

Preliminary Report on the Incident involving a Boeing 737-300 aircraft operated by Max Air Limited with nationality and registration marks 5N-ADB, which occurred at Lamido Aliyu Mustapha International Airport (DNYO) Yola, Nigeria on 21 July 2024

Operator:	Max Air Limited, Nigeria
Aircraft type and model:	Boeing 737-36Q
Manufacturer:	The Boeing Company, USA
Year of manufacture:	1999
Nationality and registration marks:	5N-ADB
Serial number:	30333
Location:	Lamido Aliyu Mustapha International Airport (DNYO) Yola, Runway 35
Date and Time:	21 July 2024 at about 17:57 h (All times in this report are local time, equivalent to UTC+1 unless otherwise stated)



INTRODUCTION

The Nigerian Airspace Management Agency (NAMA) notified the Nigerian Safety Investigation Bureau (NSIB) of the occurrence on 21 July 2024. Investigators arrived at the incident site the next day. Post-occurrence assessment commenced immediately under the provisions of the Civil Aviation (Investigations of Air Accidents and Incidents) Regulations 2023 and ICAO Annex 13.

This report provides details of initial facts, discussions, and findings surrounding the occurrence. It includes information gathered from witness statements, evidence, and a preliminary inspection of the aircraft.

The investigation is ongoing.



1.0 FACTUAL INFORMATION

1.1 History of the flight

On 21 July 2024, at 1600 h a Boeing 737-300 aircraft with nationality and registration marks 5N-ADB, operated by Max Air Limited, departed Nnamdi Azikiwe International Airport (DNAA), Abuja, for Lamido Aliyu Mustapha International Airport (DNYO) Yola with 125 persons onboard as NGL 1648. The captain was the Pilot flying (PF), and the first officer was the pilot Monitoring (PM).

At 16:35 h, NGL 1648 contacted Yola Tower and was cleared to fly at flight level (FL) 270 and expect no delay for the ILS approach to Runway 17, QNH 1013 hPa.

At 17:06 h, NGL 1648 landed on Runway 17 DNYO. The PF observed bird activity, and during the backtrack, the PM observed foreign object debris (FOD) on the runway, around the Nigerian Airforce Apron, almost on the runway centre line. The flight crew reported to the tower.

A staff member of the Nigerian Airspace Management Agency (NAMA) was dispatched to the reported position, and perforated metallic sheets were retrieved; a Boeing 737 operated by Air Peace Limited subsequently took off from Runway 17.

On ground DNYO, the captain conducted a walk-around of the aircraft as part of the pre-flight inspection, including the inspection to ascertain if the earlier sighted birds had impacted the aircraft. The captain then released the aircraft for the next flight to Abuja. The crew determined Aircraft performance data with the following prominent V-speeds: V_1 as 134 kts, V_r as 136 Kts and V_2 as 142 kts.

At 17:44 h, 5N-ADB, using the call sign NGL 1649, requested engine start-up with the following details: destination - Abuja, cruising level - FL 280 with six crew, 113 passengers



and endurance of three hours. The request was granted. The captain resumed as the PF and the first officer maintained the PM role.

At 17:48 h, NGL 1649 requested for taxi and was cleared to enter and backtrack Runway 17. NGL 1649 acknowledged and requested Runway 35 instead. The request was granted.

At 17:57 h, NGL 1649 was cleared for take-off Runway 35, with the prevailing wind as 270° at 07 kts. During the take-off roll, the flight crew observed that the auto-throttle disconnected, and the PF then set the take-off thrust manually before re-engaging the auto-throttle. The crew also observed that the desired engine thrust settings were not attained instantly. The PM then called out the aircraft speed, 90 kts. Thereafter, the aircraft buffeted at above 100 kts. A bang was heard, followed by a landing gear disagree annunciation for the Right Main Landing Gear. According to the PF, the thrust levers were then retarded at about 126 kt IAS (Indicated Air Speed) as part of Rejected Take-Off (RTO) procedure. The PM scanned the instruments and called out "stop, stop, right gear" and then proceeded to call out "speed brakes" as the speed brake lever was observed to be not fully actuated. The aircraft came to a stop 300 m from the end of the runway.

The PF called for cabin crew to remain at their stations, and the tower was informed of the aborted take-off.

Aerodrome Rescue and Fire Fighting Services (ARFFS) arrived at the scene. Upon the arrival of the airstairs, they further ascertain the prevalent condition and order the disembarkation of passengers and crew. All occupants disembarked normally.

The incident occurred at 17:57 h, and Visual Meteorological Conditions (VMC) prevailed.

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Figure 1: Point at which thrust levers were retarded (arrow shows direction of motion)

1.2 Injuries to persons

Injuries	Crew	Passengers	Total in the aircraft	Others
Fatal	Nil	Nil	Nil	Nil
Serious	Nil	Nil	Nil	Nil
Minor	Nil	Nil	Nil	Nil
None	6	113	119	Nil
TOTAL	6	113	119	Nil



1.3 Damage to aircraft

The aircraft was slightly damaged.

1.4 Other damage

Nil

1.5 Personnel information

After a three-day break, the Captain and First Officer resumed duty at the flight line in Abuja. The flight crew positioned on the same aircraft to Kano. The first officer sat in the cockpit jump seat for the flight. While at Kano, the flight crew was joined by the cabin crew.

The first officer was the Pilot Flying for the Kano-Abuja leg and also conducted pre-flight at Abuja. The flight to Yola was delayed due to the prevailing weather conditions in Abuja.

At the time of the occurrence, the flight crew had logged a total of 05:30 h on duty.

1.5.1 Captain

Nationality:	Nigerian
Age:	38 years
License type:	Airline Transport Pilot License (Aeroplane)
License validity:	Valid till 20 December, 2024
Aircraft ratings:	Boeing 737-300/500
Medical certificate:	Valid till 19 March, 2025
Instrument rating:	Valid till 16 March, 2025
Total flying time:	4550 h
Total on type:	4350 h

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Total on type (PIC):	1550 h
Last 90 days:	298:25 h
Last 28 days:	99:25 h
Last 7 days:	27:40 h
Last 24 hours:	02:05 h

1.5.2 First officer

Nationality:	Nigerian
Age:	30
License type:	Commercial Pilot License (Aeroplane)
License validity:	Valid till 13 December, 2025
Aircraft ratings:	Boeing 737-300/500
Medical certificate:	Valid till 2 November, 2024
Instrument rating:	Valid till 10 March, 2025
Total flying time:	1769 h
Total on type:	1531 h
Last 90 days:	255 h
Last 28 days:	97 h
Last 7 days:	25 h
Last 24 hours:	02:05 h

1.5.3 Purser

Nationality:	Nigerian
Age:	43 years
Licence type:	Cabin crew

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Licence:	Valid till 11 June, 2027
Aircraft ratings:	Hawker Siddeley 125, Boeing 737-300/500, Boeing 777-200/300, Embraer 135/145, Boeing 737-300/400

1.6 Aircraft information

1.6.1 General information

Type:	Boeing 737-36Q
Manufacturer:	The Boeing Company, USA
Year of manufacture:	1999
Serial number:	30333
Certificate of Airworthiness:	Valid till 29 August, 2025
Certificate of insurance:	Valid till 20 September, 2024
Certificate of registration:	Issued 16 November, 2020
Total airframe time:	55421:13 h

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Figure 2: 5N-ADB post-occurrence at DNYO

Engine	Number 1	Number 2
Manufacturer	CFM International, USA	CFM International, USA
Type/Model	CFM 56-3C-1	CFM 56-3C-1
Serial number	858580	720704
Time Since New	58970:25	50838:32
Cycles Since New	34293	39913

Total Landing Cycles: 43127

Fuel Used: Jet A1



1.7 Meteorological information

DNYO	1600 Z	1700 Z	1800 Z
Wind	240/08 kt	280/05 kt	320/09 kt
Visibility	10 km	10 km	10km
Weather	Nil	Nil	Nil
Cloud	SCT 012	Few 360 m	SCT 011
Temperature/Dew point	31 °/23 °	30 °/23 °	27°/24 °
QNH	1012 hPa	1013 hPa	1015 hPa

1.8 Aids to navigation

The status of the navigational aids at Lamido Aliyu Mustapha International Airport (DNYO), Yola, on the day of the occurrence was as follows:

"YOL VOR	-‘Unserviceable’
"YOL" DME	-‘Unserviceable’
"IYL" ILS/DME 109.9 MHz/CH368	-‘Serviceable’
METAR DISPLAY RADIO MONITOR	-‘Serviceable’
BINOCULARS AND ALDIS LAMP	-‘Serviceable’
CRASH ALARM BELL	-‘Serviceable’
WIND VELOCITY INDICATOR	-‘Serviceable’



1.9 Communication

The status of the communication equipment at Lamido Aliyu Mustapha International Airport (DNYO), Yola, on the day of the occurrence, was as follows:

VHF 122.5 Mhz TOWER MAIN & BACKUP FREQUENCY -'Serviceable'

VHF 121.7 Mhz DOMESTIC FREQUENCY -'Serviceable'

ICOM MOBILE RADIO -'Serviceable'

SATCOM LINE -'Serviceable'

There was effective communication between 5N-ADB and Air Traffic Controllers at DNYO.

1.10 Aerodrome information

Lamido Aliyu Mustapha International Airport (DNYO), Yola, has aerodrome reference points 09°15'36"N, 001°25'54.9"E and elevation 599 ft with runway orientation 17/35. The runway has a length of 3000 m and a width of 45 m with asphalt/concrete surface.

The tower watch log recorded a runway inspection at 07:35 h before the commencement of daily operations, and the runway was found fit for operations.

Foreign Object Debris were recovered from the runway after 5N-ADB Landed.

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Figure 3: Foreign Object Debris recovered from the runway (ruler to show scale)



Figure 4: Alternate view of the FOD



Figure 5: Rubberised deposits on the runway at DNYO

1.11 Flight recorders

The aircraft is fitted with a Solid-State Flight Data Recorder (FDR) and a Cockpit Voice Recorder (CVR) with the following particulars:

Recorders	Flight Data Recorder	Cockpit Voice Recorder
Manufacturer	Honeywell, USA	Allied Signal, USA
Model	SSFDR	SSCVR
Part Number	980-4700-042	980-6022-001
Serial Number	6059	62923

The FDR and CVR were retrieved and downloaded by the Transportation Safety Laboratory of the Nigerian Safety Investigation Bureau (NSIB), Abuja, Nigeria.

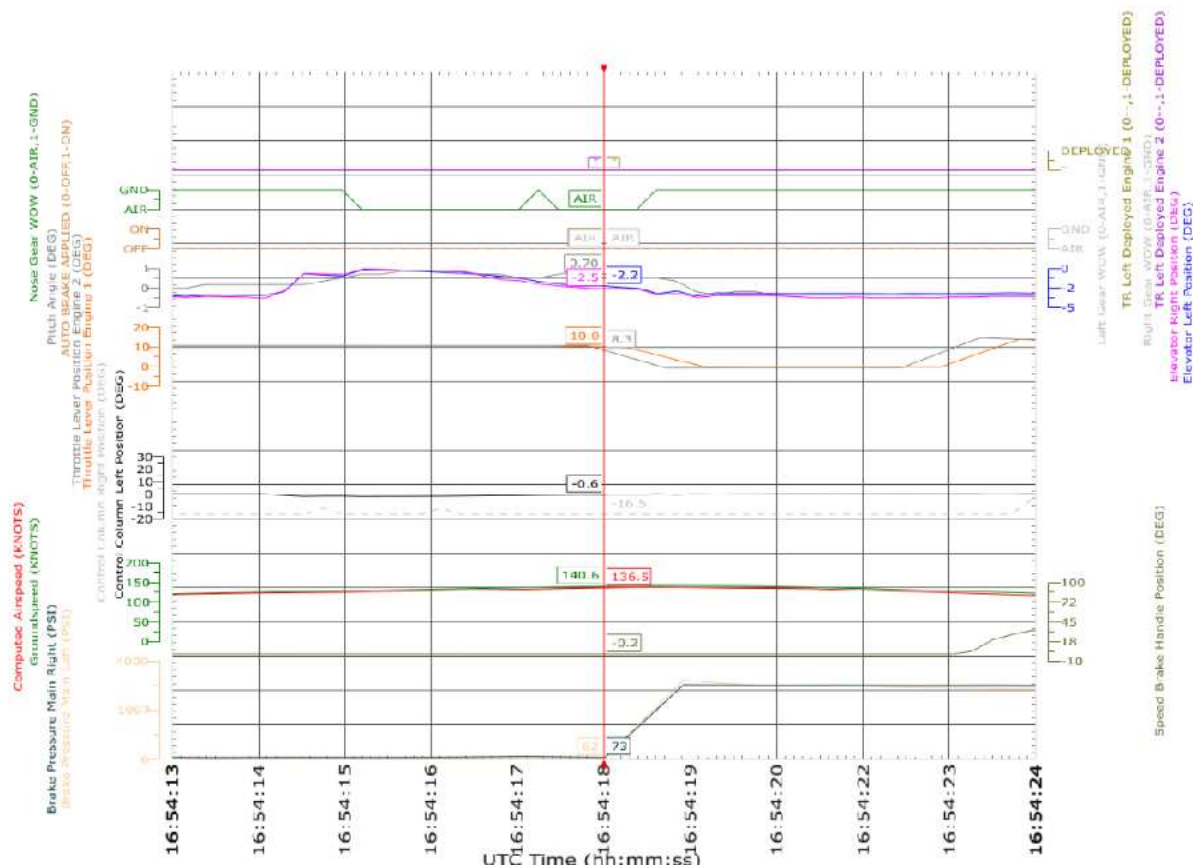


Figure 6: A representative plot from the FDR (at the point of initiation of RTO)

Flight data indicated that there was a disagreement on the Right Main Landing Gear indication at 122 kts CAS (Computed Air Speed), and the thrust levers were retarded 5 s after at 136 kts CAS. The brakes were applied, and thrust reversers were deployed.

1.12 Wreckage and impact information

Physical evidence suggests that Number 3 Main Wheel tyre (the inboard tyre on the Right Main Landing Gear, MLG) failed about 1000 m from the Runway 35 threshold then, Number



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4 Main Wheel tyre burst. Number 1 and 2 Main Wheel tyres deflated as the aircraft came to a stop. The aircraft stopped 300 m short of the threshold of Runway 35.

The following were observed:

1. Number 3 Main Wheel tyre failed;
2. Number 4 Main Wheel tyre burst;
3. Number 1 and 2 Main Wheel tyres were deflated;
4. Binding of brake assembly Number 1 and 2;
5. The right MLG shock strut door was broken.

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Figure 7: Witness marks indicating Tyre No. 3 failure



Figure 8: Landing gear indications in the cockpit

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Figure 9: Failed Tyres No. 3 and No. 4



Figure 10: Deflated tyres No. 1 and No. 2

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Figure 11: Torn section of Right MLG shock strut door



Figure 12: Detached piece of the R MLG shock strut door



1.13 Medical and pathological information

No medical or toxicological tests were conducted.

1.14 Fire

There was no fire.

1.15 Survival aspect

The incident was survivable.

The restraints and harnesses were intact and the forces due to deceleration of the aircraft were within the design limits. There was no impact, and the fuselage was not compromised. The passengers were reported to have been calm during the RTO and as they disembarked using the airstairs from the left forward exit (L1). The Aerodrome Rescue and Fire Fighting Services (ARFFS) responded, helped the flight crew assess the external environment and rendered assistance during the disembarkation.

1.16 Test and research

The illustrations below are from FDR data as replayed on the NSIB's analysis and simulation utility. The right portion gives the geospatial reference for the aircraft while the left are the pertinent flight parameters at that instance. Attitude, speeds, heading, wind conditions,

(UTC) time, presence of warning/caution, control surface conditions, brake application and throttle lever positions could be discerned.



Figure 13: Right MLG disagree

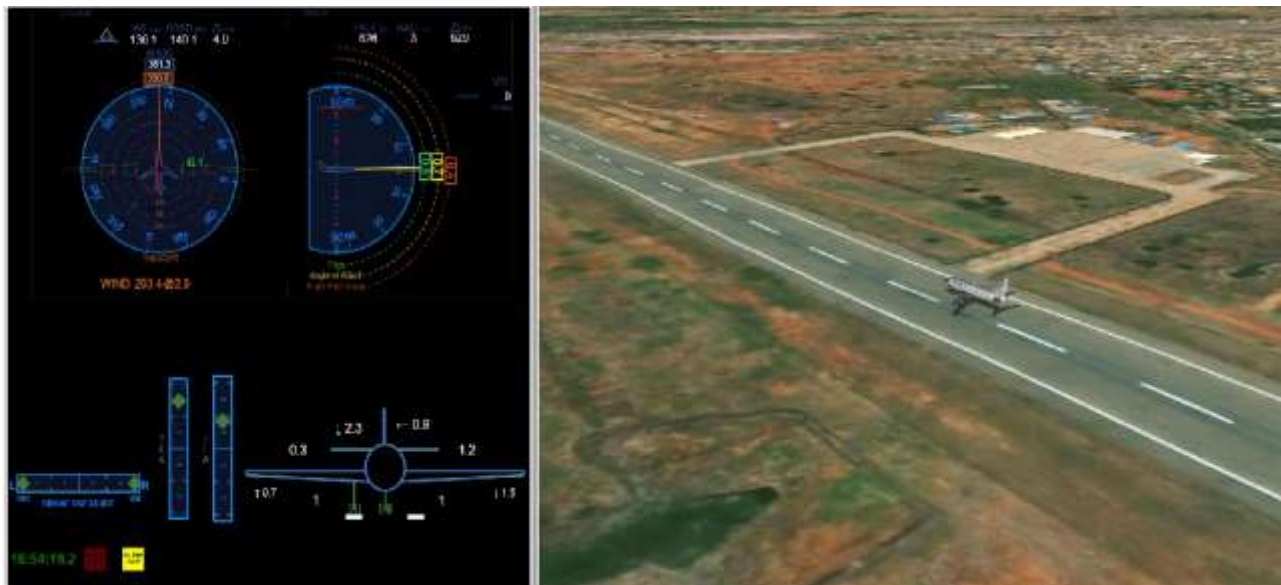


Figure 14: Commencement of RTO

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Figure 15: Deployment of reversers, brakes and speed brakes



2.0 INITIAL FINDINGS

1. The flight crew were certified to conduct the flight.
2. The aircraft had a valid Certificate of Airworthiness.
3. Foreign Object Debris (FOD) were recovered from the runway after 5N-ADB landed.
4. Another aircraft took-off Runway 17 prior to 5N-ADB.
5. Take-off was aborted due to increased airframe vibrations, a bang and an abnormal landing gear indication in the cockpit.
6. Number 3 Main Wheel Tyres failed and Number 4 Main Wheel Tyres burst during the take-off roll.
7. Main Wheel Tyres 1 and 2 were deflated prior to the aircraft coming to a stop.
8. There was binding of brake assembly No. 1 and 2.
9. The aircraft came to a stop 300 m short of the threshold of Runway 17.
10. The runway is observed to be contaminated with rubberised deposits.



FURTHER INVESTIGATIONS

1. Identification and testing of the metallic sheet recovered from the runway.
2. Examination of failed tyres (Tyre Number 3 and 4.)
3. Determination of runway surface condition at DNYO.