

# ISO Geodetic Registry

|                           |   |   |
|---------------------------|---|---|
| <i>Item class</i>         | Transformation                            |   |
| <i>Name</i>               | <b>NAD 83 (HARN) to NAD 83 (FBN) [v1]</b> |   |
| <i>Item status</i>        | VALID                                     |   |
| <i>Identifier</i>         | 714                                       |   |
| <i>Information source</i> | <i>Title</i>                              | Notice to Adopt Standard Method for Horizontal Datum Transformation   |
|                           | <i>Author</i>                             | US Government   |
|                           | <i>Publisher</i>                          | Office of Federal Register, NARA  |
|                           | <i>Publication date</i>                   | 1990-08-10  |
|                           | <i>Edition date</i>                       | 1990-08-10  |
|                           | <i>Series/Journal name</i>                | Federal Register Notice   |
|                           | <i>Issue identification</i>               | Volume 55, No. 155, Document: 00-18809  |
|                           | <i>Page</i>                               | 32681.0   |
|                           | <i>Other citation details</i>             | Mandates use of NADCON for official transformations between datums  |
|                           | <i>Title</i>                              | NADCON 5.0: Geometric Transformation Tool for points in the National Spatial Reference System                               |
| <i>Information source</i> | <i>Author</i>                             | D. Smith, A. Bilich   |
|                           | <i>Publisher</i>                          | NOAA's National Geodetic Survey   |
|                           | <i>Publication date</i>                   | 2017-03-27  |
|                           | <i>Edition date</i>                       | 2017-03-27  |
|                           | <i>Series/Journal name</i>                | NGS Technical Report  |
|                           | <i>Other citation details</i>             | Replaces version 4.2 and all earlier. Provides gridding algorithm, datum transformations, and extents of covnversion grids. |
|                           | <i>Title</i>                              |   |
| <i>Data source</i>        | ISO Geodetic Registry                     |   |
| <i>Remarks</i>            | Grid Transformation                       |   |
| <i>Operation version</i>  | V1  |   |
| <i>Scope</i>              | Spatial referencing                       |   |
| <i>Operation accuracy</i> | 0.05 m                                    |   |
| <i>Source CRS</i>         | NAD 83 (HARN) - LatLonEht                 |   |
| <i>Target CRS</i>         | NAD 83 (FBN) - LatLonEht                  |   |
| <i>Operation method</i>   | NADCON 5 (3D)                             |   |

## Extent

|                    |   |
|--------------------|---|
| <i>Description</i> | <b>United States (USA) - onshore and offshore - CONUS (Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, Wyoming).</b> |
|--------------------|---|

|                                |                             |        |
|--------------------------------|-----------------------------|--------|
| <i>Geographic Bounding Box</i> | <i>West-bound longitude</i> | -135.0 |
|                                | <i>North-bound latitude</i> | 50.0   |
|                                | <i>East-bound longitude</i> | -66.0  |
|                                | <i>South-bound latitude</i> | 24.0   |

#### Operation parameter values

|                                  |   |
|----------------------------------|---|
| <i>Latitude difference file</i>  | nadcon5.nad83_harn.nad83_fbn.conus.lat.trn.20160901.b |
| <i>Longitude difference file</i> | nadcon5.nad83_harn.nad83_fbn.conus.lon.trn.20160901.b |
| <i>Height difference file</i>    | nadcon5.nad83_harn.nad83_fbn.conus.eht.trn.20160901.b |

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|                    |   |
|--------------------|---|
| <i>Item class</i>  | OperationMethod   |
| <i>Name</i>        | <b>NADCON 5 (3D)</b>  |
| <i>Item status</i> | VALID   |
| <i>Identifier</i>  | 87  |
| <i>Alias</i>       | NADCON  |
| <i>Alias</i>       | NADCON 5  |
| <i>Data source</i> | ISO Geodetic Registry   |
| <i>Remarks</i>     | <p>The latitude, longitude and height offsets at a point are derived by interpolation within the gridded data. Separate grid files are given for latitude, longitude and height offsets. The grid file format is given in documentation available from the information source. Biquadratic interpolation is used to derive the offset values. For the forward calculation the interpolated value of the offset is then added to the source CRS coordinate value to give the coordinates in the target CRS. Transformations between NAD83(HARN) and all subsequent realizations of NAD83 are expressed in 3D with latitude, longitude and height offsets. This operational method is designed to use all three operational parameters. Previous realizations of NAD83 were only 2D and use a different operational method. NADCON includes all versions from 1 through 5 (released in 2017). While the first and the last used slightly different grids and interpolation methods, the differences are deemed to be within the errors of the methods and considered equivalent. Hence users of NADCON 2.1 should generate equivalent results for transformations using NADCON 5.0. Note that this operational method is for 3D transformation. Another method uses only a 2D transformation (latitude and longitude only). Reversibility: Iteration is required for the reverse transformation. The coordinate reference system for the coordinates of the grid nodes is the source coordinate reference system for the forward transformation. Then in forward transformations the offset is obtained through straightforward interpolation of the grid file. But for the reverse transformation the first grid interpolation entry will be the value of the point in the second coordinate reference system, the offsets are interpolated and applied with sign reversed, and the result used in further iterations of interpolation and application of offset until the difference between results from successive iterations is insignificant.</p> |

## Operation parameters

|                                  |
|----------------------------------|
| <i>Latitude difference file</i>  |
| <i>Longitude difference file</i> |
| <i>Height difference file</i>    |