# 3D tombs modeling by simple tools

## Background:

Between 2009 and 2011, new archaeological research was carried out by the Ministry of State for Antiquities (MSA) at central Dra' Abu el-Naga. Joining the MSA excavation team in the field in 2009, the author has been studying the findings from this area since then. The excavation site is situated ca. 700 km south of Cairo, opposite the modern city of Luxor in Upper Egypt on the western side of the Nile. Dra' Abu el-Naga is the modern name of the northern area of the extended necropolis.

Central Dra' Abu el-Naga lies north of the causeway of queen Hatshepsut and just south of the German and Spanish concessions, overlooking the valley where once a temple of Amenhotep I was erected. The tombs are situated just below the hilltop of the middle range of the Dra' Abu el-Naga hills.

In 2013, the following goal was set: to study and record the architecture of the new discovered tombs and to reconstruct the original context of the objects, which formed part of the burial equipment of the deceased.

The main aim of the research is to prepare animated 3D models on the basis of the plans for the rock cut tombs, as they can be difficult to be understood. 2D drawings can be tricky to read, but 3D model views are a universal language that anyone can understand. To reach this aim, one has to think about the financial budget, which some individual researchers do not have. Therefore, the author tried to use a very simple open source tool to solve this problem: SketchUp Pro. Actually, it is used in field archeology since a while. This program is used mainly to create 3D views of buildings with adding some reality affects, but with some adapting, helped to serve archaeological purposes, as part of Digital Humanities. By showing how archaeology can be brought to life using 3D modelling software, based on plans and sections, makes it easy to explore ancient architecture.
I tried to use this program to create animated 3D models for some rock cut tombs which are hard to be understood through plans and sections, and I also created 3D models for one of shaft tombs.

One interesting point of 3D models is that they could easily be to exported into an animated version (a video file) and be attached as a part of a database or online presentation.
Besides, data could be saved as 2D photos with ISO view for a publication version **(Fig 01)**. As well, there is a possibility for 3D section views **(Fig 02)**, which will be more helpful than the regular section view. With the layer option in this program, one can show reuse and development of the structure through enabling and disenabling of these layers, and it is also possible to create a reconstruction version for a tomb – e.g. how it looked like in antiquity and one could apply wall painting to the tomb's structure **(Fig 03)**.

Another advantage of SketchUp in comparison to other software is that it's easy to learn through tutorials available for free in the internet in a period of roundabout less than two weeks. This software can be of good use for archaeological missions.

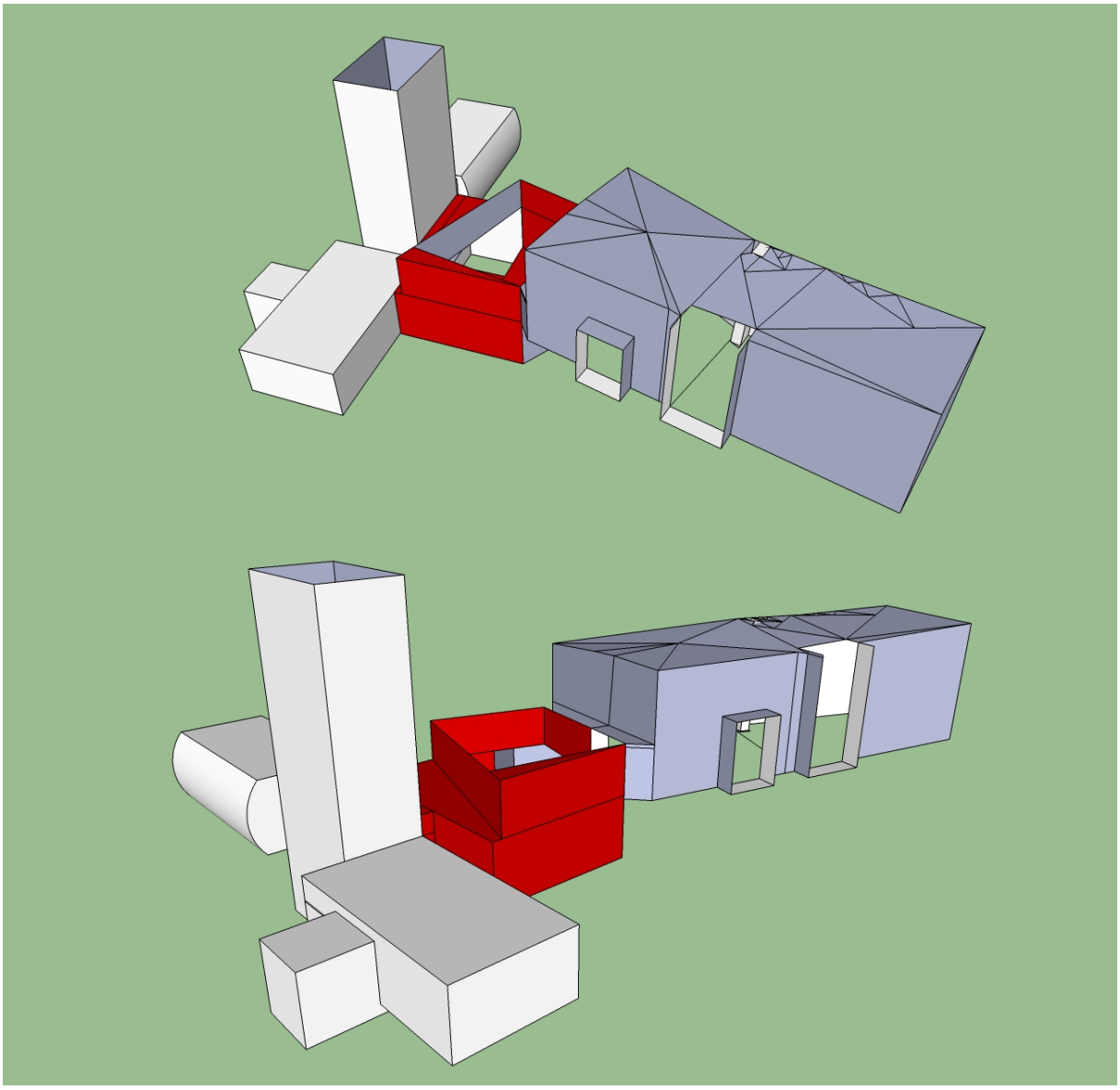

**Fig 01:** 3D model of shaft tomb ST01 with ISO view

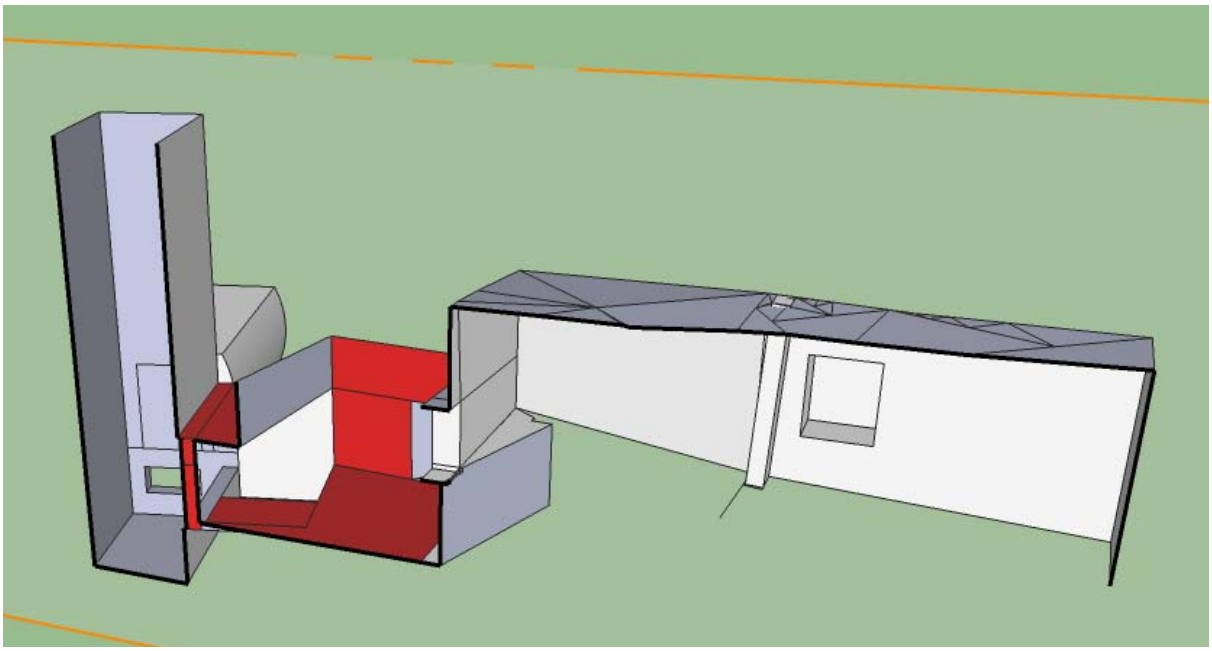

**Fig 2:** 3D section of shaft tomb ST01

**Fig 3:** 3D model of burial chamber of king Tutanchamun