

The CEDRA Corporation's COMMAND OF THE MONTH

A monthly information bulletin

September 2012

FEATURED COMMAND

Exporting to
LandXML



Application Description

Those who work with surveyors and civil engineers know that some of their work involves going into the field and picking up “shots”. Shots are points described by northings, eastings and elevations, that is, X,Y,Z coordinates. These shots can then be used to develop a triangular irregular network (TIN) which in turn can be used to develop contour strings. Superimposed upon the TIN is often a horizontal alignment which can be used to represent a centerline of a roadway. All of this information is used to develop a base map and is referred to as design data.

A question that often arises is, how can one exchange design information such as a TIN or a horizontal alignment between various CAD or CADD systems. Most folks would probably say, why not create a DXF file. The trouble or limitation in using a DXF file is that design information is lost. That is, certain design information that is required, is not stored in a DXF file. One solution that many vendors have used to get around the limitation of a DXF file is the utilization of the LandXML format..

The LandXML format consists of various tags which contain information describing civil engineering and surveying design information. Similar to a HTML file, which also uses tags to denote various commands, the LandXML format is a nonproprietary format developed by an organization of vendors with the purpose of being able to share design data between their various systems.

The CEDRA Solution

To address the ability to create a LandXML file, the [Export to LandXML] command was created and added to the CEDRA-AVland-FormattingMenus Toolbar, see Figures 1 and 2. This command was recently developed due to a suggestion from a user.

Export to LandXML Overview

The *Export to LandXML* menu command in the CEDRA-AVland-FormattingMenus toolbar enables the user to export horizontal alignments, a CEDRA TIN and/or contour strings, or parcels to a LandXML formatted file.

Command Of The Month bulletin

This month's issue discusses how to create a LandXML file for horizontal alignments, a CEDRA TIN and/or contour strings and parcels.

In using this command, the user must first activate in the ArcMap Table of Contents (TOC) the layer(s) to be processed. If no layer or table has been activated, the error message of Figure 3 is displayed.

Based upon what is to be exported, that is, horizontal alignments, a CEDRA TIN and/or contour strings, or parcels, the user activates in the Table of Contents the appropriate layer(s) to be processed. Once the appropriate layer(s) have been activated, the [Export to LandXML] command can be selected.



Figure 1
CEDRA-AVland-FormattingMenus
Toolbar



Figure 2
CEDRA-StationFormat Commands
ComboBox

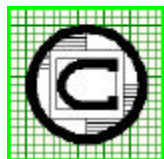
Upon activation and determination that there is at least one active layer, a multi-input dialog box is displayed from which the user is able to specify the appropriate export parameters.

Included in the multi-input dialog box is the type of export to be performed and the name of the file to be created, along with various other parameters.

Once the parameters have been specified, the OK button can be selected at which point the command processes the



Figure 3
No Layer Selected Warning



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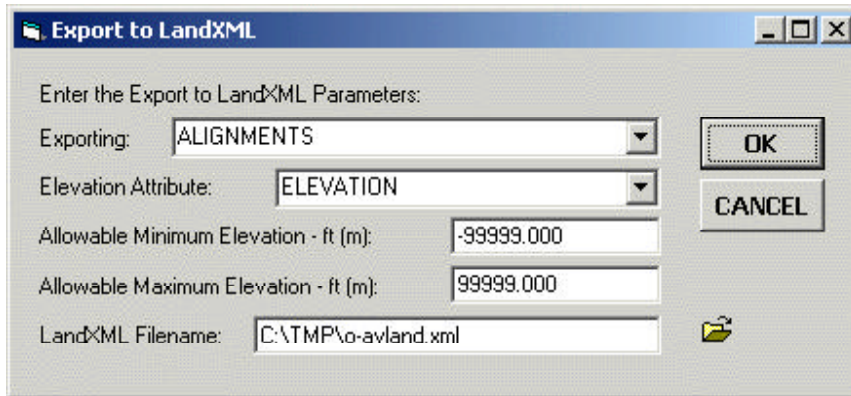


Figure 4 - The Export to LandXML Parameters

selected features in the active layer(s). If there are no selected features, the command processes all features in the layer. As the export process executes a progress bar is displaying informing the user as to the status of the processing.

Upon completion of the exporting, a message appears in the status bar area stating that the user-specified file has been created. The file can now be viewed, printed, e-mailed or forwarded as needed by the user.

Export to LandXML Operation

To create a file following the LandXML format, the following steps can be performed:

- 1 **Scroll** down in the **Table of Contents area**, and **select** the **layer(s)** that contain the features to be processed. If a layer contains selected features then only the selected features will be processed, otherwise, all features in the active layer are processed.
- 2 **Scroll** down in the {CEDRA-AVland-FormattingMenus} menu combo box, and **select** the [Export to LandXML] command.

If no layers have been selected when the command is invoked, the warning message shown in Figure 3 will be displayed. At this point, click the OK button, select the appropriate layer(s) and invoke the command again.

- If there are selected layers, the multi-input dialog box shown in Figure 4 will be displayed. Depending upon if this is the first time the command has been selected or not, the default values shown in Figure 4 will be replaced with those that were last specified by the user. In so doing, the user is able to try different parameter settings without having to reenter the data that is constant.
- 3 **Scroll** down in the *Exporting:* data field, and **select** the appropriate of the following options (see Figure 5):
 - **ALIGNMENTS**, to indicate that the LandXML file is to contain alignments.
 - **CEDRA TIN**, to indicate that the LandXML file is to contain a CEDRA TIN.
 - **CONTOURS**, to indicate that the LandXML file is to contain contour strings.
 - **CEDRA TIN and CONTOURS**, to indicate that the LandXML file is to contain a CEDRA TIN and contours strings.
 - **PARCELS**, to indicate that the LandXML file is to contain parcels.
- 4 **Scroll** down in the *Elevation Attribute:* data field, and **select** the attribute that contains the elevation value to be exported. If the ALIGNMENTS or PARCELS option has been selected for the



Figure 5
Available Export Formats

Exporting parameter, the setting for this parameter is not used in the exporting process.

- 5 **Enter** in the *Allowable Minimum Elevation:* data field the minimum allowable elevation value. If the ALIGNMENTS or PARCELS option has been selected for the *Exporting* parameter, the setting for this parameter is not used in the exporting process.
- 6 **Enter** in the *Allowable Maximum Elevation:* data field the maximum allowable elevation value. If the ALIGNMENTS or PARCELS option has been selected for the *Exporting* parameter, the setting for this parameter is not used in the exporting process.
- 7 **Enter** in the *LandXMLFilename:* data field the name of the LandXML file to be created. Alternatively, **click** on the folder icon on the right side of the parameter to display the traditional Windows file navigation dialog box where the filename can be entered or an existing file selected.
- 8 **Click** at the **OK** button to begin the exporting process, or **click** at the **Cancel** button to abort the command.

Having clicked at the *OK* button, the command processes the selected features/records in the active layer(s). If there are no selected features, then all features in the layer(s) are processed. A progress bar is displayed in the status bar area indicating the percent completion of the processing.

If an export option is selected which does not apply to the active layer(s), a warning message to this effect will be displayed, see Figure 6, 7 and 8.

Once the command has completed a message in the status bar area will be displayed indicating that the specified filename has been created.

Shown in Figure 9 is a sample LandXML file containing horizontal alignments. In this sample one horizontal alignment containing two PIs has been exported. The name of the horizontal alignment is 1 and has a total length of 1341.909 feet.



Figure 6
Invalid Active Layer for the Selected Export Format



Figure 7
Invalid Active Layer for the CEDRA TIN Export Format

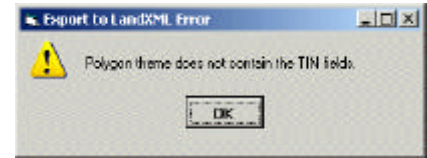


Figure 8
Invalid Active Layer for the CEDRA TIN Export Format

```
<?xml version="1.0"?>
<LandXML xmlns="http://www.landxml.org/schema/LandXML-1.1"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.landxml.org/schema/LandXML-1.1
http://www.landxml.org/schema/LandXML-1.1/LandXML-1.1.xsd"
date="2012-10-09" time="12:16:40" version="1.1"
language="English" readOnly="false">
<Application manufacturer="The CEDRA Corporation"
manufacturerURL="http://www.cedra.com" name="CEDRA-AVland"
version="09.10.12"/>
<Units>
<Imperial areaUnit="squareFoot" diameterUnit="inch" elevationUnit="feet"
linearUnit="foot" angularUnit="decimal degrees"
directionUnit="decimal degrees" pressureUnit="inchHG"
temperatureUnit="fahrenheit" volumeUnit="cubicYard"/>
</Units>
<Alignments>
<Alignment name="1" length="1341.90902853383" staStart="1000" desc=" ">
<CoordGeom>
<Line dir="350.384266486428" length="99.9919895256857">
<Start>5220.471 5044.451</Start>
<End>5203.7683884127 5143.0381225641</End>
</Line>
<Curve rot="ccw" crvType="arc" length="572.408464106491" radius="1490.984">
<Start>5203.7683884127 5143.0381225641</Start>
<Center>6673.80436875844 5392.09133925675</Center>
<End>5217.49483154982 5711.77214895797</End>
<PI>5155.365 5428.739</PI>
</Curve>
<Line dir="12.3808735263886" length="331.483166351454">
<Start>5217.49483154982 5711.77214895797</Start>
<End>5288.56789941746 6035.5463119146</End>
</Line>
<Curve rot="cw" crvType="arc" length="248.57990185703" radius="172.687">
<Start>5288.56789941746 6035.5463119146</Start>
<Center>5119.89692437551 6072.57200768657</Center>
<End>5178.68910029944 6234.94281793007</End>
<PI>5321.025 6183.405</PI>
</Curve>
<Line dir="289.904605780791" length="89.4455066931696">
<Start>5178.68910029944 6234.94281793007</Start>
<End>5094.587 6265.395</End>
</Line>
</CoordGeom>
</Alignment>
</Alignments>
</LandXML>
```

Figure 9 - Sample LandXML File for the ALIGNMENTS Export Format

Notes

- a. The Allowable Minimum Elevation and Allowable Maximum Elevation parameters are used to provide the user flexibility in controlling which features are exported within the active layer(s) by enabling the user the ability to specify a desired range of elevation values.
- b. When exporting contours, if the setting for the Elevation Attribute parameter can not be found within the contour layer, the command searches for the following attributes, in the order shown, using the one that is encountered first, ELS, ELE, ELV, ELEV and ELEVATION.
- c. When exporting alignments or parcels, the settings for the Elevation Attribute, Allowable Minimum Elevation, and Allowable Maximum Elevation parameters are ignored. As such, the user can simply accept the default values presented by the command.
- d. When exporting alignments, contours or parcels, within the CONTOURS, ALIGNMENTS, PARCELS options, only one active layer should be present in the Table of Contents.
- e. When exporting using the ALIGNMENTS option the active layer must be of point type and contain the ALIGNMENT and TYPE fields. The default CEDRA-AVland name for this layer is Alignments-Pls.
- f. When exporting using the CEDRA TIN option there must be two active layers, one of point type and the other of polygon type. The polygon layer must also contain the NODE1, NODE2 and NODE3 fields.
- g. When exporting using the CONTOURS option the active layer must be of polyline type.
- h. When exporting using the CEDRA TIN and CONTOURS option there must be three active layers, one of

point type, one of polyline type and the third of polygon type. The polygon layer must also contain the NODE1, NODE2 and NODE3 fields.

- i. When exporting using the PARCELS option the active layer must be of polygon type.
- j. When exporting using the PARCELS option if the polygon contains true curve sides, the sides will be exported as curves, rather than small line segments comprising a curve. True curve sides can be created for polygons when the polygons reside in a file or enterprise geodatabase.

Summary

Those users who require the ability to exchange surveying and civil engineering design information with other CAD and CADD systems should explore the option of using the LandXML format as a means of data exchange.

As mentioned at the outset of this publication, the implementation of this command was the direct result of a user's suggestion. So that, we encourage our users and those interested in our software to feel free to pass along their suggestions.

After all, if the software does not address the application being worked on, then there's no need for the software. As such, The CEDRA Corporation tries its best to deliver application solution products.

The implementation of the [Export to LandXML] command is a recent enhancement to the CEDRA-AVland-FormattingMenus toolbar. Users with a software support agreement should check with The CEDRA Corporation on how to obtain a software update so as to be able to utilize this new functionality.

As always, users who have a need for functionality that is not presently avail-

able in CEDRA software should feel free to forward these requests to CEDRA, as well as, any other comments or suggestions you may have.

If you have a request for Command Of The Month, feel free to phone, fax or e-mail your request to The CEDRA Corporation.