5. SATELLITE-BASED POSITIONING - *A) SEGMENTS*

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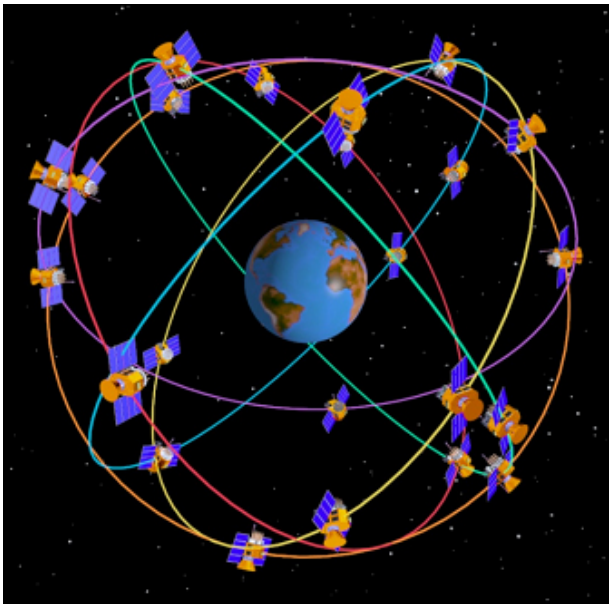
The basic constellation, or building bricks of GPS:

1. ***Space segment***: the satellites that orbit the Earth, and the radio signals that they emit.
2. ***Control segment***: the ground stations that monitor and maintain the space segment components.
3. ***User segment***: the users with their hard- and software to conduct positioning.

Ad 1) Space segment

The space segment of GPS consists of 24 satellites on 6 orbits (approx. 22,000 km from the centre of the Earth):

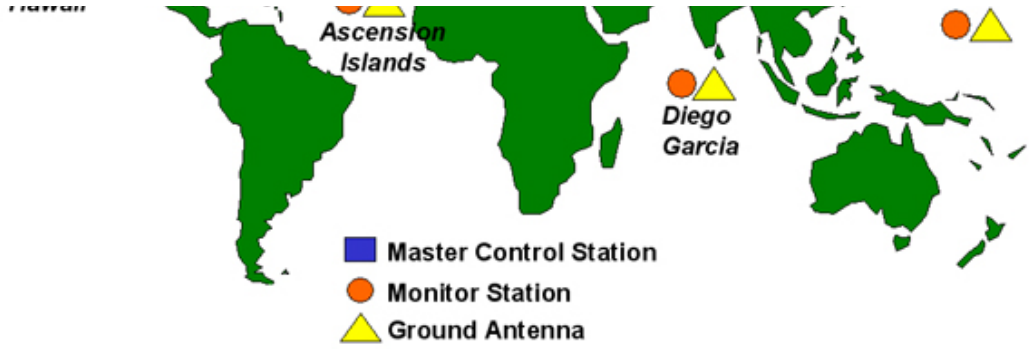
- Each satellite carries a clock
- Each satellite completes 2 orbits/day.
- 24 hour complete GPS coverage anywhere on the Earth.
- Accuracy: 21 meters 95% of time



Ad 2) Control segment

The control segment is composed of

- a master control station (MCS),
- an alternate master control station,
- four dedicated ground antennas and
- six dedicated monitor stations



Ad 3) User segment

The user segment is composed of hundreds of thousands of U.S. and allied military users of the secure GPS Precise Positioning Service, and tens of millions of civil, commercial and scientific users of the Standard Positioning Service.

In general, GPS receivers are composed of an ***antenna***, tuned to the frequencies transmitted by the satellites, ***receiver-processors***, and a highly stable ***clock*** (often a crystal oscillator).

How to select a GPS receiver?

- Application (boating, flying, driving, mapping, surveying)
- Accuracy requirements
- Power consumption requirements
- Operational environment
- Signal processing requirements
- Cost
- Data exchange standard

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