

# Preservation Using UAS

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## Introduction

Photogrammetry is the study of using images to take measurements. Companies such as wildlife conservation and agriculture use UAS to help control the products and wildlife. This research focus's on using UAS for preservation of historical locations, specifically in the Republic of Kosovo. This research was conducted using the DJI Phantom 4 Pro in coordination with Pix4D.

## Research Questions

- How does using a UAS to capture images compare to traditional aircraft?
- When compared to other software, what is the accuracy with using UAS?
- Why do preservation organizations prefer to use UAS?
- What are the benefits of using remote imagery for cultural historic preservations?
- How are UAS uniquely selected for collecting imagery?

## Background

- 1990, Kosovo split from Serbia
- Kosovo's plan to return to autonomy was rejected by Serbia
- 1996, Kosovo Liberation Army, KLA, formed to help fight the Serbian army
- Bombing of Serbia campaign started in March 1999 after the killing of Kosovars
  - June 1999, campaign stopped
- 1999, KLA disbanded; NATO-led Kosovo force, KFOR, took over



Figure 1: Pix4D model of a kulla and the surrounding area captured with the DJI Phantom 4 Pro



Figure 2: Image of the kulla located in Junik created through Pix4D

## Materials and Software

- DJI Phantom 4 Pro
- DJI Mavic 2
- Pix4D Mapper
  - Accuracy: 1.4-2 cm per pixel

The DJI products were used in coordination with Pix4D software to fly box grids, cross grids, and circle patterns.

Pix4D is the model software used to process the images taken and create 3D models.

## Limitations

- Federal:
  - 400ft height limit
    - Unless beside a building
  - Not within 5mi of airport
  - Not fly over people not in mission
- Embry-Riddle
  - 66ft above imaging object
- Language
  - Albanian
  - Arabic

## Results

- Ability to takeoff/land at site
- UAS allow for faster return on processed models/images
- UAS designed specifically for certain imaging and/or scanning objectives
- Images captured with UAS are much better quality and cost less
- The accuracy is far greater than high-altitude imagery obtained through traditional aircraft allowing for a more detailed 3D rendering