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BUREAU INTERNATIONAL DES POIDS ET MESURES
ORGANISATION INTERGOUVERNEMENTALE DE LA CONVENTION DU METRE
PAVILLON DE BRETEUIL F-92312 SEVRES CEDEX TEL. +33 1 45 07 70 70 FAX. +33 1 45 34 20 21 tai@bipm.org

1 - Coordinated Universal Time UTC and its local realizations UTC(k). Computed values of [*UTC-UTC*(*k*)] and uncertainties valid for the period of this Circular. From 2006 January 1, 0h UTC, *TAI-UTC* = 33 s.

Date 2006 0h UTC	APR 29	MAY 4	MAY 9	MAY 14	MAY 19	MAY 24	MAY 29	Uncertainty/ns			Notes
MJD	53854	53859	53864	53869	53874	53879	53884	u_A	u_B	u	
Laboratory *k*				[*UTC-UTC*(*k*)]/ns							
AOS (Borowiec)	-11.7	-13.2	1.3	-12.0	-12.5	-13.5	-0.1	1.6	5.3	5.5	
APL (Laurel)	-20.3	-16.5	-20.2	-20.2	-25.2	-27.2	-11.4	1.6	5.2	5.4	
AUS (Sydney)	-707.9	-686.9	-658.8	-643.6	-635.2	-609.8	-598.2	3.2	6.3	7.0	
BEV (Wien)	36.5	42.5	49.7	65.1	72.7	71.2	78.8	1.6	5.3	5.5	
BIRM (Beijing)	-1664.1	-1680.1	-1691.8	-1704.9	-1739.7	-1757.9	-1769.6	2.7	20.4	20.5	
CAO (Cagliari)	-1568.6	-1559.5	-1535.8	-1531.4	-1509.4	-1473.3	-1456.2	1.6	7.2	7.3	
CH (Bern)	-29.0	-29.4	-29.2	-28.8	-26.8	-19.2	-12.7	0.9	5.2	5.3	
CNM (Queretaro)	7.1	-1.0	-4.2	-12.9	-23.6	-27.4	-24.6	5.0	20.3	20.9	
CNMP (Panama)	-4843.2	-4885.9	-4933.2	-4957.4	-4983.5	-5014.7	-5037.0	4.0	7.2	8.3	
CSIR (Pretoria)	1002.0	914.4	840.8	760.1	672.2	591.4	518.7	3.0	20.1	20.3	
DLR (Oberpfaffenhofen)	-	-	-	-	-	-	-	-	-	-	
DTAG (Darmstadt)	-37.5	-34.0	-53.5	-58.4	-47.8	-50.9	-49.2	3.0	10.1	10.6	
HKO (Hong Kong)	-	95.8	94.4	99.8	102.1	103.8	115.6	3.2	6.3	7.1	
IFAG (Wettzell)	-81.0	-83.3	-77.1	-80.9	-79.4	-59.9	-56.8	0.9	5.2	5.3	
IGMA (Buenos Aires)	-	-	-	-	-	-	-	-	-	-	
INPL (Jerusalem)	107.1	111.2	113.9	119.4	136.5	138.8	150.4	4.0	10.2	10.9	
IT (Torino)	12.5	3.4	1.4	-0.8	1.4	-0.2	0.4	0.7	2.3	2.4	
JATC (Lintong)	7.5	6.9	7.8	12.8	10.4	8.6	9.5	2.6	20.9	21.1	
JV (Kjeller)	-4373.5	-4325.8	-4276.3	-4217.5	-4162.1	-4104.5	-4029.5	5.0	20.0	20.7	
KRIS (Daejeon)	-12.0	-13.9	-26.5	-25.0	-31.5	-20.2	-10.1	1.3	6.2	6.4	
LDS (Leeds)	4910.6	4946.9	4988.7	5025.8	5065.9	5099.7	5124.2	3.0	20.0	20.2	
LT (Vilnius)	105.1	73.9	61.6	71.2	74.3	92.5	120.0	1.6	5.3	5.5	
MIKE (Espoo)	-1.8	-11.4	-37.2	-71.1	-104.1	-117.3	-108.2	5.0	19.9	20.5	
MSL (Lower Hutt)	0.4	-18.5	-3.7	-20.0	-37.1	-48.3	-25.6	2.3	20.3	20.5	
NAO (Mizusawa)	217.6	218.7	209.7	216.3	213.9	211.0	206.6	3.1	19.9	20.1	
NICT (Tokyo)	-4.8	-5.8	-5.1	-4.0	-5.4	-3.3	-3.0	1.1	3.8	4.0	
NIM (Beijing)	-64.3	-60.4	-65.0	-63.0	-67.8	-56.5	-56.2	3.2	20.1	20.4	
NIMB (Bucharest)	-802.1	-817.3	-814.4	-834.1	-849.8	-841.5	-864.9	2.5	20.0	20.2	
NIMT (Bangkok)	-1133.3	-1134.1	-1127.8	-1131.5	-1143.0	-1154.4	-1149.8	1.5	20.4	20.4	
NIS (Cairo)	-	-	24.9	31.3	25.5	18.4	13.1	1.6	7.2	7.4	

Date 2006 0h UTC	APR 29	MAY 4	MAY 9	MAY 14	MAY 19	MAY 24	MAY 29	Uncertainty/ns			Notes
MJD	53854	53859	53864	53869	53874	53879	53884	u_A	u_B	u	
Laboratory *k*				[*UTC-UTC*(*k*)]/ns							
NIST (Boulder)	6.4	7.0	6.4	6.2	6.5	6.6	6.5	0.7	4.9	5.0	
NMC (Sofiya)	-4484.7	-4486.9	-4485.5	-4475.5	-4461.7	-4491.4	-4519.1	5.0	20.1	20.7	
NMIJ (Tsukuba)	-9.9	-11.2	-13.2	-14.3	-15.3	-13.3	-12.5	1.3	6.2	6.3	
NMLS (Sepang)	-347.2	-350.8	-353.0	-357.9	-366.1	-366.4	-358.0	3.2	20.3	20.5	
NPL (Teddington)	40.1	36.3	32.7	28.0	26.8	23.2	20.0	0.7	2.3	2.4	
NPLI (New-Delhi)	121.2	147.5	163.2	173.5	143.2	9.4	19.7	2.6	7.2	7.7	(1)
NRC (Ottawa)	19.4	17.0	17.9	1.2	3.5	10.6	1.2	3.0	15.1	15.4	
NTSC (Lintong)	-0.4	-2.1	-3.4	-3.4	-2.8	-1.1	2.8	2.6	6.0	6.6	
OMH (Budapest)	11046.3	11044.4	11059.5	11048.6	11071.5	11098.2	11099.1	2.5	20.1	20.2	
ONBA (Buenos Aires)	-9703.0	-9736.1	-9718.5	-9725.9	-9794.6	-10007.7	-10137.8	5.0	7.2	8.8	
ONRJ (Rio de Janeiro)	6889.2	6936.4	6997.2	7055.8	7108.3	7151.6	7203.9	5.0	20.4	21.0	
OP (Paris)	-32.8	-35.0	-26.6	-25.9	-21.2	-14.4	-16.2	0.7	2.2	2.3	
ORB (Bruxelles)	-5.1	-5.1	-5.8	-4.4	-2.2	-0.6	0.9	0.9	5.3	5.3	
PL (Warszawa)	-17.4	0.2	-0.8	-9.1	-9.7	-14.3	-3.9	1.5	5.1	5.3	
PTB (Braunschweig)	22.0	27.7	22.4	23.6	27.6	30.1	30.0	0.5	1.7	1.8	
ROA (San Fernando)	34.3	38.9	40.5	34.1	35.6	34.4	45.2	0.9	5.3	5.3	
SCL (Hong Kong)	37.4	37.8	36.9	38.8	48.4	40.2	35.0	4.1	10.5	11.3	
SG (Singapore)	18.4	7.1	-14.5	-31.3	-42.7	-57.2	-80.0	3.2	20.1	20.4	
SMU (Bratislava)	-140.1	-140.1	-131.2	-136.3	-131.2	-128.1	-124.3	5.0	20.1	20.7	
SP (Boras)	-15.7	-7.9	-0.9	8.3	16.9	27.2	25.9	0.8	9.9	9.9	
SU (Moskva)	5.4	8.6	9.7	11.3	15.2	19.1	21.7	3.0	5.2	6.0	
TCC (Concepcion)	-2665.2	-2727.1	-2762.1	-2813.3	-2816.4	-2846.1	-2864.4	2.1	20.1	20.2	
TL (Chung-Li)	2.5	4.6	3.2	2.0	3.2	2.9	5.5	1.3	6.1	6.2	
TP (Praha)	79.6	82.2	90.2	86.6	83.6	74.2	70.4	2.5	5.2	5.8	
UME (Gebze-Kocaeli)	1207.5	1211.9	1212.7	1218.9	1226.4	1240.8	1243.1	15.0	20.1	25.1	
USNO (Washington DC)	-9.7	-9.2	-9.9	-10.4	-10.1	-9.1	-8.7	0.6	1.8	1.9	
VSL (Delft)	27.0	27.0	31.1	29.5	25.0	26.5	19.4	0.7	3.5	3.5	
ZMDM (Belgrade)	2915.7	2945.0	2972.1	2998.9	3037.4	3069.6	3090.7	2.6	7.2	7.7	

- Note on section 1:

(1) NPLI : Time step of UTC(NPLI) of +200 ns on MJD 53874.

2 - International Atomic Time TAI and Local atomic time scales TA(k). Computed values of [*TAI-TA*(*k*)].

Date 2006 0h UTC	APR 29	MAY 4	MAY 9	MAY 14	MAY 19	MAY 24	MAY 29	
MJD	53854	53859	53864	53869	53874	53879	53884	
Laboratory *k*				[*TAI-TA*(*k*)]/ns				
CH (Bern)	52750.3	52780.7	52811.6	52842.8	52872.7	52904.1	52934.3	
F (Paris)	168413.4	168406.1	168404.1	168396.6	168393.6	168395.8	168387.4	
IT (Torino)	52727.4	52861.9	52999.9	53139.6	53282.6	53421.4	53559.4	
JATC (Lintong)	-39519.9	-39557.3	-39590.8	-39626.5	-39665.7	-39704.9	-39742.3	
KRIS (Daejeon)	11669.4	11730.8	11782.7	11848.2	11906.4	11981.1	12055.1	
NICT (Tokyo)	-9.7	-8.4	-6.7	-6.3	-5.3	-3.1	-1.4	
NIST (Boulder)	-45291920.1	-45292113.5	-45292308.1	-45292502.3	-45292696.0	-45292889.7	-45293083.5	
NRC (Ottawa)	29676.5	29691.0	29708.9	29709.0	29728.1	29752.0	29759.3	
NTSC (Lintong)	2720.4	2745.3	2772.0	2798.6	2824.5	2849.6	2877.3	
PL (Warszawa)	-3594.5	-3603.3	-3609.4	-3618.9	-3629.3	-3638.0	-3648.0	
PTB (Braunschweig)	-358280.2	-358266.9	-358264.7	-358255.9	-358244.2	-358234.4	-358227.0	
SU (Moskva)	27242110.6	27242126.3	27242140.0	27242154.1	27242170.5	27242187.0	27242202.1	(1)
TL (Chung-Li)	338.4	344.4	344.9	351.0	357.0	361.9	367.7	
USNO (Washington DC)	-34975474.8	-34975778.6	-34976084.0	-34976389.2	-34976693.7	-34976998.8	-34977304.5	

- Note on section 2:

(1) SU : Listed values are *TAI-TA*(*SU*) - 2.80 seconds.

3 - Difference between the normalized frequencies of EAL (free atomic time scale) and TAI.

	Interval of validity	*f*(*EAL*)-*f*(*TAI*)	
Steering correction	53854 - 53884	6.826×10^{-13}	(2006 APR 29 - 2006 MAY 29)
New correction	53884 - 53914	6.823×10^{-13}	(2006 MAY 29 - 2006 JUN 28)
No new correction foreseen	53914 - 53944	6.823×10^{-13}	(2006 JUN 28 - 2006 JUL 28)

4 - Duration of the TAI scale interval.

TAI is a realization of coordinate time TT. The following tables give the fractional deviation *d* of the scale interval of TAI from that of TT (the SI second on the geoid), i.e. the fractional frequency deviation of TAI with the opposite sign: $d = -y_{TAI}$. In this section, a frequency over a time interval is defined as the ratio of the end-point phase difference to the duration of the interval. Whenever needed, the instability of EAL should be expressed as the quadratic sum of three components with τ in days: (1) a white frequency noise of $3.0\times10^{-15} / \sqrt{\tau}$, (2) a flicker frequency noise of 0.5×10^{-15} and (3) a random walk frequency noise of $1.0\times10^{-16} \times \sqrt{\tau}$. The relation between EAL and TAI is given in *Circular T* and the *Annual Report of the BIPM Time Section*.

In the first table, *d* is obtained, on the given periods of estimation by comparison of the TAI frequency with that of the given individual Primary Frequency Standards (PFS). In this table: u_A is the uncertainty originating in the instability of the PFS, u_B is the combined uncertainty from systematic effects, Ref(u_B) is a reference giving information on the stated value of u_B or is the *Circular T* where this reference was first given, $u_{l/lab}$ is the uncertainty in the link between the PFS and the clock participating to TAI, including the uncertainty due to the dead-time, $u_{l/TAI}$ is the uncertainty in the link to TAI, *u* is the quadratic sum of all four uncertainty values. All values are expressed in 10^{-15}.

Standard	Period of Estimation	d	u_A	u_B	Ref(u_B)	$u_{l/Lab}$	$u_{l/Tai}$	u	Note
NICT-O1	53839 53869	4.9	4.0	5.5	[1]	0.0	1.0	6.9	(1)
SYRTE-JPO	53859 53884	8.7	0.8	6.3	T160	0.3	1.2	6.5	(2)
PTB-CS1	53854 53884	-4.3	5.0	8.0	T148	0.0	1.0	9.5	(3)
PTB-CS2	53854 53884	-3.5	3.0	12.0	T148	0.0	1.0	12.4	(3)

Notes:
(1) Report 31 May by NICT, $u_{l/lab}$ included in u_A.
(2) Report 2 June by LNE-SYRTE.
(3) Continuously operating as a clock participating to TAI.

[1] A. Hasegawa, et al., "Accuracy evaluation of optically pumped primary frequency standard CRL-O1", *Metrologia*, Vol.**41**, pp.257-263 (2004).

The second table gives the BIPM estimate of *d*, based on all available PFS measurements over the period MJD 53494-53884, taking into account their individual uncertainties and characterizing the instability of EAL as noted above. *u* is the computed standard uncertainty of *d*

Period of estimation	d	u	
53854-53884	1.7×10^{-15}	1.6×10^{-15}	(2006 APR 29 - 2006 MAY 29)

5 - Relations of UTC and TAI with GPS time and GLONASS time.

[*UTC-GPS time*] = -14 s + C_0, [*TAI-GPS time*] = 19 s + C_0, global uncertainty is of order 10 ns.
[*UTC-GLONASS time*] = 0 s + C_1, [*TAI-GLONASS time*] = 33 s + C_1, global uncertainty is of order hundreds ns.

The C_0 values are obtained using the values [*UTC-UTC*(*OP*)] and the GPS data taken at the Paris Observatory, corrected for IGS precise orbits, clocks and ionosphere maps. The C_1 values are obtained using the values [*UTC-UTC*(*AOS*)] and the GLONASS data taken at the Astrogeodynamical Observatory Borowiec (AOS). N_0 and N_1 are the numbers of measurements, when N_0 or N_1 is 0, the corresponding values of C_0 or C_1 are interpolated.
The standard deviations σ_0 and σ_1 characterize the dispersion of individual measurements. The actual uncertainty of user's access to GPS and GLONASS times may differ from these values.
For this circular, σ_0 = 2.1 ns, σ_1 = 14.3 ns

Date 2006 0h UTC	MJD	C_0/ns	N_0	C_1/ns	N_1
APR 29	53854	-14.1	47	-112.9	85
APR 30	53855	-14.6	45	-105.4	73
MAY 1	53856	-14.3	46	-94.0	83
MAY 2	53857	-16.0	46	-92.6	89
MAY 3	53858	-15.2	47	-94.1	89
MAY 4	53859	-14.6	46	-97.1	73
MAY 5	53860	-13.5	46	-94.7	75
MAY 6	53861	-13.4	46	-94.3	68
MAY 7	53862	-13.7	46	-98.0	71
MAY 8	53863	-17.2	45	-94.1	83
MAY 9	53864	-18.0	46	-91.5	73
MAY 10	53865	-16.7	46	-90.6	78
MAY 11	53866	-18.3	46	-99.6	87
MAY 12	53867	-18.5	46	-110.4	89
MAY 13	53868	-17.8	48	-96.1	90
MAY 14	53869	-17.7	47	-84.1	79
MAY 15	53870	-19.2	47	-84.4	83
MAY 16	53871	-18.6	46	-88.4	76
MAY 17	53872	-18.9	46	-83.0	75
MAY 18	53873	-21.3	46	-66.1	75
MAY 19	53874	-22.9	46	-57.9	68
MAY 20	53875	-21.4	46	-51.8	70
MAY 21	53876	-19.0	47	-38.4	90
MAY 22	53877	-17.1	47	-31.2	88
MAY 23	53878	-15.5	47	-28.9	81
MAY 24	53879	-14.2	46	-25.5	78
MAY 25	53880	-11.3	46	-28.1	73
MAY 26	53881	-9.9	45	-30.9	89
MAY 27	53882	-10.7	47	-25.6	84
MAY 28	53883	-11.6	47	-22.2	86
MAY 29	53884	-12.7	48	-18.1	74

6 - Time links used for the computation of TAI and their uncertainties.

The time links used in the elaboration of this *Circular T* are listed in this section. The technique for the link is indicated as follows: GPS SC for GPS common-view single-channel C/A data; GPS MC for GPS common-view multi-channel C/A data; GPS P3 for GPS common-view multi-channel dual-frequency P code data; GPS GT for 'GPS time' observations; INT LK for internal cable link and TWSTFT for two-way satellite time and frequency transfer data.

For each link, the following uncertainties are provided: u_A is the statistical uncertainty evaluated by taking into account the level of phase noise in the raw data, the interpolation interval between data points and the effects with typical duration between 5 and 30 days. u_B is the estimated uncertainty on the calibration.

The calibration type of the link is indicated as: GPS EC for GPS equipment calibration; TW EC for two-way equipment calibration; LC (technique) for a link calibrated using 'technique'; BC (technique) for a link calibrated using 'technique' to transfer a past equipment calibration through a discontinuity of link operation.

The calibration dates indicate: the most recent calibration results for the two laboratories in the case of EC and
the most recent calibration of the link in the case of LC and BC,
NA stands for not available, in this case estimated values are provided

Link	Type	u_A/ns	u_B/ns	Calibration Type	Calibration Dates
AOS /PTB	GPS MC	1.5	5.0	GPS EC /GPS EC	2003 Sep/2003 Aug
APL /USNO	GPS MC	1.5	5.0	GPS EC /GPS EC	2003 Dec/2003 Dec
AUS /NICT	GPS MC	3.0	5.0	GPS EC/GPS EC	2002 Sep/2003 Nov
BEV /PTB	GPS MC	1.5	5.0	GPS EC/GPS EC	2001 Dec/2003 Aug
BIRM/NICT	GPS MC	2.5	20.0	NA /GPS EC	NA /2003 Nov
CAO /PTB	GPS MC	1.5	7.0	GPS EC/GPS EC	2004 Nov/2003 Aug
CH /PTB	GPS P3	0.7	5.0	GPS EC/GPS EC	2004 Nov/2004 Aug
CNM /NIST	GPS SC	5.0	20.0	NA /GPS EC	NA /2003 Dec
CNMP/USNO	GPS MC	4.0	7.0	GPS EC/GPS EC	2002 Oct/2003 Dec
CSIR/PTB	GPS MC	3.0	20.0	NA /GPS EC	NA /2003 Aug
DLR /PTB	NA				
DTAG/PTB	GPS SC	3.0	10.0	GPS EC/GPS EC	1998 May/2003 Aug
HKO /NICT	GPS MC	3.0	5.0	GPS EC/GPS EC	2004 Apr/2003 Nov
IFAG/PTB	GPS P3	0.7	5.0	GPS EC/GPS EC	2003 Jun/2004 Aug
IGMA/USNO	NA				
INPL/PTB	GPS SC	4.0	10.0	GPS EC/GPS EC	1987 Jun/2003 Jun
IT /PTB	TWSTFT	0.5	1.5	BC (TWSTFT)	2005 May
JATC/NTSC	INT LK	0.2	20.0	NA	NA
JV /PTB	GPS GT	5.0	20.0	NA /GPS EC	NA /2003 Aug
KRIS/NICT	GPS P3	0.7	5.0	GPS EC/GPS EC	2005 Aug/2005 Jun

Link	Type	u_A/ns	u_B/ns	Calibration Type	Calibration Dates
LDS /PTB	GPS SC	3.0	20.0	NA /GPS EC	NA /2003 Aug
LT /PTB	GPS MC	1.5	5.0	GPS EC/GPS EC	2001 Nov/2003 Aug
MIKE/PTB	GPS MC	5.0	20.0	NA /GPS EC	NA /2003 Aug
MSL /NICT	GPS P3	2.0	20.0	NA /GPS EC	NA /2005 Jun
NAO /NICT	GPS SC	3.0	20.0	NA /GPS EC	NA /2003 Nov
NICT/PTB	GPS P3	1.5	5.0	GPS EC/GPS EC	2005 Jun/2004 Aug
NIM /NICT	GPS MC	3.0	20.0	NA /GPS EC	NA /2003 Nov
NIMB/PTB	GPS MC	2.5	20.0	NA /GPS EC	NA /2003 Aug
NIMT/NICT	GPS P3	1.0	20.0	NA /GPS EC	NA /2005 Jun
NIS /PTB	GPS MC	1.5	7.0	GPS EC/GPS EC	2005 May/2003 Aug
NIST/PTB	TWSTFT	0.5	5.0	BC(GPS P3)	2005 May
NMC /PTB	GPS SC	5.0	20.0	NA /GPS EC	NA /2003 Aug
NMIJ/NICT	GPS P3	0.7	5.0	GPS EC/GPS EC	2002 Apr/2005 Jun
NMLS/NICT	GPS MC	3.0	20.0	NA /GPS EC	NA /2003 Nov
NPL /PTB	TWSTFT	0.5	1.5	BC(GPS P3)	2005 May
NPLI/PTB	GPS MC	2.5	7.0	GPS EC/GPS EC	2005 Jul/2003 Aug
NRC /USNO	GPS SC	3.0	15.0	GPS EC/GPS EC	1982 /2003 Dec
NTSC/NICT	GPS MC	2.5	5.0	GPS EC/GPS EC	2002 Aug/2003 Oct
OMH /PTB	GPS SC	2.5	20.0	NA /GPS EC	NA /2003 Aug
ONBA/USNO	GPS MC	5.0	7.0	GPS EC/GPS EC	2000 Oct/2003 Dec
ONRJ/NIST	GPS SC	5.0	20.0	NA /GPS EC	NA /2003 Dec
OP /PTB	TWSTFT	0.5	1.5	BC(GPS P3)	2005 May
ORB /PTB	GPS P3	0.7	5.0	GPS EC/GPS EC	2003 Jul/2004 Aug
PL /PTB	GPS MC	1.5	5.0	GPS EC/GPS EC	2001 Oct/2003 Aug
ROA /PTB	TWSTFT	0.7	5.0	BC(GPS P3)	2005 May
SCL /NICT	GPS SC	4.0	10.0	GPS EC/GPS EC	1993 May/2003 Nov
SG /NICT	GPS MC	3.0	20.0	NA /GPS EC	NA /2003 Nov
SMU /PTB	GPS SC	5.0	20.0	NA /GPS EC	NA /2003 Aug
SP /PTB	GPS P3	0.7	10.0	LC(GPS SC)	2004 Nov
SU /PTB	GPS SC	3.0	5.0	GPS EC/GPS EC	2003 Apr/2003 Aug
TCC /USNO	GPS P3	2.0	20.0	NA /GPS EC	NA /2002 Dec
TL /NICT	GPS P3	0.7	5.0	GPS EC/GPS EC	2005 May/2005 Jun
TP /PTB	GPS SC	2.5	5.0	GPS EC/GPS EC	2001 Oct/2003 Aug
UME /PTB	GPS SC	15.0	20.0	NA /GPS EC	NA /2003 Aug
USNO/PTB	TWSTFT	0.5	1.1	BC(TW X-Band)	2005 May
VSL /PTB	TWSTFT	0.5	3.0	BC(GPS SC)	2005 May
ZMDM/PTB	GPS MC	2.5	7.0	GPS EC/GPS EC	2005 Mar/2003 Aug