FINDING LOCATION USING

NavIC

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Introduction

- Geography - Space
- Accurate location of a place/individual
- Accurate location- Latitudes & Longitudes- Coordinates

Introduction contd…

Navigation systems

1. USA- GPS - Global Positioning System (1978)
2. Russia – GLONASS (1982)
3. China – BeiDou (2000)
4. Japan - QZSS (2010)
5. EU – Galileo (2011)
6. India – NavIC (2013)

Introduction

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Provides users with services:

1. Positioning
2. Navigation
3. Timing

Introduction contd…

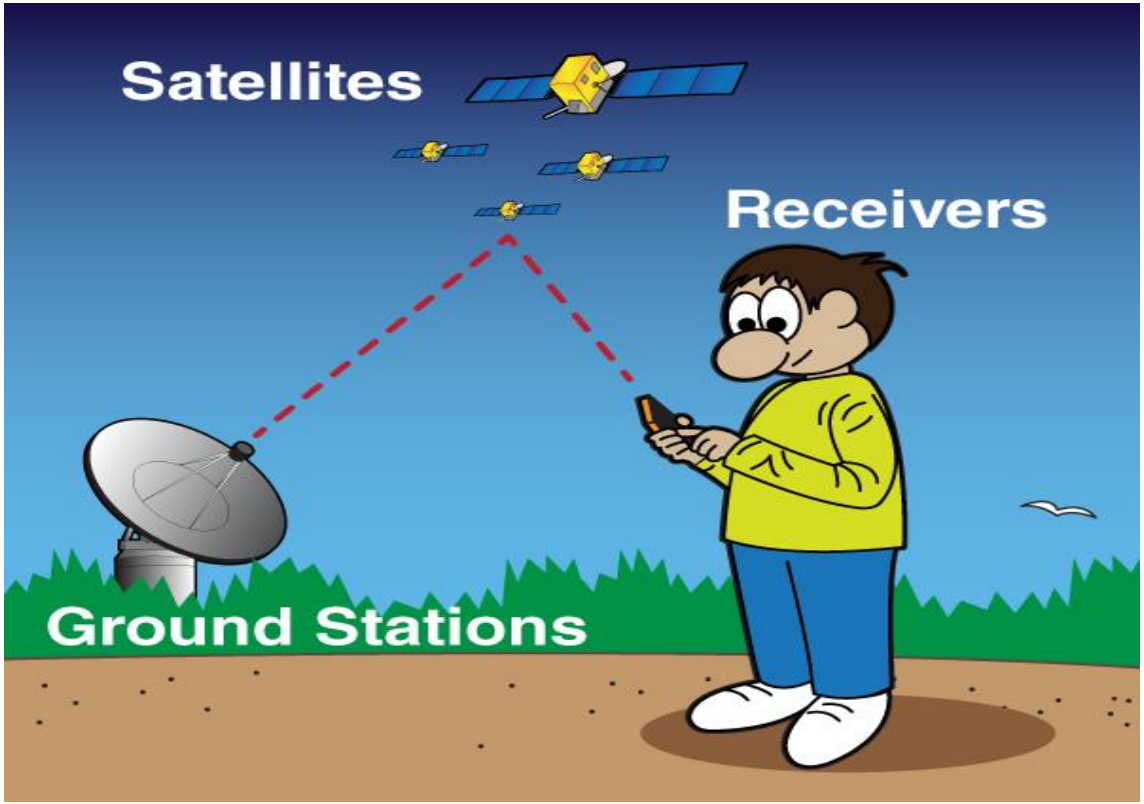
Navigation system consists of 3 segments:

i) Space segment (Satellite)

ii) Control segment (Ground station)

iii) User segment (Receiver)

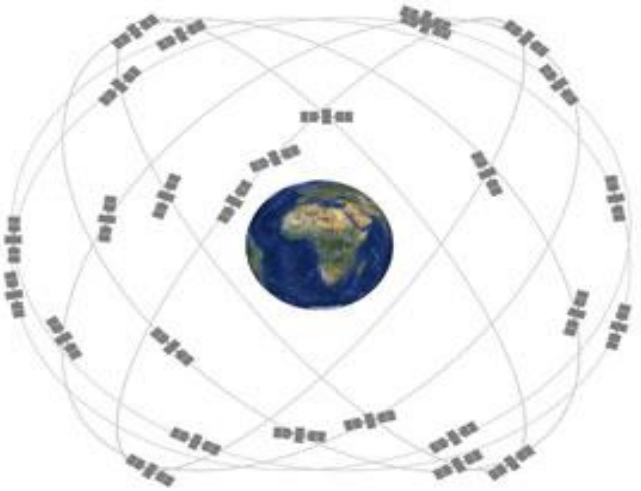
How does navigation system works?



https://spaceplace.nasa.gov/gps/en/

Space segment

- A constellation of satellites transmitting radio signals to users



Control segment

- Consists of a global network of ground facilities that:

➢ Tracks navigation satellites

➢ Monitors their transmissions

➢ Performs analyses

➢ Sends commands & data to the constellation

User Segment

1. GPS satellite broadcast radio signals providing their location, status & precise time from on-board clock

2. The GPS radio signals travel through space at the speed of light (299,792km/sec)

3. The GPS device receives the radio signals, noting their exact time of arrival and uses these to calculate its distance from each satellite in view

Ground master control system

4. Once a GPS device knows its distance from at least 4 satellites, it can use geometry to determine its location on Earth in 3 dimensions

Uses of navigation system

- An essential element of the global information infrastructure
- Variety of uses- cell phones, wristwatches, bulldozers, shipping containers & ATM's

Applications of navigation system

- Agriculture
- Aviation
- Environment
- Marine
- Disaster management & public safety
- Railways & Highways
- Recreation
- Surveying & mapping
- Time

NavIC

- Navigation with Indian Constellation (NavIC)
- Developed by Indian Space Research Organisation (ISRO)
- Idea came after Kargil War (1999)
- India- 4th country to develop own navigation system after USA, Russia & China

NavIC

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- Also known as IRNSS- Indian Regional Navigational Satellite System
- Designed to provide accurate position information service to users in India

NavIC

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- ISRO has built 9 satellites in IRNSS series (8 in orbit)

IRNSS 1G

NavIC

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- The IRNSS constellation was named as “NavIC” by the Honb’le PM, Shri Narendra Modi
- Dedicated on successful launch of the IRNSS-1G satellite

NavIC

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- Coverage- 1,500 sq. km from India’s boundary (primary service area)
- An Extended Service Area - lies between primary service area and area enclosed by the rectangle from Latitude 30º S to 50º N, Longitude 30º E to 130º E

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Provides two types of services:

1. Standard Positioning Service (SPS) - all users
2. Restricted Service (RS) - authorised users

Access

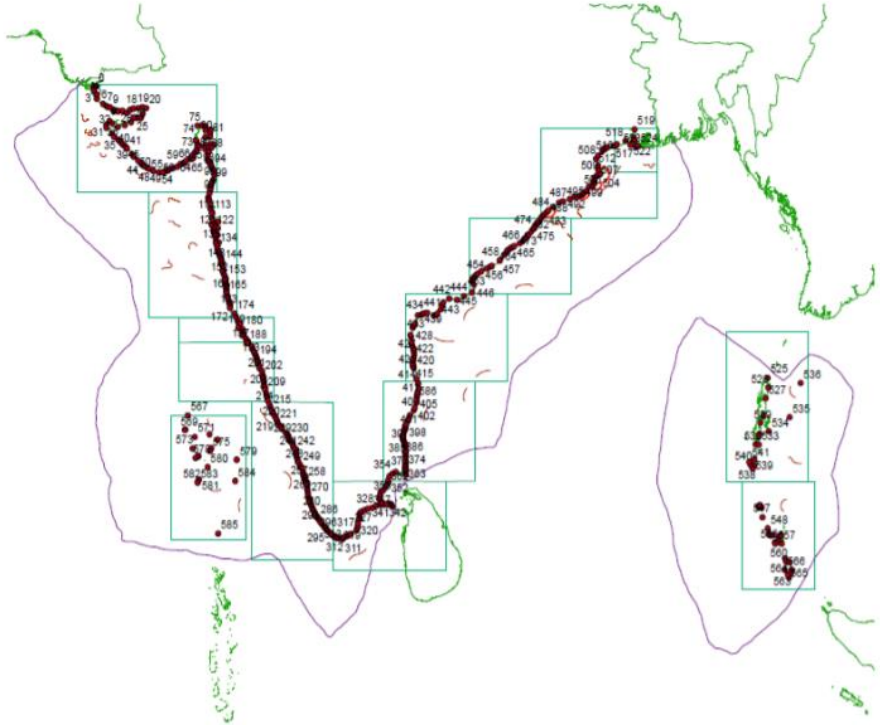
- Garmin - manufacturer of navigation products
- Launched NavIC enabled handheld devices GPSMAP 66sr and GPSMAP 65s in India
- NavIC enhances the accuracy and availability of signals in the hilly terrain as well as urban canyon

Advantages over previous systems

- More advanced
- Faster - (signals of SPS-L5 & SPS-S frequency bands)
- More accurate
- Ground - upto 10mtr height
- Ocean – upto 20mtr height

ANNEXURE 6- INCOIS Potential fishing zone message/TUNA-PFZ

The Potential Fishing Zone/ TUNA-PFZ message contains the following information: Latitude, Longitude, Ref ID & Step ID. The no.of zones can be maximum upto 800 zones. The sample forecast area definition given by INCOIS is as below:



Forecasting using NavIC

https://www.isro.gov.in/sites/default/files/article-files/irnss-programme/sis_icd_irnss1a_incois_isro_v1.1_19jul2019.pdf

Disadvantages

- Not supported by all the processors of smartphones
- Only by Qualcomm 460, 662, 720G, 765, 765G & 865G
- Not easily available to all

Thank you