RF Front End & Weak Signal Tracking Software Receiver for Dual-Frequency GPS Signals

GPS Antenna

Dual-Frequency GPS RF Front End

- Attenuator
- Active dual-frequency filter assembly
- Bit-select switches
- Data acquisition system connector

Software Receiver

- Signal Acquisition Code
- Data Demodulation
- Optimal Weak-Signal Tracking Code

- DC block
- DC block/bias T
- ADC
- LLT1
- LLT2
- CPLD w/sign/magnitude bit logic, shift registers, & counter

M.L. Psiaki, 30 June 2004
Dual Frequency GPS Software Receiver Development for Ionospheric Scintillation Measurement

- **Problem:**
  Civilian dual-frequency GPS receivers lose lock on weak signals due to signal processing limitations

- **Solution:**
  Implement optimal Kalman-filter-based semi-codeless tracking in a software signal processing environment

- **Applications:**
  - Atmospheric limb scans
  - Ionospheric scintillation measurements
  - Look-down TEC measurements via GPS ocean reflections

- **Possible Missions:**
  - Ionosphere/Thermosphere Storm Probes
  - Ionospheric Mapper

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