LMSS ArcGIS Tools

NAME: LMSS ArcGIS Tools

Install File: LMSS_Converter_9x.exe and LMSS_Converter_10x.exe
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TOPICS: Trimble SoloForest, Waypoint, Plot Layout, Import Stand IDs

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Description: This extension includes three primary tools and once ancillary tool:

1.   *LandMark Spatial Solutions Waypoint Converter* tool, which converts a point feature class into a Waypoint CSV file compatible with Trimble's SoloForest GPS data collection software.

2.   *LandMark Spatial Solutions Plot Layout* tool, which generates an array of plot points within existing stand polygons. This tool includes an ancillary tool to help set an anchor point for the plot array, if such an anchor is desired.

3.   *LandMark Spatial Solutions Import Stand IDs* tool, which imports Stand ID values from existing stand polygons to an existing plot point feature class. Optionally the tool will import any and all other attribute values from the Stand feature class as well.

Requires: ArcGIS 9.3 or better, at any license level.

Revision History on p. 36.

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Installing the LMSS ArcGIS Tools

For ArcGIS 9.x

First close ArcGIS if it is open. Tools do not install properly if ArcGIS is running during the installation.

Install the *LMSS ArcGIS Tools* extension by double-clicking on the file **LMSS_Converter_9x.exe** and following the instructions. The installation routine will register the LandmarkSS.dll with all the required ArcMap components.

The default install folder for the extension is named "LMSS_ArcGIS_Tools" and is located at either "Program Files\LMSS_ArcGIS_Tools\" (for 32-bit systems) or "Program Files (x86)\LMSS_ArcGIS_Tools\" (for 64-bit systems). This folder will also include some additional files and this document.

For ArcGIS 10.x

Note: This function will only work if you have ArcGIS 10 installed.

1. **First close ArcGIS if it is open.** The tools do not install properly if ArcGIS is running during the installation.

2. Install the *LMSS ArcGIS Tools* extension by double-clicking on the file **LMSS_Converter_10x.exe** and following the instructions. This installation routine will install the LandmarkSS.dll and several ancillary files on your hard drive, but will **not** register the tool with ArcGIS.

3. Use Windows Explorer to open your installation folder. If you used the default values, then this folder will be located at either "Program Files\LMSS_ArcGIS_Tools\" (for 32-bit systems) or "Program Files (x86)\LMSS_ArcGIS_Tools\" (for 64-bit systems). This folder will also include some additional files and this manual.
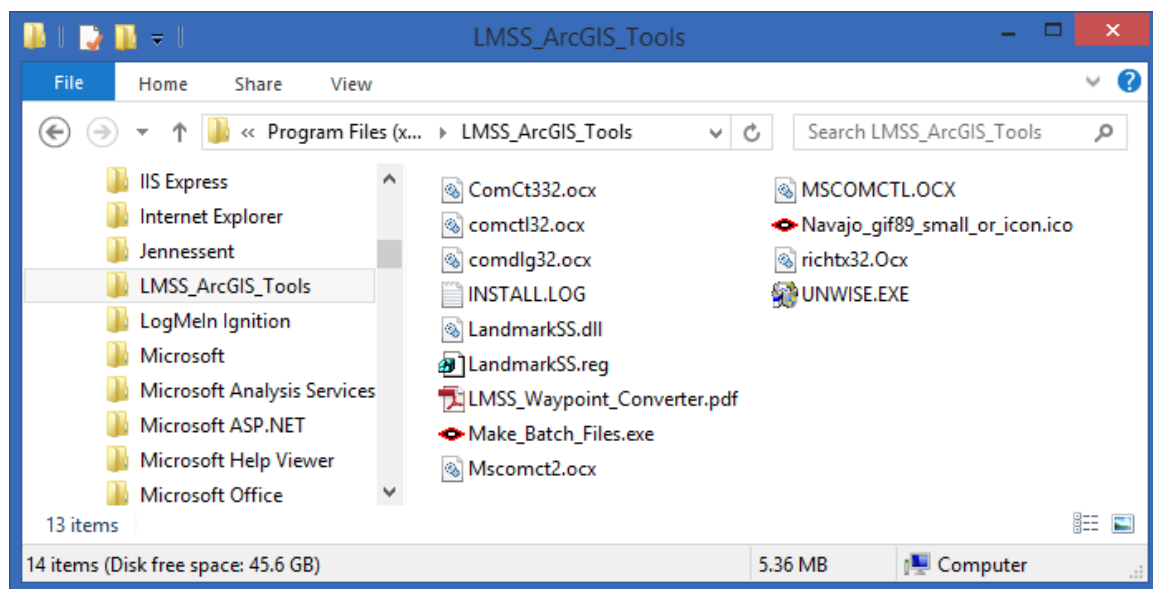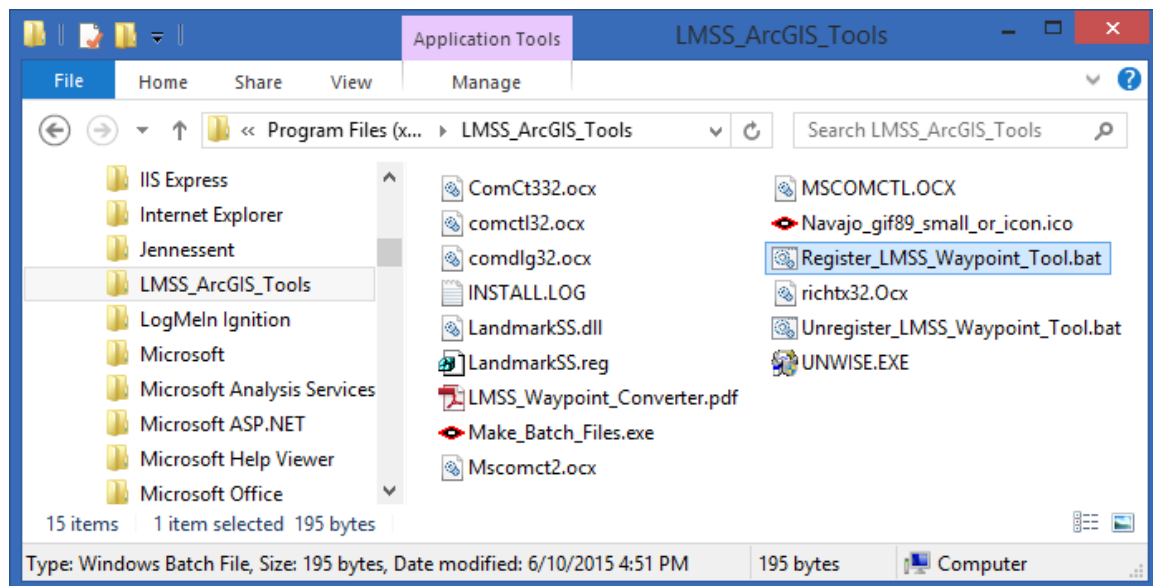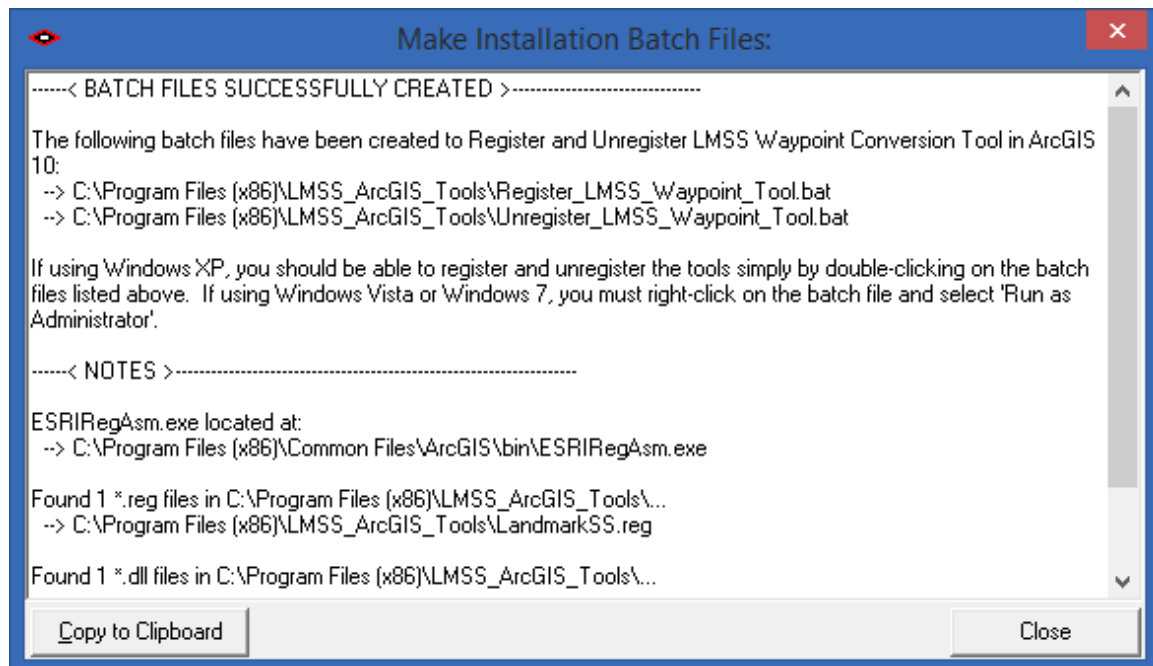

4. **For Windows XP:** Double-click the file "Make_Batch_Files.exe" to create registration and unregistration batch files that are properly formatted to your system.

a. Double-click the new batch file "Register_LMSS_Waypoint_Tool.bat" to register the tool with ArcGIS 10.x.

b. If the registration is successful, then you should see a "Registration Succeeded" notice.
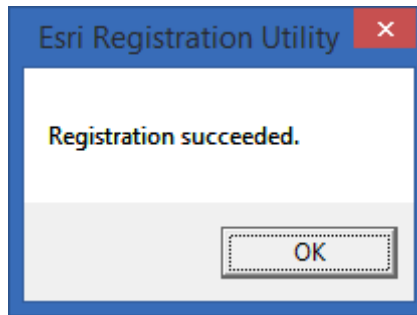
5. **For Windows Vista, Windows 7 or Windows 8:** Right-click the file "Make_Batch_Files.exe", and then choose "Run as Administrator" to create registration and unregistration batch files that are properly formatted to your system.
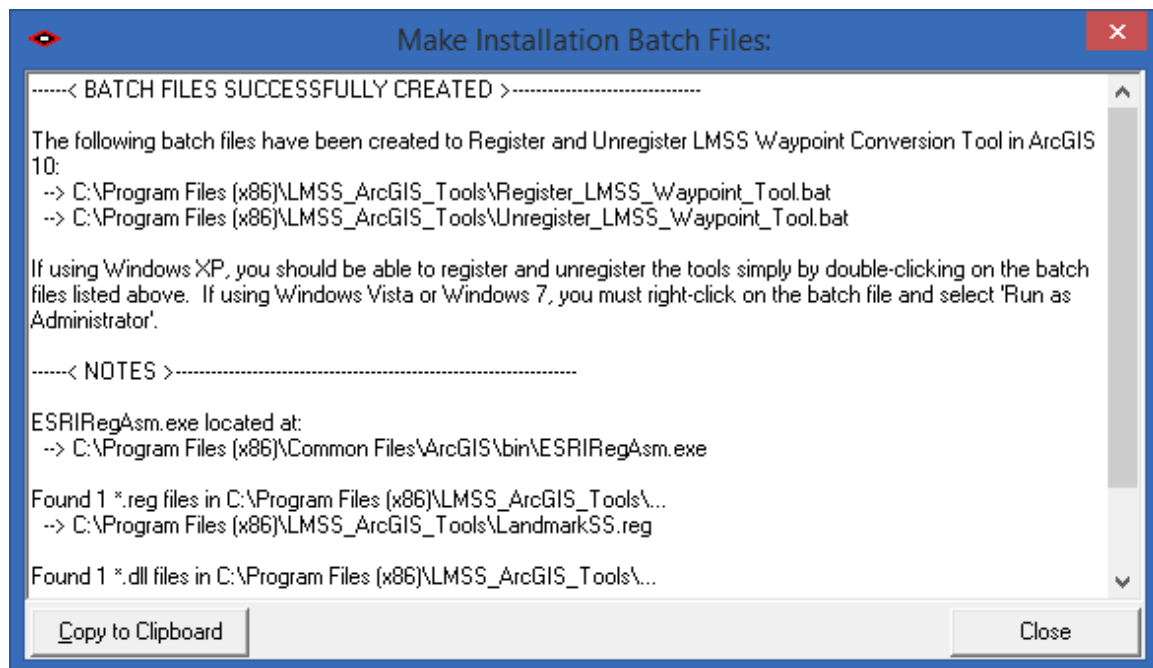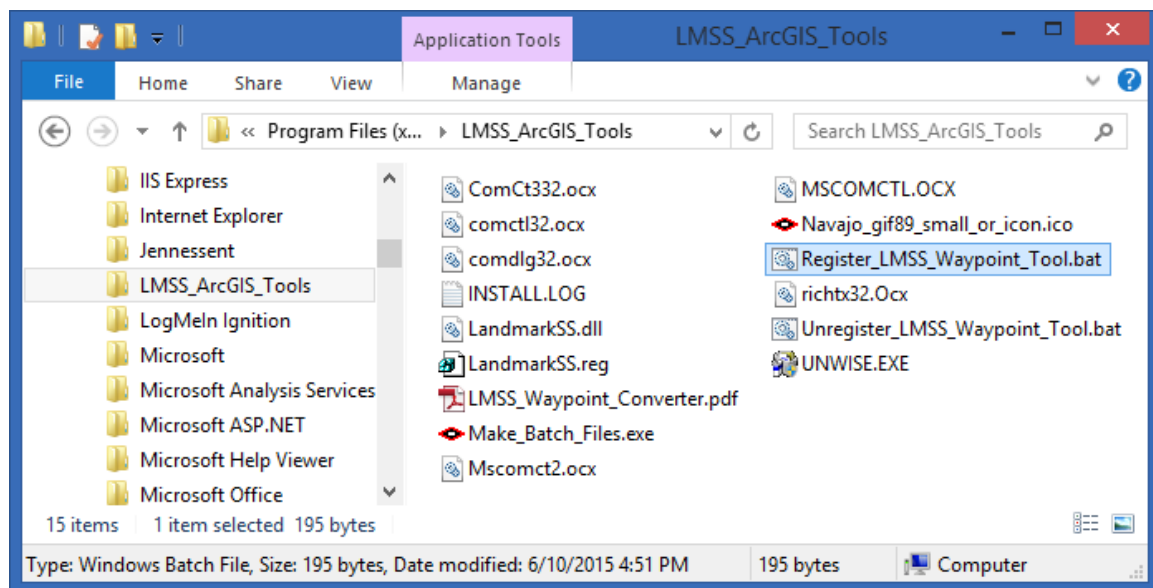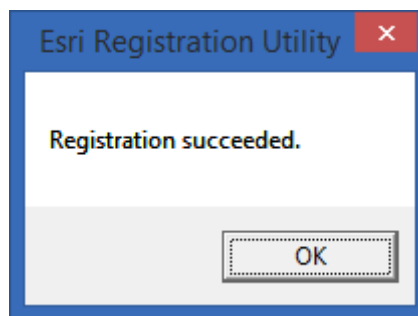
6. Right-click the new batch file "Register_LMSS_Waypoint_Tool bat", and then choose "Run as Administrator" to register all the tools with ArcGIS 10.x.

7. If the registration is successful, then you should see a "Registration Succeeded" notice.

Note: For the concerned or curious, the batch file *Register_LMSS_Waypoint_Tool.bat* contains a single line of text that looks similar to the following:

```
"C:\Program Files (x86)\Common Files\ArcGIS\bin\ESRIRegAsm.exe" /p:Desktop
"D:\arcGIS_stuff\consultation\LandmarkSpatial\LandmarkSS.dll"
/f:"D:\arcGIS_stuff\consultation\LandmarkSpatial\LandmarkSS.reg"
```

It directs the ESRI installer *ESRIRegAsm* to register the extension DLL *LandmarkSS.dll* within ArcGIS, using GUID and Class ID values from the registry file *LandmarkSS.reg* (also located in your installation directory). Both *Register_LMSS_Waypoint_Tool.bat* and *LandmarkSS.reg* may be opened and viewed using standard text editors such as Notepad or WordPad.

Viewing the Tool

This tool is installed as an extension in ArcMap, but it is a type of extension that is automatically loaded. You will not see this extension in the "Extensions" dialog available in the ArcGIS "Tools" menu. It is not dependent on any other extensions or any ArcGIS license level.

After installing the extension, you should see the following new toolbar in your map (it may also be embedded in your standard ArcMap toolbars, rather than as a standalone object):

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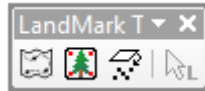
If you do not see this toolbar, then open your "Customize" tool by either:

1) Double-clicking on a blank part of the ArcMap toolbar, or

2) For ArcGIS 9, click the "Tools" menu, then "Customize", or

1) For ArcGIS 10, click the "Customize" menu, then "Customize Mode"

In the "Customize" dialog, click the "Toolbars" tab and check the box next to "LandMark Tools":
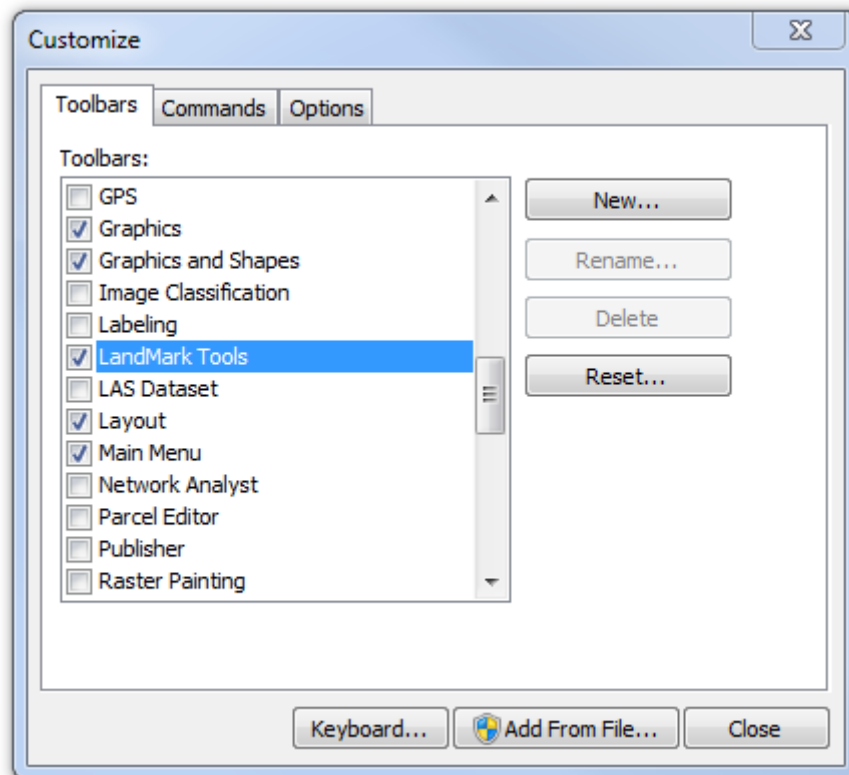
Registering the Tool

This tool can be installed without restriction on any Windows computer. However, it will be disabled on that computer until the user is provided with a license file by the Landmark Spatial Solutions License Administrator.

The first time the user runs the tool, they will be shown a message similar to the following:
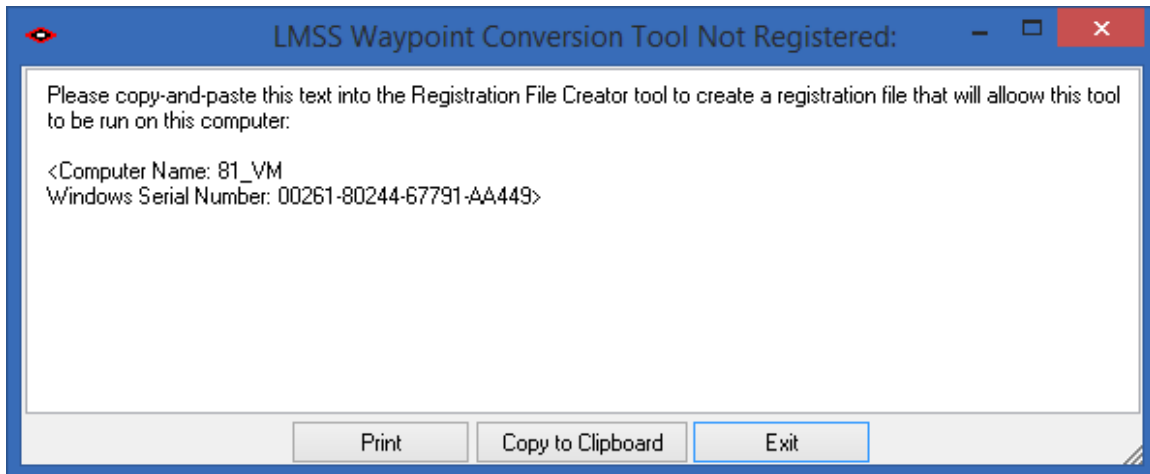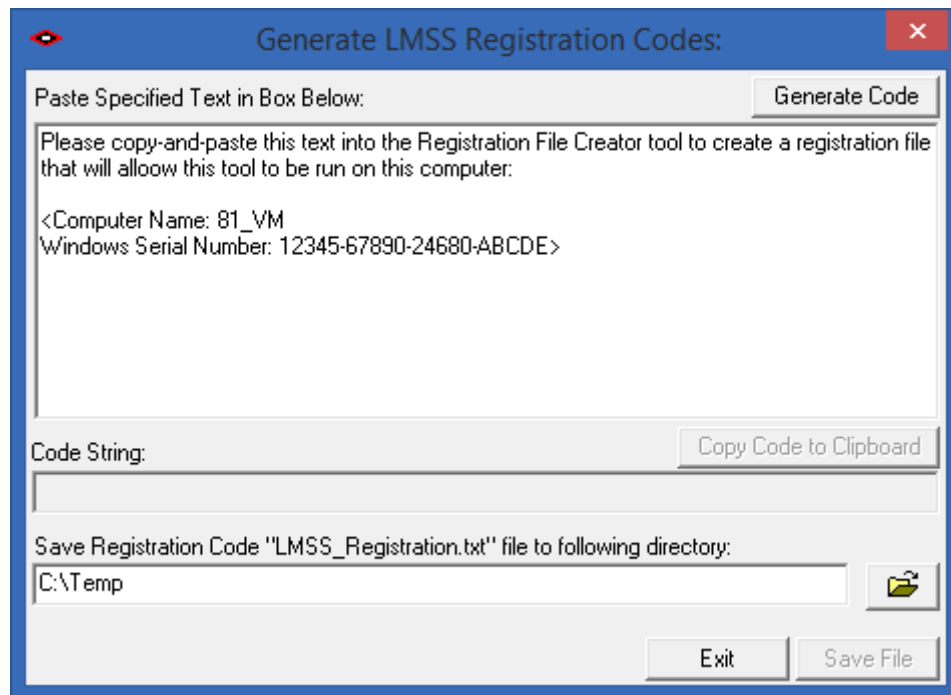
The user should copy this to an email or text file and provide it to the LMSS License Administrator.

For the License Administrator:

The license administrator will run the "LMSS_CodeMaker" tool to create the license file. You must copy at minimum the portion of the message between (and including) the angle brackets into the LMSS_CodeMaker tool. You may copy the entire message from the user into the tool if you wish.
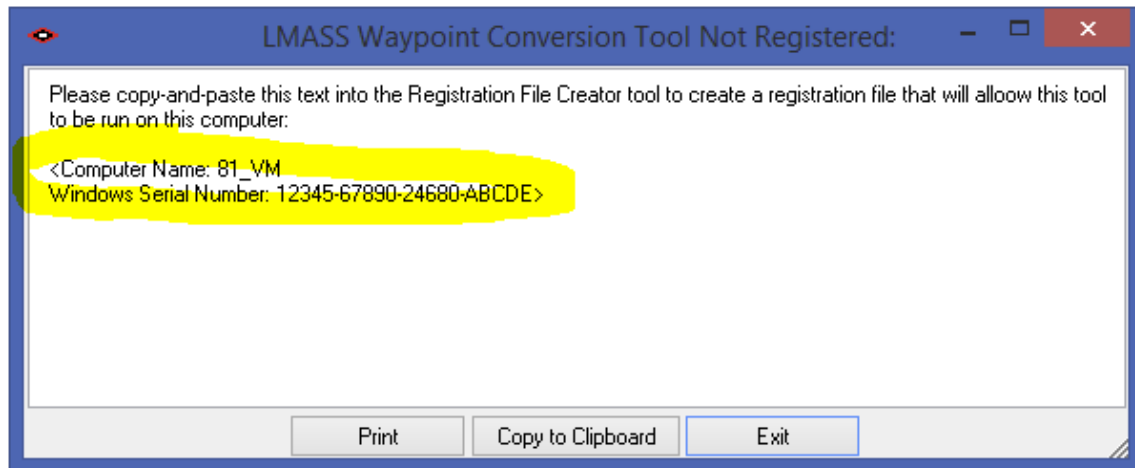
Paste the code into the "Generate LMSS Registration Codes" window as illustrated below:

Click the "Generate Code" button to create a hash code unique to that computer:

Next, select a folder to save the registration file to, and then click the "Save File" button. The tool will save the file with the name "LMSS_Registration.txt". The tool should let you know if it successfully created the file:
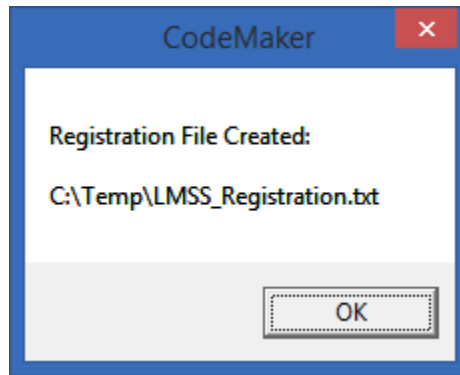
Finally, copy this "LMSS_Registration.txt" file back to the Installation folder on the user computer. If the tool finds this file, and if the code in the file correctly corresponds with the code it expects to find for this computer, then the tool will run without any further interruption.

Note: If you are unable to create the "LMSS_Registration.txt" file for any reason (possibly if you do not have write-access privilege to that location), then you can simply use Notepad to create an empty text file and copy the code string into it. Be sure to name the file "LMSS_Registration.txt", and then move the file into the tool installation folder.

Uninstalling the LMSS ArcGIS Tools Extension

For ArcGIS 9.x.

1) Close ArcGIS if it is open.

2) Click the Start button.

3) Open your Control Panel.

4) Double-click "Add or Remove Programs".

5) Scroll down to find and select "LMSS_Waypoint_Converter_9x".

6) Click the "Remove" button and follow the directions.
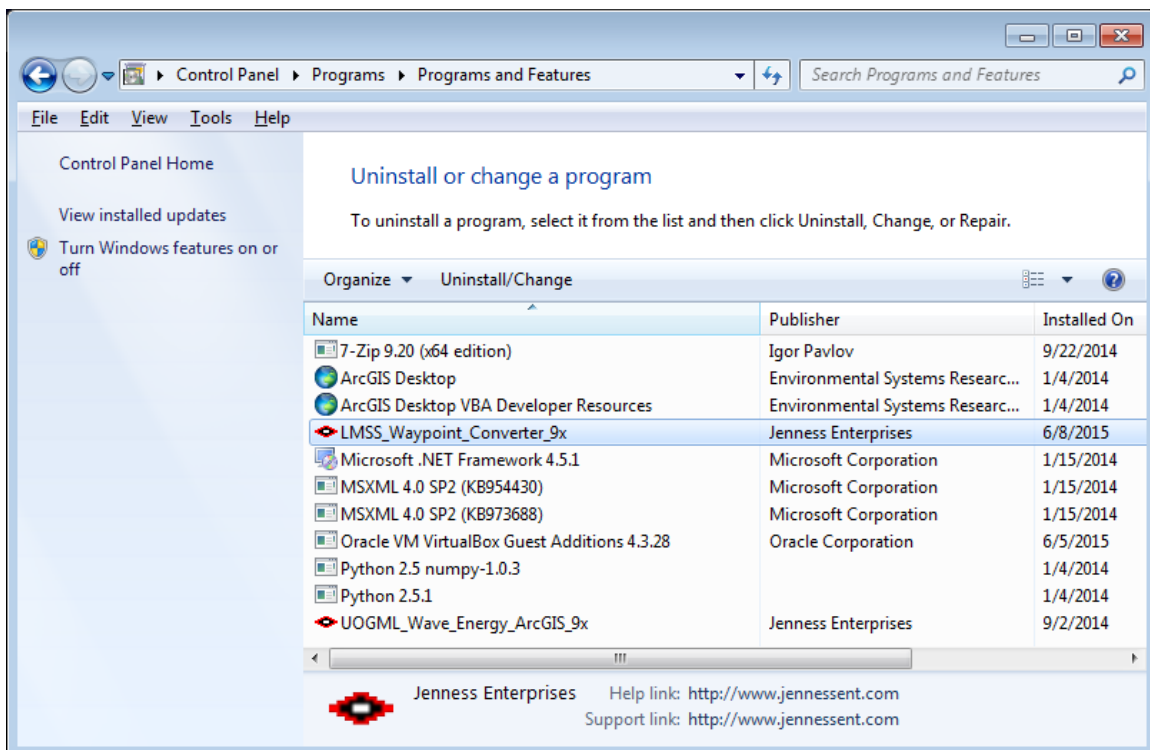
For ArcGIS 10.x

1) Close ArcGIS if it is open.

2) Use Windows Explorer to open your installation folder. If you used the default values, then this folder will be located at either "Program Files\LMSS_ArcGIS_Tools\" (for 32-bit systems) or "Program Files (x86)\LMSS_ArcGIS_Tools\" (for 64-bit systems). This folder will also include some additional files and this manual.
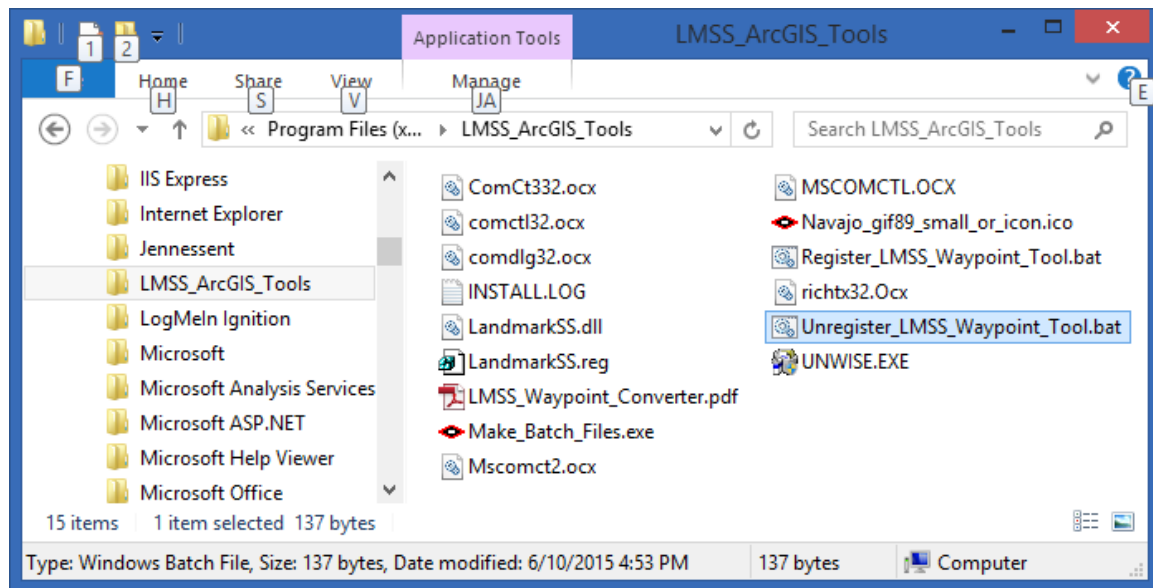
3) Find the file *Unregister_LMSS_Waypoint_Tool .bat.* **IF YOU DO NOT SEE THIS FILE,** use the *Make_Batch_Files.exe* tool to create the batch file. Refer to Step 4 in "Installing the LMSS ArcGIS Tools Extension" above for instructions on how to use this tool.

4) **For Windows XP:** Double-click the file *Unregister_LMSS_Waypoint_Tool.bat* to unregister the tool with ArcGIS 10.x.

   For Windows Vista, Windows 7 and Windows 8: Right-click the file *Unregister_LMSS_Waypoint_Tool.bat* and select "Run as Administrator" to unregister the tool with ArcGIS 10.x.

   If the unregistration is successful, then you should see an "Unregistration Succeeded" notice.
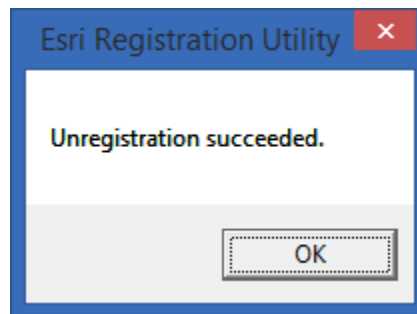
5) Click the Start button.

6) Open your Control Panel.

7) Double-click "Add or Remove Programs".

8) Scroll down to find and select "LMSS_Waypoint_Converter_10x".

9) Click the "Uninstall" button and follow the directions.

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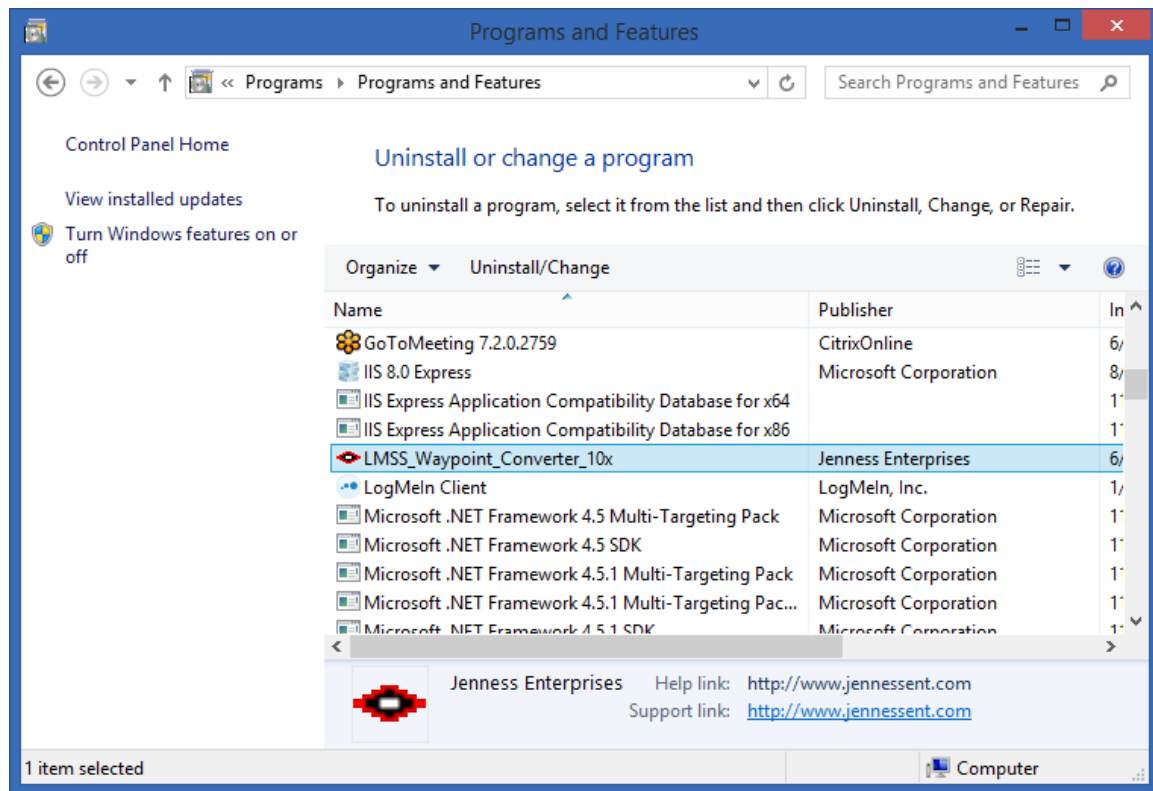
Note: For the concerned or curious, the batch file *Unregister_LMSS_Waypoint_Tool.bat* contains something similar to the following single line of text:

```
"C:\Program Files (x86)\Common Files\ArcGIS\bin\ESRIRegAsm.exe" /p:Desktop /u
"C:\Program Files (x86)\LMSS_ArcGIS_Tools\LandmarkSS.dll"
```

It directs the ESRI installer *ESRIRegAsm* to unregister the DLL *LandmarkSS.dll* within ArcGIS. *Unregister_LMSS_Waypoint_Tool.bat* may be opened and viewed using standard text editors such as Notepad or WordPad.

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Troubleshooting

If Any of the Tools Crash

If a tool crashes, you should see a dialog that tells us what script crashed and where it crashed. I would appreciate it if you could copy the text in that dialog, or simply take screenshots of the dialog and email them to me at jeffj@jennessent.com. **Note:** Please make sure that the line numbers are visible in the screenshots! The line numbers are located on the far right side of the text. Use the scrollbar at the bottom of the dialog to make the line numbers visible.

Error Log

In most cases, a crash will cause an error log to be produced in the Installation folder, named "LandMark_SS_Error_Log_[Year][Month][Day]_[Hour][Minute][Second].txt". For example, an error that occurred at exactly 5 seconds past 3:01pm, on October 1, 2015, would produce an error report named "LandMark_SS_Error_Log_20151001_150105.txt". Please send this error log to me at jeffj@jennessent.com.

"Object variable or With block variable not set" Error:

If you open ArcMap and immediately see the error dialog appear with one or more error messages stating that "Object variable or With block variable not set", then 90% of the time it is because ArcGIS was running when you installed the extension. The "Object" variable being referred to is the "Extension" object, and ArcGIS only sets that variable when it is initially opened.

The solution is usually to simply close ArcGIS and restart it. If that does not work, then:

1) Close ArcGIS

2) Reinstall the extension

3) Turn ArcGIS back on.

RICHTX32.OCX Error (also comct332.ocx, comdlg32.ocx, mscomct2.ocx, mscomctl.ocx, msstdfmt.dll errors):

If you see a line in the error dialog stating:

```
Component 'RICHTX32.OCX' or one of its dependencies not correctly registered: a file is
missing or invalid
```

Or if you see a similar error stating that one or more of the files *comct332.ocx, comdlg32.ocx, mscomct2.ocx, mscomctl.ocx* or *msstdfmt.dll* are missing or invalid, then simply follow the instructions for *RICHTX32.OCX* below, but substitute the appropriate file for *RICHTX32.OCX*.

This error is almost always due to the fact that new installations of Windows 7 and Windows Vista do not include a file that the extension expects to find. For example, the file "richtx32.ocx" is actually the "Rich Text Box" control that appears on some of the extension dialogs. The other OCX files refer to other common controls that might appear on the various extension dialogs.

The solution is to manually install the missing file (richtx32.ocx) yourself. Here is how to do it:

1) Open Windows Explorer and locate the file *richtx32.ocx* in your extension installation file.

2) If you are running a **32-bit version of Windows**, then copy *richtx32.ocx* to the directory

   `C:\Windows\System32\`

   If you are running a **64-bit version of Windows**, then copy *richtx32.ocx* to the directory

   `C:\Windows\SysWOW64\`

3) Open an "Elevated Command Prompt" window. This is the standard Windows Command Prompt window, but with administrative privileges enabled. You need these privileges enabled in order to register the OCX with Windows. **Note:** The Elevated Command Prompt opens up in the "..\windows\system32" directory, not the "..\Users\[User Name]" directory. The window title will also begin with the word "Administrator:"
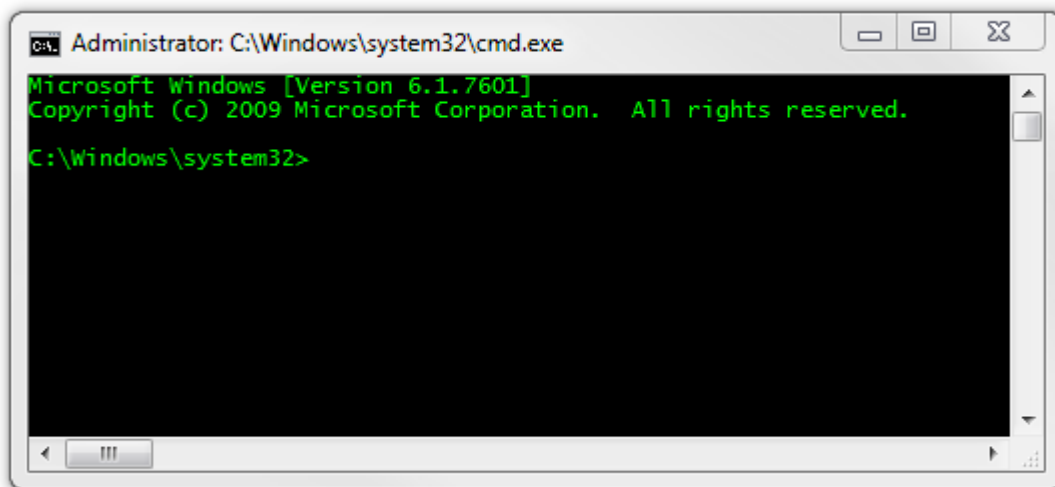
a. **Method 1:** Click the "Start" button, then "All Programs", then "Accessories" and then **right-click** on "Command Prompt" and select **Run as Administrator**.

b. **Method 2:** Click the "Start" button, and then click on the "Search Programs and Files" box. Type "cmd" and then click CONTROL+SHIFT+ENTER to open the Command window with Administrator privileges.

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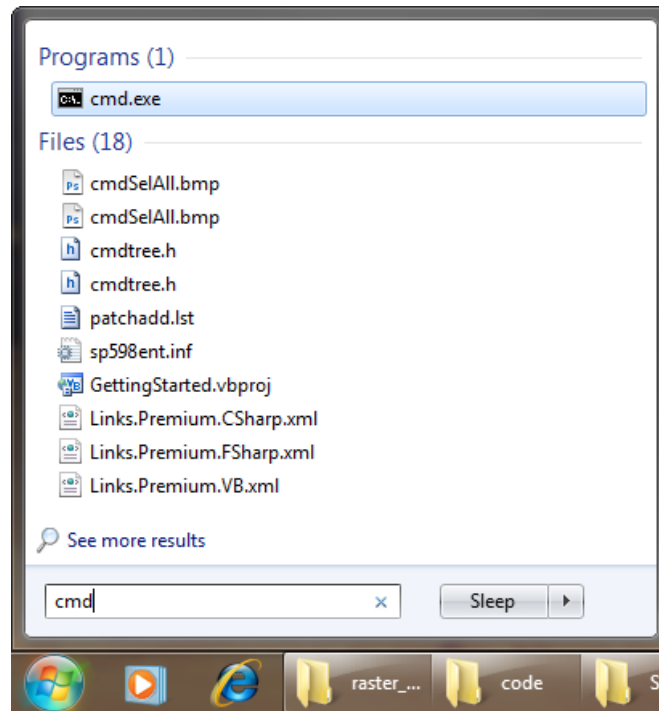
For more help on opening an Elevated Command Prompt, please refer to:

http://www.sevenforums.com/tutorials/783-elevated-command-prompt.html

http://www.winhelponline.com/articles/158/1/How-to-open-an-elevated-Command-Prompt-in-Windows-Vista.html

Or simply do a search for "Elevated Command Prompt".

4) Register the file *richtx32.ocx* using the Windows RegSvr function:

   a. If using a **32-bit version of Windows**, type the line

   ```
   regsvr32.exe c:\windows\system32\richtx32.ocx
   ```
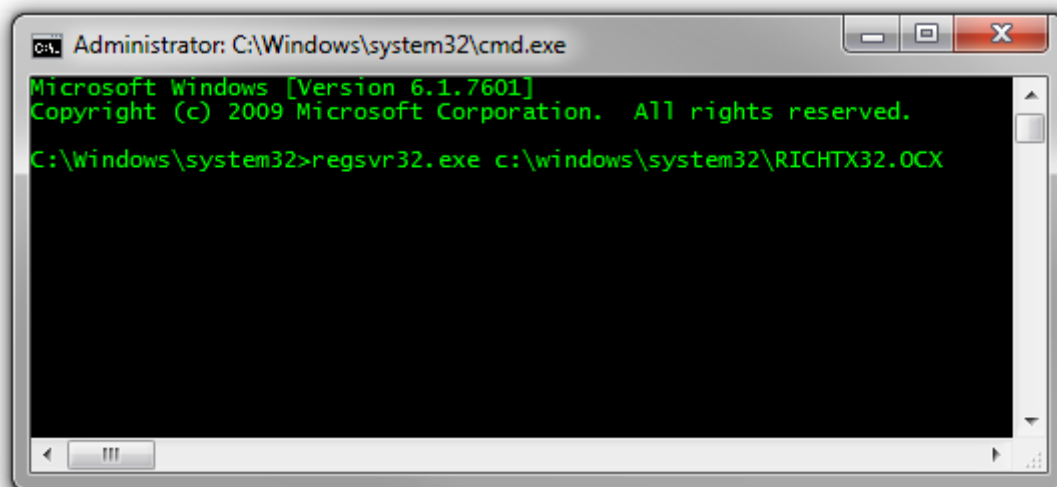

   b. If using a **64-bit version of Windows**, type the line

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```
regsvr32.exe %windir%\syswow64\richtx32.ocx
```
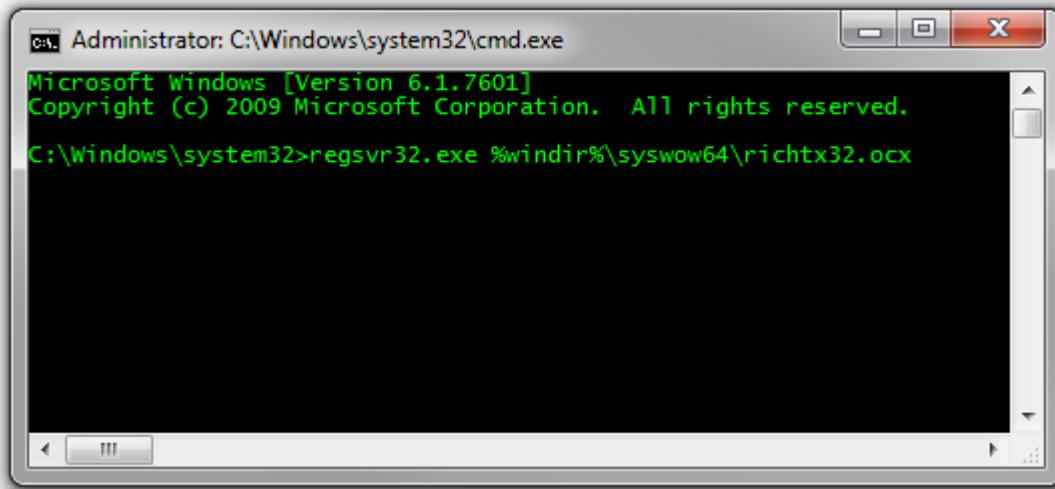

c. Click [ENTER] and you should see a message that the registration succeeded.
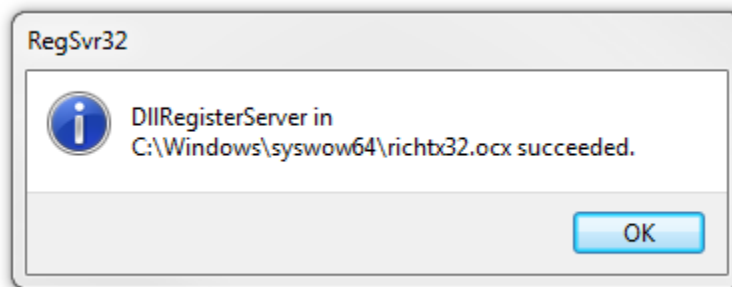
Using the Tools

Waypoint Converter

This tool will convert a point feature class into a Waypoint CSV file compatible with Trimble's SoloForest GPS data collection software.

1) Make sure the tool is registered (see p. 7).

2) Open ArcMap and load your point feature class.
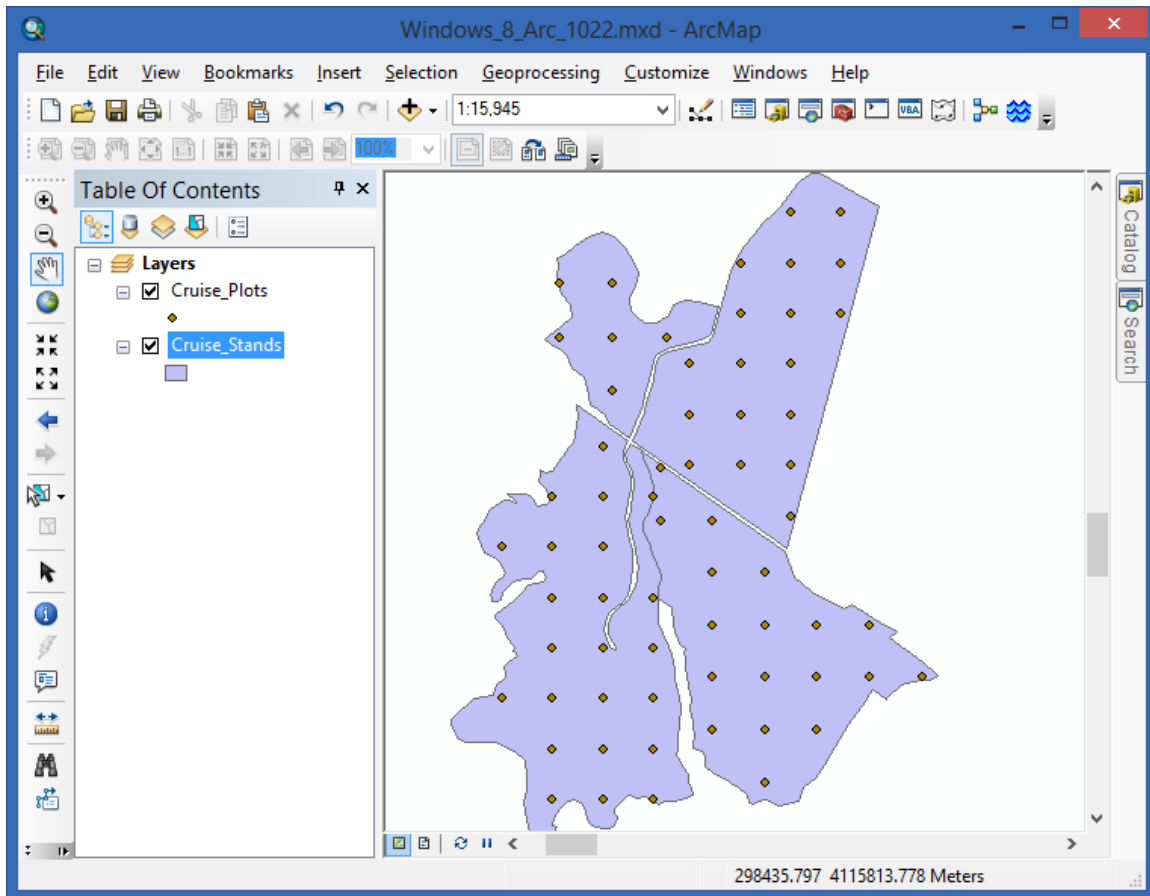
3) Click the *Landmark Spatial Solutions Waypoint Converter* tool to open the *LMSS Solo Waypoint Converter* window:
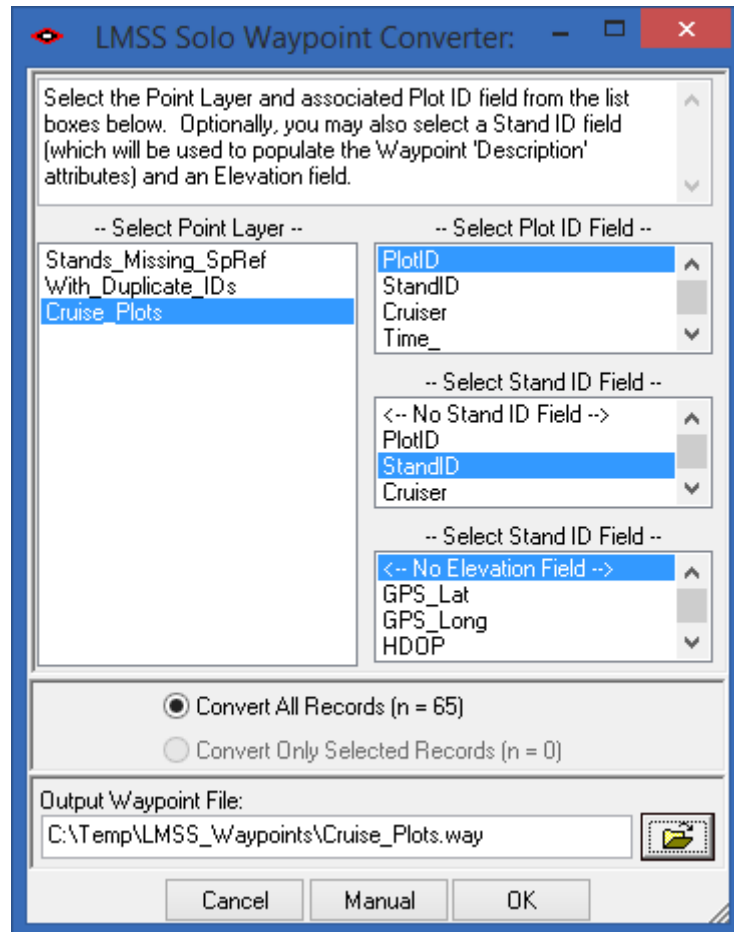
4) You must select your point layer and your Plot ID field. Optionally you may also select a Stand ID and Elevation field. **Note:** If your feature class contains attribute fields with "PlotID", "StandID", "Elev" or "DEM" anywhere in their names, then the tool will preselect those fields in the various Field Name listboxes.

5) If you wish to only convert a subset of the points, then simply select those points before you run the tool and choose the option "Convert Only Selected Records".

6) Click "OK" to run the tool. The tool will perform a few error-checks before running the analysis:

   a) **Geographic Transformations:** All output will be in Lat/Long coordinates in the WGS 1984 Geographic Coordinate System. If your point layer is in a different projection and/or geographic coordinate system, then the tool must project the points before writing the output file.

      i) **If your data are in a different projection**, based on the WGS 1984 Geographic Coordinate system, then the tool will simply project the points without requiring any input from you.

      ii) **If your data are in any coordinate system other than WGS 1984**, either projected or unprojected, then the tool will require you to specify an appropriate geographic transformation. You may do this in one of two ways:

(1) **You may set the transformation before you ever run the tool:** If you set any appropriate geographic transformations in your Data Frame Properties, then this tool will use those transformations and will not require any further input from you.

(2) **You may select the transformation from a list of possibilities:** If you do not have any appropriate geographic transformations in your Data Frame Properties, then this tool will examine the geographic location of your data and present you with a list of possible geographic transformations. It attempts to list them in order of appropriateness, but this is a little subjective. Each transformation has an accuracy level associated with it, plus an area which it is designed for. This tool ranks them by multiplying the accuracy level by the distance from the dataset extent centroid to the Geotransformation Area centroid.

For example: If your point feature class is in NAD 1983 coordinates, and if you do not have any geographic transformations set to convert between NAD 1983 and WGS 1984, then the tool will pop up a window similar to this:

You should choose one of the transformations from the list. If you want to know a little more about any transformation (maybe to see where it is designed for), then simply double-click on the name:

This data is all extracted from the ArcGIS document "Geographic_Transformations.pdf", located in your "..\ArcGIS\Desktop[Version]\Documentation\" folder.

Note: If you wish, you can choose not to apply any geographic transformation. This is not recommended, however, because it only introduces unnecessary error into the output and will cause you to spend a lot of unnecessary time searching for your point out in the field. The author of this tool speaks from experience in this matter.

b) **Missing Spatial Reference:** If your point feature class has no spatial reference set (for example, if a shapefile is missing the *.prj file), then the tool will be unable to convert the points and will not run. You must set the spatial reference for the dataset before you run the tool.

c) **Duplicate PlotID values:** If your point feature classes has duplicate PlotID values, the tool will alert you to this and will not run. You must either fix the feature class or select a different PlotID field:
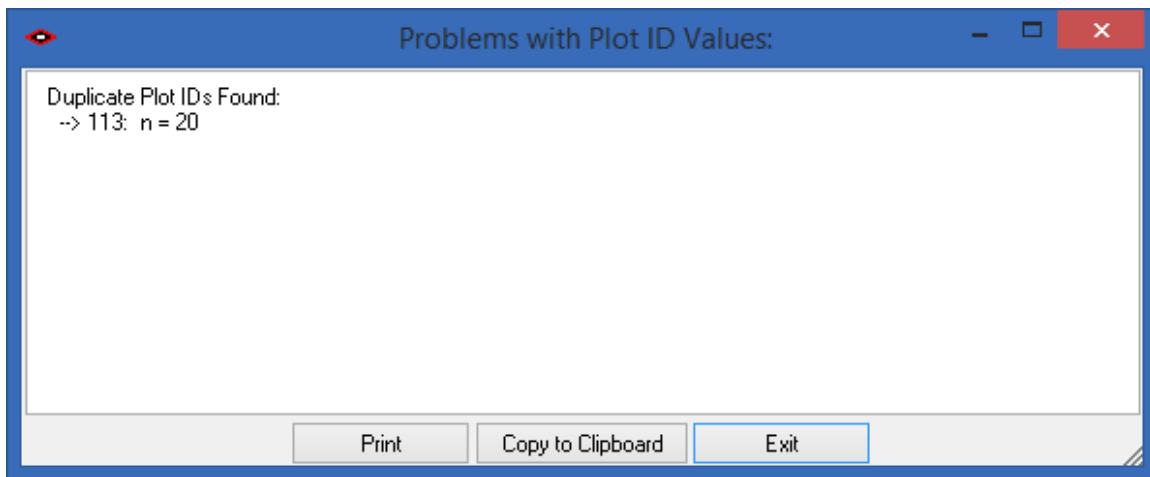
7) Upon Completion, the tool will create a *.way file (which is simply a text file in comma-separated format) and give you a report detailing what it did.
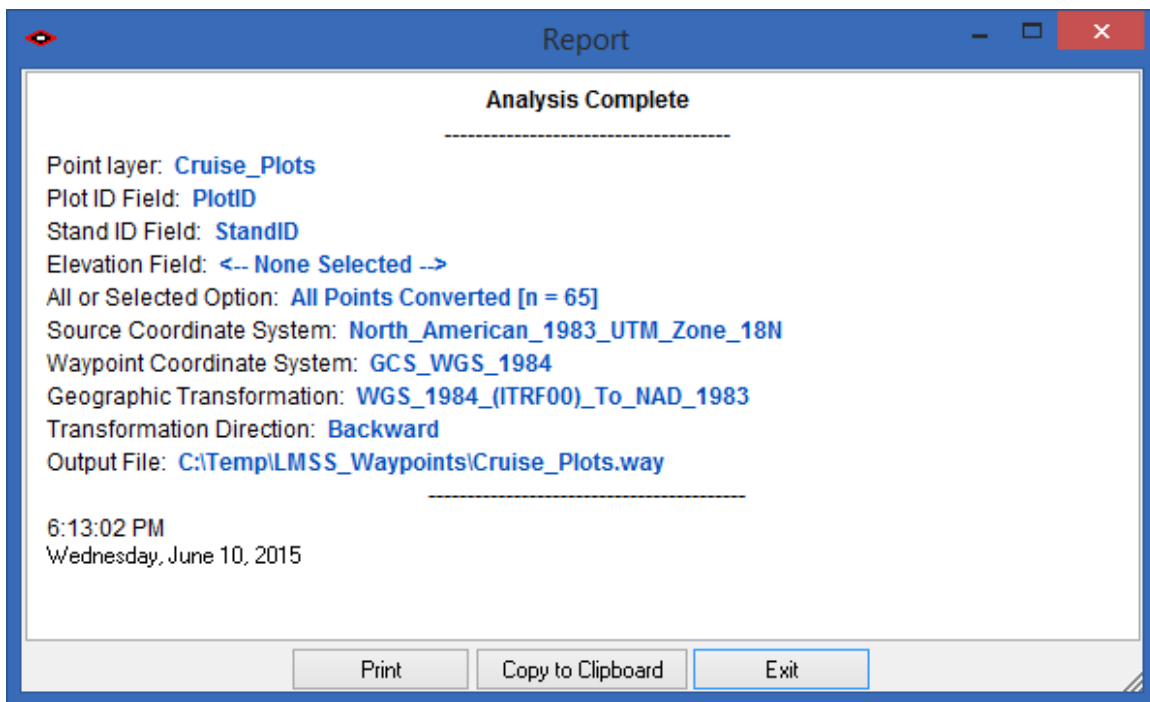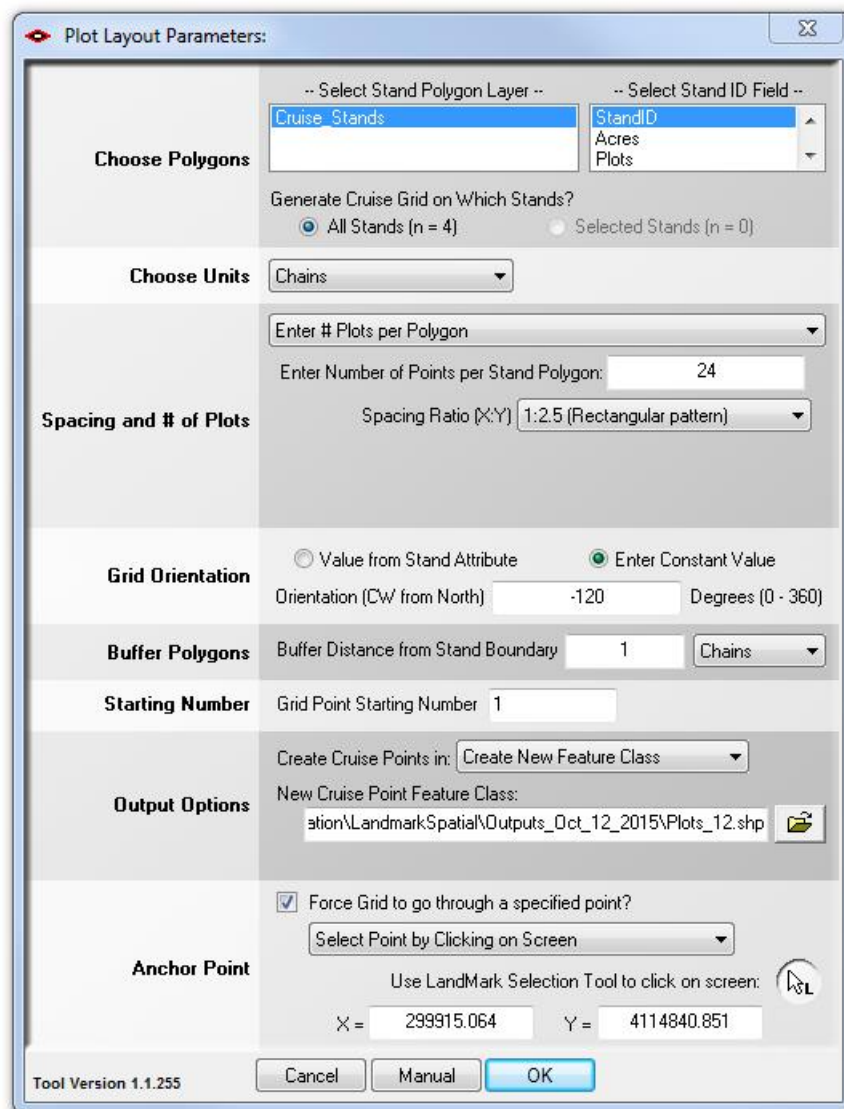
```
Cruise_Plots.way - Notepad

File   Edit   Format   View   Help

1,3709.152052,-7716.005324,0.0,BI6217-1-8;<ICON = 9>,
2,3709.289023,-7716.009416,0.0,BI6217-1-8;<ICON = 9>,
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15,3709.291205,-7715.495328,0.0,BI6217-1-8;<ICON = 9>,
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23,3709.064009,-7715.431479,0.0,BI6217-1-8;<ICON = 9>,
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31,3709.082105,-7715.306059,0.0,BI6217-1-10;<ICON = 9>,
32,3709.129451,-7715.307468,0.0,BI6217-1-10;<ICON = 9>,
33,3709.176797,-7715.308877,0.0,BI6217-1-10;<ICON = 9>,
34,3709.224143,-7715.310286,0.0,BI6217-1-10;<ICON = 9>,
35,3709.271489,-7715.311695,0.0,BI6217-1-10;<ICON = 9>,
36,3709.225270,-7715.251133,0.0,BI6217-1-10;<ICON = 9>,
37,3709.177924,-7715.249725,0.0,BI6217-1-10;<ICON = 9>,
38,3709.130578,-7715.248317,0.0,BI6217-1-10;<ICON = 9>,
39,3709.179051,-7715.190574,0.0,BI6217-1-10;<ICON = 9>,
40,3709.226397,-7715.191981,0.0,BI6217-1-10;<ICON = 9>,
41,3709.180177,-7715.131422,0.0,BI6217-1-10;<ICON = 9>,
42,3709.366883,-7715.399578,0.0,BI6217-1-3;<ICON = 9>,
43,3709.412649,-7715.400942,0.0,BI6217-1-3;<ICON = 9>,
```

Plot Layout Tool 🌲

The LandMark *Plot Layout* tool provides a highly flexible means to create an array of plot sample points distributed within stand polygons. The plot count, spacing and orientation can be entered manually or extracted from Stand attribute values. Optionally plots can be restricted to a buffer distance away from the stand boundary, so that no plots are within a specified distance from the edge. Plot locations may be saved to a new point feature class, or appended to an existing one. Optionally plots can be forced to go through some specified anchor point, allowing users to build the array out from a predetermined base location.

To use the tool:

1) Make sure the tool is registered (see p. 7).

2) Open ArcMap and load your stand feature class.

3) Click the *Plot Layout Tool* command 🌲 to open the *Plot Layout Parameters* window:

4) **Analysis Parameters:**

   i) **Stand Polygon Layer:**

      (1) Choose your Polygon Layer and Stand ID field. All stand ID values will be transferred to the Point feature layer.

      (2) Optionally you can generate plot points for all stands, or for just a subset of them. If you wish to generate plots over a subset of stands, then select those stands prior to running this tool, then choose the "Selected Stands" option.

  b) **Choose Units:** This option applies to cases where you wish to generate plot points a specified distance from each other. You may specify distances in Feet, Meters or Chains.

  c) **Spacing and # of Plots:** There are several ways you can distribute your plots within the stand:

   i) **Enter # Plots per Polygon:** This option will generate the specified number of plots in each polygon. If you are working with multiple stand polygons, then each stand will get the exact same number of points.

      (1) *Enter Number of Points per Stand Polygon:* This is the number of plots you want to generate in each polygon. The tool will apply your X/Y spacing ratio and grid orientation, and adjust the X- and Y-spacing values until it creates an array that has the correct number of points. It may go through many iterations before it finds the correct number.

      (2) *Spacing Ratio:* You have 4 options for Spacing Ratio. Note that all these options refer to *relative* distances along the X- and Y-axes. The true distances will be adjusted to make the array fit within the polygon, but the relative proportions along the X- and Y-axes will be maintained.

         (a) 1:1 (Square pattern): The point separation distance along the X-axis is the same as the Y-axis, so all points are arrayed in a square array. In this case the X- and Y-distances describe the distance along the grid orientation angle.

         (b) 1:2 (Rectangular pattern): Similar to (1) above, but the separation distance along the Y-axis is twice the distance along the X-axis.

         (c) 1:2.5 (Rectangular pattern): The distance along the Y-axis is 2.5 × the distance along the X-axis.

         (d) User-Defined Ratio: You may set any ratio you wish. For example, if you want a 1:2 ratio, but where the X-distance is twice that of the Y-distance, then you can set the X-value to 2 and the Y-value to 1.

   ii) **Read # Plots from Stand Attribute Field:**

      (1) *Select Attribute Field Containing Plot Count:* This drop-down list will show all numeric fields in your *Stands* attribute table. Select the field containing the number of plot points you wish to generate for this stand. **Note:** This option allows you to generate a separate number of plot points for each stand, and gives a useful method to standardize your sampling effort. For example, if you

wanted to generate X plots per acre, you would just calculate the number of acres in the polygon and multiply that number by X.

Note: This drop-down list will show all numeric fields, including non-integer fields. If your Plot Count value is not an integer, the tool will round it to the nearest integer before generating the points.

(2) *Spacing Ratio:* You have 4 options for Spacing Ratio. Note that all these options refer to *relative* distances along the X- and Y-axes. The true distances will be adjusted to make the array fit within the polygon, but the relative proportions along the X- and Y-axes will be maintained.

    (a) 1:1 (Square pattern): The point separation distance along the X-axis is the same as the Y-axis, so all points are arrayed in a square array. In this case the X- and Y-distances describe the distance along the grid orientation angle.

    (b) 1:2 (Rectangular pattern): Similar to (1) above, but the separation distance along the Y-axis is twice the distance along the X-axis.

    (c) 1:2.5 (Rectangular pattern): The distance along the Y-axis is 2.5 × the distance along the X-axis.

    (d) User-Defined Ratio: You may set any ratio you wish. For example, if you want a 1:2 ratio, but where the X-distance is twice that of the Y-distance, then you can set the X-value to 2 and the Y-value to 1.

iii) **Manually Enter X/Y Point Spacing:**

(1) *Spacing Ratio:* You have 4 options for Spacing Ratio. All these options refer to *absolute* distances along the X- and Y-axes. The first three options force certain common X/Y ratios, so changing one value will automatically change the other. For example, if you want a Square pattern and specify an X-distance of 2 chains, then the Y-distance value will automatically be set to 2 chains.

Note: Your distance units (Feet, Meters or Chains) must be set in the "Choose Units" option (see (b) above).

Note: All distances are along the specified grid orientation angle. If you specify an X-distance of 2 chains, and set the orientation angle at 20°, then this tool will generate points every 2 chains in a direction of 20°.

    (a) 1:1 (Square pattern): The point separation distance along the X-axis is the same as the Y-axis, so all points are arrayed in a square array.

    (b) 1:2 (Rectangular pattern): Similar to (1) above, but the separation distance along the Y-axis is twice the distance along the X-axis.

    (c) 1:2.5 (Rectangular pattern): The distance along the Y-axis is 2.5 × the distance along the X-axis.

    (d) User-Defined Ratio: You may set any X- and Y-distance values you wish. All distances are along the specified grid orientation angle.

iv) **Read X/Y Point Spacing from Attribute Fields:** X- and Y-distances are extracted from *Stand* attribute fields.

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d) **Grid Orientation:** The plot point array may be oriented in any direction you wish. Any X- and Y-distances or distance ratios you set will be along this grid orientation angle.

    i) *Value from Stand Attribute:* This option will extract array orientation values from an existing numeric stand attribute field. If this value is **null**, then the tool will use an attribute value of 0°.

    ii) *Enter Constant Value:* This option will use a single specified orientation value for all stands.

e) **Buffer Polygons:** This option allows you to force all points to be greater than some specified buffer distance from the stand edge. If you want to guarantee that no points will be closer than 2 chains from the edge, then you may set that value here. Note that you must specify both a distance value and a buffer distance unit.

f) **Starting Number:** You may specify the Plot ID of the first point. All subsequent plot IDs are incremented in ascending order after that first value. **Note:** If you are appending new plot points to an existing plot feature class, you have the option below to have the tool automatically set the first value as equal to the currently highest Plot ID value + 1.

g) **Output Options:** You may save your plots to a new feature class, or append them to an existing feature class.

    i) If saving to a **new** feature class, you must specify the output location. You may save to either a shapefile, file geodatabase or personal geodatabase. Your new feature class will have 2 attribute fields, containing your Plot ID and Stand ID values.

    ii) If appending to an **existing** feature class, you must select the feature class from the list of point layers in your ArcMap document, and the Plot ID attribute field to hold your Plot ID values. The Plot ID field should be a text field, and the tool will only show text fields in the dropdown list.

    The tool will also transfer Stand ID values to the existing feature class. If the tool finds a field with the same name as your specified Stand ID value (from (a) above), it will copy Stand IDs into that field. If the tool does not find any field with the same name, it will create a new field for Stand ID values.

    iii) If you are adding to an **existing** feature class, then you will also have the option to force the tool to set the starting Plot ID number based on the highest plot id value currently in the feature class.

h) **Anchor Point:** Optionally you can force your plot array to go through a single specified point. This may be helpful if you want to set one point as a base or origin location. You may specify this anchor point by either selecting a point in an existing point feature class in your map, or by clicking on the screen.

    i) *Select Point by Clicking on Screen:* If you choose this option, then click the

    LandMark Specify an Anchor Point for Plot Array command and use it to click on your ArcMap map. You will see a green dot appear at the location of the anchor point, and the X- and Y-coordinates of that dot will appear in the dialog. You may edit these coordinate values manually if you like.

    ii) *Use First Selected Point in Point Feature Class*: You may set your anchor point using an existing point feature class in your map. If you select any of the points before running this tool, then the tool will use the first selected value as the anchor point. If no points are selected, then the tool will use the first point in the feature class.

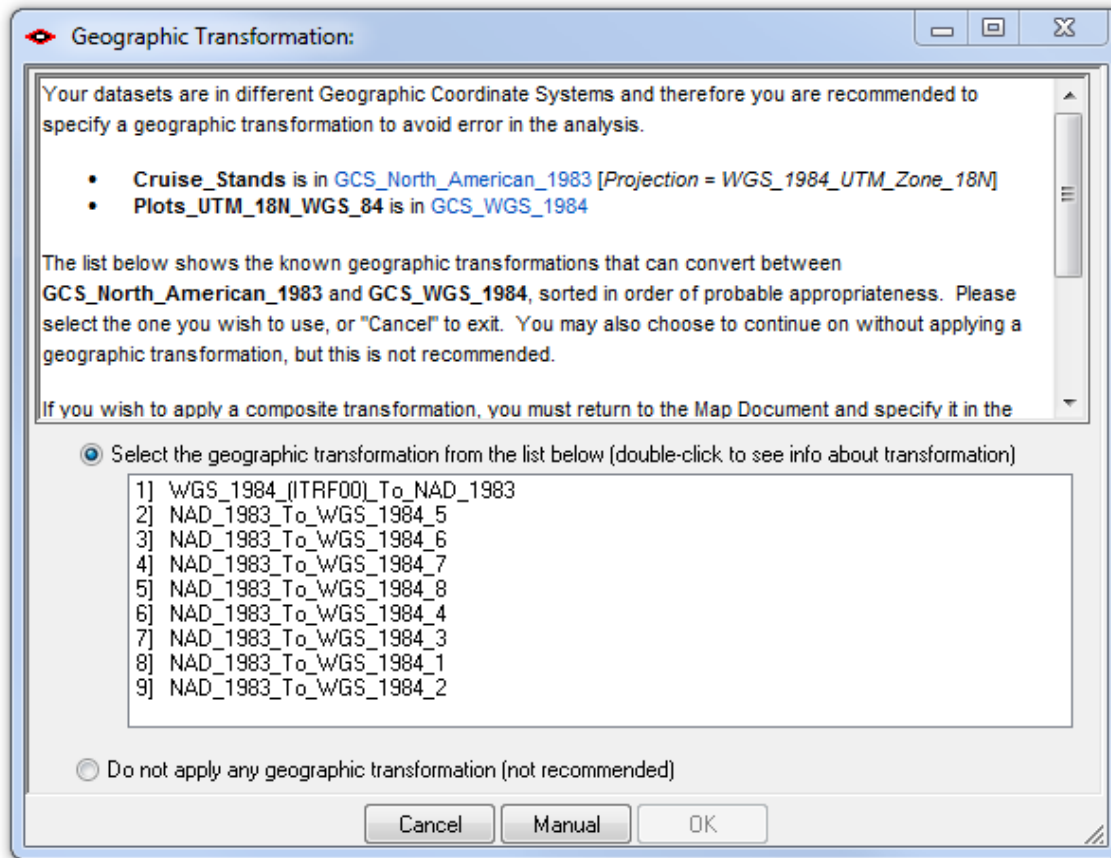5) Click "OK" to run the tool. The tool will perform a few error-checks before running the analysis:

    a) **Geographic Transformations:** The analysis coordinate system will be determined by your parameter choices. If you are creating a new point feature class, then the points will be in the same coordinate system as your Stand feature class. If you are appending to an existing feature class, then the stands will be internally reprojected into the existing Point coordinate system before analysis.

    If you specify an anchor point, then that anchor point will be projected into the Plot coordinate system before any analysis takes place.

    If your final plot coordinate system is geographic (i.e. in Latitude/Longitude coordinates), then all spacing and distance measurements will use spheroidal geometry using true distances over the surface of the spheroid. If your final plot coordinate system is projected, then all measurements will be done in the plane coordinate system. This means that if you use the "Measure" tool to check distances between points, then you should use the "Measure" setting corresponding with the analysis method (i.e. "Geodesic" distances if your plots are in geographic coordinates, or "Planar" distances if your plots are projected).

    i) **If your *Stand*, *Plot* and *Anchor Point* data are in different Projections**, then the tool will simply project the necessary geometries without requiring any input from you. This is all done internally and will not change your original datasets in any way.

    ii) **If your *Stand*, *Plot* and *Anchor Point* data are in different Datums**, either projected or unprojected, then the tool will require you to specify an appropriate geographic transformation. You may do this in one of two ways:

        (1) **You may set the transformation before you ever run the tool:** If you set any appropriate geographic transformations in your Data Frame Properties, then this tool will use those transformations and will not require any further input from you.

        (2) **You may select the transformation from a list of possibilities:** If you do not have any appropriate geographic transformations in your Data Frame Properties, then this tool will examine the geographic location of your data and present you with a list of possible geographic transformations. It attempts to list them in order of appropriateness, but this is a little subjective. Each transformation has an accuracy level associated with it, plus an area which it is designed for. This tool ranks them by multiplying the accuracy level by the distance from the dataset extent centroid to the Geotransformation Area centroid.

        For example: If your stand feature class is in some NAD 1983-based coordinate system, and your plot points are in some WGS 1984-based coordinate system, and if you do not have any geographic transformations set to convert between NAD 1983 and WGS 1984, then the tool will pop up a window similar to this:

You should choose one of the transformations from the list. If you want to know a little more about any transformation (maybe to see where it is designed for), then simply double-click on the name:

This data is all extracted from the ArcGIS document "Geographic_Transformations.pdf", located in your "..\ArcGIS\Desktop[Version]\Documentation\" folder.

Note: If you wish, you can choose not to apply any geographic transformation. This is not recommended, however, because it only introduces unnecessary error into the output and will cause you to spend a lot of unnecessary time searching for your point out in the field. The author of this tool speaks from experience in this matter.

b) **Missing Spatial Reference:** If your point feature class has no spatial reference set (for example, if a shapefile is missing the *.prj file), then the tool will be unable to convert the points and will not run. You must set the spatial reference for the dataset before you run the tool.

Upon completion, the tool will produce an array of sample points in all selected polygons and give you a progress report describing what it did. All parameters are also described in the Lineage and Geoprocessing steps of the Metadata as well.
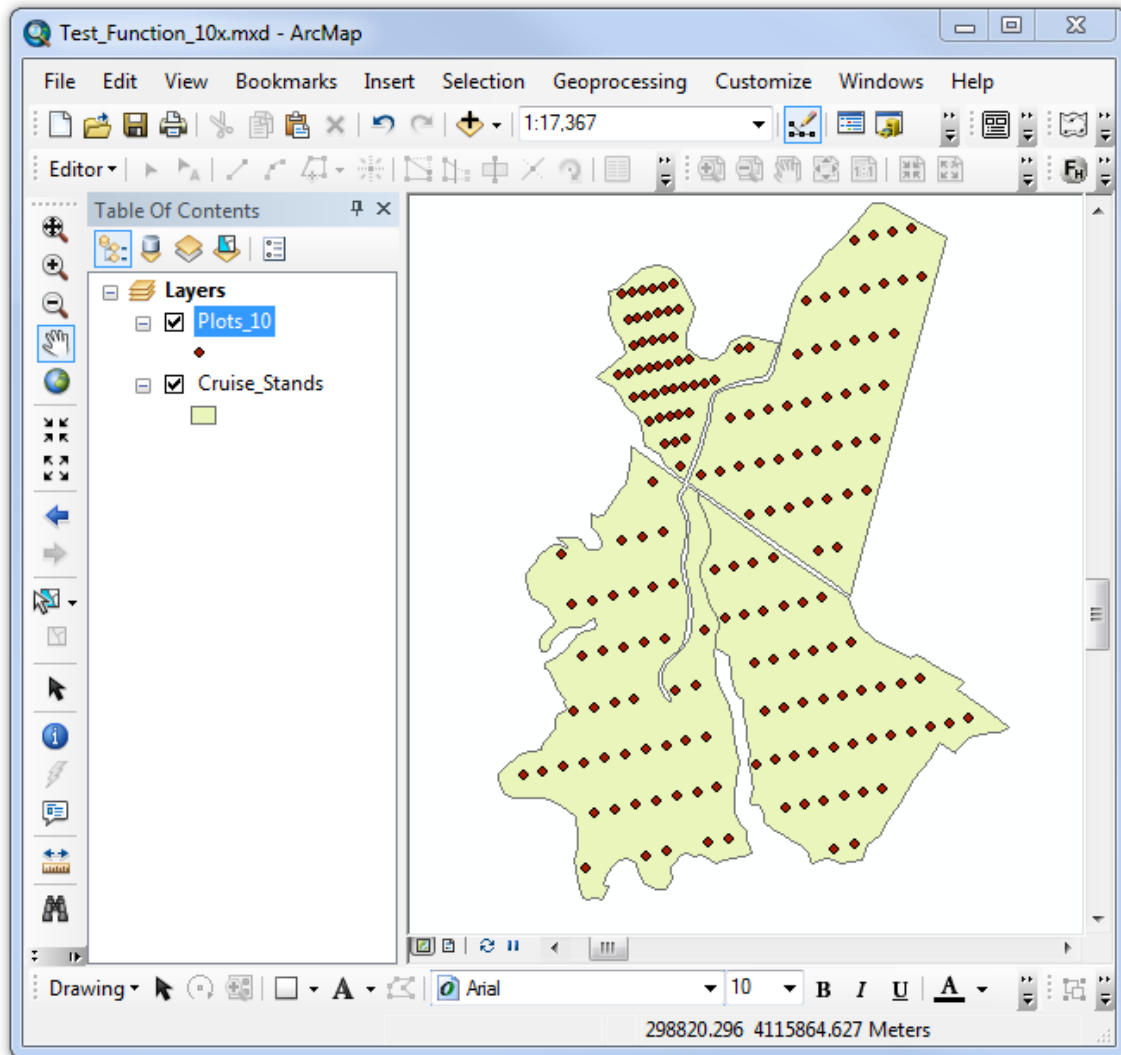
Data Source Item Description - Plots_UTM_18N_WGS_84

Print   Edit

INCLUDE IN LINEAGE WHEN EXPORTING METADATA   Yes

PROCESS
PROCESS NAME   GeneratePlotLayout
DATE   2015-10-16   17:32:36
TOOL LOCATION   Plot Layout tool in LandMark Spatial Solutions Extension 'LandMark Tools' [c:\program files (x86)
\lmss_arcgis_tools\LandMarkSS.dll
COMMAND ISSUED
  NOTE: This is not Python or VB Code! [FUNCTION Generate_Plot_Layout][Parameters: Stand_Feature_Class =
  'Cruise_Stands', Stand_ID_Field = 'StandID' (Field Index 4), Do_All_Stands = 'TRUE', Units = 'Chains',
  Spacing_Method = 'Enter # Plots per Polygon', Plot_Count = '34', Spacing_Ratio_X_Axis = '1',
  Spacing_Ratio_Y_Axis = '1', Plot_Layout_Orientation = '4', Buffer_Distance = '0', Buffer_Units =
  'Chains', Output_Option = 'Add to Existing Feature Class', Existing_Dataset_Name =
  'Plots_UTM_18N_WGS_84', Existing_Dataset_Worksapce =
  'D:\arcGIS_stuff\consultation\LandmarkSpatial\Outputs_Oct_12_2015',
  Determine_Grid_Point_Starting_Number_from_Points_Layer = 'TRUE', Starting_Number = '181', Plot_ID_Field
  = 'PlotID', Stand_ID_Field = 'StandID', Point_Coordinate_System = 'WGS_1984_UTM_Zone_18N',
  Stand_Coordinate_System = 'North_American_1983_UTM_Zone_18N', Stand_To_Point_Transform = 'WGS_1984_
  (ITRF00)_To_NAD_1983', Stand_To_Point_Transform_Direction = 'Reverse', Force_Through_Anchor_Point =
  'FALSE']
INCLUDE IN LINEAGE WHEN EXPORTING METADATA   Yes

Analysis Complete:

Plot Generation Complete

Parameters

Stand Polygons:
    Feature Class: Cruise_Stands & vbNewLine
    Option to do All or Selected: All Stand Polygons (n = 4)
    Stand ID Field: StandID (Field Index 4)
    Stand Coordinate System: North_American_1983_UTM_Zone_18N

Plot Units: Chains

Spacing and Plot Count:
    Plot Count Option: Enter # Plots per Polygon
    Plot Spacing Option: 1:2.5 (Rectangular pattern)
    Plot Count: 45
    X-Ratio Option: 1
    Y-Ratio Option: 2.5

Grid Orientation: -12 degrees (compass direction)

Internal Buffer: 1 Chains

Output Options:
    New or Existing Option: Create New Feature Class
    Feature Class: Plots_10.shp
    Plot ID Field Name: PlotID
    Stand ID Field Name: StandID
    Feature Class Spatial Reference: North_American_1983_UTM_Zone_18N
    First Plot Starting Number: 1

Anchor Point:
    Anchor Point Option: Do not force grid through a specified point

Notes on Analysis:
    1] Stand 'BI6217-1-8': Plot Count = 45 (10 iterations)
    2] Stand 'BI6217-1-10': Plot Count = 45 (8 iterations)
    3] Stand 'BI6217-1-3': Plot Count = 45 (6 iterations)
    4] Stand 'BI6217-1-4': Plot Count = 45 (1 iterations)

Analysis Parameters also saved to plot feature class metadata.

Analysis Began: *Friday, October 16, 2015 at 5:04:47 PM*
Analysis Complete: *Friday, October 16, 2015 at 5:04:48 PM*
Time Elapsed: *Time Elapsed: 1 second...*

| Print | Copy to Clipboard | Exit |

Import Stand IDs Tool ⌗

The *Import Stand IDs* tool is a simple tool that extracts stand ID values from stand polygons, plus optionally any other polygon attributes, and saves them to the Point feature class. It is similar conceptually to the standard *Spatial Join* function, but saves several steps in that it saves values directly to the Plot point feature class and internally handles any projection or geotransformation issues. It also allows you to specify a *Stand ID* field in your Plot point feature class, or create a new one.
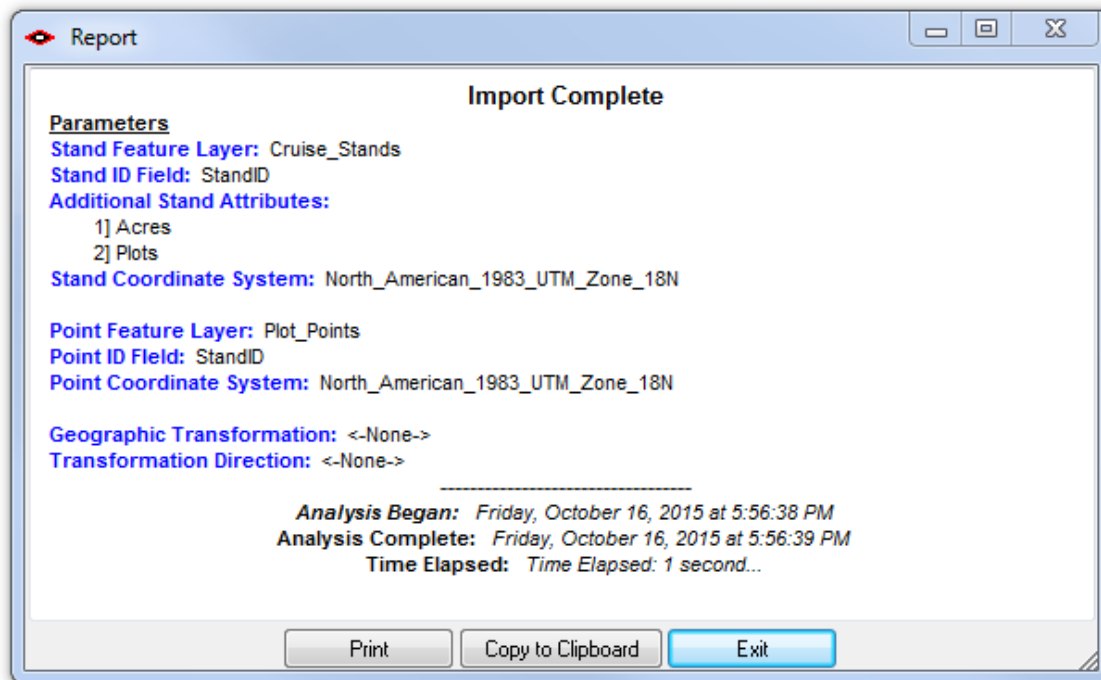
To use the tool:

1) Make sure the tool is registered (see p. 7).

2) Open ArcMap and load your stand feature class.

3) Click the *Plot Layout Tool* command ⌗ to open the *Import Stand ID Parameters* window:
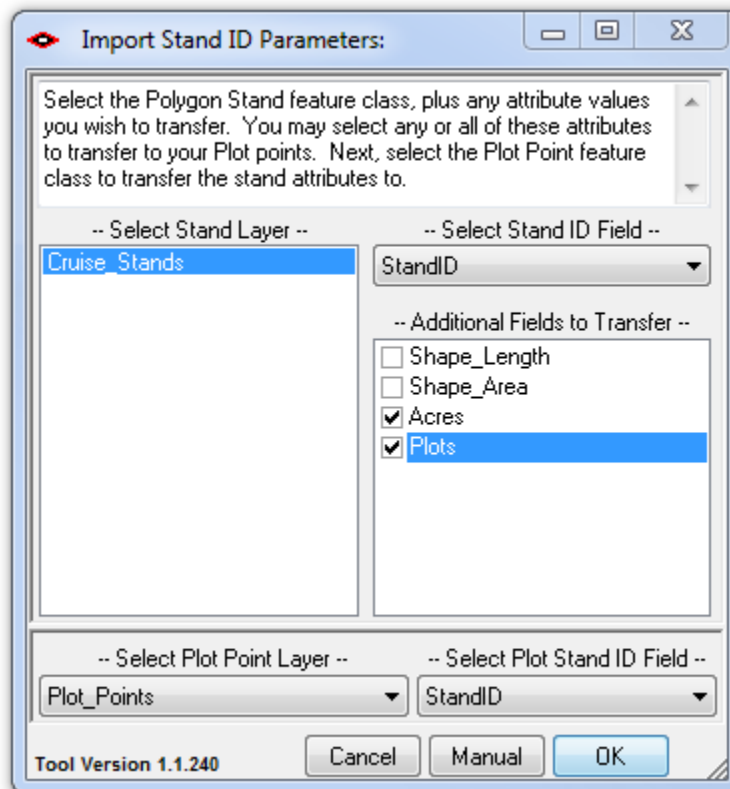
4) Select the *Stand* layer you want to import data from, then the *Stand ID* field, and optionally any other fields you want to transfer over.

5) Select the *Plot Point ID* layer, plus the *Stand ID* field you want to copy Stand ID values to.

6) Click 'OK' to run the tool.

Note: When copying over additional fields, the tool will check the Point feature class to see if fields already exist with those names. If so, the tool will paste the values directly into the existing fields. If not, the tool will create new attribute fields based on the *Stand* attribute fields, and paste the values into the new fields.

7) Upon completion, the tool will give you report describing what it did:

8) This information is also saved to the *Geoprocessing* and *Lineage* sections of the metadata:

Data Source Item Description - Plot_Points   ⊠

🖨 Print   📝 Edit

INCLUDE IN LINEAGE WHEN EXPORTING METADATA   Yes

PROCESS
   PROCESS NAME   ImportStandIDValues
   DATE   2015-10-16   17:56:39
   TOOL LOCATION   Import Stand ID tool in LandMark Spatial Solutions Extension 'LandMark
   Tools' [c:\program files (x86)\lmss_arcgis_tools\LandMarkSS.dll
   COMMAND ISSUED
      [NOTE: This is not Python or VB Code!][Add Additional Stand Attribute Field
      to Plots_10: Field Name = 'Acres', Field_Alias = 'Acres' & Field_Type =
      'esriFieldTypeDouble', Field_Scale = '6', Field_Precision = '12']
   INCLUDE IN LINEAGE WHEN EXPORTING METADATA   Yes

Revisions

Version 1.0.44 (June 10, 2015):

- Initial Release

Version 1.0.46 (June 18, 2015):

- Changed "LMASS" to "LMSS" in dialog caption.
- Fixed manual to correctly state the default installation location on 64-bit machines.

Version 1.0.52 (June 23, 2015):

- Fixed a bug in which it was reporting FID values instead of PlotID values.
- Added a progress meter to the primary dialog to show progress as it checks large files for duplicate ID values.
- Added the current tool version to the output report.

Version 1.1.240 (October 16, 2015):

- Added tool to generate plot points within existing stand polygons.
- Added a tool to import Stand ID values to an existing Point feature class.

Version 1.1.249 (October 19, 2015):

- Fixed a bug that raised an error message at line 3008 of 'ReturnAcceptableFieldName'.
- Changed report file location to be in folder alongside current MXD file.

Version 1.1.255 (October 24, 2015):

- Added option to specify point array orientation from a Stand attribute value.