

# The CEDRA Corporation's COMMAND OF THE MONTH

A monthly information bulletin

September 2008

FEATURED COMMAND

Rotating, Translating  
and Scaling Features



## Application Description

In the May 2006 issue of Command of the Month we discussed the Rotate, Translate and Scale Tool, . This tool provides the user the ability to rotate, translate and scale a selected set of features. The operation of this tool is based upon the concept of an original or existing baseline and a new baseline.

Although an extremely useful command, this command offers a multitude of options, one of its drawbacks was that you had to perform four steps just to get to the option you wanted to invoke.

As such, it was suggested that something be done to simplify the operation of the command. That is, minimize the number of clicks to translate, rotate and/or scale features.

## The CEDRA Solution

To address this request, the CEDRA-Transform-Tools toolbar was modified. Shown in Figure 1 is the toolbar as it looks today for ArcGIS® users.

As can be seen from Figure 1, nine tools have been added to the right of the Rotate, Translate and Scale Tool, . By selecting these tools, the user is able to eliminate four steps from an operation. Shown in Figure 2 are the available options offered by the  tool.

The aim of introducing these tools was to make the process of translating, rotating and/or scaling a selected set of

features easier and more efficient by creating tools which offered the same functionality as its corresponding option.

For example, the  tool provides the same functionality as the Pick Baseline Point 1 option. By using the  tool, the user no longer has to:

- click the drop-down arrow,
- scroll down to the Pick Baseline Point 1 option,
- select the option and
- click the OK button.

Now the user can, after selecting the  tool, simply make a pick in the map area to denote the start point of the original baseline.

### Command Of The Month bulletin

*This month's issue discusses the tools in the CEDRA-Transform-Tools toolbar, which enable the user to transform a selected set of features.*

This same principle applies to the other tools that have been added to the toolbar. By looking at the number of tools, which have been added, it can be seen that not all of the options shown in Figure 2 have had corresponding tools created for them.

Only the most popular or relevant options, pertaining to rotating, translating and scaling features, have had tools created for them. As such, the user may

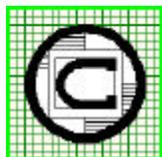


Figure 1  
CEDRA-Transform-Tools Toolbar



Figure 2  
Available Transformation Options

still need to use the  tool to perform some operations. Since the  tool was discussed in the May 2006 issue of Command of the Month, this month's issue will focus on the other tools in the CEDRA-Transform-Tools toolbar.



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Phone: 585-232-6998  
Fax: 585-262-2042

151 Sully's Trail - Suite 6  
Pittsford, New York 14534

E-mail: [cedra@cedra.com](mailto:cedra@cedra.com)  
URL: <http://www.cedra.com>

**Rotate, Translate and Scale w/o Baseline Tool**

The  tool enables the user to rotate translate and scale selected features without having to define a baseline. It is especially useful when the user wishes to move a set of features along the X and/Y axes.

This tool operates on the current set of selected features. Using these features, the tool generates an imaginary enclosing rectangle to identify five control points, see Figure 3.

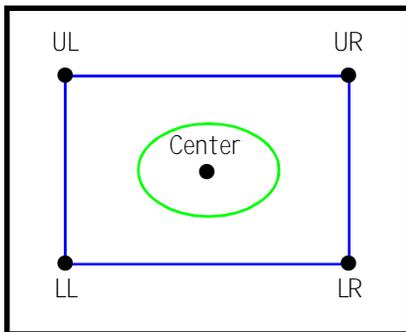


Figure 3 - The 5 Control Points

The user is able to specify which of the five control points is to serve as the base point when the transformation is applied. That is to say, the user is able to rotate, translate and scale a set of selected features about one of the five control points shown in Figure 3.

Shown in Figure 4 is an example where the low left corner (LL) is used as the control point. In this example, the features are translated (moved) along the X axis a distance, DX, and along the Y axis a distance, DY.

In using this tool, the program first checks if there are any layers in the Table of Contents. If there are no layers, the error message shown in Figure 5 will be displayed. If there are layers, but no selected features, the error message shown in Figure 6 will be displayed.

Thus, to use this tool, the user should perform the following steps:

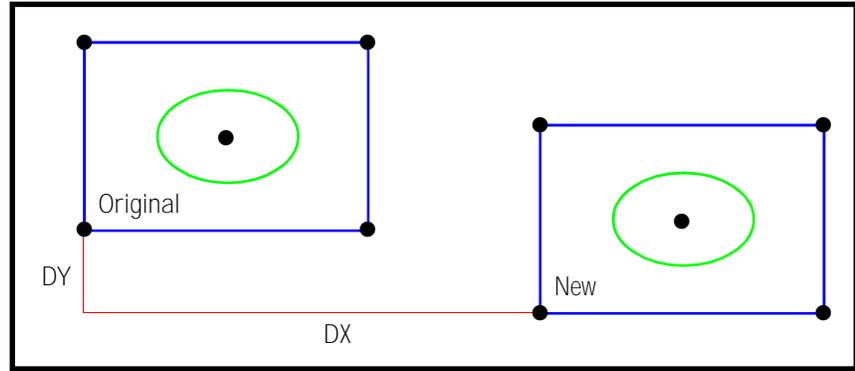


Figure 4 - Features Translated using the LL as the Control Point



Figure 5 - No Layers Defined Error Message

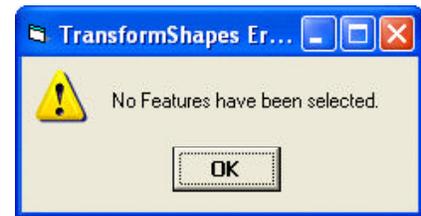


Figure 6 - No Selected Features Error Message

1. Select the features to be transformed.
2. Activate the  tool in the toolbar.
3. Enter the appropriate values for the transformation parameters shown in Figure 7.

Beginning at the top of the dialog box, the user is able to control the following:

Data Line 1 - DX Translation

Enter the distance in world units that the selected features are to be

moved along the X axis, see Figure 4. This value can be less than zero, equal to zero or greater than zero.

Data Line 2 - DY Translation

Enter the distance in world units that the selected features are to be moved along the Y axis, see Figure 4. This value can be less than zero, equal to zero or greater than zero.

Data Line 3 - Rotation in Degrees

Enter the rotation angle to be used

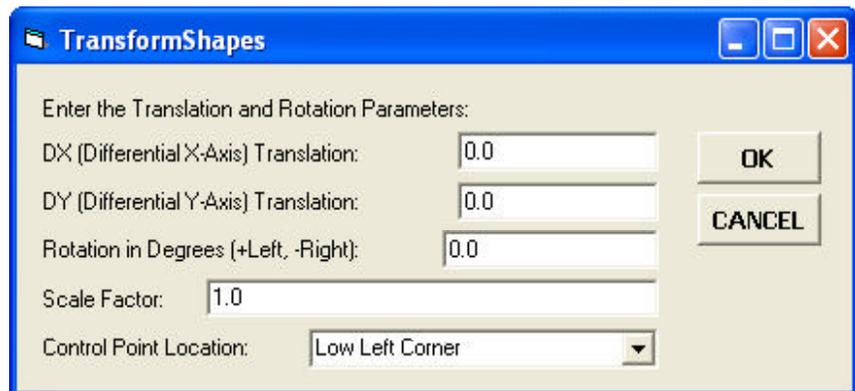


Figure 7 - Transformation Parameters

in the transformation. This value should be entered in terms of decimal degrees (i.e. 45.75) with a positive value denoting a counterclockwise rotation and a negative value denoting a clockwise rotation.

Data Line 4 - Scale Factor

Enter the scale factor to be used in the transformation. A value greater than 1.0 will enlarge the size of the features, while a value less than 1.0 will result in the features becoming smaller. This tool does not allow for different X and Y axis scale factors.

Data Line 5 - Control Point Location

From the choice list, select the control point location to be used, see Figure 3. The user can select one of the following options:

- Low Left Corner
- Low Right Corner
- Center
- Upper Left Corner
- Upper Right Corner

After entering the appropriate values, click at the:

- *Cancel* button to terminate the command, or the
- *OK* button to begin the transformation process.

4. Once the transformation has been applied, the multi-input dialog box of Figure 7 will be re-displayed. As such, the user is able to apply another transformation on the same group of selected features, if desired.

This process repeats until the Cancel button is selected.

### Baseline Definition Tools

The **O1, O2, O3, N1, N2, N3** tools enable the user to define the six baseline control points, see Figure 8. These tools correspond to the following options:

- Pick Baseline Point 1
- Pick Baseline Point 2
- Pick Baseline Point 3
- Pick New Baseline Point 1
- Pick New Baseline Point 2
- Pick New Baseline Point 3

respectively and as shown in Figure 2. The **O1, O2, O3** tools pertain to the existing baseline (original image), while the **N1, N2, N3** tools pertain to the new baseline (new image).

Using these tools enables the user to forego activating the  tool and selecting the appropriate option from the choice list shown in Figure 2.

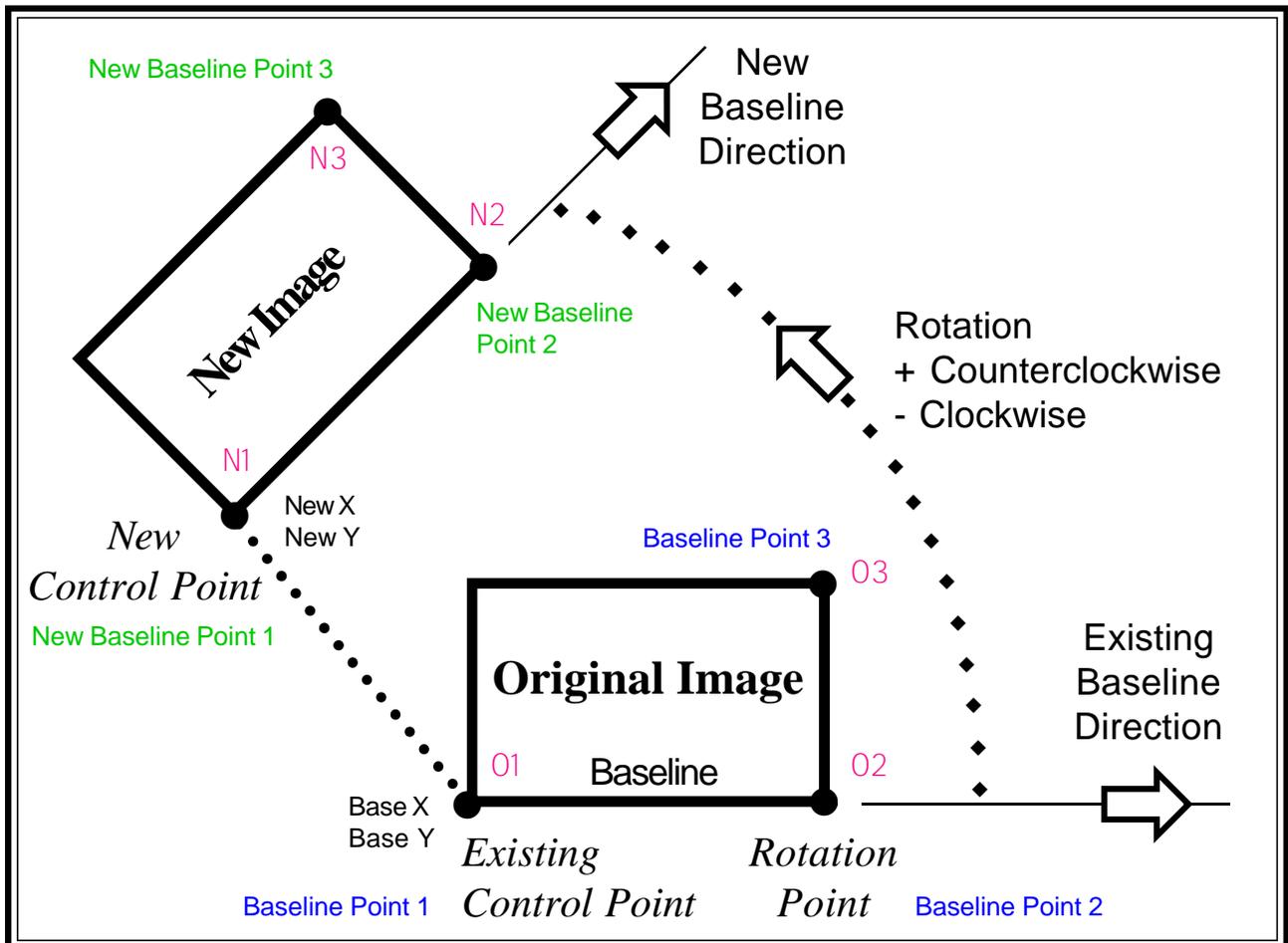


Figure 8 - Baseline Definition Tools Control Point Locations

**Note**, to initialize the control point values, activate the  tool and select the Initialize option. This will erase any previous control point information and ensure that only new data is used.

### Pick Baseline Point 1 Tool

The  tool enables the user to define the start point of the existing baseline. This location represents the existing control point location () or the “from point”.

1. Activate the tool in the toolbar.
2. Make a pick in the map area denoting the start point of the existing baseline, see Figure 8.

### Pick Baseline Point 2 Tool

The  tool enables the user to define the end point of the existing baseline ()

1. Activate the tool in the toolbar.
2. Make a pick in the map area denoting the end point of the baseline.

### Pick Baseline Point 3 Tool

The  tool enables the user to define the rotation point of the existing baseline (). If the features are not to be scaled or if the scales along the X and Y axes are to be the same, this control point can be: (a) skipped (that is, not defined) or (b) identical to the location selected with the  tool.

1. Activate the tool in the toolbar.
2. Make a pick in the map area denoting the rotation point of the baseline.

### Pick New Baseline Point 1 Tool

The  tool enables the user to define the start point of the new baseline. This location represents the new control point location () or the “to point”.

1. Activate the tool in the toolbar.
2. Make a pick in the map area denoting the start point of the new baseline, see Figure 8.

### Pick New Baseline Point 2 Tool

The  tool enables the user to define the end point of the new baseline ()

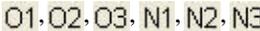
1. Activate the tool in the toolbar.
2. Make a pick in the map area denoting the end point of the new baseline.

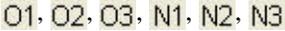
### Pick New Baseline Point 3 Tool

The  tool enables the user to define the rotation point of the new baseline (). If the features are not to be scaled or if the scales along the X and Y axes are to be the same, this control point can be: (a) skipped (that is, not defined) or (b) identical to the location selected with the  tool.

1. Activate the tool in the toolbar.
2. Make a pick in the map area denoting the rotation point of the new baseline.

### Notes

- a. The  tools do not need to be selected in succession. For example, the user can (1) select the  tool to define the start point of the existing baseline, (2) change the view by zooming in or out and then depending upon the view:
  - ▶ select the  tool to pick the end point of the existing baseline, or
  - ▶ the  tool to define the start point of the new baseline.

- b. Once a control point has been defined the tool will prompt the user to define the next logical control point. The default order of tool selection is . If the view contains all of the control point locations, then the user is able to select the  tool, then without selecting any other tool, simply pick the next control point location. However, if the user needs to change the view to make a control point location more “pickable”, the user should: (1) change the view, (2) activate the appropriate tool and (3) make a pick denoting the control point location.

### Rotate, Translate and Scale Tool

The  tool enables the user to rotate, translate and scale a set of selected features. Prior to activating this tool, the user should select the feature(s) to be processed. If there are no selected features when the tool is activated, the error message shown in Figure 9 will be displayed.

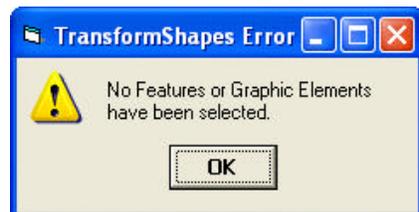
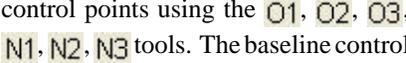


Figure 9 - No Selected Features Error Message

In addition to selecting the features, the user should also define the baseline control points using the  tools. The baseline control points can be selected either *prior to* or *after* selecting the features to be processed.

This tool can be used in lieu of the Transform Features option shown in Figure 2.

Thus, to use this tool, the user should perform the following steps:

1. Activate the  tool, select the Initialize option and click the OK button to initialize the transformation control point data.
2. Use one or more of the following tools, O1, O2, O3, N1, N2, N3, to define the transformation's control points.
3. Select the features to be transformed.
4. Activate the  tool in the toolbar.
5. Enter the appropriate values for the transformation parameters shown in Figure 10.

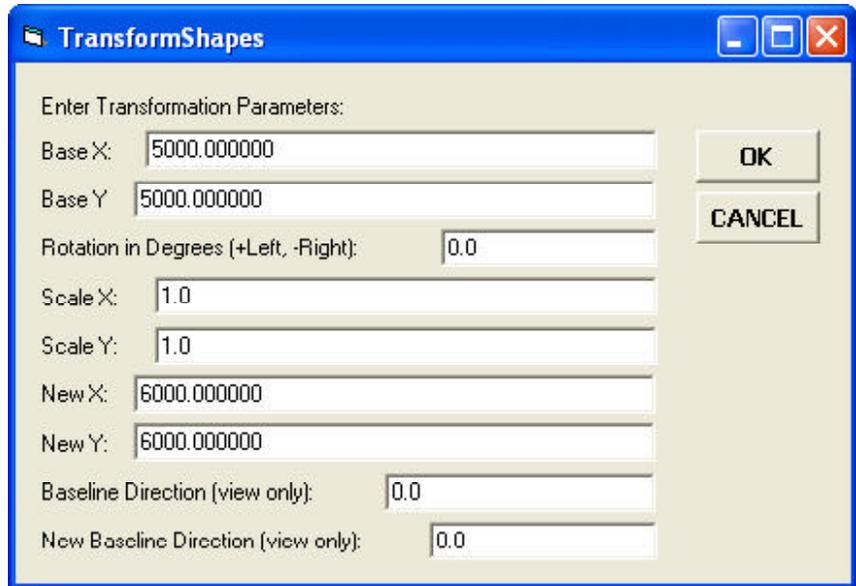


Figure 10 - Multi-Input Dialog Box containing the Transformation Parameters

Beginning at the top of the dialog box, the user is able to control the following:

Data Line 1 - Base X

The X coordinate for the start point (O1) of the existing baseline, see Figure 8. The default value is defined using the O1 tool

Data Line 2 - Base Y

The Y coordinate for the start point (O1) of the existing baseline, see Figure 8. The default value is defined using the O1 tool

Data Line 3 - Rotation in Degrees

Enter the rotation angle to be used in the transformation. This value can be entered in terms of decimal degrees (i.e. -42.17513) or degrees, minutes and seconds (i.e. -42 10 30.5) with a positive value denoting a counterclockwise rotation and a negative value denoting a clockwise rotation.

Data Line 4 - Scale X

Enter the X axis scale factor to be used in the transformation. A value greater than 1.0 will enlarge the size of the features, while a value less than 1.0 will result in the features becoming smaller.

Data Line 5 - Scale Y

Enter the Y axis scale factor to be used in the transformation. A value greater than 1.0 will enlarge the size of the features, while a value less than 1.0 will result in the features becoming smaller.

Data Line 6 - New X

The X coordinate for the start point (N1) of the new baseline, see Figure 8. The default value is defined using the N1 tool

Data Line 7 - New Y

The Y coordinate for the start point (N1) of the new baseline, see Figure 8. The default value is defined using the N1 tool

Data Line 8 - Baseline Direction

This is view only data field denoting the direction of the existing baseline. Altering this value will have no effect on the transformation that is performed.

Data Line 9 - New Baseline Direction

This is view only data field denoting the direction of the new baseline. Altering this value will have no effect on the transformation that is performed.

After entering the appropriate attribute in the second column, click at the:

- Cancel button to terminate the command, or the
- OK button to begin the transformation of the selected features.

**Notes**

- a. If the selected features are not to be rotated or scaled, the  tool should be used. This tool is more efficient when the user simply wishes to translate or move selected features.
- b. If the selected features are not to be scaled or if the X and Y scale factors are to be the same, the O3 and N3 tools do not need to be activated.
- c. The transformation is based upon the values entered in the first 7 data fields, the last two data fields are not used in the transformation.

### Translate Selected Features Tool

The  tool enables the user to translate a set of selected features by picking a control point or “from point” and the new location of the “from point”, which can be thought of as the “to point”. In Figure 11, the “from point” is called A and the “to point”, B. Note that the selected features are transformed (moved) without any scaling or rotation being applied.

Prior to activating this tool, the user should select the feature(s) to be processed. If there are no selected features when the tool is activated, the error message shown in Figure 9 will be displayed.

This tool can be used in lieu of the Move Selected Features (no rotation) option shown in Figure 2.

Thus, to use this tool, the user should perform the following steps:

1. Select the features to be transformed.
2. Activate the  tool in the toolbar.
3. Make a pick in the map area denoting the control point, “from point”.
4. Make a pick in the map area denoting the new location of the control point, “to point”.

Once the “to point” has been defined, the selected features are transformed.

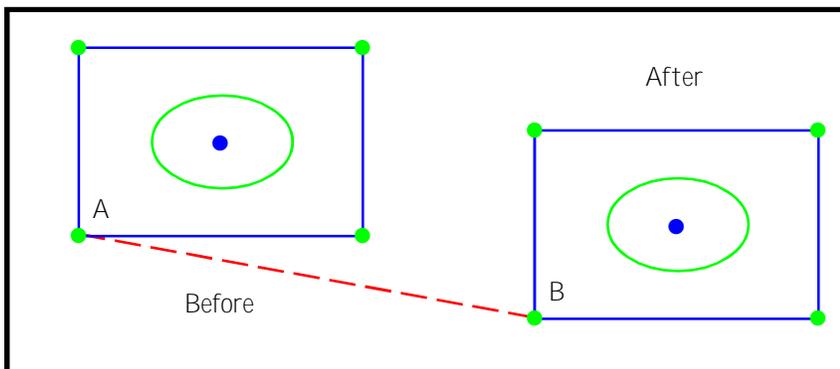


Figure 11 - Example 1 Moving Features from Point A to B

### Example 1 Moving Features

Shown in Figure 11 is an example where a group of features are to be moved from one location to another without any scaling or rotation being applied.

That is to say, the blue and green features, which appear on the left side of Figure 11, are to be relocated to the right side of the figure.

To accomplish this, the user should perform the following steps:

1. Select the features to be transformed. That is, the features on the left side of Figure 11.
2. Activate the  tool in the toolbar.
3. Make a pick in the map area denoting the control point, “from point”. In this example, this refers to Point A in Figure 11.
4. Make a pick in the map area denoting the new location of the control point, the “to point”. In this example, this refers to Point B.

Once the “to point” has been defined, the selected features are transformed. That is, the features no longer will appear on the left side of Figure 11, but rather, will appear on the right side of the figure.

### Example 2 Aligning Features

Shown in Figure 12(a) is an example where it is desired to translate and rotate a set of features such that the O1-O2 baseline is aligned with the N1-N2 baseline.

That is to say, the blue and green features shown on the left side of Figure 12(a) are to be moved and rotated such that the O1-O2 direction is identical to that of the N1-N2 direction and the O1 location matches the N1 location.

Depending upon the position of the control points (O1, O2, N1 and N2) there are two possible scenarios that could be used to accomplish this type of transformation.

The first scenario presented is the most general and will work for any situation. The second is specific for the case when the four control points are visible and clearly “pickable”. That is to say, when selecting a control point there is no possibility for selecting a control point other than the desired one (i.e. there is sufficient distance or separation between the individual control points).

#### Scenario 1

1. Activate the  tool, select the Initialize option and click the OK button to initialize the transformation control point data.
2. Activate the  tool in the toolbar.
3. Make a pick in the map area denoting the start point of the existing baseline. In this example, this refers to O1.

Optionally, if the user wishes to change the view, this can be done at this time.

4. Activate the  tool in the toolbar.
5. Make a pick in the map area denoting the end point of the existing

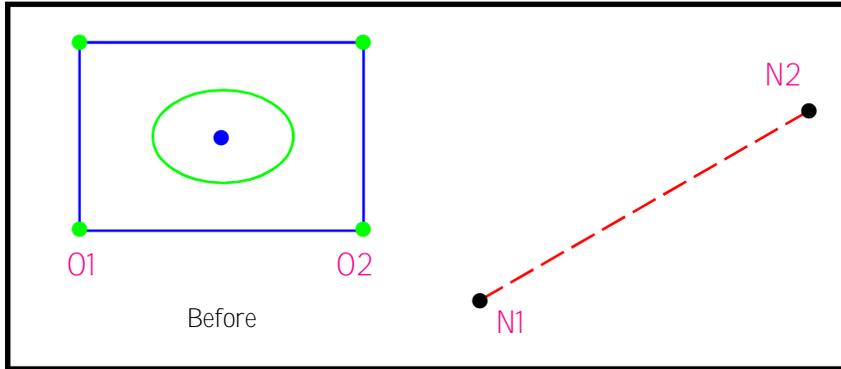


Figure 12(a) - Example 2 Aligning Features to a Known Baseline Direction

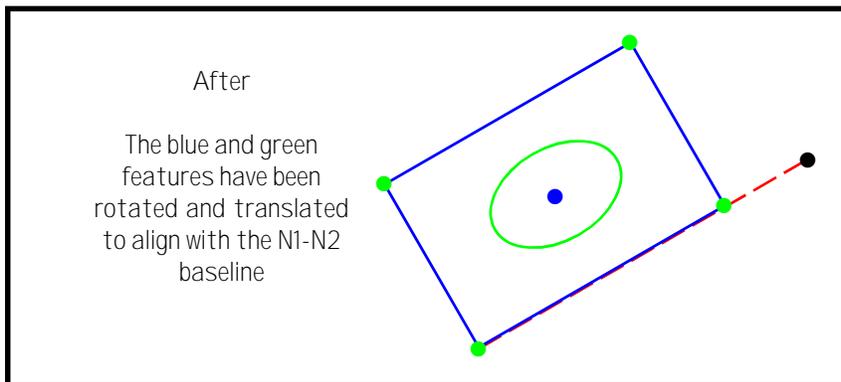


Figure 12(b) - Example 2 Aligning Features to a Known Baseline Direction

3. Make a pick in the map area denoting the start point of the existing baseline. In this example, this refers to O1.
4. Make a pick in the map area denoting the end point of the existing baseline. In this example, this refers to O2.
5. Activate the **N1** tool in the toolbar.
6. Make a pick in the map area denoting the start point of the new baseline. In this example, this refers to N1.
7. Make a pick in the map area denoting the end point of the new baseline. In this example, this refers to N2.
8. Select the features to be transformed.
9. Activate the **+** tool in the toolbar.
10. Make sure the Scale X and Scale Y parameter values are set to 1.0, then click the OK button.

baseline. In this example, this refers to O2.

Optionally, if the user wishes to change the view, this can be done at this time.

6. Activate the **N1** tool in the toolbar.
7. Make a pick in the map area denoting the start point of the new baseline. In this example, this refers to N1.

Optionally, if the user wishes to change the view, this can be done at this time.

8. Activate the **N2** tool in the toolbar.
9. Make a pick in the map area denoting the end point of the new baseline. In this example, this refers to N2.

Optionally, if the user wishes to change the view, this can be done at this time.

10. Select the features to be transformed.
11. Activate the **+** tool in the toolbar.
12. Make sure the Scale X and Scale Y parameter values are set to 1.0, then click the OK button.

The blue and green features are now transformed, see Figure 12(b).

**Scenario 2**

1. Activate the **S** tool, select the Initialize option and click the OK button to initialize the transformation control point data.
2. Activate the **O1** tool in the toolbar.

The blue and green features are now transformed, see Figure 12(b).

**Summary**

As stated at the beginning, the CEDRA-Transform-Tools toolbar has been recently modified and 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 use the new tools in the toolbar.

As always, should the reader have any comments or suggestions they should feel free to forward them to us.

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