Volume

1

Anderson Research, LLC

Statistical Programming and Analysis

LASTools User Manual

Statistical Programming and Analysis

LASTools User Manual

© Anderson Research, LLC

2499 West 111th Place

Westminster, CO 80234

Phone 303-469-0655

Table of Contents

* [Seven Keys to Creating a Professional Manual **Error! Bookmark not defined.**](#_Toc36022999)
* [How to Customize This Manual 1](#_Toc36023000)

[About the “Picture” Icons 1](#_Toc36023001)

* [Section Breaks Are Key 2](#_Toc36023002)
* [About Pictures and Captions 2](#_Toc36023003)

[How to Generate a Table of Contents 3](#_Toc36023004)

[How to Create an Index 3](#_Toc36023005)

* [How to Change the Headers and Footers 3](#_Toc36023006)
* [How to Create a Numbered Paragraph 4](#_Toc36023007)
* [How to Save Time in the Future 4](#_Toc36023008)

[How to Create a Document 4](#_Toc36023009)

* [More Template Tips 4](#_Toc36023010)
* [Index 5](#_Toc36023011)

Chapter

1

blast2iso

Reads in one or more LAS/LAZ formatted files, triangulates them into a seamless TIN and then rasters the TIN into a DEM.

B

Last2iso is a tool that can read billions of LiDAR points from the LAS/LAZ format, triangulates them into a seamless TIN, and rasters the TIN onto a DEM that can optionally be tiled. The output is either in BIL, ASC, IMG, XYZ, DTM, TIF, PNG or JPG format.

# Blast2iso Basics

For BIL, ASC, IMG, DTM, and XYZ output, one typically stores the actual elevation (-elevation), the slope (-slope), or intensity (-intensity) values. Whereas, the TIF, PNG, and JPG formats are usually used for a hillshade, gray or false coloring coloring (-hillshade, -gray, or –false, respectively), or for the RBG raster (-rgb). The particular range of values to be color mapped can be clamped using the command option '-set\_min\_max 10 100' or their range computed with the option '-compute\_min\_max'. The color ramps can be inverted with the '-invert\_ramp'.

This is part of the BLAST extension pack of LAStools that is built on streaming TINs via spatial finalization & streaming Delaunay.

By default the generated raster is sized based on the extend of the bounding box. If the LAS/LAZ file was generated using lastile, its extend can be set to that of the tile using the '-use\_tile\_bb' option. Any lastile-generated buffer that the tile may have had is then not rastered. This allows to avoid boundary artifacts and yet create matching tiles in parallel. It is also possible to define the raster extend with setting '-ll min\_x min\_y' and '-ncols 512' and '-nrows 512'.

Automatically a KML file is generated to allow the resulting DEM to be displayed inside Google Earth (for TIF/PNG/JPG). In case the LAS/LAZ file contains projection information (i.e. a VLR with geokeys) this is used for georeferencing the KML file. It is also possible to provide the georeferencing information in the command-line.

By default triangles whose edges are longer than 100 meters are not rasterized. This value can be changed with '-kill 200'. The value is always assumed to be meters and will be multiples of 3.28 for LAS/LAZ files where x and y are known to be in feet.

The color ramps can be inverted with '-invert\_ramp'.

# Examples

###### Using the Break command, you can insert a page, column, or section break.

In this manual, section breaks are the secret to success. Double-click the section break above to activate the **Page Setup** menu. Click the **Margins** tab. As you can see, this section (page) has margins of 1.25 inches top and bottom, 2.33 left, and .83 right—with headers and footers of .67 inches. Special section margins make it possible for this manual to use framed Styles—such as the Icon 1 style—which will move with the text.

1. Breaks in a Word document appear as “labeled,” dotted double-lines.
2. To insert a section break, click **Break** on the **Insert** menu. Select one option, and then click **OK**.

# About Pictures and Captions

Assuming that you see your paragraph marks, you’ll notice a paragraph mark attached to the lower-right corner of the picture. Click the picture, and notice too, the name of the style—not surprisingly, the Picture style. Pictures attached to paragraph styles make it possible for pictures to act like paragraphs.



Figure 21.1 uses this caption text. In Word, the Caption style can be automatically numbered and labeled. Click **Caption** on the **Insert** menu to access and control the caption settings, Press the F1 key to search for additional information and Help on captions.

##### This is Heading 5. Like all styles in this margin, it can flow with the text.

To change the picture, first click it to select it. Point to **Picture** on the **Insert** menu, and then click **From File**. Clear the **Float over Text** check box. Select a new picture, and then click **Insert**. To change the color of the picture, double-click the graphic to activate the drawing layer—where you can group or ungroup picture objects, and re-color or delete objects. Click an object, and then click **Drawing Object** on the **Format** menu. Select a new shade, and then click **Close**. To delete an object, select it, and then press DELETE. Click **Close Picture**.

To crop the picture, click the picture. Hold the SHIFT key down and re-size the picture by moving the picture “handles” with your mouse.

Try this: Click in the framed text below, and choose **Body Text** from the **Style** list on the **Formatting** toolbar. The headline should now appear as the paragraph below this paragraph. To change the paragraph back to Heading 5, click the **Undo** toolbar button, or click **Heading 5** from the **Style** list.

##### Framed text, like this heading, can be cut, copied and pasted like regular paragraph text.

To cut and paste framed text, click on the bounding border of the frame to reveal the frame handles. Press CTRL+X to cut the frame from the page. Place your cursor before the first letter of the paragraph that you want the frame to appear next to. Press CTRL+V to paste the frame next to the paragraph.

## How to Generate a Table of Contents

To create a Table of Contents, click where you want to insert the Table of Contents. On the **Insert** menu, click **Reference**, and then click **Index and Tables**. Click the **Table of Contents** tab. Select any formatting preferences, and then click **OK**. The Table of Contents will be automatically created with words contained in Headings 1 through 3.

Note

The TOC is generated from text formatted with Heading styles used throughout the document.

⮷

## How to Create an Index

To create index entries for the Word automatic indexing feature, select the text to be indexed, point to **Reference** on the **Insert** menu, and then click **Index and Tables**. Click the **Index** tab. (For more information, click **Microsoft Word Help** on the **Help** menu, type **index** into the question space, and then click the **Search** button. Finally, select the “Create an Index” Help topic.)

# How to Change the Headers and Footers

###### Written exercise pages 121 - 123 in your workbook.

In print layout view, double-click the header or footer to activate it, or click **Header and Footer** on the **View** menu. You can change or delete the text just as you would regular document text. To specify placement and whether the header or footer should be different on odd and even pages, or different for the first page only, click **Page Setup** on the **File** menu, and then click the **Layout** tab.

# How to Create a Numbered Paragraph

To create a numbered paragraph:

1. In the **Font** list on the **Formatting** toolbar, click the **List Number** style; or
2. Click the **Numbering** button on the **Formatting** toolbar.

If you choose to format more than one paragraph, Word will automatically number the paragraphs.

# How to Save Time in the Future

When you save the manual template with your changes, it will be easier to create documents in the future. To customize this manual:

###### To link a picture to your template, link the picture when you insert it by clicking on the Link to File box.

1. Insert your company information in place of the sample text on the cover page, as well as the inside-cover page. If you plan to use styles such as the “Icon Key” or Icon 1 style, set them now (see instructions, page 1).
2. Click **Save As** on the **File** menu. In the dialog box, click **Document Template** in the **Save File as Type** box. (The file name extension should change from .doc to .dot.)

## How to Create a Document

To create a manual from your newly saved template, click **New** on the **File** menu to re-open your template as a document. If you followed the steps above, your company information should appear in place. Now, you are ready to type your manual.

# More Template Tips

There are three ways to view the various style names of the template sample text:



1. In normal view, click **Options** on the **Tools** menu. Click the **View** tab. In the **Style Area Width** box, dial a number, and then click **OK**;
2. In any view, click a paragraph and view the style name on the **Formatting** toolbar; or
3. On the **Format** menu, click **Styles and Formatting** to display the **Styles and Formatting** pane.

# Index

background, 1

border, 3

bullet, 1

caption, 2

color, 2

drawing, 2

drop cap, 1

footer, 3

frame, 3

graphic, 2

group, 2

header, 3

Help, 3

link, 4

margins, 2

normal view, 1

number, 4

picture, 2, 3, 4

print, 1

re-size, 3

section break, 2

shading, 1

style, 1, 2, 3, 4

symbol, 1

Table of Contents, 3

template, 4

ungroup, 2

Wingdings, 1