

Earth Rotation Information System (ERIS)

Testbed for Enhanced Interactive Geodetic Data and Information Presentation

Introduction

The aim of ERIS, as part of the research unit “Earth rotation and Global Dynamic Processes (FOR 584)”, is to describe the rotation of the “System Earth” taking into account the influence of the various sub-systems of Earth, e.g. ocean, atmosphere, etc.

Up to now ERIS provides:

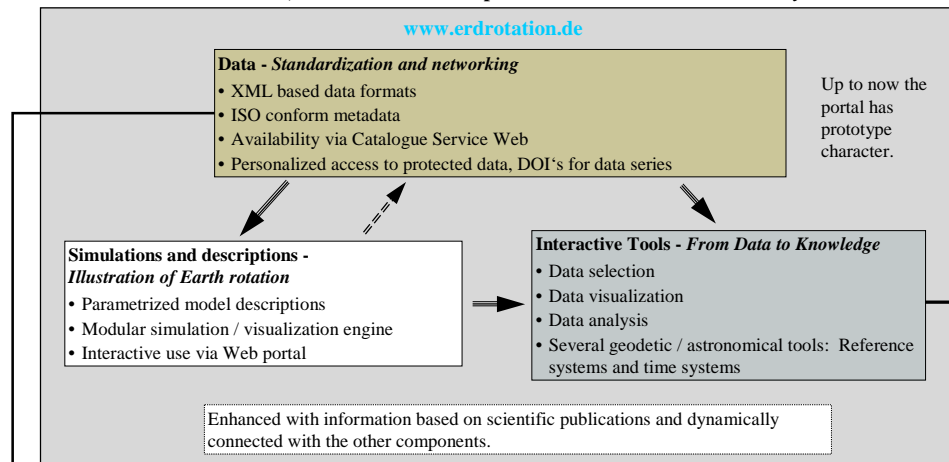
- **Observational and analytical data:** structured access to all relevant and available data produced by several institutions and organisations
- **Methodological information and interactive tools:** Interactive analysis and visualization of data allowing to execute typical and frequently needed operations on the available datasets

ERIS follows a holistic approach to describe the Earth rotation by aggregating datasets and models coming from various fields of geosciences in heterogeneous formats. ERIS will provide standardization of data and metadata and connect them with (at least) standardized description of models. This will enable the application of interoperable tools for enhanced network based data access, data visualization and data analyses, etc.

To realize this ambitious approach the main tasks of ERIS are:

- Data - Standardization and networking
- Interactive Tools - From Data to Knowledge
- Simulations and descriptions - Illustration of Earth rotation

The main modules of ERIS, included in the Web portal *Earth Rotation and Global Dynamic Processes*



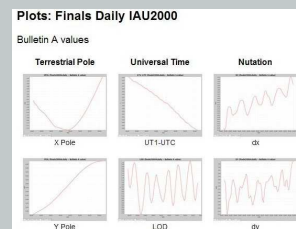
Data preparation

- Transformation of data series (EOP, AAM, OAM etc.) into standardized data formats based on XML
- Generation of several output formats like PDF or HTML from XML versions (realized by applying the XML technology XSLT)
- Generation of metadata for scientific data, using schema-validated XML, too
- Development of interfaces for data networking
- The most important EOP series are actually presented - available for download in different file formats and completed by links to metadata files.

- Geodetic and astronomic tools (SOFA)

- Data visualization

- Generation of data plots of all versions of the data series presented
- For each series a compendium of plots of all parameters is presented
- Single plots for each parameter are accessible



- Specialized data reader

- Extraction of a single day from EOP data series by entering date as Gregorian date or as MJD
- Access to data series of the IERS data archive (Bulletin A and B, Finals Daily, Finals Data, Finals All, C04)

EOP Reader

This reader presents the EOP-Parameters of a given day.
You can choose among most of the series available in the IERS:

- Bulletin A - Finalo Daily (IAU 1980)
- Bulletin B - Finalo Daily (IAU 2000)
- C04 yearly (IAU 1980) - Finalo Data (IAU 1980)
- C04 yearly (IAU 2000) - Finalo Data (IAU 2000)
- C04 all (IAU 1980) - Finalo All (IAU 1980)
- C04 all (IAU 2000) - Finalo All (IAU 2000)
- C04 G5

From the short time series only the current version is available.
If you need the values of a date far in the past choose a long time series.

Type in a date (year, month, day) Or a MJD:

Select an EOP-Series: Bulletin A Submit Reset

Result

EOP Reader

EOP-Data taken from C04 G5:
Date : 1.12008
MJD : 54466

X Pole	[arcsec]	-0.000518	err X Pole	[arcsec]	0.000012
Y Pole	[arcsec]	0.258431	err Y Pole	[arcsec]	0.000015
UT1-UTC	[sec]	-0.273585	err UT1-UTC	[sec]	0.0000474
LOD	[msec]	0.0019341	err LOD	[msec]	0.00000119
rotation dx	[arcsec]	-0.000433	err rotation dx	[arcsec]	0.000062
rotation dy	[arcsec]	0.000823	err dy	[arcsec]	0.00127

Back to input form

- **Interactive data analysis tool** (screenshot showing a preliminary design)

Application flow via three main steps, accessible via tabs:

Data – load data files

Procedure – run analysis operations

Output – results as data and visualizations

Data **Procedure** **Output**

Basic Statistics
Fast Fourier Transformation

Procedures that will be incorporated (in progress):

- Basic statistics (mean, maximum, median, etc.)
- Polynomial, sinus and spline approximations
- FIR filters (high-pass/low-pass/band-pass, Moving-average, derivation)
- Up / down sampling and shifting of the time axis
- FFT, short-time FFT and power spectrum
- Correlation and autocorrelation
- Time / frequency analysis with wavelets

Choices

EOPC0405CSV - Mo Jan 01 00:00:00 CET 1962 - Do Jun 19 00:00:00 CEST 20

- Date
- MJD
- Nutation/ide
- Nutation/dip
- Nutation/orid
- Nutation/orip
- Pole/x
- Pole/y
- Pole/ax
- Pole/ay
- UT1/ILOD
- UT1/UTC
- UT1/eLOD
- UT1/eUTC
- Pole/x - Basic Statistics

Median: 0.02516050000000000002

Mean: 0.026337914329483934

Std. Deviation: 0.132152221714752

Min.: -0.30619

Max.: 0.32442

Run

Status:

Future Work:

- Extended plot tool:
Interactive user interface to configure plots on demand and generate them on the fly

- Extended EOP reader:
Extraction of time sections and parameters and export of the resulting data in different file formats
- Models and simulations:
Simulation and visualisation of basic models of Earth rotation
Comparison of simulated data with observational data