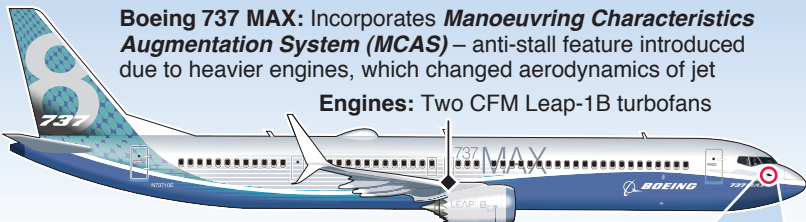


Boeing “withheld information” on 737 MAX

Boeing failed to tell airline pilots about features of a new flight-control system suspected of playing a role in the fatal crash of an Indonesian 737 MAX plane, according to pilots who fly the jet in the U.S.

Boeing 737 MAX: Incorporates *Manoeuvring Characteristics Augmentation System (MCAS)* – anti-stall feature introduced due to heavier engines, which changed aerodynamics of jet

Engines: Two CFM Leap-1B turbofans



HOW MCAS WORKS

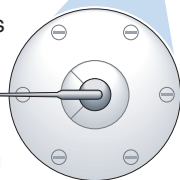
Level flight: Normal angle of attack (AOA) – angle at which airflow hits aircraft



AOA sensor

Winglet aligns itself with airflow

AIR FLOW



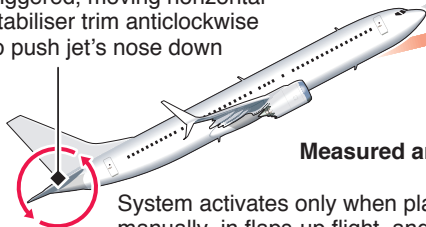
Nose-up flight

High AOA puts aircraft at risk of stalling. MCAS automatically triggered, moving horizontal stabiliser trim anticlockwise to push jet's nose down

Longitudinal axis of aircraft

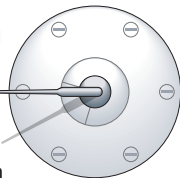
Angle of attack

Aircraft trajectory



AIR FLOW

Measured angle of attack



System activates only when plane is being flown manually, in flaps-up flight, and typically during steep turns

In Oct 29 Lion Air crash that killed 189 people in Indonesia, investigators have determined that AOA sensor was feeding bad data to jet's flight computer, repeatedly activating MCAS when there was no risk of stall