# Help/Instructions

O-Laser

# Index

# Install O-Laser

O-Laser is a Windows application that should run on most PCs. The internal memory capacity is the critical point. It is preferable to have at least 2GB. You can read more about O-Laser at:
http://oapp.se/Applikationer/OL_Laser.html

## Download installation files

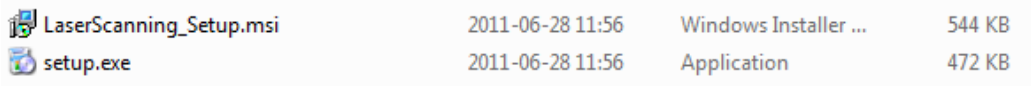
http://oapp.se/Download/View.php

1. OCAD Transformer - Installationsfiler för OCAD Transformer - (311)
2. OCADconv - GIF bild som används som icon till OCAD Transformer - (221)
3. OL Laser description (short version) - Kort beskrivning på engelska för OL Laser - (391)
4. OL Laser version 1.1 - Installationsfiler för OL Laser - (266)
5. ol_laser - GIF bild som används som icon till OL Laser - (310)

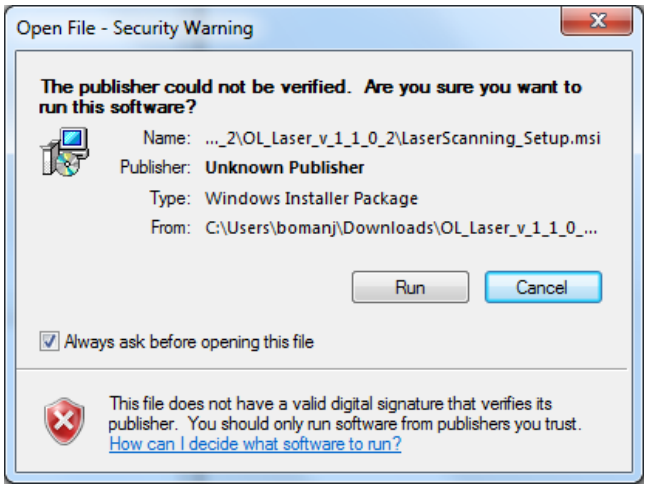
Click on ”OL Laser version x.x” and save the file on your computer.
The files are "zipped" into one package so you need to unzip the file to see the content.

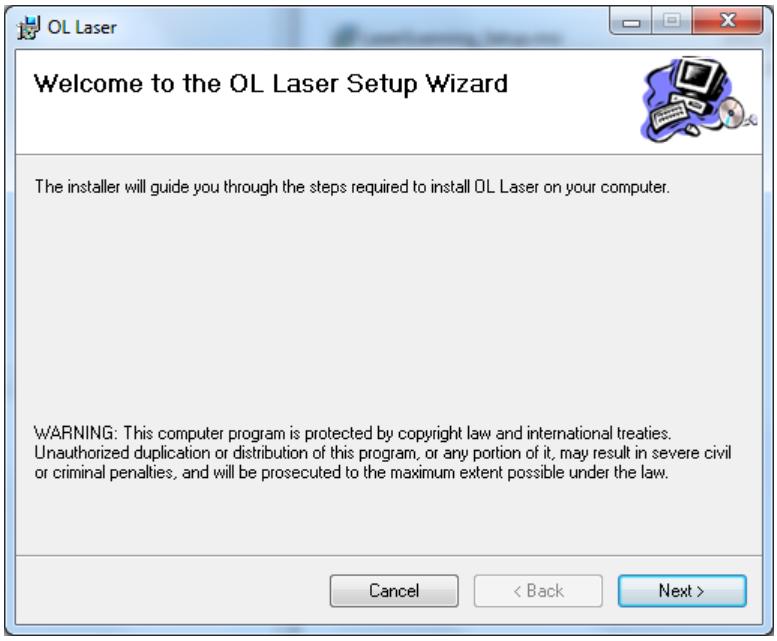

## Install O-Laser

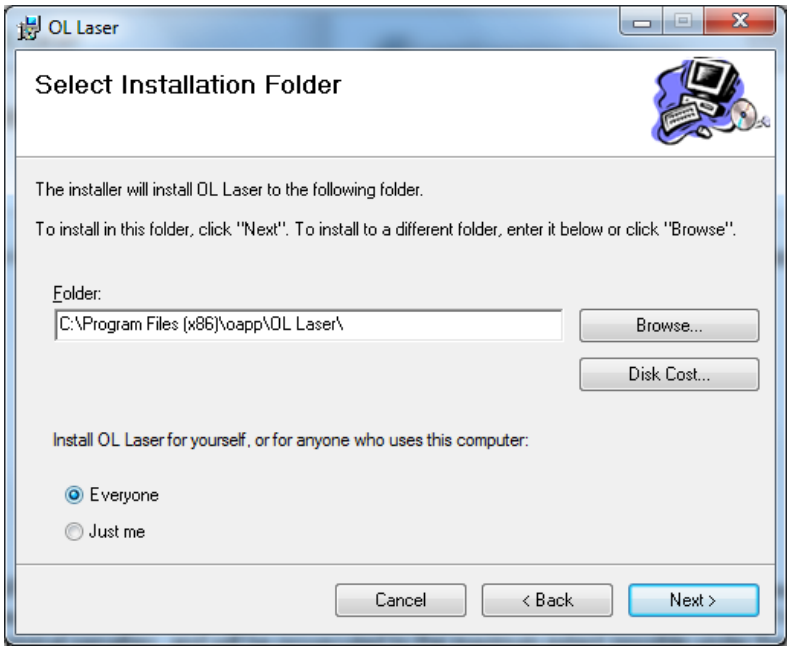
To start the installation process - doubelclick LaserScanning_Setup.msi.

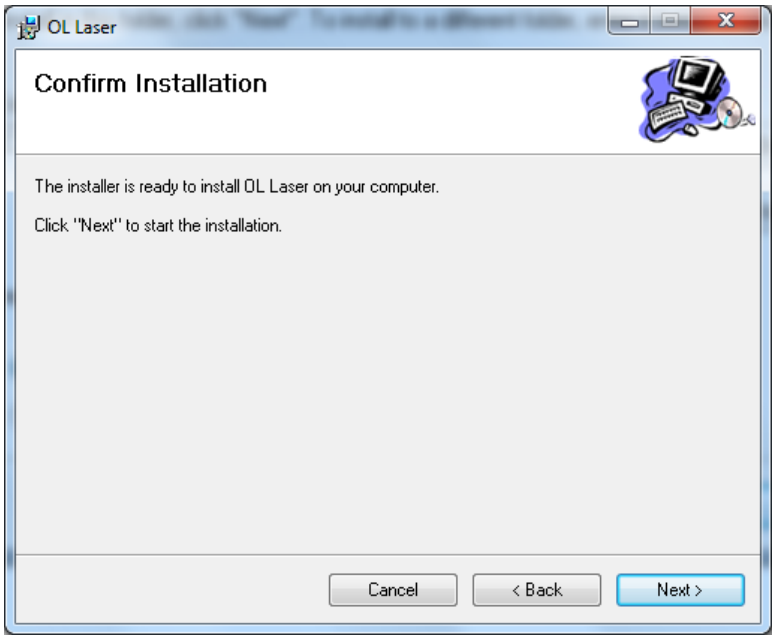



Follow the dialogue until the program is installed.

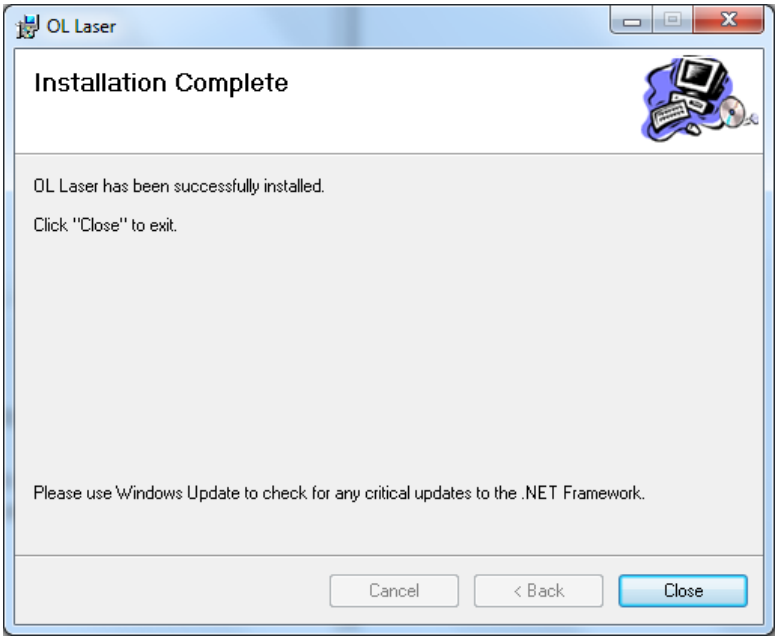

Open File - Security Warning
The publisher could not be verified. Are you sure you want to run this software?
Name: ..._2\OL_Laser_v_1_1_0_2\LaserScanning_Setup.msi
Publisher: Unknown Publisher
Type: Windows Installer Package
From: C:\Users\bomanj\Downloads\OL_Laser_v_1_1_0_...
Run
Cancel
Always ask before opening this file
This file does not have a valid digital signature that verifies its publisher. You should only run software from publishers you trust.
How can I decide what software to run?


OL Laser
Welcome to the OL Laser Setup Wizard
The installer will guide you through the steps required to install OL Laser on your computer.
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.
Cancel
< Back
Next >

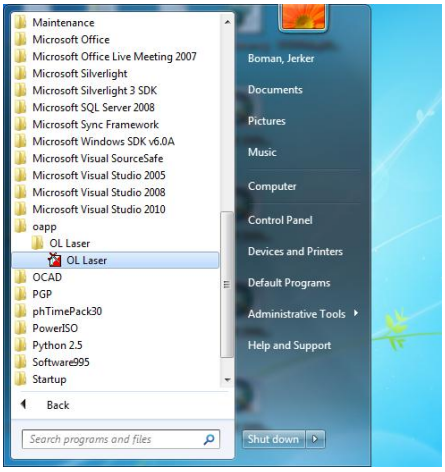

OL Laser
Select Installation Folder
The installer will install OL Laser to the following folder.
To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".
Folder:
C:\Program Files (x86)\oapp\OL Laser\
Browse...
Disk Cost...
Install OL Laser for yourself, or for anyone who uses this computer:
Everyone
Just me
Cancel
< Back
Next >


OL Laser
Confirm Installation
The installer is ready to install OL Laser on your computer.
Click "Next" to start the installation.
Cancel
< Back
Next >

A bit into the installation, you select the language. The dialogue can sometimes hide behind ordinary setup form .


The program is available in Start Menu.



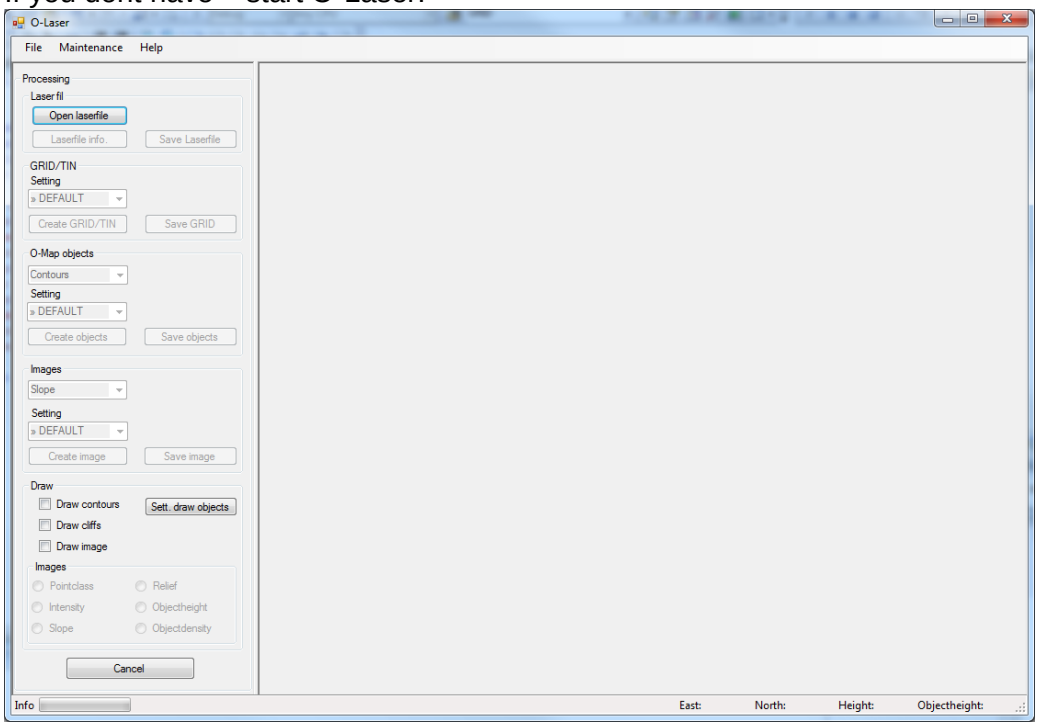
# Read in laser data, get information and save the laser data

Laser Data often comes in files that are compressed into "zip" or "rar" to save space. So remember to first "unpack" these files.
The file format Swedish National Land Survey supplies is in the format LAS. Land Survey also supplies a 2-meter Ground GRID in ASCII format (ASC).

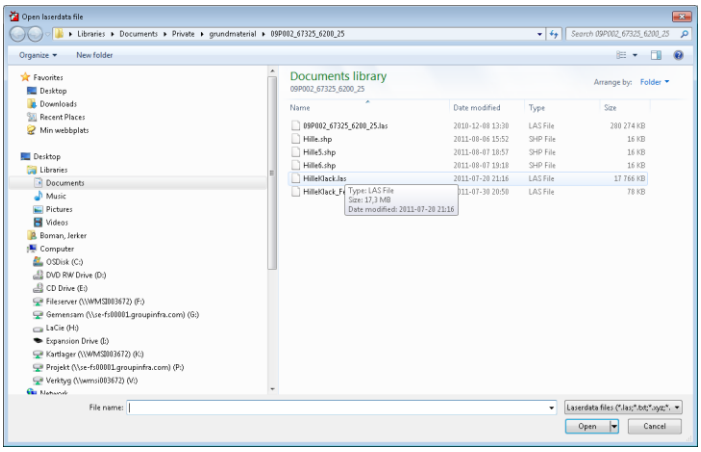
O-Laser support these formats:
• LAS
• TXT
• XYZ
• ASC
• GRD
• SHP
• ITF

## Open laserdatafile

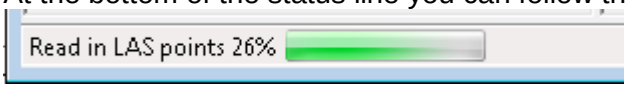
If you dont have – start O-Laser.



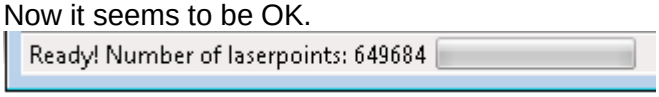

Click ”Open laserfile” and shoose a file to open.



At the bottom of the status line you can follow the applications process.

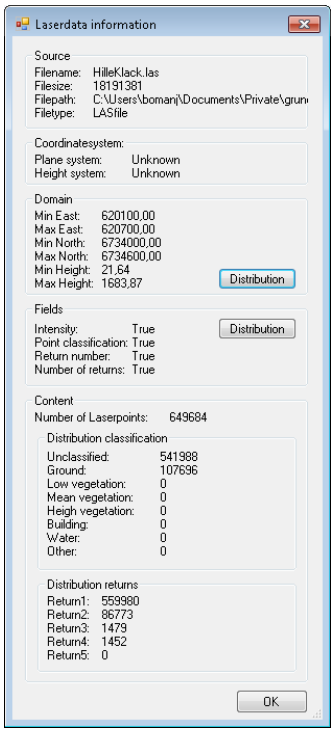



Now it seems to be OK.




# Information about the laserfile

Click Laserfile info.


Source:
The file name, size, location and type / format.

Coordinatesystem:
Swedish National Land of Survey data are in Sweref99 TM.

Domain:
Laserdata in three dimensions. Often, the maximum height is misleading. Different objects in the air, as steeds, can give undesirable return pulses. Is it also possible to see the distribution of height information.

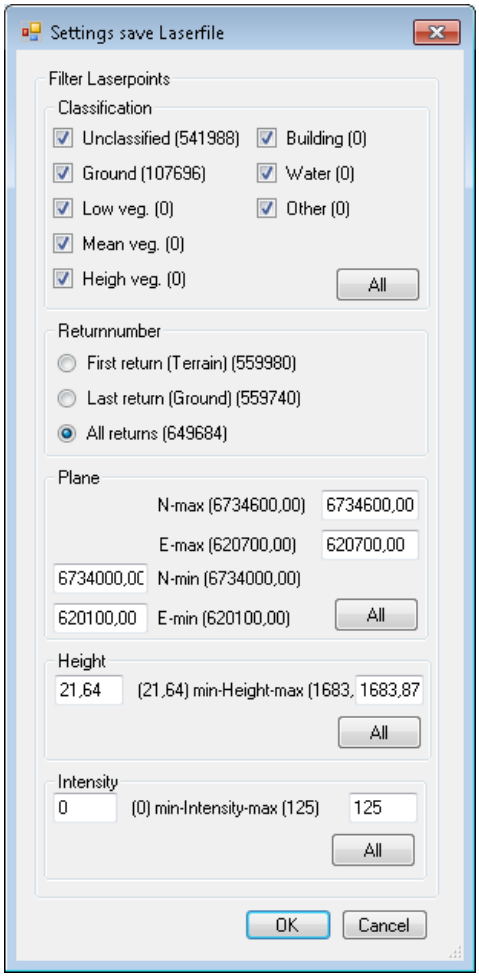
Fields:
Specifies True / False if the most common attributes is found in the file or not. It is possible to see the distribution of intensity.

Content:
Total number of laser points and divided into different classes and returns. Today Swedish National Land of Survey classifies points in Unclassified, Soil and Water.

# Save laserfile

O-Laser can store the laser data file in another format and filtered if desired. A tip is to shrink the file when you testing different settings. Because it takes some time to create the GRID, elevations, slopes, and the different images.

Click ”Save laserfile”


Before you save the file you get the opportunity to make a choice. If you want the entire file, click directly on the OK button.

Classification:
Click in / out the item categories you want to be included in the file.

Returnnumber:
Items from first return may be considered to belong to the terrain model. The last return is considered to belong to laserpoints hitting the ground. Although ungraded items are included, making this setting unsecure.

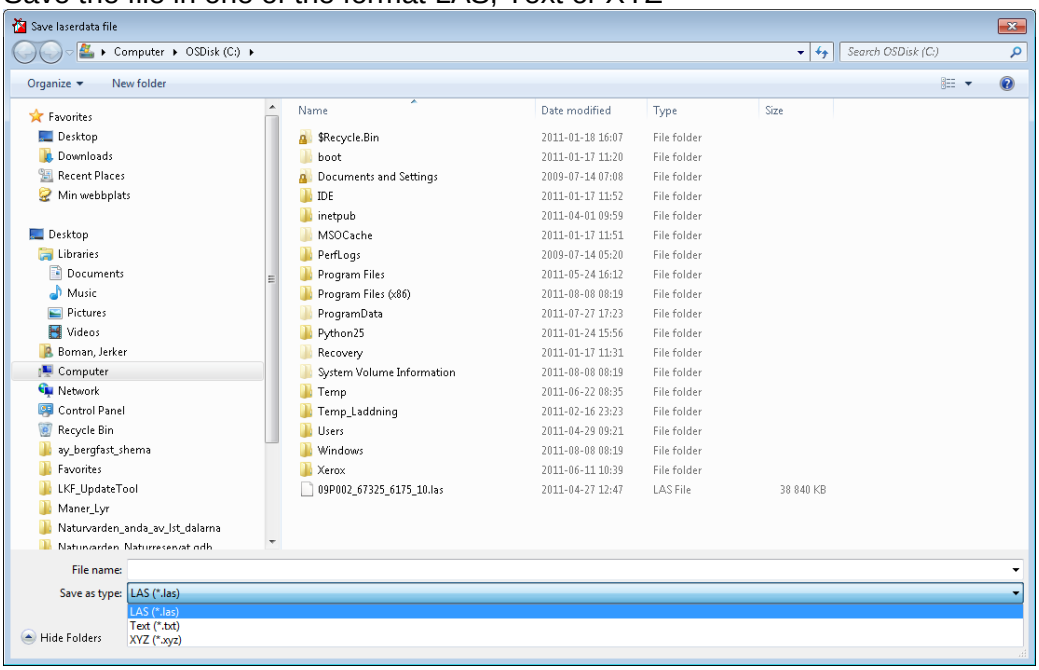
Plane:
Very useful for reducing file size and speed up the program.

Height:
Recommended to filter out extreme values.

Intensity:
Recommends using the 0-255 (depending on laserscanner equipment)

When you are finish click OK.

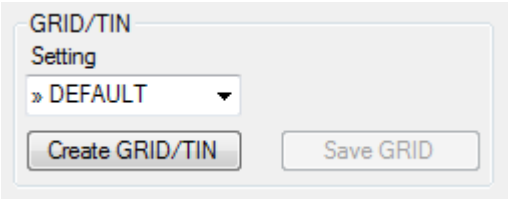
Save the file in one of the format LAS, Text or XYZ




I recommend the format LAS whether to use the file again in OL Laser.
To view information on items in clear text (readable), you can choose any of the other two formats.
PS! I cannot guarantee that the saved LAS file can be used in other software.

# GRID/TIN

In order to create map objects and images based on the individual laser points the information is needed to be grouped together. In O-Laser there are two ways.
1. In a regular square network GRID.
2. In an irregular triangulation TIN.
TIN is more expensive to create over large areas, and certain features of the software only works with GRID. For the laser data from the National Land of Survey, with a point cloud of laser points fairly evenly distributed, GRID fits perfectly.




## Settings

In the main menu just under system maintenance, you can build your own preferences for how GRID / TIN should be made up. Here in the main program, you select the setting you want.

## Create GRID/TIN

Click on "Create GRID / TIN" to start the function.


The process can be found as usual on the status bar.

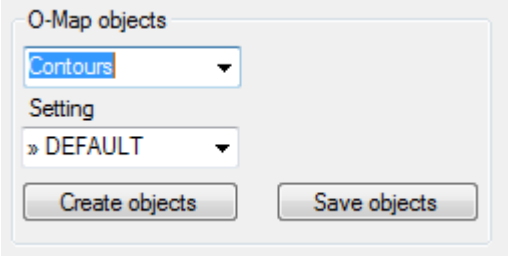
## Save GRID

Click ”Save GRID” to save the GRID to a internal O-Laser format.

# Contours

Contours ties together some selected levels to curves/lines.
The Equdistans is optional. In Gävle, where it commonly is 2.5 meter contour interval on the maps, I usually take 0.5-meter contour interval for the laser contours.
The requirements for creating contour is that you have created a GRID / TIN with "Ground" points. It is not advisable to create contour lines from the "Unclassified" laser points.

In the "O-Map objects", select Contours from the list.



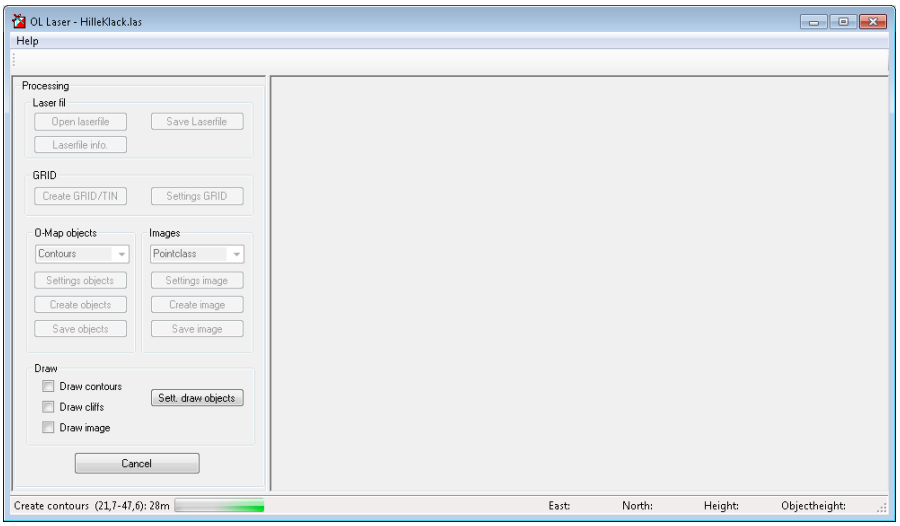

## Settings

In the main menu just under system maintenance, you can build your own preferences for how GRID / TIN should be made up. Here in the main program, you select the setting you want.

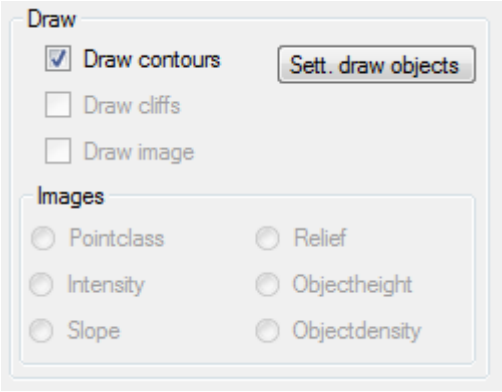
## Create contours

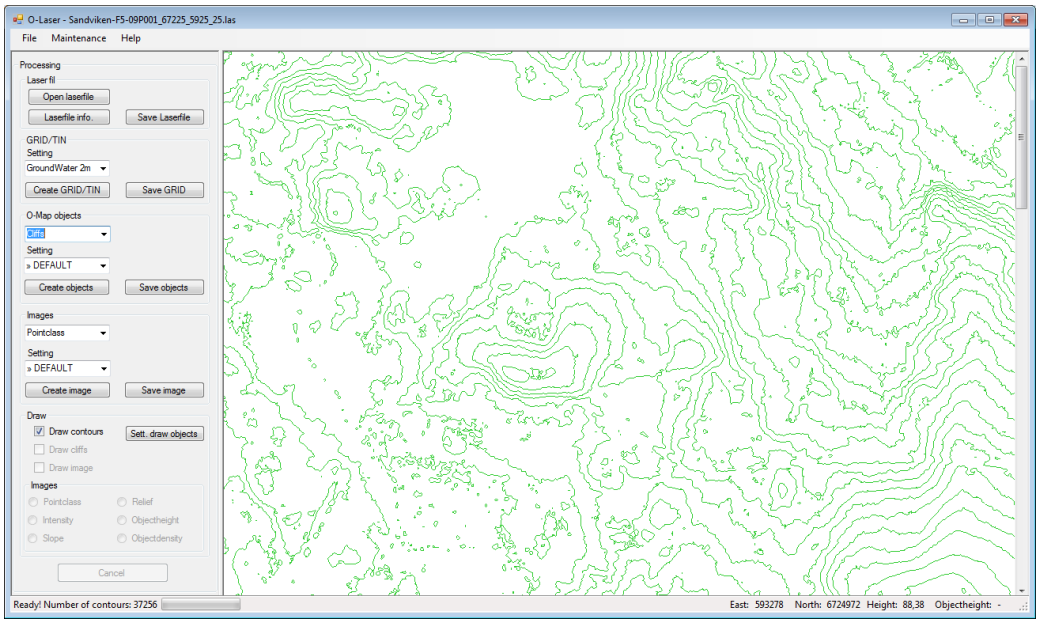
Choose "Create objects" to start the function.


See the bottom of the status bar when the process is completed.

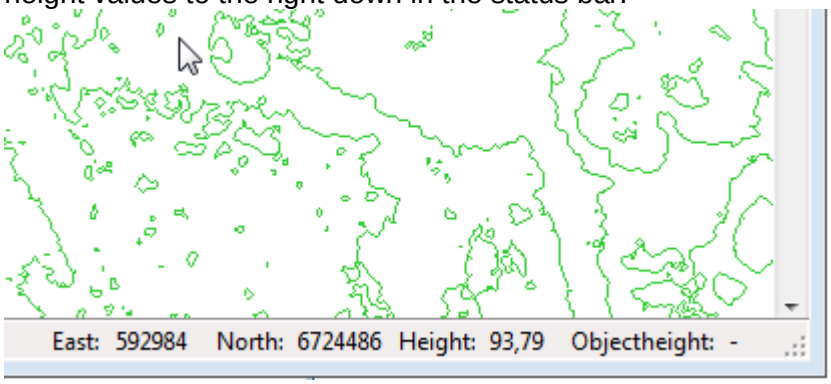



Choose to check the "Draw contours" if you want to see contour lines in the large window on the right.





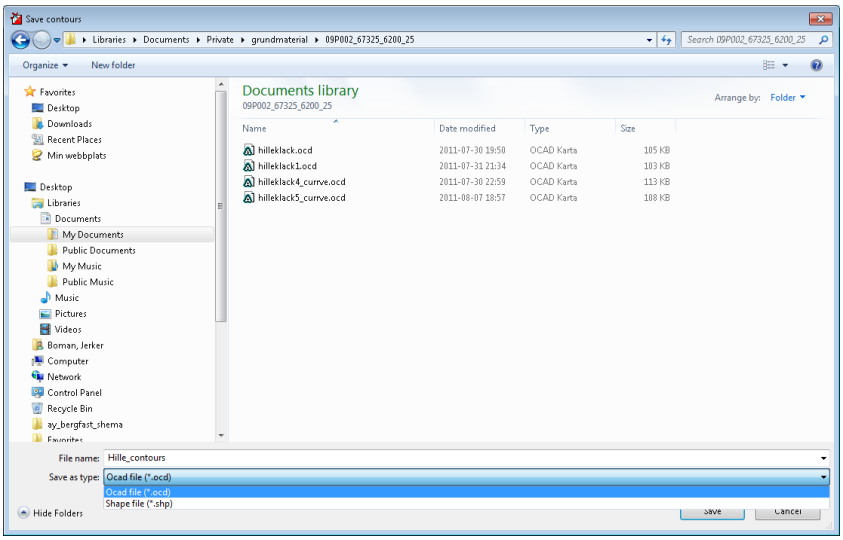

If the mouse is inside the map area you can see the plane coordinates and height values to the right down in the status bar.




# Save contours

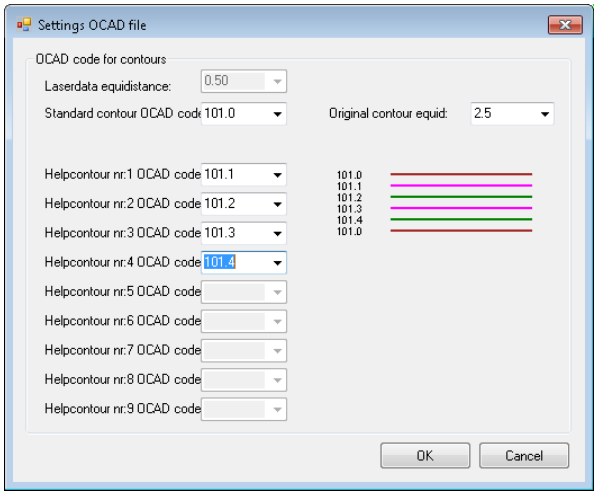
Select "Save objects" to save the contours to OCAD or Shape file.


Fill in filename and click ”Save”.




## OCAD

If you chose OCAD file type, the following dialogue show up.




Original equdistance:
Start with the contour equdistance for the final map.

There are some different OCAD symbols to choose from to use as “Helpcontours”. You see in the image on the right how it will look like in the OCAD. OCAD file version will be version 6 with standard symbols.

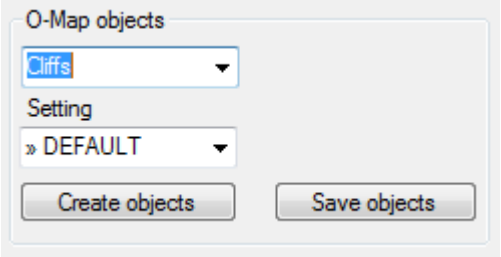
## Shape

If you choose to save the contour to Shape format, three files will be created. These files all have to stick together to be able to import and use contour in other applications.

# Cliffs

A first attempt to ”automatically” produce cliffs is now available in O-Laser from version 1.2. I think it may need a few tries before you get to the right level in terms of number of cliffs and the size and length. Try it with an old map as key result.
The requirements for creating cliffs are that you have created beforehand a GRID / TIN with "Ground" points. It is not advisable to create cliffs from the "Unclassified" laser points.

In the "O-Map objects", you can choose cliffs from the list.




# Settings

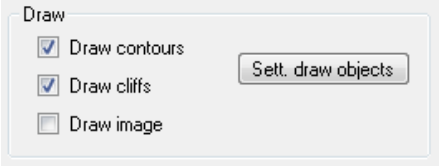
In the main menu just under system maintenance, you can build your own preferences for how GRID / TIN should be made up. Here in the main program, you select the setting you want.

# Create cliffs

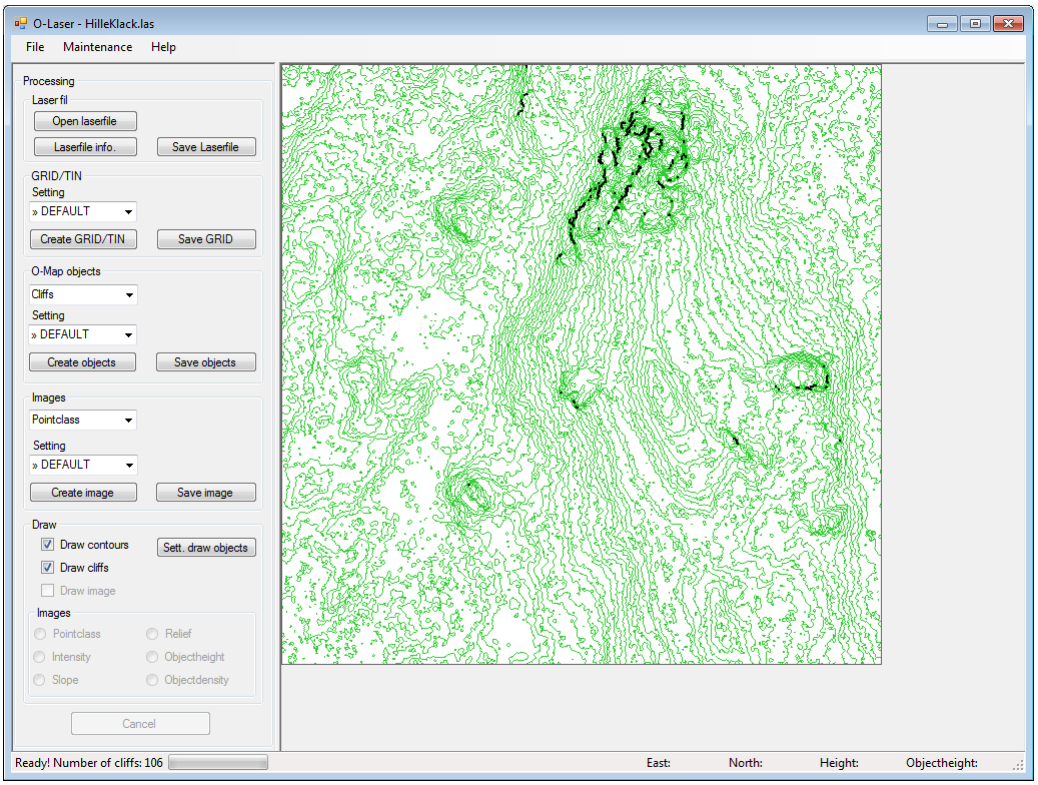
Choose "Create objects" to start the function.


See the bottom of the status bar when the process is completed.

Choose to check the "Drawing cliffs" if you want to see cliffs in the Window to the right.



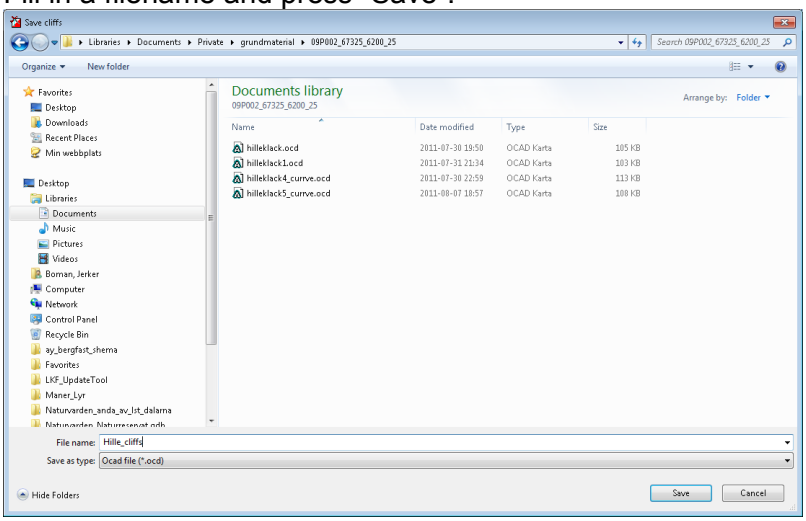

If the mouse is inside the map area you can see the plane coordinates and height values to the right down in the status bar.



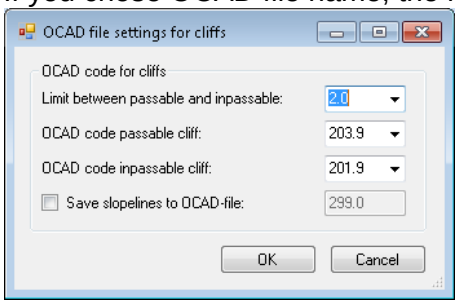

# Save cliffs

Select "Save objects" to save the curves to OCAD or Shape file.


Fill in a filename and press ”Save”.



**OCAD**
If you chose OCAD file name, the following dialogue is showed.




Height Limit between passable and impassable cliff:
Enter the height limit between passable and impassable cliff.

OCAD code passable cliff:
Select OCAD code.

OCAD code impassable cliff:
Select OCAD code.

Save slopelines to OCAD file:
Slopelines are the lines that built up the cliffs.
Check if you want them to be included in the OCAD file.

Click OK and OCAD file will be created.

**Shape**
If you choose to save the cliffs to Shape format, three files will be created. All the files needed to be able to import and use them in another application.

# Images

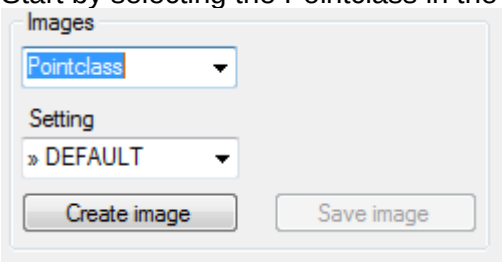
There are a number of raster images to choose from.

- Pointclass
- Intensity
- Slope
- Shading
- Object height
- Object density

Images are built up based on the information available in the GRID / TIN that you previously created. Some images such as Object height requires that there are Unclassified points included in the GRID creation (LAS files from National Land of Survey). Some laser files may not contain intensity information and therefore it is impossible to create the intensity image.

# Pointclass

Start by selecting the Pointclass in the drop-down list.



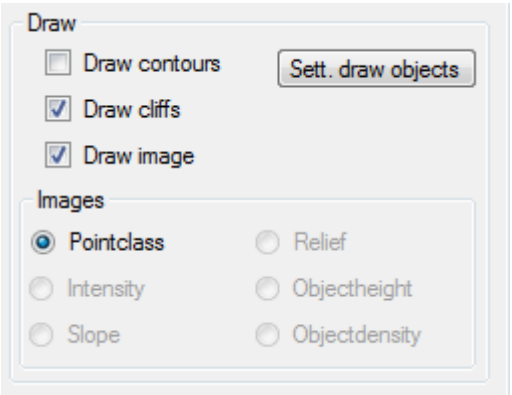

# Settings

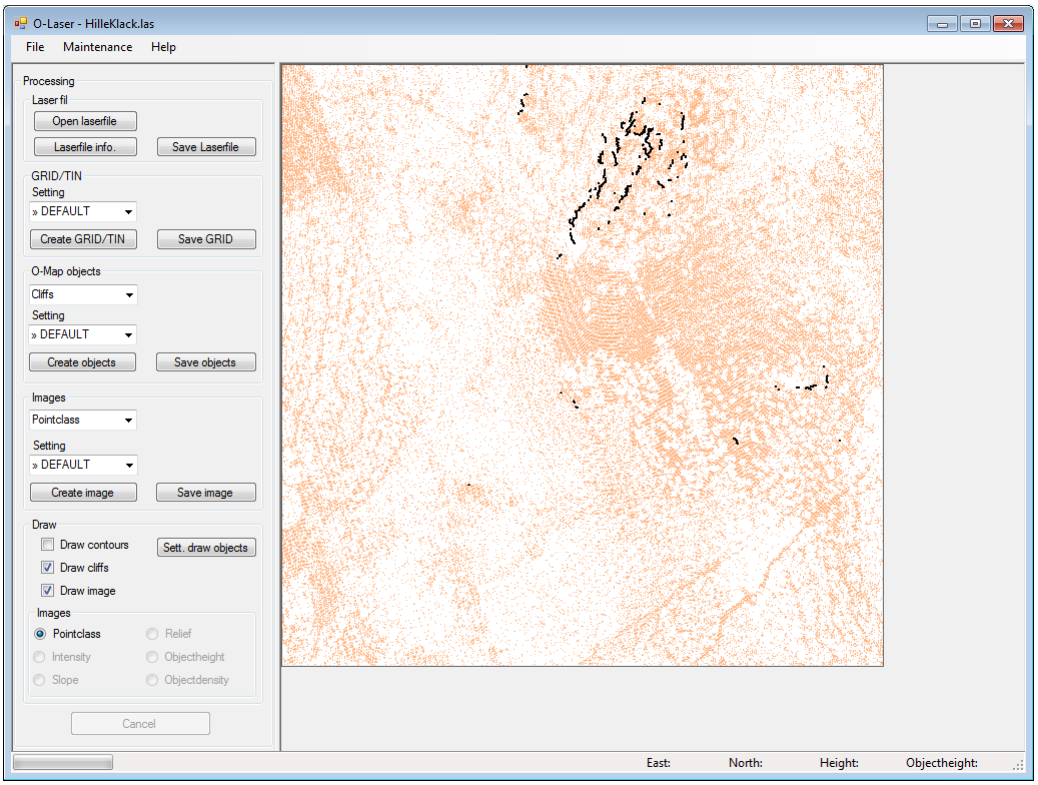
In the main menu just under system maintenance, you can build your own preferences for how GRID / TIN should be made up. Here in the main program, you select the setting you want.

# Create Pointclass image

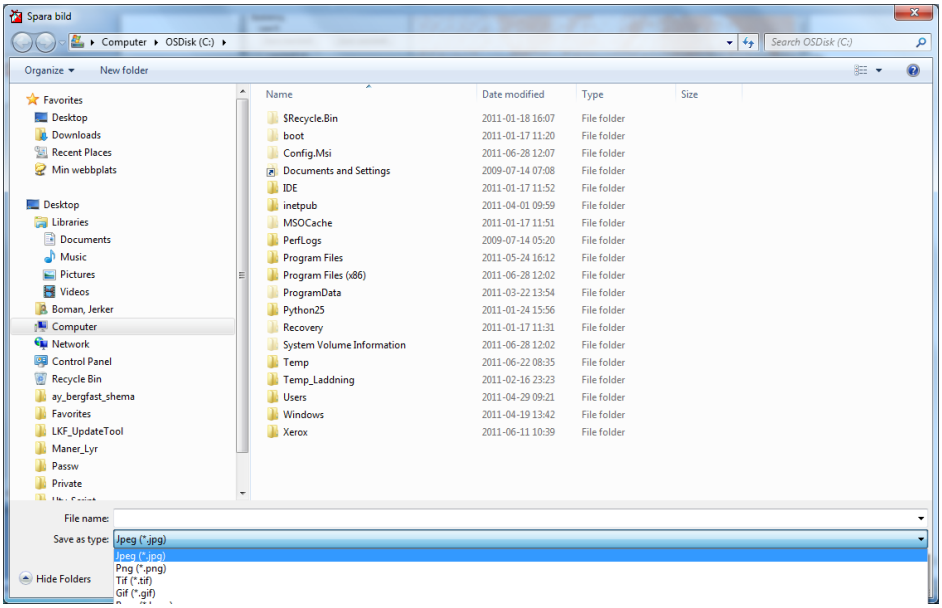
Then it's time to create the image. Choose "Create Image".


Wait for the process is complete - see the status bar.
If you choose to "draw image" you can see the image on the screen to the right of the program.
The status bar at the bottom right has information about the mouse pointer coordinates and heights.





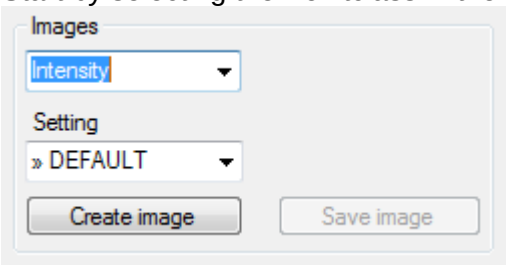

Finally - Select "Save Image".


There are a number of formats to choose from. It also follows a "worldfile" to the raster image that can be used to add raster images as background images in other applications such as OCAD.

# Intensity image

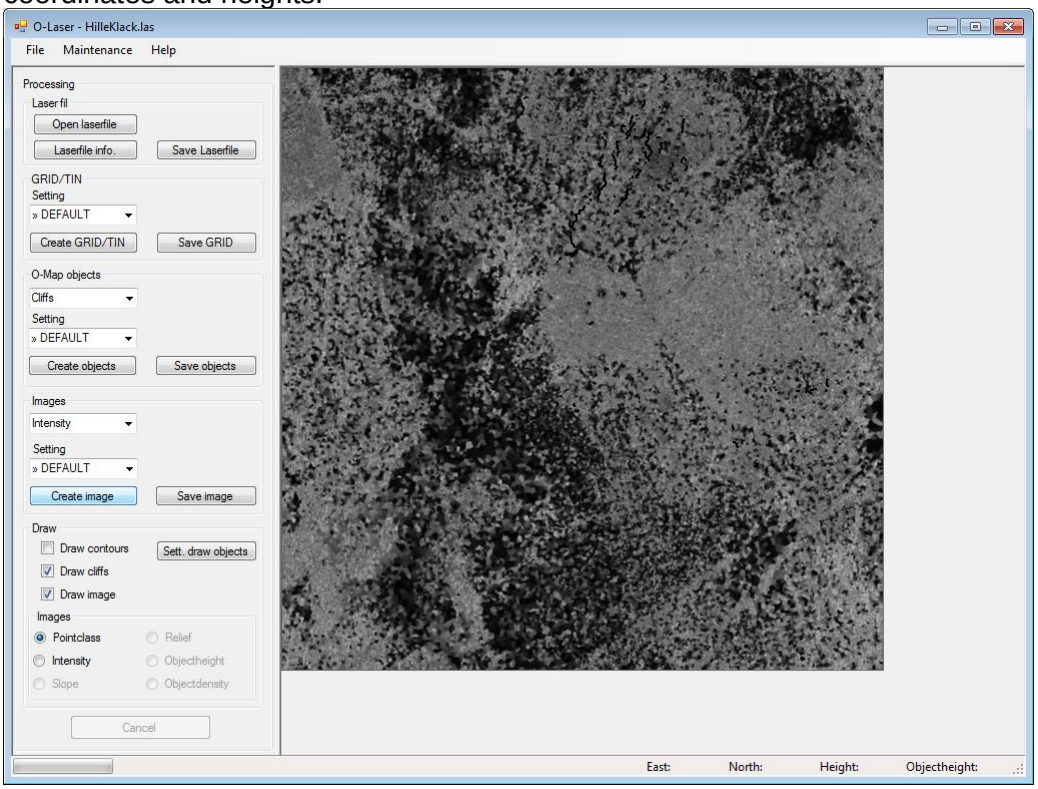
Start by selecting the Pointclass in the drop-down list.



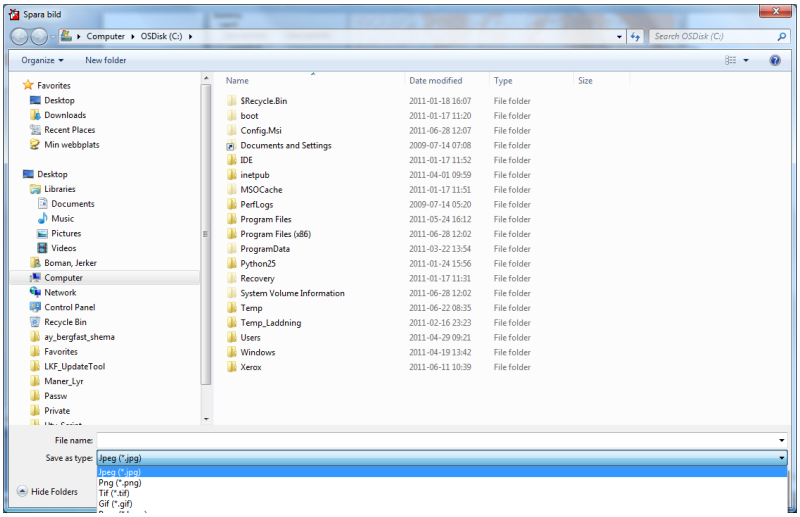

# Create Intensity image

Then it's time to create the image. Choose "Create Image".


Wait for the process is complete - see the status bar.
If you choose to "draw image" you see the image on the screen to the right of the program.
The status bar at the bottom right has information about the mouse pointer coordinates and heights.



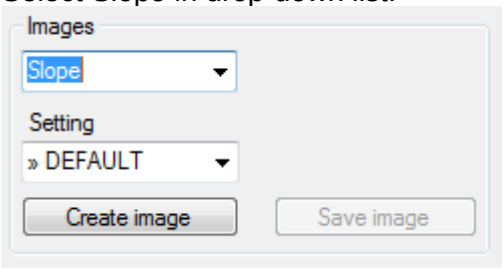
Finally - Select "Save Image".


There are a number of formats to choose from. It also follows a "worldfile" to raster image that can be used to add raster images as background images in other applications such as OCAD.

# Slope image

Select Slope in drop-down list.



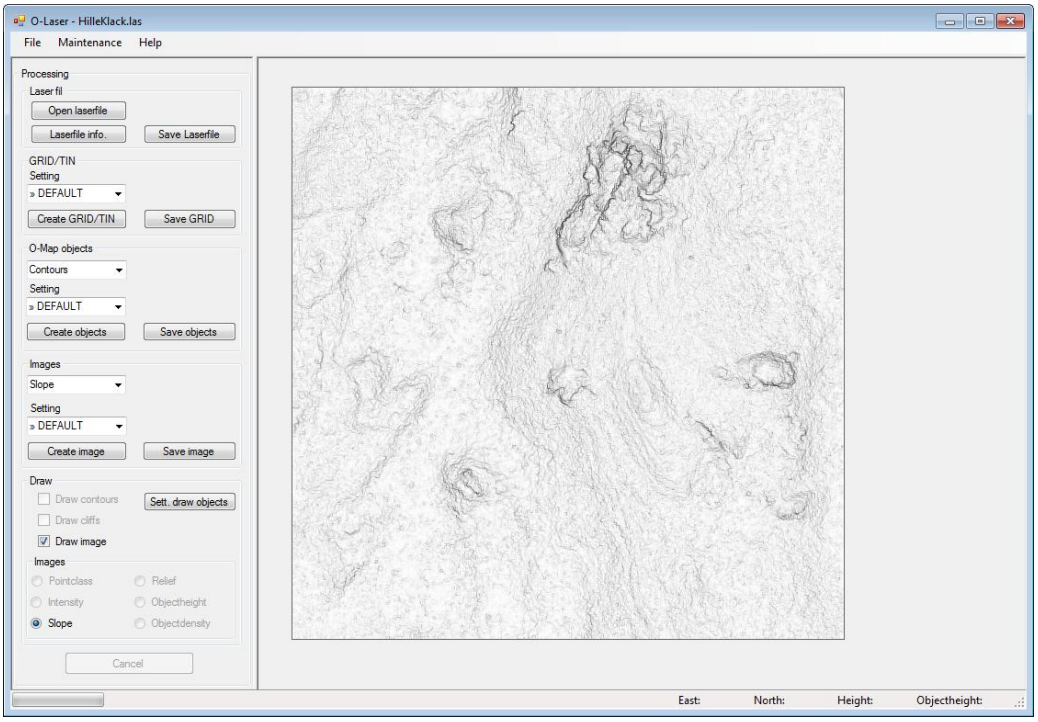

# Settings

In the main menu just under system maintenance, you can build your own preferences for how GRID / TIN should be made up. Here in the main program, you select the setting you want.

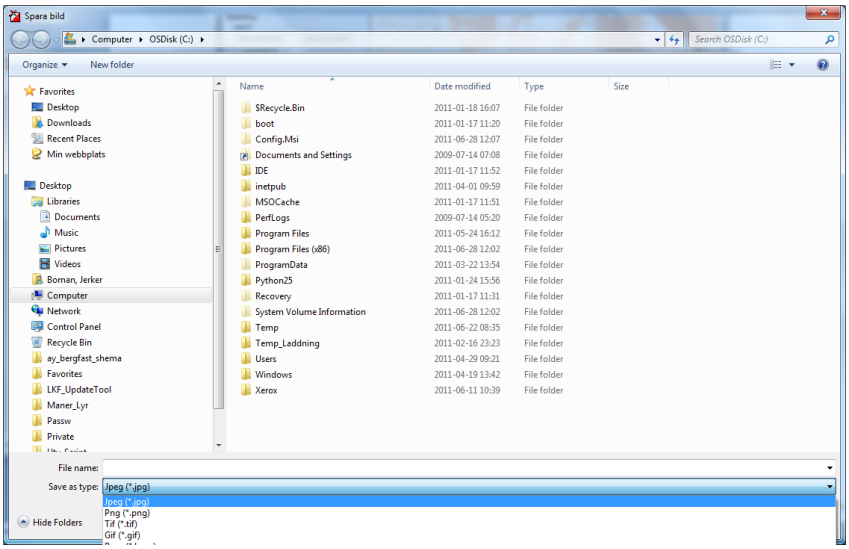
# Create Slope image

Then it's time to create the image. Choose "Create Image".


Wait for the process is complete - see the status bar.
If you choose to "draw image" you see the image on the screen to the right of the program.
The status bar at the bottom right has information about the mouse pointer coordinates and heights.



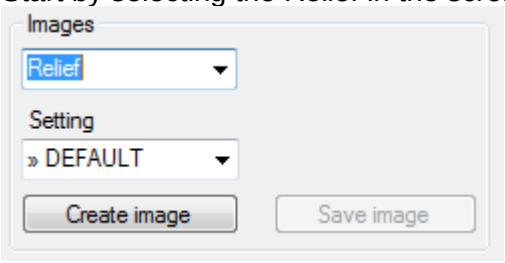

Finally - Select "Save Image".




There are a number of formats to choose from. It also follows a "worldfile" to raster image that can be used to add raster images as background images in other applications such as OCAD.

# Relief image

Relief or Terrain Shading is an image that simulates a light source shines on the ground from a certain position so that a shadows appear. Slope relative to the direction of light determines the gray shades in the image.
Start by selecting the Relief in the scroll bar.



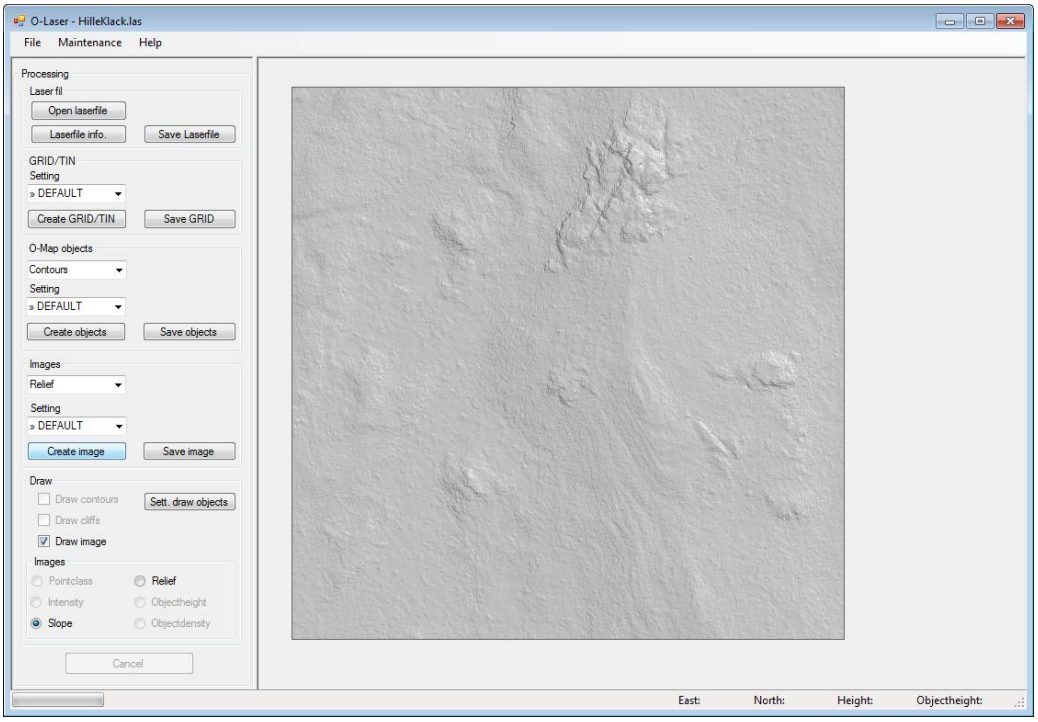

# Settings

In the main menu just under system maintenance, you can build your own preferences for how GRID / TIN should be made up. Here in the main program, you select the setting you want.

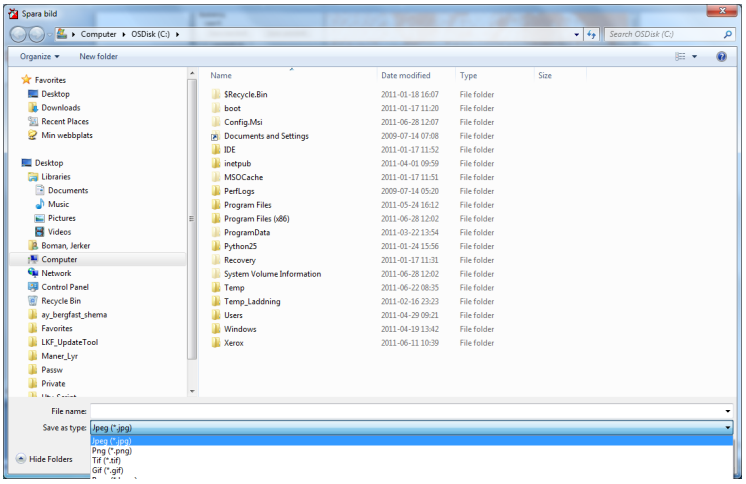
# Create Relief image

Then it's time to create the image. Choose "Create Image".


Wait for the process is complete - see the status bar.
If you choose to "draw image" you see the image on the screen to the right of the program.
The status bar at the bottom right has information about the mouse pointer coordinates and heights.




Finally - Select "Save Image".

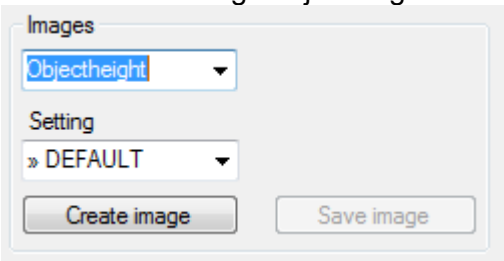



There are a number of formats to choose from. It also follows a "worldfile" to raster image that can be used to add raster images as background images in other applications such as OCAD.

# Objectheight image

Objectheight image shows the objects heights as a grey ramp image. Darker means higher objects and brighter means lower objects. You have also the choice to use color steps representing the object heights. The requirements is that you chose to include also the "non" ground points = unclassified when you created your GRID / TIN. You must also ensure that you checked the "Create a ground GRID in addition to these settings".

Start with selecting ”Objectheight” in the drop-down list.



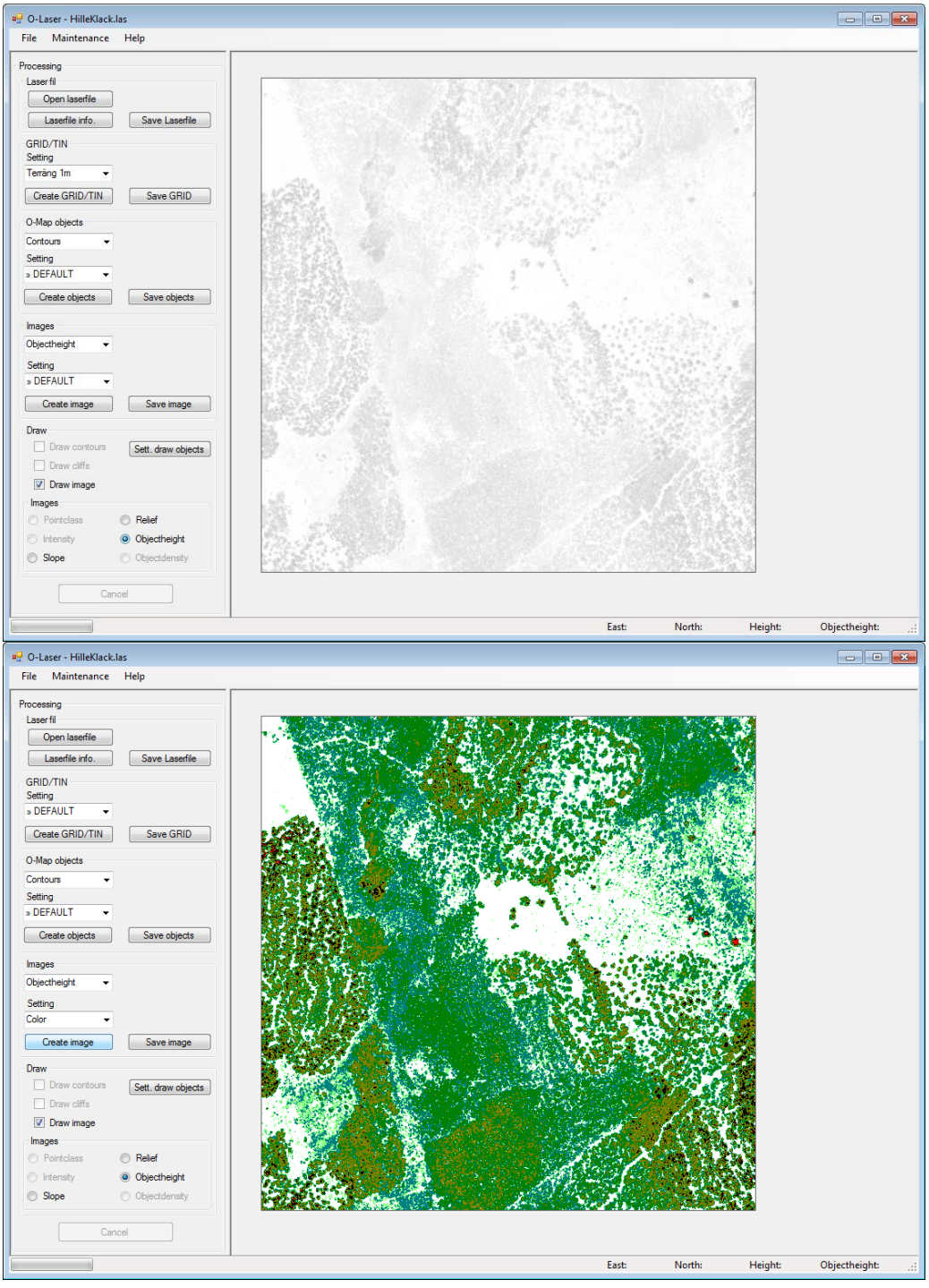

# Settings

In the main menu just under system maintenance, you can build your own preferences for how GRID / TIN should be made up. Here in the main program, you select the setting you want.

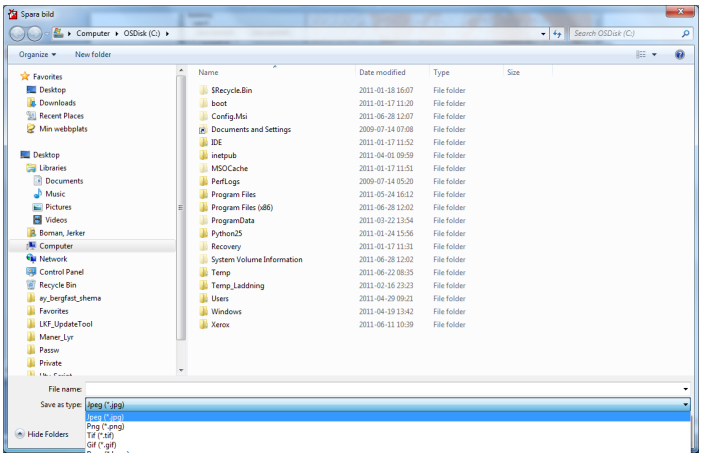
# Create Objectheight image

Then it's time to create the image. Choose "Create Image".


Wait for the process to complete - see the status bar.
If you choose to "draw image" you see the image on the screen to the right of the program.
The status bar at the bottom right has information about the mouse pointer coordinates and heights.




Finally - Select "Save Image".

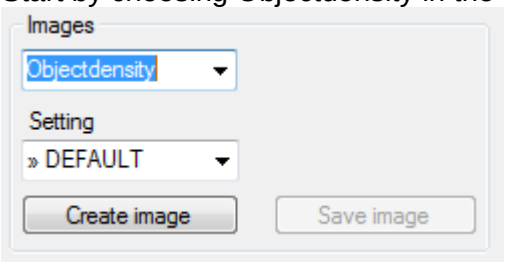



There are a number of formats to choose from. It also follows a "worldfile" to raster image that can be used to add raster images as background images in other applications such as OCAD.

# Objectdensity image

Objectdensity image shows, in a gray shade or in a range of colors, objects density. The density refers to how many laser points of a specific laser point class is found in a “search window”, compare to the total number of laser points. The requirement is that you included "non" ground points = unclassified, when you created your GRID / TIN.

Start by choosing Objectdensity in the drop-down list.



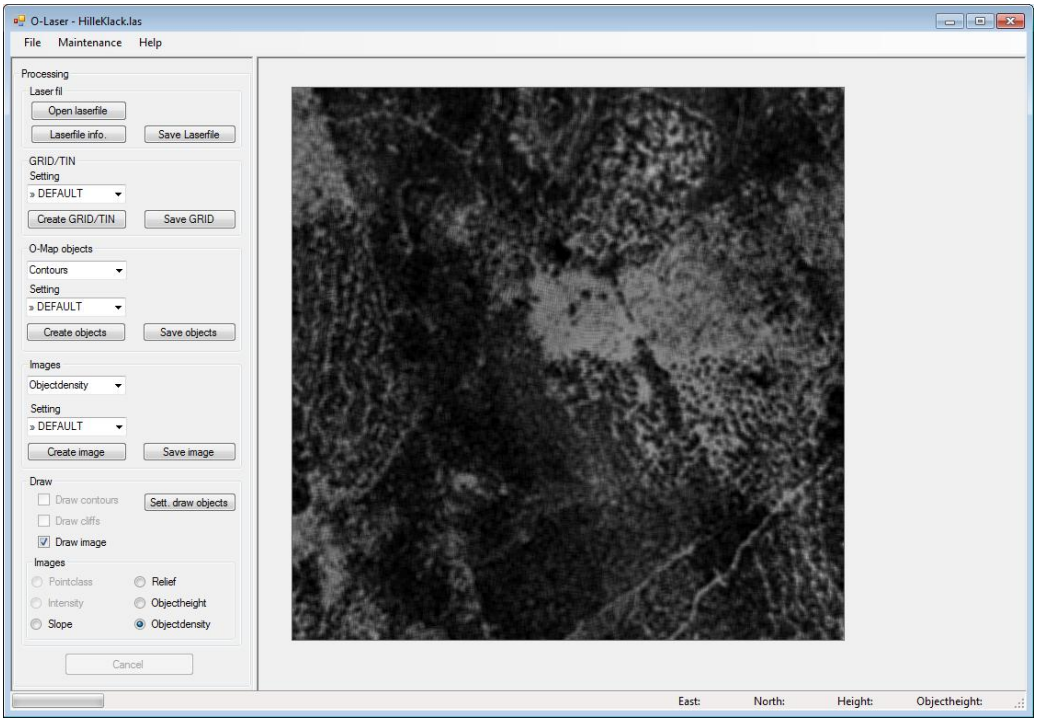

## Settings

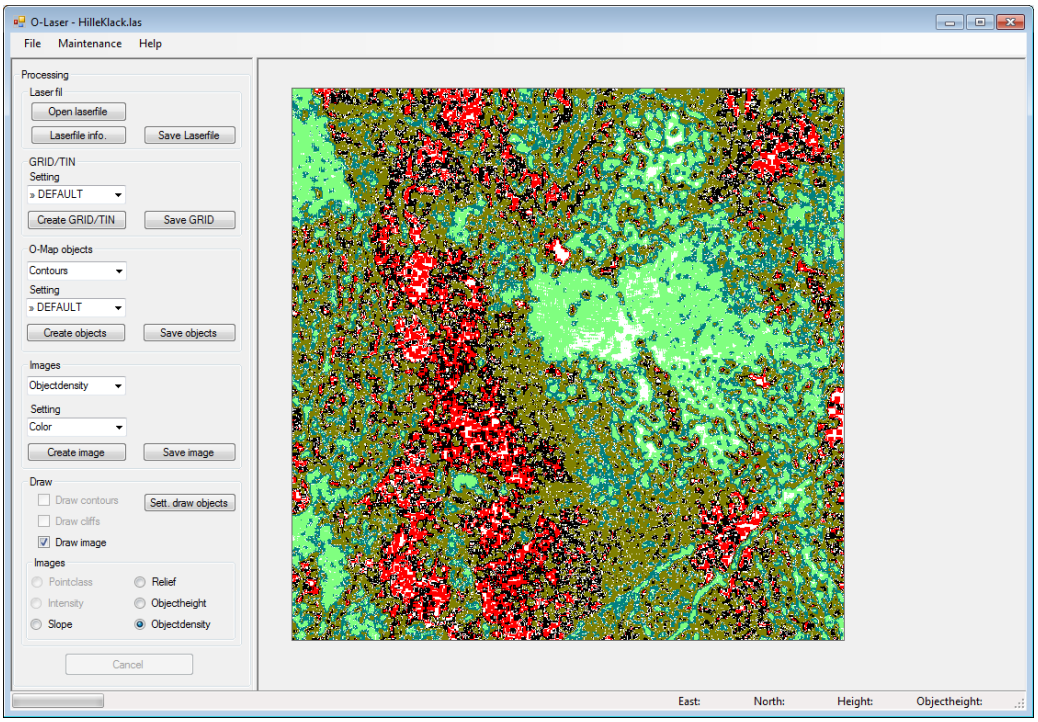
In the main menu just under system maintenance, you can build your own preferences for how GRID / TIN should be made up. Here in the main program, you select the setting you want.

## Create Objectdensity image

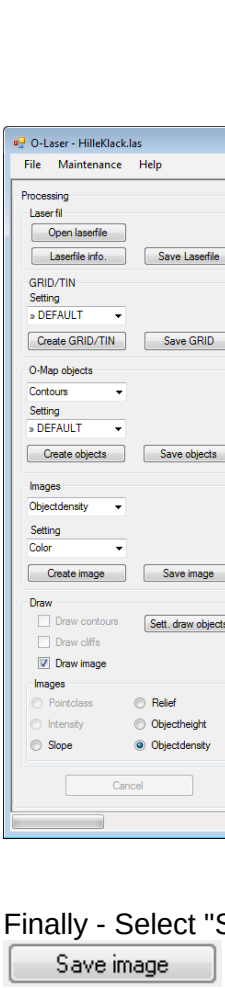
Then it's time to create the image. Choose "Create Image".

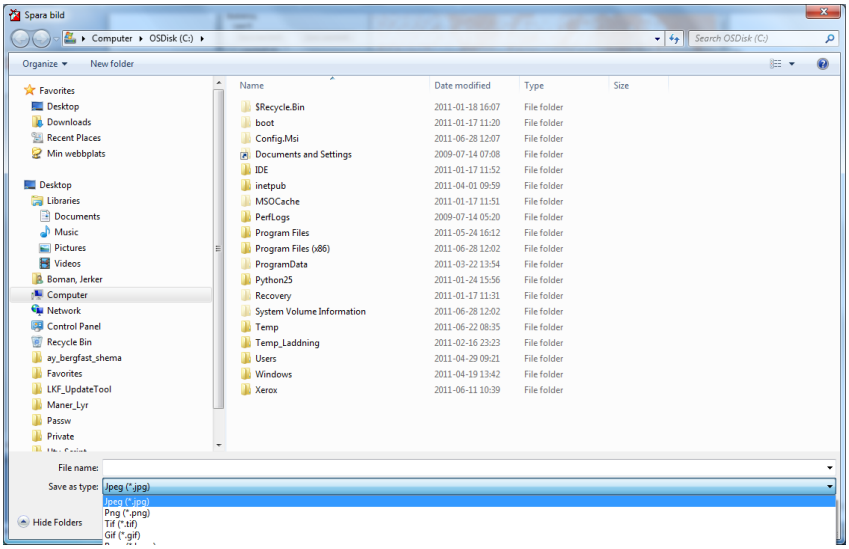

Wait for the process is complete - see the status bar.
If you choose to "draw image" you see the image on the screen to the right of the program.
The status bar at the bottom right has information about the mouse pointer coordinates and heights.






Finally - Select "Save Image".

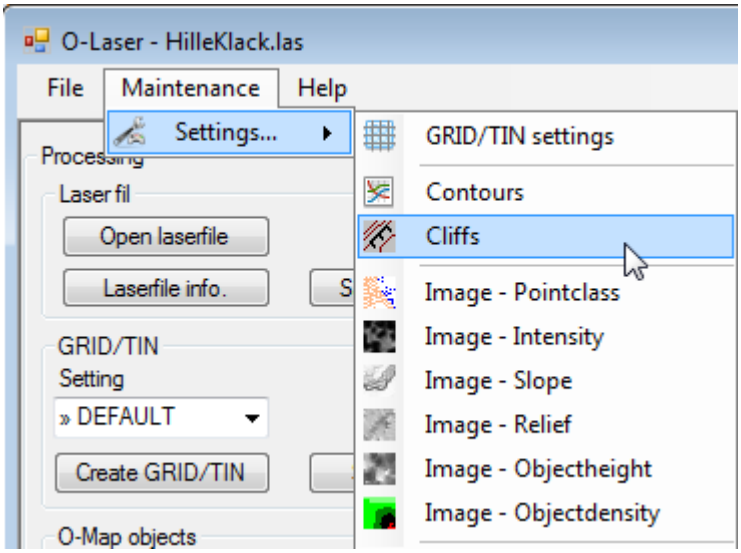



There are a number of formats to choose from. It also follows a "worldfile" to raster image that can be used to add raster images as background images in other applications such as OCAD.

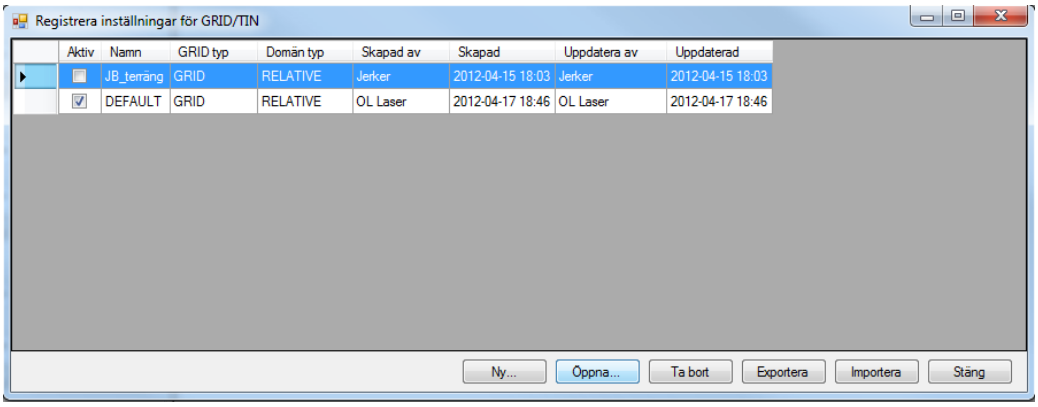
# Maintenance, settings

In the main menu under system maintenance, you can administer / register your own settings. I will give you some examples what opportunities this will give you. Mainly you do not need to declare your favorite settings each time you use the program. The setting can be saved and reused. Additionally, you can share your favorites to others by exporting them out to a file. There is always one default settings made ready. So if you do not want to make your own - use the default. Then you can skip this entire chapter.
I think it is important that you do your own settings. Even if you think that the default setting seems decent - making a copy of the default and give it a descriptive name.




# General – List

Choose from the main menu - **System Maintenance-Settings ...**
You will see that all settings have the same structure for the different areas. First you will see a list of all the settings for just the selected area (GRID / TIN, Contours, Cliffs, etc.) and from there you can “Open” specific setting or create a “New” settings. Other options are to ”Delete”, ”Export” or ”Import” settings. Select a row to the left. To mark the any number of lines you can hold down Shift or Ctrl keys. You can sort the list by selecting a column at the top of the header. Close the form when you are finished, choose Close.




# General - New

The New is always active. You do not need to select any row.
Select New ... to get to the registration form where you enter your choices and save. Always enter a descriptive "name" on the setting itself, and who (person) that create the setting for "Created by". If you want it to be the active, the default setting in the main form, tick the "Active setting".

# General - Open

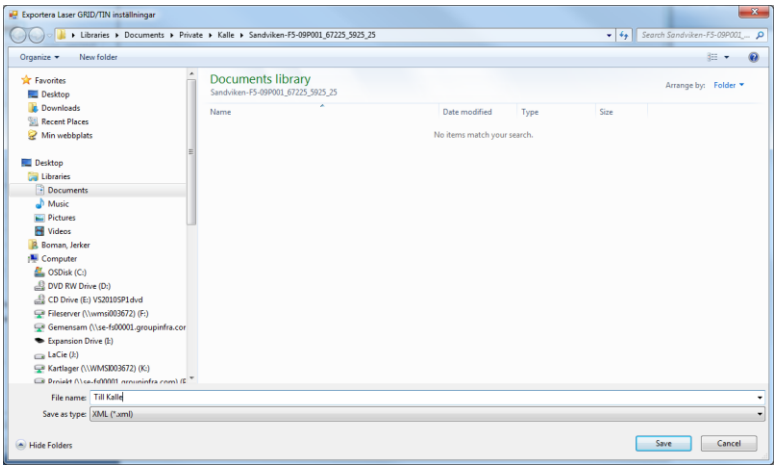
The Open will be active when you select ONE row. If you choose Open ... it will take you to the registration form where you register / edit your settings and save. From here, you also can to remove the setting entirely.

# General - Delete

The "Delete" button becomes active when you select at least one row. Note that you do not get any control question, the setting is deleted immediately.

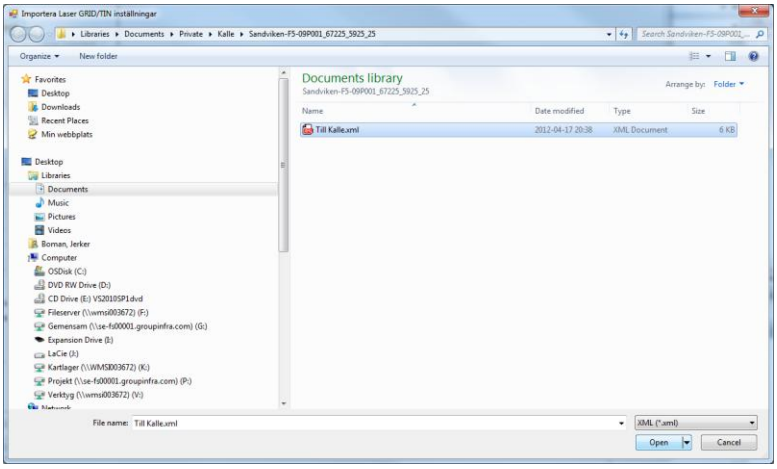
# General - Export

The "Export" becomes active when you select at least one row. In the dialog that appears, specify where the exported file (containing the selected settings) are to be stored. Then you can send / exchange the file with other like-minded people. However, they must have this or newer version of OL Laser.

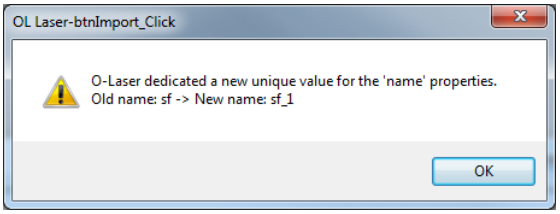



# General – Import

The alternative ”Import” is always active. Har du fått en fil så ska den förhoppningsvis gå att importera till din version av OL Laser. Välj filen i dialogen som dyker upp
If you receive a file, hopefully it will be imported into your version of OL Laser. Select the file in the dialog that pops up




If the name of the settings are already used, O Laser put a suffix – number in the end.



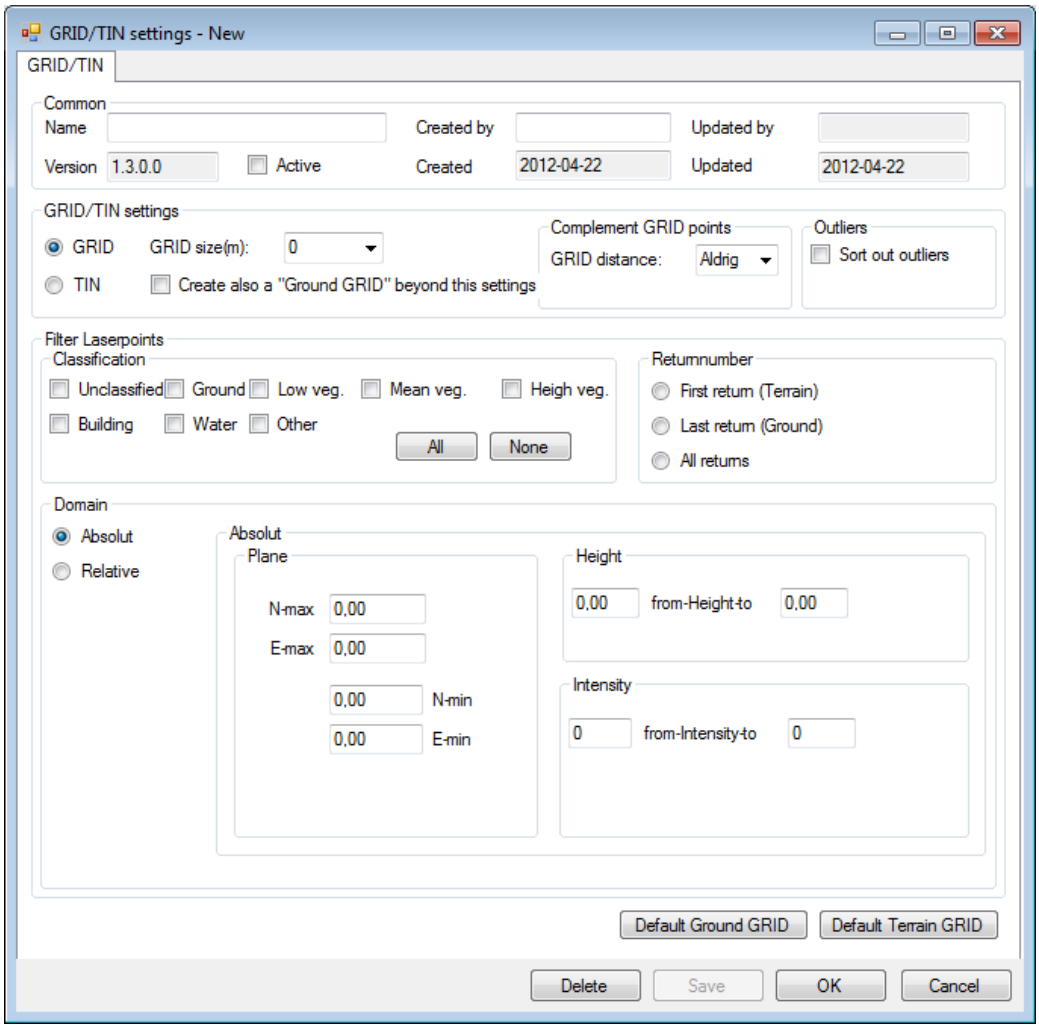
# GRID / TIN settings

It is your decision to sort out points that should be included in the creation of GRID / TIN. It is important to be aware of what information you want out from laser data and then choose the settings that correspond to your desires.

General:
Name: Enter a descriptive name.
Created by: Name the creator of the setting. Might be good to know later on.
Active: Tick here if you want that this setting should be active. Then this setting is the default in the main form later. Can only be one active setting.

GRID / TIN settings:
GRID size (m): Select the size of the GRID (the distance between the GRID points).
Create a "Mark GRID" in addition to these settings: If you are going to create a ground-GRID and have marked “Ground” under classification, then you don’t need to check this setting. Such is the case whether to create contours.
But if you're looking for information objects (trees, houses, rocks, etc.) you need select the Unclassified points and in case you're interested in object heights also tick the "Create" Mark GRID "beyond these settings."
Complete GRID points:
GRID distance: Some areas of dense forest contains very few points. This settings enables the program search around far from the GRID point for finding suitable candidates. This distance can be set under "GRID distance". Select "Always" to be sure of getting a value in all GRID points.
Outliers:
Sort out outliers: Laser files could contain points with abnormal heights. Check here to sort out any outliers.

Filters:
Classification: select / unselect the item / classes you want included in the file.
Return number:
Laserpoints from first return may be considered to belong to the terrain model.
Ground points are considered to belong to the first return.
The last return is considered to belong to the ground model.
Distribution:
Very useful for reducing the size and speed up the program.
Absolute values: Specify the spread in absolute terms. Not so useful.
Relative values: Specify the distribution of relative values 0 - 100%.
Default Mark GRID and Default Terrain GRID gives you the two most common settings automatically without having to consider further details.




# Contoures

Contours connecting some selected levels to curves / lines.
You can choose the Equdistance yourself. In Gävle, where it commonly is 2.5 meters contour interval on the maps, I usually take 0.5 m contour interval of the laser curves.

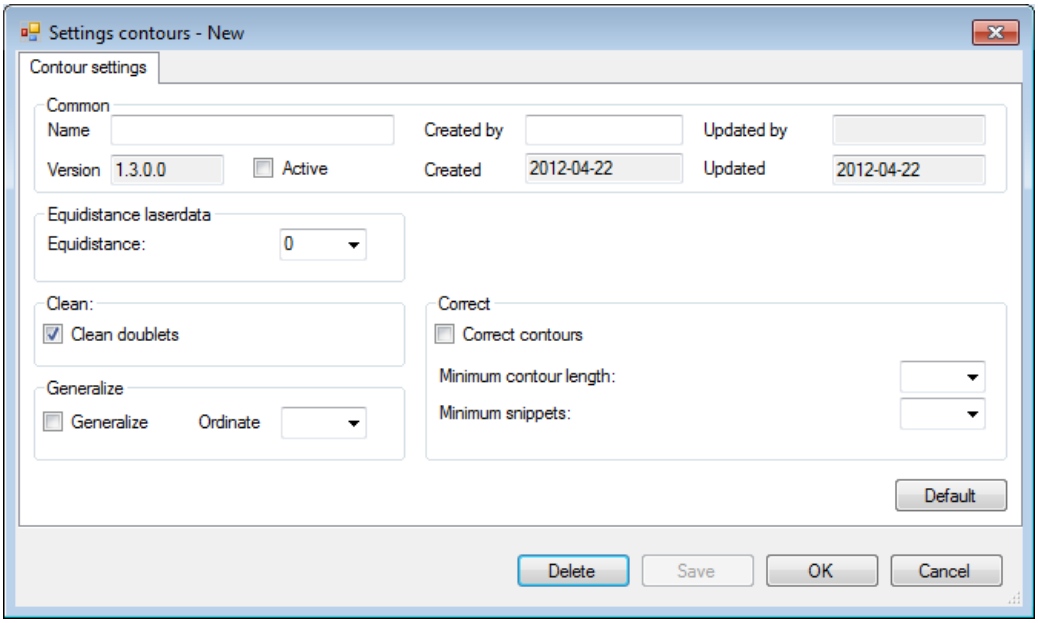
General:
Name: Enter a descriptive name.
Created by: Name the creator of the setting. Might be good to know later on Exports and Imports.
Active mode: Tick here if you want that this setting should be active. Then it get to be the default settings in the main form later. Can only be one active setting.

Contour interval laser data:

Clear:
Clear doublets.

Generalize:
Reduce the number of break points, but keep the shape of the curve. The ordinate is a mathematical term that indicates how large an orthogonal distance should be to remove an intermediate point.

Corrections:
Specify a minimum length of the length of a curve must be at least to be included.
Enter a minimum gap where two endpoints on the curves are bound together.




# Cliffs

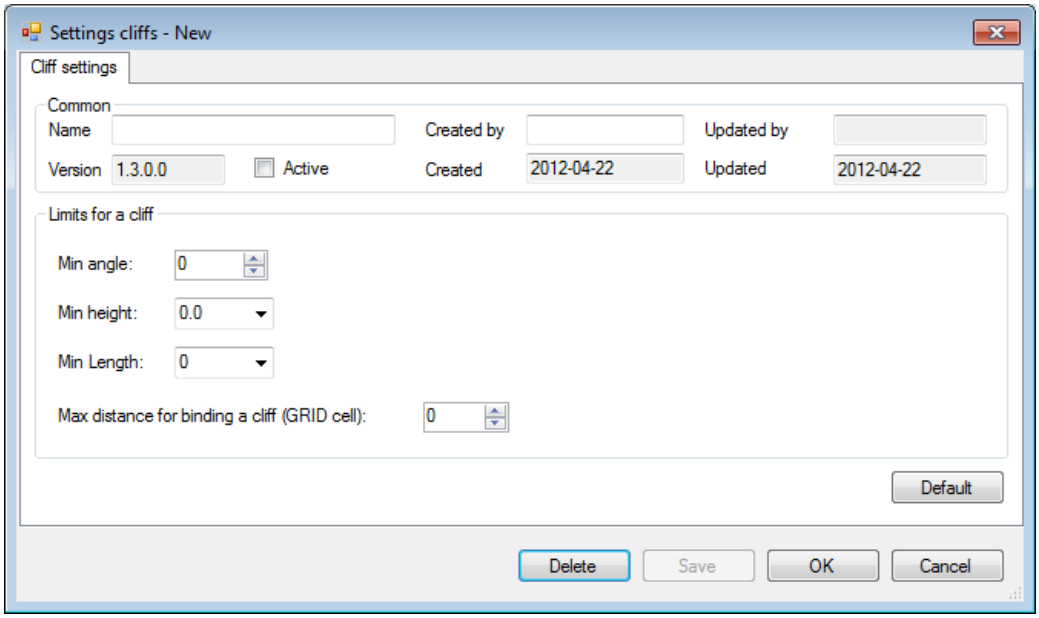
General:
Name: Enter a descriptive name.
Created by: Name the creator of the setting. Might be good to know later on.
Active: Tick here if you want that this setting should be active. Then this setting is the default in the main form later. Can only be one active setting.

Minimum angle:
Specify the angle of the cliff.

Minimum height:
Specifies the height of the cliff.

Minimum length:
Specifies the length of the cliff.

Max GRID cell distance to connect cliffs:
Cliffs are connected by the altitude, direction and angle of each GRID point. Normally you want connect only them with one GRID cell distance between each other.

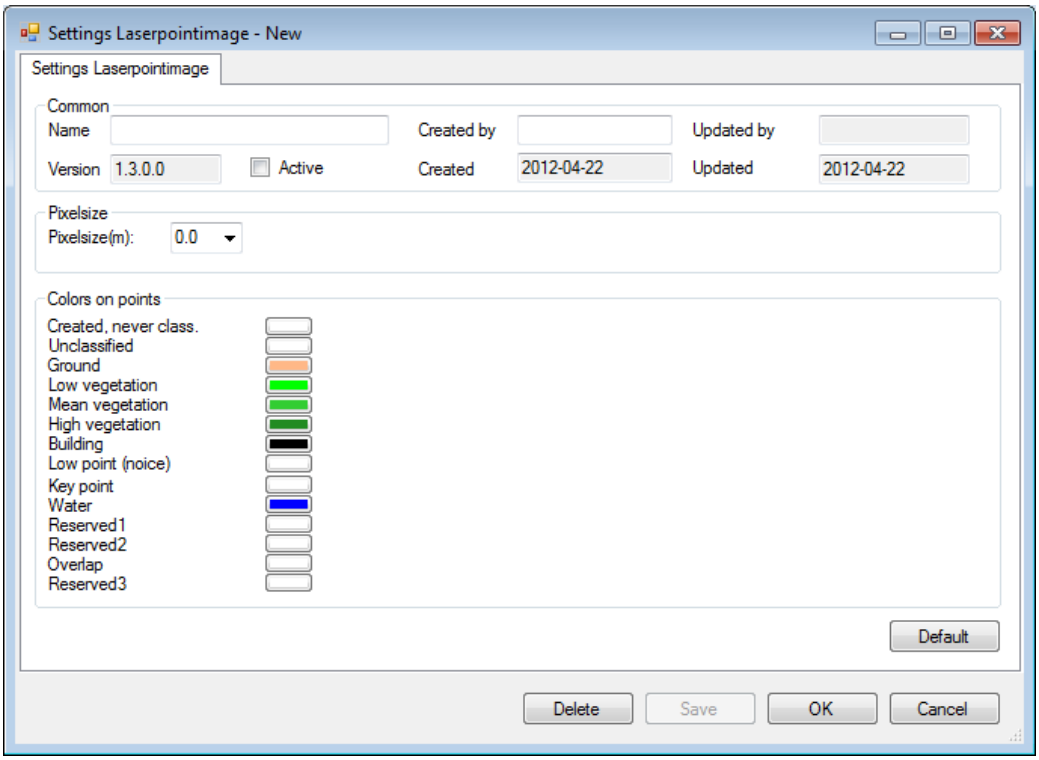



# Laserpoint image

**General**:
Name: Enter a descriptive name.
Created by: Name the creator of the setting. Might be good to know later on.
Active: Tick here if you want that this setting should be active. Then this setting is the default in the main form later. Can only be one active setting.

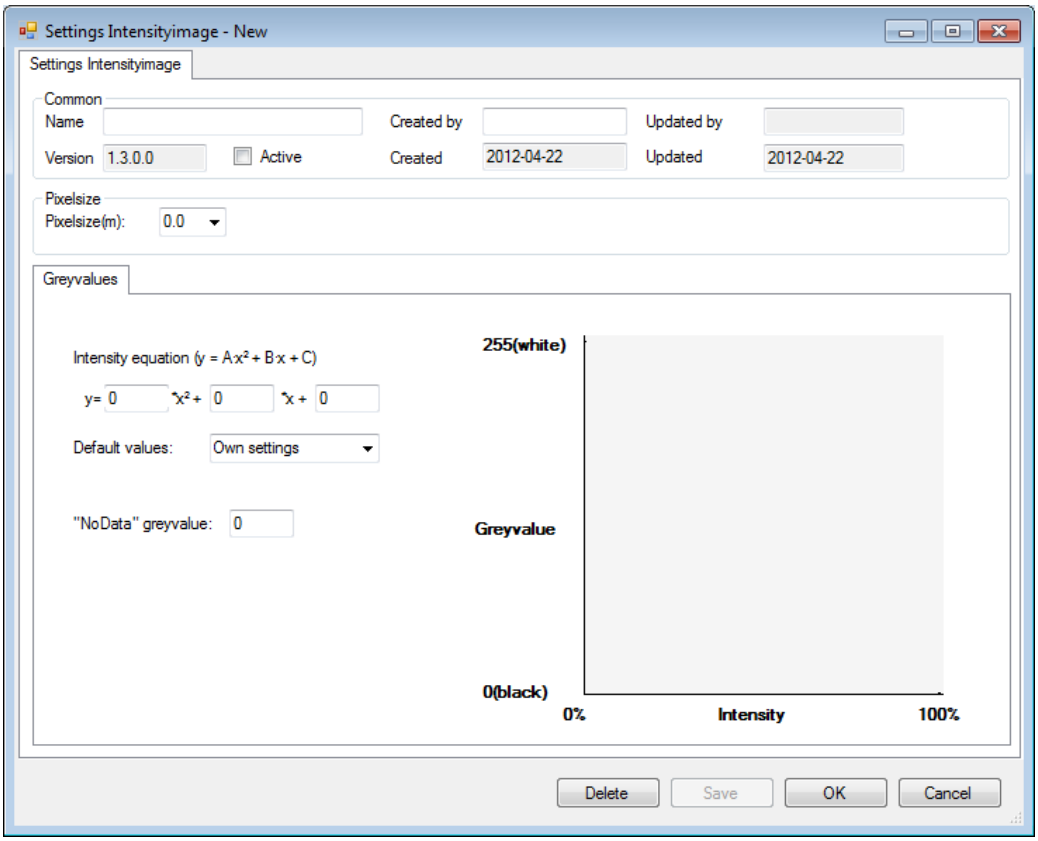
**Pixelsize:**
Set the resolution of the raster image. Recommend the same resolution as the GRID cell size.

**Colors on points:**
Click the color buttons to select the color.
The Swedish National Land of Survey laser data contains only three classes - Unclassified, Soil and Water




# Intensity image

**General**:
Name: Enter a descriptive name.
Created by: Name the creator of the setting. Might be good to know later on.
Active: Tick here if you want that this setting should be active. Then this setting is the default in the main form later. Can only be one active setting.



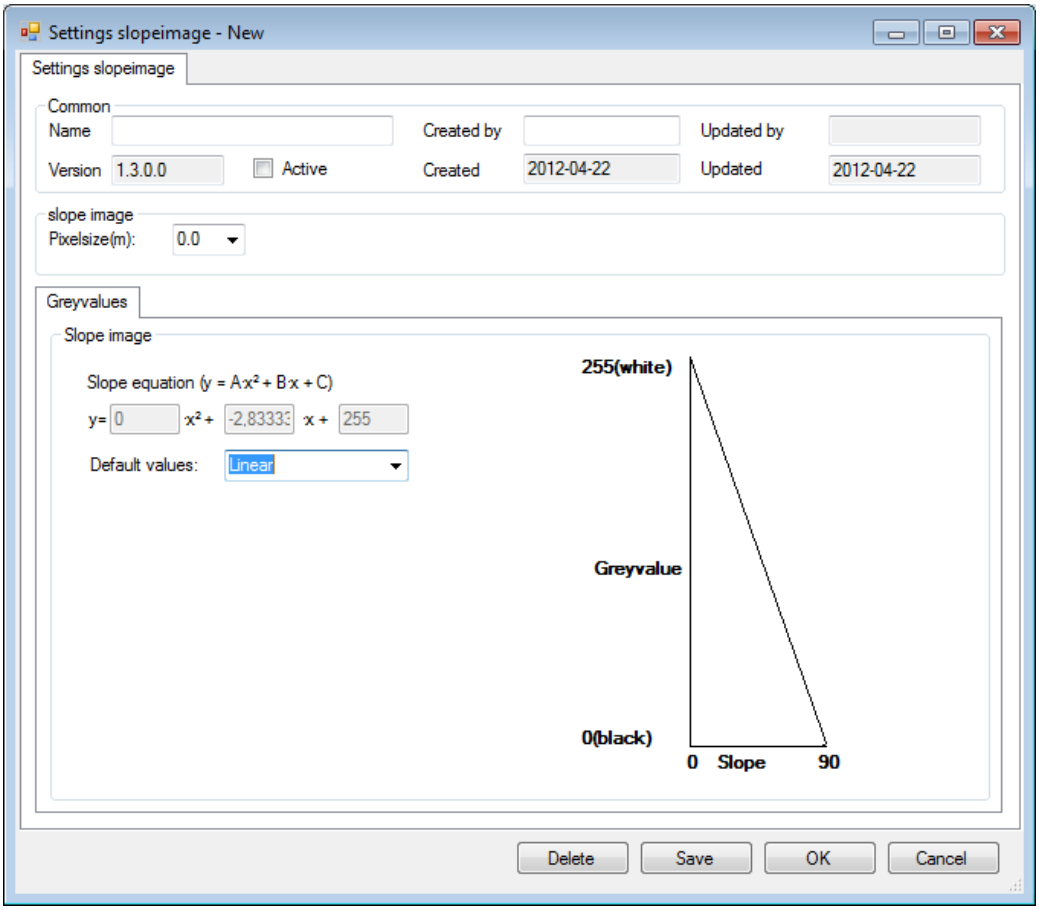

**Pixel size:**
Set the resolution of the raster image. Recommend the same resolution as the GRID cell size.

**Intensity Graph:**
The image on the right you will see a graph showing the gray value of the image will be reproduced in raster image depending on the intensity of the laser points are.
Low intensity 0 gives the lowest gray value 0 (black).
You also see that the minimum intensity value is 0 and the maximum is 240.

Default:
In the drop down menu are some default values entered, and an option for their own entries. Try the other options and look at how the graph changes.

# Slope image

**General**:
Name: Enter a descriptive name.
Created by: Name the creator of the setting. Might be good to know later on.
Active: Tick here if you want that this setting should be active. Then this setting is the default in the main form later. Can only be one active setting.

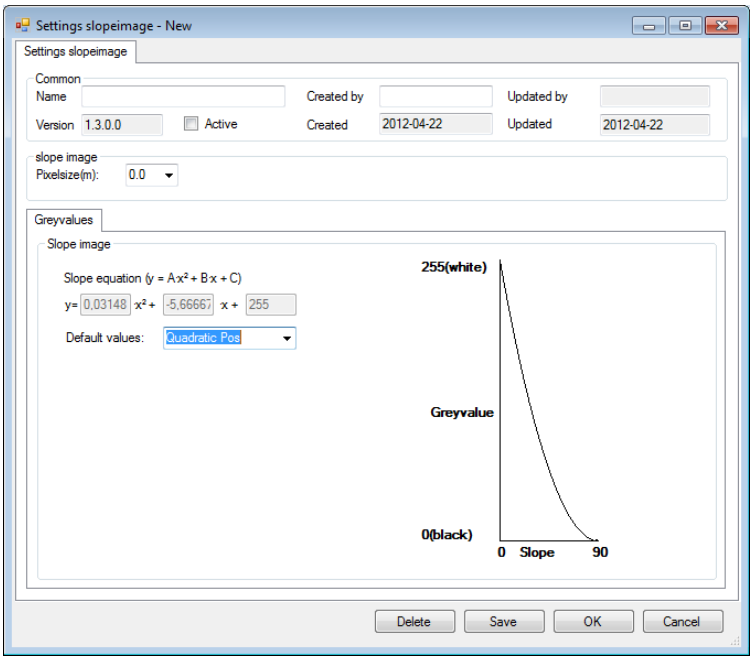



**Pixel size:**
Set the resolution of the raster image. Recommend the same resolution as the GRID cell size.

**Slope Graphs**:
In the image on the right side you can see a graph showing pixel gray value and the corresponding slope value.
The maximum slope of 90 °which gives the lowest gray value 0 (black).

Default:
In the drop down menu are some default values entered, and an option for their own entries. Try the other options and look at how the graph changes.
Although self-setting can be entered in the equation above.

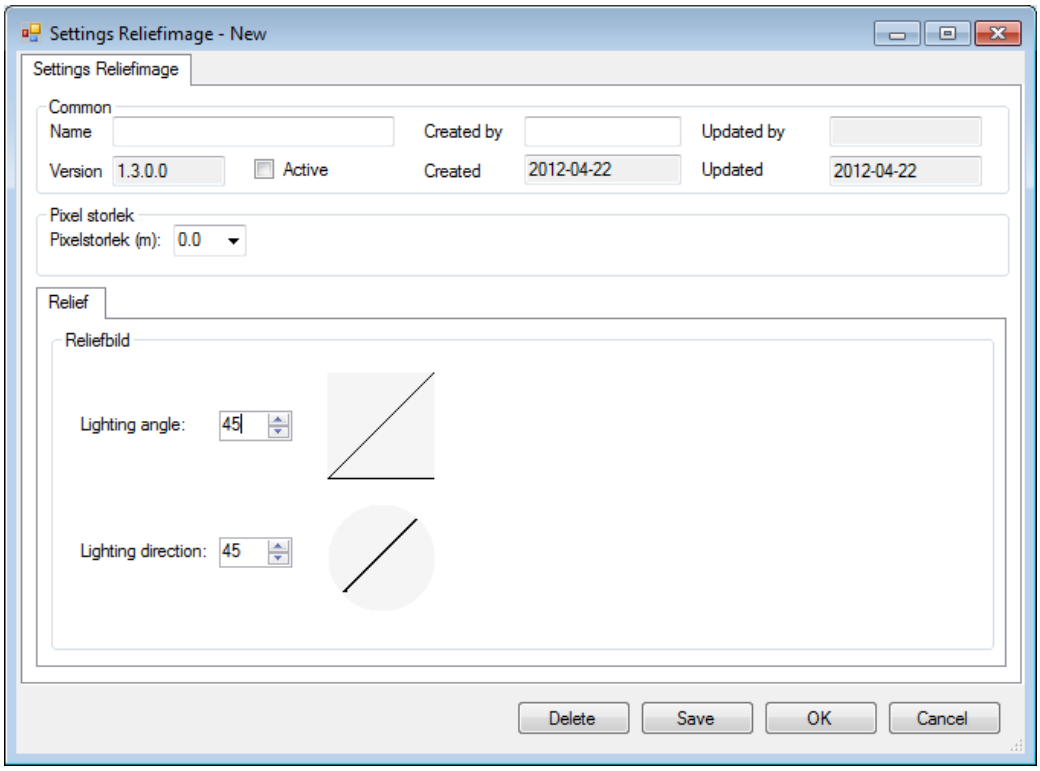
Here is an example of a different standard setting - Quadratic Pos.
The graph shows that the image will be darker than the first linear default.




PS! I recommend other powerful image editor for adjusting the raster images.
Press OK when you are satisfied.

# Relief image

**General**:
Name: Enter a descriptive name.
Created by: Name the creator of the setting. Might be good to know later on.
Active: Tick here if you want that this setting should be active. Then this setting is the default in the main form later. Can only be one active setting.




**Pixelsize:**
Set the resolution of the raster image. Recommend the same resolution as the GRID cell size.

**Lighting angle:**
Sets the angle between the light source and a horizontal plane. The default is 45 degrees. If you take a lower angle then the image became darker and opposite higher illumination angle (the sun stands high on sky) creates a brighter image.

**Lighting direction:**
Sets the direction of the light source to have. The default is that the rays of light coming from the northeast and thus light to the southwest. Another lighting direction are likely to give other information in the images.

Press OK when you are satisfied.

# Objectheight image

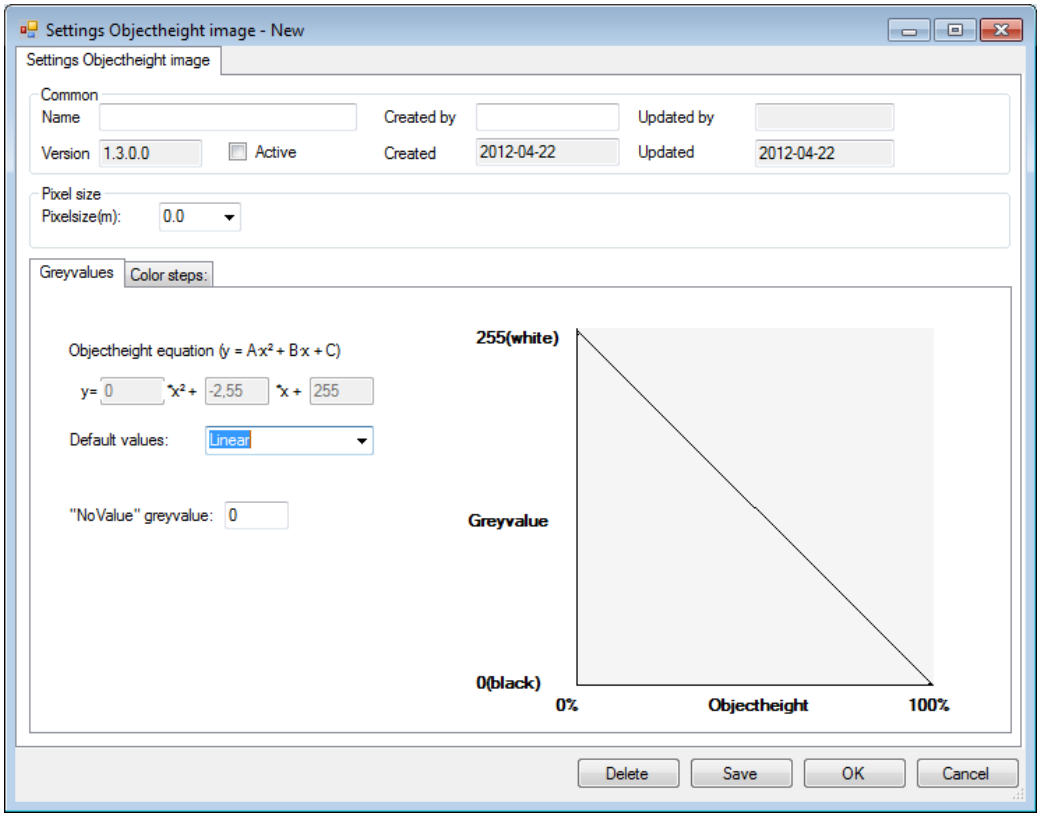
**General**:
Name: Enter a descriptive name.
Created by: Name the creator of the setting. Might be good to know later on.

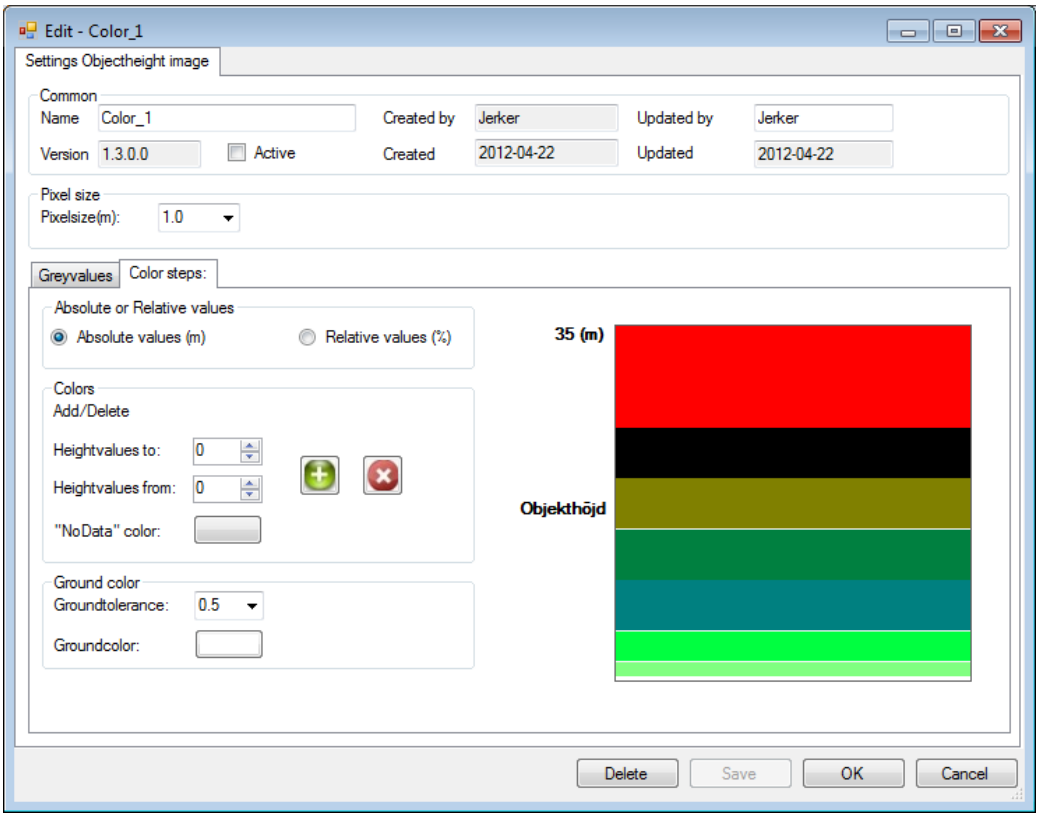
Active: Tick here if you want that this setting should be active. Then this setting is the default in the main form later. Can only be one active setting.

**Pixel size:**
Set the resolution of the raster image. Recommend the same resolution as the GRID cell size.

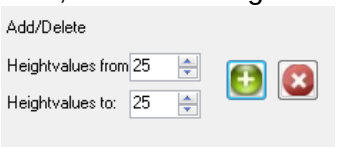
**Min and Max object height:**
Information on minimum and maximum values for object heights. Sometimes you can get very high maximum object height on the ground that the laser has hit a bird or other object high in the air. I recommend that you already in the creation of GRID / TIN filters out the extreme height values.

**Gray ramp or color steps:**
You choose between the tabs gray ramp and color steps.
"Gray ramp" provides a raster image where the object height is represented as a greyvalue image. High objects are dark / black and low objects are bright / white.
"Color step" provides a raster image where every object height meters can be reproduced with a specific color

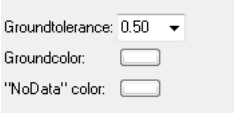





**Color Steps:**
First, select the height range. Click on the green “Add” button to specify a color.




You can also enter a ground tolerance. The example below gives that all objects heights under 0.5 meters will be treated as a ground hit and plotted with the specified ground color.




Press OK when you are satisfied.

# Objectdensity image

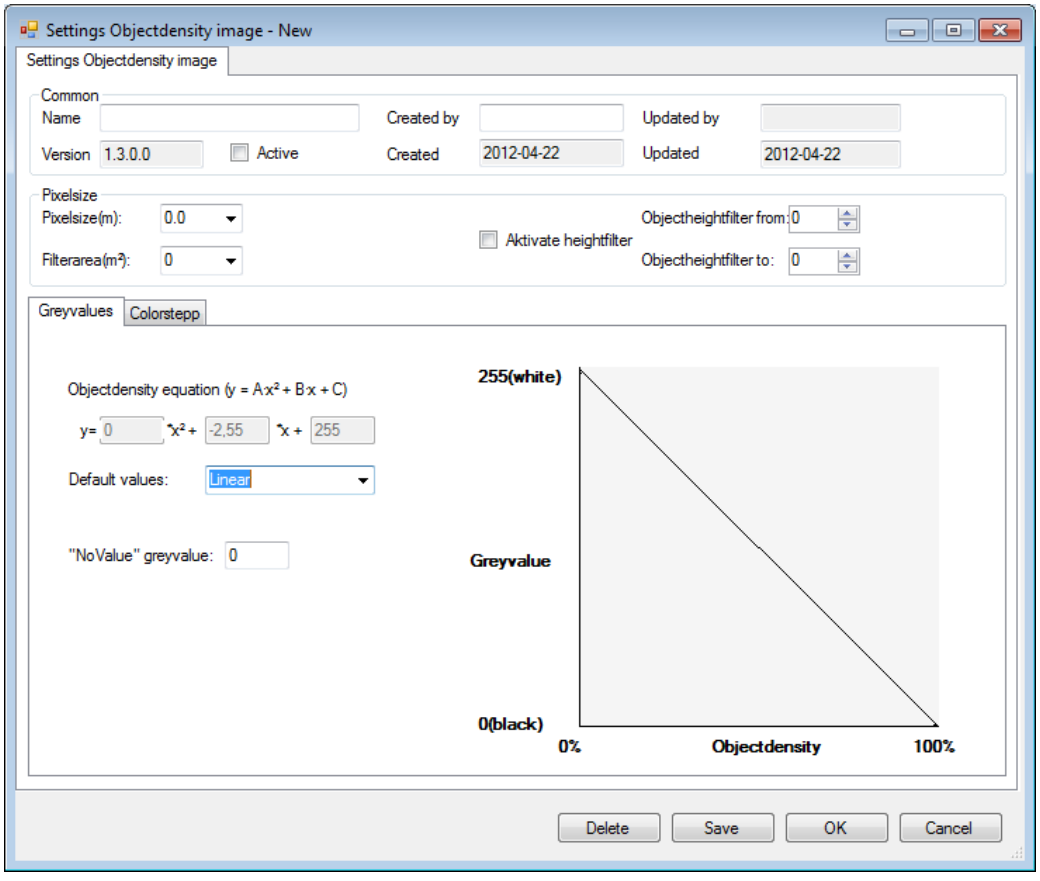
**General**:
Name: Enter a descriptive name.
Created by: Name the creator of the setting. Might be good to know later on.

Active: Tick here if you want that this setting should be active. Then this setting is the default in the main form later. Can only be one active setting.

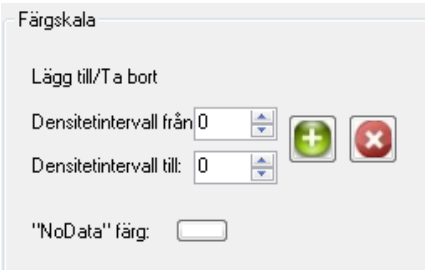
**Pixel size:**
Set the resolution of the raster image. Recommend the same resolution as the GRID cell size.

**Filter area:**
A large filter area can smooth out the image.

**Object Height Filter:**
It is also possible to filter the objects' height. The idea is to be able to pick out green and dense areas that usually have lower tree heights.




**Color System:**
First, select the density range. Click on the green “Add” button to specify a color.




Press OK when finish.