

Summary of talk delivered on 14 **Sept,1997** to Timing Sub-committee.

R.P.Giffard (Hewlett-Packard Laboratories)

Robin Giffard described the work he has been doing on "All-in-View" common-view time transfer (**ACV**), using Motorola "ONCORE" single-board receiver modules. One of the **recievers** was tested by operating it side by side with the primary USNO SPS receiver for over 100 days. The data showed that the modular receiver was functioning correctly and very stable in that environment. It was shown that the environmental stability of the receivers can be increased by careful control of operating temperature and supply voltage. The results of ACV measurements over the 4,000 km East-West baseline HPL/USNO indicated that Ephemeris and multipath errors were dramatically reduced by averaging. The signature of incompletely corrected ionospheric delays was clearly seen in the data.

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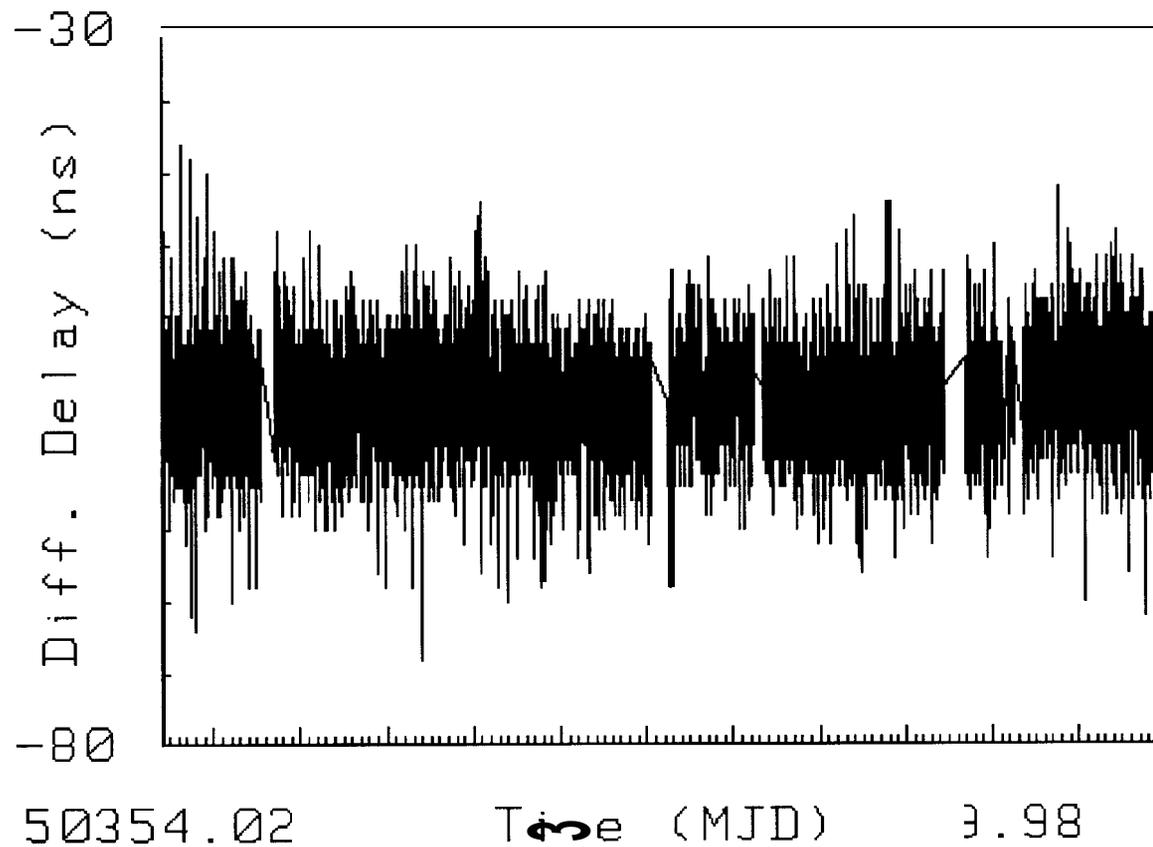
— ACV with Motorola *ONCORE*

- Evaluate receivers: Noise/Calibration/Stability
- Measure environmental effects
- Assess contributions to noise level in ACV between HPL and USNO
- Interpret diurnal effect in terms of Ionosphere and GPS Built-In Correction

Evaluation of Receivers

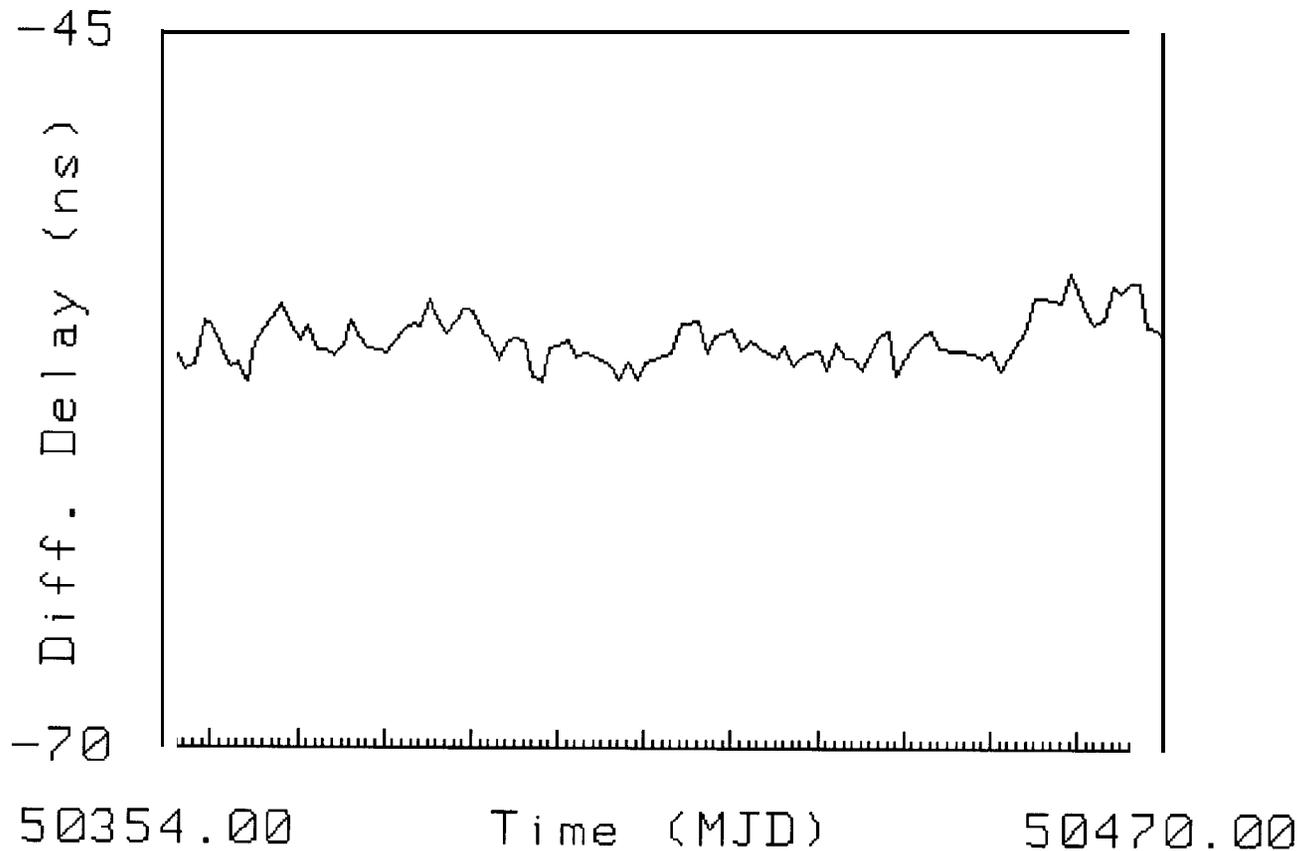
- Carry out Zero-Baseline measurements at USNO using 8-channel *ONCORE* receiver and antenna at known coordinates
- Compute scheduled 13-minute averages to compare data with USNO Primary SPS Receiver (Stel-502)
- Data from 97 days gives 7538 points, rms is 3.3 ns.
- Find little correlation with angle to satellite (Ionosphere and Troposphere corrections ON)
- Find stability is good, $\ll 1$ ns. (operating in benign environment)

ONCORE vs STel-5

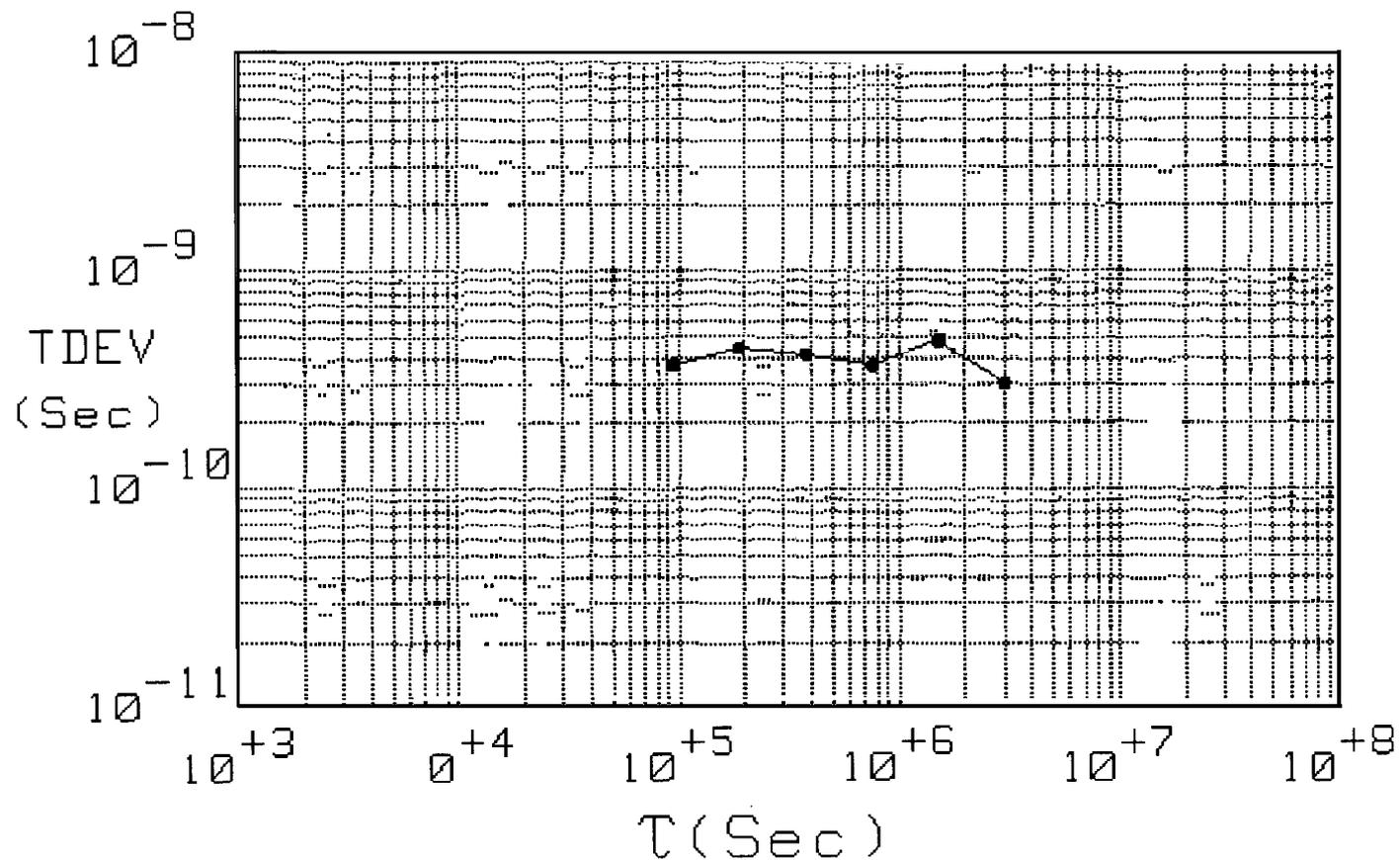


ONCORE vs STel-502

(One-day Averages)



ONCORE vs STel-502

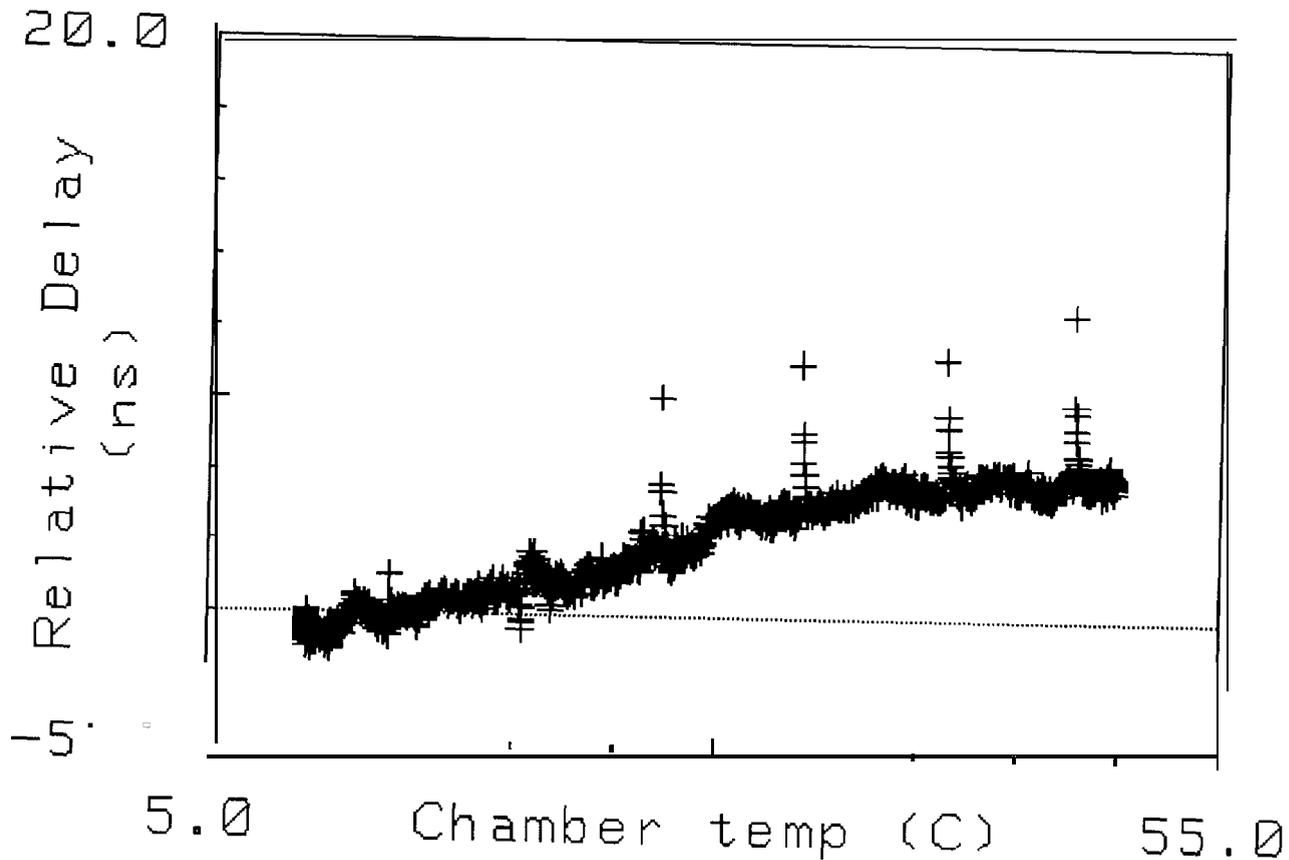


Evaluation of Receivers (cont.)

- Show environmental stability of receiver improved by regulating temperature of correlator ASIC
- Find delay of modified receiver stable to 1 ns peak-to-peak over 20 to 35 C
- Find sensitivity of modified receiver to signal level too small to measure (smaller than 0.05 ns per dB)
- Show noise level of C/A code correlation less than 1.5 ns with 10 second averages for single channel

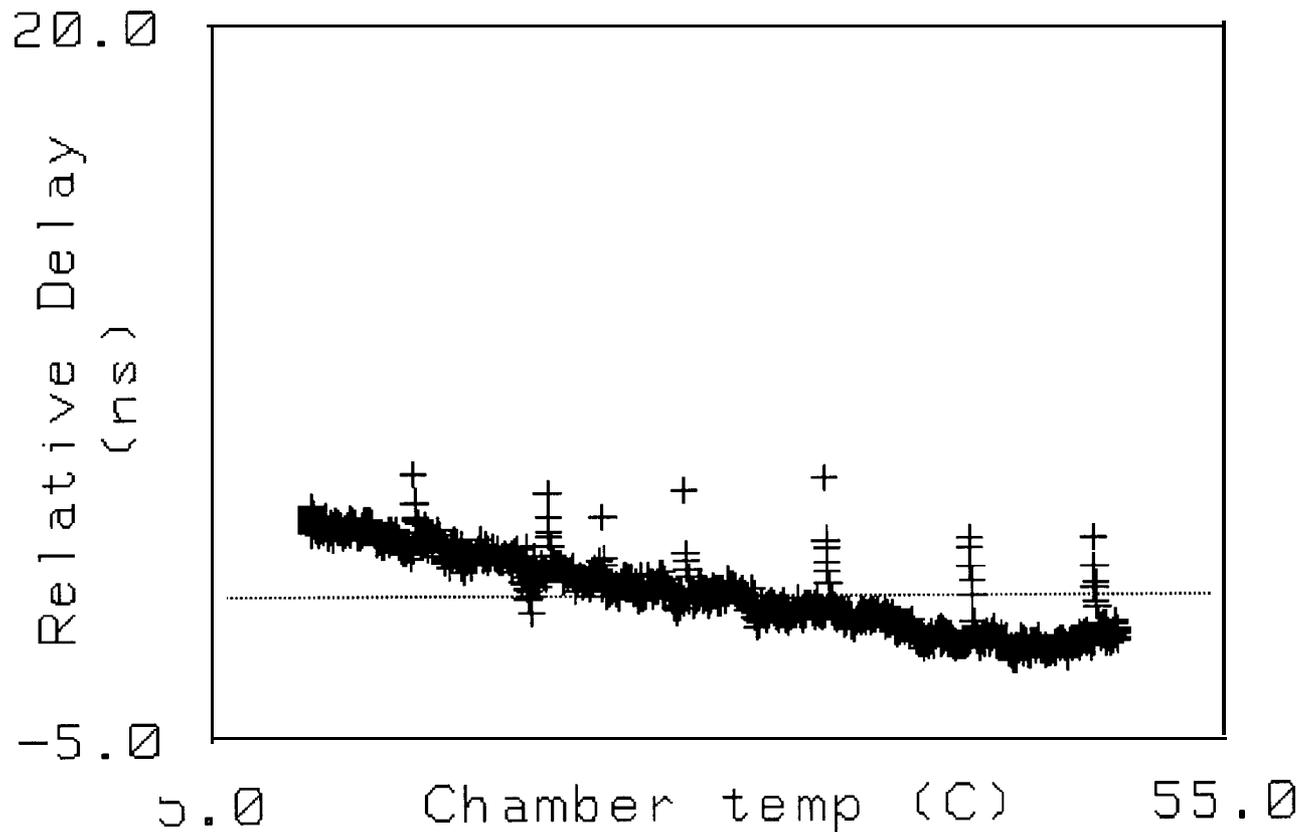
Temperature Effect (Modified)

Supply Voltage: 5.058 V



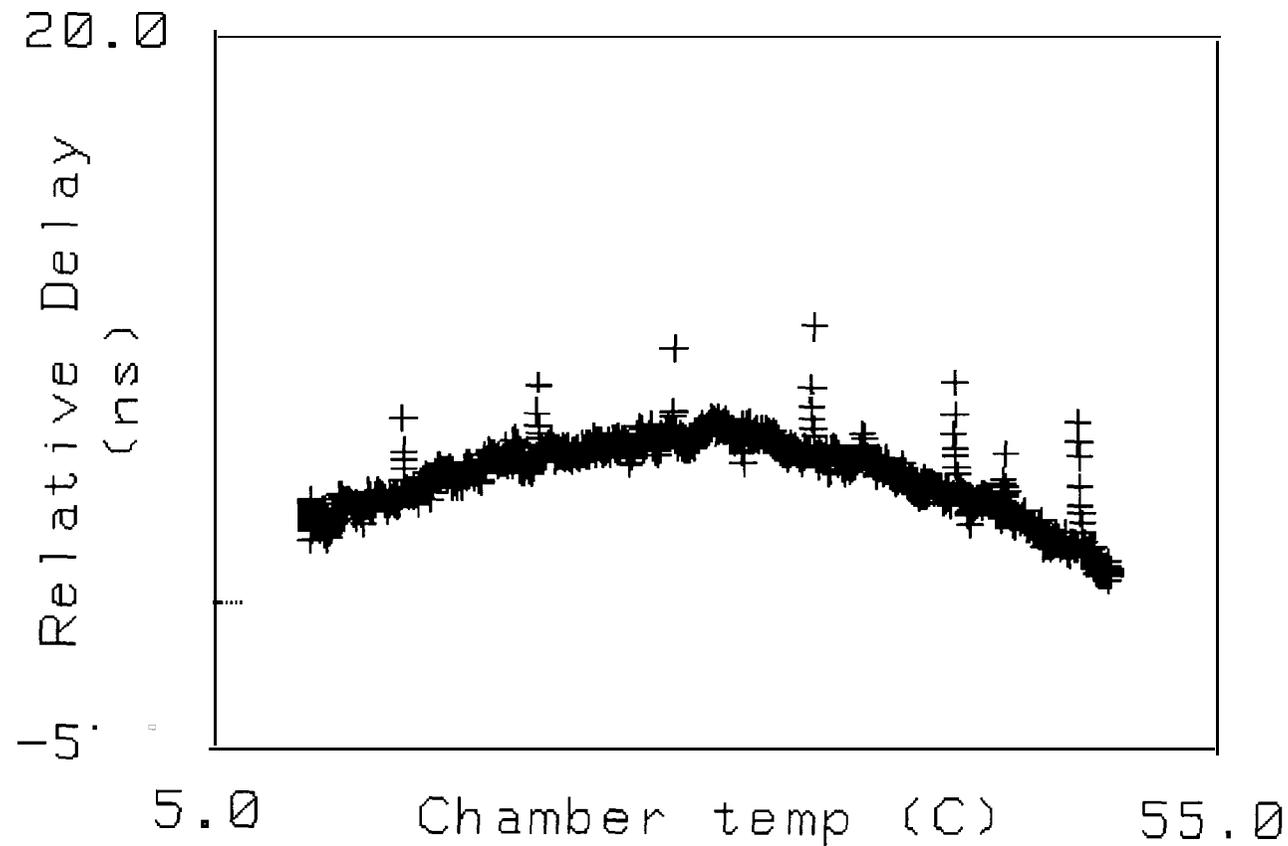
Temperature Effect (Modified)

Supply Voltage: 4.857 V

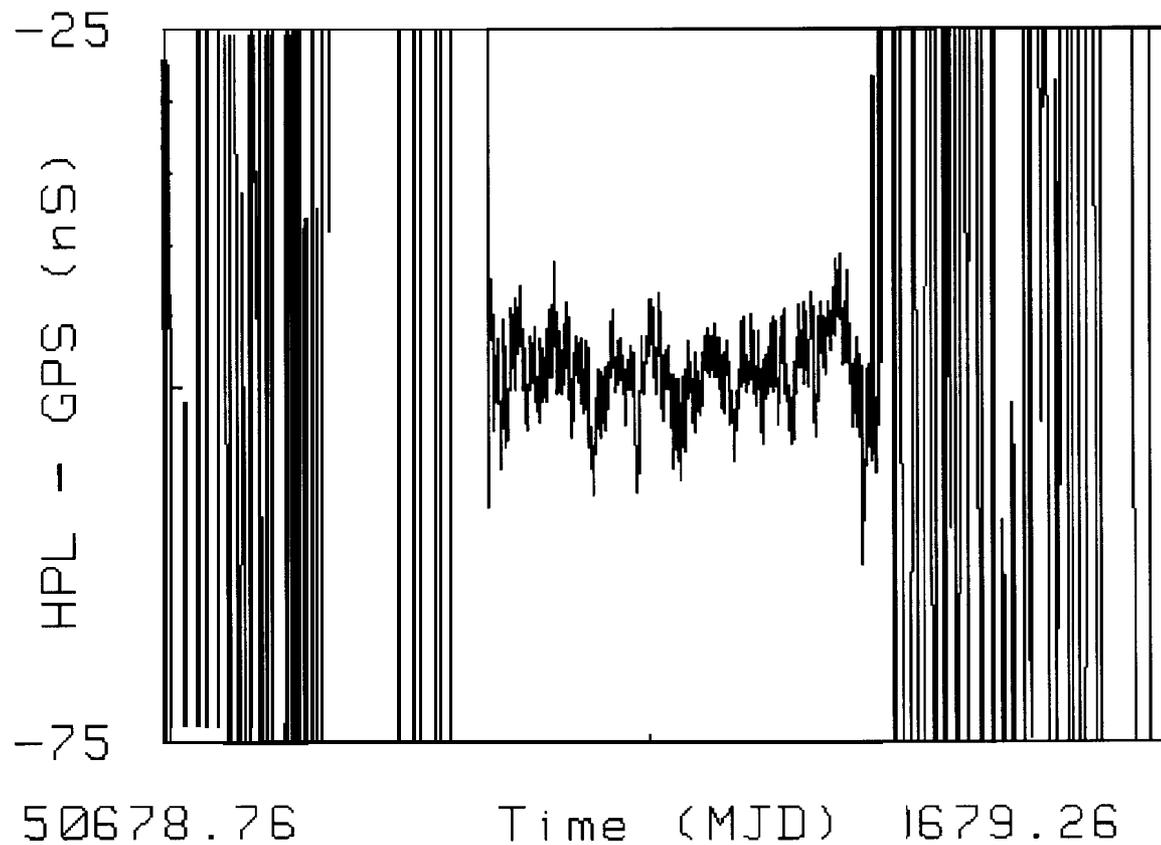


Temperature Effect (Modified)

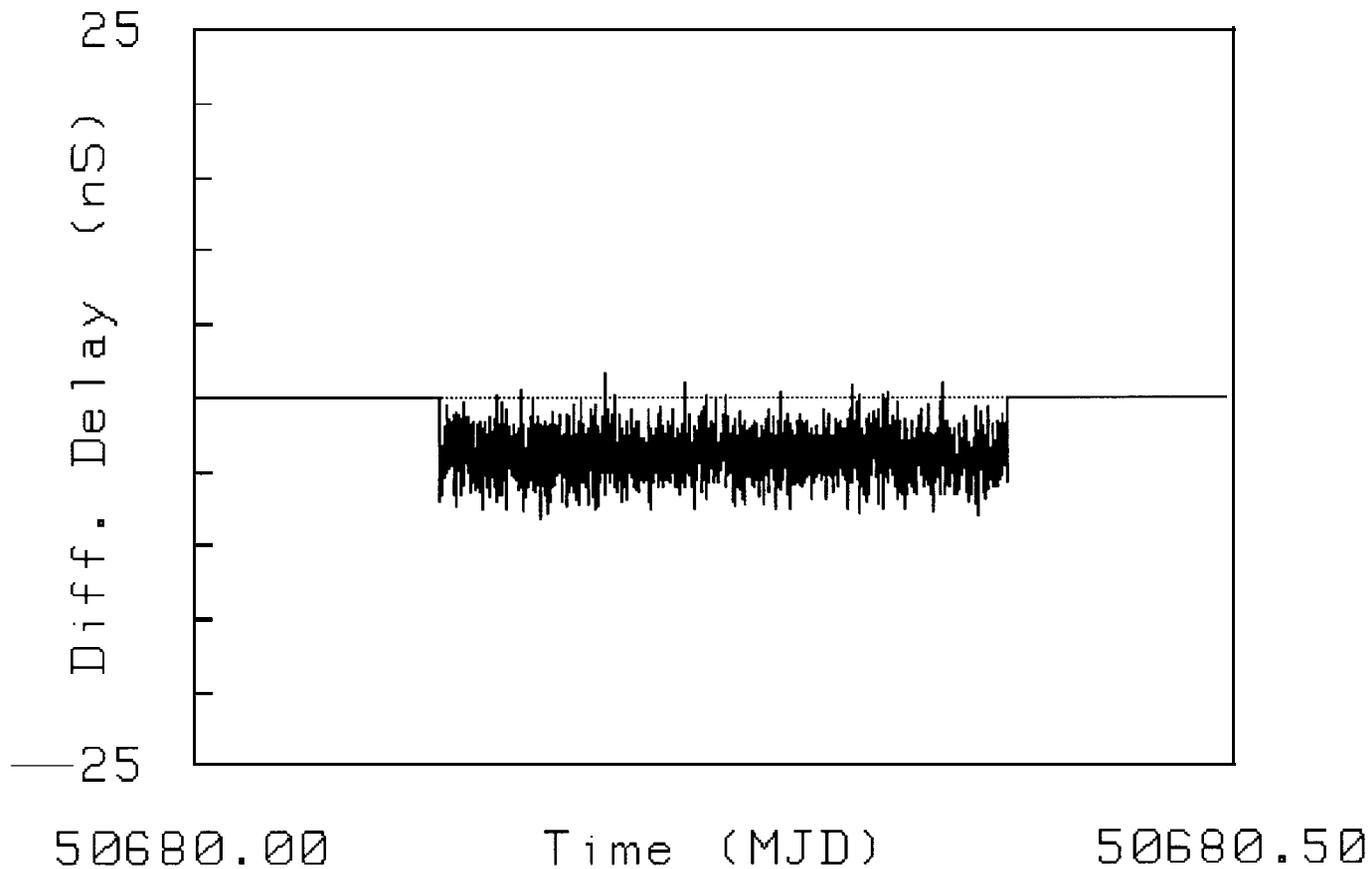
Supply Voltage: 4.975 V



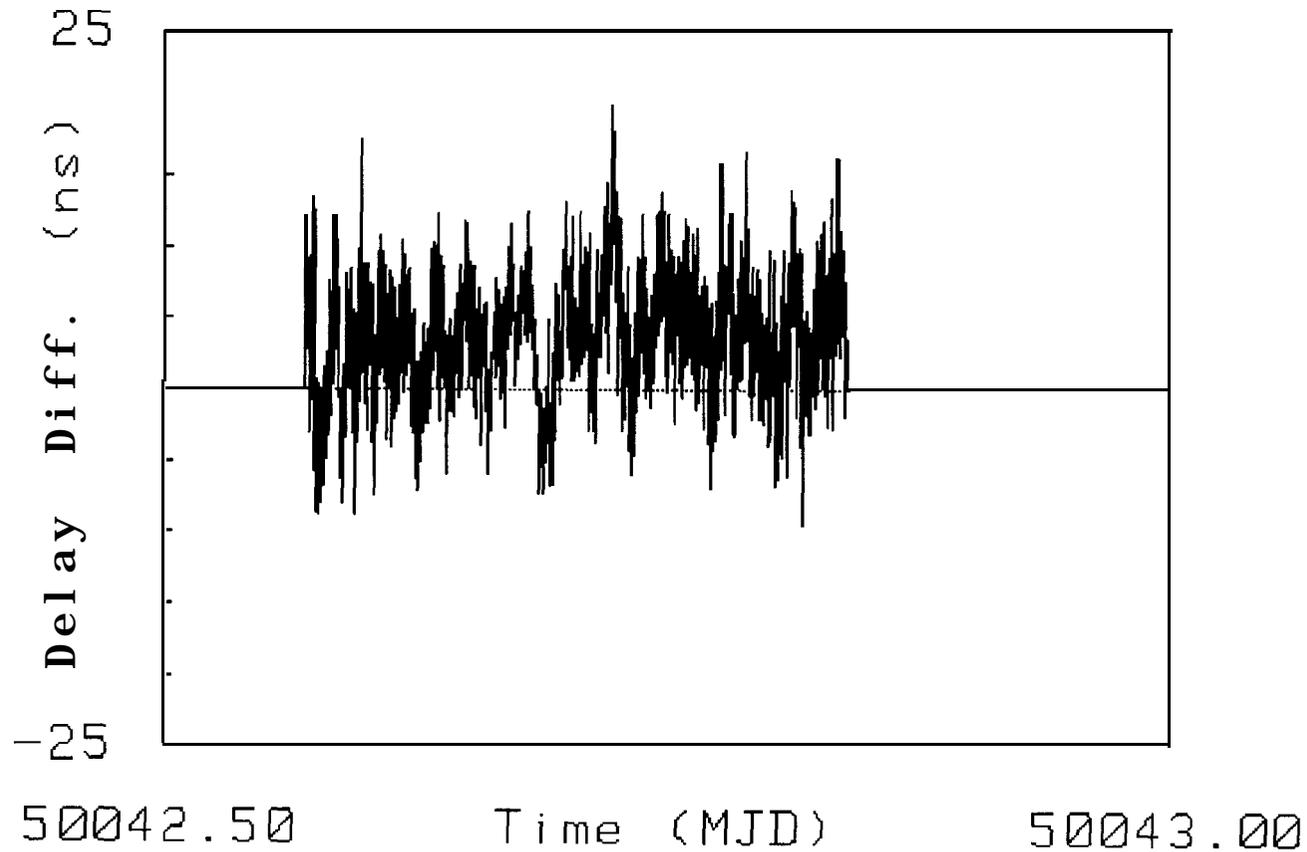
Single Pass (PRN, No S/A)



Common Ant. CV (prn 19)

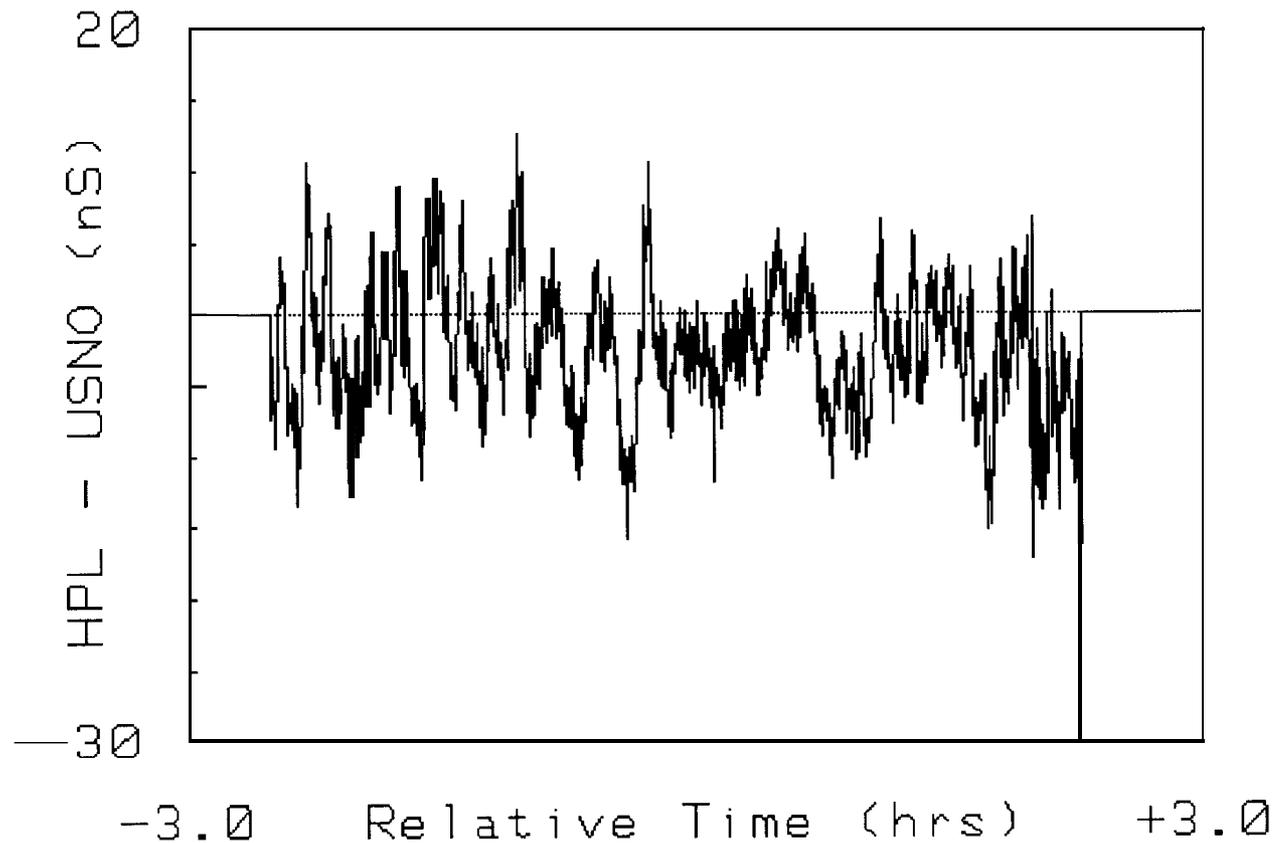


17 m Baseline CV (PRN 21)



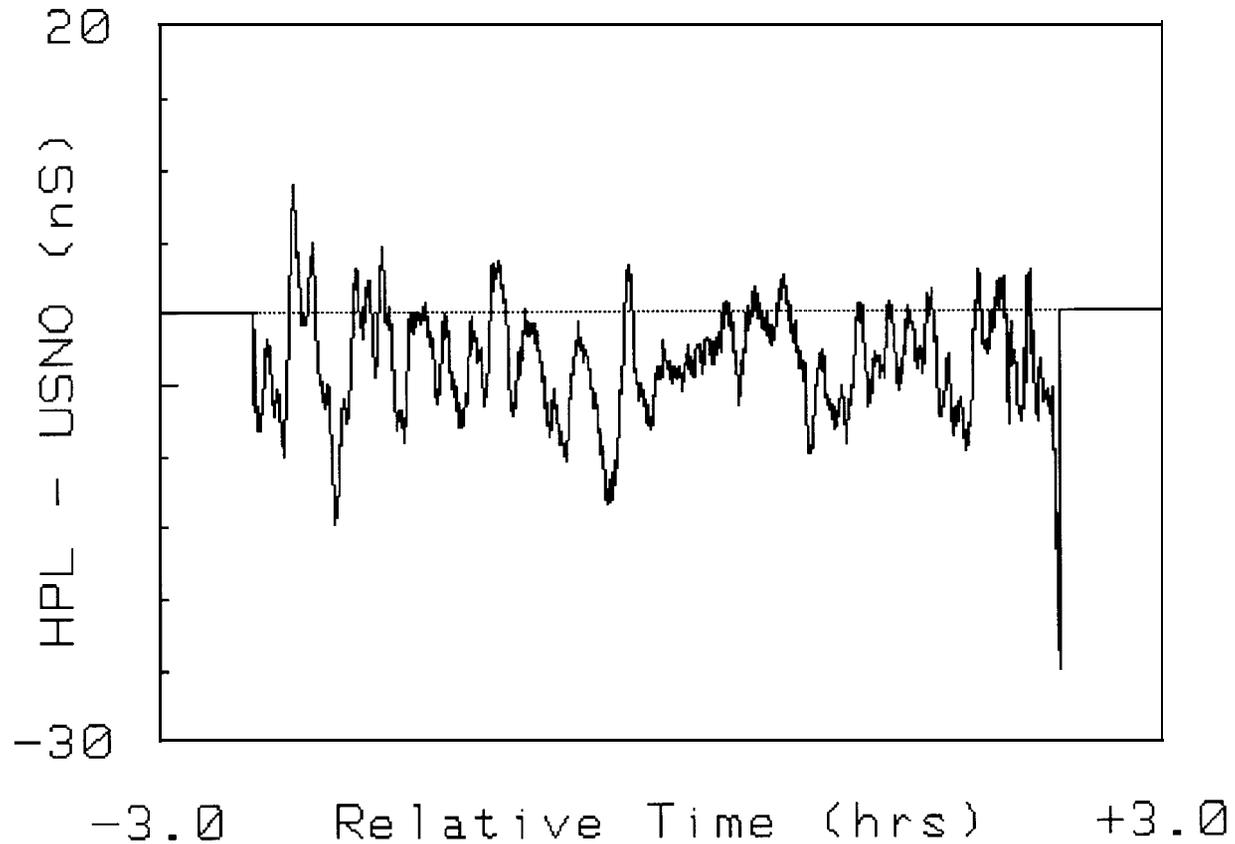
CV HP_L/USNO (PRN 2)

Single-Pass data



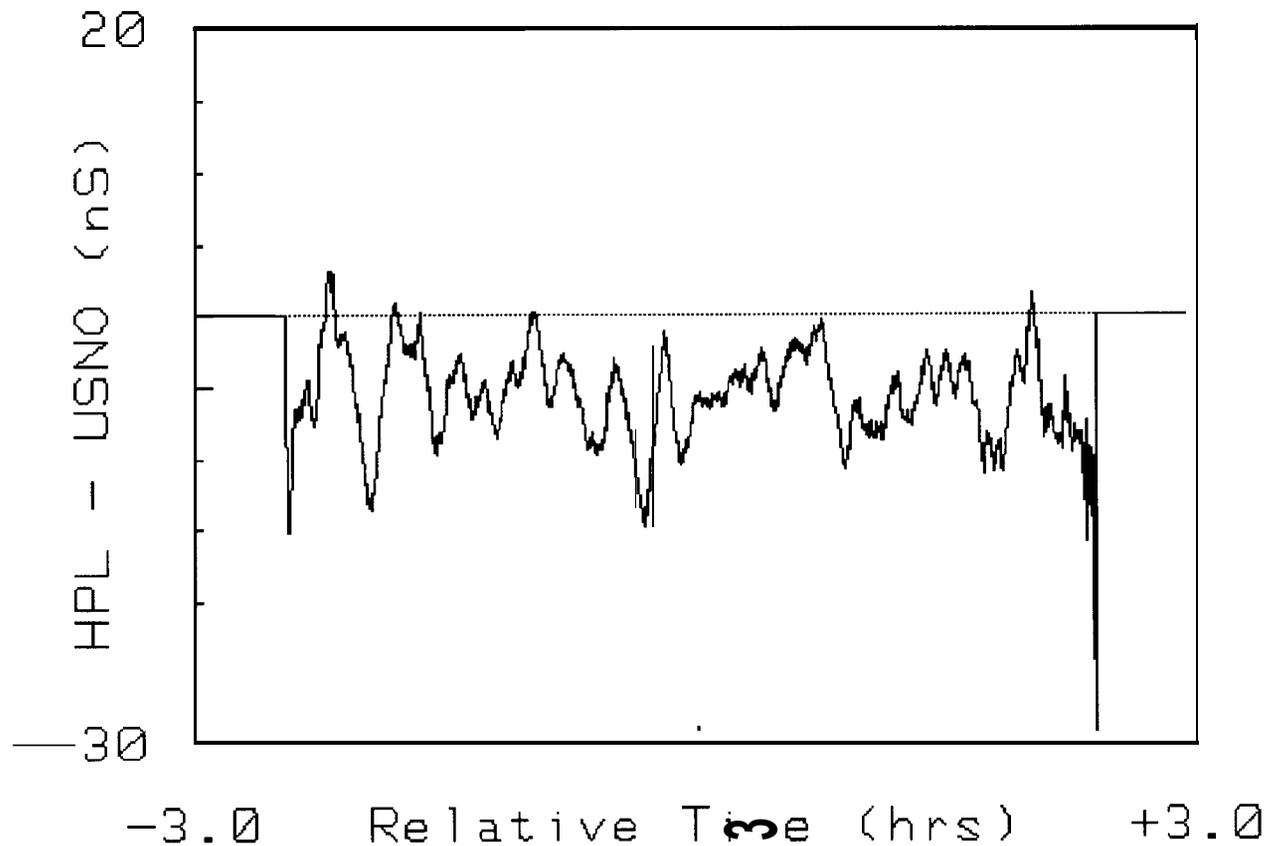
CV HPL/USNO (PRN 2)

10-day (Sidereal) Average



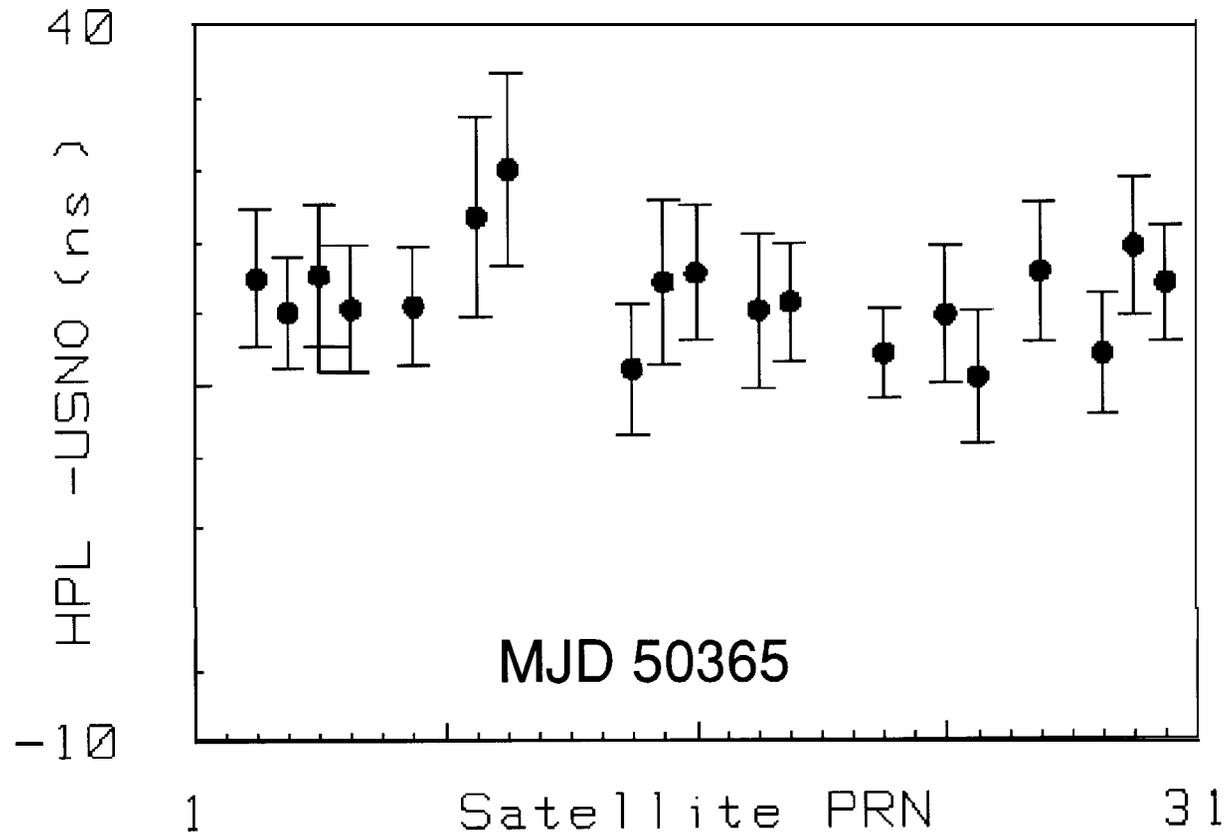
CV HPL/USNO (PRN 2)

28-day (Sidereal) Average



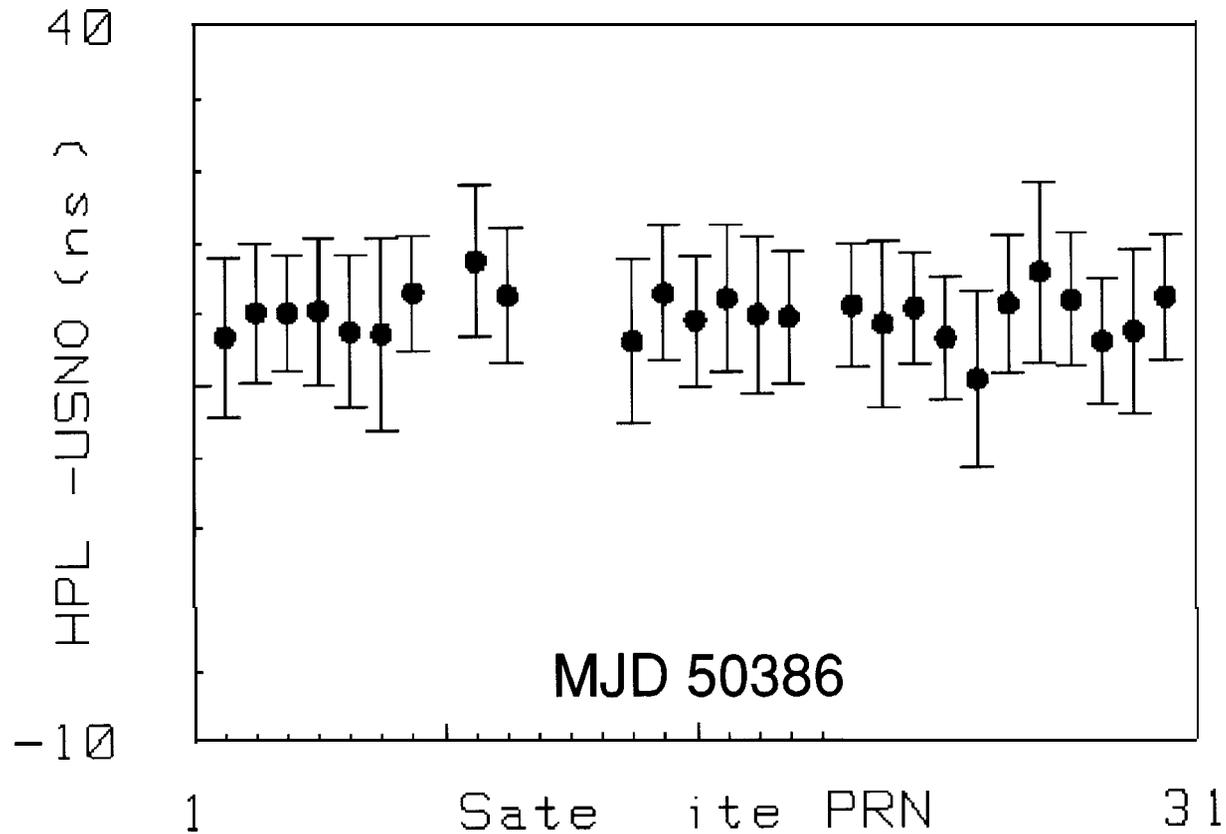
Single-Satellite CV Averages

Rms of data set: 2.6 ns



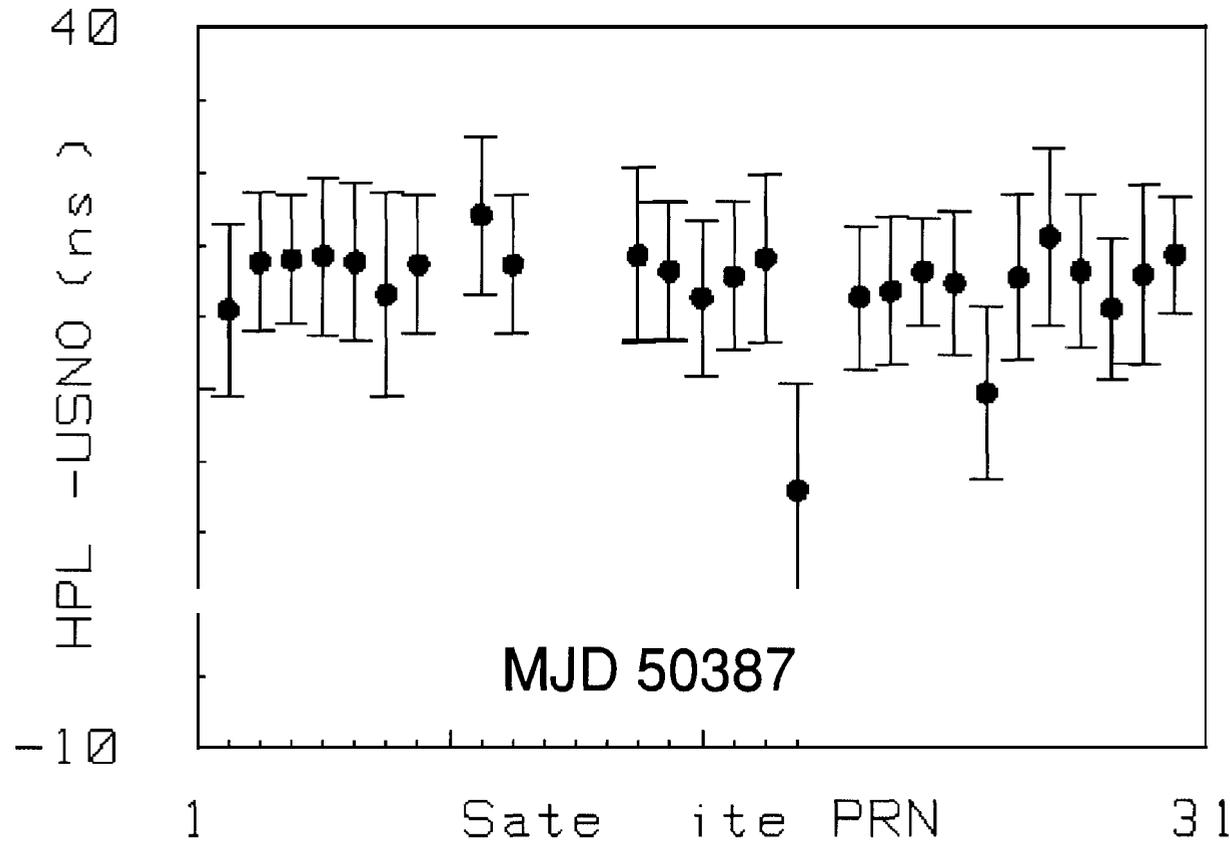
Single-Satellite CV Averages

Rms of data set: 1.7 ns

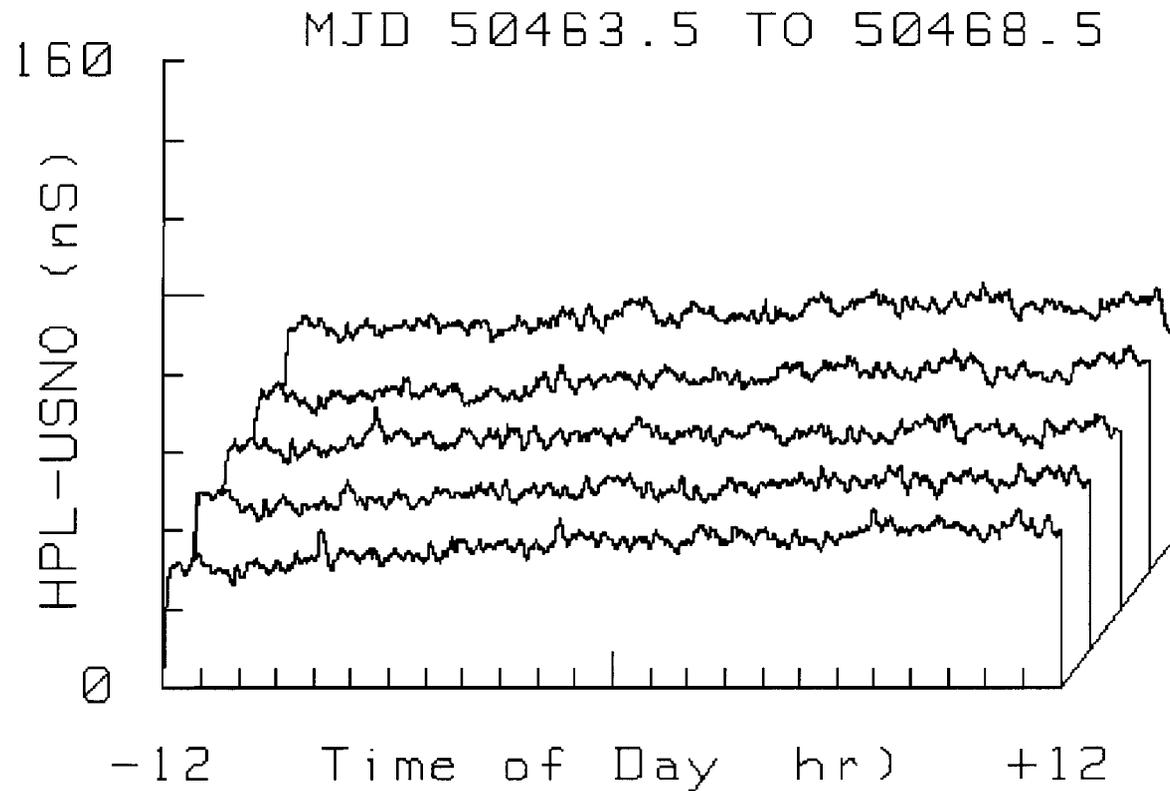


Single-Satellite CV Averages

Rms of data set: 3.6 ns

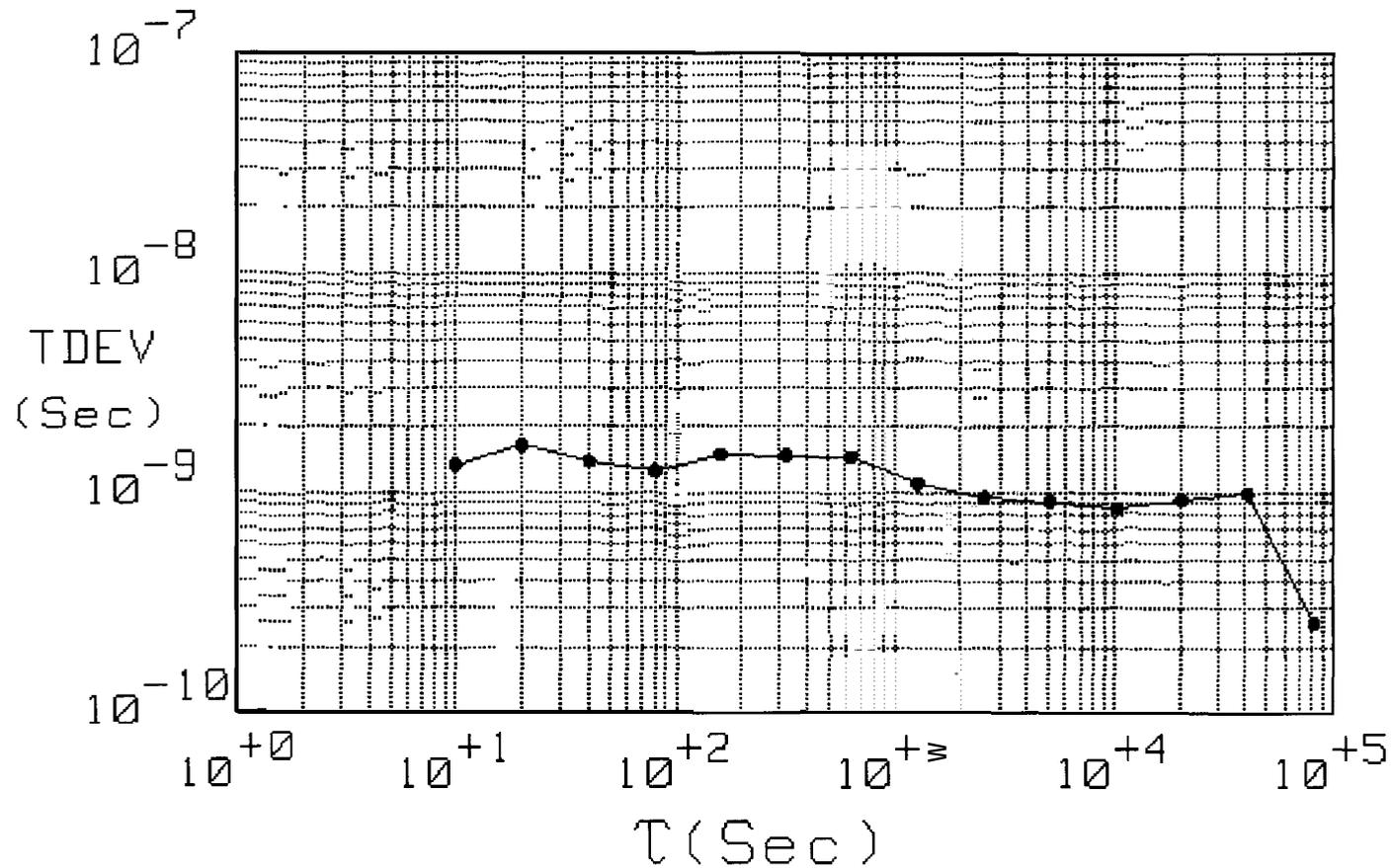


ACV Time Difference

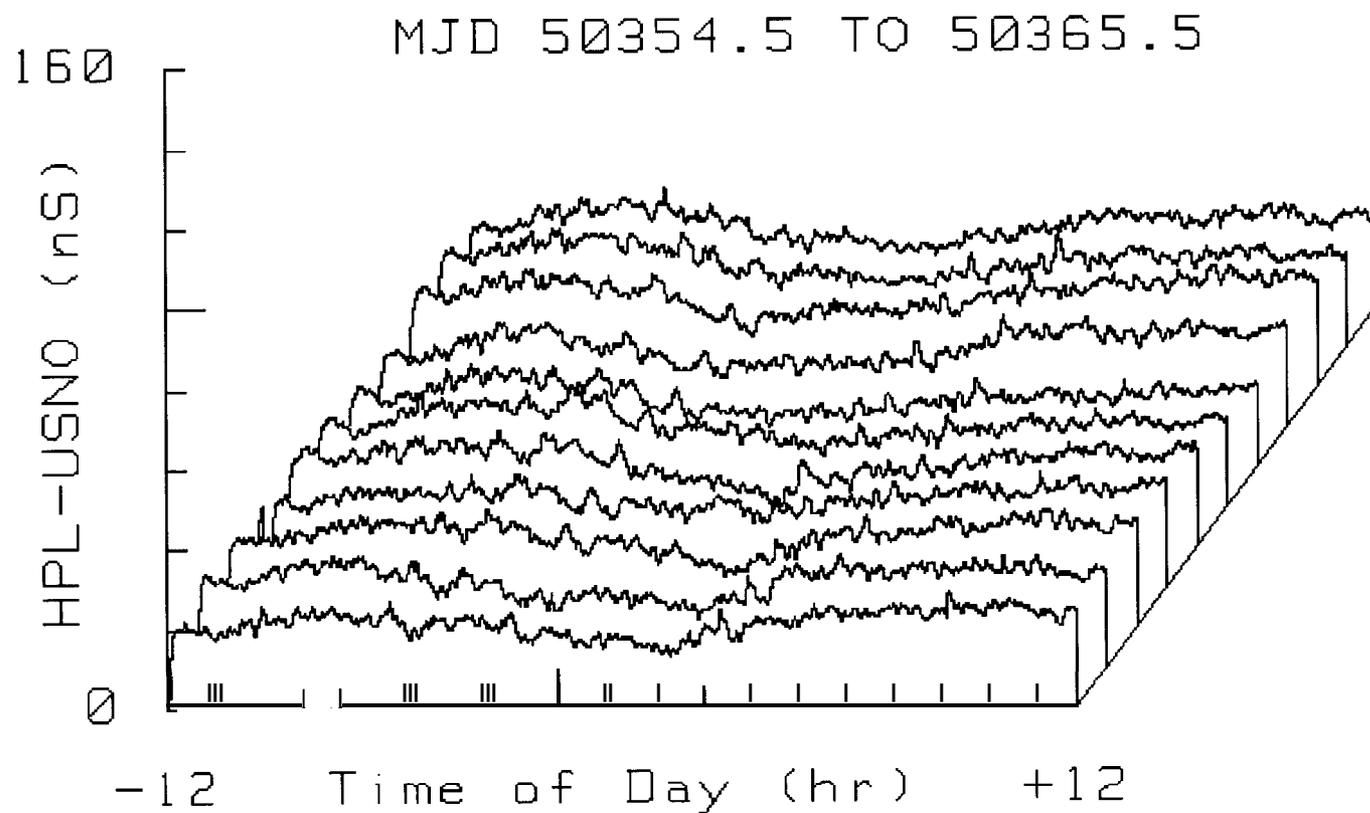


ACV Noise Level

MJD 50463.5 to 50464.3



ACV Time Difference



ACV Noise Level

MJD 50361.5 to 50365.3

