

<i>2nd BIPM TWSTT Monthly Report</i>

<i>May 1999</i>

To: TWSTT Participating Stations

Dear Colleagues,

Please find enclosed the second monthly report on the handling of TWSTT data at the BIPM.

Some selected TWSTT links are computed and compared to GPS at the time of preparation of *Circular T* but are not yet used for the construction of TAI. The results of the computation of five links for May 1999 are provided in Tables 1 to 5 in the Appendix to this report.

Below we briefly report on the status of the TWSTT Participating Stations and point out some issues and problems.

1. Status of Participating Stations and data collection at the BIPM

TWSTT files are collected on an operational basis from the following stations: DTAG, NPL, NIST, PTB, TUG, USNO and VSL. Most of these files fulfil requirements for standard format and data quality, but some of them still exhibit some anomalies, which complicate or prevent computation of some links. We are currently trying to resolve these problems.

The OCA Earth station has been out of commission since 20 May 1999 due to a lightning storm. The IEN and ROA stations are approaching operational status.

2. Calibration of TWSTT links

We stress the need for the calibration of TWSTT links by transportation of a TWSTT station, transportation of a GPS receiver, or at least by values published in *Circular T*. Calibrations should be undertaken between pairs of stations. For this report we were unable to use the VSL TWSTT data due to lack of coherence between the calibration coefficients of the VSL and other stations.

3. Letter of D. Kirchner to the Participating Stations

After our 1st Report Dr Kirchner addressed an important letter to the Participating Stations, concerning anomalies occurring at some laboratories in the treatment of raw TWSTT 1 s. We are very grateful for this contribution and invite you all to signal any other problems encountered.

4. Introduction of TWSTT links into TAI

As previously announced, the TUG/PTB TWSTT link will be introduced into the computation of TAI, starting with the *Circular T* issue covering July 1999.

The GPS link between these two laboratories will be computed as a check and kept as reserve data.

We hope to introduce further links within some months.

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

With our best regards,

Jacques Azoubib and Włodzimierz Lewandowski

Appendix

TWSTT links computed at the BIPM for May 1999

Because the TWSTT 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.

Table 1. TUG/PTB link

BIPM Report No	Date 1999 (MJD)	[UTC(TUG) – UTC(PTB)] /ns		
		TWSTT	Circular T (GPS)	TWSTT – Circular T
1	1 April (51269)	110	132	–22
	6 April (51274)	112	133	–21
	11 April (51279)	112	135	–23
	16 April (51284)	129	148	–19
	21 April (51289)	156	180	–24
	26 April (51294)	*177	197	–20
2	1 May (51299)	189	217	–28
	6 May (51304)	196	217	–21
	11 May (51309)	205	231	–26
	16 May (51314)	222	242	–20
	21 May (51319)	236	258	–22
	26 May (51324)	248	271	–23
	31 May (51329)	266	288	–22

Note: The TUG/PTB TWSTT link was calibrated by the transportation of a TWSTT station. *Circular T* GPS data for TUG was calibrated by an outdated value and the last GPS differential calibration between TUG and PTB was not taken into account; this is the reason for the offset of about –22 ns between the two techniques. If the last differential GPS calibration results would have been applied, the difference between the two techniques would be within a few nanoseconds.

* This value replaces the incorrect value given in the 1st Report.

Table 2. PTB/NIST link

BIPM Report No	Date 1999 (MJD)	[UTC(PTB) – UTC(NIST)] /ns		
		TWSTT	Circular T (GPS)	TWSTT – Circular T
1	1 April (51269)	41	41	0
	6 April (51274)	38	37	1
	11 April (51279)	36	36	0
	16 April (51284)	30	33	-3
	21 April (51289)	19	16	3
	26 April (51294)	10	12	-2
2	1 May (51299)	4	3	1
	6 May (51304)	1	3	-2
	11 May (51309)	2	1	1
	16 May (51314)	-3	-4	1
	21 May (51319)	-4	-6	2
	26 May (51324)	7	9	-2
	31 May (51329)	10	11	-1

Note: The PTB/NIST TWSTT link was calibrated by *Circular T*.

Table 3. NPL/USNO link

BIPM Report No	Date 1999 (MJD)	$[UTC(NPL) - UTC(USNO)] / ns$		
		TWSTT	Circular T (GPS)	TWSTT – Circular T
2	26 April (51294)	171	-46	217
	1 May (51299)	172	-48	220
	6 May (51304)	169	-48	217
	11 May (51309)	170	-48	218
	16 May (51314)	165	-51	216
	21 May (51319)	164	-52	216
	26 May (51324)	162	-53	215
	31 May (51329)	161	-54	215

Note: The NPL/USNO TWSTT link was not calibrated.

Table 4. USNO/PTB link

BIPM Report No	Date 1999 (MJD)	[UTC(USNO) – UTC(PTB)] /ns		
		TWSTT	Circular T (GPS)	TWSTT – Circular T
2	26 April (51294)	-11	-33	22
	1 May (51299)	-7	-28	21
	6 May (51304)	-4	-27	23
	11 May (51309)	-8	-25	17
	16 May (51314)	4	-19	23
	21 May (51319)	8	-16	24
	26 May (51324)	12	-11	23
	31 May (51329)	15	-7	22

Note: The USNO/PTB TWSTT link was calibrated using *Circular T* of May 1997. At this time the USNO GPS time-receiving equipment was inaccurate by about 23 ns, which explains the offset between the TWSTT data and the *Circular T* data observed in this table.

Table 5. PTB/DTAG link

BIPM Report No	Date 1999 (MJD)	[UTC(PTB) – UTC(DTAG)] /ns		
		TWSTT	Circular T (GPS)	TWSTT – Circular T
2	26 April (51294)	22	–2	24
	1 May (51299)	–	–15	–
	6 May (51304)	–	–11	–
	11 May (51309)	–1	–22	21
	16 May (51314)	–8	–22	14
	21 May (51319)	–14	–42	28
	26 May (51324)	–33	–57	24
	31 May (51329)	–39	–61	22

Note: The PTB/DTAG TWSTT link was calibrated by the transportation of a TWSTT station. The observed discrepancy between the TWSTT data and the *Circular T* values in this table could be explained by the inaccuracy of the DTAG GPS time-receiving equipment.