
## About the **Authors**

**Renato Donato Viana**
**E-mail:** renatodonatoviana@gmail.com

**Júlio César Soares Aragão**
**E-mail:** jaragaum@gmail.com

Scan the **QR Code to visit our YouTube** channel

https://www.youtube.com/@RDVVANT

FOA UniFOA Centro Universitário de Volta Redonda MESTRADO PROFISSIONAL ENSINO EM CIÊNCIAS DA SAÚDE E DO MEIO AMBIENTE

# Aerial Mapping with UAVs:

## Video Lessons for Engineering Students

*Renato Donato Viana*
*Júlio César Soares Aragão*
*2023*

# Channel **Presentation**

This educational channel is an integral product of the master's research conducted within the scope of the Professional Master's Program in Teaching of Health and Environmental Sciences at UniFOA, developed between March 2021 and April 2022, under the guidance of Professor Dr. Júlio César Soares Aragão. **The objective is to develop an autonomous teaching-learning methodology for engineering students, focusing on the effective use of *UAVs* for aerial mapping and topographic projects.** The methodology focused on the creation of video lessons, in which students can learn all the steps of a *UAV's* mapping project, from flight planning, through image collection and processing, to extracting all the information necessary to prepare georeferenced projects in specific software.


# **Modules** that guide the **lessons**

## **Module 1** | *Fundamentals of Autonomous Flight Planning and Execution*

**In this module, the steps involved in Flight Planning will be defined:** the area to be worked on, the level of image detail, geographic features, structures, and other objects that may affect the *UAVs* movement. During flight execution, ANAC and DECEA regulations must be respected and followed according to the plan to ensure air safety and the safety of objects on the ground.

## **Module 2** | *Step-by-Step UAV Image Digital Processing*

**Digital image processing involves the use of algorithms in specialized software to merge multiple images captured** during remote sensing using *UAVs*. The result is a single georeferenced image containing altitude and planimetric points indicators. This process enables engineering professionals to perform information stratification tasks, which are essential to assist in calculations and in the preparation of technical plans and drawings.


## **Module 3** | *Integrating Digital Processing and AutoCAD Civil 3D for Engineering Projects*

In this module, the process involves **transferring the tabulated information generated by the Digital Processing software to Autodesk AutoCAD Civil 3D software.** This results in the final product, built according to the objectives defined at the beginning of the project. It is important to note that this information can be applied in both CAD and GIS environments. In this module, our goal is to demonstrate the practical application of these concepts in Engineering, specifically using the CAD tools provided by Autodesk.