-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
18-Nov-18	B737-300	5N-AIS	ZQ2322	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
18-Nov-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
18-Nov-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
18-Nov-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		01C	HIGH GROUND SPEED AFTER LANDIND	√	
19-Nov-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
19-Nov-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
20-Nov-18	B737-300	5N-AIS	ZQ2324	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
20-Nov-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		43C	SpeedBrake Handle pos.>"Flight detent"	√	
20-Nov-18	B737-300	5N-AIS	ZQ2327	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		

FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	1493/04-12-18		
Company:	*"AZMAN AIR"*		
Aircraft - Model:	B737-5L9	Tail: 5N-AIS	MSN: 29235
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 21.11.2018 - 27.11.2018 (21 flt.)		
FDR Removal Date:	27.11.2018		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
No read-out flight data 21.11.2018-23.11.2018						
23-Nov-18	5N-AIS	ZQ2325	ABV - LOS	15:47 - 16:55		ok
24-Nov-18	5N-AIS	ZQ2322	LOS - ABV	07:08 - 08:17		ok
24-Nov-18	5N-AIS	ZQ2323	ABV - LOS	09:00 - 10:03		22H
24-Nov-18	5N-AIS	ZQ2326	LOS - ABV	14:28 - 15:32		ok
24-Nov-18	5N-AIS	ZQ2325	ABV - LOS	16:20 - 17:22		ok
24-Nov-18	5N-AIS	ZQ2315	LOS - KAN	18:06 - 19:42		BTA1012
25-Nov-18	5N-AIS	ZQ2310	KAN - LOS	06:31 - 07:50		ok
25-Nov-18	5N-AIS	ZQ2313	LOS - KAN	08:54 - 10:18		BTA1012
25-Nov-18	5N-AIS	ZQ2332	KAN - ABV	11:01 - 11:49		ok
25-Nov-18	5N-AIS	ZQ2335	ABV - DNBK	12:37 - 13:35		ok
25-Nov-18	5N-AIS	ZQ2336	DNBK - ABV	14:14 - 15:13		BTA1012
25-Nov-18	5N-AIS	ZQ2327	ABV - LOS	15:58 - 16:56		ok
25-Nov-18	5N-AIS	ZQ2315	LOS - KAN	18:04 - 19:33		ok
26-Nov-18	5N-AIS	ZQ2310	KAN - LOS	06:32 - 07:55		BTA1012
26-Nov-18	5N-AIS	ZQ2316	LOS - YOL	10:29 - 12:35		ok
26-Nov-18	5N-AIS	ZQ2317	YOL - ABV	13:24 - 14:33		ok
26-Nov-18	5N-AIS	ZQ2321	ABV - LOS	15:35 - 16:46		BTA1012
27-Nov-18	5N-AIS	ZQ2322	LOS - ABV	06:59 - 08:07		ok
27-Nov-18	5N-AIS	ZQ2319	ABV - YOL	08:54 - 10:03		ok
27-Nov-18	5N-AIS	ZQ2320	YOL - ABV	10:32 - 11:32		ok
27-Nov-18	5N-AIS	ZQ2323	ABV - LOS	12:28 - 13:30		ok

DONE BY:			
Name:	M.Esvovicius	Signature:	Date (dd/mm/aa):
Registry:	FDR Processing & Analysis Group		05.12.2018

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CONTENTS

Date	A/C Type	A/C Reg.	Flight No	Route	Pilot	Event No	Event Descript.	Attach.Graf. Numeric	Notes
24-Nov-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		22H	High rate of approach below 40 ft.	√	
24-Nov-18	B737-300	5N-AIS	ZQ2315	LOS - KAN		BTA1012	Fan Vibration Limit Guide Eng.Left	√	
25-Nov-18	B737-300	5N-AIS	ZQ2313	LOS - KAN		BTA1012	Fan Vibration Limit Guide Eng.Left	√	
25-Nov-18	B737-300	5N-AIS	ZQ2336	DNBK - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left	√	
26-Nov-18	B737-300	5N-AIS	ZQ2310	KAN - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left	√	
26-Nov-18	B737-300	5N-AIS	ZQ2321	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left	√	

FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	1496/05-12-18		
Company:	*"AZMAN AIR"*		
Aircraft - Model:	B737-5L9	Tail: 5N-AIS	MSN: 29235
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 27.11.2018 - 04.12.2018 (25 flt.)		
FDR Removal Date:	04.12.2018		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
No read-out flight data 27.11.2018-29.11.2018						
29-Nov-18	5N-AIS	ZQ2321	ABV - LOS	08:57 - 10:00		ok
29-Nov-18	5N-AIS	ZQ2342	LOS - ABV	10:55 - 11:56		ok
29-Nov-18	5N-AIS	ZQ2325	ABV - LOS	12:45 - 13:50		ok
29-Nov-18	5N-AIS	ZQ2314	LOS - PHC	14:34 - 15:30		WARN024
29-Nov-18	5N-AIS	ZQ2317	PHC - LOS	16:03 - 16:59		ok
30-Nov-18	5N-AIS	ZQ2320	LOS - ABV	07:05 - 08:13		ok
30-Nov-18	5N-AIS	ZQ2320	ABV - YOL	08:53 - 10:04		ok
30-Nov-18	5N-AIS	ZQ2321	YOL - ABV	10:29 - 11:33		ok
30-Nov-18	5N-AIS	ZQ2325	ABV - LOS	12:44 - 13:41		BTA1012
30-Nov-18	5N-AIS	ZQ2314	LOS - PHC	14:35 - 15:24		ok
30-Nov-18	5N-AIS	ZQ2317	PHC - LOS	16:06 - 17:03		ok
2-Dec-18	5N-AIS	ZQ2320	LOS - ABV	06:52 - 07:55		WARN008,22G
2-Dec-18	5N-AIS	ZQ2323	ABV - LOS	08:43 - 09:49		ok
2-Dec-18	5N-AIS	ZQ2334	LOS - ABV	10:44 - 11:49		ok
2-Dec-18	5N-AIS	ZQ2325	ABV - LOS	12:38 - 13:41		ok
2-Dec-18	5N-AIS	ZQ2314	LOS - PHC	14:28 - 15:25		ok
2-Dec-18	5N-AIS	ZQ2317	PHC - LOS	16:08 - 17:10		ok
3-Dec-18	5N-AIS	ZQ2320	LOS - ABV	07:13 - 08:15		ok
3-Dec-18	5N-AIS	ZQ2323	ABV - LOS	08:59 - 10:02		ok
3-Dec-18	5N-AIS	ZQ2316	LOS - PHC	10:46 - 11:41		ok
3-Dec-18	5N-AIS	ZQ2311	PHC - LOS	12:11 - 13:07		22G
3-Dec-18	5N-AIS	ZQ2314	LOS - PHC	14:01 - 14:59		ok
3-Dec-18	5N-AIS	ZQ2317	PHC - LOS	15:54 - 16:47		03G_2,WARN072,WARN073
4-Dec-18	5N-AIS	ZQ2324	LOS - ABV	07:21 - 08:31		ok
4-Dec-18	5N-AIS	ZQ2323	ABV - LOS	09:08 - 10:10		BTA1012

DONE BY:			
Name:	M.Esvovicius	Signature:	Date (dd/mm/aa):
Registry:	FDR Processing & Analysis Group		06.12.2018

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CONTENTS

Date	A/C Type	A/C Reg.	Flight No	Route	Pilot	Event No	Event Descript.	Attach.Graf. Numeric	Notes
29-Nov-18	B737-300	5N-AIS	ZQ2314	LOS - PHC		WARN024	Terrain Aware Not Available Warning	√	
30-Nov-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left	√	
02-Dec-18	B737-300	5N-AIS	ZQ2320	LOS - ABV		22G	High rate of descent below 2000 ft.	√	
02-Dec-18	B737-300	5N-AIS	ZQ2320	LOS - ABV		WARN008	Glideslope Alert	√	
03-Dec-18	B737-300	5N-AIS	ZQ2311	PHC - LOS		22G	High rate of descent below 2000 ft.	√	
03-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		03G_2	Exceeding of Speed235 to LG retraction	√	
03-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		WARN072	ILS DEV WARNING	√	
03-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		WARN073	LOC DEV WARNING	√	
04-Dec-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left	√	

FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	1502/12-12-18		
Company:	*"AZMAN AIR"*		
Aircraft - Model:	B737-5L9	Tail: 5N-AIS	MSN: 29235
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 04.12.2018 - 11.12.2018 (23 flt.)		
FDR Removal Date:	11.12.2018		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
No read-out flight data 04.12.2018-07.12.2018						
7-Dec-18	5N-AIS	ZQ2314	LOS - PHC	16:12 - 16:41		No data T/O BTA1012
7-Dec-18	5N-AIS	ZQ2317	PHC - LOS	17:17 - 18:23		BTA1012
8-Dec-18	5N-AIS	ZQ2319	LOS - KAD	05:48 - 06:56		ok
8-Dec-18	5N-AIS	ZQ2318	KAD - LOS	07:43 - 08:47		ok
8-Dec-18	5N-AIS	ZQ2324	LOS - ABV	09:59 - 11:07		ok
8-Dec-18	5N-AIS	ZQ2337	ABV - MIU	12:18 - 13:34		ok
8-Dec-18	5N-AIS	ZQ2338	MIU - ABV	14:15 - 15:34		BTA1012
8-Dec-18	5N-AIS	ZQ2331	ABV - KAN	16:17 - 17:07		ok
8-Dec-18	5N-AIS	ZQ2312	KAN - LOS	17:43 - 19:23		BTA1012
9-Dec-18	5N-AIS	ZQ2320	LOS - ABV	07:04 - 08:05		ok
9-Dec-18	5N-AIS	ZQ2323	ABV - LOS	08:47 - 09:48		BTA1012
9-Dec-18	5N-AIS	ZQ2324	LOS - ABV	10:46 - 11:50		13
9-Dec-18	5N-AIS	ZQ2325	ABV - LOS	12:41 - 13:43		BTA1012
9-Dec-18	5N-AIS	ZQ2316	LOS - PHC	14:33 - 15:27		BTA1012
9-Dec-18	5N-AIS	ZQ2317	PHC - LOS	16:07 - 17:06		ok
9-Dec-18	5N-AIS	ZQ2326	LOS - ABV	17:56 - 19:04		BTA1012
10-Dec-18	5N-AIS	ZQ2321	ABV - LOS	06:53 - 07:46		BTA1012
10-Dec-18	5N-AIS	ZQ2316	LOS - PHC	08:31 - 09:26		BTA1012
10-Dec-18	5N-AIS	ZQ2311	PHC - LOS	10:04 - 11:00		ok
10-Dec-18	5N-AIS	ZQ2324	LOS - ABV	12:11 - 13:23		ok
10-Dec-18	5N-AIS	ZQ2327	ABV - LOS	14:07 - 15:08		BTA1012
10-Dec-18	5N-AIS	ZQ2326	LOS - ABV	16:00 - 17:02		BTA1012
11-Dec-18	5N-AIS	ZQ2321	ABV - LOS	06:40 - 07:40		BTA1012

DONE BY:			
Name:	V.Sazanov	Signature:	Date (dd/mm/aa):
Registry:	FDR Processing & Analysis Group		12.12.2018

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CONTENTS

Date	A/C Type	A/C Reg.	Flight No	Route	Pilot	Event No	Event Descript.	Attach.Graf. Numeric	Notes
07-Dec-18	B737-300	5N-AIS	ZQ2314	LOS - PHC		BTA1012	Fan Vibration Limit Guide Eng.Left	√	
07-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left	√	
07-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
07-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
08-Dec-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
08-Dec-18	B737-300	5N-AIS	ZQ2312	KAN - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
08-Dec-18	B737-300	5N-AIS	ZQ2312	KAN - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
08-Dec-18	B737-300	5N-AIS	ZQ2312	KAN - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Dec-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Dec-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Dec-18	B737-300	5N-AIS	ZQ2324	LOS - ABV		13	Exceeding of enacted Touchdown VERTACC	√	
09-Dec-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Dec-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Dec-18	B737-300	5N-AIS	ZQ2316	LOS - PHC		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Dec-18	B737-300	5N-AIS	ZQ2316	LOS - PHC		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Dec-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
09-Dec-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
10-Dec-18	B737-300	5N-AIS	ZQ2321	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
10-Dec-18	B737-300	5N-AIS	ZQ2316	LOS - PHC		BTA1012	Fan Vibration Limit Guide Eng.Left		
10-Dec-18	B737-300	5N-AIS	ZQ2316	LOS - PHC		BTA1012	Fan Vibration Limit Guide Eng.Left		
10-Dec-18	B737-300	5N-AIS	ZQ2327	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
10-Dec-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
10-Dec-18	B737-300	5N-AIS	ZQ2326	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
11-Dec-18	B737-300	5N-AIS	ZQ2321	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
11-Dec-18	B737-300	5N-AIS	ZQ2321	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
11-Dec-18	B737-300	5N-AIS	ZQ2321	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
11-Dec-18	B737-300	5N-AIS	ZQ2321	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left	√	

FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	**1508/18-12-18**		
Company:	***"AZMAN AIR"***		
Aircraft - Model:	B737-5L9	**Tail: 5N-AIS**	**MSN: 29235**
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 11.12.2018 - 18.12.2018 (23 flt.)		
FDR Removal Date:	18.12.2018		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
No read-out flight data 11.12.2018-14.12.2018						
14-Dec-18	5N-AIS	ZQ2314	LOS - PHC	15:20 - 16:20		**BTA1012**
14-Dec-18	5N-AIS	ZQ2317	PHC - LOS	16:52 - 17:59		**BTA1011**
15-Dec-18	5N-AIS	ZQ0000	LOS - KAD	05:52 - 06:58		**ok**
15-Dec-18	5N-AIS	ZQ2318	KAD - LOS	07:36 - 08:41		**ok**
15-Dec-18	5N-AIS	ZQ2322	LOS - ABV	09:55 - 11:11		**ok**
15-Dec-18	5N-AIS	ZQ2337	ABV - MIU	11:58 - 13:16		**BTA1011,BTA1012**
15-Dec-18	5N-AIS	ZQ2338	MIU - ABV	13:58 - 15:14		**BTA1011,BTA1012**
15-Dec-18	5N-AIS	ZQ2331	ABV - KAN	16:07 - 16:58		**BTA1011**
15-Dec-18	5N-AIS	ZQ2312	KAN - LOS	17:33 - 19:03		**BTA1011**
16-Dec-18	5N-AIS	ZQ2320	LOS - ABV	07:00 - 08:07		**ok**
16-Dec-18	5N-AIS	ZQ2323	ABV - LOS	08:56 - 10:00		**BTA1011**
16-Dec-18	5N-AIS	ZQ2334	LOS - ABV	10:45 - 11:57		**BTA1011**
16-Dec-18	5N-AIS	ZQ2325	ABV - LOS	12:42 - 13:52		**BTA1011,BTA1012**
16-Dec-18	5N-AIS	ZQ2314	LOS - PHC	14:38 - 15:33		**BTA1011**
16-Dec-18	5N-AIS	ZQ2317	PHC - LOS	16:10 - 17:03		**BTA1011,BTA1012**
17-Dec-18	5N-AIS	ZQ2320	LOS - ABV	06:58 - 08:06		**ok**
17-Dec-18	5N-AIS	ZQ2323	ABV - LOS	08:42 - 09:46		**BTA1012,BTA1011**
17-Dec-18	5N-AIS	ZQ2324	LOS - ABV	10:33 - 11:41		**BTA1012**
17-Dec-18	5N-AIS	ZQ2325	ABV - LOS	12:23 - 13:28		**BTA1011,BTA1012,06B**
17-Dec-18	5N-AIS	ZQ2314	LOS - PHC	14:19 - 15:17		**BTA1011**
17-Dec-18	5N-AIS	ZQ2317	PHC - LOS	16:04 - 16:56		**BTA1011,06D**
18-Dec-18	5N-AIS	ZQ2320	LOS - ABV	06:56 - 08:05		**ok**
18-Dec-18	5N-AIS	ZQ2323	ABV - LOS	08:46 - 09:49		**BTA1011,BTA1012**

DONE BY:			
Name:	J.Zaicev	**Signature:**	**Date (dd/mm/aa):**
Registry:	FDR Processing & Analysis Group		20.12.2018

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Date	A/C Type	A/C Reg.	Flight No	Route	Pilot	Event No	Event Descript.	Attach.Graf. Numeric	Notes
14-Dec-18	B737-300	5N-AIS	ZQ2314	LOS - PHC		BTA1012	Fan Vibration Limit Guide Eng.Left		
14-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
14-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
15-Dec-18	B737-300	5N-AIS	ZQ2337	ABV - MIU		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
15-Dec-18	B737-300	5N-AIS	ZQ2337	ABV - MIU		BTA1012	Fan Vibration Limit Guide Eng.Left		
15-Dec-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
15-Dec-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
15-Dec-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
15-Dec-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
15-Dec-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
15-Dec-18	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
15-Dec-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
15-Dec-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
15-Dec-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
15-Dec-18	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
15-Dec-18	B737-300	5N-AIS	ZQ2312	KAN - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
15-Dec-18	B737-300	5N-AIS	ZQ2312	KAN - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
15-Dec-18	B737-300	5N-AIS	ZQ2312	KAN - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
16-Dec-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
16-Dec-18	B737-300	5N-AIS	ZQ2334	LOS - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
16-Dec-18	B737-300	5N-AIS	ZQ2334	LOS - ABV		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
16-Dec-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
16-Dec-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
16-Dec-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
16-Dec-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
16-Dec-18	B737-300	5N-AIS	ZQ2314	LOS - PHC		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
16-Dec-18	B737-300	5N-AIS	ZQ2314	LOS - PHC		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
16-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
16-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
16-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
16-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
16-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
16-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
17-Dec-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
17-Dec-18	B737-300	5N-AIS	ZQ2323	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
17-Dec-18	B737-300	5N-AIS	ZQ2324	LOS - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left		
17-Dec-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
17-Dec-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
17-Dec-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
17-Dec-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
17-Dec-18	B737-300	5N-AIS	ZQ2325	ABV - LOS		06B	Approach Speed high below 500ft.	√	
17-Dec-18	B737-300	5N-AIS	ZQ2314	LOS - PHC		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
17-Dec-18	B737-300	5N-AIS	ZQ2314	LOS - PHC		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
17-Dec-18	B737-300	5N-AIS	ZQ2314	LOS - PHC		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		
17-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS		BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right		

17-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS	BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right	
17-Dec-18	B737-300	5N-AIS	ZQ2317	PHC - LOS	06D	CAS>300 ALT 10000ft. to ALT 3000ft.	√
18-Dec-18	B737-300	5N-AIS	ZQ2323	ABV - LOS	BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right	√
18-Dec-18	B737-300	5N-AIS	ZQ2323	ABV - LOS	BTA1011	Compr/Turb Vibr. Limit Guide Eng.Right	√
18-Dec-18	B737-300	5N-AIS	ZQ2323	ABV - LOS	BTA1012	Fan Vibration Limit Guide Eng.Left	√

FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	1515/28-12-18		
Company:	*"AZMAN AIR"*		
Aircraft - Model:	B737-5L9	Tail: 5N-AIS	MSN: 29235
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 18.12.2018 - 27.12.2018 (24 flt.)		
FDR Removal Date:	27.12.2018		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
No read-out flight data 18.12.2018-21.12.2018						
21-Dec-18	5N-AIS	ZQ2323	ABV - LOS	09:38 - 10:06		No data T/O
21-Dec-18	5N-AIS	ZQ2334	LOS - ABV	11:28 - 12:42		ok
21-Dec-18	5N-AIS	ZQ2325	ABV - LOS	13:24 - 14:26		ok
21-Dec-18	5N-AIS	ZQ2314	LOS - PHC	15:25 - 16:20		BTA1012
21-Dec-18	5N-AIS	ZQ2317	PHC - LOS	16:57 - 17:57		ok
22-Dec-18	5N-AIS	ZQ2316	LOS - LOS	09:13 - 09:54		30A;06A;06B
22-Dec-18	5N-AIS	ZQ2316	LOS - PHC	11:51 - 12:44		ok
22-Dec-18	5N-AIS	ZQ2311	PHC - LOS	13:14 - 14:10		BTA1012
22-Dec-18	5N-AIS	ZQ2324	LOS - ABV	15:16 - 16:25		ok
22-Dec-18	5N-AIS	ZQ2329	ABV - LOS	17:22 - 18:27		ok
23-Dec-18	5N-AIS	ZQ2320	LOS - ABV	08:12 - 09:18		ok
23-Dec-18	5N-AIS	ZQ2323	ABV - LOS	10:02 - 11:08		ok
23-Dec-18	5N-AIS	ZQ2334	LOS - ABV	11:53 - 12:58		ok
23-Dec-18	5N-AIS	ZQ2325	ABV - LOS	13:47 - 14:53		ok
23-Dec-18	5N-AIS	ZQ2314	LOS - PHC	15:49 - 16:52		WARN072;WARN073
23-Dec-18	5N-AIS	ZQ2317	PHC - LOS	17:29 - 18:29		ok
24-Dec-18	5N-AIS	ZQ2320	LOS - ABV	07:08 - 08:14		ok
24-Dec-18	5N-AIS	ZQ2323	ABV - LOS	08:50 - 09:54		ok
25-Dec-18	5N-AIS	ZQ2334	LOS - ABV	10:47 - 10:55		24
25-Dec-18	5N-AIS	ZQ2325	ABV - LOS	10:55 - 13:48		ok
25-Dec-18	5N-AIS	ZQ2314	LOS - PHC	14:34 - 15:30		ok
25-Dec-18	5N-AIS	ZQ2311	PHC - LOS	16:11 - 17:04		ok
27-Dec-18	5N-AIS	ZQ2319	LOS - KAD	08:09 - 09:20		ok
27-Dec-18	5N-AIS	ZQ2318	KAD - LOS	10:03 - 11:13		ok

DONE BY:			
Name:	V.Sazanov	Signature:	Date (dd/mm/aa):
Registry:	FDR Processing & Analysis Group		28.12.2018

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Date	A/C Type	A/C Reg.	Flight No	Route	Pilot	Event No	Event Descript.	Attach.Graf. Numeric	Notes
21-Dec-18	B737-300	5N-AIS	ZQ2314	LOS - PHC		BTA1012	Fan Vibration Limit Guide Eng.Left		
22-Dec-18	B737-300	5N-AIS	ZQ2316	LOS - LOS		30A	AP desengage at the Alt. below 140ft.	√	
22-Dec-18	B737-300	5N-AIS	ZQ2316	LOS - LOS		06A	Appr. Speed high withing 90sec. of TD	√	
22-Dec-18	B737-300	5N-AIS	ZQ2316	LOS - LOS		06B	Approach Speed high below 500ft.	√	
22-Dec-18	B737-300	5N-AIS	ZQ2311	PHC - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
22-Dec-18	B737-300	5N-AIS	ZQ2311	PHC - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
22-Dec-18	B737-300	5N-AIS	ZQ2311	PHC - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
22-Dec-18	B737-300	5N-AIS	ZQ2311	PHC - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left		
23-Dec-18	B737-300	5N-AIS	ZQ2314	LOS - PHC		BTA1012	Fan Vibration Limit Guide Eng.Left		
23-Dec-18	B737-300	5N-AIS	ZQ2314	LOS - PHC		WARN072	ILS DEV WARNING	√	
23-Dec-18	B737-300	5N-AIS	ZQ2314	LOS - PHC		WARN073	LOC DEV WARNING	√	
25-Dec-18	B737-300	5N-AIS	ZQ2334	LOS - ABV		24	"GO-AROUND" procedure	√	

FLTECHNICS

FLIGHT DATA MONITORING REPORT

IDENTIFICATION			
Report Number:	1523/05-01-19		
Company:	*"AZMAN AIR"*		
Aircraft - Model:	B737-5L9	Tail: 5N-AIS	MSN: 29235
FDR Part Number:		Serial Number:	
Readout reason:	Flight Data Monitoring 27.12.2018 - 02.01.2019 (25 flt.)		
FDR Removal Date:	02.01.2019		

RESULTS

Date	A/C Reg.	Flight No	Route	Time	Pilot	Event No
No read-out flight data 26.12.2018-27.12.2018						
28-Dec-18	5N-AIS	ZQ2316	LOS - PHC	09:14 - 09:49		No takeoff,cruise data
28-Dec-18	5N-AIS	ZQ2311	PHC - LOS	10:29 - 11:25		ok
28-Dec-18	5N-AIS	ZQ0000	LOS - ABV	12:18 - 13:57		ok
28-Dec-18	5N-AIS	ZQ2325	ABV - LOS	14:42 - 15:44		ok
28-Dec-18	5N-AIS	ZQ2326	LOS - ABV	16:35 - 17:47		ok
29-Dec-18	5N-AIS	ZQ2321	ABV - LOS	07:18 - 08:21		BTA1012
29-Dec-18	5N-AIS	ZQ2314	LOS - PHC	12:01 - 12:59		ok
29-Dec-18	5N-AIS	ZQ0000	PHC - LOS	13:37 - 14:39		ok
29-Dec-18	5N-AIS	ZQ0000	LOS - ABV	14:39 - 16:36		ok
30-Dec-18	5N-AIS	ZQ2321	ABV - LOS	08:46 - 09:48		ok
30-Dec-18	5N-AIS	ZQ2314	LOS - PHC	14:05 - 15:06		ok
30-Dec-18	5N-AIS	ZQ2317	PHC - LOS	15:58 - 16:56		ok
31-Dec-18	5N-AIS	ZQ2319	LOS - KAD	09:42 - 10:50		ok
31-Dec-18	5N-AIS	ZQ2313	KAD - KAN	11:10 - 11:43		ok
31-Dec-18	5N-AIS	ZQ2332	KAN - ABV	12:37 - 13:24		ok
31-Dec-18	5N-AIS	ZQ2328	ABV - GMO	14:04 - 14:54		ok
31-Dec-18	5N-AIS	ZQ2329	GMO - ABV	15:42 - 16:36		ok
31-Dec-18	5N-AIS	ZQ2327	ABV - LOS	17:37 - 18:49		ok
2-Jan-19	5N-AIS	ZQ2316	LOS - PHC	09:04 - 10:09		ok
2-Jan-19	5N-AIS	ZQ2311	PHC - LOS	10:39 - 11:36		ok
2-Jan-19	5N-AIS	ZQ2324	LOS - ABV	12:33 - 13:43		ok
2-Jan-19	5N-AIS	ZQ2337	ABV - MIU	14:19 - 15:30		ok
2-Jan-19	5N-AIS	ZQ2338	MIU - ABV	16:09 - 17:25		BTA1012
2-Jan-19	5N-AIS	ZQ2331	ABV - KAN	17:51 - 18:39		BTA1012
2-Jan-19	5N-AIS	ZQ2312	KAN - LOS	19:06 - 20:33		ok

DONE BY:			
Name:	M.Esvovicius	Signature:	Date (dd/mm/aa):
Registry:	FDR Processing & Analysis Group		06.01.2019

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CONTENTS

Date	A/C Type	A/C Reg.	Flight No	Route	Pilot	Event No	Event Descript.	Attach.Grat. Numeric	Notes
30-Dec-18	B737-300	5N-AIS	ZQ2321	ABV - LOS		BTA1012	Fan Vibration Limit Guide Eng.Left	√	
02-Jan-19	B737-300	5N-AIS	ZQ2338	MIU - ABV		BTA1012	Fan Vibration Limit Guide Eng.Left	√	
02-Jan-19	B737-300	5N-AIS	ZQ2331	ABV - KAN		BTA1012	Fan Vibration Limit Guide Eng.Left	√	