

Transforming Coordinates in Alberta

Land Surveys Unit, Geodetic Control

Introduction

In order to facilitate user needs working with coordinate data referenced to different reference frames, Geodetic Control has developed transformation grids to allow users to accurately transform 2-dimensional coordinate data from one reference frame to another. This fact sheet reviews the two primary transformation grids available, their format, and where to obtain them.

ABCSRSV7.DAC

The Alberta Canadian Spatial Reference System Version 7.0 (ABCSRSV7.DAC) is the direct access grid transformation file to go from NAD83(Original) to NAD83(CSRS)v7 Epoch 2010 and vice versa. This grid covers the geographical area of 48° 55' to 61° 05' north latitude and 109° 55' to 120° 05' west longitude. This grid is available from the Government of Alberta (GOA) open data portal at <https://open.alberta.ca/opendata/national-transformation-analysis-data-tables-1-to-12>.

NTV2_0.DAC

The National Transformation Version 2 (NTV2_0.DAC) is the direct access grid transformation file to go from NAD27 to NAD83(Original) and vice versa. This grid covers from 48° to 61° north latitude and 109° to 122° west longitude. This grid is available from the Government of Alberta (GOA) open data portal at <https://open.alberta.ca/opendata/national-transformation-analysis-data-tables-1-to-12>.

Transformation grid modelling, accuracy, evaluation and development

All transformation grids available from Geodetic Control are based on modelling the coordinate (i.e., Latitude and Longitude) differences for the same point referenced to two different reference frames. The accuracy of the modelling is dependent upon the quality of the integrated coordinate values of the

point in each of the reference frames as well as the density of the control markers used to develop the grid. Thus, areas with a dense network of Alberta Survey Control Markers (ASCMS) typically have a more accurate transformation from one reference frame to the other. Further information regarding evaluation of the transformation grids is available from the GOA open data portal at <http://open.alberta.ca/publications/transformation-grids-in-alberta-march-2021.pdf>. Of note, the details on how the grids were developed is outlined in the *NTv2 National Transformation Version 2 Developer's Guide* by D.R Junkins S.A. Farley Geodetic Survey Division Geomatics Canada September 1995. Please contact Geodetic Control if you wish to have a copy of this guide.

Grid Density

In Alberta, the grid(s) themselves have a density of 30 arc-seconds by 30 arc-seconds in urban cadastral areas while everywhere else the grid density is 5 arc-minutes by 5 arc-minutes. See Fact Sheet No.10 for further information on which municipalities in Alberta are considered to be urban cadastral areas for transformation grid purposes.

Old Transformation Grids

The Geodetic Control has produced two previous transformation grids with respect to NAD83(CSRS) and NAD83(Original), AB_CSRS.DAC and ABCSRSV4.DAC. Both grids are based on previous NAD83(CSRS) provincial readjustments of the Alberta Survey Control network and were published in 2000 and 2005, respectively. In addition, both have the same geographic coverage of Alberta as ABCSRSV7.DAC. Having said this, neither grid is consistent with the most current implementation of NAD83(CSRS) in Alberta (See Fact Sheets No.1 and No.3 for further information). If users require either the AB_CSRS.DAC and/or the ABCSRSV4.DAC transformation grid, please contact Geodetic Control directly.

Programs that use Alberta transformation grids

There are a number of programs available to transform coordinate data using the above noted transformation grids. These include commercial off-the-shelf programs such as ESRI ArcGIS and Blue Marble Geographics GIS software. In addition, users requiring a standalone solution can download the National Transformation Version 2 software package for free from the Canadian Geodetic Survey (NRCAN) at <https://www.nrcan.gc.ca/maps-tools-publications/tools/geodetic-reference-systems-tools/tools-applications/10925#ntv2>.

Need more information?

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