

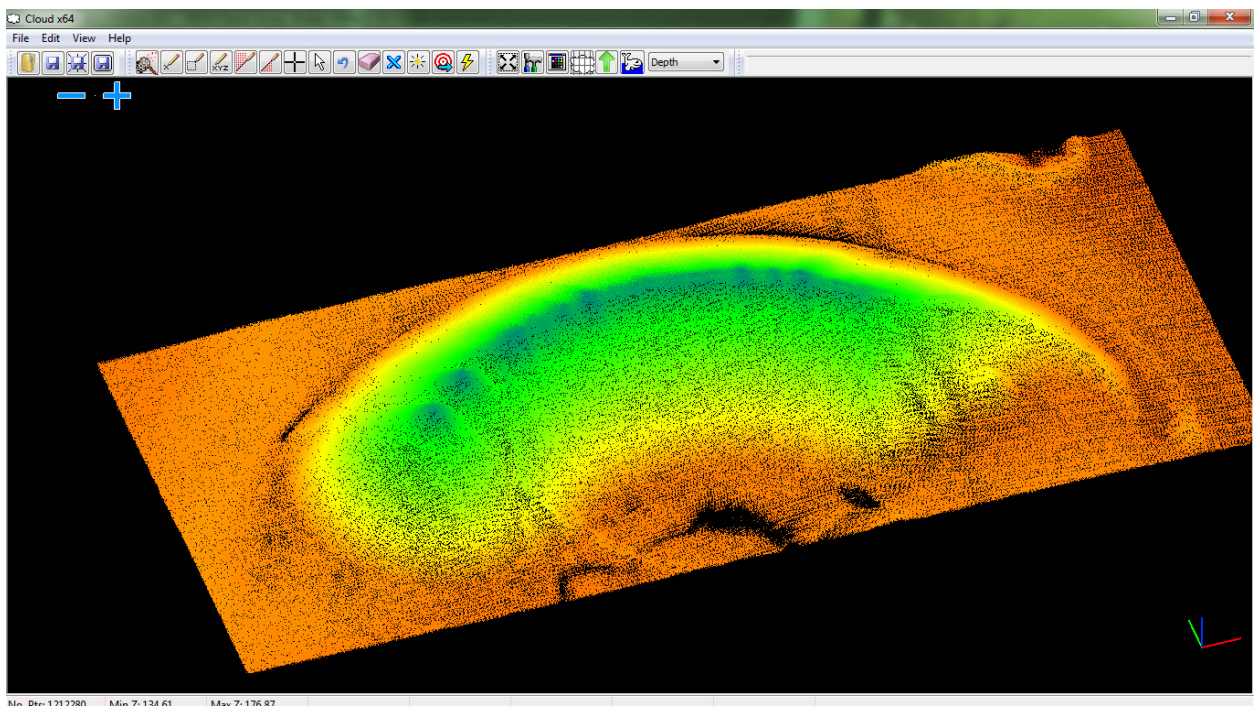


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Stock Pile Volumes in HYPACK®

By Jerry Knisley



This document is intended to provide a quick method for determining the volume of a stock pile of material. The steps in this procedure use the CLOUD and TIN MODEL programs assuming that you have an XYZ data set.

The dataset in this example is for reference only and has not been verified for accuracy. The steps involved will be to create a border of the pile, separate the pile and the surrounding area into separate XYZ data files and finally compute the volume of the pile.

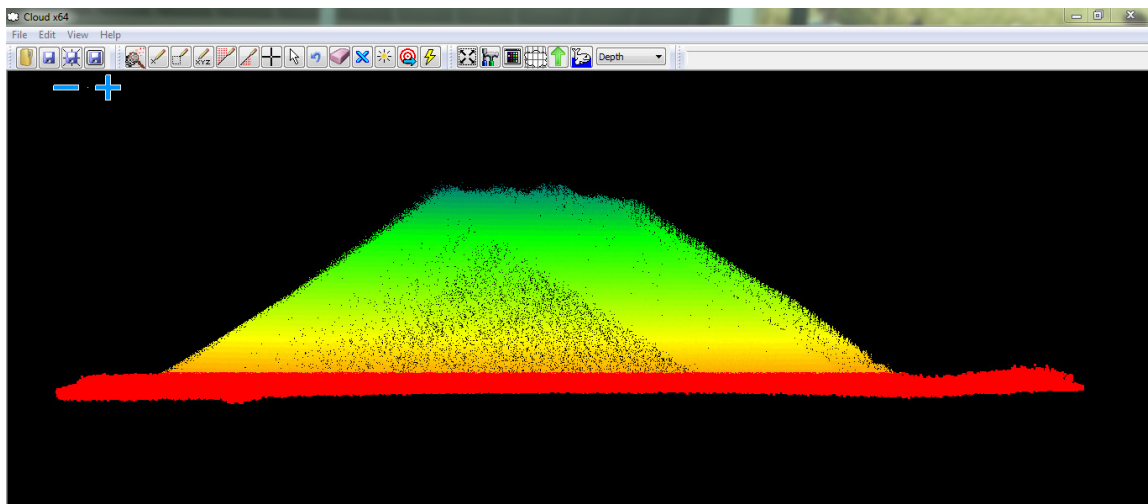
SEPARATE THE DATA FILES

To create separate files, the first step is to delete the surrounding area, leaving only the area that encompasses the material.

(**Editor's note:** This process includes a feature that requires CLOUD 17.1.10 or later.)

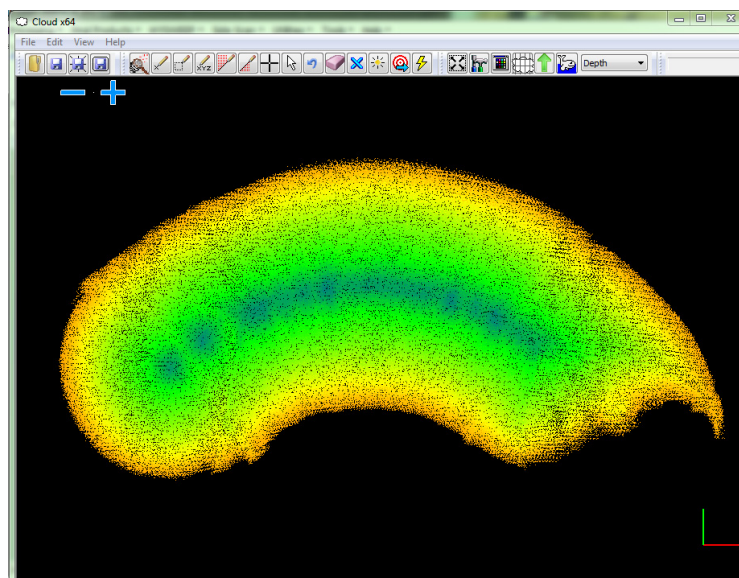
1. **Load the data in the CLOUD program.**

FIGURE 1. Point Cloud Display of Pile Data and Surrounding Area



2. **Remove the data surrounding the pile.** Rotate the data as required. Take the time necessary to delete the data as accurately as required for your project. Select the points you wish to remove then click the Eraser icon to delete.

FIGURE 2. Pile Data



3. **Save your pile data.** Select FILE-SAVE AS XYZ file, save this file now.
4. **Save the deleted data.** Also in the FILE menu, select SAVE DELETED TO XYZ and name your file.

At this point there should be two separate data files, one of the pile and one without the pile.

COMPUTING A VOLUME OF THE PILE AND CREATE THE BORDER FILE

The next section will require the TIN MODEL program to both create the border file as well as computing the volume of the pile.

CREATING A BORDER FILE

1. Load the Pile XYZ data file into the TIN MODEL program.
2. Select **EXPORT - BORDER**.
3. Ensure that the **TRUE BORDER** option is checked to get an accurate representation of the area for the border file.
4. Click [Output File] and enter the name of the border file.
5. Click [Export] to create the Border File.

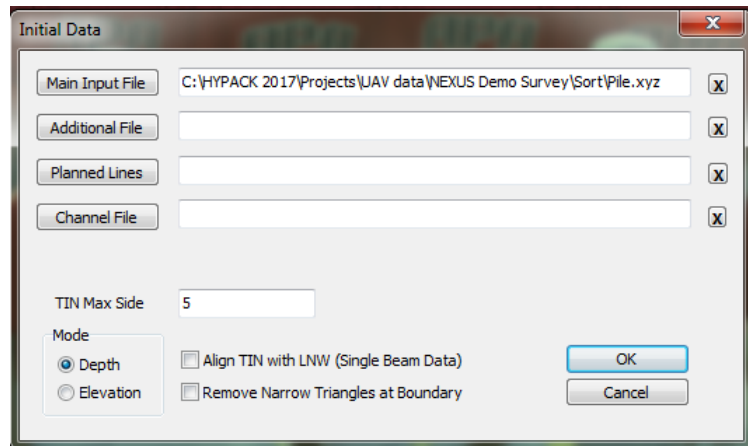
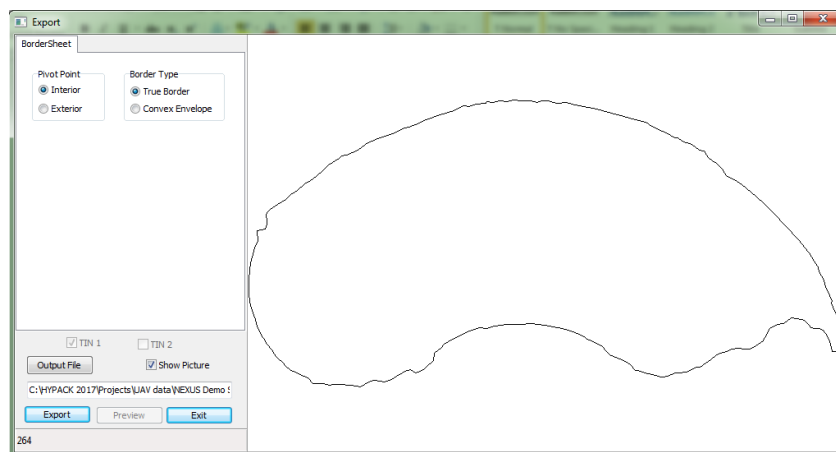


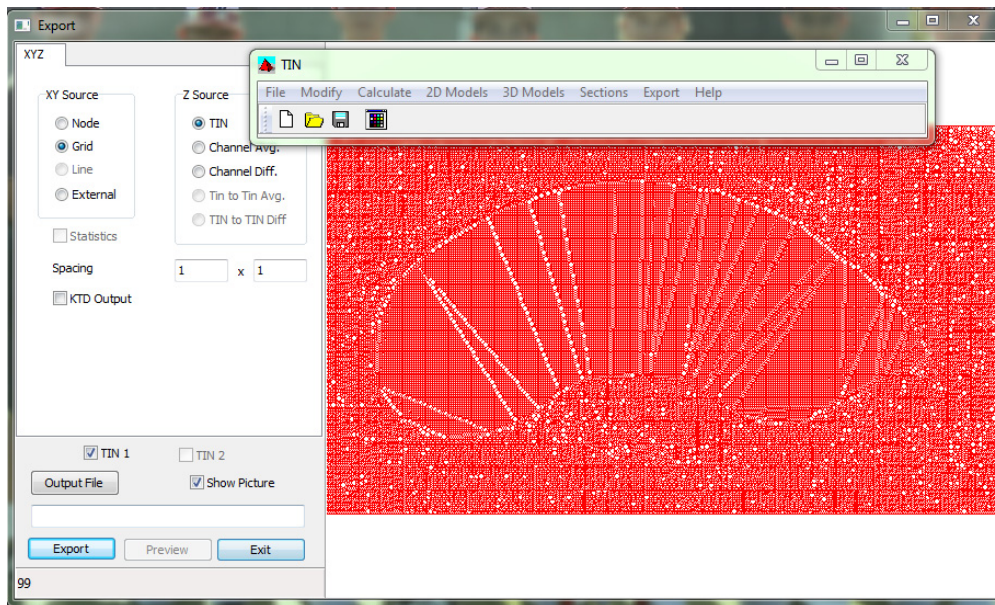
FIGURE 3. Exported Pile Border



CALCULATING THE PILE VOLUME

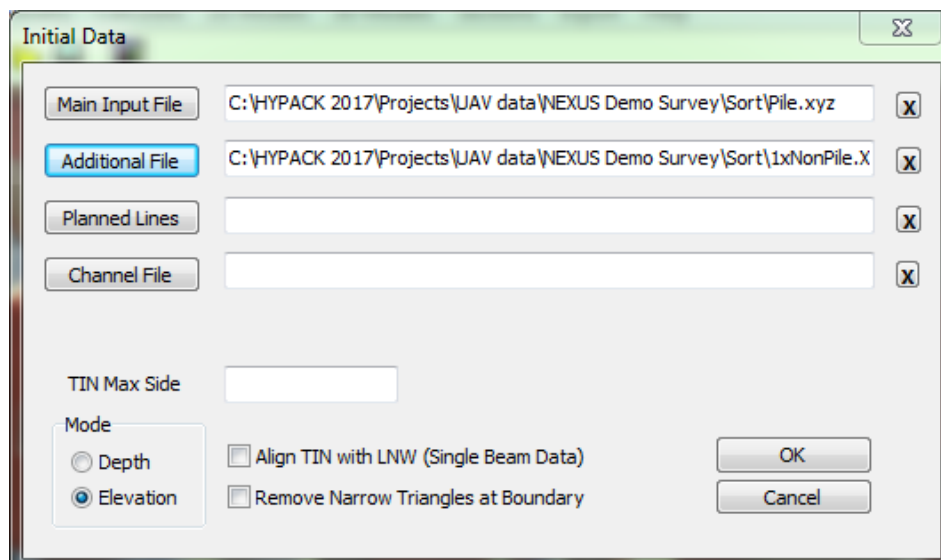
1. Fill in the XYZ data where the pile was removed.
 - a. Load the XYZ file of the deleted data. Leave the TIN MAX SIDE empty to allow the program to fill the entire void.
 - b. Save an XYZ grid from the TIN model using the EXPORT-XYZ dialog. (In this example, 1xNonPile.XYZ.)

FIGURE 4. TIN Model of Deleted Data



2. **Compute the volume between the two surfaces.**
 - a. **Load the Pile XYZ file as the Main Input file and 1xNonPile.XYZ as the Additional File for the reference surface.**

FIGURE 5. Loading the Pile Data with the Gridded Non-Pile Reference Surface



- b. **Do a TIN-to-TIN Volumes calculation.** The TIN MODEL program loads both files, compares the surfaces, and computes a volume of the difference. On this relatively small sample, the process took several minutes.
The pile in this example covers 26,000 square meters. The final result took 4 seconds to compute, total time about 30 minutes.

FIGURE 6. TIN vs TIN with Borders Volume Totals

Volume unit: Cubic Meter				
TIN1 File: C:\HYPACK 2017\Projects\UAV data\NEXUS Demo Survey\Sort\Pile.xyz				
TIN2 File: C:\HYPACK 2017\Projects\UAV data\NEXUS Demo Survey\Sort\1xNonPile.XYZ				
Border	Volume Above	Area Above	Volume Below	Area Below

None	353996.3	25940.8	0.0	0.0

Total	353996.3	25940.8	0.0	0.0