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BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 90 (1995 July 17)

1 - Coordinated Universal Time UTC. Computed values of UTC-UTC(k).

(From 1994 July 1, 0hUTC, to 1996 January 1, 0hUTC, TAI-UTC = 29 s)
(From 1996 January 1, 0hUTC, until further notice, TAI-UTC = 30 s)

Date 1995 0h UTC	May 22	Jun 1	Jun 11	Jun 21
MJD	49859	49869	49879	49889
Laboratory k	UTC-UTC(k) (Unit is one nanosecond)			
AOS (Borowiec)	-2080	-2146	-2107	-1938
APL (Laurel)	1576	1684	1781	1874
AUS (Canberra)	-455	-381	-379	-394
BEV (Wien)	-	-	-	-
CAO (Cagliari)	-8176	-8446	-8717	-9019
CH (Bern)	309	326	316	276
CRL (Tokyo)	1009	971	944	915
CSAO (Lintong)	-377	-374	-410	-398
CSIR (Pretoria)	-879	-695	-442	-193
FTZ (Darmstadt)	-142	-135	-142	-154
GUM (Warszawa)	-117	-131	-130	-154
IEN (Torino)	94	81	77	39
IFAG (Wettzell)	-1974	-2050	-2180	-2321
IGMA (Buenos Aires)	-1981	-2069	-2130	-2217
INPL (Jerusalem)	-2389	-2242	-2151	-1959
JATC (Lintong)	414	146	-60	28
KRIS (Taejon)	187	179	184	174
LDS (Leeds) (1)	-43	449	468	453
MSL (Lower Hutt)	-3448	-3372	-3347	-3338
NAOM (Mizusawa)	-2757	-2830	-2891	-2965
NAOT (Tokyo)	-1765	-1924	-2126	-2318
NIM (Beijing)	7353	7364	7378	7392
NIST (Boulder)	50	46	43	38
NMC (Sofiya)	-	-	-	-
NPL (Teddington)	117	109	116	115
NPLI (New-Delhi)	-	-	-	-
NRC (Ottawa)	345	371	410	482
NRLM (Tsukuba)	-8459	-8329	-8174	-8034
OMH (Budapest)	9967	10097	10258	10474
ONBA (Buenos Aires)	-	-	-	-
ONRJ (Rio de Janeiro)	-19279	-19631	-19441	-18393
OP (Paris)	-103	-106	-102	-93
ORB (Bruxelles)	-12	52	40	41
PTB (Braunschweig)	2459	2454	2449	2434
RC (Habana)	-	-	-	-
ROA (San Fernando)	2248	2234	2229	2202
SCL (Hong Kong)	-342	-479	-574	-667
SO (Shanghai)	1965	1993	1983	1982
SU (Moskva)	-6773	-6803	-6819	-6839
TL (Chung-Li)	-306	-224	-185	-184
TP (Praha)	-555	-563	-555	-557
TUG (Graz)	-591	-565	-559	-540
UME (Gebze-Kocaeli)	-3486	-3466	-3443	-3430
USNO (Washington DC)(USNO MC)	2	1	6	5
VSL (Delft)	-166	-181	-182	-198

2 - International Atomic Time TAI and local atomic time scales TA(k).

The following table gives the computed values of TAI-TA(k).

Date 1995 0h UTC		May 22	Jun 1	Jun 11	Jun 21
MJD		49859	49869	49879	49889
Laboratory k		TAI-TA(k) (Unit is one nanosecond)			
APL (Laurel)		3039	3147	3244	3337
AUS (Canberra)		-60481	-60664	-60930	-61192
CH (Bern)		-68754	-68560	-68354	-68151
CRL (Tokyo)		54440	54857	55280	55695
CSAO (Lintong)		9504	9377	9211	9094
F (Paris)		143045	143388	143730	144074
IEN (Torino)		-212	-242	-251	-280
INPL (Jerusalem)		-283936	-286218	-288587	-290876
JATC (Lintong)		13560	13502	13450	13369
KRIS (Taejon)		1299	1291	1273	1246
NIM (Beijing)		-8297	-8265	-8225	-8191
NISA (Boulder)	(2)	-45128927	-45129361	-45129794	-45130229
NRC (Ottawa)		24164	24217	24281	24379
PTB (Braunschweig)		-360941	-360946	-360951	-360966
RC (Habana)		-	-	-	-
SO (Shanghai)		-45585	-45589	-45615	-45633
SU (Moskva)	(3)	27243227	27243197	27243181	27243161
USNO (Washington DC)	(4)	-34724005	-34724668	-34725334	-34725998

3 - Notes on sections 1 and 2.

(1) LDS . Time step of UTC(LDS) of - 430 ns on MJD = 49868.35

(2) NIST. TA(NISA) designates the scale AT1 of NIST.

(3) SU . Listed values are TAI-TA(SU) - 2.80 seconds.

(4) USNO. TA(USNO) designates the scale A1(MEAN) of USNO.

4 - Information. UTC time step on the 1st of January 1996.

Bulletin C10 of the International Earth Rotation Service informs that a positive leap second will be introduced at the end of December 1995. The sequence of dates of the UTC second markers will be :

1995 December 31, 23h 59m 59s
1995 December 31, 23h 59m 60s
1996 January 1, 0h 0m 0s

5 - [UTC - GPS time] and [TAI - GPS time].

[UTC - GPS time] = -10 s + C0 (until 1996 January 1, 0h UTC)
[UTC - GPS time] = -11 s + C0 (from 1996 January 1, 0h UTC)
[TAI - GPS time] = 19 s + C0.

Daily values of C0 are given in the following table. They are obtained as follows: the GPS data taken at the Paris Observatory, for highest elevation, are first corrected for precise satellite ephemerides and for measured ionospheric delays, and then smoothed to obtain daily values of [UTC(OP) - GPS time] at 0h UTC; daily values of C0 are derived from them using linear interpolation of [UTC - UTC(OP)].

For a given day, where N measurements are used for estimation of C0 :
- the dispersion of individual measurements is characterized by a standard deviation σ,
- the daily C0 value is characterized by the standard deviation of the mean $\sigma/\sqrt{N}$.

Date 1995 0h UTC	MJD	C0 (ns)	σ (ns)	$\sigma/\sqrt{N}$ (ns)
May 22	49859	15	20	5
May 23	49860	19	60	13
May 24	49861	24	34	7
May 25	49862	30	39	9
May 26	49863	30	41	11
May 27	49864	25	54	13
May 28	49865	25	54	12
May 29	49866	30	46	10
May 30	49867	31	40	10
May 31	49868	26	32	7
Jun 1	49869	17	46	10
Jun 2	49870	7	35	8
Jun 3	49871	1	41	10
Jun 4	49872	0	57	13
Jun 5	49873	7	57	13
Jun 6	49874	12	43	10
Jun 7	49875	10	42	9
Jun 8	49876	11	32	7
Jun 9	49877	15	37	8
Jun 10	49878	16	48	11
Jun 11	49879	11	44	10
Jun 12	49880	6	46	10
Jun 13	49881	4	24	5
Jun 14	49882	6	48	11
Jun 15	49883	11	39	9
Jun 16	49884	16	46	10
Jun 17	49885	16	43	10
Jun 18	49886	13	43	10
Jun 19	49887	10	30	7
Jun 20	49888	10	50	12
Jun 21	49889	22	38	9

6 - [UTC - GLONASS time].

[UTC - GLONASS time] = C1 (modulo 1 s).

From his current observations of both the GPS and GLONASS satellite systems Prof. P. Daly, University of Leeds, establishes and reports [GPS time - GLONASS time] at ten-day intervals, together with the standard deviation σ of his daily GLONASS data. C1 is then derived using [UTC - GPS time] of section 5.

Date 1995 0h UTC	MJD	C1 (ns)	σ (ns)
May 22	49859	-16982	39
Jun 1	49869	-17267	40
Jun 11	49879	-17598	42
Jun 21	49889	-17967	46

7 - Difference between the normalized frequencies of EAL and TAI.

Interval of validity		f(EAL)-f(TAI)
1995 Apr. 22 - 1995 Jun. 21	49829-49889	7.38×10^{-13}

New steering correction foreseen for July-August 1995

1995 Jun. 21 - 1995 Aug. 30	49889-49959	7.37×10^{-13}

8 - Duration of the TAI scale interval.

The following table gives the departure D of the duration of the TAI scale interval from the SI second on the rotating geoid as realized by a given primary standard occasionally evaluated or continuously operating as a clock. In the latter case the chosen two-month period of observation is also indicated. The last communicated estimate of the inaccuracy of the standard provides the uncertainty σ of the D value.

D and σ are expressed in units of 10^{-14} second.

Standard	Obs. period	D	σ
PTB-CS1	49829-49889	+1.9	3.0
PTB-CS2	49829-49889	+0.4	1.5

The estimate of the duration of the TAI scale interval, computed by the BIPM, from all the available measurements of the TAI frequency, obtained by comparison with primary frequency standards continuously observed or occasionally evaluated (*CRL, *LPTF, *NIST, NRC, PTB, SU), is:

$$1 - 0.3 \times 10^{-14} \pm 2.0 \times 10^{-14}$$

in SI second on the rotating geoid, for the two-month interval 49829-49889 .

* The frequencies of the primary frequency standards Cs1 from CRL, JPO from LPTF, and NIST-7 from NIST, are corrected for the black body radiation shift.