



## Medical Treatment Research report

**Subject: creating the measurement of petechial and process of healing**

### Table of Contents

1 Objectives research.....	2
2 Scanning.....	2
3 Dimensioning wounds.....	3
4 Creating the surface of injury.....	4
5 Determination of the volume of material to fill.....	5
6 Checking the progress of injury healing.....	5
7 Summary.....	7

## 1. Objectives research

First objective of research made by SMARTTECH 3D was to find a way to measure the surface of the wound, its size and the volume of material that has to be use to fill the injury. Second objective was to show the method of checking the amount of organic material to fill the hole after the injury

## 2. Scanning



*Pic. 2.1 Patient's leg scanned in 3D*

First patient's leg was scanned using Scan3D Med scanner with a resolution of 0,5mm (369 pts. /mm<sup>2</sup>)

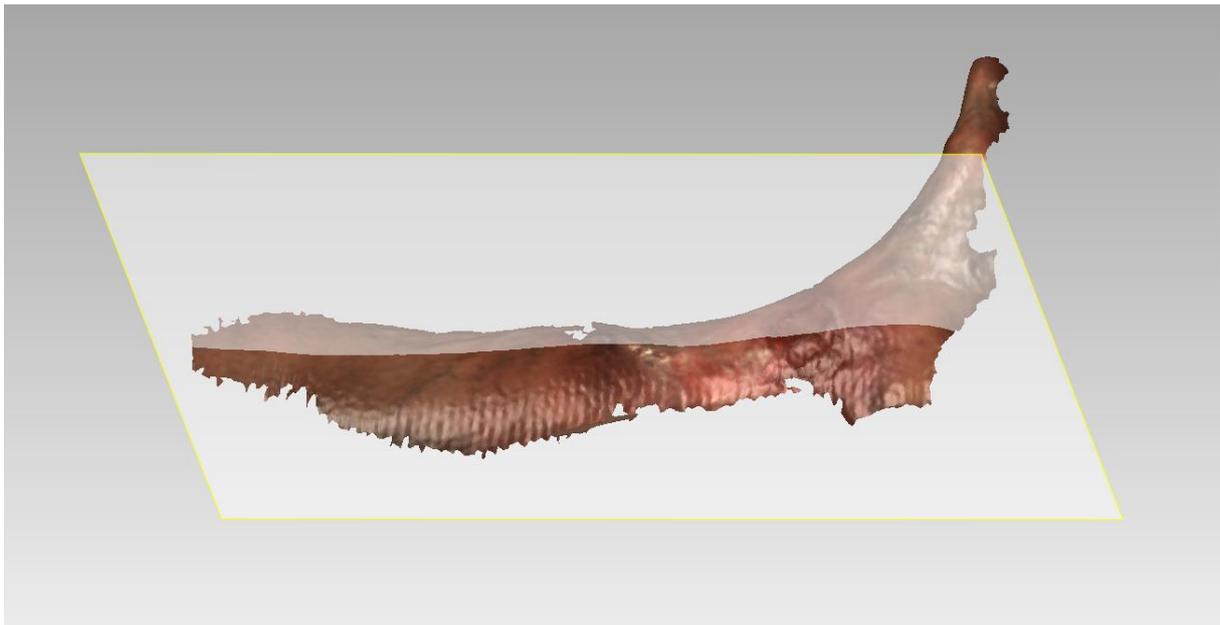
The result of the scanning is a cloud of points (with coordinates X, Y, Z). Thanks to use high-class color detector, there's possibility to recognize skins deviations. Simply, there is a visible difference between sick and healthy skin.

On Picture 2.1 we can see the scanned results in MESH3D software. This program has the function to export data as .ply file which is supported by the majority of data processing software from 3D scanners.

### 3. Dimensioning wounds

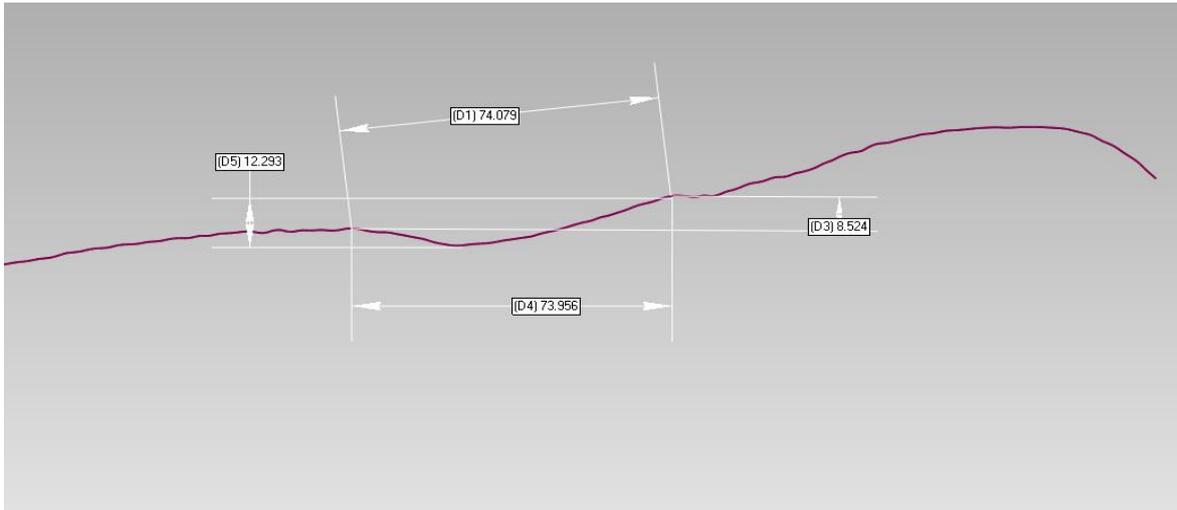
In MESH 3D software it is possible to dimension the cloud of points. However to provide more detailed analysis we need more advanced program - Geomagic Control.

To check the size of this injury two methods can be used: 3D space dimensioning or 2D dimensioning. To dimension object in 2D, select place of performance of the section line (picture.3.1).



*Picture 3.1 Visible place of profile*

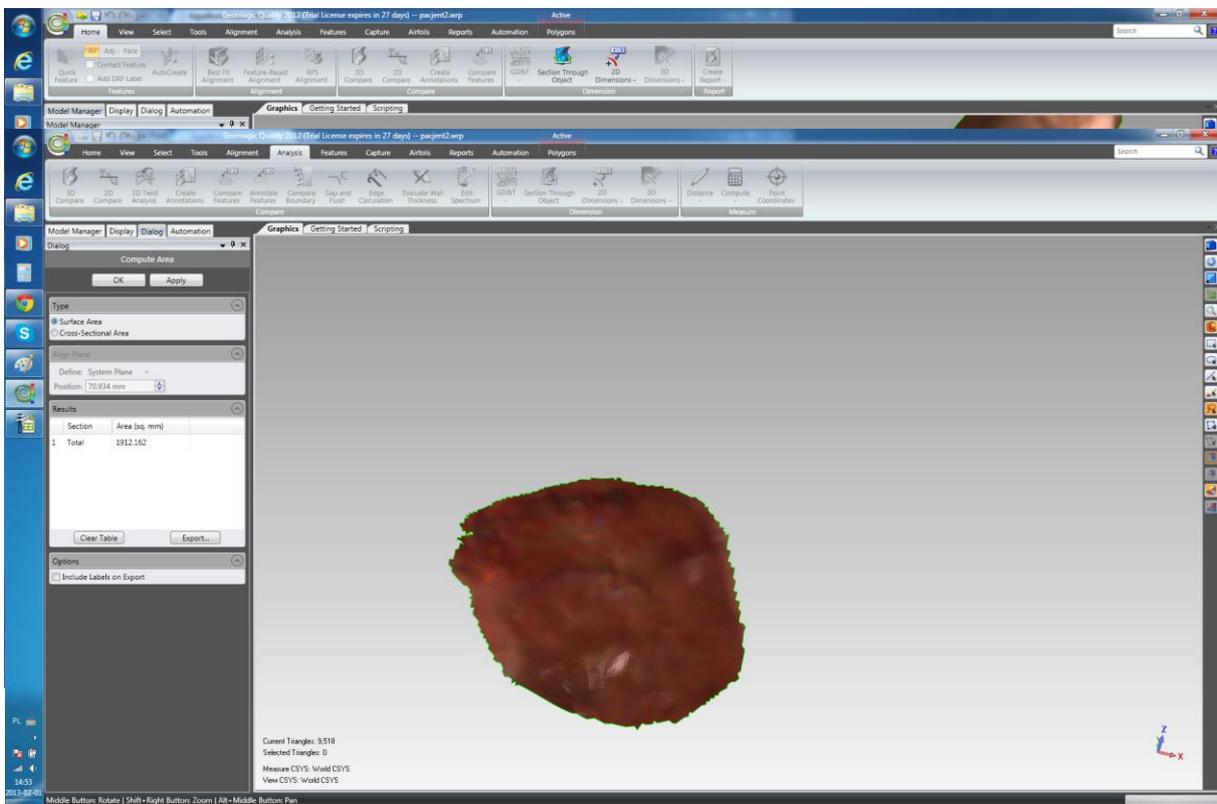
Next step is to dimension the diseased places. It can be done in many ways. Linearly, terms of the program's axis coordinate system, plane. On the picture 3.2 we have an example of few.



Picture 3.2 Dimensioned injury

#### 4. Creating the surface of injury

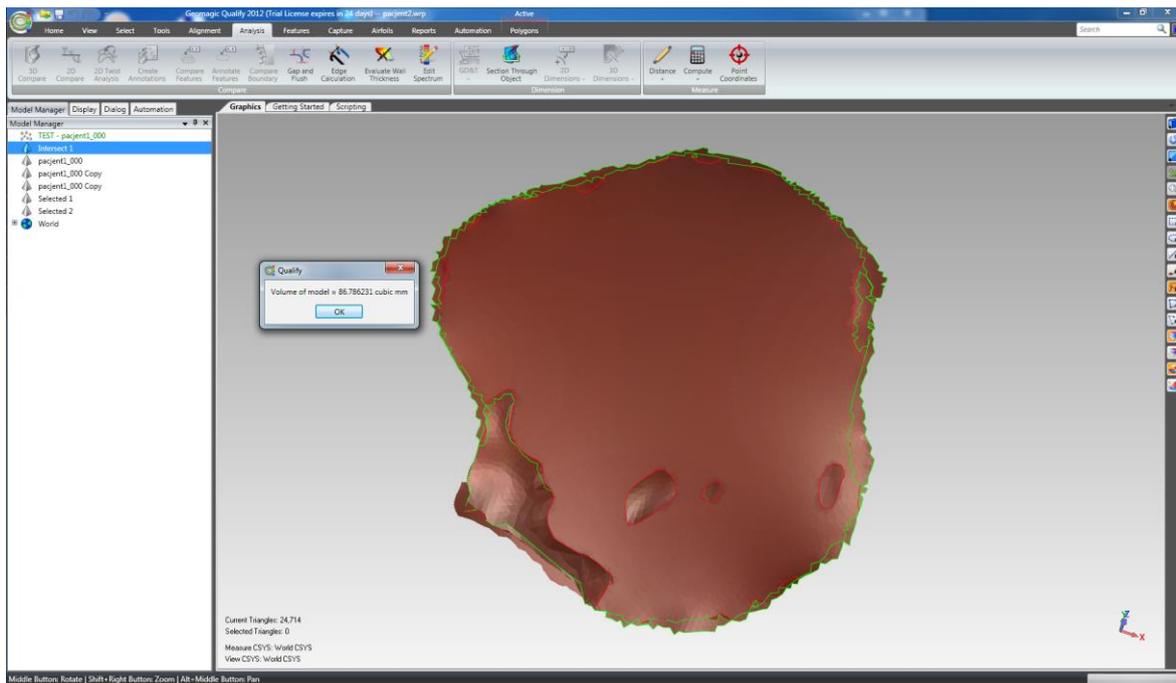
Another problem to solve is to find a surface of this petechial. To do so we need to select the injury surface manually and duplicate the object from selected area. On picture 4.2 we can see sized surface which has; 1912,162 mm<sup>2</sup> Picture 4.1 selected injury



Picture 4.2 Selected injuries.

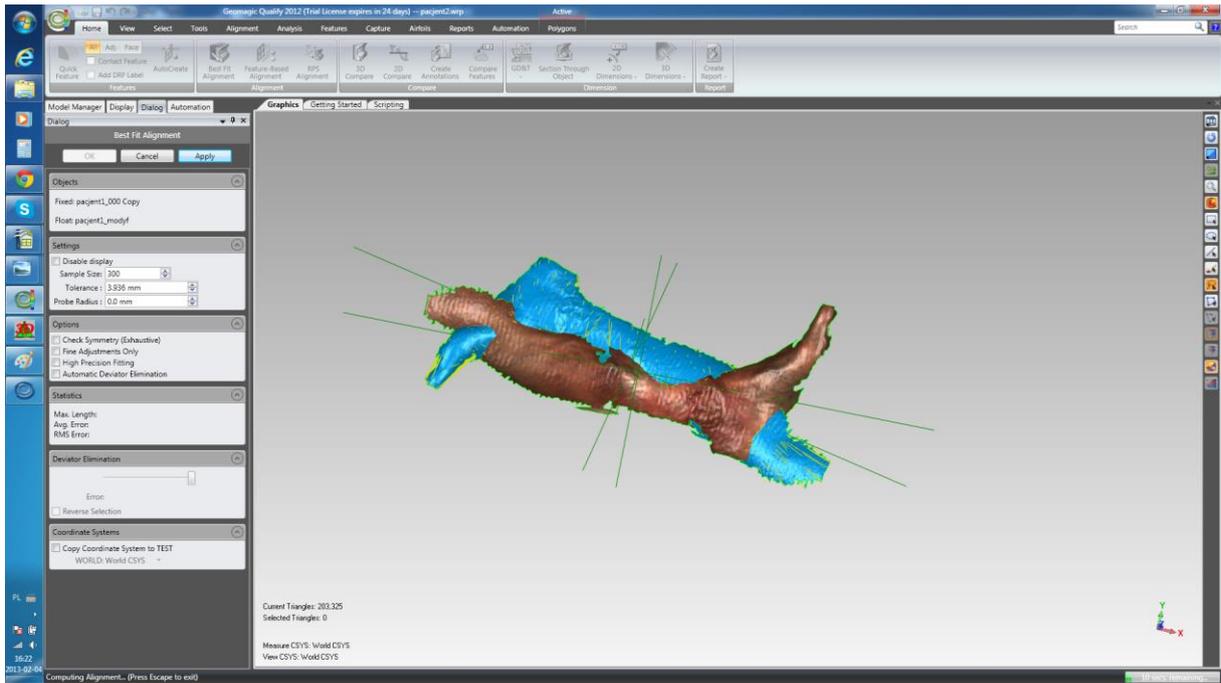
## 5. Determination of the volume of material to fill

Next problem to solve is to find the volume of organic material that should be used to fill the hole in patient leg. To make it possible we should remove the place from selected injury and fill following the curve of the heal part of the leg. It is possible by using the tools from the Geomagic Control program. Moving forward, we are connecting the new surface with the injury area and we get closed solid. The program counts the volume of the material - which is 87mm<sup>3</sup>.

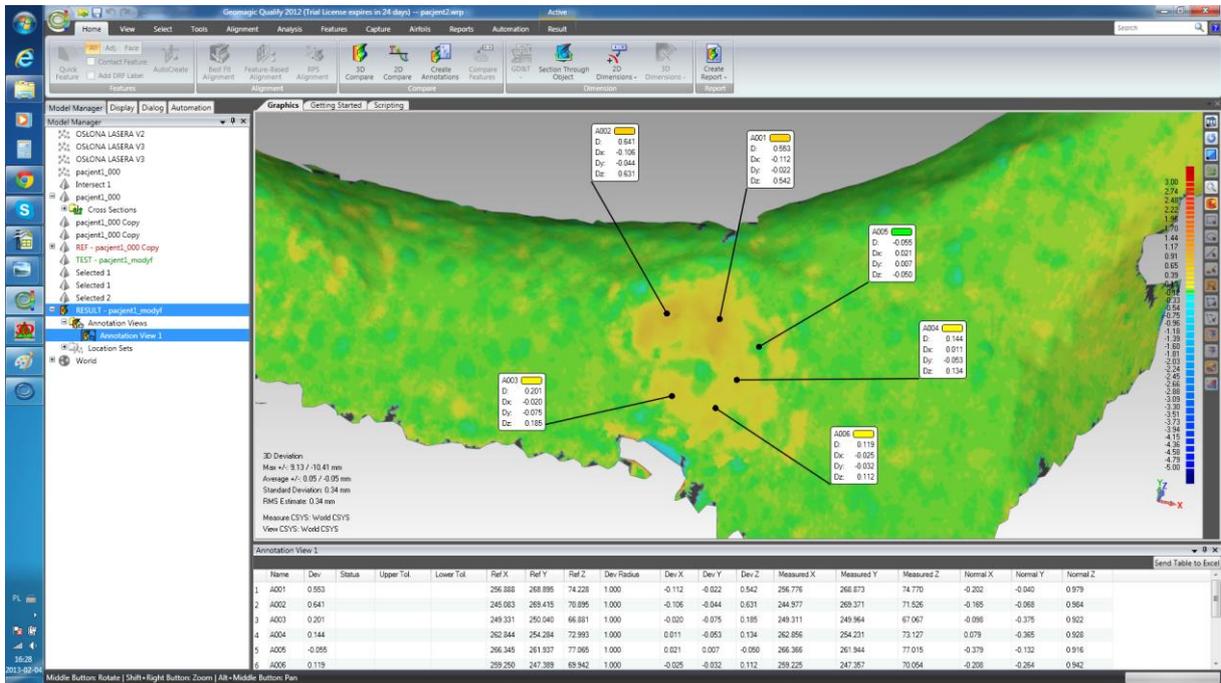


## 6. Checking the progress of injury healing

The last thing to solve is to follow the progress of healing the injury. Because of lack of the comparative material – leg with regenerating injury, the modification was made virtually. Two scans were compared automatically by the program. After that the program generated the colorful map of deviations showing the place and amount of tissue on injured leg. It's also possible to count the exact place of healing using software tools (picture 6.2). All actions taken in program can be presented by using PDF 3D format.



Picture 6.1 Automate merging



Resume 6.2 Exact analyse of injury

## 7. Summary

Researches provided by SMARTTECH prove that the most effective way of using 3D scanner with dedicated software is in treatment of skin disease. Our method is much faster, and more accurate comparing to the traditional methods. Thanks to that we get the whole shape and the surface area. Using simple tools in program we are able to count the volume and dimension the injury with very high accuracy. Cause of using the color detector we receive colored scan that can be used to identify the deviation of skin and further, to visualize received results.