

# Geographic Coordinate Systems in MicroStation

Design Manual Chapter 21 Automation Tool Instructions Originally Issued: 07-31-15

21C-71

Revised: 06-25-19

Setting a geographic coordinate system in MicroStation will assign the X,Y,Z coordinates into the MicroStation file to correspond with X, Y, Z coordinates of the selected coordinate system. This becomes very important when trying to reference CADD files in different coordinate system to each other, or when running a process in which MicroStation needs to know where the line work exists in the real world (creating a KMZ file for example).

The Geographic Coordinate Systems tool is accessed in MicroStation through **Tools>Geographic>Select Geographic Coordinate System**, or by clicking on the

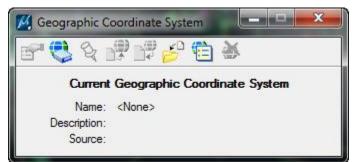


icon in the Geographic ToolBox.

× ×	<u>Attributes</u> <u>Primary</u>				
	<u>Standard</u>				
	<u>M</u> ain				
*	<u>T</u> asks				
	Animation	+			
	Base Geometry	<u>ا (</u>			
	Cells	•			
	Civil Accudraw	•			
	Change Tracking	•			
	Civil Geometry	•			
	Clash Detection	•			
	Coordinate Systems	•			
	Curves	+			
	Custom Linestyles	. ) <b>)</b>			
	Database	•			
R	Data Acquisition				
	Detailing Symbols	ा			
	Dimensions	•			
	Feature Solids	•			
1	Geographic	+	100	_	Select Geographic Coordinate System
	Groups	•	¢,	2	Global Positioning System (GPS)
	Levels	•	D	3	Export Google Earth (KML) File
	Manipulate	•	8	4	Capture Google Earth Image
	Measure	•	3	<u>5</u>	Define Placemark Monument
	Mesh	•	i	<u>6</u>	Synchronize Google Earth View
	Multi-lines	•	R	7	Follow Google Earth View
	Parametrics	•	1	8	Google Earth Settings
	Patterning	•	Ð	9	Play Camera Animation in Google Earth
	Point Cloud	•		0	Open Location in Google Maps
	Project Navigation	্	-	Op	en as ToolBox
	Properties		-	- P	

### Setting the Coordinate System

The Geographic Coordinate System toolbox shown to the right will display. The image on the right indicates that no current geographic system is applied to the MicroStation model. Geographic coordinate systems are applied to each model individually. If the appropriate geographic coordinate system is applied to the **Project Overview** model of the "DSN" seed file, the **Create New Model** (21A-40) copies the Project Overview model when creating new models and propagates the



correct coordinate system to all models created using the tool.

#### Selecting the Coordinate System from the Library

To set a coordinate system, *Click* on the **From Library** icon is to open the library of available coordinate systems. MicroStation comes with a large library of coordinate systems, and the Iowa DOT has also included the 14 <u>Iowa Regional Coordinate System</u> (IaRCS) zones within the MicroStation workspace to be available. The library should look like the image below when first opened.

🥖 Select Geographic Coordinate System	
Library Search	
Favorites Favorites	
Ok	

Three folders are available: Favorites, IaRCS, Library.

- **Favorites**: Location to bookmark commonly used coordinate systems for ease in finding again at a later time.
- **IaRCS**: Custom Iowa DOT projections.
- Library: The default library of coordinate systems delivered from Bentley Systems with MicroStation.

To apply a coordinate system to the model, select the appropriate coordinate system from one of the three folders in the left side of the dialogue and *click* **OK**.

#### Iowa Regional Coordinate System

The Iowa Regional Coordinate system is relatively new. Newer surveyed projects may be in these coordinate systems. This will be indicated in Project Scheduling System (PSS) in the **IaRCS** column in the grid, as shown below.

	Vork Type roj. Dir. No: 0102502014		
	Consultant		
Segment		<u> </u>	Υ Υ
	laRCS Project Number	Status	Assigned To
nt Of Way	FPN-025-3(32)2J-01	Active	Nicole L. Cuva
ge 0000	7 - Carroll-A BRFN-025-3(30)39-01	New	Bridges and Structures

The coordinate system is set in PSS per project number. When Preliminary Survey finishes the D01 event, the IaRCS filed will be filled out if the survey work was done in an Iowa RCS zone. This is only filled out for the project number used for the D01 event, not all project numbers associated with the PIN. This will give an indication to the designer what coordinate system the survey work was done in. If an IaRCS zone was used on the survey work, the appropriate zone should be selected in the Design MicroStation file. For this example, Zone 7 (Carroll-Atlantic) was selected as the coordinate system. Using an IaRCS zone will have the greatest accuracy of the linework within MicroStation to Google Earth extraction.

ġ	IaRCS
	laRCS Zone 1 - Spencer (LCC)
	laRCS Zone 10 - Cedar Rapids (LCC)
	IaRCS Zone 11 - Dubuque-Davenport (TM)
	IaRCS Zone 12 - Red Oak-Ottumwa (LCC)
	IaRCS Zone 13 - Fairfield (TM)
	IaRCS Zone 14 - Burlington (TM)
	IaRCS Zone 2 - Mason City (LCC)
	IaRCS Zone 3 - Elkader (TM)
	IaRCS Zone 4 - Sioux City-Iowa Falls (LCC)
	IaRCS Zone 5 - Waterloo (LCC)
	IaRCS Zone 6 - Council Bluffs (TM)
	laRCS Zone 7 - Carroll-Atlantic (TM)
	IaRCS Zone 8 - Ames-Des Moines (TM)
	IaRCS Zone 9 - Newton (TM)

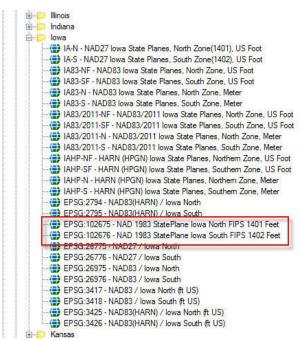
#### Library

The library contains many coordinate systems; however, most CAD work is drawn in a scaled State Plane coordinate system to correct for ground truth. Older survey work should use Iowa State Plane North or Iowa State Plan South coordinate systems when an Iowa RCS zone is not appropriate. The two coordinate systems for SP North & SP South that are in the preloaded library are:

- EPSG: 102675 NAD 1983 StatePlane Iowa North FIPS 1401 Feet
- EPSG: 102676 NAD 1983 StatePlane Iowa South FIPS 1402 Feet

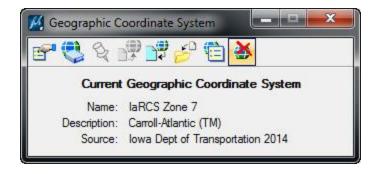
These can be selected from the library by navigating to: Library>Projected (northing, easting, \_)>North America>Iowa.

These two coordinate systems may be used often and are deep in the tree of the library, making them good candidates to save to favorites. This is easily done by *Right-clicking* on the coordinate zone you want to save to favorites and selecting **Add to Favorites**, as shown below.



<ul> <li>IA83-NF - NAD83 Iowa State Plane</li> <li>IA83-SF - NAD83 Iowa State Planes</li> <li>IA83-N - NAD83 Iowa State Planes</li> <li>IA83-S - NAD83 Iowa State Planes</li> <li>IA83-S - NAD83 Iowa State Planes</li> <li>IA83/2011-NF - NAD83/2011 Iowa</li> <li>IA83/2011-S - NAD83/2011 Iowa</li> <li>IA83/2011-S - NAD83/2011 Iowa</li> </ul>	es, South Zone, US Foot s, North Zone, Meter s, South Zone, Meter a State Planes, North Zone, US Foot a State Planes, South Zone, US Foot State Planes, North Zone, Meter
<ul> <li>IA83-N - NAD83 lowa State Planes</li> <li>IA83-S - NAD83 lowa State Planes</li> <li>IA83/2011-NF - NAD83/2011 lowa</li> <li>IA83/2011-SF - NAD83/2011 lowa</li> <li>IA83/2011-N - NAD83/2011 lowa</li> <li>IA83/2011-S - NAD83/2011 lowa</li> </ul>	s, North Zone, Meter s, South Zone, Meter a State Planes, North Zone, US Foot a State Planes, South Zone, US Foot State Planes, North Zone, Meter
<ul> <li>IA83-S - NAD83 Iowa State Planes</li> <li>IA83/2011-NF - NAD83/2011 Iowa</li> <li>IA83/2011-SF - NAD83/2011 Iowa</li> <li>IA83/2011-N - NAD83/2011 Iowa</li> <li>IA83/2011-S - NAD83/2011 Iowa</li> </ul>	s, South Zone, Meter a State Planes, North Zone, US Foot a State Planes, South Zone, US Foot State Planes, North Zone, Meter
	a State Planes, North Zone, US Foot a State Planes, South Zone, US Foot State Planes, North Zone, Meter
	a State Planes, South Zone, US Foot State Planes, North Zone, Meter
	State Planes, North Zone, Meter
	Ctate Diamas Cauth Zana Mater
	ate Planes, Northern Zone, US Foot
IAHP-SF - HARN (HPGN) Iowa Sta	
IAHP-N - HARN (HPGN) Iowa Stat IAHP-S - HARN (HPGN) Iowa Stat	
EPSG:2794 - NAD83(HARN) / low	
EPSG:2795 - NAD83(HARN) / Iow	
EPSG:102675 - NAD 1983 StatePI	
EPSG:102676 - NAD 1983 StatePI	
EPSG:26775 - NAD27 / Iowa North	Add To Favorites
EPSG:26776 - NAD27 / Iowa Sout	
EPSG:26975 - NAD83 / Iowa North	
EPSG:26976 - NAD83 / Iowa Sout	fh (ft US)

After setting the appropriate zone, the Geographic Coordinate System dialogue shown to the right will show the current coordinate system attached to the MicroStation model. This example has IaRCS Zone 7 applied to the model.



### Automated Application of Geographic Coordinates

Newer projects that have been surveyed in Iowa RCS, have had the correct zone set in PSS, have had the project properties set correctly in ProjectWise, and have had the appropriate workspace applied to the ProjectWise folder will, when opening the MicroStation DGN file for the first time, run an automated tool to set the geographic coordinate system upon.

The image on the right will appear if the MicroStation DGN you are working in does not have a geographic coordinate system set, and the appropriate workspace has been applied to your working directory. This will be done to projects that have been surveyed in IaRCS as they come up until the completed system is in place to set all new projects in PSS with a coordinate system upon project number creation.

Iowa RCS Zone
To confirm you are settiing the Correct Zone, Check Project Scheduling System!
Current RCS Setting: IaRCS Zone 10
Select LDP: IaRCS Zone 6 (Council Bluffs)
Select County: Harrison
Cancel OK

The tool will read the county and select the appropriate zone based on the county. *Click* **OK** to set the geographic coordinate system to the project overview model. The message below will appear asking if you're sure you have the correct zone being applied. *Click* **Yes** to set the zone and continue into the drawing.

Check PSS for Correct Zone	X
Setting the IaRCS Zone incorre Correct Zone! Are you sure yo	ectly WILL cause errors! Check PSS for ou want to continue?
	Yes No

## **Chronology of Changes to Design Manual Section:**

## 021C-071 Geographic Coordinate Systems in MicroStation

6/25/2019	Revised
	Updated hyperlinks. Updated header logo and text.
	Opualed header logo and lext.

7/31/2015 NEW

New