JAWL/TM.95 Sèvres, 23 August 2000

14th BIPM TWSTFT Monthly Report

To: TWSTFT Participating Stations

Dear Colleagues,

Please find enclosed the 14th BIPM TWSTFT Report. This report covers the data of June 2000.

Some selected TWSTFT links through INTELSAT 307° E are computed and compared with GPS C/A-code common-view at the time of preparation of *Circular T*. The results of the computation of eight such links are given in Tables 1 to 8 of the Appendix I. Plots showing the differences between the TWSTFT results and the GPS results are given in Figures 1 to 8 of the same Appendix. In order to compare easily the various plots, the same scale has been used for all, i.e. *Y*-axis with an amplitude of 30 ns and *X*-axis spanning Modified Julian Dates 51500–51750.

Among the computed TWSTFT links, the following are currently used in the construction of TAI: USNO/NPL, TUG/PTB and VSL/PTB. The corresponding GPS C/A-code common-view links are also computed and considered as back-up data. For the NIST/PTB link, the GPS data are used for the computation of TAI, and the corresponding TWSTFT data are considered as back-up.

In Appendix II we provide a brief description of the hardware equipment of the participating laboratories. Please check it and send us missing information.

Please note that the BIPM TWSTFT Monthly Reports are available by ftp (62.161.69.5) in the directory /Publication/, also accessible via the BIPM web site (www.bipm.fr, see Scientific Work of the Time Section). Computer-readable data for all the TWSTFT links published in these monthly reports are available from the same address.

We will be pleased to receive your comments on this report.

Sincerely Yours,

Jacques Azoubib and Wlodzimierz Lewandowski

Appendix I

Comparison of
TWSTFT and GPS CV links
computed at the BIPM

- TWSTFT links

  Because the TWSTFT data are unevenly spaced by intervals of 2 or 3 days, they are linearly interpolated to give the data for the TAI standard dates at intervals of 5 days.

  When TWSTFT sessions are missing and data are interpolated between TWSTFT sessions more than 5 days apart, results are printed in bold characters. The ucpper limit for interpolation is 10 days.

- GPS C/A-code common-view links

  GPS C/A-code common-view links are computed using IGS precise ephemerides and IGS ionosphere maps.

Table 1. TUG/PTB link

Date 2000 (MJD)	[*UTC(TUG) – UTC(PTB)*] /ns		TWSTFT – GPS
	TWSTFT (*Circular T*)	GPS	
4 June (51699)	1601	1603	–2
9 June (51704)	1625	1629	–4
14 June (51709)	1649	1654	–5
19 June (51714)	1666	1672	–6
24 June (51719)	1685	1686	–1
29 June (51724)	1716	1720	–4

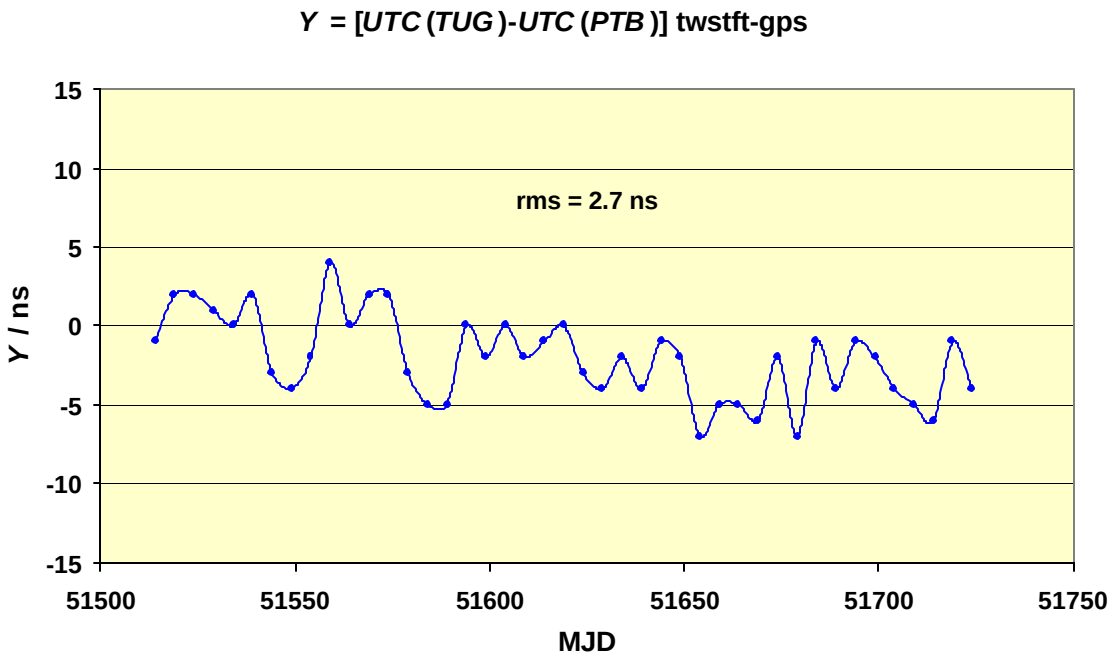

Figure 1. Differences between TWSTFT and GPS C/A-code common-view for TUG/PTB link

Note: The TUG/PTB TWSTFT link was calibrated by the transport of a TWSTFT station in May-June 1998.

Table 2. PTB/NIST link

Date 2000 (MJD)	[*UTC(PTB) – UTC(NIST)*] /ns		TWSTFT – GPS
	TWSTFT	GPS (*Circular T*)	
4 June (51699)	17	13	4
9 June (51704)	19	17	2
14 June (51709)	21	19	2
19 June (51714)	26	21	5
24 June (51719)	31	27	4
29 June (51724)	36	31	5

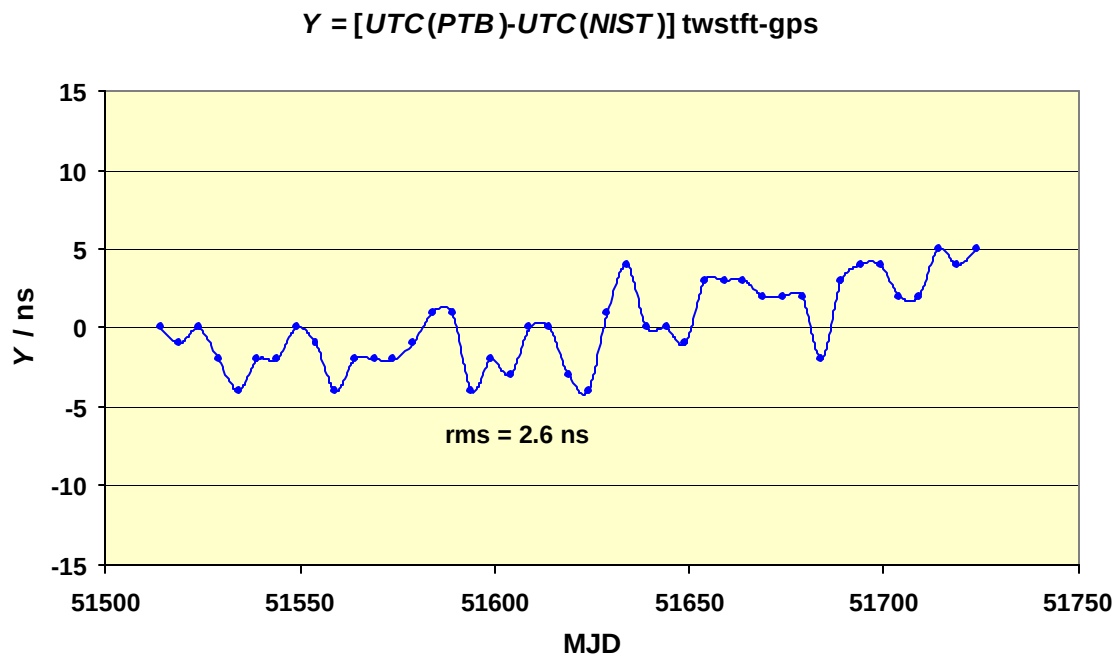

Figure 2. Differences between TWSTFT and GPS C/A-code common-view for PTB/NIST link

Notes: A new calibration of the PTB/NIST TWSTFT link derived from *Circular T* after July 1999 was applied starting from 29 November 1999 (MJD = 51511).

The PTB/NIST GPS C/A-code common-view link has been included in the computation of TAI since 1 January 2000 (MJD = 51544). The TWSTFT link between the NIST and the PTB computed in parallel is considered as back-up link and its data is kept in reserve.

Table 3. USNO/NPL link

Date 2000 (MJD)	[*UTC(USNO) – UTC(NPL)*] /ns		TWSTFT – GPS
	TWSTFT (*Circular T*)	GPS	
4 June (51699)	2	9	–7
9 June (51704)	2	9	–7
14 June (51709)	5	13	–8
19 June (51714)	4	13	–9
24 June (51719)	7	13	–6
29 June (51724)	7	16	–9

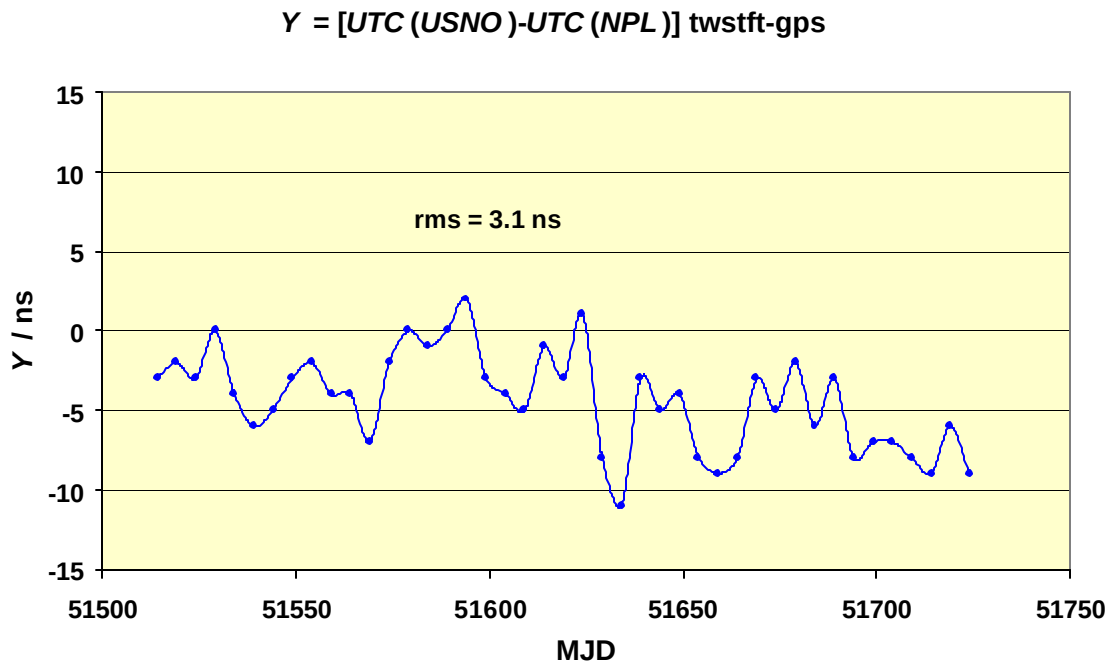

Figure 3. Differences between TWSTFT and GPS C/A-code common-view for USNO/NPL link

Notes: A new calibration of the USNO/NPL TWSTFT link derived from *Circular T* after June 1999 was applied starting from 29 November 1999 (MJD = 51511).

The USNO/NPL TWSTFT link has been included in the computation of TAI since 1 January 2000 (MJD = 51544).

Table 4. USNO/PTB link

Date 2000 (MJD)	[*UTC(USNO) – UTC(PTB)*] /ns		TWSTFT– GPS
	TWSTFT	GPS	
4 June (51699)	–5	5	–10
9 June (51704)	–7	1	–8
14 June (51709)	–7	5	–12
19 June (51714)	–8	5	–13
24 June (51719)	–9	–1	–8
29 June (51724)	–13	–2	–11

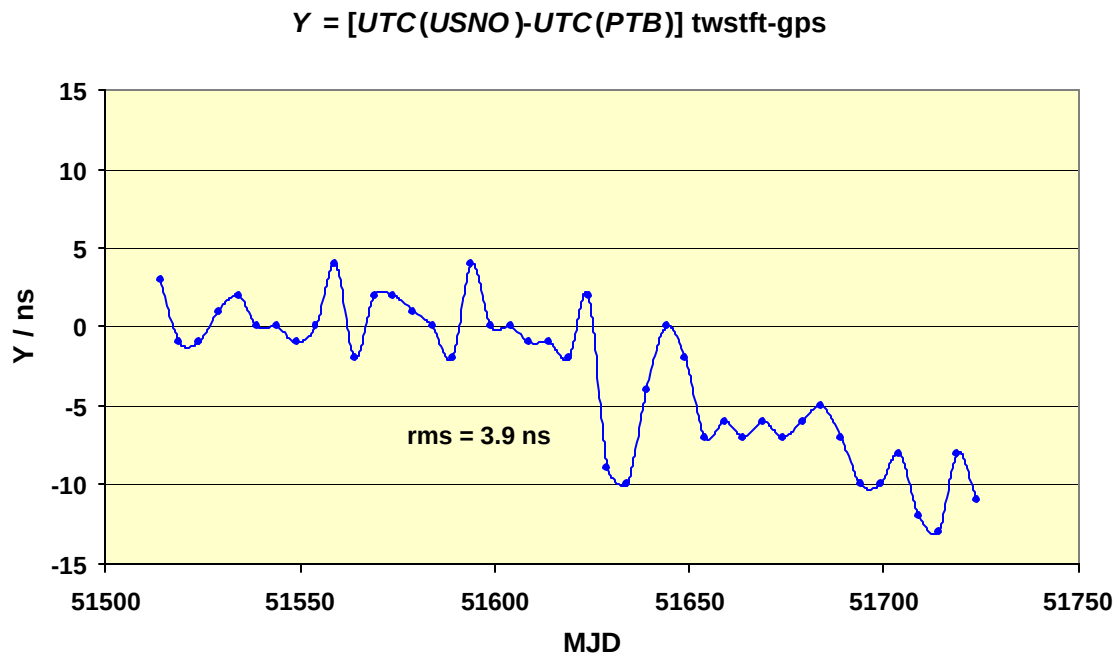

Table 4. Differences between TWSTFT and GPS C/A-code common-view for USNO/PTB link

Note: A calibration of the USNO/PTB TWSTFT link derived from *Circular T* values from July 1999 was applied starting from 29 November 1999 (MJD = 51511).

Table 5. VSL/PTB link

Date 2000 (MJD)	[*UTC(VSL) – UTC(PTB)*] /ns		TWSTFT – GPS
	TWSTFT (*Circular T*)	GPS	
4 June (51699)	33	31	2
9 June (51704)	24	21	3
14 June (51709)	15	18	–3
19 June (51714)	11	14	–3
24 June (51719)	7	6	1
29 June (51724)	–1	0	–1

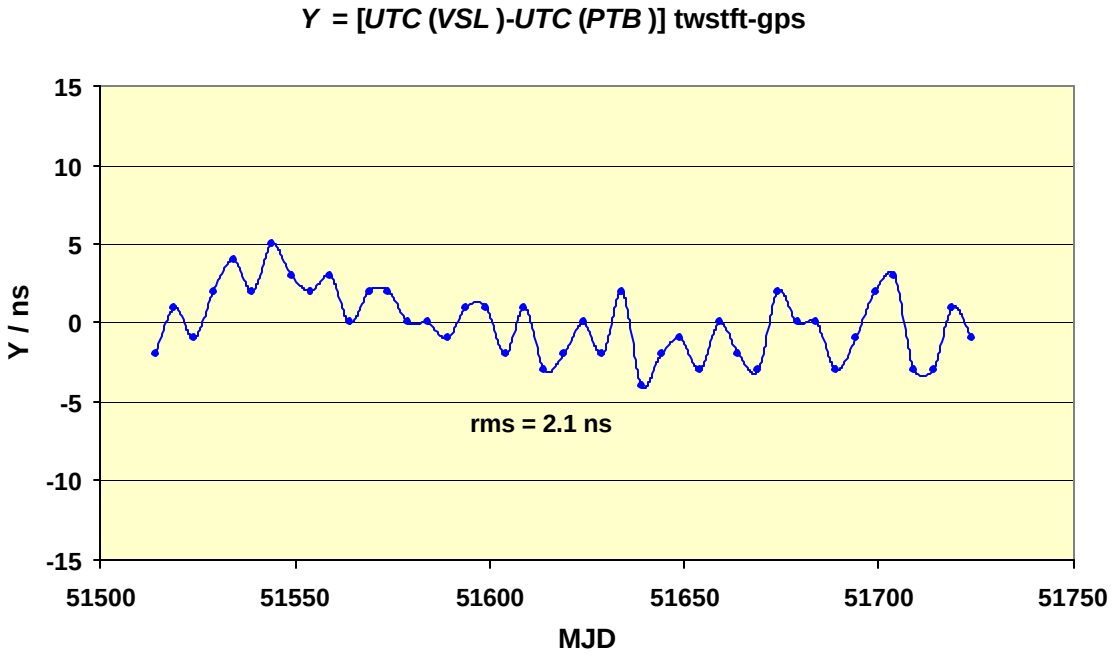

Figure 5. Differences between TWSTFT and GPS C/A-code common-view for VSL/PTB link

Notes: The VSL/PTB TWSTFT link was calibrated by *Circular T*.

The VSL/PTB TWSTFT link has been included in the computation of TAI since 1 January 2000 (MJD = 51544).

Table 6. NPL/NIST link

Date 2000 (MJD)	[*UTC(NPL) – UTC(NIST)*] /ns		TWSTFT – GPS
	TWSTFT	GPS	
4 June (51699)	9	9	0
9 June (51704)	10	10	0
14 June (51709)	8	11	–3
19 June (51714)	13	12	1
24 June (51719)	14	14	0
29 June (51724)	16	14	2

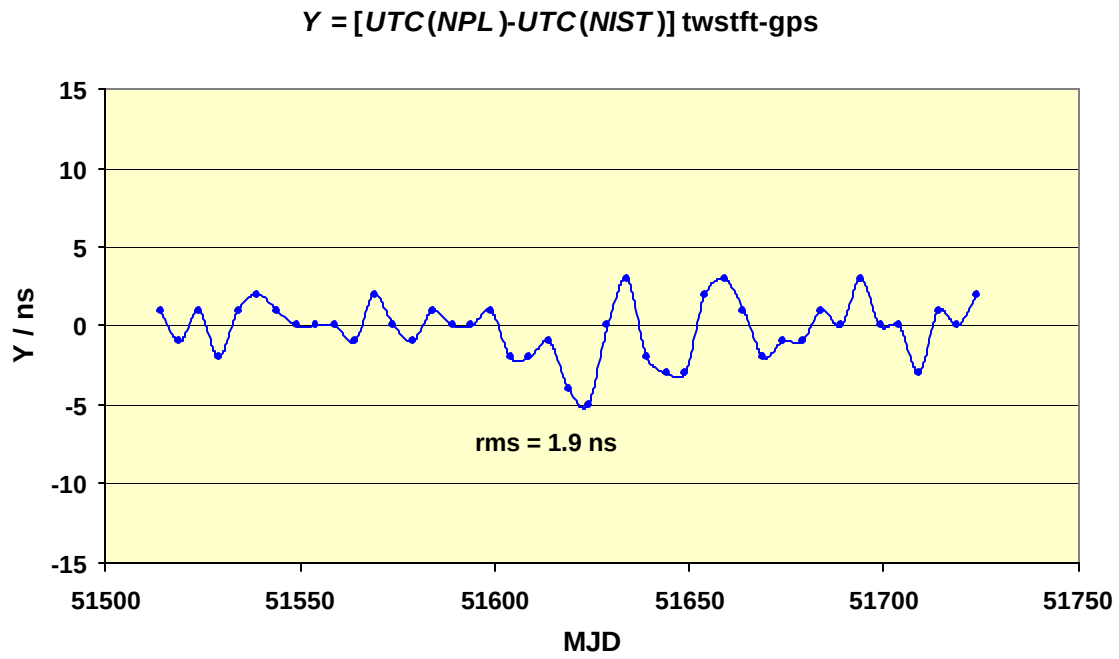

Figure 6. Differences between TWSTFT and GPS C/A-code common-view for NPL/NIST link

Note: The NPL/NIST TWSTFT link was calibrated using *Circular T* values dating from July 1999, and the calibration value was applied at the beginning of September 1999 (MJD = 51429).

] /ns *Circular T*)	TWSTFT – GPS
–5	–2
–8	–1
–9	–3
–8	–5
-14	–1
-17	–3

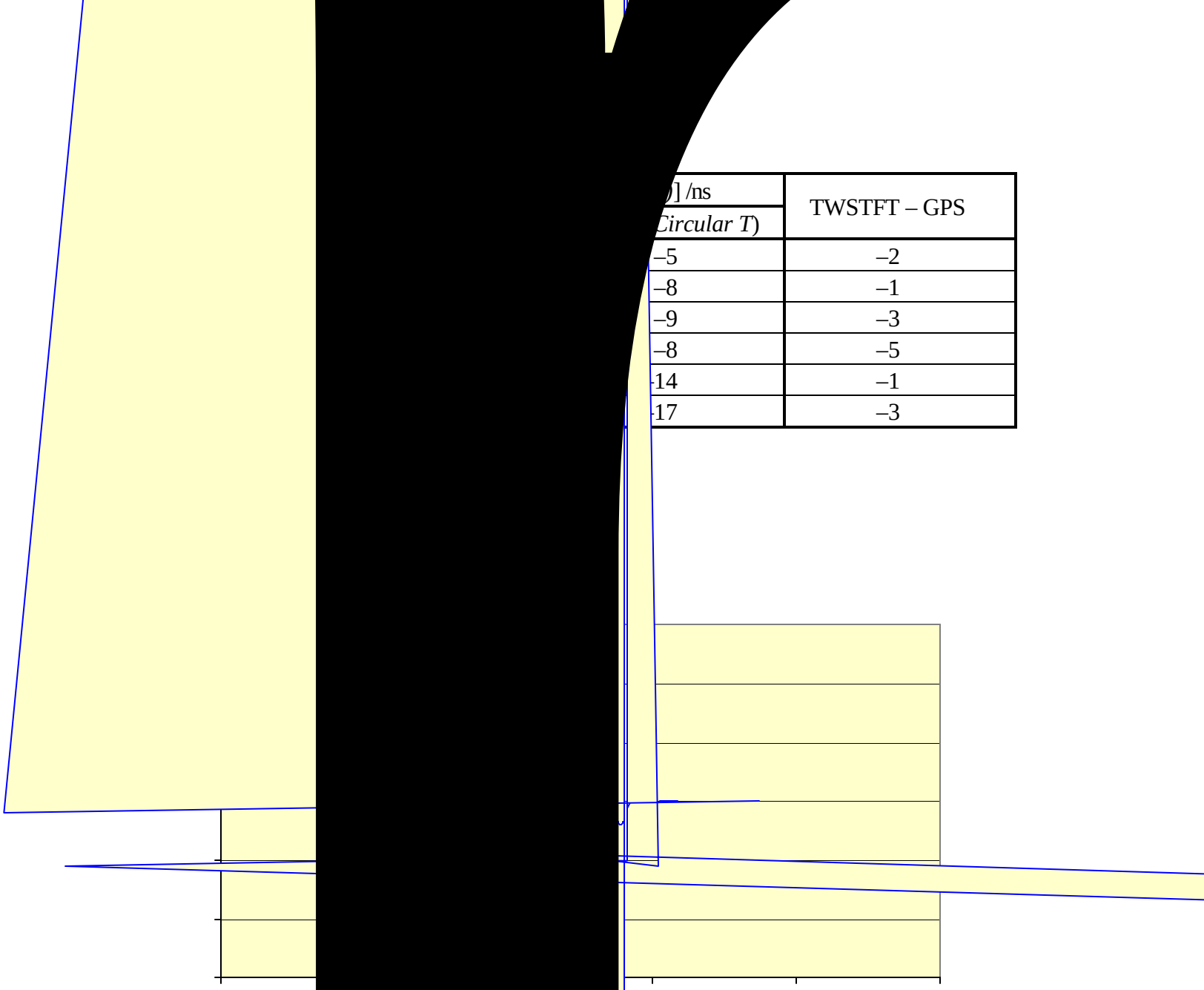

Figure 7. Difference -code common-view for NPL/PTB link

Note: A new calibrati using *Circular T* was applied on
29 November

Table 8. NPL/VSL link

Date 2000 (MJD)	[*UTC(NPL) – UTC(VSL)*] /ns		TWSTFT – GPS
	TWSTFT	GPS	
4 June (51699)	–40	–35	–5
9 June (51704)	–33	–30	–3
14 June (51709)	–28	–28	0
19 June (51714)	–25	–23	–2
24 June (51719)	–22	–15	–7
29 June (51724)	–19	–17	–2

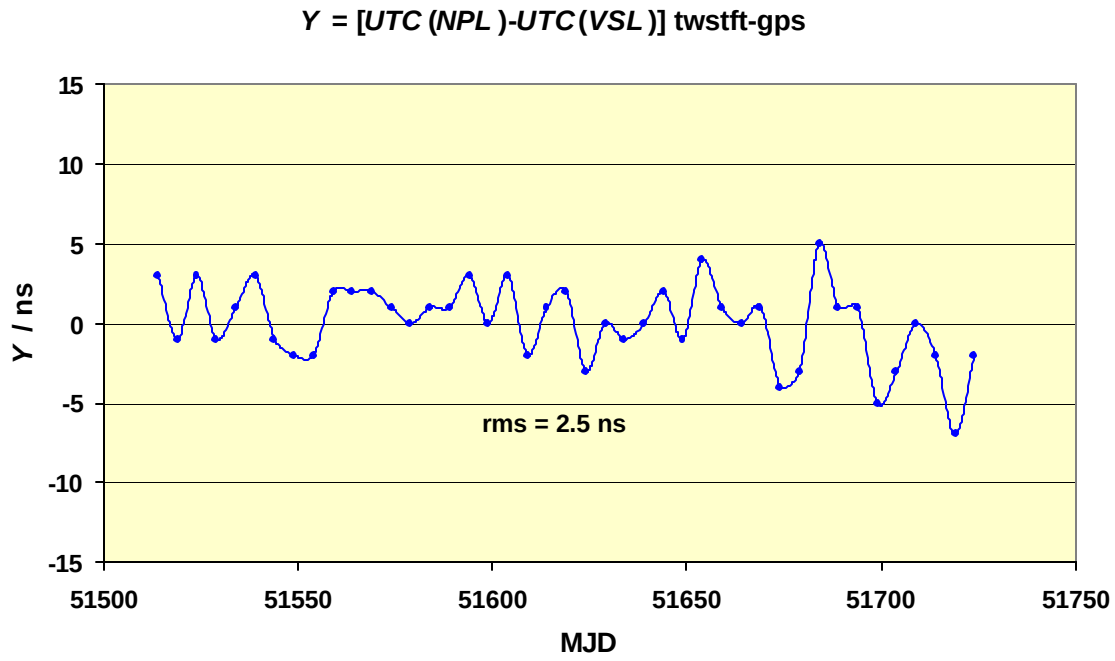

Figure 8. Differences between TWSTFT and GPS C/A-code common-view for for NPL/VSL link

Note: A new calibration of the NPL/VSL TWSTFT link using *Circular T* was applied on 29 November 1999 (MJD = 51511).

APPENDIX II

Description of equipment providing data for this report.

Lab.	GPS CV	TWSTFT (through INTELSAT 307° E)
NIST	Receiver type: NBS/TTR5 Receiver serial no: 010 Internal delay: 53.0 ns Reference name: UTC(NIST) Reference type: ensemble of 4 Cs + 5 H-masers	Modem type: University of Stuttgart/MITREX 2500 Modem serial no: Antenna: 3.7 m - steerable Degree of automation: 85 % Reference name: UTC(NIST) Reference type: ensemble of 4 Cs + 5 H-masers
NPL *	Receiver type: AOA/TTR5A Receiver serial No: 276 Internal delay: 68.5 ns Reference name: UTC(NPL) Reference type: 1 H-maser	Modem type: TimeTech/SATRE Modem serial no: 038 Antenna: 2.4 m – VSAT Degree of automation: Reference name: UTC(NPL) Reference type: 1 H-maser
PTB	Receiver type: Rockwell Collins/TTR5 Receiver serial No: Internal delay: 77 ns Reference name: UTC(PTB) Reference type: 1 Lab. Cs	Modem type: TimeTech/SATRE Modem serial no: 037 Antenna: 1.8 m – VSAT Degree of automation: Reference name: UTC(PTB) Reference type: 1 Lab. Cs
TUG *	Receiver type: NBS/TTR5 Receiver serial No: 012 Internal delay: 55.6 ns Reference name: UTC(TUG) Reference type: 1 Cs	Modem type: TimeTech/SATRE Modem serial no: 043 Antenna: 1.8 m – VSAT-1 Degree of automation: full Reference name : UTC(TUG) Reference type: 1 Cs
USNO *	Receiver type: AOA/TTR6 Receiver serial no: 440 Internal delay: Reference name: UTC(USNO MC) Reference type: 1 H-maser + freq. syntent.	Modem type: University of Stuttgard/MITREX 2500 Modem serial no: 85006 Antenna: 4.6 m – steerable Degree of automation: Reference name: UTC(USNO MC) Reference type: 1 H-maser + freq. syntent.
VSL	Receiver type: VSL/TTR5 Receiver serial no: VSL01 Internal delay: 63.9 ns Reference name: UTC(VSL) Reference type: 1 Cs + micro-phase-stepper	Modem type:Univerity of Stuttgard/MITREX 2500 Modem serial no: 85008 Antenna: 3 m – steerable Degree of automation: Reference name: UTC(VSL) Reference type: 1 Cs + micro-phase-steppper

Notes

* The NPL, TUG and USNO are also equipped with TWSTFT back-up stations.
The TUG back-up station is portable and fully automated.