



Air routes

“Airways” along which aircraft fly, where virtually every aspect is strictly regulated.

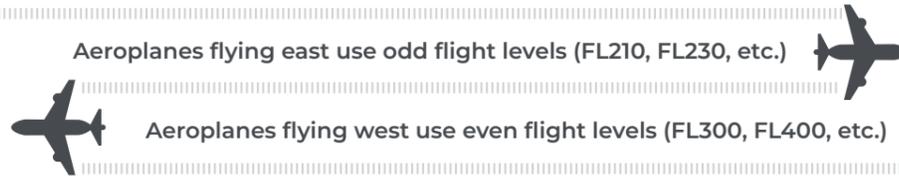


The width of airways is 8 nautical miles (almost 15 km) and their vertical separation is 300 metres

Fly further



Aeroplanes flying east use odd flight levels (FL210, FL230, etc.)

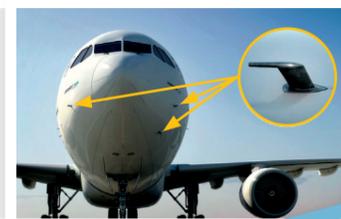


Aeroplanes flying west use even flight levels (FL300, FL400, etc.)

A curious fact

Did you know?

The pitot tube or probe allows navigators to calculate the aircraft's altitude, relative speed and climb gradient.

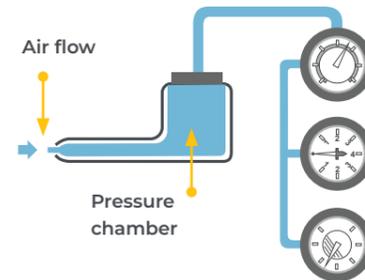


PITOT PROBE

When an aircraft creates a flight plan, it defines its passage through a series of specific points identified in air navigation charts (waypoints).

Airways are corridors established in space, determined by a succession of known position points, which can be followed by means of the navigation systems found on board an aircraft.

The segments closest to airports, which link them to the air routes, can be either take-off (SID - Standard Instrument Departures) or landing (STA - Standard Arrival) routes.



Speedometer
Indicates the relative speed of the aircraft

Variometer
Indicates if the aircraft ascends or descends and its speed

Altimeter
Indicates the altitude of the aircraft

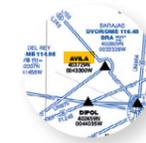
Radio station



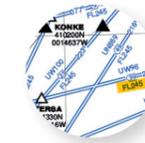
Nomenclature



Airway names consist of 2 letters and 3 numbers, e.g.: **UM744**

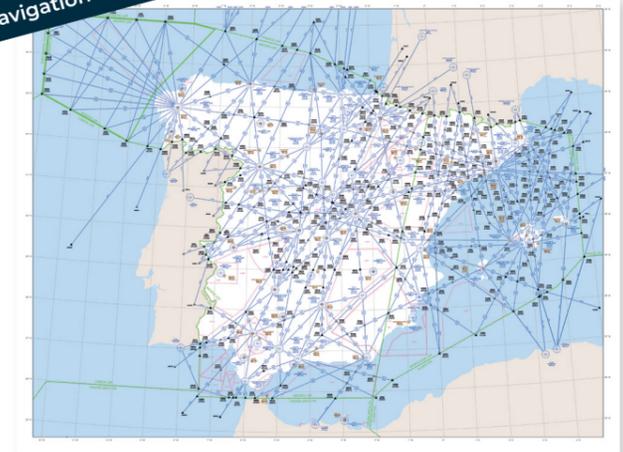


Waypoints are named with five letters that sound unmistakable in different languages, e.g.: **AVILA**



Aeroplanes fly at different heights or “flight levels”, which are named according to their altitude in feet, e.g.: **FL245**
· FL > Flight Level
· FL > 24,500 feet

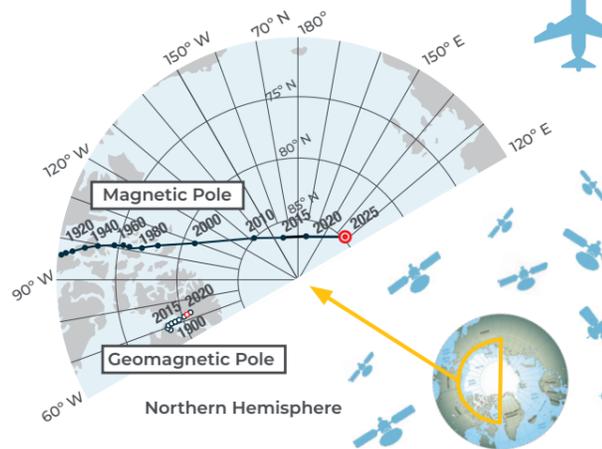
Navigation chart (Spain)



Busiest air routes

Airports & Flights	Distance	PAX per day
→ Seoul-Jeju (Corea del Sur)	449	14,184,000
→ Sapporo-Tokyo (Japan)	835	11,932,000
→ Fukuoka-Tokyo (Japan)	889	11,335,000
→ Hanoi-Ho Chi Min (China)	1,171	10,632,000
→ Sydney-Melbourne (Australia)	705	9,217,000
→ Jeddah-Riyadh (KSA)	857	8,701,000
→ Tokyo - Naha (Japan)	1,573	8,034,000
→ Mumbai-Delhi (India)	1,081	7,715,000
→ Beijing-Shanghai (China)	1,081	7,715,000
→ Guangzhou-Shanghai (China)	1,176	7,010,000

Magnetic pole movement



The erratic movement of the North Magnetic Pole requires an update to the World Magnetic Model (WMM2025) to ensure the accuracy of satellite navigation. Although it does not affect everyday life, it necessitates the recalibration of compasses and digital maps, particularly in polar regions.

Navigation aids

The first navigation aids were in the form of radio signals emitted from ground stations, whose locations were positioned on a map. By plotting the direction to the transmitting station, it allowed a course to be followed. This made it possible to fly without seeing.

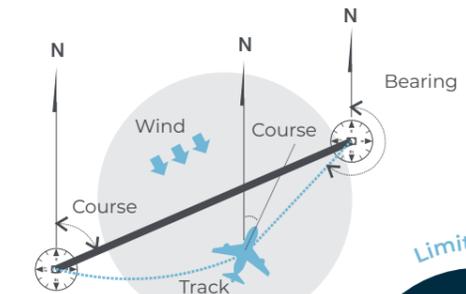
These radio aids are known as Radio Direction Finding (RDF). One transmitter allows you to set the course; two or more transmitters allow you to establish the position.

The next step was the Very High Frequency (VHF) Omnidirectional Range (VOR), a much more precise VHF omnidirectional beacon that emits three signals simultaneously:
→ A Morse code signal to identify the station
→ A 30 Hz sine wave signal with a constant phase
→ A 30 Hz sine wave signal with a variable phase depending on the direction it is emitted in (360 direction lines starting from magnetic north)

VORs usually incorporate another radio aid called Distance Measurement Equipment (DME), which allows the pilot to know the distance between the aircraft and the VOR-DME station.

The aircraft are equipped with satellite positioning (GNSS) receivers, which utilise the NAVSTAR-GPS (USA), Glonass (Russia) and Galileo (European Union) constellations. Furthermore, the use of EGNOS (European Geostationary Navigation Overlay Service) improves accuracy from 5–10 metres to 2 metres.

Aircraft also have an inertial navigation system (INS) on board, which establishes its position independently and without external help thanks to its sensors (accelerometers, gyroscopic rotation sensors, etc.).



Limited flights

VFR flights are limited by weather conditions and sunlight

Types of flight

Visual Flight Rules

In the early years of aviation development, pilots, in addition to using a compass, were guided by what they could see on land (cities, villages, rivers, coastlines, terrain, etc.).

Dead Reckoning Navigation

Allows a pilot to know the aircraft's current position using simple basic technology (clock and compass) and knowing their speed and direction with respect to the ground.

Instrumental Flight Rules

IFR flights allow continuous and safe operation in low or null visibility conditions for the pilot and/or controllers, as it is based on the use of navigation instruments and is carried out automatically.

IFR flights do not need visual contact with the ground, as they use navigation instruments

The busiest international air route is Hong Kong (HKG)–Taipei (TPE), with over 6 million passengers a year (16,500 seats a day).

