

Chapter 1

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1.1 Overview

GEOPAK is a comprehensive software package that covers every project phase from conceptualization to final quantities. The software works within the MicroStation graphic environment providing true *interactive design*. For example, a horizontal alignment can be created graphically, it can be calculated with the coordinate geometry component of GEOPAK or some interactive combination of the two. Dynamic on-screen design provides immediate interpretation of plan view geometrics for making design choices through visualization.

Using GEOPAK helps ensure consistency and accuracy of design work and generate significant timesaving in the overall effort of producing construction plans.

For GEOPAK support, please contact the CADD Support Center.

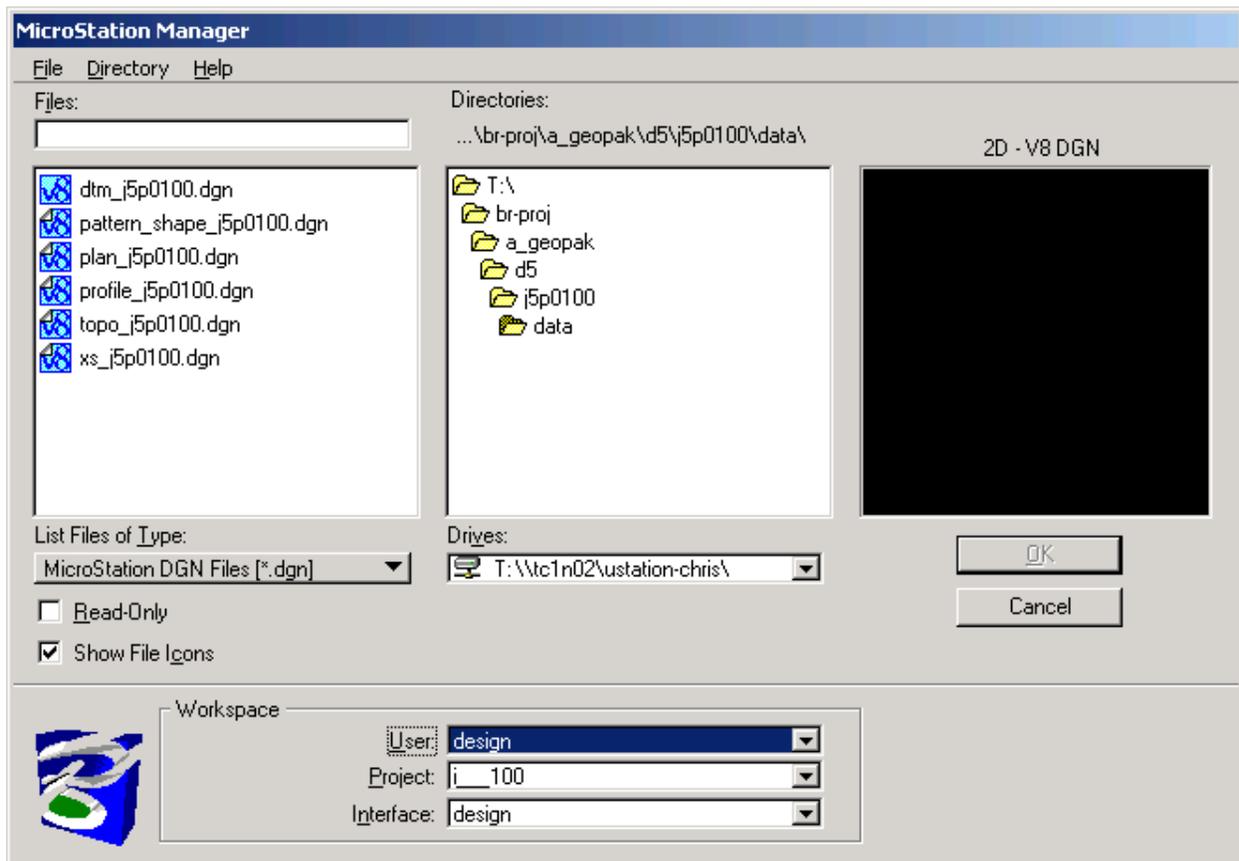
1.2 File Names

GEOPAK uses and/or creates files during the design process. The files you need to be familiar with are listed below:

job###.gpk	This binary file is created when the user starts a coordinate geometry (COGO) session for the first time or through Project Manager and may be appended to during the design process. All coordinate geometry elements are stored in this file. Multiple users can access this file at the same time, and only one file should be created for each project. The "###" is the only variable in this name. It represents a job number (up to 3 alphanumeric characters) unique to a project and is defined by the user upon creation. MoDOT users should use the last 3 digits of the job number. Example J1P0999 -> job999.gpk
fname.inp	Any ASCII input file for running GEOPAK processes. Name is user defined with a .inp extension. Example: shape.inp
fname.log	ASCII file used to capture results from processing input files, proposed cross sections, and earthwork.
fname###.ioc	ASCII input file for loading data during a COGO session. "###" represents the job number and "oc" is the operator code (users initials). Example: align999.ioc
fname###.ooc	ASCII output file created by GEOPAK during a COGO session. Variables are the same as defined above. Example: align999.ooc
fname.dat	A binary file that contains string and point information to be used for digital terrain model construction.
fname.tin	A binary file containing triangular surfaces also known as the digital terrain model (DTM).
project.prj	Binary file resulting from the creation of a new project.

1.3 Accessing GEOPAK Road

GEOPAK is started upon entering a MicroStation File with **User:** set to **design**, as shown in the following dialog. This setting is very important for two reasons. First, GEOPAK is configured to work in the design **Interface**. Second, MicroStation stores all elements in meters and converts those values to the working units for the design file (Settings > Design File...). Design user files are set to use the U.S. Survey foot (0.304800609601219 meters per U.S. Survey foot), which is the basis for the Modified State Plane Coordinates used by the State of Missouri for all survey related work including highway alignments. Bridge user files use the International foot (0.3048 meters per International foot), which is the standard for structural drawings. Since GEOPAK Road is used for alignment work, files set to the U.S. Survey foot should be used.



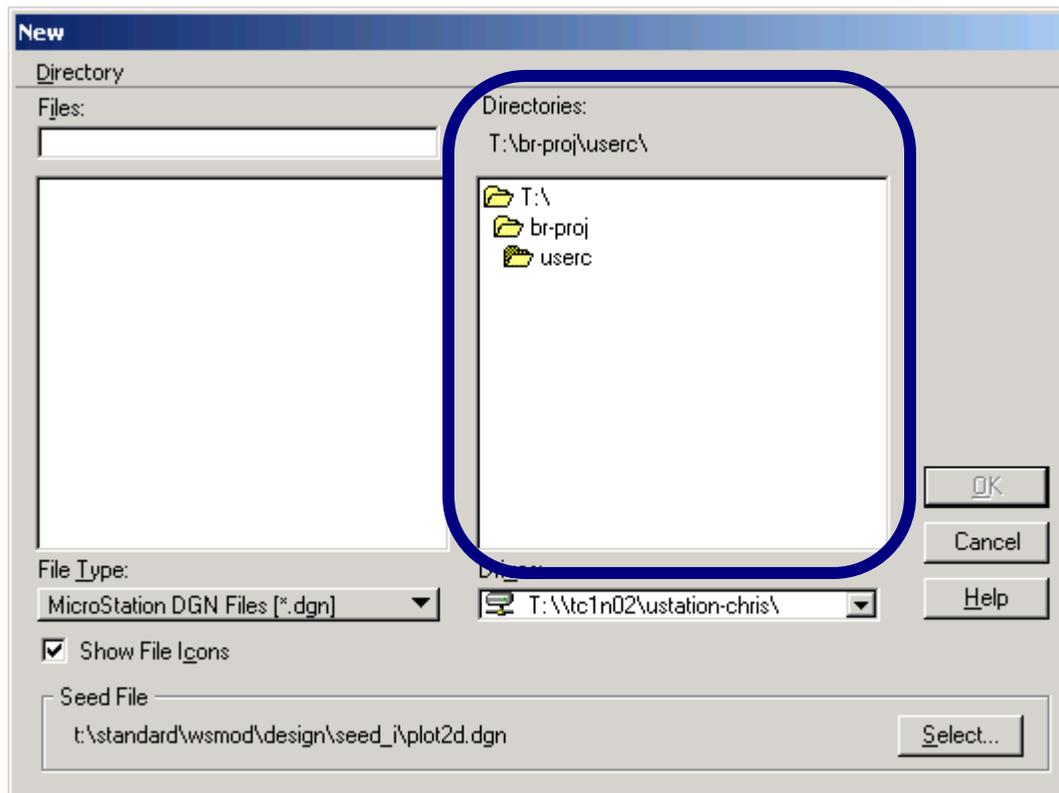
Activate GEOPAK by going to the MicroStation pull-down **Applications > GEOPAK > Activate GEOPAK**. Once GEOPAK is active, the Applications menu expands to show all installed products including **GEOPAK Road**. When each tool is selected, the corresponding dialog appears. To utilize the full potential of GEOPAK, GEOPAK dialogs may be interspersed with generic MicroStation commands. Several dialogs may be opened simultaneously.

To close a dialog, simply click the X in the upper right corner of the dialog. In addition, the Coordinate Geometry dialog and Design and Computation Manager may be closed by selecting the **File > Exit** option. Other various dialogs will have a **Cancel** button, which will exit the dialog. Exiting the MicroStation file automatically closes all GEOPAK dialogs.

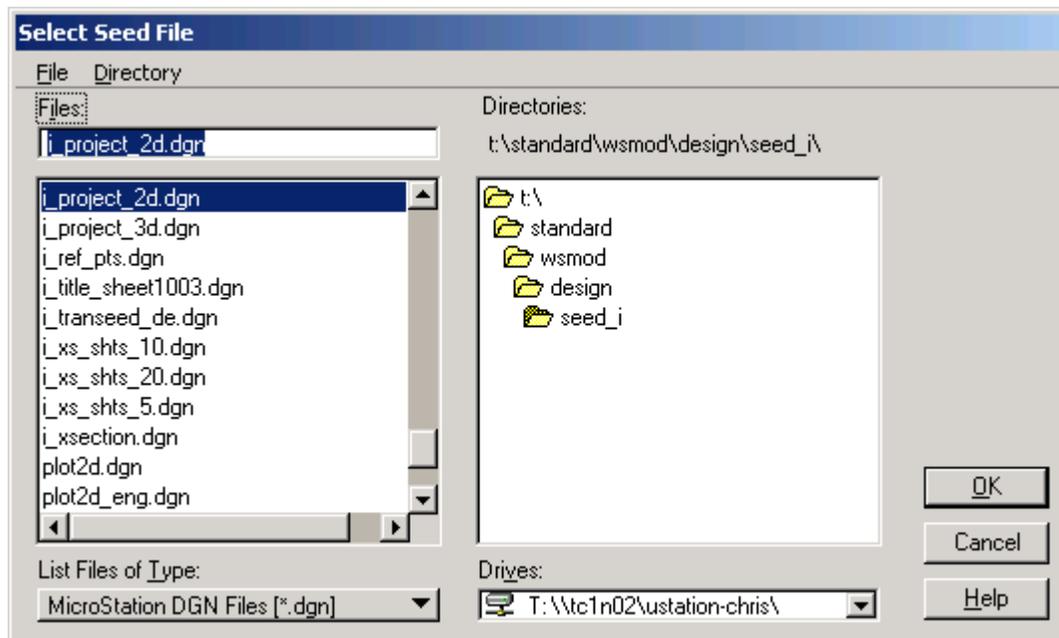
1.4 Starting A New MicroStation File For Use With GEOPAK

As stated in the previous section, GEOPAK Road as used at MoDOT utilizes the actual Modified State Plan coordinates assigned to the project. This coordinate system uses the U. S. Survey Foot as the master unit. For consistency, the MicroStation design file should also use the same master unit. For this to occur, the MicroStation seed file should be selected from the following location: t:\standard\wsmod\design\seed_i. The rest of this section guides you through the steps to manual create a new two-dimensional drawing using the U. S. Survey Foot as the master unit.

To create a new MicroStation design file, select **File > New** from the pull down menu or click on the new file icon shown to the right. This will bring up the following dialog:



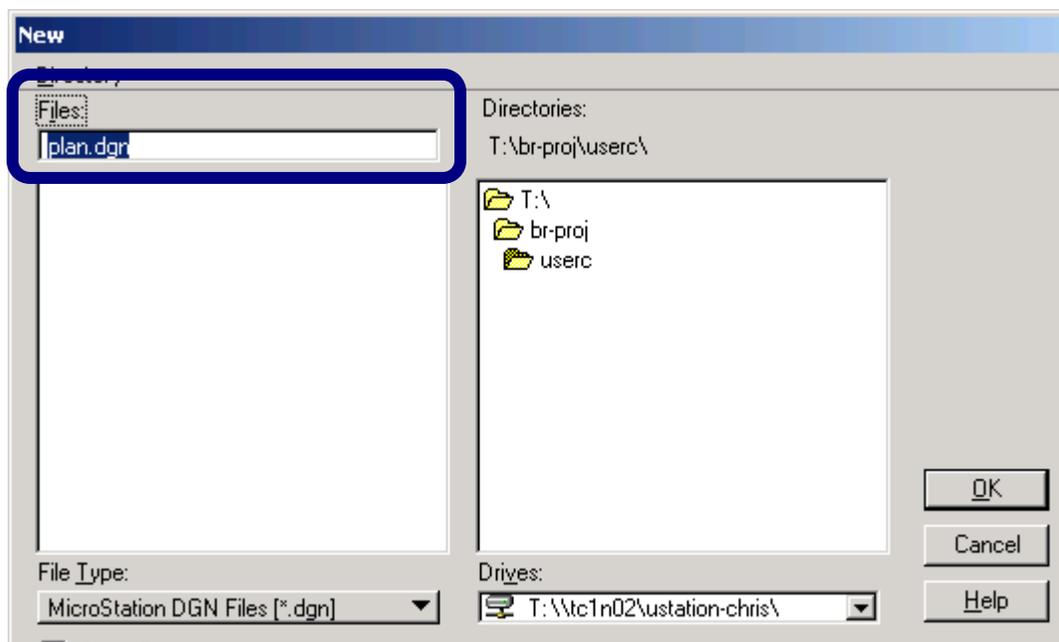
On the right side of the dialog is the **Directories** portion, which is outlined above. Use it to navigate to the folder for the location of the new file. Next, go to the bottom of the dialog and make sure the desired **Seed File** is listed. If it is not, as is the case above, press the **Select** button in the lower right hand corner of the dialog to bring up the Select Seed File dialog shown on the next page:



As shown above in the **Select Seed File** dialog, use the **Directories** portion to navigate to `t:\standard\wsmoc\design\seed_i`.

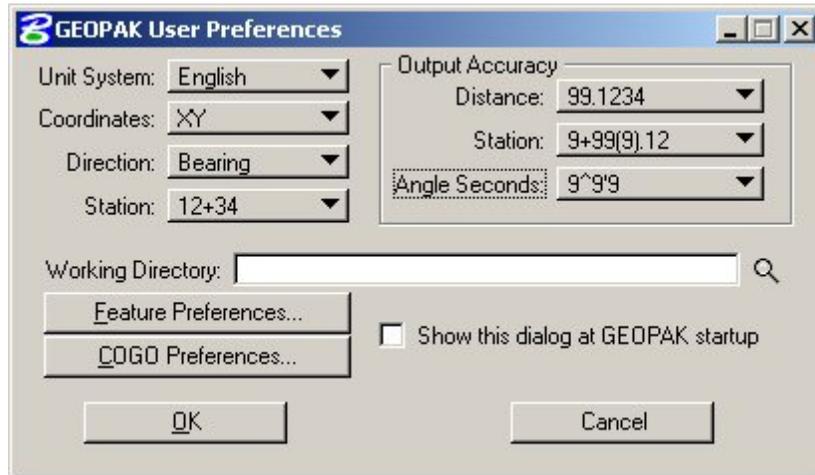
Select **i_project_2d.dgn** from the **Files** list on the left side of the dialog as shown above and click **OK**.

This will return you to the **New** dialog. Type the name for the new file in the **Files:** field, which is outlined in the following figure, and click **OK** to create the file.



1.5 User Preferences

The **User Preferences** dialog is used to set items that determine how distances, directions, and stationing is displayed and calculated, as well as the units that are used. The **User Preferences** dialog can be accessed from **Applications > GEOPAK Road > User Preferences**. The following dialog appears.

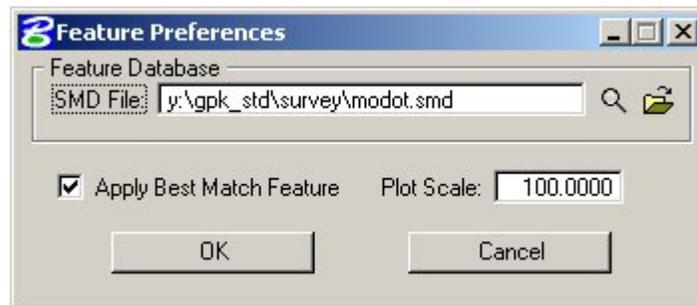


Most of the settings in this dialog will be set when the project is setup.

The **Working Directory** is used to tell GEOPAK where the data files for a particular project can be found. If a user does not want to work within a specific project, they can delete the information out of this field, and GEOPAK will use the directory that the open MicroStation file is located in.

1.5.1 Feature Preferences

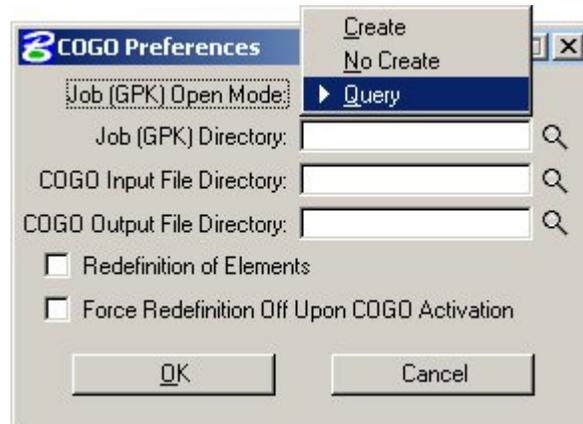
The **Feature Preferences** button activates the following dialog.



The **SMD File** is used to control the symbology of survey elements. Users will not be able to edit the **SMD File**, however, the **Edit SMD...** button can be used to view the feature codes. The **Apply Best Match Feature** toggle should be checked to allow for proper import of survey data. The scale of the features can be controlled using the **Plot Scale**. This should be set to the scale of the plan sheets to be created.

1.5.2 COGO Preferences

The **COGO Preferences** button will activate the following dialog.



The **Job (GPK) Open Mode** allows the user to set certain constraints used upon creation of a new coordinate geometry data file. So each time the Coordinate Geometry window is invoked for a job number that does not correspond with a job###.gpk file in the specified working directory, GEOPAK creates a new job###.gpk file based on the constraints set up in the COGO Preferences. The three constraints are **Create**, **No Create**, and **Query**. The **Create** mode automatically creates a new .gpk file without giving the user any warning. The **No Create** mode does not allow the creation of a new .gpk file and gives the user a warning. The **Query** mode gives the user a warning that this job###.gpk file does not exist in the current working directory as well as giving the user the option to proceed with the creation of the file or cancel it. The default MoDOT Mode is set to **Query**.

The **Job Directory** must be set to indicate the location of the coordinate geometry database (.gpk), which is automatically placed in the **working directory** when a GEOPAK job is first created. If this field is not set, GEOPAK Survey will not run correctly. The **COGO Input File Directory** and **COGO Output File Directory** can be set to indicate the location of the COGO input and output files respectively. If these fields are not set, GEOPAK will look in the **Job Directory**. If the **Job (GPK) Directory is not set**, GEOPAK will look for the files in the working directory. If the **Working Directory is not set** in the GEOPAK User Preferences dialog, GEOPAK will look for the files in the directory where the active MicroStation file is located.

The **Redefinition of Elements** toggles on or off the COGO redefine option. This option is discussed further in Chapter 5. The **Force redefinition off at Cogo Activation** will turn the COGO redefine toggle off whenever GEOPAK's coordinate geometry tools are activated.