3.5 Product Centres

3.5.1 Earth Orientation Centre

This section presents over the year 2017 the activities and main results of the Earth Orientation Centre located at Paris Observatory.

According to the IERS Terms of Reference, this component is responsible for monitoring Earth Orientation Parameters including long term consistency, publications for time dissemination (DUT1) and leap second announcements. Earth Rotation Parameters (ERPs), i.e. Pole coordinates (x,y), Difference UT1–UTC, Length of Day variation (LOD) and Celestial pole offsets (dX, dY), are available to a broad community of users in various domains such as astronomy, geodesy, geophysics, space sciences and time. ERPs are firstly collected in the form of combined solutions derived by the Technique Centres (IGS, IVS, ILRS and IDS). Two main solutions are computed: a long-term solution (IERS C01) since 1846 until the end of the previous year and the Bulletin B / C04 given at one-day intervals, which is published monthly with a 30 day delay (Gambis, 2004; Bizouard and Gambis, 2009; Gambis and Luzum, 2011, Bizouard et al, 2018).

14 C04 solution consistent with ITRF 2014

The 14 C04 solution consistent with ITRF 2014 became operational in March 2017. During the year 2017, it was finalized and tuned up (Bizouard et al, 2018). In July 2017, discussions during the Unified Analysis Workshop held at LAREG/IGN, lead us to create and maintain an alternative solution C04 at 12hUTC. This allows a direct comparison with pole coordinate and LOD solutions provided at midday by GNSS analysis centers. The UT1 solution had been spoilt by the removal of the UT1 intensive series. Outside the R1/R4 24 hour sessions, the interpolation procedure produced much larger errors than the one associated with the intensive UT1 values. Therefore UT1 intensive have been reintroduced in the C04 solution in April 2018. Changes or updates are reported in the public file ftp://hpiers.obspm.fr/iers/eop/eopc04/updateC04.txt.

Web site upgrade

Upgrates to the web site pertain especially to the tool for inter-comparing ERP series (http://hpiers.obspm.fr/eop-pc/index.php?index=operational&lang=en). Now, this tool allows to simultaneously compare as many series as the user wants to.

Table 1: Intra-techniques solutions: averaged time sampling and standard deviation with respect to the combined solutions Bulletin B / C04 over the year 2017. Solutions contributing to Bulletin B / C04 are flagged by stars (*).

Intra-technique solutions	Estimated uncertainties				
	Time sampling	Terrestrial Pole	UT1	LOD	Celestial Pole
VLBI - 24h					
EOP(AUS)	~ 4 d	274.5	19.5		129
EOP(BKG)	~ 2 d	104.5	8.3		98.5
EOP(GSFC)	~ 2 d	79	8.4		92
EOP(IAA)	~ 3 d	101.5	8.7		102
EOP(USNO)	~ 2 d	79	8.6		77.5
EOP(IVS Comb*)	~ 4 d	63.5	8.5		61.5
VLBI - Intensive					
EOP(BKG)	~ 1 d		9.4		
EOP(GSFC)	~ 1 d		27.3		
EOP(IAA*)	~ 1 d		11.5		
EOP(PUL)	~ 1 d		11.9		
EOP(USNO*)	~ 1 d		12.4		
SLR					
EOP(MCC)	~ 1 d	128.5		201	
EOP(IAA)	~ 1 d	212.5		27	
EOP(ASI)	~ 1 d	199		55	
EOP(ILRS Comb*)	~ 1 d	135.5		24	
GPS					
EOP(CODE)	~ 1 d	40		13	
EOP(JPL)	~ 1 d	43		18	
EOP(GFZ)	~ 1 d	41		16	
EOP(ESOC)	~ 1 d	40		13	
EOP(NOAA)	~ 1 d	46		12	
EOP(SIO)	~ 1 d	72		32	
EOP(EMR)	~ 1 d	53		13	
EOP(IAA)	~ 1 d	75		25	
EOP(GRGS)	~ 1 d	39		11	
EOP(CGS)	~ 1 d	400.5		61	
EOP(IGS-R Comb*)	~ 1 d	34.5		10	
EOP(IGS-F Comb*)	~ 1 d	34.5		9	
DORIS					
EOP(INASAN)	~ 1 d	365.5			
EOP(IDS Comb*)	~ 1 d	204.5			

Statistics

Statistics of 14 C04 for the year 2017 are provided in Table 1 (standard deviations of C04 – intra-techniques solutions), Table 2 (mean and standard deviations of C04 – intra-technique combined solutions) and 3 (mean and standard deviations of C04 – multi-technique combined solutions).

Table 2: Mean and standard deviations (STD) in microarcseconds of the differences between intra-techniques combined solutions entering the combination and Bulletin B / C04 over 2017.

EOP	IGS Comb - IERS 14C04		ILRS Comb - 14C04		IVS Comb - 14C04		IDS Comb - 14C04	
	Mean	Std	Mean	Std	Mean	Std	Mean	Std
x(µas)	26	35	141	131	53	78	118	211
y(µas)	-21	34	25	140	-25	80	2	198
UT1(µas)					-2.5	9.5		
LOD(µas)	-1	34	0	24				
dX(µas)					32	81		
dY(µas)					-18	42		

Table 3: Mean and standard deviations for Pole coordinates (x,y) and UT1 of the differences between combined solutions derived by both the Rapid Service/Prediction Center at USNO, the JPL and Bulletin B / C04 over 2017.

EOP	Unit	Bul A - Bul B		Comb JPL - Bul B	
		Mean	STD	Mean	STD
x	µas	21	56	25	65
y	µas	-11.6	16.8	1	48
UT1	µs	-11.6	16.8	-11.2	15.4

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