Predefined Coordinate Reference Systems

The Predefined tabbed panel is shown by default when you open the Coordinate Reference System window. This panel allows you to select from among the hundreds of predefined coordinate reference systems (CRS) and coordinate systems provided with the TNT products. In many cases you can select a complete predefined CRS in one step by choosing an entry from the list on this panel.

The Predefined panel uses an interactive tree control to organize the available selections into hierarchical groupings that you can expand or contract as needed, as shown in the illustration below. The predefined systems are subdivided by their geographic extent, with the highest levels being a Global and Regional grouping and a National and Local grouping. For example, the Global and Regional grouping includes entries for

Geographic (longitude, latitude) and for Universal Transverse Mercator (UTM). These entries are groupings that can be expanded to allow selection of individual examples, such as a specific UTM zone. The National and Local grouping includes subgroupings for many nations, including a United States entry that in turn includes a grouping for each state; to select a U.S. State Plane zone, you would navigate through these groupings to the desired state and zone, as shown by the example on the bottom half of this page. The Recent grouping at the top of the Predefined panel lists the last ten CRSs that have been selected in any TNT process, allowing easy one-step selection of a recently-used CRS. You can also press the Get from Object pushbutton at the bottom of the window to select any spatial object as a source for a CRS.

Groups in the listing on the Predefined panel are indicated by a clickable box symbol to the left of the entry. Left-click on a collapsed group symbol (⊞) to expand it, or on an expanded group symbol (⊟) to collapse it.

When the Coordinate Reference System window is opened in a TNT process using georeferenced data, the CRS in use is automatically shown in the Current text line. WGS84 / Geographic is the default setting if no other CRS is in use.
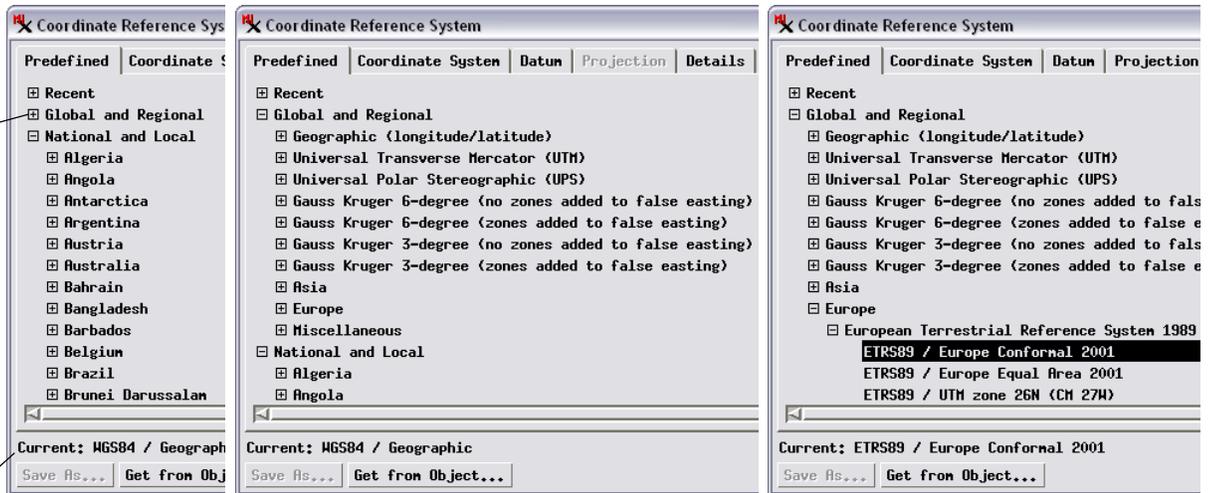

Global and Regional grouping shown collapsed (at left) and expanded (center). A scroll bar on the right side of the panel (not shown in these illustrations) lets you scroll through the expanded listings. At the right, the Europe grouping and one of its subgroups have been expanded and one CRS entry has been selected (shown by black highlighting). The Current text line at the bottom of the window automatically updates to show the selection.

Complete CRS Entries

All of the entries in the National and Local grouping on the Predefined panel, as well as those in the Asia, Europe, and Miscellaneous groupings within the Global and Regional grouping, are complete coordinate reference systems that can be selected in a single step. You can identify such entries because they begin with the datum name followed by the coordinate system name, with the two separated by the "/" character. An example shown in the illustration to the right is "NAD27 / SPCS27 Alabama East zone (m)" under National and Local / United States / Alabama. This is an entry for a zone of the U.S. State Plane Coordinate System (SPCS) using the North American Datum 1927 with meters as the measurement unit. Note that another entry in this group allows selection of the same coordinate system and datum but using U.S. feet as the unit of measure. Coordinate system selections (and thus CRS selections) automatically specify the unit of measure.

The Global and Regional grouping on the Predefined panel also includes several widely-applicable coordinate systems (including longitude, latitude and Universal Transverse Mercator) that can be paired with any available datum to form a complete CRS tailored to a specific area, as described on the next page.


Entry for a complete Coordinate Reference System including both datum and Coordinate System.
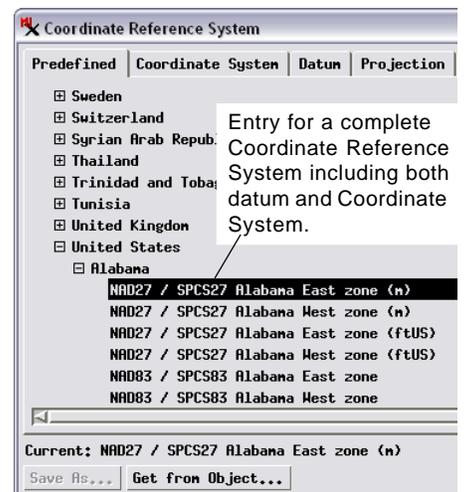
(over)

Predefined Coordinate Systems Using any Datum

Several coordinate systems are widely used for georeferencing geospatial data because they can be used anywhere in the world. Examples are unprojected global geographic coordinates (longitude, latitude) and the projected Universal Transverse Mercator (UTM) and Gauss-Kruger coordinate systems, which divide the Earth's surface into a set of geographic zones. Each of these coordinate systems can be combined with any of the hundreds of datums available in the TNT products to provide a complete coordinate reference system that is tailored to the location of your specific geodata.

You can select geographic coordinates or a particular zone in the UTM or Gauss-Kruger system by selecting the appropriate entry in the Global and Regional grouping on the Coordinate Reference System window's Predefined panel. Note that choosing one of these coordinate systems in the list does not alter the current datum selection. To specify the datum appropriate for the required geographic locality, use the menu on the Datum tabbed panel. The illustrations below show setup of a CRS that combines the UTM zone 5N Coordinate System with the North American 1983 (NAD83) datum for spatial data from Hawaii.
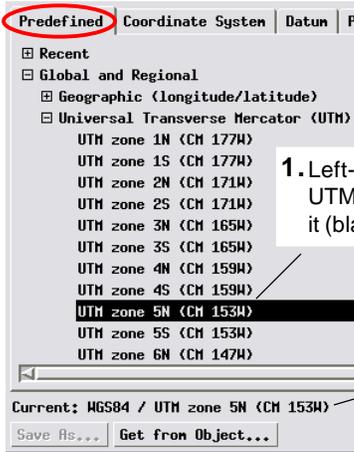

1. Left-click on a UTM zone to select it (black highlight).
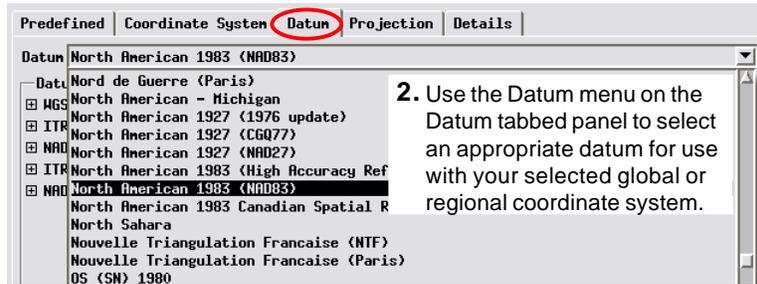
2. Use the Datum menu on the Datum tabbed panel to select an appropriate datum for use with your selected global or regional coordinate system.

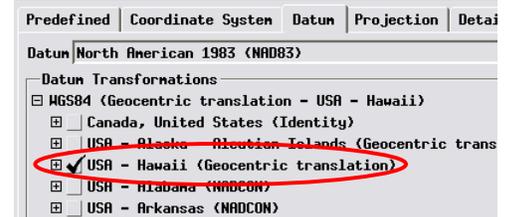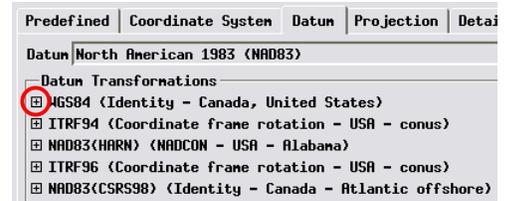Datum menu after selection of the North American 1983 (NAD83) datum.

The Current text line updates automatically to show your selection from the Predefined list. Since in step 1 a coordinate system (UTM zone 5N) was selected rather than a complete Coordinate Reference System, this selection did not change the previous datum setting.
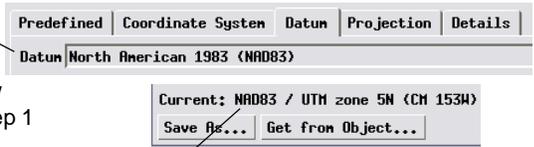
After step 2, the Current line has updated to include the NAD83 datum selected.

Selecting Datum Transformations

Once you have selected a datum on the Datum panel (or indirectly by selecting a complete predefined Coordinate Reference System), you can select direct transformations to other datums (one per datum) using the Datum Transformations listing on the Datum panel. A datum transformation is used whenever a spatial object must be reprojected to match another object georeferenced to a different datum. This situation can occur when objects with CRSs using different datums are overlaid in a View window or are used in other spatial processing. A direct datum transformation provides the fastest and most accurate transformation result. If a direct transformation is not selected or is not available, positions are first translated to WGS84, then to the target datum. The two-step transformation may introduce slight positional inaccuracies compared to a direct transformation. (Note that direct datum transformations may not be available for the particular datum you selected because they are not mathematically defined or are not provided in the European Petroleum Survey Group [EPSG] geodetic parameter database used in TNTmips.) In some instances you can tailor your datum transformation selections to the geographic location and scope of your data. If you were setting up a CRS for an area in a U.S. state using a UTM zone and the North American 1983 datum, for example, you could select a direct transformation specific to that state to the WGS84 datum, as shown here for Hawaii.

Selecting one of the datum transformations from the North American 1983 (NAD83) datum to WGS84.

Saving Coordinate Reference Systems

If you are going to routinely use a particular combination of predefined coordinate system and datum, you can set up this combination once and press the Save As button at the bottom of the Coordinate Reference System window to add it to the Predefined list. The Save Coordinate Reference System window lets you edit the name of the CRS and choose whether to save it for use by any user of the computer ("All users" or as a private CRS only for the "Current user". Once you have saved the custom CRS, it appears in the Predefined selection list of the Coordinate Reference System window within the Saved grouping. You can rename or delete a saved CRS by right-clicking on its entry in the Saved grouping and selecting Rename or Delete from the popup menu.