Wide Area Augmentation System (WAAS)

WAAS is a system designed to improve the

- Accuracy (up to 40 times)
- integrity
- availability
  Of GPS signals
  WAAS is made up of
- Wide Area Reference stations which
  - are strategically placed around the country
  - These stations constantly monitor the signals from the satellite to determine clock and positions errors
- Wide Area Master stations also on the ground which
  - receive the results of these comparisons from the ground stations
  - create a correction calculation
- Communication satellites which
  - Receive and Rebroadcast the correction message to WAAS-capable aircraft and Serve as an additional navigation satellite
  The WAAS system provides improved
- Availability of GPS
  - by providing in effect an additional satellite view
- Integrity of GPS
  - through real time monitoring
- Accuracy of GPS
  - by providing differential corrections to reduce errors
- Performance of GPS
  - enough to enable approach procedures with vertical glide paths
  If the 172 has a G1000 with WAAS, the G1000
- Receives the correction message from the Satellite and
- Uses the message to Correct for errors
  - in the GPS signal
  - For its location
- Instead of having the Usual Accuracy within 50 meters
  - Is now typically accurate within
    - 1.25 meters horizontally
    - 2 meters vertically

- Gives you the ability to fly into more airports
    - with lower ceiling and visibility minimums
        - on some approaches you will be able to fly
            - as low as 200 Feet above the runway
            - in vis as low as 1/2 mile
            - which is as precise as an ILS approach

WAAS Receivers

- support all basic GPS approach functions
- provide additional capabilities
  - particularly the ability to generate an electronic glidepath
  Since these glide paths are not generated from ground equipment and do not rely on barometric aiding
- several problems are eliminated
  - cold and hot temperature effects
  - which can create baro errors
  - incorrect altimeter settings
  - lack of local altimeter source
  Because WAAS can provide vertical guidance
- an additional class of approach procedures has been developed
    - this is called approach with vertical guidance

WAAS Notams

Although the G1000 can predict RAIM availability, it cannot predict WAAS outages or availibitly of service

- This means you will to check for WAAS NOTAMS before you depart
    - So that you can anticipate if the WAAS based approach you plan to fly will be available
        - at your destination
        - when you expect to arrive
    - you will the see the term UNREL
        - stands for unreliable
        - if WAAS is predicted to be unavailable

WAAS Video Notes

Is operated by the NAS national airspace system
Augments the basic service provided by GPS through improving the accuracy, integrity and

availability of service for performance based navigation operations and vertically guided approaches.

Consists of a network of Wide Area Reference stations

- there are 38 of them
  Also uses wide area master stations
- there are 3 of them
  The WMS send the corrections signals to the GEO uplink substations
- there are 3 of them
  The geostationary satellites receive the signal
- there are 3 of them
  The signals travel at the speed of light.

Satellite Based Augmentation Systems (SBAS)