

# POSSIBILITIES OF APPLYING 3D PRINTING TECHNOLOGY FOR MODELLING OF RELIEF MAPS AND FOREST STANDS IN FOREST MANAGEMENT AND PLANNING

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## Introduction

In the field of geoinformation technologies, 3D scenes are nowadays very realistic, but they are still only a visualisation of a 2D image, which requires a high level of imagination. 3D printing has the potential to bridge this gap between the virtual and physical worlds. The result is physically durable, solid and anyone can touch it or rotate it themselves to get the desired view. 3D models created in this way are easy to present to the public. The method of 3D print consists of applying layers of material to a base. The layers are applied one on top of the other from the base upwards, so this process is called additive manufacturing.

The aim of the project was to explore the possibilities of applying 3D printing technology as an innovative technological tool for the production and visualization of relief maps, forest stands, trees, and models of real-world phenomena in forest management and in the visualization of landscape.



Fig. 1: DJI Matrice 600 Pro with GeoSLAM Horizon laser scanner

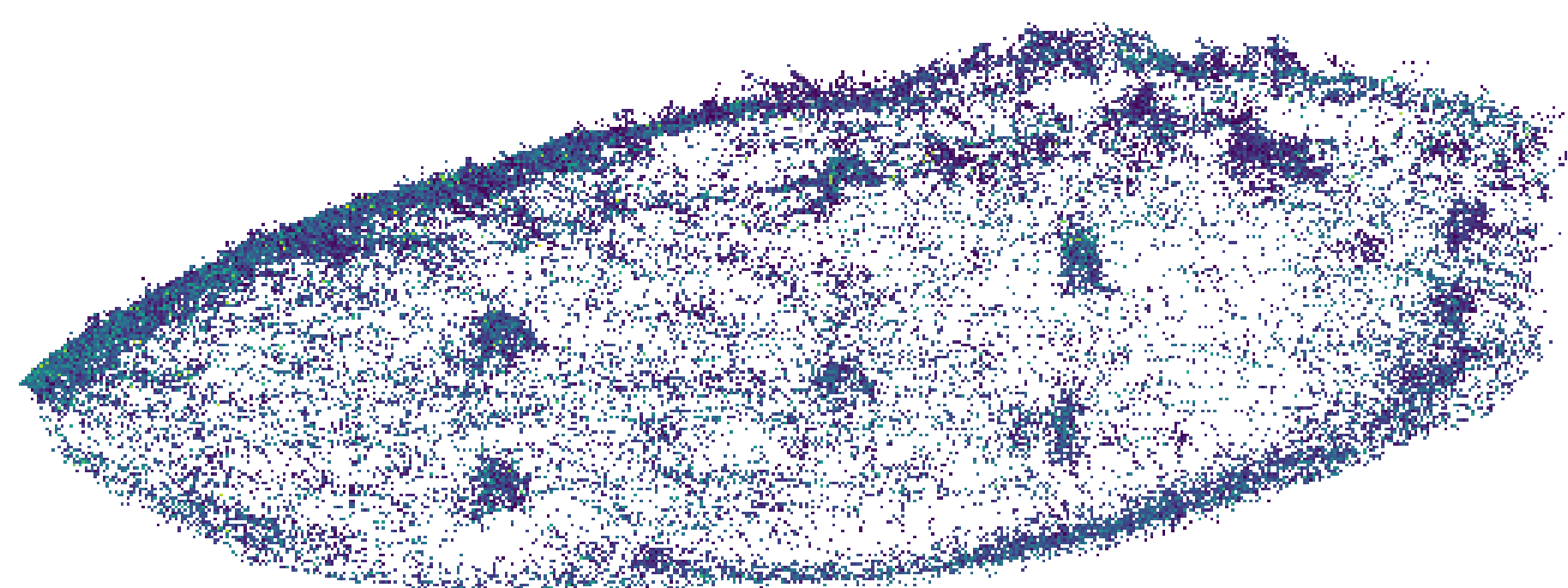


Fig. 2: Point cloud in CloudCompare

## Methodology

The charcoal sites were scanned in an area near Klepačov. A few specific ones were chosen from the many confirmed ones. These were scanned from the air in order to create a digital surface model and terrain model. Aerial laser scanning was performed using a DJI Matrice 600 Pro hexacopter equipped with a GeoSLAM Horizon laser scanner (Fig. 1) with RGB camera. Flight planning (selection of flight altitude and flight path overlap) was done using DJI Ground Station software, data processing and point cloud creation was done in GeoSLAM Hub software.

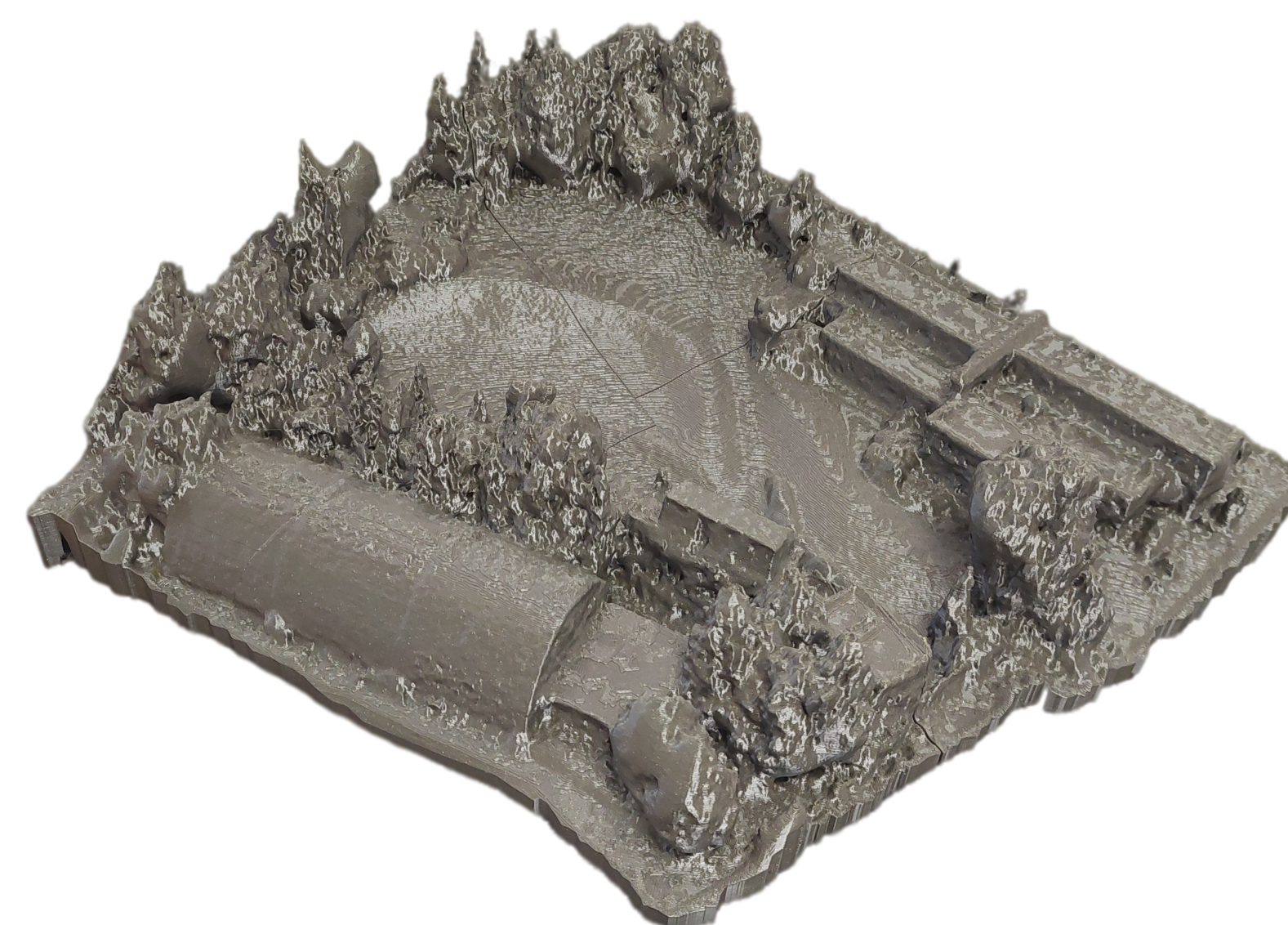


Fig. 3: 3D printed model of Arboretum Mendelu



Fig. 5: 3D printed model of area near Klepačov



Fig. 4: 3D printed model of charcoal site

Within the chosen methodology, the processing of the point cloud and then the adjustment of the layer height, scale, material, and printing speed were optimized for printing the terrain models. The results show that this method of data processing and preparation is suitable for printing 3D relief models and leads to the desired results.