Status Report of TL

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NMi Van Swinden Laboratorium

Status Report of TL

- **Clocks and Time scale**
  - Atomic Time Scale
- **GPSTime transfer**
  - GPS CV, GPS CP, GPSP3
- **TWSTFT**
  - Links and Facilities
  - TL-VSL Link
- **Future Works**
  - USNO/NIST/NICT/TL TWSTFT Link via Hawaii
  - PTB-TL TWSTFT, SATRE Link
  - NMIA(AUS)-TL TWSTFT, SATRE Link

Clocks and Time Scales

- **Cesium clocks :**

  Agilent 5071A high performance × 9, fixed Clock : Cs 1500

- **Active H-masers:**

  CH1-75 × 2 (with CAT)

- **Time Scale:**

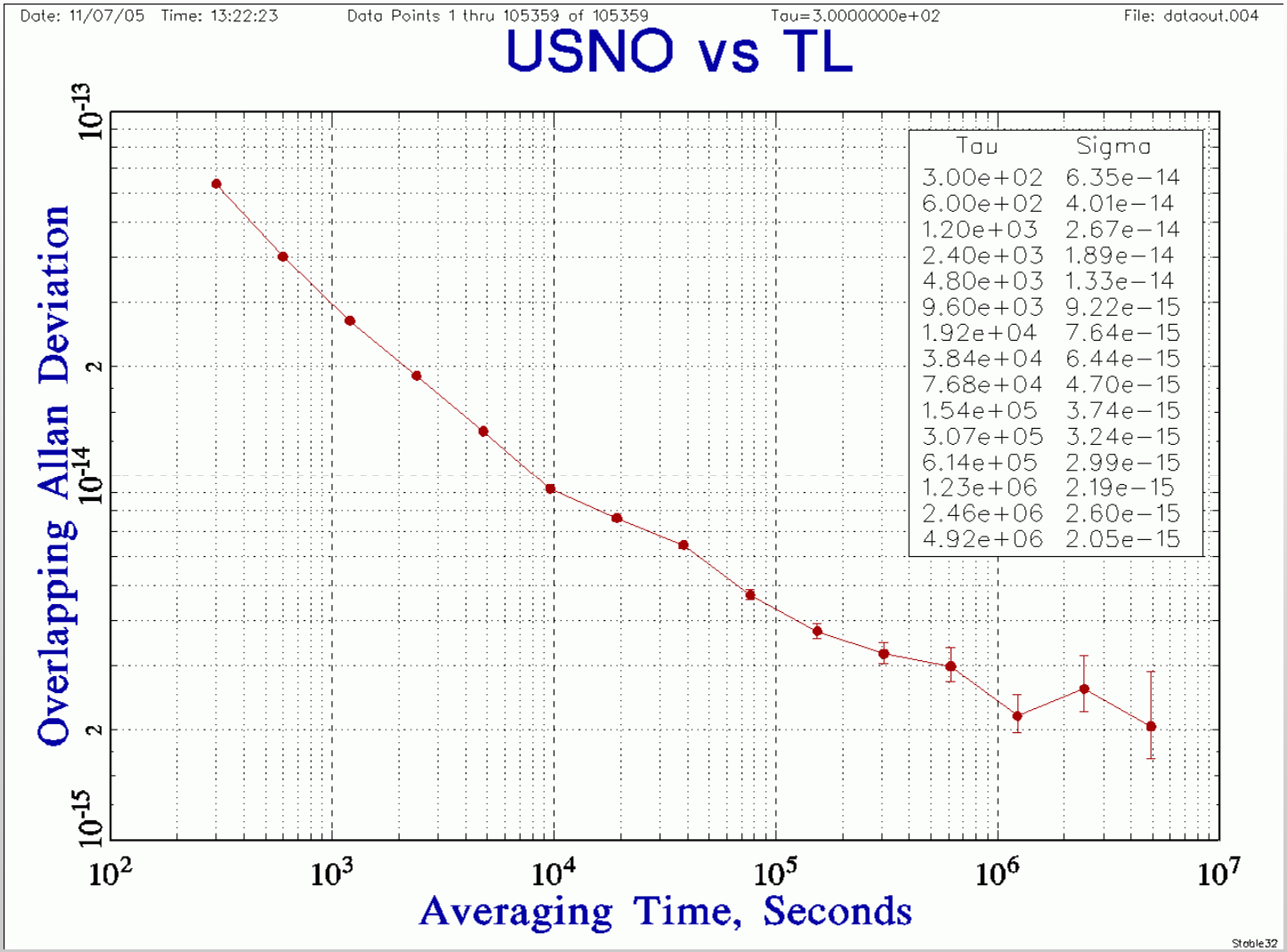
  UTC(TL):

  - **HM 6053 ➔ MPS (AOG-110)**
  - **Apparent Time steps of UTC(TL) of -59 ns between MJD 53489 and 53494, and of 5 ns between MJD 53504 and 53509 due to changes in the time link from TWSTFT into GPSP3**

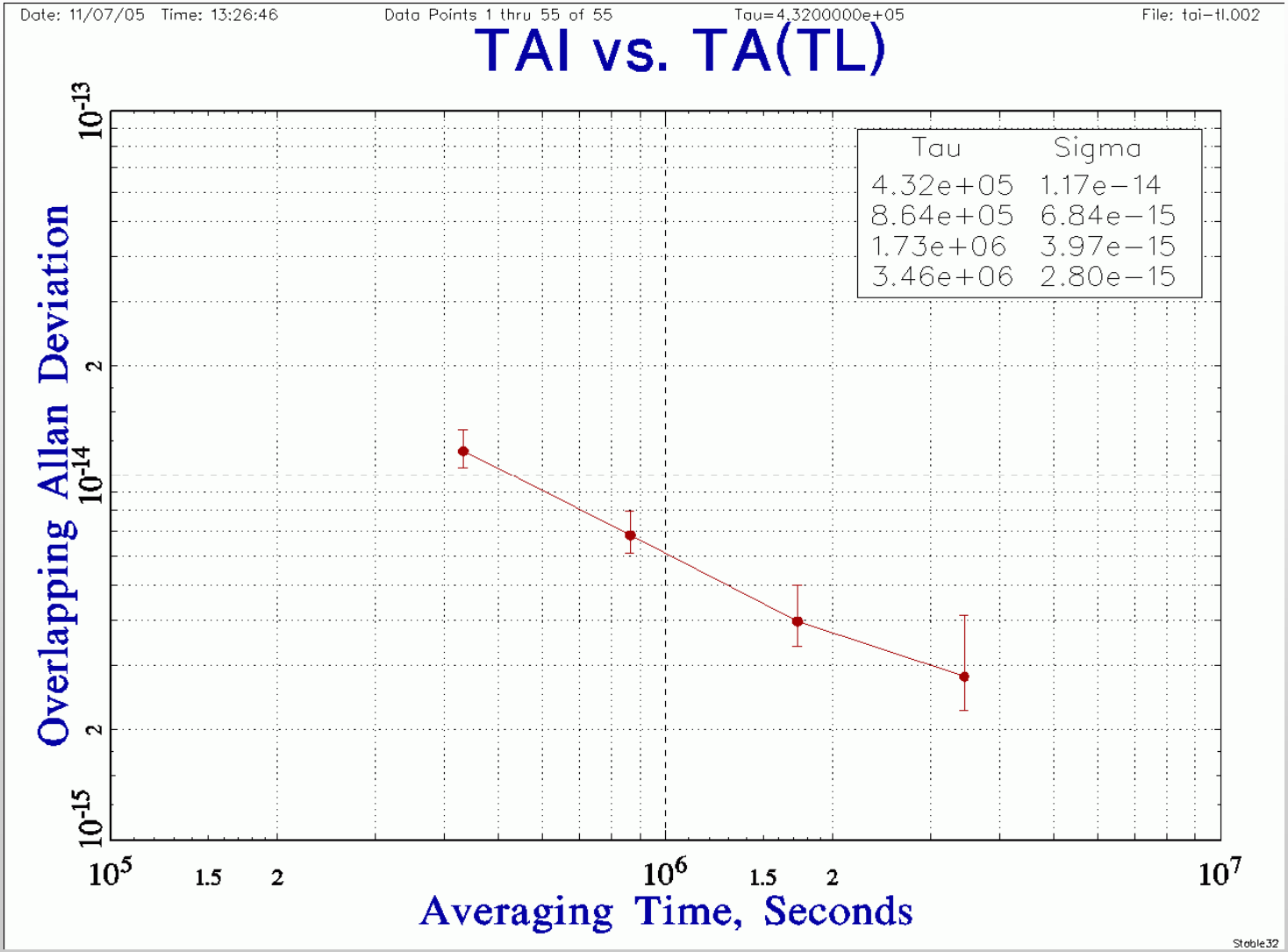
  TA(TL):

  - **9 Agilent 5071A cesium clock ensemble**
  - **Inversely exponential weighting**

UTC(USNO) vs. UTC(TL), GPSCP , Oct 2004 –



TAI - TA(TL), Oct 2004 -



GPS Time Transfer

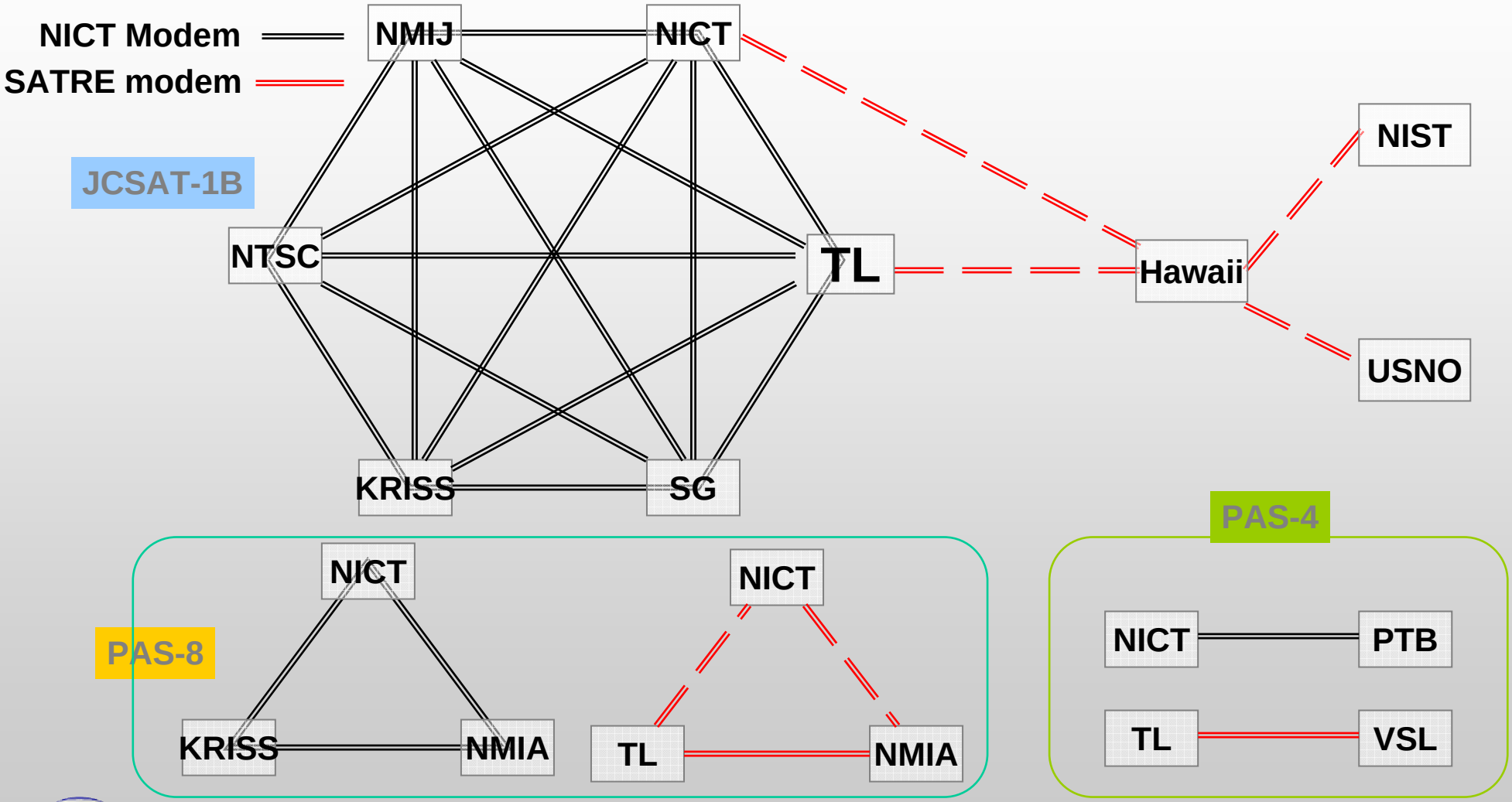
- **GPS CV**
  - **Topcon (multi channel)**
    ftp://ftp.stdtime.gov.tw/pub/gps/gpscv/topcon
- **GPS P3**
  - **Ashtech Z12-T**
    ftp://ftp2.bipm.org//pub/tai/data/2005/time_transfer
    /corrected_gps_data
- **GPS CP**
  - **Ashtech Z12-T × 2 (UTC(TL) and H-maser)**
  - **Bernese 5.0**
  - **IGS site data (TWTF)**
    ftp://ftp.stdtime.gov.tw/pub/gps/twtf/

TWSTFT, Links and Facilities

Earth Station	TL-01	TL-02	TL-03	TL-04
Labs to be linked	NICT, NMIA	NICT, KRISS, NTSC, NMIJ, SG	VSL	-
Satellite	PAS-8	JCSAT-1B	PAS-4	-
Band	Ku	Ku	Ku	C
Antenna	Prodelin-1194 1.8 m	Andrew 2.4 m	Andrew 2.4 m	Andrew 4.6 m
Modem	SATRE (073)	NICT modem	SATRE (066)	SATRE(063)
UP/Down Converter	Codan 5900 (8W) (5908 SSPA, 5582 Power Supply Unit)	Codan 5900 (8W) (5908 SSPA, 5582 Power Supply Unit)	Codan 5900 (8W) (5908 SSPA, 5582 Power Supply Unit)	EFData CST-5000 Satellite terminal
IF Cable	Andrew SFJ1-50A	Andrew SFJ1-50A	Andrew SFJ1-50A	Andrew SFJ1-50A
Counter	SATRE internal	NICT internal	SR-620	HP5370B
OP and Analyzing Software	-	Operated by NICT	Automation operating by TL	-
Others	SATSIM (Satellite simulator)	Power Splitter and 70 MHz BP filter	Power splitter and VHF switch	-

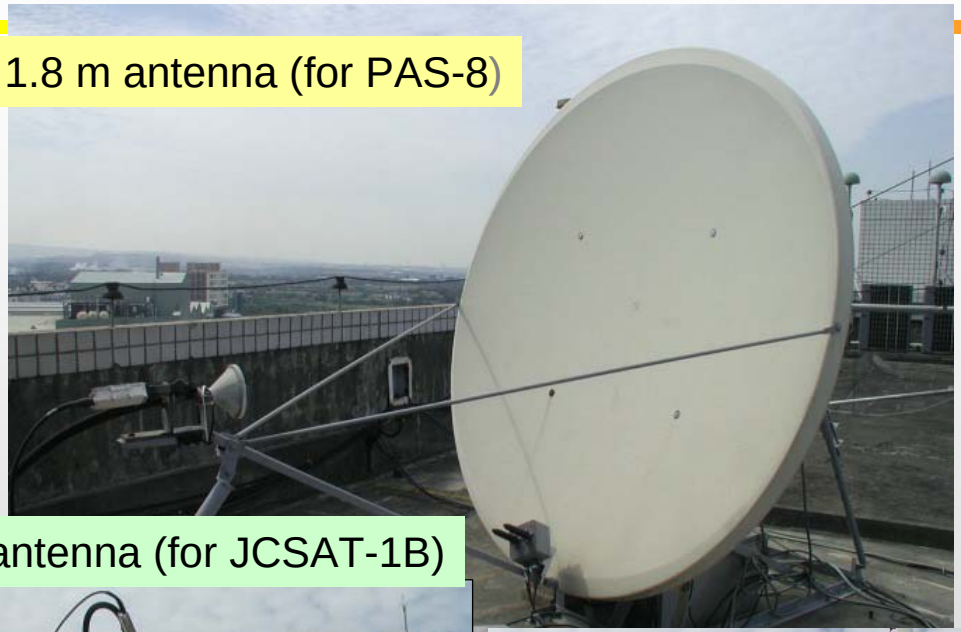
TWSTFT Links at TL

TWSTFT links at TL



Antenna dishes

Prodelin 1.8 m antenna (for PAS-8)



2.4 m antenna (for PAS-4)

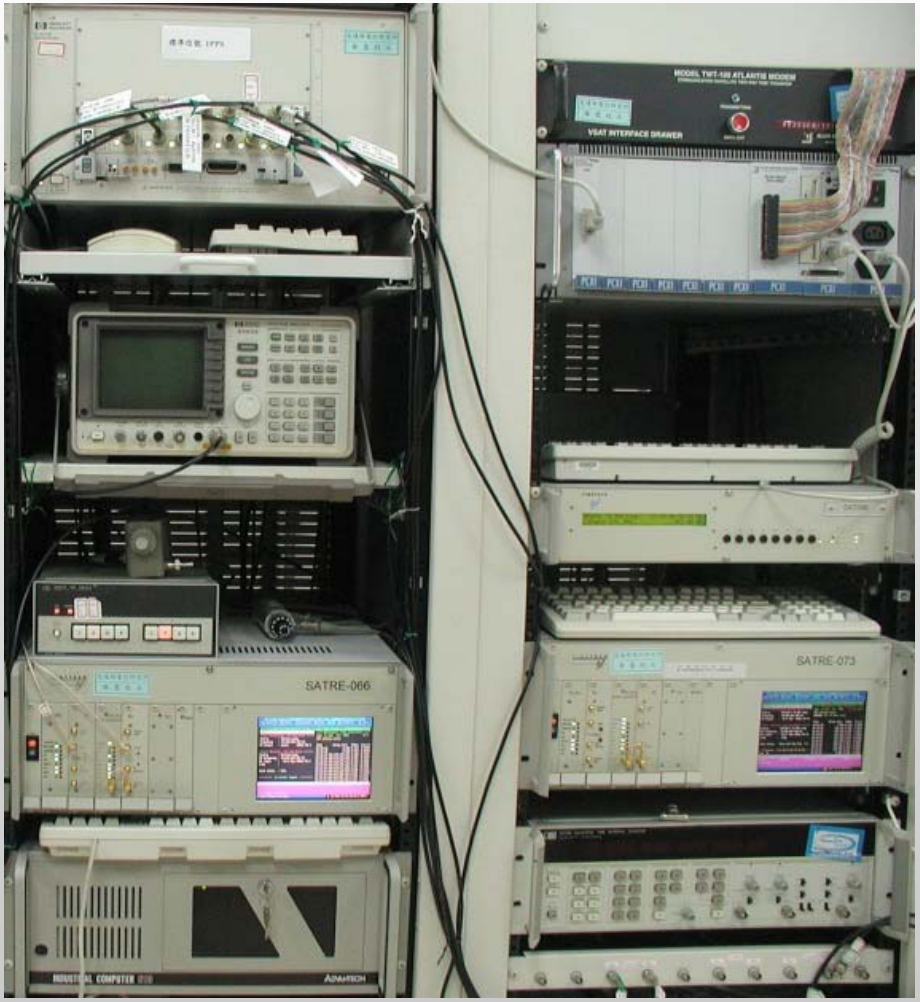
2.4 m antenna (for JCSAT-1B)

4.6 m antenna (for NSS-5)

NICT Modem and SATRE Modems

NICT modem (Provided by NICT)

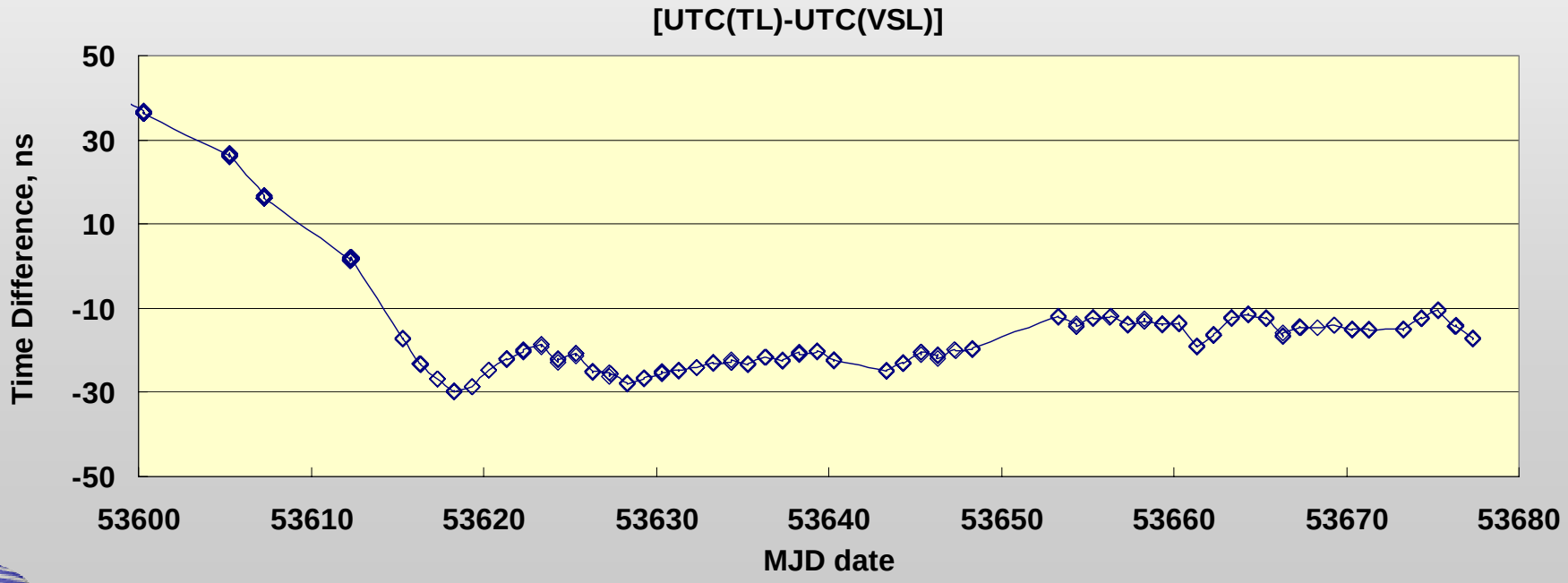
SATRE modems



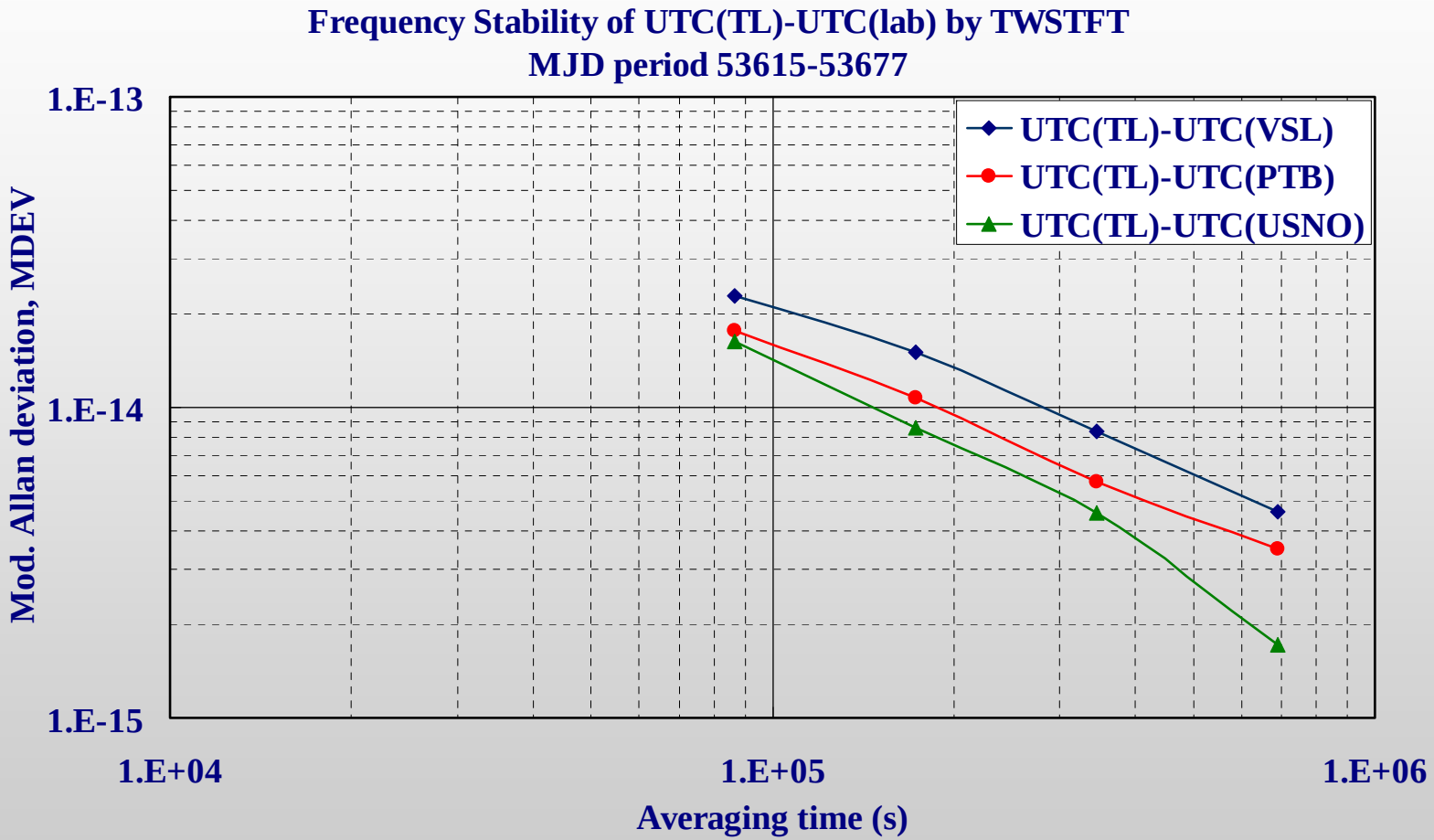
VSL-TL Link

From September 2005:

- **Schedule changed from twice per week into daily measurements (3 sessions from 7:38 UTC to 7:48 UTC)**
- **Both VSL and TL have completed the automation of their daily TWSTFT measurements and data processing.**
- **ftp://ftp.stdtime.gov.tw/pub/twstft**



TWSTFT Comparison via VSL



The time difference between TL and other LABs, via VSL-TL link

TWSTFT@TL, Improvements

- Automatic daily operation
- Finished the SATSIM installation and began the earth station Delay Measurement
- Extended the Asia TWSTFT links to NTSC, KRISS, SG, and NMIJ (via NICT modem)
- Fixed the 59 ns alignment between GPSTT and TWSTFT (MJD 53489)

TWSTFT@TL, Future Works

Link With PTB (planning)

- Using PAS-4,
- Already finished the data up and down link test

Link With America (planning)

- Transfer TWSTFT signal via Hawaii
- SATRE link
- Cooperate with USNO, NICT, and NIST
- The SATRE Europe-Asia-America TWSTFT Closure Loop experiment

Link With Australia (planning)

- Cooperate with NMIA