Dissemination of DUT1 through the use of Virtual Observatory

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What is a Virtual Observatory VO project?

- **Virtual observatory** (VO) is a collection of interoperating data archives and software tools which utilize the internet to form a scientific research environment in which astronomical research programs can be conducted.

- Same way as a real observatory consists of telescopes, each with a collection of unique astronomical instruments, the VO consists of a collection of data centres, each with unique collections of astronomical data, software systems and processing capabilities.

- The main goal is to allow transparent and distributed access to scientific data available worldwide (Votable standard file, XML format)

- Define services to access the data via Internet (ex Web service en soap, registry, Astrogrid for computation)

- Inter-operability of tools able to process these data (ex Topcat et Voplot for plots, Aladin celestial catalogs)

- This allows scientists to discover, access, analyze, and combine nature and lab data from heterogeneous data collections in a user-friendly manner.
Objectives

• To make solutions of geodetic products be comparable in an homogeneous way

• Develop webservice to directly interact within scientific analysis softwares

• Develop an efficient interface between different scientific communities linked to geodesy
  – Between geophysics and astronomy
  – ...

Decoupling Civil Timekeeping from earth Rotation, October 5-5, 2011
Specific VO Projects for IERS
Two approaches

1 – Execute program

Make available EOP and in particular DUT1 using web service (.exe in a different language launched from outside)

Operational, however results not in XML format and the results only contains a single data line
Decoupling Civil Timekeeping from earth

Rotation, October 5-5, 2011

WEB SERVICE

By executing the following programmes on your computer, obtain data from hpier server.

The Windows programmes only work in the command line mode (with the msdos windows).

1- Earth orientation parameters from civil date (combined series C04) - click here for description

Address of the webservice server: http://hpiers.obspm.fr/eop-pc/webservice/server_EOP2.php


Inputs: date (YYYY MM DD)

Outputs: MJD x y UT1-UTC L0D dx dy dE r UT1-UTC Enr Lod Enr d1 Enr d1Enr

Executable for Windows: DOWNLOAD

Executable for Linux: DOWNLOAD

2- Earth Orientation Matrix at a given instant - see also

Address of the webservice server: http://hpiers.obspm.fr/eop-pc/webservice/server_MATRICE_EOP.php

Example of a php client calling this webservice: http://hpiers.obspm.fr/eop-pc/webservice/files/client_MATRICE_EOP.php


Inputs: year month day hour minute seconds polar motion nutation diurnal/semi-diurnal tides,

(YYYY) (MM) (DD) (h-23) (0-59) (0-59) (0 or 1) (0 or 1) (0 or 1)
Decoupling Civil Timekeeping from earth Rotation, October 5-5, 2011

C04.exe 2006 08 12

C04 parameters – 2006, August 12

MJD (Modified Julian Date): 53959

x (arcsecond): 0.106045

y (arcsecond): 0.260583

UT1-UTC (second): 0.1784529

UTC-TAI (second): -33

LOD (second): 0.0011146

dPsi (arcsecond): 0.000000

dEpsilon (arcsecond): 0.000000
2 - Principles of the OV tool

- Requirements:
- The tool extracts and shows:
  - Times series of geodetic products:
    - EOP
    - Stations positions
    - Transformation parameters
  - Over a period chosen by the user
  - Output: ASCII or VO-Table
- The tool has to:
  - Be easy to use
  - Be compatible with: Internet Explorer, Firefox…
  - Be made up of independant sub-programs,
  - Be secuirised
  - Give results quickly
The VO-concept

• Use of data where they are stocked: VO-Table format (XML)
  – To facilitate links between communities
  – Data need not to be duplicated

• Web services
  – Compatibility between external softwares ensured by VO-Table format
  – Existing tools: top cat, VO-Plot
Format VO-Table

- Format VOTable is structured
- It uses standard XML and is independent from the computer system
- The analyses are made easier
VO approach

- automatic retrieval of the EOP C04 file “c04.62-now” and conversion into VO(XML) format
- accessible via FTP
- The file contain the full data set
- Compatible with VO software packages
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### Description of the original C04 ASCII

#### INTERNATIONAL EARTH ROTATION AND REFERENCE SYSTEMS SERVICE
**Earth Orientation Parameters**
**EOP (ZERO) C04**

**FORMAT:** (0(4),17,2(8L6.2),2(8L7.2),2(8L6.2),2(8L7.2),2(8L6.2))

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Decoupling Civil Timekeeping from earth
**Rotation, October 5-5, 2011**
Format VO – XML (eopc04.year.XML)

Decoupling Civil Timekeeping from Earth Rotation, October 5-5, 2011
- Compatibility of file C04 VO (XML) with other tools like:
  - TOPCAT
  - VOPLOT
  - ALADIN
Decoupling Civil Timekeeping from earth
Rotation, October 5-5, 2011

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Tools
Decoupling Civil Timekeeping from Earth Rotation, October 5-5, 2011
Conclusion

Work still in progress on
Development of ad hoc web service
Interoperability concepts