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BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 113 (1997 June 12)
Circulaire T 113

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

(From 1996 January 1, 0h UTC, to 1997 July 1, 0h UTC, *TAI-UTC* = 30 s)
(From 1997 July 1, 0h UTC, until further notice, *TAI-UTC* = 31 s)

Date 1997 0h UTC	Apr 26	May 1	May 6	May 11
MJD	50564	50569	50574	50579
Laboratory k	*UTC-UTC(k)* (Unit is one nanosecond)			
AOS (Borowiec)	-441	-499	-394	-250
APL (Laurel)	1417	1484	1540	1588
AUS (Canberra)	287	326	340	336
BEV (Wien)	-	-	-	-
BIRM (Beijing)	-5438	-5507	-5572	-5638
CAO (Cagliari)	-546	-584	-596	-627
CH (Bern)	44	40	28	11
CNM (Queretaro)	-3473	-3420	-3361	-3307
CRL (Tokyo)	-14	-9	0	8
CSAO (Lintong)	3	-22	-5	-21
CSIR (Pretoria)	8330	8382	8459	8545
DLR (Oberpfaffenhofen)	353	321	292	260
DTAG (Darmstadt)	-743	-746	-733	-728
GUM (Warszawa)	268	279	300	309
IEN (Torino)	528	529	527	532
IFAG (Wettzell)	-2181	-2115	-2021	-1940
IGMA (Buenos Aires)	222	228	223	241
INPL (Jerusalem)	-2671	-2812	-2934	-3034
IPQ (Monte de Caparica)	401	405	418	433
JATC (Lintong)	3652	3613	3618	3589
KRIS (Taejon)	-219	-229	-216	-206
LDS (Leeds)	-65	-78	-80	-78
MSL (Lower Hutt)	-5615	-5651	-5710	-5754
NAO (Mizusawa)	-3170	-3120	-3053	-2989
NIM (Beijing)	-1573	-1604	-1622	-1634
NIST (Boulder)	-2	-5	-9	-7
NML (Sydney) (1)	-	377	391	391
NPL (Teddington)	72	71	72	74
NRC (Ottawa)	-1	6	6	9
NRLM (Tsukuba)	63	71	77	86
OMH (Budapest)	663	658	668	679
ONBA (Buenos Aires) (2)	-19130	139	-240	-431
ONRJ (Rio de Janeiro)	41195	41655	42084	42566
OP (Paris)	-4	-3	2	16
ORB (Bruxelles)	250	265	242	261
PTB (Braunschweig)	1760	1751	1746	1741
ROA (San Fernando)	-57	-63	-72	-75
SCL (Hong Kong)	20	31	48	70
SO (Shanghai)	1039	1019	1012	1028
SP (Boras)	296	298	301	309
SU (Moskva)	771	766	761	753
TL (Chung-Li)	492	662	680	682
TP (Praha)	120	117	115	106
TUG (Graz)	1994	2032	2064	2108
UME (Gebze-Kocaeli)	475	487	501	513
USNO (Washington DC)(USNO MC)	13	15	11	14
VSL (Delft)	-418	-405	-391	-378

1 - Coordinated Universal Time UTC. (Cont.)

Date 1997 0h UTC	May 16	May 21	May 26	May 31
MJD	50584	50589	50594	50599
Laboratory k	*UTC-UTC(k)*	(Unit is one nanosecond)		
AOS (Borowiec)	-52	6	84	238
APL (Laurel)	1633	1687	1746	1795
AUS (Canberra)	351	328	302	282
BEV (Wien)	-	-	-	-
BIRM (Beijing)	-5688	-5746	-5809	-5861
CAO (Cagliari)	-641	-660	-696	-745
CH (Bern)	-12	-32	-61	-78
CNM (Queretaro)	-3256	-3198	-3144	-3095
CRL (Tokyo)	10	18	23	20
CSAO (Lintong)	12	-22	-44	-19
CSIR (Pretoria)	8647	8782	8894	9000
DLR (Oberpfaffenhofen)	226	191	154	124
DTAG (Darmstadt)	-731	-718	-722	-715
GUM (Warszawa)	337	362	382	414
IEN (Torino)	537	542	541	549
IFAG (Wettzell)	-1903	-1864	-1816	-1747
IGMA (Buenos Aires)	233	268	275	287
INPL (Jerusalem)	-3110	-3149	-3196	-3216
IPQ (Monte de Caparica)	448	454	463	475
JATC (Lintong)	3615	3565	3529	3547
KRIS (Taejon)	-209	-212	-203	-188
LDS (Leeds)	-56	-91	-92	-86
MSL (Lower Hutt)	-5758	-5759	-5766	-5711
NAO (Mizusawa)	-2912	-2842	-2776	-2712
NIM (Beijing)	-1638	-1676	-1701	-1702
NIST (Boulder)	-10	-4	-1	-5
NML (Sydney)	389	408	424	450
NPL (Teddington)	72	69	70	71
NRC (Ottawa)	10	17	25	32
NRLM (Tsukuba)	86	91	92	98
OMH (Budapest)	681	700	698	716
ONBA (Buenos Aires)	-716	-1000	-1513	-2040
ONRJ (Rio de Janeiro)	42952	43335	43734	44122
OP (Paris)	20	25	22	28
ORB (Bruxelles)	245	258	258	268
PTB (Braunschweig)	1733	1729	1727	1726
ROA (San Fernando)	-77	-82	-92	-98
SCL (Hong Kong)	69	63	82	66
SO (Shanghai)	1041	1014	1002	996
SP (Boras)	310	308	311	322
SU (Moskva)	745	735	728	727
TL (Chung-Li)	697	709	725	744
TP (Praha)	111	110	114	121
TUG (Graz)	2142	2187	2223	2263
UME (Gebze-Kocaeli)	515	523	522	531
USNO (Washington DC)(USNO MC)	13	18	18	15
VSL (Delft)	-374	-364	-344	-325

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

The following tables give the computed values of *TAI-TA(k)*.

Date 1997 0h UTC		Apr 26	May 1	May 6	May 11
MJD		50564	50569	50574	50579
Laboratory k		*TAI-TA(k)* (Unit is one nanosecond)			
APL (Laurel)		2880	2947	3003	3051
AUS (Canberra)		-77803	-77916	-77979	-78102
CH (Bern)		-48466	-48281	-48106	-47939
CRL (Tokyo)		83746	83961	84171	84386
CSAO (Lintong)		742	652	604	523
F (Paris)		163159	163147	163139	163126
IEN (Torino)		2929	2961	2996	3045
INPL (Jerusalem)		-385461	-386228	-386998	-387767
JATC (Lintong)		13556	13505	13500	13464
KRIS (Taejon)		5490	5463	5459	5452
NISA (Boulder)	(3)	-45159601	-45159816	-45160035	-45160248
NML (Sydney)		-	-	427	427
NRC (Ottawa)		27065	27065	27057	27056
PTB (Braunschweig)		-361640	-361649	-361654	-361659
SO (Shanghai)		-46491	-46493	-46484	-46464
SU (Moskva)	(4)	27241771	27241766	27241761	27241753
USNO (Washington DC)	(5)	-34770321	-34770641	-34770966	-34771285

Date 1997 0h UTC		May 16	May 21	May 26	May 31
MJD		50584	50589	50594	50599
Laboratory k		*TAI-TA(k)* (Unit is one nanosecond)			
APL (Laurel)		3096	3150	3209	3258
AUS (Canberra)		-78171	-78303	-78411	-78531
CH (Bern)		-47778	-47615	-47460	-47293
CRL (Tokyo)		84597	84811	85027	85239
CSAO (Lintong)		492	393	306	266
F (Paris)		163113	163104	163092	163083
IEN (Torino)		3093	3147	3194	3246
INPL (Jerusalem)		-388534	-389286	-390067	-390843
JATC (Lintong)		13485	13444	13400	13411
KRIS (Taejon)		5431	5414	5395	5388
NISA (Boulder)	(3)	-45160466	-45160675	-45160887	-45161106
NML (Sydney)		425	443	461	487
NRC (Ottawa)		27053	27056	27059	27061
PTB (Braunschweig)		-361667	-361671	-361673	-361674
SO (Shanghai)		-46456	-46494	-46513	-46519
SU (Moskva)	(4)	27241745	27241735	27241728	27241727
USNO (Washington DC)	(5)	-34771608	-34771925	-34772246	-34772569

3 - Notes on sections 1 and 2.

(1) NML . National Measurement Laboratory, Sydney, Australia.

(2) ONBA. Time step of UTC(ONBA) of - 19500 ns on MJD = 50568.

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

(4) SU . Listed values are *TAI-TA(SU)* - 2,80 seconds.

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

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

Interval of validity		*f(EAL)-f(TAI)*
1997 Apr. 26 - 1997 June 30	50564-50629	$7,230 \times 10^{-13}$

New steering correction foreseen for July-August 1997

1997 June 30 - 1997 Aug. 29	50629-50689	$7,210 \times 10^{-13}$

5 - Duration of the TAI scale interval.

The following table gives the duration u_{TAI} of the TAI scale interval expressed as its relative departure d from the SI second on the rotating geoid, u_0, together with its uncertainty σ : $d = (u_{TAI} - u_0)/u_0$. This is obtained, on the given period of estimation, by comparison of the TAI frequency :

- with the frequency, corrected for the black-body radiation shift, of a given individual primary frequency standard (σ is then the last communicated estimate of the uncertainty of the standard frequency), and

- with a combination computed by the BIPM of all available measurements from PTB CS2, PTB CS3, NIST-7, SU MCsR 102 and LPTF-F01 consistently corrected for the black-body radiation shift (σ is then estimated by the BIPM taking into account the individual uncertainties and parameters characteristic of TAI stability).

Standard	Period of estimation	d (10^{-14})	σ (10^{-14})
PTB-CS2	50564-50599	+2,8	1,5
PTB-CS3	50564-50599	+4,8	1,4
BIPM estimate	50539-50599	+2,7	1,0

6 - [*UTC-GPS time*] and [*TAI-GPS time*].

[*UTC-GPS time*] = -11 s + C_0 (until 1997 July 1, 0h UTC)
[*UTC-GPS time*] = -12 s + C_0 (from 1997 July 1, 0h UTC)
[*TAI-GPS time*] = 19 s + C_0.

Daily values of C_0 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 C_0 are derived from them using linear interpolation of [*UTC-UTC(OP)*].

For a given day, where N measurements are used for estimation of C_0 :
- the dispersion of individual measurements is characterized by a standard deviation σ,
- the daily C_0 value is characterized by the standard deviation of the mean $\sigma/\sqrt{N}$.

Date 1997 0h UTC	MJD	C_0 (ns)	σ (ns)	$\sigma/\sqrt{N}$ (ns)
Apr 26	50564	38	48	10
Apr 27	50565	31	32	6
Apr 28	50566	30	38	8
Apr 29	50567	35	45	9
Apr 30	50568	35	47	10
May 1	50569	30	46	10
May 2	50570	24	55	11
May 3	50571	21	43	9
May 4	50572	21	50	10
May 5	50573	22	44	9
May 6	50574	21	44	9
May 7	50575	26	46	9
May 8	50576	31	42	8
May 9	50577	34	43	9
May 10	50578	32	51	10
May 11	50579	27	50	10
May 12	50580	30	46	9
May 13	50581	44	43	9
May 14	50582	49	43	9
May 15	50583	49	35	7
May 16	50584	52	40	8
May 17	50585	50	37	7
May 18	50586	44	45	9
May 19	50587	42	41	8
May 20	50588	42	63	13
May 21	50589	41	47	10
May 22	50590	40	34	7
May 23	50591	42	43	9
May 24	50592	34	50	10
May 25	50593	23	51	10
May 26	50594	16	33	7
May 27	50595	19	48	10
May 28	50596	27	51	10
May 29	50597	37	49	10
May 30	50598	38	51	10
May 31	50599	32	47	9

7 - [*UTC-GLONASS time*] and [*TAI-GLONASS time*].

[*UTC-GLONASS time*] = 0 s + C_1
[*TAI-GLONASS time*] = +30 s + C_1 (until 1997 July 1, 0h UTC)
[*TAI-GLONASS time*] = +31 s + C_1 (from 1997 July 1, 0h UTC)

Daily values of C_1 are given in the following table. They are obtained as follows: the GLONASS data taken at the NMi Van Swinden Laboratorium, Delft, The Netherlands, for highest elevation, are smoothed to obtain daily values of [*UTC(VSL)-GLONASS time*] at 0h UTC; daily values of C_1 are then derived from them using linear interpolation of [*UTC-UTC(VSL)*]. A time correction of + 1285 ns is also applied in order to ensure continuity of C_1 estimates on 1997, January 1 (MJD = 50449).

For a given day, where N measurements are used for estimation of C_1 :
- the dispersion of individual measurements is characterized by a standard deviation σ,
- the daily C_1 value is characterized by the standard deviation of the mean $\sigma/\sqrt{N}$.

Date 1997 0h UTC	MJD	C_1 (ns)	σ (ns)	$\sigma/\sqrt{N}$ (ns)
Apr 26	50564	-34946	34	6
Apr 27	50565	-34949	22	4
Apr 28	50566	-34945	16	4
Apr 29	50567	-34940	24	4
Apr 30	50568	-34938	22	4
May 1	50569	-34933	20	4
May 2	50570	-34928	25	5
May 3	50571	-34925	23	5
May 4	50572	-34931	21	4
May 5	50573	-34936	30	6
May 6	50574	-34927	32	6
May 7	50575	-34914	17	4
May 8	50576	-34913	21	4
May 9	50577	-34918	-	-
May 10	50578	-34920	24	4
May 11	50579	-34921	15	2
May 12	50580	-34922	18	3
May 13	50581	-34917	18	3
May 14	50582	-34907	18	3
May 15	50583	-34912	12	2
May 16	50584	-34916	16	3
May 17	50585	-34914	11	2
May 18	50586	-34919	18	3
May 19	50587	-34920	12	2
May 20	50588	-34919	17	4
May 21	50589	-34922	18	3
May 22	50590	-34928	13	3
May 23	50591	-34926	20	4
May 24	50592	-34916	19	4
May 25	50593	-34895	28	5
May 26	50594	-34879	24	4
May 27	50595	-34882	24	4
May 28	50596	-34887	17	3
May 29	50597	-34890	17	3
May 30	50598	-34896	22	5
May 31	50599	-34898	20	4