

## New CAD platform

nanoCAD 3DScan 2.0 based on 20.1 version of nanoCAD platform. Thus, nanoCAD 3DScan 2.0 gets all features of nanoCAD Plus, since 8.5, version. To get detailed description of nanoCAD Plus 20 features read **What's new in nanoCAD Plus 20** section.

## New point clouds commands & features

- Automatic recognition of ground surface has been significantly improved;
- Possibility to classify vegetation and objects at a given distance from the ground (or any other surface) has appeared;
- Support of WGS84 coordinate system;
- Significant corrections and improvements.

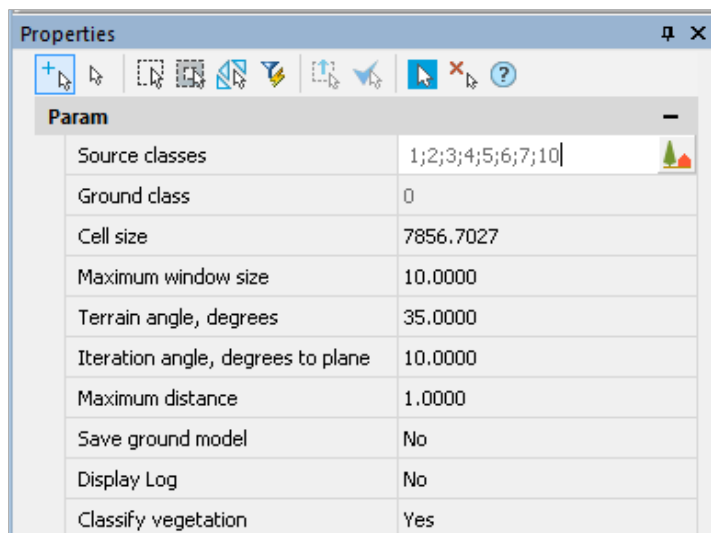
## Classification of Ground and Vegetation

The command **Classification of Ground** (NPC\_CLS\_GROUND) has been revised.

### COMMAND OPTIONS ON THE "PROPERTIES" BAR

Now the command options are displayed and configured not in the command line, but on the **Properties** bar.

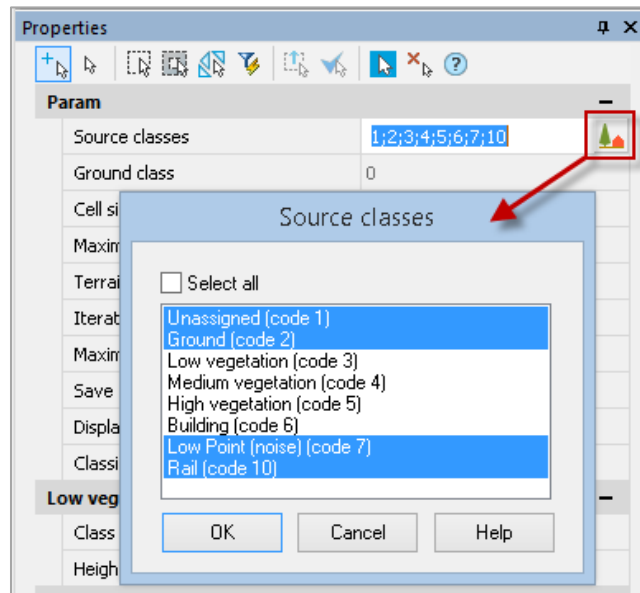
New command options:



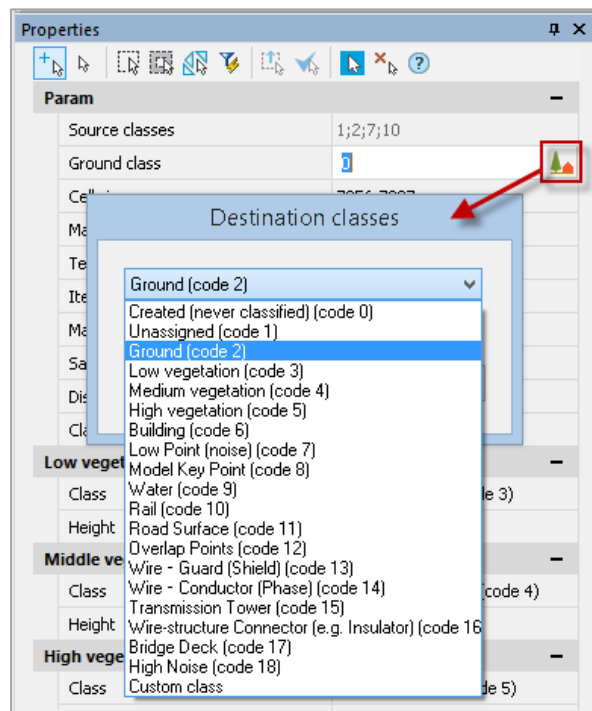
### FILTRATION BASED ON SOURCE CLASSES

The command allows you to specify certain classes of points for the ground classification process. It can be useful if a cloud was earlier classified by these or those criteria. For example, to exclude from the recognition process the points of noise, man-made objects, etc.

The **Source classes** parameter defines the classes of those points, that will be used for ground classification. Points of other classes will not be reclassified. The list opened by button displays all classes of the current point cloud.



The **Ground class** parameter is the target class, which should be assigned to recognized points of the ground.



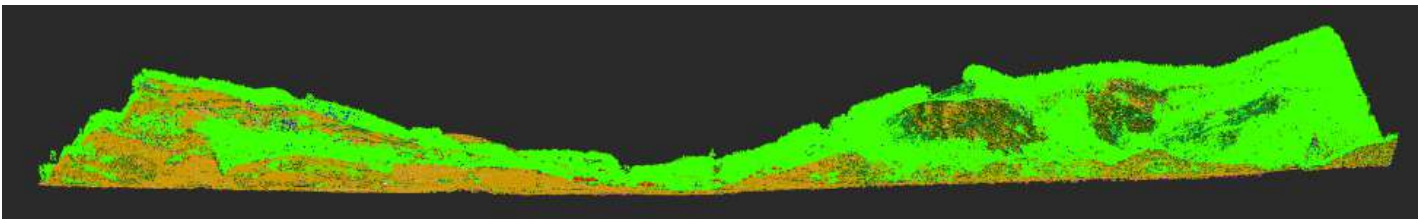
The target class should coincide with none of the source classes, otherwise the command will stop ahead of time with an error message in the command line.

## AUTOMATIC CALCULATING OF SURFACE DETALIZATION DURING GROUND CLASSIFICATION

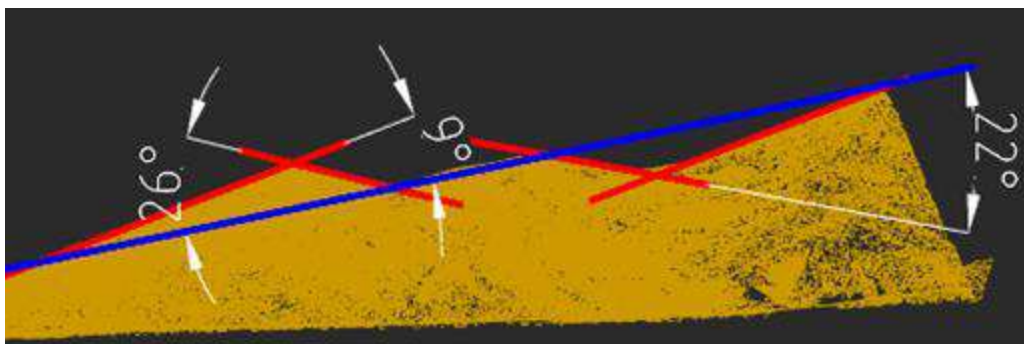
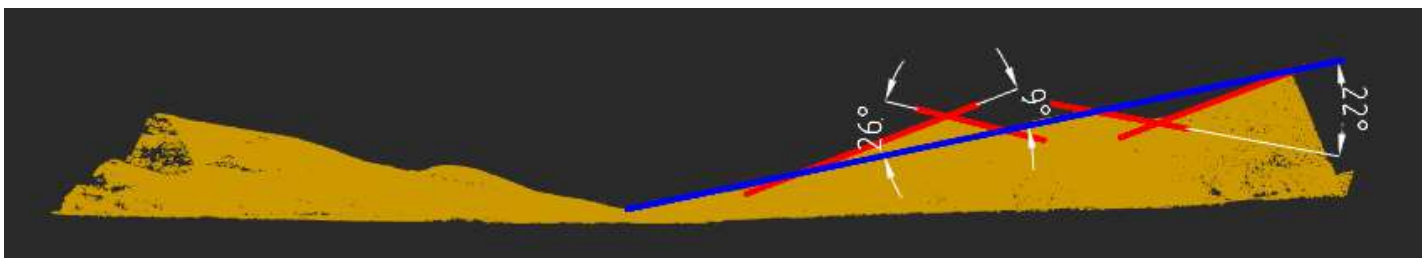
Now the **Cell size** parameter is calculated automatically, based on the size of a point cloud in the drawing. As a rule, it should not be changed. In previous version of a program, the value of this parameter was taken from the **Point clouds** section of the **Options** dialogue. The Cell size defines the length of sides of square cells that divided surface of point cloud. The smaller the value, the more accurately relief elements are reflected. Parameter value is set in the units of drawing.

## SURFACE IRREGULARITIES

We preserved the parameter **Terrain angle**, degrees – maximum angle of slope in degrees relative to XY plane in WCS. It can be measured at some characteristic area. Points on surfaces that exceed this angle will not be classified as ground surface points.

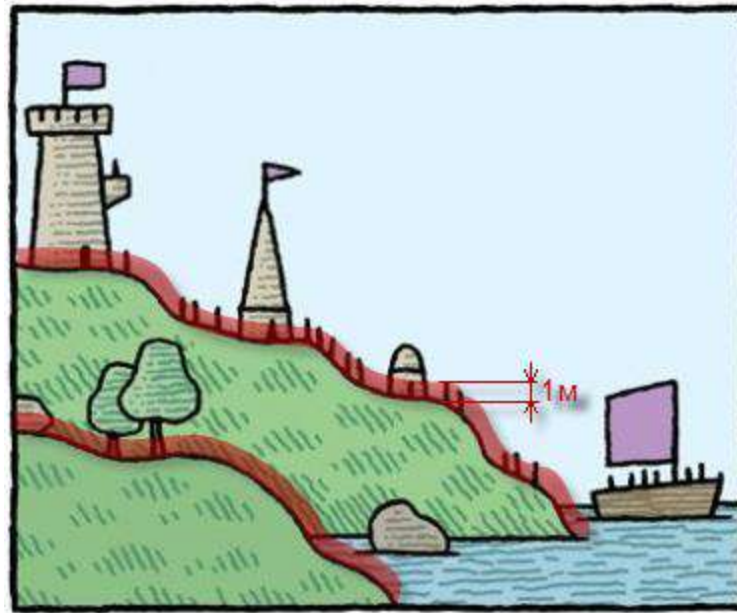


Parameter **Iteration angle, degrees to plane** – maximum angle of deviation of local irregularities from the main direction of the ground surface.



## FILTRATION BY DISTANCE FROM GROUND SURFACE

The Maximum distance parameter determines the maximum distance above the ground surface, above which points will not participate in the classification process and, therefore, will not be classified as ground points. The distance is specified in the units of drawing.



## EXCLUSION OF FALSE SURFACES

A new parameter **Maximum window size** allows you to exclude low buildings and constructions with flat wide roofs from ground recognition



It is necessary to find the widest low object and measure a half of its shorter side, increasing the resulting value by 20 percent. For each cloud the parameter should be set manually in the units of drawing.

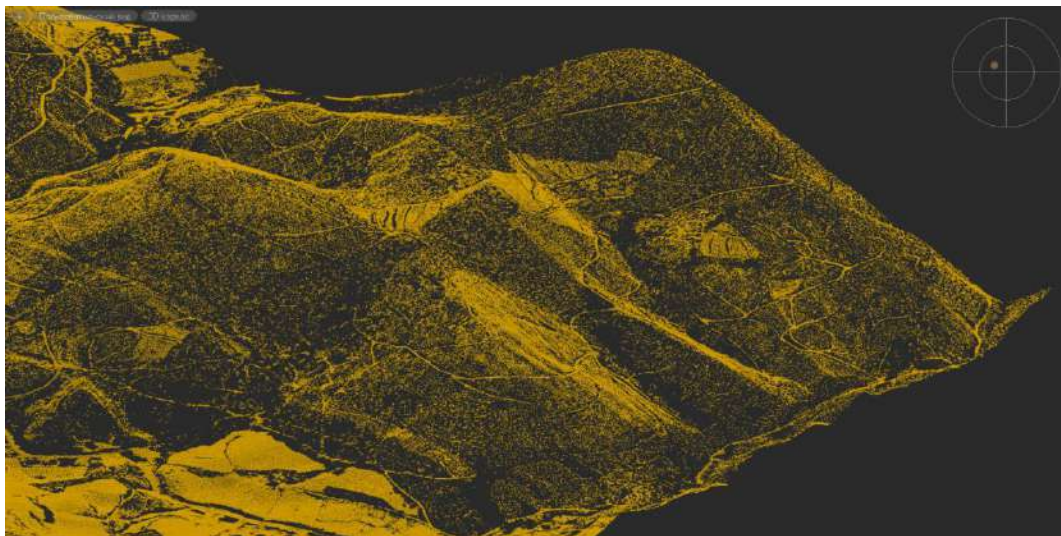
**Note:** correctly measured parameter **Maximum window size** is always larger than **Cell size** parameter.

## CLASSIFICATION OF VEGETATION

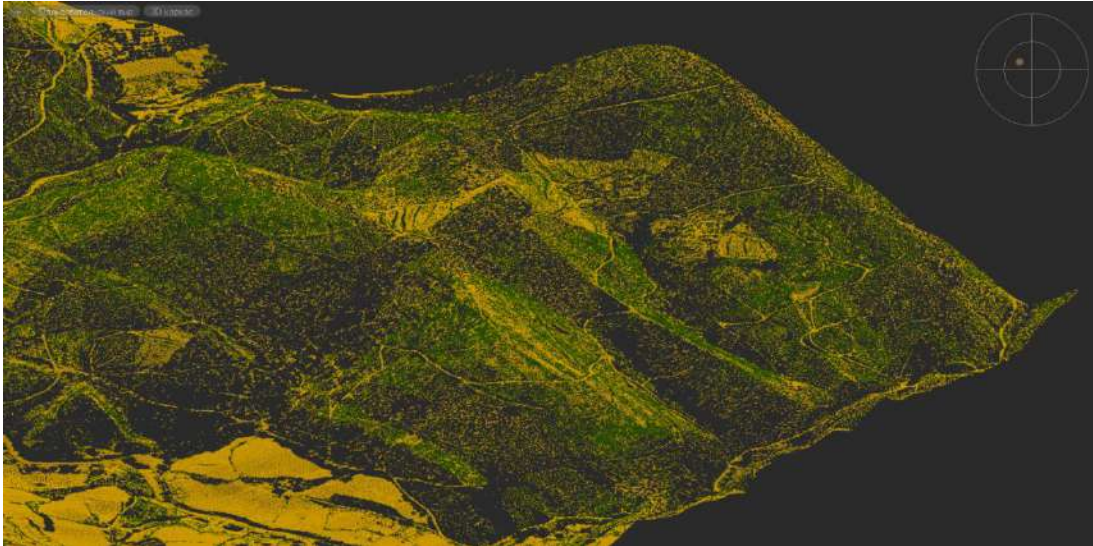
The command is enhanced with the functional for classification of points (vegetation) by height above ground level. Set **Yes** for the **Classify vegetation** option, additional options will appear.

Classify vegetation	Yes
<b>Low vegetation</b>	—
Class	Low vegetation (code 3)
Height	0.3000
<b>Middle vegetation</b>	—
Class	Medium vegetation (code 4)
Height	2.0000
<b>High vegetation</b>	—
Class	High vegetation (code 5)
Height	100.0000

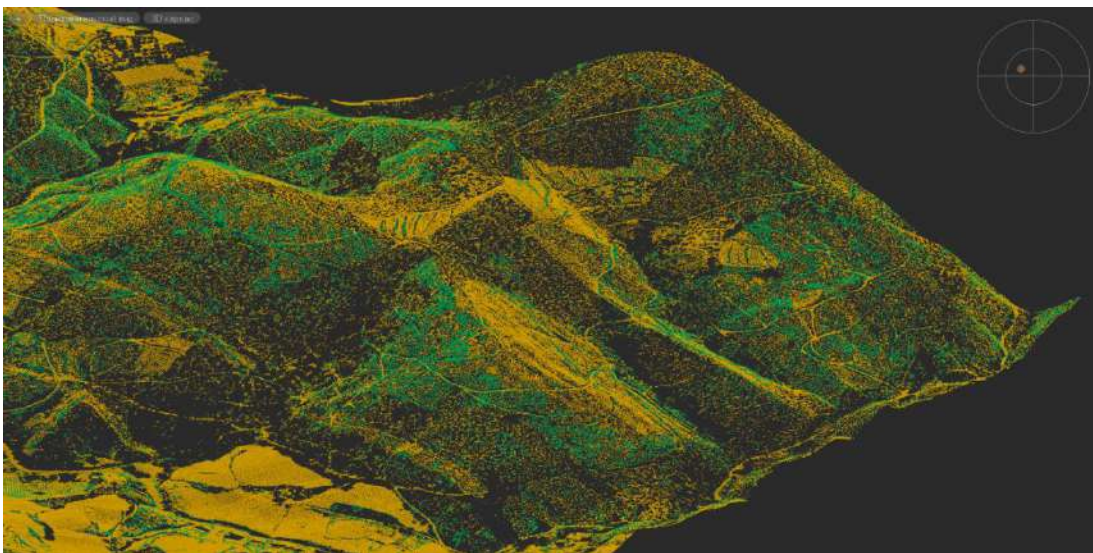
The command classifies points located in the given altitude range relative to the ground surface. Values are set in the units of drawing.



Only ground surface points



Ground surface points with low vegetation points



Ground surface points, points of low, average and high vegetation

This procedure can be used not only to classify vegetation, but also to classify any objects by height from the ground surface: low constructions, high-rise buildings, power lines, pipes, etc.

## CREATING TRIANGULATION MESH OF A SURFACE

In addition to ground surface classification, the command allows you to automatically construct its triangulation model as a mesh object. For this the value of **Save ground model** option should be **Yes**.

In contrast to the triangulation mesh of ground surface created by **Create TIN command**, this network is created with optimized edges. In the future the created triangulation mesh can be optimized by **Model Simplification** command.

## New commands & improvements

### “VEGETATION BY HEIGHT” COMMAND

The functional of objects classifying by height above the surface is also put into a separate command **Vegetation by Height**.

The command has parameters identical to those described above. As the surface relative to which the classification will be made, it is necessary to specify the existing triangulation mesh, for example, the one built earlier by the command **Classification of ground** or **Create TIN**.

### FILTRATION BASED ON SOURCE CLASSES IN THE “CREATE TIN” COMMAND

The command **Create TIN** (NPC\_2D\_TRIANGULATION) got new options that allow you to select particular point classes for creation of triangulation mesh based on them. The options are similar to ground classification command **Classification of ground** (NPC\_CLS\_GROUND).

### IMPORTING CLOUDS WITH WGS84 COORDINATE SYSTEM

The possibility to import point clouds from LAS format with WGS84 coordinate system is added. Previously clouds with WGS84 coordinate system were imported with distortion.

### CHANGING CLASS FOR VISIBLE POINTS ONLY

A new command **Classification by class** (NPC\_CLS\_CLASS) changes class for visible points only. Just cut a part of cloud containing required points with one of the **Clip** or **Section** commands and reclassify only visible points by specifying their source class.

### COLORING CLOUDS BY “COMPARE POINT CLOUDS” COMMAND

Now the command **Compare Point Clouds** colors the cloud according to the normal direction (outside/inside) when comparing a cloud with triangulation ground surface. The cloud above TIN surface is colored in the spectrum from green to red, and below – from green to blue. It allows easily determine the position of points relative to the mesh (ground surface).

### Changes and Corrections

- Fixed errors of graphics (widget) displaying when comparing clouds.
- Correcting work of the command **Fit Cylinder** (NPC\_FIT\_CYLINDER).
- Fixed errors of comparison algorithm in video card.
- Updated icons of cloud points classification commands.