



Black Box on Aircraft

 [drishtias.com/printpdf/black-box-on-aircraft](https://www.drishtias.com/printpdf/black-box-on-aircraft)

Why in News

The black boxes of the Boeing 737-800 aircraft which recently crashed in Kozhikode (Kerala) have been found.

These boxes will help investigators gather information about the crucial events that led to the crash.

Key Points

- **About:** A black box, technically known as an **Electronic Flight Data Recorder**, is an orange-coloured heavily protected recording device placed in a flight. It is used to investigate the details of the events immediately preceding an accident.
 - Black Boxes are **compulsory on any commercial flight or corporate jet** where they are usually **kept in the tail of an aircraft**, where they are more likely to survive a crash.
 - It usually takes at least **10-15 days to analyse the data** recovered from the black boxes.
 - Black boxes are also used in vehicles other than planes like **railways, cars** etc.
- **Invention:** Australian Scientist **David Warren** was the first to build a FDR/CVR prototype in 1958.
- **Parts:** The "black box" is made up of two separate pieces of equipment: the Flight Data Recorder (FDR) and a Cockpit Voice Recorder (CVR).
 - FDR records things like airspeed, altitude, vertical acceleration and fuel flow.
 - CVR records the conversations in the cockpit.

- **Technology:**
 - Older black boxes used **magnetic tape**, a technology that was first introduced in the 1960s. Magnetic tape works like any tape recorder.
 - These days, black boxes use solid-state memory boards, which came along in the 1990s. **Solid state memory boards** use stacked arrays of memory chips, and are stronger.
 - The FDR contains **Crash-Survivable Memory Units (CSMUs)** which are engineered to withstand extreme heat, jarring crashes and tons of pressure.
 - To make black boxes discoverable in situations where they are under water, they are equipped with a **Beacon** that sends out ultrasound signals for 30 days.
- **Other Methods to Investigate an Aircrash**
 - Accounts from Air Traffic Control (ATC) personnel.
 - Recordings of the conversation between ATC and the pilots moments before the crash.
 - Various data recorders at the airport, which would tell about the precise point and speed of touchdown on the runway.
- **Limitations:**
 - In certain cases – like the Malaysian Airlines MH370 flight, they are not found.
 - They still lack video recording capabilities.
- **Alternatives:** It is being tried to **stream** all of their essential data **directly to a ground-based station in realtime** which would eliminate the desperate search for a box that may have been destroyed in a crash, and will be more dependable.

Aircraft Security

- **The International Civil Aviation Organization (ICAO)** is a UN specialized agency, established in **1944** to manage the administration and governance of the **Convention on International Civil Aviation (Chicago Convention)**.
 - The Chicago Convention was signed on 7th December, 1944 in Chicago (USA) by 52 signatory states including **India**.
 - It coordinates international air travel, establishes rules of airspace, aircraft registration and safety, security, and sustainability, and details the rights of the signatories in relation to air travel.
- **The Bureau of Civil Aviation Security (BCAS)** is an attached office of the Ministry of Civil Aviation (India).

It is the regulatory authority for civil aviation security in India.
- **The Aircraft Accident Investigation Bureau (AAIB)** is a division of the Ministry of Civil Aviation which investigates aircraft accidents and incidents in India.
- Recently, the Lok Sabha passed the **Aircraft (Amendment) Bill, 2020** which seeks to amend the **Aircraft Act, 1934**.

Source: IE