# ISO Geodetic Registry

Item class Transformation

NAD 83 (HARN) to NAD 83 (FBN) [v1]

Item statusVALIDIdentifier714

Information source Title Notice to Adopt Standard Method for Horizontal

**Datum Transformation** 

Author US Government

Publisher Office of Federal Register, NARA

Publication date 1990-08-10 Edition date 1990-08-10

Series/Journal name Federal Register Notice

Issue identification Volume 55, No. 155, Document: 00-18809

Page 32681.0

Other citation details Mandates use of NADCON for official

transformations between datums

Information source Title NADCON 5.0: Geometric Transformation Tool for

points in the National Spatial Reference System

Author D. Smith, A. Bilich

Publisher NOAA's National Geodetic Survey

Publication date 2017-03-27 Edition date 2017-03-27

Series/Journal name NGS Technical Report

Other citation details Replaces version 4.2 and all earlier. Provides

gridding algorithm, datum transformations, and

extents of covnversion grids.

Data source ISO Geodetic Registry
Remarks Grid Transformation

Operation version V1

Scope Spatial referencing

Operation accuracy 0.05 m

Source CRS NAD 83 (HARN) - LatLonEHt
Target CRS NAD 83 (FBN) - LatLonEHt

Operation method NADCON 5 (3D)

#### Extent

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).

Geographic Bounding Box	West-bound longitude	-135.0	
	North-bound latitude	50.0	
	East-bound longitude	-66.0	
	South-bound latitude	24.0	

## Operation parameter values

Latitude difference file	nadcon5.nad83_harn.nad83_fbn.conus.lat.trn.2016	0901.b
Longitude difference file	nadcon5.nad83_harn.nad83_fbn.conus.lon.trn.2016	0901.b
Height difference file	nadcon5.nad83_harn.nad83_fbn.conus.eht.trn.2016	30901.b

# ISO Geodetic Registry

Item class OperationMethod

Name NADCON 5 (3D)

Item status VALID
Identifier 87

Alias NADCON
Alias NADCON 5

Data source ISO Geodetic Registry

Remarks The latitude, longitude and height offs

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. Biguadratic 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.

### Operation parameters

Latitude difference file Longitude difference file Height difference file