

# Model Navigator (V1.0) User's Manual

03-Apr-09

Model Navigator can parse a mathematical model and display information that will be useful to the model user and model builder.

## Specifications

Model Navigator (V1.0) can parse any model that is compliant with the DES V1.0 XML schema. Compliant models include all of the models in the model library and DigitalHuman (V0.4).

## Required Files

- Model Navigator.EXE
- Images folder containing ModelNavigator.ICO

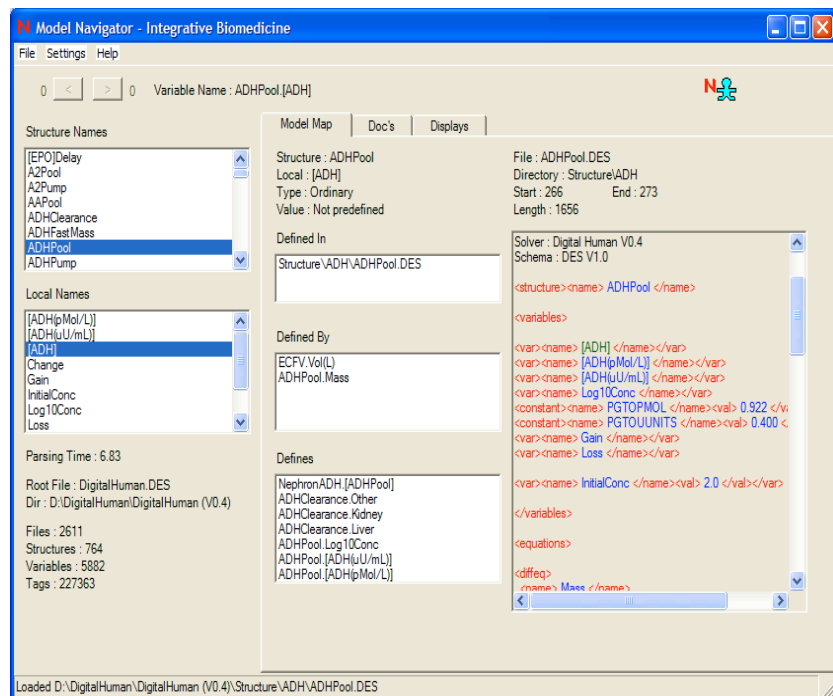
The Images folder is work in progress. It may not be needed in the next release.

## General Organization

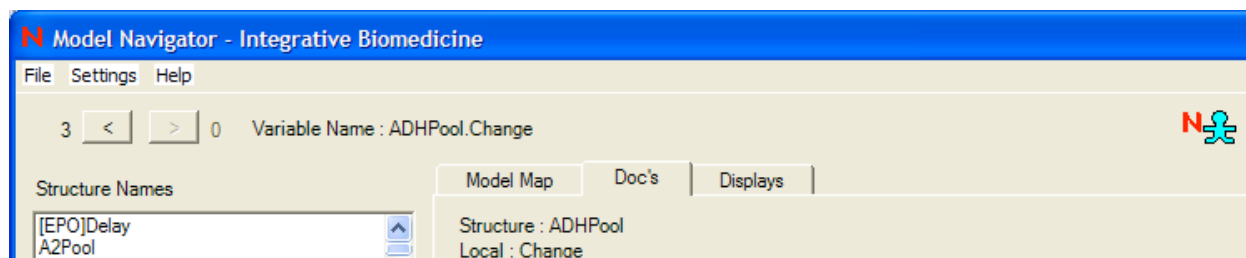
Most navigating activity takes place in Model Navigator's main window. Activity typically flows from left to right and top to bottom.

The functional areas of the main window are

- Top Area – Shows the name of the variable that is currently being investigated in detail.
- Left Area – Provides a list of all the model's variable names.
- Tabs – Three tabs control the functionality of the center and right areas.
- Center Area – Details related to cause and effect.
- Right Area – File Content



## Top Area



The model title, as defined in the `<modeltitle> ... </modeltitle>` element is displayed in the window title bar after the application name.

The application main menu has just three choices: *File*, *Settings* and *Help*. *File* and *Settings* are described below. *Help* serves up an *About* box.

Model Navigator displays model information as a function of variable name. The name of the variable currently being analyzed is displayed here. It is a global variable name (see below).

At the top-left are forward-backward buttons that allow you to re-trace and re-re-trace previous variable picks. The figure above shows a history of 3 previous picks.

## Left Area

The left area of the main window lists the names of all of the variables in the model.

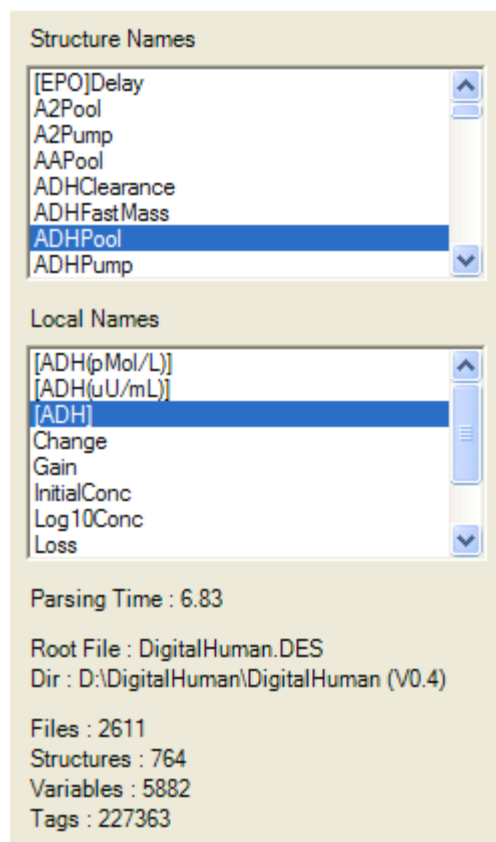
Variable names in DES V1.0 schema have two parts separated by a dot (.). The prefix is the name of the structure in which the variable is declared. The suffix is the local name, which can be used without qualification in its own structure. The global variable name is prefix-dot-suffix.

GlobalName = StructureName.LocalName

The left area breaks global variable names down into structure names and local names for display and selection.

Click a structure name and then a local name to select a variable for further analysis. In the figure at the right, the variable that was selected is ADHPool.[ADH].

Some information generated by the parser is shown at the bottom of the left area.



## Tabs

The function in the center and right areas of the main window is determined by three tabs: *Model Map*, *Doc's* and *Displays*. The right area generally displays the contents of a relevant file (see below). So, the next three topics describe the functions offered in the center area in response to tab clicks.

### Model Map

The center area for Model Map displays four items.

At the top is the name of the variable being analyzed. In this case it is *ADHPool.[ADH]*.

Next down is the name of the file or files where the variable is defined. Some variables, such as parameters and constants are defined when they are declared. Other variables are defined in more remote locations. Some variables are defined in more than one location – typically in conditional math.

Clicking on the file name takes you directly to the file and location where the definition is taking place. You can then see the math used in the definition.

Next down is a list of all the variables involved in the definition. In this example, *ADHPool.[ADH]* is defined by *ECFV.Vol(L)* and *ADHPool.Mass*. Clicking on a (defined by) name selects that variable for analysis. The entire window is updated after the click.

Finally at the bottom is a list of all the variables that our variable helps to define. As above, clicking on a (defines) name selects that variable for analysis. The entire window is updated after the click.

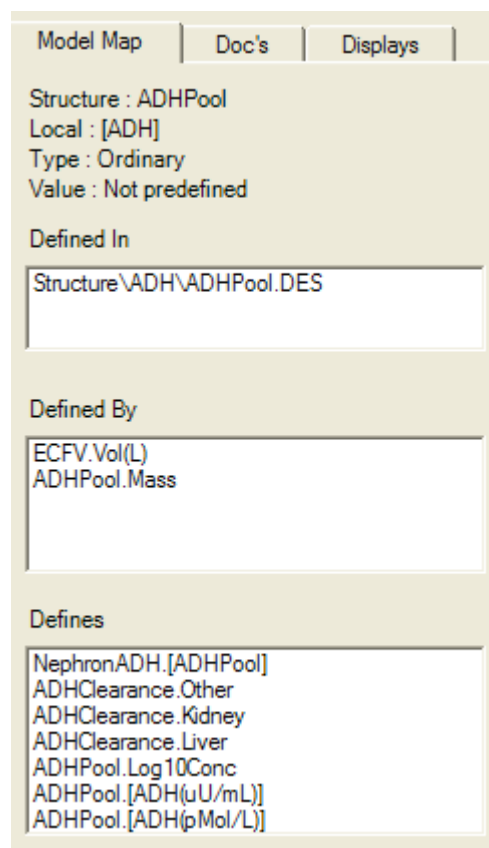
### Doc's

Model documentation in DES V1.0 schema is divided into *internal* and *external* components.

*Internal documentation* is contained in the models variables, equations and other definitions. Internal documentation is extracted and displayed by this Model Navigator.

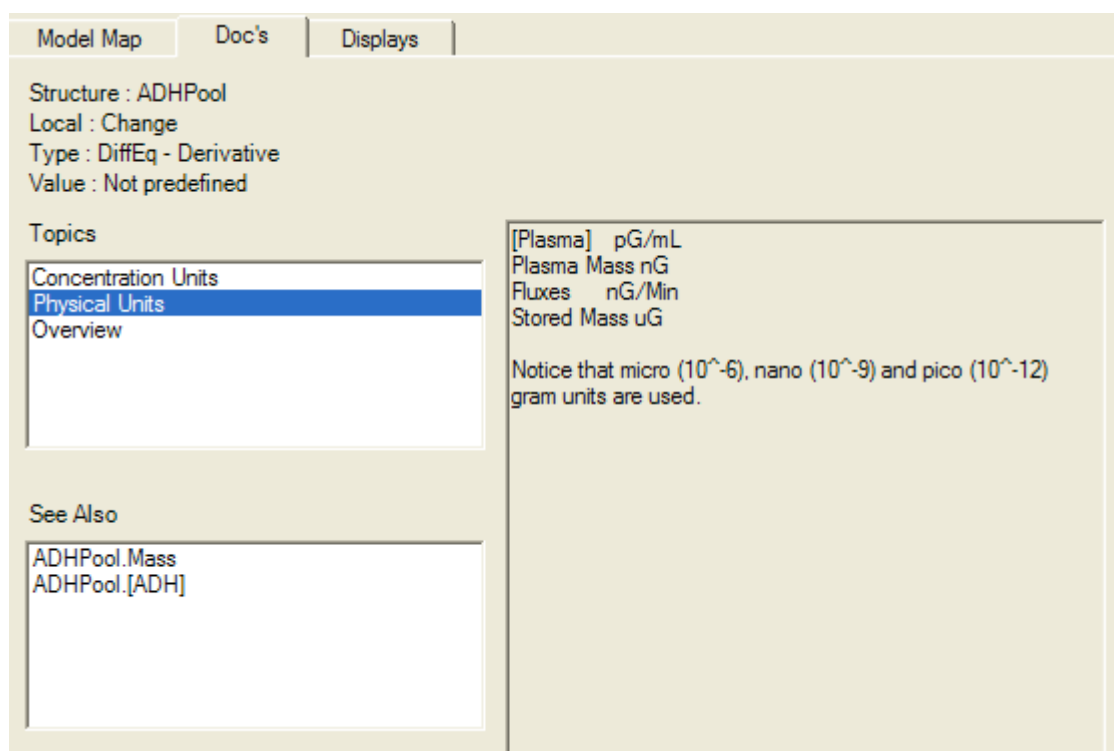
*External documentation* is additional information supplied by the model's authors. It is displayed using the *Doc's* tab.

When the *Doc's* tab is clicked, the center area displays external model documentation and documentation choices.



The center area displays two items

- A list of documentation topics that have been assigned to the variable being analyzed. Click on a topic and it is displayed in the content area to the right (as illustrated in the example).
- A list of variables that are related to the variable being analyzed. Clicking on a name selects that variable for detailed analysis.



External model documentation in DES V1.0 schema is carried along with the rest of the model but in separate files. These files can have any filename extension, but DOCS is recommended.

The equation solver's parser does not parse these files, but the Model Navigator parses these files and displays the information obtained.

## Displays

When the *Displays* tab is clicked, the center area describes where the variable being analyzed is displayed.

This is usually of little interest, but there are two occasions when it is of great interest.

One occasion is when you want to view the values of a variable during a simulation and just cannot find where it is displayed. This service will show you where or will tell you it is not displayed and please stop looking.

The other occasion is when you are considering deleting or renaming a variable. Reference to that variable in the displays must also be deleted or edited. This service provides the display filenames and intra-file locations.

The screenshot shows a software window with three tabs: 'Model Map', 'Doc's', and 'Displays'. The 'Displays' tab is active. On the left, under 'Displayed in', there is a list of file paths: 'Hormones\ADH\Pool\Balance.DES' (highlighted) and 'Hormones\ADH\Pool\Balance.DES'. On the right, there is a text area containing XML code for a display. The code includes labels for 'Time' and 'Mass', scales for the x-axis and y-axis, and showvalue blocks for 'Mass' and 'mw'.

Model Map | Doc's | Displays

Structure : ADHPool  
Local : [ADH]  
Type : Ordinary  
Value : Not predefined

File : Balance.DES  
Directory : Display\Physiology\Hormones\ADH\Pool  
Start : 757      End : 764  
Length : 1861

Displayed in

- Hormones\ADH\Pool\Balance.DES
- Hormones\ADH\Pool\Balance.DES

```
<label> Time </label>
<scale><min> 0 </min><max> 2 </max></scale>
</xaxis>
<yaxis>
<yvar>
  <name> [ADH] </name>
  <notlabel/>
  <linecolor> BLUE </linecolor>
</yvar>
<scale>
  <min> 0 </min><max> 2 </max><inc> 1 </inc>
</scale>
</yaxis>
</showgraph>

<showvalue>
  <row> 10.0 </row><col> 1.0 </col>
  <name> Mass </name>
  <format><decimal> 1 </decimal></format>
  <label> Mass </label>
</showvalue>

<showvalue>
  <mw> 11.0 </mw><col> 3 </col>
  </showvalue>
```

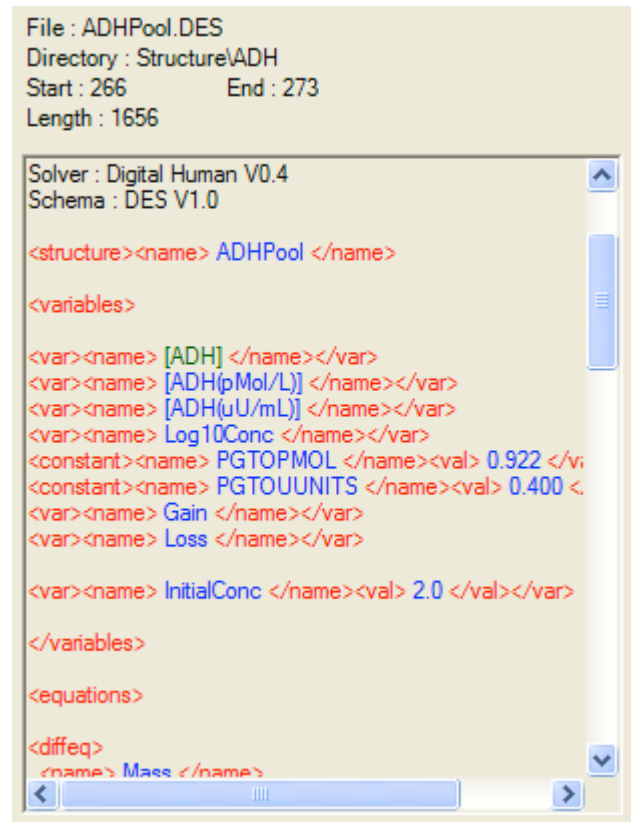
## Right Area

The right area generally displays the contents of a relevant file for the variable name being analyzed. Alternatively, it displays documentation topics.

XML is color highlighted. Colors can be selected using the *Settings* main menu selection (below).

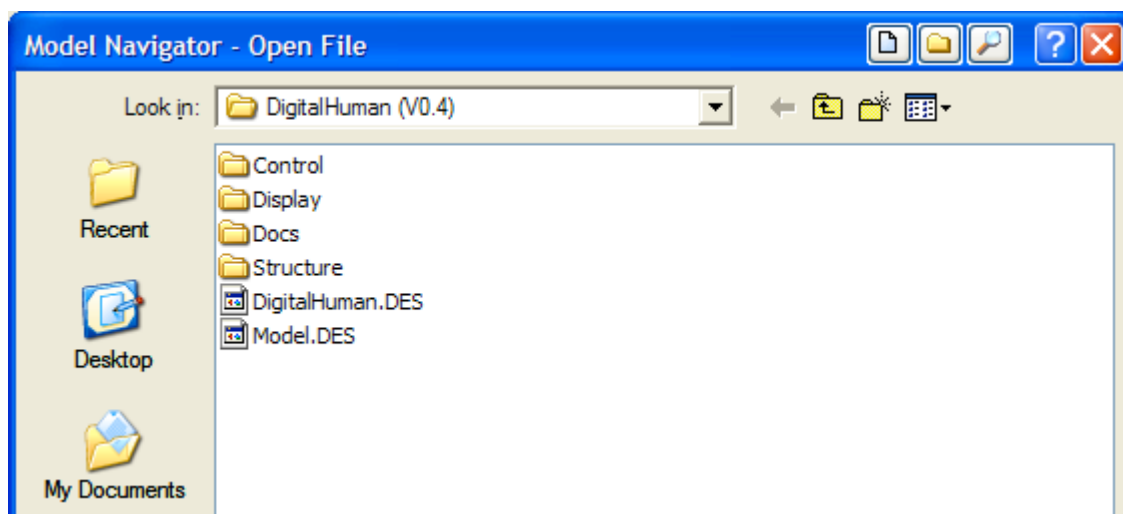
Specific content is identified by the selection color. In this example, selection highlighting shows the exact place in the document where the variable named [ADH] is declared.

File information for the current file is displayed at the top of the right area.



## File Main Menu Selection

The *File* main menu selection offers *Open* which in turn offers a standard Windows *Open File* dialog box. Go here to select the next model to be analyzed by Model Navigator.

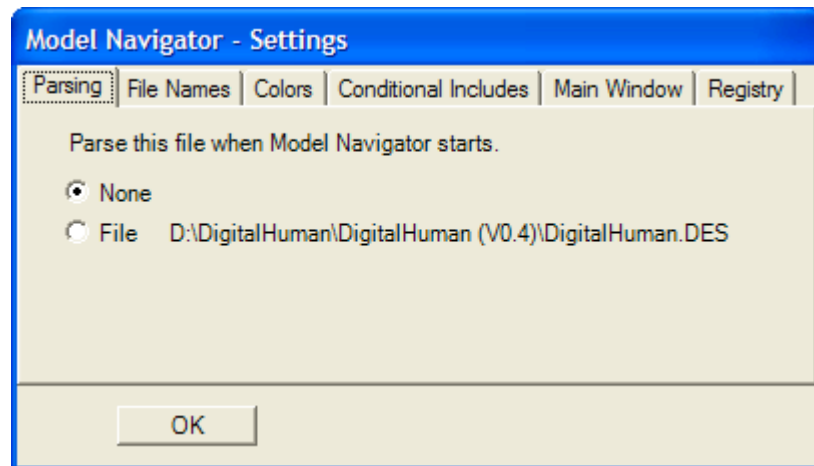


## Settings Main Menu Selection

The *Settings* main menu selection offers you several useful options, as described below. Clicking the *Settings* menu item invokes a tabbed dialog box (as shown in the following topics).

### Parsing

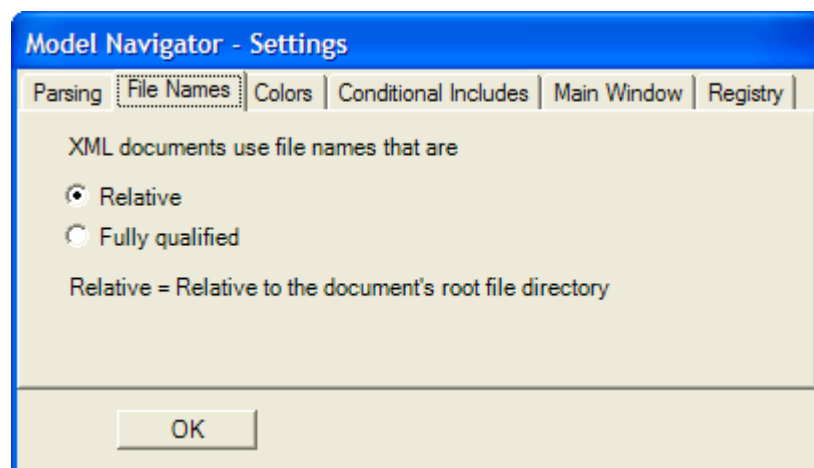
Model Navigator can start up in two different ways. One is to start and to wait for you to select a file using the *File* main menu selection. This is the procedure at first use. The other way is to start up and automatically parse a predetermined file. This is useful if you are always browsing the same file, such as DigitalHuman.



Click *None* for no action at startup. Click *File* to have the specified file parsed at startup.

### File Names

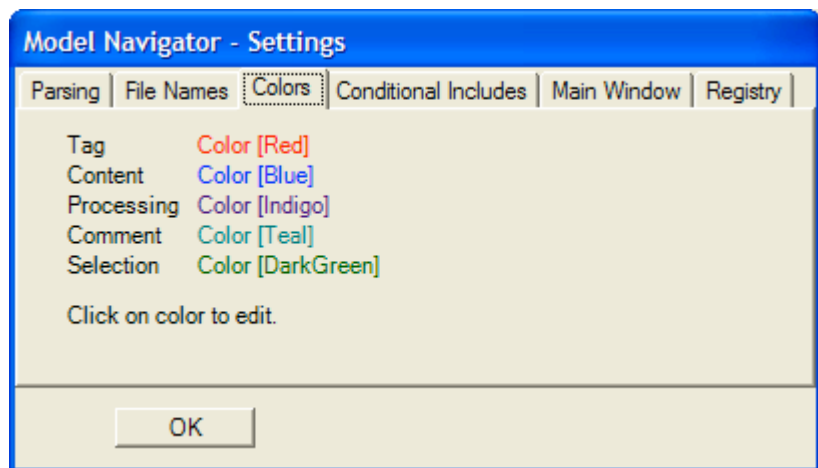
The DES schema allows file paths to be specified using the `<?path ...?>` processing instruction and filenames to be specified in the `<?include ...?>` processing instruction. These paths and filenames can be either relative to the model's main (root) file (common and preferred, as in DigitalHuman) or absolute



(fully qualified), going all the way down to the disk drive letter (rare and not preferred). Use this panel to select either relative or fully qualified file names for the model being parsed.

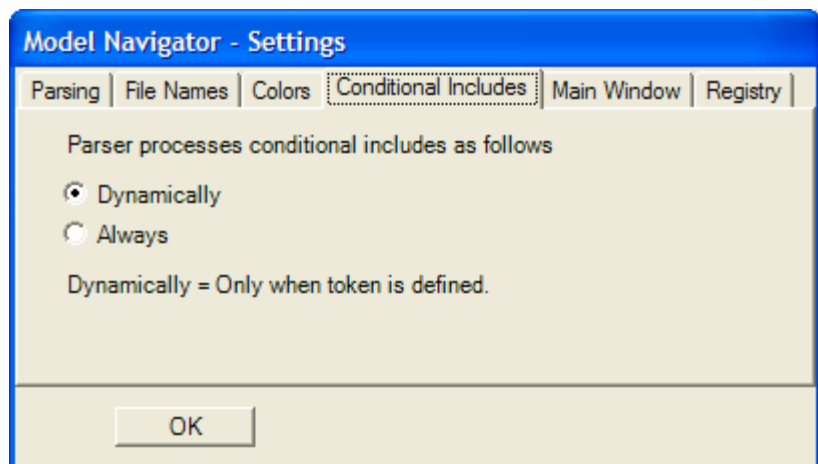
## Colors

The file content box color highlights XML. Use this panel to specify highlighting colors. The first four colors identify XML tags, element content, processing instructions and comments. The last color is used when the file content box wants to highlight some content that is directly relevant to the variable being analyzed.



## Conditional Includes

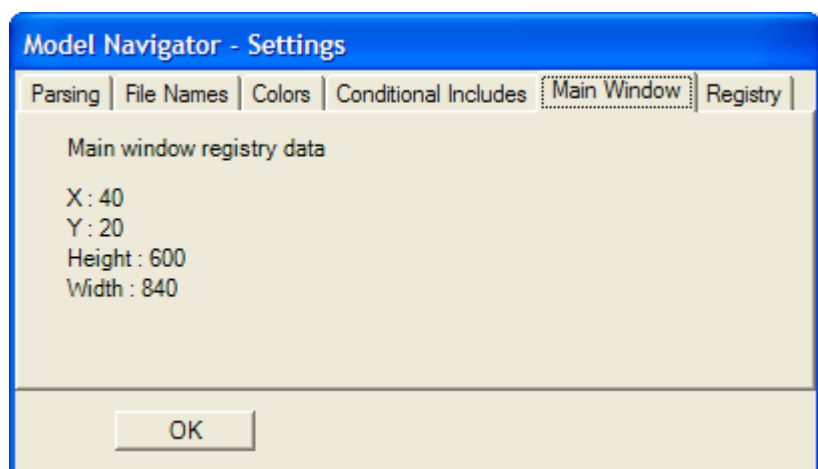
A model that is compliant with DES V1.0 XML schema can be customized as it is parsed. This is implemented by conditional includes. Conditional includes are processing instructions that are specified as `<?if Token Filename ?>`. This translates to: if *Token* exists, then include *Filename*. There is also an `<?ifnot ... ?>` processing instruction. Tokens are created using `<?create Token ?>`.



You can use this panel to specify that tokens be evaluated and the only the parts of the model that will be visible are those allowed in by the current state of the token (Dynamically). Alternatively, all parts of the model are parsed and are visible in the browser (Always).

## Main Window

This panel shows the size and location of the main window (in pixels). It probably has no value.





## Registry

Model Navigator stores a small amount of important information in the registry.

To uninstall Model Navigator, simply delete the relevant files.

But wait, do a really clean uninstall this way. Run Model Navigator one last time. Check the box in this panel. On program exit, the Model Navigator's registry entries will be wiped clean. Now delete the relevant files.

You can also check the box if you want to start over with a clean registry and default program values.

End

