

DESIGN AND DEVELOPMENT OF A DRONE ASSISTED SEISMIC SURVEY

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ABSTRACT:

In Civil engineering, active source reflection seismic surveys can determine soil composition as well as identify underground utilities and infrastructure. However, each geophone requires meticulous placement and calibration. Additionally, one survey, depending on its scale, can require tens or hundreds of geophones. To alleviate the tedious installation process and expand the use of active source reflection seismic surveys for Civil engineering-scale projects, this senior design aims to design and test a working prototype of a drone system with the ability to properly install a prefabricated geophone in a predetermined location and record accurate and precise data.

To ensure the design is adequate, the drone will be designed based upon its payload, flight characteristics, battery life, and landing mode. For a larger survey, the drone will be able to communicate with multiple drones so that multiple geophones can be installed simultaneously. Additionally, the geophone case, the sole connection between the geophone and the drone, will be designed for a typical wireless seismic node and will be analyzed under three failure modes (reactions at bolt connections, bending, and shear) for three scenarios (landed, take off/midflight, and landing).