GPS Time and Frequency Transfer Activities at NIST

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Code-Based Common-View

- Backup link for contributing NIST time scale to the computation of TAI and UTC
- Monitor the clocks and time synchronization system of the MINOS neutrino time of flight experiment
- Time and frequency comparison network in the Inter-American Metrology System (SIM)
- Synchronization of clocks in radio stations WWV/WWVB, and WWVH to UTC(NIST)
- Global Time Service and Time Measurement and Analysis Service (TMAS)

Code-Based One-Way

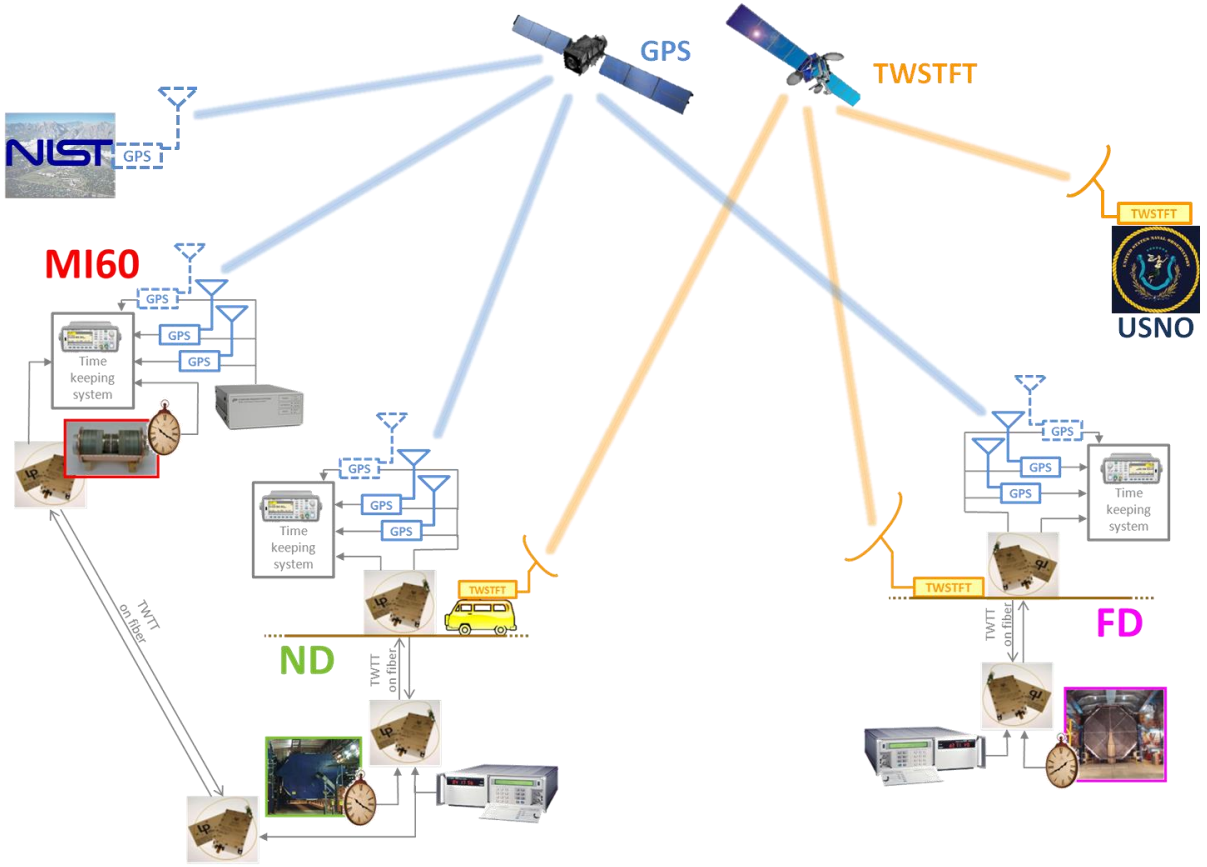
- Frequency Measurement and Analysis Service (FMAS)
- GPS Disciplined Oscillator and GPS One-Way Receiver Calibration Service
- NIST GPS Data Archive

Carrier-Phase

- Contribute NIST time scale to the computation of TAI and UTC and compare remote clocks with the BIPM TAIPPP results
- Participate in the IGS tracking network
- Compare remote clock with the IGS clock products
- Analyze carrier-phase data for studies of receiver performance and remote clock comparison
  (Marc Weiss: mweiss@boulder.nist.gov)

Recent Activities

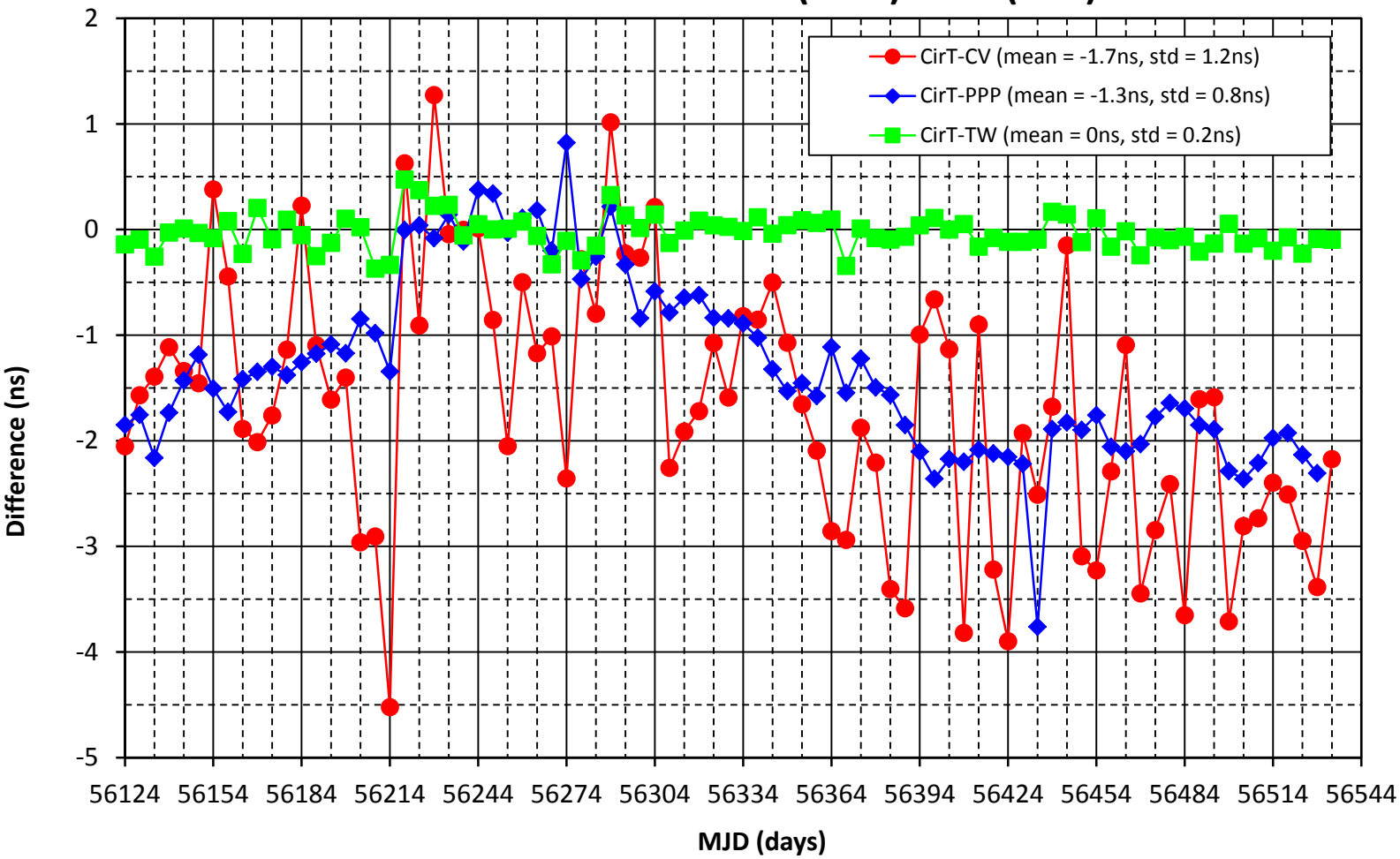
Time synchronization for MINOS neutrino time of flight experiment



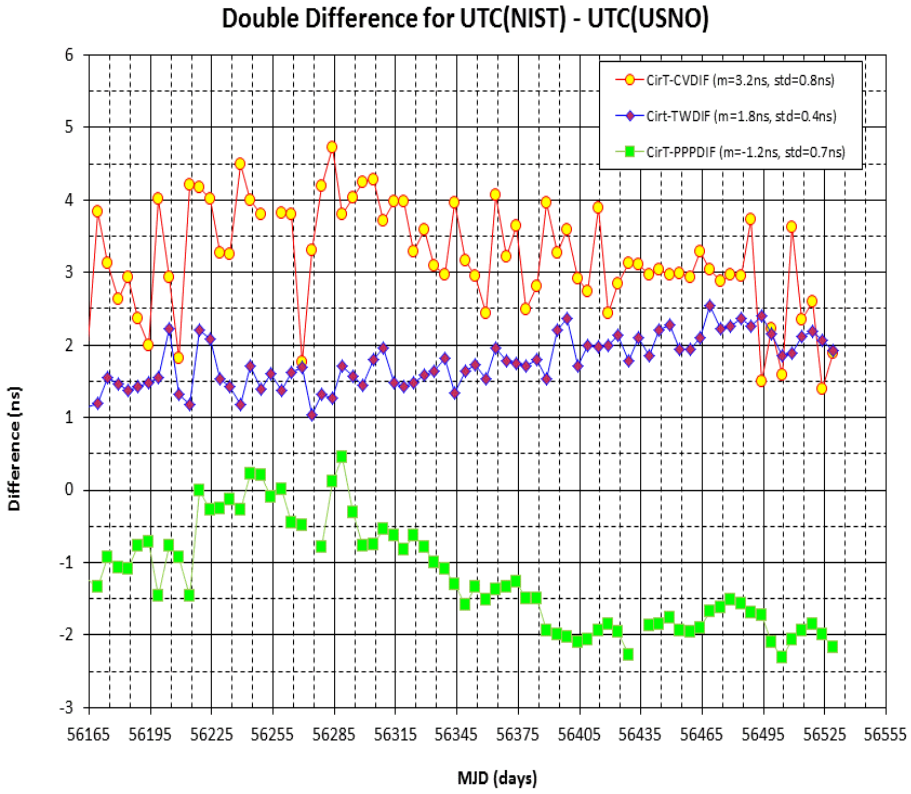
- using code-based GPS common-view time transfer with repeated link calibrations to achieve time transfer uncertainty less than 5ns
- MINOS, NIST and USNO cooperation

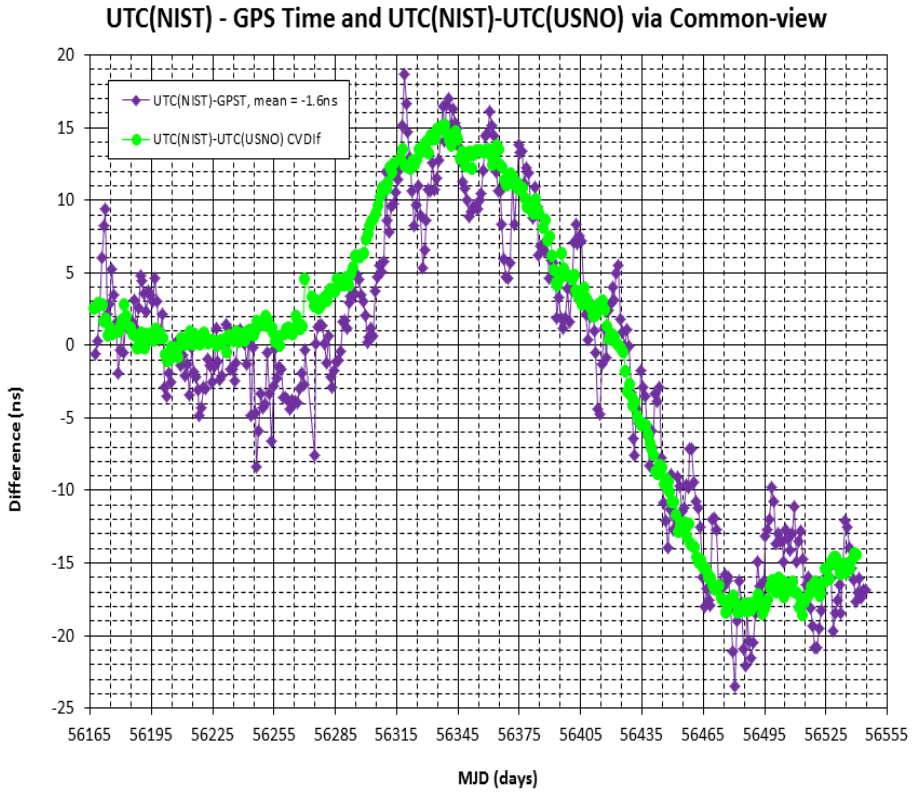
MINOS: Main Injector Neutrino Oscillation Search

Primary Receiver Performance



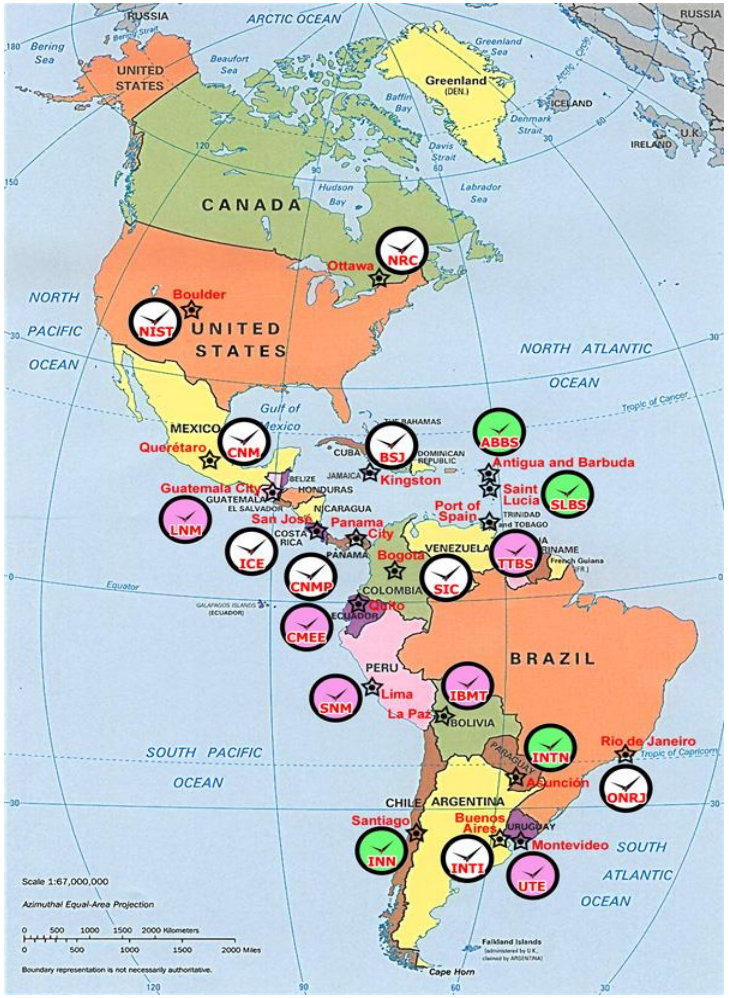
Primary Receiver Performance



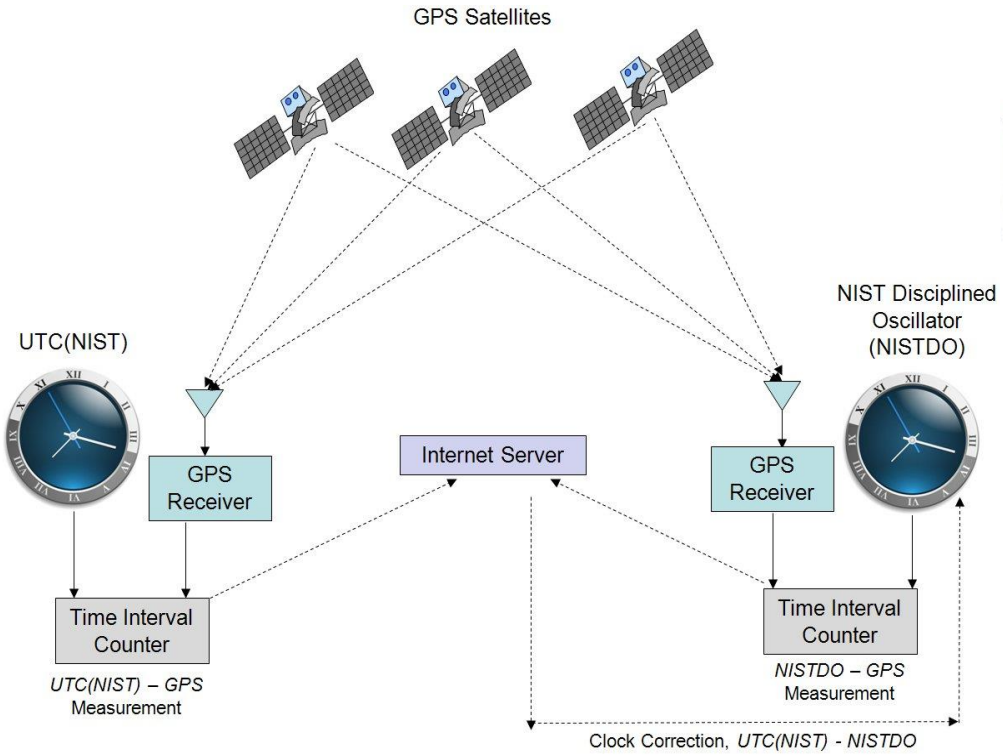


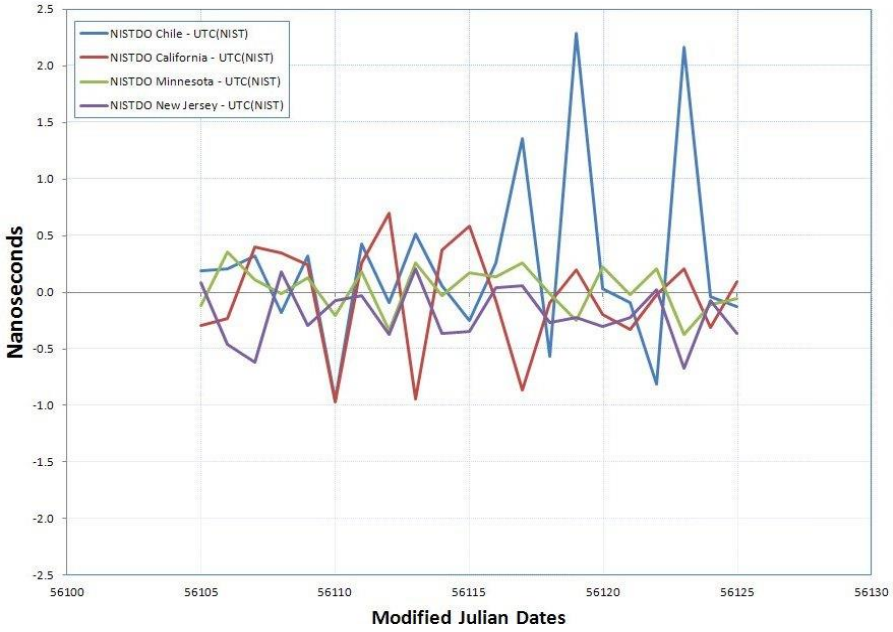
**The NIST/USNO TWDIF is obtained from* $[UTC(NIST)-UTC(PTB)]_{TWDIF} - [UTC(USNO)-UTC(PTB)]_{TWDIF}$

Time and Frequency Comparison Network in the Inter-American Metrology System



NIST Disciplined Oscillator





For details about the NISTDO, Contact Michael Lombardi: michael.lombardi@nist.gov

NIST GPS Time and Frequency Transfer Service

- Frequency Measurement and Analysis Service (FMAS) (*Service ID#76100S*)
- Time Measurement and Analysis Service (TMAS) (*Service ID#76101S*)
- Global Time Service (*Service ID#76110S*)
- Characterization of Global Positioning System (GPS) Satellite Receivers (*Service ID#76120S*)

http://ts.nist.gov/ts/htdocs/230/233/calibrations/time_freq/broadcast.htm

GPS Data Archive [GPS - UTC(NIST) all-in-view]

http://tf.nist.gov/service/gpstrace.htm