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EPSG Geodetic Parameter Dataset

Version 7.6 – 2nd November 2010

Readme file (updated 10th November 2010)

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The EPSG Geodetic Parameter Dataset, or EPSG dataset, is maintained by the Geodesy Subcommittee of the Surveying and Positioning Committee of the International Association of Oil and Gas Producers (OGP).

Version 7.6 of the EPSG Geodetic Parameter Dataset comprises of data corrections and updates to the v7.5 release of March 2010. Version 7.6 includes new data as well as consolidating data released only in the registry as interim versions 7.5.1 through 7.5.9 between May and September 2010.

Contents of this document

Use of the Data

The user assumes the entire risk as to the accuracy and the use of this data. The data may be used, copied and distributed subject to the following conditions:

1. INFORMATION PROVIDED IN THIS DOCUMENT IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE.

2. The data may be included in any commercial package provided that any commerciality is based on value added by the provider and not on a value ascribed to the EPSG dataset which is made available at no charge. The ownership of the EPSG dataset [OGP] must be acknowledged.

3. Subsets of information may be extracted from the dataset. Users are advised that coordinate reference system and coordinate transformation descriptions are incomplete unless all elements detailed as essential in OGP Surveying and Positioning Guidance Note 7-1 annex F are included.

4. Essential elements should preferably be reproduced as described in the dataset. Modification of parameter values is permitted as described in the table below to allow change to the content of the information provided that numeric equivalence is achieved. Numeric equivalence refers to the results of geodetic calculations in which the parameters are used, for example (i) conversion of ellipsoid defining parameters, or (ii) conversion of parameters between one and two standard parallel projection methods, or (iii) conversion of parameters between 7-parameter geocentric transformation methods.

	As given in EPSG dataset	Permitted change for vendors / users to adopt
Change of ellipsoid defining parameters.		
4.1a	Ellipsoid parameters a and b.	a and $1/f$; a and f; a and e; a and e^2.
4.1b	Ellipsoid parameters a and $1/f$.	a and b; a and f; a and e; a and e^2.
Change of projection method		
4.2a	Lambert Conic Conformal (1 SP) method with projection parameters φ_O and k_O.	Lambert Conic Conformal (2 SP) method with projection parameters φ_1 and φ_2.
4.2b	Lambert Conic Conformal (2 SP) method with projection parameters φ_1 and φ_2.	Lambert Conic Conformal (1 SP) method with projection parameters φ_O and k_O.
4.3a	Mercator (variant A) method with projection parameters φ_O and k_O.	Mercator (variant B) method with projection parameter φ_1.
4.3b	Mercator (variant B) method with projection parameter φ_1.	Mercator (variant A) method with projection parameters φ_O and k_O.
4.4a	Hotine Oblique Mercator (variant A) method with projection parameters FE and FN.	Hotine Oblique Mercator (variant B) method with projection parameters E_C and N_C.
4.4b	Hotine Oblique Mercator (variant B) method with projection parameters E_C and N_C.	Hotine Oblique Mercator (variant A) method with projection parameters FE and FN.
4.5a	Polar Stereographic (Variant A) method with projection parameters φ_O and k_O.	Polar Stereographic (Variant B) method with projection parameter φ_F.
4.5b	Polar Stereographic (Variant B) method with projection parameter φ_F.	Polar Stereographic (Variant A) method with projection parameters φ_O and k_O.
4.5c	Polar Stereographic (Variant A) method with projection parameters φ_O, k_O, FE and FN.	Polar Stereographic (Variant C) method with projection parameters φ_F, E_F and N_F.
4.5d	Polar Stereographic (Variant C) method with projection parameters φ_F, E_F and N_F.	Polar Stereographic (Variant A) method with projection parameters φ_O, k_O, FE and FN.

4.5e	Polar Stereographic (Variant B) method with projection parameter FE and FN.	Polar Stereographic (Variant C) method with projection parameters E_F and N_F.
4.5f	Polar Stereographic (Variant C) method with projection parameters E_F and N_F.	Polar Stereographic (Variant B) method with projection parameter FE and FN.
Change of transformation method		
4.6a	Position Vector 7-parameter transformation method parameters R_x R_Y and R_Z.	Coordinate Frame transformation method with signs of position vector parameters R_X R_Y and R_Z reversed.
4.6b	Coordinate Frame transformation method parameters R_x R_Y and R_Z.	Position Vector 7-parameter transformation method with signs of coordinate frame parameters R_X R_Y and R_Z reversed.
4.7	Concatenated transformation using geocentric methods (Geocentric translations, Position Vector 7-parameter transformation, Coordinate Frame rotation).	Equivalent single geocentric transformation in which for each parameter the parameter values of the component steps have been summed.
Change of units		
4.8	NTv2 method grid file filename.	NTv2 method grid file relative storage path with file name including removal (if necessary) of "special characters" [spaces, parentheses, etc] which are replaced by underscore characters.
4.9	Parameter value.	Convert unit to another, for example from microradian to arc-second, *using conversion factors obtained from the EPSG dataset Unit table*.

5. No data that has been modified other than as permitted in these terms and conditions shall be described as or attributed to the EPSG dataset.

<u>Criteria for inclusion of data</u>

Criteria used for material in the dataset include:

- information must be in the public domain: "private" data not released and available to the general public is not included.

- data must be in current use by a significant number of users. This definition has been broadened to include data generated by a single user but regularly referenced by a significant number of others, including contractors and subcontractors.

- parameters are given to the precision consistent with the original publication documents. The EPSG Geodetic Parameter Dataset aims for derived coordinates to be to a precision of one centimetre or better.

New to version 7.6

- Changes as documented in Change Records through 2010.094, but with actions still remaining on some change requests.

- New data for Bhutan, Brunei, Czech Republic, Faroe Islands, Finland, Germany, Italy, South Korea, Spain, Sri Lanka, Turkey, Vietnam, former Yugoslavia.

- Significant revisions to data for Norway.

- Minor revisions to data for Bahamas, Bolivia, Brunei, Cote d'Ivoire, Germany, Guyana, Jordan, Mexico, United Kingdom, United States.

- Changes to the names of the variants of the Mercator and Oblique Mercator projection methods.

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Known limitations and/or problems in version 7.6

Known limits and problem areas within this version of the MS Access database data maintenance functions are:

- Deletion of any record with an alias does not remove the associated alias records from the alias table. In MS Access terms, there is an inability to "Enforce Referential Integrity" on links from ALIAS tables to other tables. Thus removal of aliases must be done before removal of the primary record to which they apply, or they will remain as unused residuals in the Alias table. We have added a warning to all Edit/Add forms to warn users of this problem.

- Likewise, there is an inability to force deletion of Coordinate_Operation Parameters when a Coordinate_Operation Method is deleted. Any coordinate operation parameters (e.g., geodetic transformation parameters) that are used only in the deleted Coordinate_Operation Method will remain as unused residuals in the Coordinate_Operation Parameter table unless removed prior to deletion of the Coordinate_Operation Method. *[Caution here: One should be __extremely__ cautious in deleting Coordinate_Operation Parameter (Geodetic Transformation Parameters or Map Projection Parameters) as these are often used in various different Coordinate_Operation Methods.*]

- Similarly, if you delete a single Geodetic Transformation, any dependent Concatenated Operations (Concatenated Transformations) remain in the database (but clearly show that something is wrong with the now missing step.)

- Problems with unzipping the zipped files:

  (i) The archive files are zipped using WinZIP. If the default decompressor on your computer is WinRAR instead of WinZip, then you may have to manually change the name of the database from "epsg-v7_6" to "epsg-v7_6.zip" in order to subsequently unzip it to an mdb. Or you could right click the "I agree" link on the web page instead of left click, and then to "save target as", and then it will save as a .zip.

(ii) If you use Internet Explorer and are told that the downloaded ZIP file is corrupt, please follow the instructions at http://kb.winzip.com/kb/entry/150 to change your internet settings to disable HTTP 1.1 and delete temporary internet files, then download the file again.

Data Availability

This dataset is available online through the OGP Geodetic Registry service. The registry supports anonymous (guest) access through which users may query and view the data and generate printable reports. It also permits the user to register for additional services, such as the export of the entire EPSG data set as GML 3.2 dictionaries. Additionally the OGP Geodetic Registry supports access through an API, permitting geospatial software to query and retrieve geodetic parameters without human intervention. Details are described in Guidance Note 7 part 3

It is additionally available for downloading at no charge as an MS Access database or as SQL scripts for loading to another relational database from the EPSG geodetic parameter dataset internet web site at http://www.epsg.org.

Additional information, including detailed Guidance Notes relating to the use of the information in this geodetic parameter dataset is available via the same web site. In particular, Guidance Note 7 part 2 may be useful as it provides formulae and test points for all conversions and transformation methods used in the EPSG dataset.

The parameter listings are "living documents" and will be updated from time to time, usually following meetings in April and October. Comments or suggestions for improvements may be submitted at any time.

The master dataset is available only at this site. Users are discouraged from making the data available on alternate sites, but instead are encouraged to provide hot links to the EPSG site. This will reduce or eliminate the potential problem of users accessing versions of the data that have been superseded.

Previous versions of the Access database released since February 2002 are available as superseded archived databases. These older databases are not recommended for current use, but are available to users should they need to check data in a prior release, etc.

To be on an electronic mailing list to receive notification of EPSG dataset updates at no charge, select the subscribe option on the web site. This same form may be used to send information about possible errors in the database or to request that new data be added to the EPSG dataset.

Shipping List

In addition to the online registry, this release of the dataset consists of the following.

- a downloadable file *epsg-v7_6.zip* containing:

  - One MS Access 2000 database file (*EPSG_v7_6.mdb*) which includes 21 related *tables*, 19 *queries* which provide necessary controls and inputs for the various reports and forms, 55 *reports* (29 on valid data plus 26 to review deprecated

records) in which data is displayed in formats suitable for browsing, printing or export and 31 *forms* through which the data may be browsed or edited (4 welcome/navigation forms, 12 browse forms and 15 edit/add forms). Numerous subreports and subforms provide integral components and help for the various reports and forms. The database also contains a number of queries entitled qry_epsg_gn7_1_* that are used for extracting data from the database using SQL queries. These are described in GN7-4 annex E. They do not impact other reports or forms. There are also three macros that are provided for form navigation.

- A README file in MS Word 97-2000 (this file), *epsg-v7_6_Readme.doc* and in Adobe Acrobat pdf format, *epsg_v7_6_Readme.pdf*).

- three downloadable files *epsg-v7_6sql-mySQL.zip*, *epsg-v7_6sql-Oracle.zip* and *epsg-v7_6sql-PostgreSQL.zip* for mySQL, Oracle and PostgreSQL respectively, each containing:

  - A Data Description Language (DDL) file which contains the SQL CREATE statements necessary to create a database equivalent to the Access on an SQL server.

  - A Data Manipulation Language (DML) file which contains the SQL INSERT statements necessary to populate a database created using the DDL file with the current contents of the dataset.

  - A second DDL file which contains the SQL ALTER statements necessary to enforce Foreign Key Constraints on the tables.

  - A README file in MS Word 97-2000 & 6/95 - RTF (this file, *epsg-v7_6_Readme.doc* and in Adobe Acrobat pdf format, *epsg-v7_6_Readme.pdf*).

If you have problems opening the zip file or its contents, see Known Limitations and Problems above.

Data Structure

See Guidance Note 7 part 1 – *Using the EPSG Geodetic Parameter Dataset* – for a general description, Guidance Note 7 part 3 – *Registry Developer's Guide* – for a specific description of the registry implementation, and Guidance Note 7 part 4 – *Database Developer's Guide* – for a specific description of the Access and SQL relational implementation.

EPSG Codes

The OGP Geodesy Subcommittee has reserved the integer range 0 to 32767 for use as codes. As of dataset version 6.3, the integer range from 60,000,000 to 69,999,999 was also reserved for codes for geographic CRSs in explicitly described degree representations, but this is no longer supported. To prevent conflict with future additions to the EPSG dataset, users who wish to augment the data with their own information should utilise codes greater than 32768 and outside the 60 million number range indicated.

If users wish to supplement the change table with their own entries, it is important that the user's change notice IDs be above the EPSG integer code limit of 32,767.0. Such an entry in the change table is required for users to deprecate any erroneous user data.

EPSG codes are unique within any particular entity type, but the same value may be used for different entity types (for example CRS and Area). Codes are not reused. See Guidance Note 7 part 1 for further information on coding, deprecation and naming policies.

Future Developments

In the longer term it is intended to describe area of use polygons using GML in accordance with ISO 19136.

An interactive GIS front-end has been requested and remains under consideration, subject to availability of resources.

OGP Geodesy Subcommittee

(Send any comments or queries to the entire group by submitting the comment form at www.epsg.org).

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