An **equipment code** describes the communication (COM), navigation (NAV), approach aids and surveillance transponder equipment on board an aircraft. These alphabetic codes are used on FAA and ICAO flight plan forms to aid air traffic services personnel in their handling of aircraft.

On the FAA non-RNAV domestic flight plan form (FAA Form 7233-1) the equipment code is a single character placed in block 3 (Aircraft Type / Special Equipment) as a suffix to the aircraft type code. A single letter is used to represent a radio navigational capability and transponder combination.

On the ICAO flight plan form (e.g. FAA Form 7233-4 based on the format specified by ICAO Doc 4444) one or more alphabetic codes are placed in box 10. Multiple letters are used to describe individual radio navigational capabilities and a single letter is used to designate the transponder. The FAA began requiring the ICAO format form for domestic flights desiring RNAV routes on 29 July 2008. The ICAO format has already been in use for all domestic flight plans in Canada, Mexico and many other countries for a number of years.

Regardless of the form used, Air traffic controllers (ATC) issue clearances based on filed equipment codes, therefore it is important for pilots to use the appropriate coding. For example, if a desired route requires GPS, then the pilot should file /G, even if the aircraft also qualifies for other suffixes (this may be moot due to new RNAV routing requirements to use the ICAO form & codes). Pilots are recommended to file the maximum capability of their aircraft in the equipment suffix.

To see the differences in the coding systems, consider a VFR aircraft with a VHF communication radio, VOR receiver with glideslope for ILS approaches, ADF, a GPS and a pressure altitude reporting transponder. It would be coded as SG/C on an ICAO form and as /G on the FAA domestic form. Add a DME to the panel and the ICAO code becomes SDG/C while the FAA code remains /G. Then, if the ADF stops receiving the ICAO code becomes DGIOV/C while the FAA code remains /G. More letters with the ICAO format mean more information about the aircraft's radio navigation capability is available to the ATS controller than with the older FAA coding system.

Aircraft Radio Communication, Navigation & Approach Equipment Codes

- A Loran A
- B (Not allocated)
- C LORAN C
- D DME
- E Decca
- F ADF
- G GNSS (No restrictions for VFR flight plans, but for IFR flight plans this code implies the GPS receiver is TSO C-129 ((((IFR) certified. If the equipment is not IFR certified it could be entered in box 18 on an IFR flight plan as NAV/G non-IFR.)
- H HF RTF (HF RadioTelephone)
- I INS
- J Data Link (Noteed as DAT/details in ICAO form box 18)
- K MLS
- L ILS
- M Omega (Not allocated in some jurisdictions.)
- N No COM/NAV equipment for the route carried or is unservicable.
- O VOR
- P Doppler
- Q (Not allocated)
- R RNAV / RNP type certification met for the route segment, route or area concerned
- S Standard Equipment composed of ADF ILS VOR VHF
- T TACAN
- U UHF
- V VHF
- W RVSM (Reduced Vertical Separation Minimum)
- X NAT MNPS Certification
- Y CMNPS Certification (e.g. for Canada, when aircraft has Canadian but not NAT MNPS)
- Z Other equipment carried (Noted as COM/details or NAV/details in ICAO form box 18)

A = LORAN A

LORAN (Long Range Navigation) is a radio navigation system using upper medium frequency radio transmitters that uses multiple transmitters to determine location and/or speed of the receiver. LORAN is the predecessor of GPS (satelites) but nowadays mainly serve as a backup.

C = LORAN C

Improved version of LORAN A using Low frequency radio transmitters

D = DME

Distance measurement equipment is used to determine the distance between a DME station on the ground and an aircraft. The ground stations are typically collocated with VORs. Two pairs of UHF pulses with fixed duration and separation are send and received by the aircraft to the DME station. The difference in time (propagation time) between send and recieve determines the distance.

E = Decca

DECCA was a navigation system that worked based on radio waves in the midrange frequency band for position determination. Since the use of GPS it is no longer being used (year 2000).

F = ADF

An *Automatic Direction Finder* (ADF is an aircraft radio-navigation instrument which automatically and continuously displays the relative bearing from the aircraft to a suitable radio station. ADF receivers are normally tuned to aviation NDBs operating in the LW band between 190 - 535 kHz. Like RDF units, most ADF receivers can also receive medium wave (AM) broadcast stations, though as mentioned, these are less reliable for navigational purposes and have limited range.

G = GNSS/GPS

Global Navigation Satellite system / Global Positioning System
provides reliable positioning, navigation, and timing services to worldwide users on a continuous basis in all weather, day and night, anywhere on or near the Earth.

H = HF RTF

High Frequency Radio Telephone, used for air-to-ground voice communication in overseas operations.

I = INS

Inertial navigation system is a navigation that uses a computer, motion sensors (accelerometers) and rotation sensors (gyroscopes) to continuously calculate via dead reckoning (estimation) the position, orientation, and velocity (direction and speed of movement) of a moving object without the need for external references. It is used on vehicles such as shipss, aircraftt, submariness, guided missiless, and spacecrafts. Other terms used to refer to inertial navigation systems or closely related devices include **inertial guidance system**, **inertial reference platform**, and many other variations.

J = Data Link

In civil aviation, a data-link system (known as Controller Pilot Data Link Communications) is used to send information between aircraft and air traffic controlers when an aircraft is too far from the ATC to make voice radio communication and radar observations possible. Such systems are used for aircraft crossing the Atlantic and Pacific oceans. One such system, used by NavCanada and NATS over the North Atlantic uses a five-digit data link sequence number which is confirmed between air traffic control and the pilots of the aircraft before the aircraft proceeds to cross the ocean. This system uses the aircraft's flight management computer to send location, speed and altitude information about the aircraft to the ATC. ATC can then send messages to the aircraft regarding any necessary change of course

K = MLS

The Microwave Landing System (MLS) is an all-weather, precision landing system originally intended to replace or supplement the Instrument Landing System (ILS). MLS has a number of operational advantages, including a wide selection of channels to avoid interference with other nearby airports, excellent performance in all weather, and a small "footprint" at the airports

L = ILS

The Instrument Landing System (ILS) is a ground-based instrument approach system that provides precision guidance to an aircraft approaching and landing on a runway, using a combination of radio signals and, in many cases, high-intensity lighting arrays to enable a safe landing during instrument meteorological conditions (IMC), such as low ceilings or reduced visibility due to fog, rain, or blowing snow

M = Omega

Omega stations transmitted a very low frequency signal which consisted of a pattern of four tones unique to the station that was repeated every ten seconds. Because of this and radionavigation principles, an accurate fix of the receiver's position could be calculated. Due to the succes of the Global postioning System the use of Omega declined during the 1990s, to a point where the cost of operating Omega could no longer be justified. Omega was permanently terminated in 1997 and all stations ceased operation.

O = VOR

Very High Frequency Omni directional range beacon. Unlike a NDB which transmits 1 frequency all around . The VOR transmits 2 signals. 1 steady frequency and 1 rotating frequency. The VOR therefore can transmit 360 signals all around. 1 signal per degree ! The VOR allows the airborne receiving equipment to derive a magnetic bearing from the station to the aircraft (direction from the VOR station in relation to the Earth's magnetic North at the time of installation).

P = Doppler

The Doppler effect is the change in frequency of a wave for an observer moving relative to the source of the waves. Used for weather radar

Q = (not allocated)

R = RNAV/RNP

Area Navigation (RNAV) is a method of air navigation that allows an aircraft to choose any course within a network of navigation beacons, rather than navigating directly to and from the beacons. This can conserve flight distance, reduce congestion, and allow instrument flight plans into airports without beacons

S = Standard equipment

Standard Equipment composed of ADF ILS VOR VHF. (the letters F, L, O, V)
T = TACAN

TACtical Air Navigation, or TACAN, is a navigation system used by military aircraft. It provides the user with a distance and bearing from a ground or ship-borne station. It is a more accurate version of the VHF omnidirectional range/distance measuring equipment (VOR/DME) system that provides range and bearing information for military aviation. At VORTAC facilities, the DME portion of the TACAN system is available for civil use.

U = UHF RTF

Ultra-High Frequency Radiotelephony

V = VHF RTF

Very- High Frequency Radiotelephony

W = RVSM Operational Approval

Reduced Vertical Separation Minima or Minimum (RVSM) is an aviation term used to describe the reduction of the standard vertical separation required between aircraft flying at levels between FL290 (29,000 ft.) and FL410 (41,000 ft.) from 2,000 feet to 1,000 feet (or between 8,900 metres and 12,500 metres from 600 metres to 300 metres in China). This therefore increases the number of aircraft that can safely fly in a particular volume of airspace.
Only aircraft with specially certified altimeters and autopilots may fly in RVSM airspace, otherwise the aircraft must fly lower or higher than the airspace, or seek special exemption from the requirements.

X = MNPS Certified

Minimum Navigation Performance Specifications Airspace (MNPSA): Designated airspace in which minimum navigation performance specifications (MNPS) procedures are applied between MNPS certified and equipped aircraft. Under certain conditions, non-MNPS aircraft can operate in Minimum Performance Specifications Airspace (MNPSA). However, standard oceanic separation minima is provided between the non-MNPS aircraft and other traffic. Currently, the only designated MNPSA is described as follows: 1) Between Flight Level 275 and 400; 2) Between latitudes 27-N. and the North Pole; 3) In the east, the eastern boundaries of the Control Areas (CTA) Santa Maria Oceanic, Shanwick Oceanic, and Reykjavik; 4) In the west, the western boundaries of CTA's Reykjavik and Gander Oceanic and New York Oceanic excluding the area west of 60-W and south of 38-30'N

Y = 8.33 kHz Capable Radio

Since October 1999, the carriage and operation of 8.33 kHz radio equipment applies above FL245 in the ICAO EUR Region. From 15 March 2007, the carriage and operation of 8.33 kHz radio equipment applies above FL195 in the ICAO EUR Region.
In real life the 8,33 kHz radio equipment is used to contact EURO control.

Z = Other Equipment Carried

If other equipment carried then specify in item 18 other information, preceding by COM/ or NAV/

more info at : http://academy.ivao.aero/