

## **Project ROSE**

(Remote Operated Sample Extraction)

Desert Research Institute and University Nevada, Reno

Kai Frudden, Kemma Kolstrup, Bryce Duhammel

Supervised by Claire Parker and Jesse Juchtzer

Project ROSE (Remote Operated Sample Extraction) is a research, design, and build project carried out by Kai Frudden, Kemma Kolstrup, and Bryce DuHamel. Under the mentorships of Claire Parker and Jesse Juchtzer at the Desert Research Institute (DRI). ROSE's goal is to engineer a reliable, remote operated, sample collection system that can be deployed via UAV. For 60 years Cloud Seeding research has been conducted through DRI. Being able to collect uncontaminated samples in targeted seeding areas has become a complication in the weather modification experimentation process. The Northern Sierra Nevadas is filled with steep, avalanche prone terrain. Due to the cruciality of collecting clean snow samples to assess the effects of seeding project ROSE was developed. ROSE connects to the bottom of the UAV carrying a sample collector as well as a motorized reeling mechanism to retrieve said sample. This was designed and engineered over the 4 months and currently is in the experimentation process. We aimed to create a reliable, remote operated, sample collection system to be deployed via UAV into areas that pose a potential risk to personnel. The system collects a snow sample via drop tube and retrieves the sample using a payload wench. The system has been built as a research tool for the cloud seeding project for which they use it to measure the levels of silver compounds present in precipitation cycles. This tool can help reduce the risks associated to field personnel and on-site sample collection. This device helps the Reno DRI WxMod crew verify the effects of their cloud seeding, proving its use. In the future this technology can make all sorts of sampling that was previously impossible, possible. Possible applications are samples of ocean water, high mountain snow, soil in remote regions, many more. The device was developed by the ROSE team, three college students and recent graduates, with assistance from the WxMod crew and advice from industry engineers.

[Kfrudden@nevada.unr.edu](mailto:Kfrudden@nevada.unr.edu), [kkolstrup@nevada.unr.edu](mailto:kkolstrup@nevada.unr.edu), [bduhammel@nevada.unr.edu](mailto:bduhammel@nevada.unr.edu)