

Leica FAQ

Question Which ellipsoid should I choose when creating a geoid model to be attached to a NAD83 State Plane Coordinate System (SPCS)?

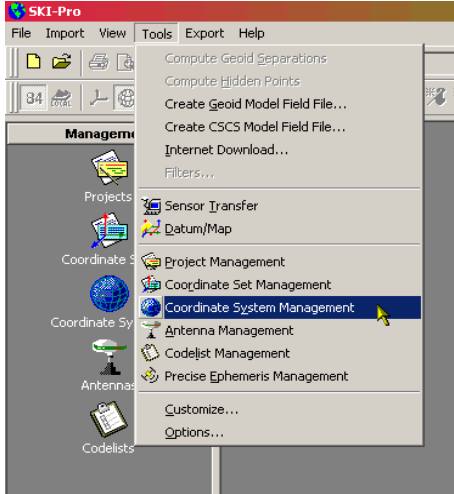
Background The NAD83 State Plane Coordinate System (SPCS83) is based on the GRS80 ellipsoid, not the WGS84 ellipsoid. Even if the two ellipsoids are very much the same, the GRS 80 ellipsoid is considered to be local in SKI-Pro and SYSTEM 500 whereas the WGS84 ellipsoid is considered to be global.

This especially comes into effect when you are using a 3-D classical transformation.
Note: If you have created a geoid model in the past and used WGS84 as the ellipsoid and attached this to an NAD83 state plane zone, you would not have seen any affect unless you were using a 3-D classical transformation.

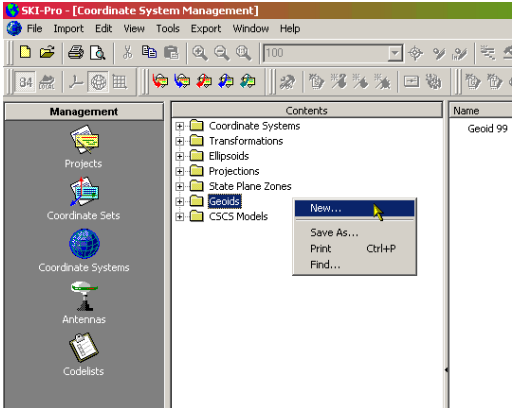

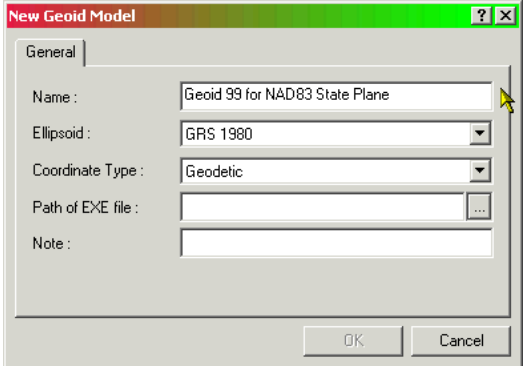
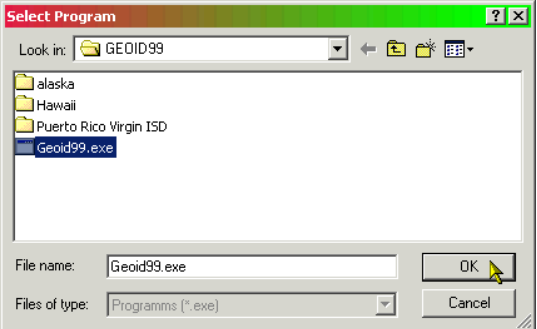
Answer GRS80 is the best ellipsoid to use for a geoid model when working with NAD83 State Plane Coordinate Systems.

Below are the steps to create a geoid model using Geoid 99 and the GRS80 ellipsoid.

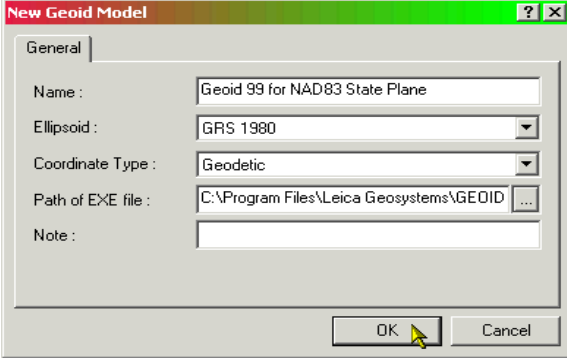
Note: This paper assumes that you have already installed Geoid 99. If you have not, please see the FAQs at the end of this document on installing Geoid 99 into SKI-Pro.

Step	Action	Display
1	From anywhere within SKI-Pro: <ul style="list-style-type: none"> • Click on the “Tools” pull down menu. • Select “Coordinate System Management” from the selection list. <p>This takes you to the “Coordinate System Management” view.</p>	

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Step	Action	Display
2	<p>In the “Coordinate System Management” view:</p> <ul style="list-style-type: none"> • Right click on the “Geoids” folder. • Select “New...” from the selection list. <p>This opens the “New Geoid Model” window.</p>	
3	<p>In the “New Geoid Model” window:</p> <ul style="list-style-type: none"> • Enter a name for the geoid model. In this example, we named it “Geoid 99 for NAD83 State Plane”. • Select “GRS 1980” as the ellipsoid. • Select “Geodetic” as the coordinate type. • In the “Path of EXE file:” field, click on the  button to browse to the Geoid 99 executable file that you installed on your hard drive. <p>This takes you to the “Select Program” window.</p>	
4	<p>In the “Select Program” window:</p> <ul style="list-style-type: none"> • Browse to the “Geoid99.exe” file. • Press the OK button when the file is highlighted. <p>This returns you to the “New Geoid Model” window.</p>	

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Step	Action	Display
5	<p>In the “New Geoid Model” window:</p> <ul style="list-style-type: none"> • Press the OK button to complete creating the new geoid model. <p>The new geoid model is ready to be attached to a coordinate system using a NAD83 state plane zone.</p>	

Further Reading

For more information on coordinate systems, ellipsoids, and geoid models, go to the GPS FAQ or FAQ Archives pages and read the following FAQs entitled:

[I just installed SKI-Pro and I want to see orthometric heights but I can't compute geoid separations, why?](#)

[Which geoid model do I use in a coordinate system containing the NADCON\(US\) CPCS model for NAD27 2-D coordinate conversion?](#)

[How does SKI-Pro and System 500 apply the geoid separations in a coordinate system containing a WGS84 geoid model?](#)

[Which types of geoid models can be used in coordinate systems to convert vertical information between orthometric and ellipsoidal heights?](#)

[How do I create a coordinate system?](#)

[How do I attach a Coordinate System to a project?](#)

[How do I create a coordinate system with state-plane-projection parameters?](#)

Also, go to the **GPS Newsletters page** and read the following GPS Newsletters:

For Coordinate Systems: Read GPS Newsletters: Vol. 00, Numbers 07, 08, 09, 20, 21, 22, and 23.

For Geoid Models: Read GPS Newsletters: Vol. 01, Numbers 19, 20, and 21.

John Coldrick
Henri Ayers
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