Overview

- What is GPS and how it works
- Navigating
- Approaches
Part of the GNSS (Global Navigation Satellite System)

- 24 satellites
  - 21 operational plus 3 spares
  - Obits are about 55 degree incline from equator
  - Minimum of 5 in view at any time

- Position accuracy with 100 Meters

- Used for enroute navigation and Instrument approaches

- Aircraft using GPS must have alternate approved means of navigation
GPS Receivers
GPS receiver uses travel time of radio signal to determine distance from satellite

- Satellites issue course/acquisition (CA) code
- Receiver compares CA code to database

Requires 3 satellites to triangulate position plus 4th satellite for timing correction
Navigating with GPS

- User defined waypoints
  - Navigation Facilities
  - Airports
  - Airway intersections
  - User defined

- Course deviation
  - 30 miles or more from destination
    - 1 mile per dot
    - full deflection=5 miles
  - Within 30 miles “armed for the approach”
    - Full deflection=1 mile
  - Inside FAWP
    - Full deflection=0.3 mile
Receiver Autonomous Integrity Monitoring (RAIM)

- Enables continuous verification of integrity of GPS signals
- Uses one additional satellite to compare with 4 in use to verify reliability
- Required for approved approach
Types of Approaches

- **Overlay**
  - Uses procedures already established for preexisting approaches
  - Phase 1: FAA declared GPS operational for civil operations
  - Phase 2: Required underlying navaids to be operational
  - Phase 3: Underlying navaids don’t need to be operational

- **Stand Alone**
  - Designed specifically for GPS
  - Uses Basic T structure
The Basic T usually incorporates 2 IAFs located 4 or 5 nautical miles on either side of the IF/IAF, approximately 90° to the final approach course. The leg length or angle of the turn to the intermediate segment may be modified when required by obstructions or airspace.

Normally, the IF also is designated an IAF for straight-in (NoPT) procedures. If a straight-in procedure cannot be used due to terrain or airspace considerations, the IF will not be designated an IAF. If circumstances require a course reversal, a holding pattern is established at the IF/IAF.

The Basic T design ideally aligns the procedure with runway centerline, with the MAP located at the threshold, the FAF 5 nautical miles from the threshold, and the intermediate fix (IF) 5 nautical miles from the FAF.
Summary

- GPS utilizes orbiting satellites
- Location up to 100 meters
- Approved for enroute navigation
- Capable of performing existing approaches
- Utilized in creating new and simpler approaches
References


