

Contributing factors to Indonesia jet crash

Flaws in the design of Boeing's 737 MAX jet contributed to the crash of a Lion Air plane in October 2018 that killed all 189 people on board, according to Indonesian investigators

Manoeuvring Characteristics Augmentation System (MCAS)

737 MAX flight control system automatically pushes plane's nose down to reduce risk of aerodynamic stall



■ **Incorrect assumptions made during design and certification of 737 MAX about how pilots would react to MCAS malfunctions**

Control yoke ("stick")

"Stick-shaker"

Vibrates yoke if approaching stall



Angle of attack (AOA) sensor

(One each side of nose). Measures angle between wing and air flow. MCAS takes data from one sensor

■ **Reliance on single AOA sensor made MCAS more vulnerable to failure, while sensor on plane that crashed had been miscalibrated during earlier repair.** Maintenance crews and pilots could not identify problem because **AOA Disagree** alert feature was not correctly enabled during 737 MAX development

■ **Lack of documentation about how systems would behave in crash scenario, including activation of stick-shaker – device that warned of stall throughout most of 13-minute Lion Air flight**

■ **"Deficiencies" in flight crew's communication and manual control of aircraft also contributed, as did alerts and distractions in cockpit. Deficiencies had been "identified during training"**

Lion Air Flight 610 profile (Oct 29, 2018)

