

**GEOLOGICAL SURVEY OF CANADA**

**OPEN FILE xxxx**

**FixSEGYRecordLength – A fixed record length SEGY file utility**

**R. C. Courtney**

**2016**

****

**GEOLOGICAL SURVEY OF CANADA**

**OPEN FILE xxx**

**FixSEGYRecordLength – A fixed record length SEGY file utility**

**R. C. Courtney**

**2016**

©Her Majesty the Queen in Right of Canada 2016

Available from

Geological Survey of Canada

601 Booth Street

Ottawa, Ontario K1A 0E8

**R. C. Courtney**

**2016:** FixSEGYRecordLength – A fixed record length SEGY file utility,Geological Survey of Canada, Open File xxxx.

Open files are products that have not gone through the GSC formal publication process.

Contents

[Abstract 4](#_Toc449514451)

[Introduction 5](#_Toc449514452)

[Installation 5](#_Toc449514453)

[Use 6](#_Toc449514454)

[Launch Program 6](#_Toc449514455)

[Read SEGY 6](#_Toc449514456)

[Scan SEGY 7](#_Toc449514457)

[Fix Trace Length 8](#_Toc449514458)

[Appendix 1 – Ellipsoid Definitions 10](#_Toc449514459)

[Appendix 2 –Geocentric Datum Corrections 11](#_Toc449514460)

FixSEGYRecordLength – A fixed record length SEGY file utility

# Abstract

FixSEGYRecordLength is a Windows 7 utility that can be used to resize record lengths in a variable record length input SEGY file to produce an output SEGY file with a fixed record length. The utility also has the option of transforming coordinates stored in the SEGY trace headers to UTM coordinates and changing the earth datum. This utility can be used to precondition seismic data downloaded from NRCan seismic inventory for subsequent use in industry standard seismic mapping packages such as Kingdom Suite (www.ihs.com).

Keywords: seismic data, SEGY,Kingdom Suite, Windows 7, Windows 10

# Introduction

The GSC has been collecting digital seismic data since the early 1990’s and has used and continues to use SEGY (Norris and Faichney, 2002) as its primary format for storing its digital seismic, sounder and sidescan data.

Most of the positional data stored in the traces headers of these holdings are recorded as latitude and longitude positions. In addition, the trace record lengths may vary within a file as the recording window or sampling rate changes. This effect is most commonly encountered in Knudsen echosounder data that was transcribed from the Knudsen binary format (KEB). Many industry seismic mapping packages accept SEGY only with a fixed SEGY record length and with UTM positional coordinates.

FixSEGYRecordLength was written to address this issue. This routine will scan a sequence of SEG-Y files and create and trace length -zero-padded version of each file with a fixed record length. It can also be used to transform the geographic datum on latitude/longitude pairs in the trace header to WGS84. In addition, the routine can project these positions from to UTM (Universal Transverse Mercator) or UPS (Universal Polar Sterographic) (Snyder, 1987).

# Installation

The routine was written with Microsoft Visual Studio 2013 in C#. The code contains calls to the open-source GeographicLib library (<http://geographiclib.sourceforge.net>) in compliance with the MIT/X11 open-source license. The source code is freely available through contact with the author (email:bob.courtney@canada.ca).

The executable image is packaged in a zip file and distributed with supporting files and documentation , made available through NRCan Open File system via Geoscan (<http://geoscan.nrcan.gc.ca/>). The excutable image is written for Windows 7 and subsequent operating systems running .Net 4.0 and above.

The zip file retrieved from Geoscsan can be unpacked and the setup.exe file is used to install the program on the host machine.

# Use

## Launch Program

The program is run via the Windows Start menu:

*Start=>All Programs=>NRCan=>FixSEGYRecordLength*

The user interface should appear on the desktop:

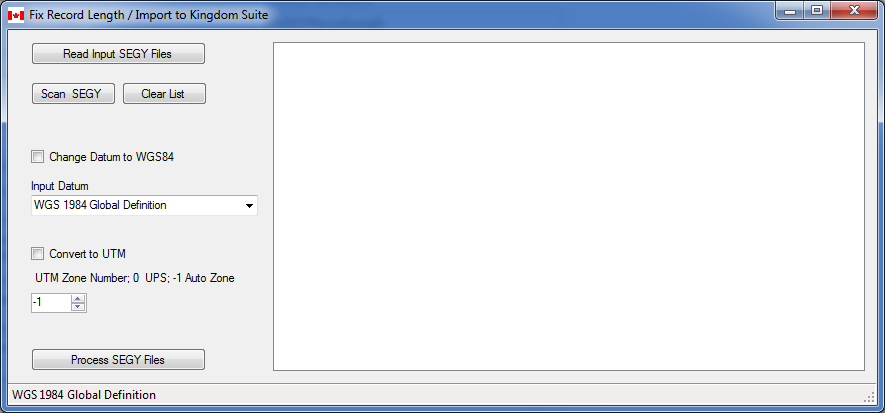
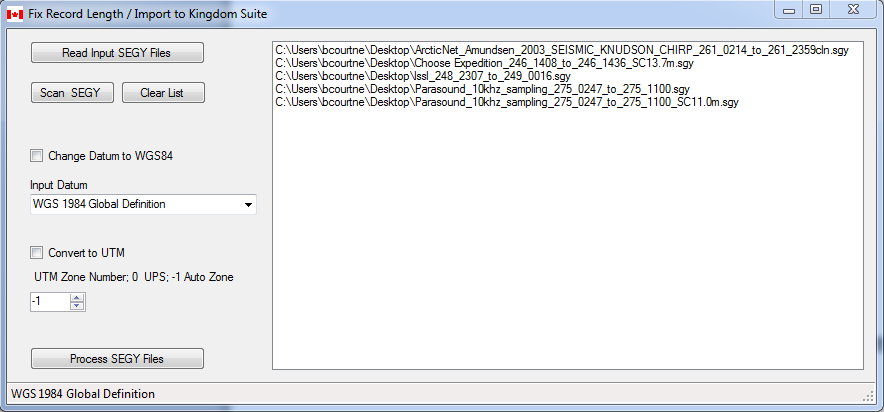


Figure 1 – User interface

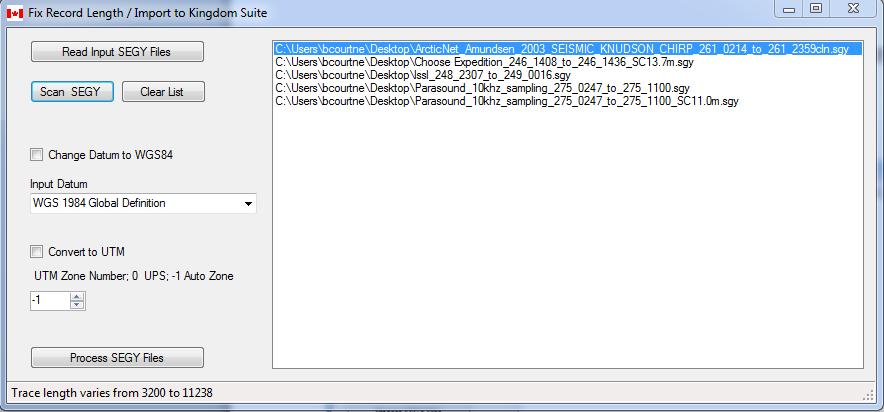
## Read SEGY

Press the “Read Input SEGY file” button to read in the SEGY files of interest. Multiple files can be chosen and, to some extent, the program will automatically exclude files not recognized as SEGY.



## Scan SEGY

Click of one of the entries in the listbox found to the right-hand side and press “Scan SEGY” to scan the selected file and summarize the trace length changes in the file.



## Fix Trace Length

Press “Process SEGY Files” to generate a zero-padded, constant trace version of the input file. The program will prompt for an output folder then generate fixed length records for all the SEGY files with the file suffix “\_fixed.sgy”.

## Change Datum to WGS84

Often for older SEGY files derived from registered scanned sections, the trace header positions are stored with reference to in an older geodetic datum, usually NAD27. This option can be enacted to apply a geocentric –based datum correction method to apply the appropriate datum shift and ellipsoidal parameters needed to transform positions to the WGS84 datum. (<http://earth-info.nga.mil/GandG/publications/tr8350.2/wgs84fin.pdf>).

The datum transform parameters are stored in the folder, *C:\Program Files (x86)\NRCan\FixSEGYRecordLength,* in two csv files : [*Ellipsoids.csv*](#_Appendix_1_–) and [*GeodeticTransformParameters.csv.*](#_Appendix_2_–Geocentric)  *GeodeticTransformParameters.csv* can be manually edited to update existing corrections or add additional corrections.

Choose the source datum from the pull-down combo-box and check the checkbox option. These corrections will be calculated and applied to the output SEGY when the Fix Trace Length button is pushed.

## Convert to UTM

For many industry-standard seismic mapping packages, UTM mapping coordinates are used as the survey areas are generally local in natures and the UTM projection offers a convenient equal-area mapping of geographic data.

If the positional information in the source SEGY file is stored in latitude and longitude positions, then the Convert to UTM checkbox can be used to convert the positions stored in the output file to UTM.

By default, the zone number is set to -1. With this choice, the program will project the positional data into their “natural “ zone, one that is defined by the closest UTM zone to a given trace location. A choice of 0 will result in a UPS projection for polar regions. A choice greater than 0 results in a UTM projection.

If the seismic line crosses UTM zone boundaries, the automatic choice of the natural zone will change causing large discontinuities in the apparent survey track. But set the zone number to -1 first and process the seismic file.

The program will produce a file with the extension “\_fixed.prj” that lists the source and projected coordinates and the calculated zone number. Open and examine this file with a text editor :

*65.6695575 -59.9996461111111 362138.696753519 7286368.05251473 21*

*65.6697455555556 -59.9997591666667 362134.503884546 7286389.24177669 21*

*65.6698563888889 -59.9998136111111 362132.592529226 7286401.70325827 21*

*65.6699919444444 -59.9998919444444 362129.715422386 7286416.97012963 21*

*65.6701425 -59.9999533333333 362127.696383433 7286433.87019568 21*

*65.6702475 -60.0000055555556 637873.63351048 7286445.65285542 20*

*65.6704447222222 -60.0001172222222 637867.455912818 7286467.37002568 20*

*65.6705427777778 -60.0001719444444 637864.421129602 7286478.16918734 20*

*65.6706855555556 -60.000245 637860.306523946 7286493.90828034 20*

Take note of the zone changes and then choose a best-representative zone , change the input zone value and reprocess the seismic file. Check the resulting .prj file to ensure the process completed as expected. The seismic file may have to be spilt into separate sections if the converted points fall too far away from the prescribed zone meridian (+/- 500 km).

# Appendix 1 – Ellipsoid Definitions (*Ellipsoids.csv)*

|  |  |  |
| --- | --- | --- |
| **Ellipsoid** | **Semi-major axis** | **1/flattening** |
| Airy 1830, | 6377563 | 299.325 |
| Modified Airy | 6377340 | 299.325 |
| Australian National | 6378160 | 298.25 |
| Bessel 1841 (Namibia) | 6377484 | 299.1528 |
| Bessel 1841 | 6377397 | 299.1528 |
| Clarke 1866, | 6378206 | 294.9787 |
| Clarke 1880, | 6378249 | 293.465 |
| Everest (India 1830)" | 6377276 | 300.8017 |
| Everest (Sabah Sarawak) | 6377299 | 300.8017 |
| Everest (India 1956) | 6377301 | 300.8017 |
| Everest (Malaysia 1969) | 6377296 | 300.8017 |
| Everest (Malay. & Sing) | 6377304 | 300.8017 |
| Everest (Pakistan) | 6377310 | 300.8017 |
| Modified Fischer 1960 | 6378155 | 298.3 |
| Helmert 1906 | 6378200 | 298.3 |
| Hough 1960 | 6378270 | 297 |
| Indonesian 1974 | 6378160 | 298.247 |
| International 1924 | 6378388 | 297 |
| Krassovsky 1940 | 6378245 | 298.3 |
| GRS 80 | 6378137 | 298.2572 |
| South American 1969 | 6378160 | 298.25 |
| WGS 72 | 6378135 | 298.26 |
| WGS 84 | 6378137 | 298.2572 |

# Appendix 2 –Geocentric Datum Corrections (*GeodeticTransformParameters.csv)*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Datum** | **Ellipsoid** | **dX** | **dY** | **dZ** | **Region of use** | **eX** | **eY** | **eZ** | **#S** |
| Adindan | Clarke 1880 | -118 | -14 | 218 | Burkina Faso | 25 | 25 | 25 | 1 |
| Adindan | Clarke 1880 | -134 | -2 | 210 | Cameroon | 25 | 25 | 25 | 1 |
| Adindan | Clarke 1880 | -165 | -11 | 206 | Ethiopia | 3 | 3 | 3 | 8 |
| Adindan | Clarke 1880 | -123 | -20 | 220 | Mali | 25 | 25 | 25 | 1 |
| Adindan | Clarke 1880 | -166 | -15 | 204 | MEAN FOR Ethiopia; Sudan | 5 | 5 | 3 | 22 |
| Adindan | Clarke 1880 | -128 | -18 | 224 | Senegal | 25 | 25 | 25 | 2 |
| Adindan | Clarke 1880 | -161 | -14 | 205 | Sudan | 3 | 5 | 3 | 14 |
| Afgooye | Krassovsky 1940 | -43 | -163 | 45 | Somalia | 25 | 25 | 25 | 1 |
| Ain el Abd 1970 | International 1924 | -150 | -250 | -1 | Bahrain | 25 | 25 | 25 | 2 |
| Ain el Abd 1970 | International 1924 | -143 | -236 | 7 | Saudi Arabia | 10 | 10 | 10 | 9 |
| American Samoa 1962 | Clarke 1866 | -115 | 118 | 426 | American Samoa Islands | 25 | 25 | 25 | 2 |
| Anna 1 Astro 1965 | Australian National | -491 | -22 | 435 | Cocos Islands | 25 | 25 | 25 | 1 |
| Antigua Island Astro 1943 | Clarke 1880 | -270 | 13 | 62 | Antigua (Leeward Islands) | 25 | 25 | 25 | 1 |
| Arc 1950 | Clarke 1880 | -138 | -105 | -289 | Botswana | 3 | 5 | 3 | 9 |
| Arc 1950 | Clarke 1880 | -153 | -5 | -292 | Burundi | 20 | 20 | 20 | 3 |
| Arc 1950 | Clarke 1880 | -125 | -108 | -295 | Lesotho | 3 | 3 | 8 | 5 |
| Arc 1950 | Clarke 1880 | -161 | -73 | -317 | Malawi | 9 | 24 | 8 | 6 |
| Arc 1950 | Clarke 1880 | -143 | -90 | -294 | MEAN FOR Botswana; Lesotho; Malawi; Swaziland; Zaire; Zambia; Zimbabwe | 20 | 33 | 20 | 41 |
| Arc 1950 | Clarke 1880 | -134 | -105 | -295 | Swaziland | 15 | 15 | 15 | 4 |
| Arc 1950 | Clarke 1880 | -169 | -19 | -278 | Zaire | 25 | 25 | 25 | 2 |
| Arc 1950 | Clarke 1880 | -147 | -74 | -283 | Zambia | 21 | 21 | 27 | 5 |
| Arc 1950 | Clarke 1880 | -142 | -96 | -293 | Zimbabwe | 5 | 8 | 11 | 10 |
| Arc 1960 | Clarke 1880 | -160 | -6 | -302 | MEAN FOR Kenya; Tanzania | 20 | 20 | 20 | 25 |
| Arc 1960 | Clarke 1880 | -157 | -2 | -299 | Kenya | 4 | 3 | 3 | 24 |
| Arc 1960 | Clarke 1880 | -175 | -23 | -303 | Taanzania | 6 | 9 | 10 | 12 |
| Ascension Island 1958 | International 1924 | -205 | 107 | 53 | Ascension Island | 25 | 25 | 25 | 2 |
| Astro Beacon E 1945 | International 1924 | 145 | 75 | -272 | Iwo Jima | 25 | 25 | 25 | 1 |
| Astro DOS 71/4 | International 1924 | -320 | 550 | -494 | St Helena Island | 25 | 25 | 25 | 1 |
| Astro Tern Island (FRIG) 1961 | International 1924 | 114 | -116 | -333 | Tern Island | 25 | 25 | 25 | 1 |
| Astronomical Station 1952 | International 1924 | 124 | -234 | -25 | Marcus Island | 25 | 25 | 25 | 1 |
| Australian Geodetic 1966 | Australian National | -133 | -48 | 148 | Australia; Tasmania | 3 | 3 | 3 | 105 |
| Australian Geodetic 1984 | Australian National | -134 | -48 | 149 | Australia; Tasmania | 2 | 2 | 2 | 90 |
| Ayabelle Lighthouse | Clarke 1880 | -79 | -129 | 145 | Djibouti | 25 | 25 | 25 | 1 |
| Bellevue (IGN) | International 1924 | -127 | -769 | 472 | Efate & Erromango Islands | 20 | 20 | 20 | 3 |
| Bermuda 1957 | Clarke 1866 | -73 | 213 | 296 | Bermuda | 20 | 20 | 20 | 3 |
| Bissau | International 1924 | -173 | 253 | 27 | Guinea-Bissau | 25 | 25 | 25 | 2 |
| Bogota Observatory | International 1924 | 307 | 304 | -318 | Colombia | 6 | 5 | 6 | 7 |
| Bukit Rimpah | Bessel 1841 | -384 | 664 | -48 | Indonesia (Bangka & Belitung Ids) | -1 | -1 | -1 | 0 |
| Camp Area Astro | International 1924 | -104 | -129 | 239 | Antarctica (McMurdo Camp Area) | -1 | -1 | -1 | 0 |
| Campo Inchauspe | International 1924 | -148 | 136 | 90 | Argentina | 5 | 5 | 5 | 20 |
| Canton Astro 1966 | International 1924 | 298 | -304 | -375 | Phoenix Islands | 15 | 15 | 15 | 4 |
| Cape | Clarke 1880 | -136 | -108 | -292 | South Africa | 3 | 6 | 6 | 5 |
| Cape Canaveral | Clarke 1866 | -2 | 151 | 181 | Bahamas; Florida | 3 | 3 | 3 | 19 |
| Carthage | Clarke 1880 | -263 | 6 | 431 | Tunisia | 6 | 9 | 8 | 5 |
| Chatham Island Astro 1971 | International 1924 | 175 | -38 | 113 | New Zealand (Chatham Island) | 15 | 15 | 15 | 4 |
| Chua Astro | International 1924 | -134 | 229 | -29 | Paraguay | 6 | 9 | 5 | 6 |
| Corrego Alegre | International 1924 | -206 | 172 | -6 | Brazil | 5 | 3 | 5 | 17 |
| Dabola | Clarke 1880 | -83 | 37 | 124 | Guinea | 15 | 15 | 15 | 4 |
| Deception Island | Clarke 1880 | 260 | 12 | -147 | Deception Island; Antarctia | 20 | 20 | 20 | 3 |
| Djakarta (Batavia) | Bessel 1841 | -377 | 681 | -50 | Indonesia (Sumatra) | 3 | 3 | 3 | 5 |
| DOS 1968 | International 1924 | 230 | -199 | -752 | New Georgia Islands (Gizo Island) | 25 | 25 | 25 | 1 |
| Easter Island 1967 | International 1924 | 211 | 147 | 111 | Easter Island | 25 | 25 | 25 | 1 |
| Estonia; Coordinate System 1937 | Bessel 1841 | 374 | 150 | 588 | Estonia | 2 | 3 | 3 | 19 |
| European 1950 | International 1924 | -104 | -101 | -140 | Cyprus | 15 | 15 | 15 | 4 |
| European 1950 | International 1924 | -130 | -117 | -151 | Egypt | 6 | 8 | 8 | 14 |
| European 1950 | International 1924 | -86 | -96 | -120 | England; Channel Islands; Scotland; Shetland Islands | 3 | 3 | 3 | 40 |
| European 1950 | International 1924 | -86 | -96 | -120 | England; Ireland; Scotland; Shetland Islands | 3 | 3 | 3 | 47 |
| European 1950 | International 1924 | -87 | -95 | -120 | Finland; Norway | 3 | 5 | 3 | 20 |
| European 1950 | International 1924 | -84 | -95 | -130 | Greece | 25 | 25 | 25 | 2 |
| European 1950 | International 1924 | -117 | -132 | -164 | Iran | 9 | 12 | 11 | 27 |
| European 1950 | International 1924 | -97 | -103 | -120 | Italy (Sardinia) | 25 | 25 | 25 | 2 |
| European 1950 | International 1924 | -97 | -88 | -135 | Italy (Sicily) | 20 | 20 | 20 | 3 |
| European 1950 | International 1924 | -107 | -88 | -149 | Malta | 25 | 25 | 25 | 1 |
| European 1950 | International 1924 | -87 | -98 | -121 | MEAN FOR Austria; Belgium; Denmark; Finland; France; W Germany; Gibraltar; Greece; Italy; Luxembourg; Netherlands; Norway; Portugal; Spain; Sweden; Switzerland | 3 | 8 | 5 | 85 |
| European 1950 | International 1924 | -87 | -96 | -120 | MEAN FOR Austria; Denmark; France; W Germany; Netherlands; Switzerland | 3 | 3 | 3 | 52 |
| European 1950 | International 1924 | -103 | -106 | -141 | MEAN FOR Iraq; Israel; Jordan; Lebanon; Kuwait; Saudi Arabia; Syria | -1 | -1 | -1 | 0 |
| European 1950 | International 1924 | -84 | -107 | -120 | Portugal; Spain | 5 | 6 | 3 | 18 |
| European 1950 | International 1924 | -112 | -77 | -145 | Tunisia | 25 | 25 | 25 | 4 |
| European 1979 | International 1924 | -86 | -98 | -119 | MEAN FOR Austria; Finland; Netherlands; Norway; Spain; Sweden; Switzerland | 3 | 3 | 3 | 22 |
| Fort Thomas 1955 | Clarke 1880 | -7 | 215 | 225 | Nevis; St. Kitts (Leeward Islands) | 25 | 25 | 25 | 2 |
| Gan 1970 | International 1924 | -133 | -321 | 50 | Republic of Maldives | 25 | 25 | 25 | 1 |
| Geodetic Datum 1949 | International 1924 | 84 | -22 | 209 | New Zealand | 5 | 3 | 5 | 14 |
| Graciosa Base SW 1948 | International 1924 | -104 | 167 | -38 | Azores (Faial; Graciosa; Pico; Sao Jorge; Terceira) | 3 | 3 | 3 | 5 |
| Guam 1963 | Clarke 1866 | -100 | -248 | 259 | Guam | 3 | 3 | 3 | 5 |
| Gunung Segara | Bessel 1841 | -403 | 684 | 41 | Indonesia (Kalimantan) | -1 | -1 | -1 | 0 |
| GUX 1 Astro | International 1924 | 252 | -209 | -751 | Guadalcanal Island | 25 | 25 | 25 | 1 |
| Herat North | International 1924 | -333 | -222 | 114 | Afghanistan | -1 | -1 | -1 | 0 |
| Hermannskogel Datum | Bessel 1841 (Namibia) | 653 | -212 | 449 | Croatia -Serbia, Bosnia-Herzegovina | -1 | -1 | -1 | 0 |
| Hjorsey 1955 | International 1924 | -73 | 46 | -86 | Iceland | 3 | 3 | 6 | 6 |
| Hong Kong 1963 | International 1924 | -156 | -271 | -189 | Hong Kong | 25 | 25 | 25 | 2 |
| Hu-Tzu-Shan | International 1924 | -637 | -549 | -203 | Taiwan | 15 | 15 | 15 | 4 |
| Indian | Everest (India 1830) | 282 | 726 | 254 | Bangladesh | 10 | 8 | 12 | 6 |
| Indian | Everest (India 1956) | 295 | 736 | 257 | India; Nepal | 12 | 10 | 15 | 7 |
| Indian | Everest (Pakistan) | 283 | 682 | 231 | Pakistan | -1 | -1 | -1 | 0 |
| Indian 1954 | Everest (India 1830) | 217 | 823 | 299 | Thailand | 15 | 6 | 12 | 11 |
| Indian 1960 | Everest (India 1830) | 182 | 915 | 344 | Vietnam (Con Son Island) | 25 | 25 | 25 | 1 |
| Indian 1960 | Everest (India 1830) | 198 | 881 | 317 | Vietnam (Near 16øN) | 25 | 25 | 25 | 2 |
| Indian 1975 | Everest (India 1830) | 210 | 814 | 289 | Thailand | 3 | 2 | 3 | 62 |
| Indonesian 1974 | Indonesian 1974 | -24 | -15 | 5 | Indonesia | 25 | 25 | 25 | 1 |
| Ireland 1965 | Modified Airy | 506 | -122 | 611 | Ireland | 3 | 3 | 3 | 7 |
| ISTS 061 Astro 1968 | International 1924 | -794 | 119 | -298 | South Georgia Islands | 25 | 25 | 25 | 1 |
| ISTS 073 Astro 1969 | International 1924 | 208 | -435 | -229 | Diego Garcia | 25 | 25 | 25 | 2 |
| Johnston Island 1961 | International 1924 | 189 | -79 | -202 | Johnston Island | 25 | 25 | 25 | 1 |
| Kandawala | Everest (India 1830) | -97 | 787 | 86 | Sri Lanka | 20 | 20 | 20 | 3 |
| Kerguelen Island 1949 | International 1924 | 145 | -187 | 103 | Kerguelen Island | 25 | 25 | 25 | 1 |
| Kertau 1948 | Everest (Malay. & Sing) | -11 | 851 | 5 | West Malaysia & Singapore | 10 | 8 | 6 | 6 |
| Kusaie Astro 1951 | International 1924 | 647 | 1777 | -1124 | Caroline Islands | 25 | 25 | 25 | 1 |
| Korean Geodetic System | GRS 80 | 0 | 0 | 0 | South Korea | 2 | 2 | 2 | 12 |
| L. C. 5 Astro 1961 | Clarke 1866 | 42 | 124 | 147 | Cayman Brac Island | 25 | 25 | 25 | 1 |
| Leigon | Clarke 1880 | -130 | 29 | 364 | Ghana | 2 | 3 | 2 | 8 |
| Liberia 1964 | Clarke 1880 | -90 | 40 | 88 | Liberia | 15 | 15 | 15 | 4 |
| Luzon | Clarke 1866 | -133 | -77 | -51 | Philippines (Excluding Mindanao) | 8 | 11 | 9 | 6 |
| Luzon | Clarke 1866 | -133 | -79 | -72 | Philippines (Mindanao) | 25 | 25 | 25 | 1 |
| M'Poraloko | Clarke 1880 | -74 | -130 | 42 | Gabon | 25 | 25 | 25 | 1 |
| Mahe 1971 | Clarke 1880 | 41 | -220 | -134 | Mahe Island | 25 | 25 | 25 | 1 |
| Massawa | Bessel 1841 | 639 | 405 | 60 | Ethiopia (Eritrea) | 25 | 25 | 25 | 1 |
| Merchich | Clarke 1880 | 31 | 146 | 47 | Morocco | 5 | 3 | 3 | 9 |
| Midway Astro 1961 | International 1924 | 912 | -58 | 1227 | Midway Islands | 25 | 25 | 25 | 1 |
| Minna | Clarke 1880 | -81 | -84 | 115 | Cameroon | 25 | 25 | 25 | 2 |
| Minna | Clarke 1880 | -92 | -93 | 122 | Nigeria | 3 | 6 | 5 | 6 |
| Montserrat Island Astro 1958 | Clarke 1880 | 174 | 359 | 365 | Montserrat (Leeward Islands) | 25 | 25 | 25 | 1 |
| Nahrwan | Clarke 1880 | -247 | -148 | 369 | Oman (Masirah Island) | 25 | 25 | 25 | 2 |
| Nahrwan | Clarke 1880 | -243 | -192 | 477 | Saudi Arabia | 20 | 20 | 20 | 3 |
| Nahrwan | Clarke 1880 | -249 | -156 | 381 | United Arab Emirates | 25 | 25 | 25 | 2 |
| Naparima BWI | International 1924 | -10 | 375 | 165 | Trinidad & Tobago | 15 | 15 | 15 | 4 |
| North American 1927 | Clarke 1866 | -5 | 135 | 172 | Alaska (Excluding Aleutian Ids) | 5 | 9 | 5 | 47 |
| North American 1927 | Clarke 1866 | -2 | 152 | 149 | Alaska (Aleutian Ids East of 180øW) | 6 | 8 | 10 | 6 |
| North American 1927 | Clarke 1866 | 2 | 204 | 105 | Alaska (Aleutian Ids West of 180øW) | 10 | 10 | 10 | 5 |
| North American 1927 | Clarke 1866 | -4 | 154 | 178 | Bahamas (Except San Salvador Id) | 5 | 3 | 5 | 11 |
| North American 1927 | Clarke 1866 | 1 | 140 | 165 | Bahamas (San Salvador Island) | 25 | 25 | 25 | 1 |
| North American 1927 | Clarke 1866 | -7 | 162 | 188 | Canada (Alberta; British Columbia) | 8 | 8 | 6 | 25 |
| North American 1927 | Clarke 1866 | -9 | 157 | 184 | Canada (Manitoba; Ontario) | 9 | 5 | 5 | 25 |
| North American 1927 | Clarke 1866 | -22 | 160 | 190 | Canada (New Brunswick; Newfoundland; Nova Scotia; Quebec) | 6 | 6 | 3 | 37 |
| North American 1927 | Clarke 1866 | 4 | 159 | 188 | Canada (Northwest Territories; Saskatchewan) | 5 | 5 | 3 | 17 |
| North American 1927 | Clarke 1866 | -7 | 139 | 181 | Canada (Yukon) | 5 | 8 | 3 | 8 |
| North American 1927 | Clarke 1866 | 0 | 125 | 201 | Canal Zone | 20 | 20 | 20 | 3 |
| North American 1927 | Clarke 1866 | -9 | 152 | 178 | Cuba | 25 | 25 | 25 | 1 |
| North American 1927 | Clarke 1866 | 11 | 114 | 195 | Greenland (Hayes Peninsula) | 25 | 25 | 25 | 2 |
| North American 1927 | Clarke 1866 | -3 | 142 | 183 | MEAN FOR Antigua; Barbados; Barbuda; Caicos Islands; Cuba; Dominican Republic; Grand Cayman; Jamaica; Turks Islands | 3 | 9 | 12 | 15 |
| North American 1927 | Clarke 1866 | 0 | 125 | 194 | MEAN FOR Belize; Costa Rica; El Salvador; Guatemala; Honduras; Nicaragua | 8 | 3 | 5 | 19 |
| North American 1927 | Clarke 1866 | -10 | 158 | 187 | MEAN FOR Canada | 15 | 11 | 6 | 112 |
| North American 1927 | Clarke 1866 | -8 | 160 | 176 | MEAN FOR CONUS | 5 | 5 | 6 | 405 |
| North American 1927 | Clarke 1866 | -9 | 161 | 179 | MEAN FOR CONUS (East of Mississippi; River Including Louisiana; Missouri; Minnesota) | 5 | 5 | 8 | 129 |
| North American 1927 | Clarke 1866 | -8 | 159 | 175 | MEAN FOR CONUS (West of Mississippi; River Excluding Louisiana; Minnesota; Missouri) | 5 | 3 | 3 | 276 |
| North American 1927 | Clarke 1866 | -12 | 130 | 190 | Mexico | 8 | 6 | 6 | 22 |
| North American 1983 | GRS 80 | 0 | 0 | 0 | Alaska (Excluding Aleutian Ids) | 2 | 2 | 2 | 42 |
| North American 1983 | GRS 80 | -2 | 0 | 4 | Aleutian Ids | 5 | 2 | 5 | 4 |
| North American 1983 | GRS 80 | 0 | 0 | 0 | Canada | 2 | 2 | 2 | 96 |
| North American 1983 | GRS 80 | 0 | 0 | 0 | CONUS | 2 | 2 | 2 | 216 |
| North American 1983 | GRS 80 | 1 | 1 | -1 | Hawaii | 2 | 2 | 2 | 6 |
| North American 1983 | GRS 80 | 0 | 0 | 0 | Mexico; Central America | 2 | 2 | 2 | 25 |
| North Sahara 1959 | Clarke 1880 | -186 | -93 | 310 | Algeria | 25 | 25 | 25 | 3 |
| Observatorio Meteorologico 1939 | International 1924 | -425 | -169 | 81 | Azores (Corvo & Flores Islands) | 20 | 20 | 20 | 3 |
| Old Egyptian 1907 | Helmert 1906 | -130 | 110 | -13 | Egypt | 3 | 6 | 8 | 14 |
| Old Hawaiian | Clarke 1866 | 89 | -279 | -183 | Hawaii | 25 | 25 | 25 | 2 |
| Old Hawaiian | Clarke 1866 | 45 | -290 | -172 | Kauai | 20 | 20 | 20 | 3 |
| Old Hawaiian | Clarke 1866 | 65 | -290 | -190 | Maui | 25 | 25 | 25 | 2 |
| Old Hawaiian | Clarke 1866 | 61 | -285 | -181 | MEAN FOR Hawaii; Kauai; Maui; Oahu | 25 | 20 | 20 | 15 |
| Old Hawaiian | Clarke 1866 | 58 | -283 | -182 | Oahu | 10 | 6 | 6 | 8 |
| Oman | Clarke 1880 | -346 | -1 | 224 | Oman | 3 | 3 | 9 | 7 |
| Ordnance Survey Great Britain 1936 | Airy 1830 | 371 | -112 | 434 | England | 5 | 5 | 6 | 21 |
| Ordnance Survey Great Britain 1936 | Airy 1830 | 371 | -111 | 434 | England; Isle of Man; Wales | 10 | 10 | 15 | 25 |
| Ordnance Survey Great Britain 1936 | Airy 1830 | 375 | -111 | 431 | MEAN FOR England; Isle of Man; Scotland; Shetland Islands; Wales | 10 | 10 | 15 | 38 |
| Ordnance Survey Great Britain 1936 | Airy 1830 | 384 | -111 | 425 | Scotland; Shetland Islands | 10 | 10 | 10 | 13 |
| Ordnance Survey Great Britain 1936 | Airy 1830 | 370 | -108 | 434 | Wales | 20 | 20 | 20 | 3 |
| Pico de las Nieves | International 1924 | -307 | -92 | 127 | Canary Islands | 25 | 25 | 25 | 1 |
| Pitcairn Astro 1967 | International 1924 | 185 | 165 | 42 | Pitcairn Island | 25 | 25 | 25 | 1 |
| Point 58 | Clarke 1880 | -106 | -129 | 165 | MEAN FOR Burkina Faso & Niger | 25 | 25 | 25 | 1 |
| Pointe Noire 1948 | Clarke 1880 | -148 | 51 | -291 | Congo | 25 | 25 | 25 | 1 |
| Porto Santo 1936 | International 1924 | -499 | -249 | 314 | Porto Santo; Madeira Islands | 25 | 25 | 25 | 2 |
| Provisional South American 1956 | International 1924 | -270 | 188 | -388 | Bolivia | 5 | 11 | 14 | 5 |
| Provisional South American 1956 | International 1924 | -270 | 183 | -390 | Chile (Northern; Near 19øS) | 25 | 25 | 25 | 1 |
| Provisional South American 1956 | International 1924 | -305 | 243 | -442 | Chile (Southern; Near 43øS) | 20 | 20 | 20 | 3 |
| Provisional South American 1956 | International 1924 | -282 | 169 | -371 | Colombia | 15 | 15 | 15 | 4 |
| Provisional South American 1956 | International 1924 | -278 | 171 | -367 | Ecuador | 3 | 5 | 3 | 11 |
| Provisional South American 1956 | International 1924 | -298 | 159 | -369 | Guyana | 6 | 14 | 5 | 9 |
| Provisional South American 1956 | International 1924 | -288 | 175 | -376 | MEAN FOR Bolivia; Chile; Colombia; Ecuador; Guyana; Peru; Venezuela | 17 | 27 | 27 | 63 |
| Provisional South American 1956 | International 1924 | -279 | 175 | -379 | Peru | 6 | 8 | 12 | 6 |
| Provisional South American 1956 | International 1924 | -295 | 173 | -371 | Venezuela | 9 | 14 | 15 | 24 |
| Provisional South Chilean 1963 | International 1924 | 16 | 196 | 93 | Chile (Near 53øS) (Hito XVIII) | 25 | 25 | 25 | 2 |
| Puerto Rico | Clarke 1866 | 11 | 72 | -101 | Puerto Rico; Virgin Islands | 3 | 3 | 3 | 11 |
| Pulkovo 1942 | Krassovsky 1940 | 28 | -130 | -95 | Russia | -1 | -1 | -1 | 0 |
| Qatar National | International 1924 | -128 | -283 | 22 | Qatar | 20 | 20 | 20 | 3 |
| Qornoq | International 1924 | 164 | 138 | -189 | Greenland (South) | 25 | 25 | 32 | 2 |
| Reunion | International 1924 | 94 | -948 | -1262 | Mascarene Islands | 25 | 25 | 25 | 1 |
| Rome 1940 | International 1924 | -225 | -65 | 9 | Italy (Sardinia) | 25 | 25 | 25 | 1 |
| S-42 (Pulkovo 1942) | Krassovsky 1940 | 28 | -121 | -77 | Hungary | 2 | 2 | 2 | 5 |
| S-42 (Pulkovo 1942) | Krassovsky 1940 | 23 | -124 | -82 | Poland | 4 | 2 | 4 | 11 |
| S-42 (Pulkovo 1942) | Krassovsky 1940 | 26 | -121 | -78 | Czechoslavakia | 3 | 3 | 2 | 6 |
| S-42 (Pulkovo 1942) | Krassovsky 1940 | 24 | -124 | -82 | Latvia | 2 | 2 | 2 | 5 |
| S-42 (Pulkovo 1942) | Krassovsky 1940 | 15 | -130 | -84 | Kazakhstan | 25 | 25 | 25 | 2 |
| S-42 (Pulkovo 1942) | Krassovsky 1940 | 24 | -130 | -92 | Albania | 3 | 3 | 3 | 7 |
| S-42 (Pulkovo 1942) | Krassovsky 1940 | 28 | -121 | -77 | Romania | 3 | 5 | 3 | 4 |
| S-JTSK | Bessel 1841 | 589 | 76 | 480 | Czechoslavakia (Prior 1 JAN 1993) | 4 | 2 | 3 | 6 |
| Santo (DOS) 1965 | International 1924 | 170 | 42 | 84 | Espirito Santo Island | 25 | 25 | 25 | 1 |
| Sao Braz | International 1924 | -203 | 141 | 53 | Azores (Sao Miguel; Santa Maria Ids) | 25 | 25 | 25 | 2 |
| Sapper Hill 1943 | International 1924 | -355 | 21 | 72 | East Falkland Island | 1 | 1 | 1 | 5 |
| Schwarzeck | Bessel 1841 (Namibia) | 616 | 97 | -251 | Namibia | 20 | 20 | 20 | 3 |
| Selvagem Grande 1938 | International 1924 | -289 | -124 | 60 | Salvage Islands | 25 | 25 | 25 | 1 |
| Sierra Leone 1960 | Clarke 1880 | -88 | 4 | 101 | Sierra Leone | 15 | 15 | 15 | 8 |
| South American 1969 | South American 1969 | -62 | -1 | -37 | Argentina | 5 | 5 | 5 | 10 |
| South American 1969 | South American 1969 | -61 | 2 | -48 | Bolivia | 15 | 15 | 15 | 4 |
| South American 1969 | South American 1969 | -60 | -2 | -41 | Brazil | 3 | 5 | 5 | 22 |
| South American 1969 | South American 1969 | -75 | -1 | -44 | Chile | 15 | 8 | 11 | 9 |
| South American 1969 | South American 1969 | -44 | 6 | -36 | Colombia | 6 | 6 | 5 | 7 |
| South American 1969 | South American 1969 | -48 | 3 | -44 | Ecuador | 3 | 3 | 3 | 11 |
| South American 1969 | South American 1969 | -47 | 26 | -42 | Ecuador (Baltra; Galapagos) | 25 | 25 | 25 | 1 |
| South American 1969 | South American 1969 | -53 | 3 | -47 | Guyana | 9 | 5 | 5 | 5 |
| South American 1969 | South American 1969 | -57 | 1 | -41 | MEAN FOR Argentina; Bolivia; Brazil; Chile; Colombia; Ecuador; Guyana; Paraguay; Peru; Trinidad & Tobago; Venezuela | 15 | 6 | 9 | 84 |
| South American 1969 | South American 1969 | -61 | 2 | -33 | Paraguay | 15 | 15 | 15 | 4 |
| South American 1969 | South American 1969 | -58 | 0 | -44 | Peru | 5 | 5 | 5 | 6 |
| South American 1969 | South American 1969 | -45 | 12 | -33 | Trinidad & Tobago | 25 | 25 | 25 | 1 |
| South American 1969 | South American 1969 | -45 | 8 | -33 | Venezuela | 3 | 6 | 3 | 5 |
| South Asia | Modified Fischer 1960 | 7 | -10 | -26 | Singapore | 25 | 25 | 25 | 1 |
| Tananarive Observatory 1925 | International 1924 | -189 | -242 | -91 | Madagascar | -1 | -1 | -1 | 0 |
| Timbalai 1948 | Everest (Sabah Sarawak) | -679 | 669 | -48 | Brunei; E. Malaysia (Sabah Sarawak) | 10 | 10 | 12 | 8 |
| Tokyo | Bessel 1841 | -148 | 507 | 685 | Japan | 8 | 5 | 8 | 16 |
| Tokyo | Bessel 1841 | -148 | 507 | 685 | MEAN FOR Japan; South Korea; Okinawa | 20 | 5 | 20 | 31 |
| Tokyo | Bessel 1841 | -158 | 507 | 676 | Okinawa | 20 | 5 | 20 | 3 |
| Tokyo | Bessel 1841 | -147 | 506 | 687 | South Korea | 2 | 2 | 2 | 29 |
| Tristan Astro 1968 | International 1924 | -632 | 438 | -609 | Tristan da Cunha | 25 | 25 | 25 | 1 |
| Viti Levu 1916 | Clarke 1880 | 51 | 391 | -36 | Fiji (Viti Levu Island) | 25 | 25 | 25 | 1 |
| Voirol 1960 | Clarke 1880 | -123 | -206 | 219 | Algeria | 25 | 25 | 25 | 2 |
| Wake Island Astro 1952 | International 1924 | 276 | -57 | 149 | Wake Atoll | 25 | 25 | 25 | 2 |
| Wake-Eniwetok 1960 | Hough 1960 | 102 | 52 | -38 | Marshall Islands | 3 | 3 | 3 | 10 |
| WGS 1972 | WGS 72 | 0 | 0 | 0 | Global Definition | -1 | -1 | -1 | 0 |
| WGS 1984 | WGS 84 | 0 | 0 | 0 | Global Definition | -1 | -1 | -1 | 0 |
| Yacare | International 1924 | -155 | 171 | 37 | Uruguay | -1 | -1 | -1 | 0 |
| Zanderij | International 1924 | -265 | 120 | -358 | Suriname | 5 | 5 | 8 | 5 |