

Comparison of GPS CV and TWSTFT Calibration of the IEN/PTB Time Link

In June 2003, a simultaneous calibration of the IEN/PTB time link by GPS CV and TWSTFT portable equipment was conducted by the Technical University of Graz (TUG) for TWSTFT, and by the BIPM for GPS CV. Below is provided comparison of two calibrations.

Differential time correction d to be added to $[UTC(IEN) - UTC(PTB)]$, and its estimated uncertainty $u(d)$ for the period of comparison (1σ).

Method	d/ns	$u(d)/ns$
TWSTFT	-1.0	1.0
GPS CV	3.2	3.0



IEN/PTB TWSTFT and GPS CV links before applying calibration corrections

Date 2003 (MJD)	$[UTC(IEN) - UTC(PTB)] / ns$		(TWSTFT - GPS) / ns
	TWSTFT	GPS	
4 June (52794)	-30.1	-35.4	5.3
9 June (52799)	-38.6	-43.8	5.2
14 June (52804)	-47.1	-49.9	2.8
19 June (52809)	-52.6	-59.4	6.8
24 June (52814)	-49.5	-53.2	3.7
29 June (52819)	-49.0	-54.5	5.5
4 July (52824)	-53.6	-58.1	4.5
9 July (52829)	-48.4	-55.3	6.9
14 July (52834)	-55.2	-60.3	5.1
19 July (52839)	-61.9	-70.1	8.2
24 July (52844)	-54.0	-57.1	3.1
29 July (52849)	-56.7	-59.8	3.1

IEN/PTB TWSTFT and GPS CV links after applying calibration corrections

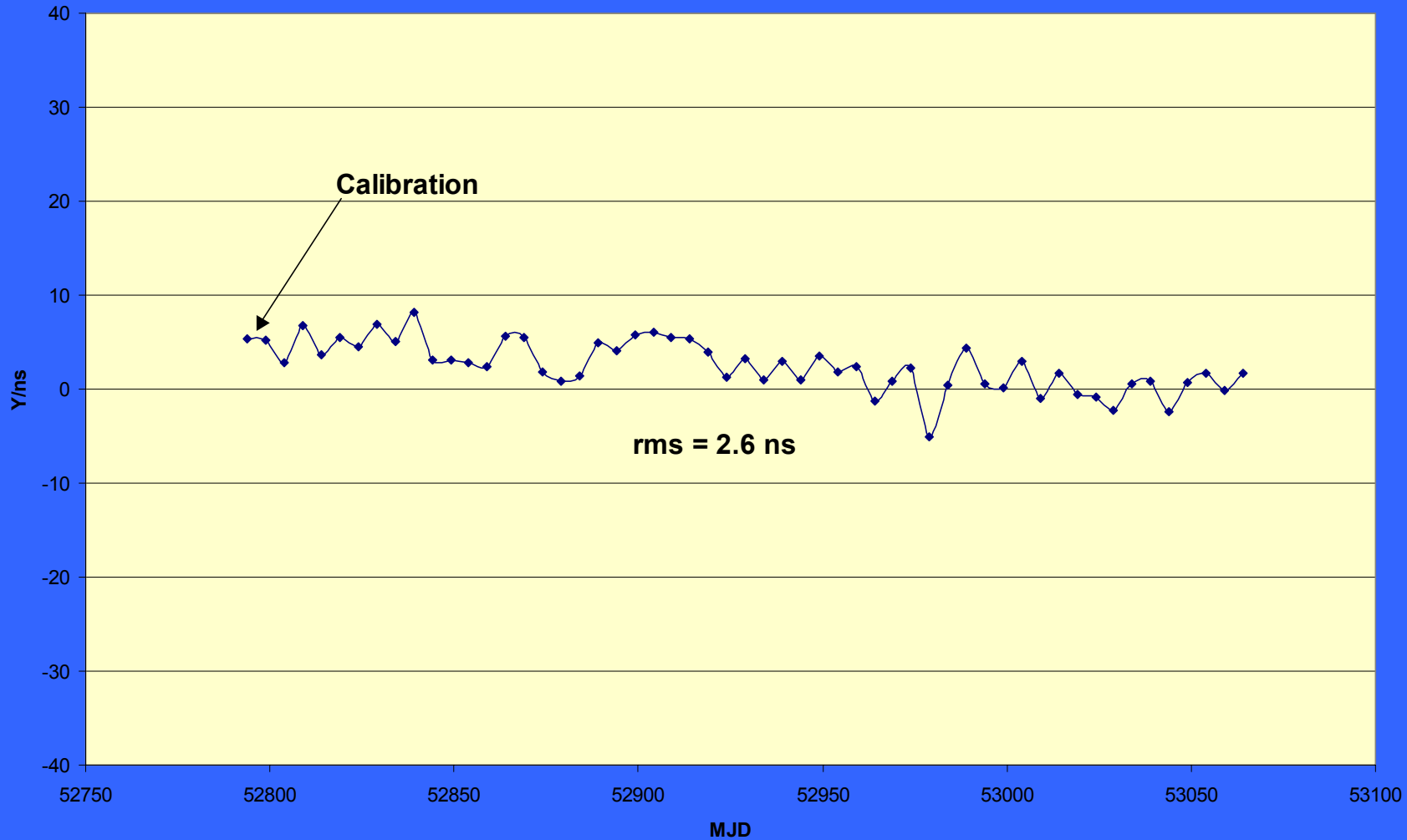
-1.0 ns for TWSTFT
+3.2 ns for GPS CV

Date 2003 (MJD)	[UTC(IEN) – UTC(PTB)] /ns		(TWSTFT – GPS) /ns
	TWSTFT	GPS	
4 June (52794)	-31.1	-32.2	1.1
9 June (52799)	-39.6	-40.6	1.0
14 June (52804)	-48.1	-46.7	-1.4
19 June (52809)	-53.6	-56.2	2.6
24 June (52814)	-50.5	-50.0	-0.5
29 June (52819)	-50.0	-51.3	1.3
4 July (52824)	-54.6	-54.9	0.3
9 July (52829)	-49.4	-52.1	2.7
14 July (52834)	-56.2	-57.1	0.9
19 July (52839)	-62.9	-66.9	4.0
24 July (52844)	-55.0	-53.9	-1.1
29 July (52849)	-57.7	-56.6	-1.1

**Differences between TWSTFT and GPS CV
before and after applying calibration corrections
for IEN/PTB for the period 4 June – 29 July 2004**

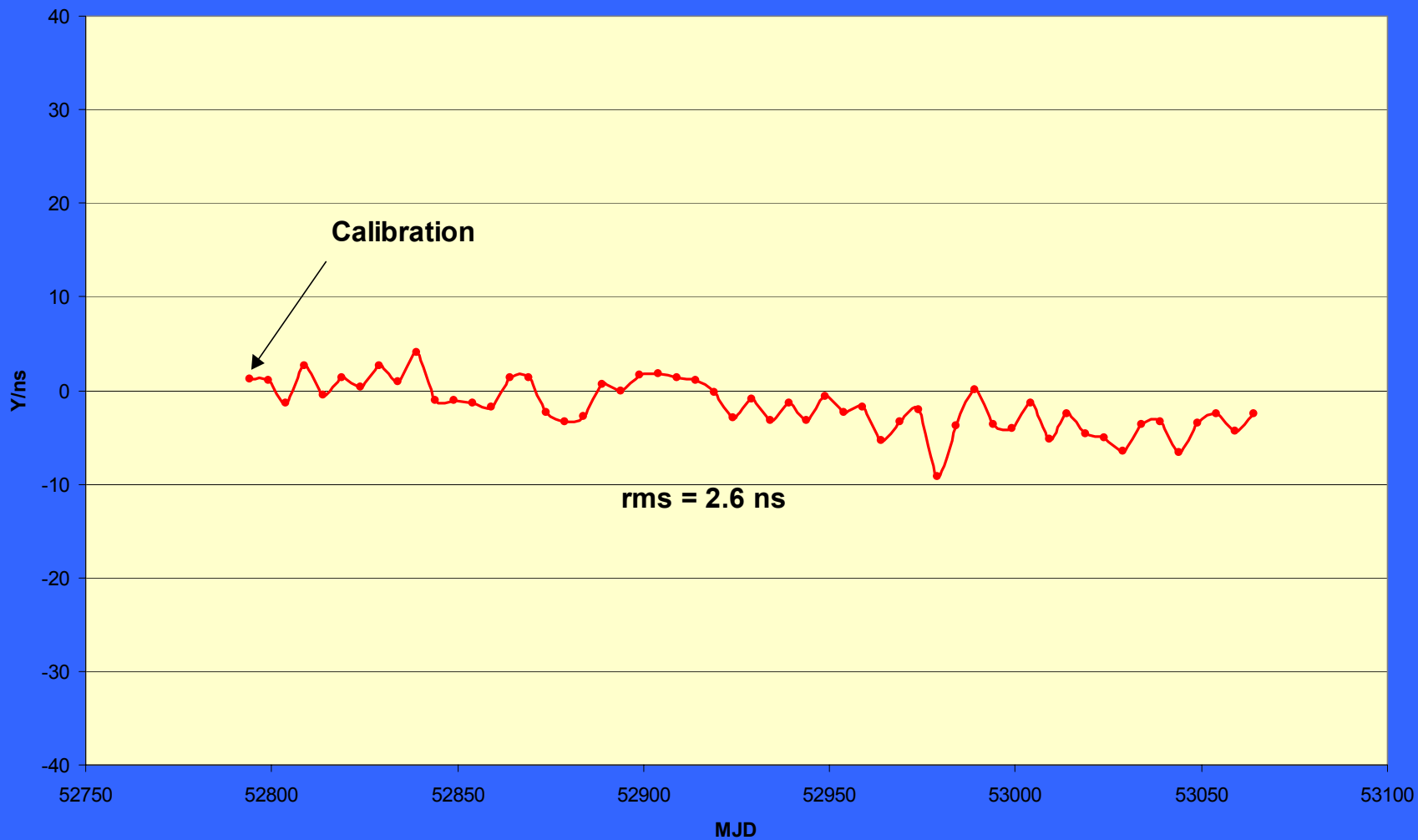
<i>UTC(IEN) – UTC(PTB)</i>	(TWSTFT – GPS) /ns	
	Mean	rms
Before calibration corrections	5.0	1.7
After calibration corrections	0.8	1.7

**Y = [UTC(IEN) - UTC(PTB)] twstft-gps
Before Calibration**



16th CCTF, 1-2 April 2004

**Y = [UTC(IEN) - UTC(PTB)] twstft-gps
After Calibration**



16th CCTF, 1-2 April 2004

$$Y = [UTC(VSL) - UTC(PTB)] \text{ twstft-gps}$$

