

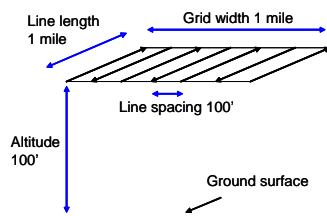
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### **Aerial Neutron Detection of Cosmic-Ray Interactions with the Earth's Surface**

We have demonstrated the ability to measure the neutron flux produced by the cosmic-ray interaction with nuclei in the ground surface using aerial neutron detection. High energy cosmic-rays (primarily muons with GeV energies) interact with the nuclei in the ground surface and produce energetic neutrons via spallation.

At the air-surface interface, the neutrons produced by spallation will either scatter within the surface material, become thermalized and reabsorbed, or be emitted into the air. The mean free path of energetic neutrons in air can be hundreds of feet as opposed to a few feet in dense materials. As such, the flux of neutrons escaping into the air provides a measure of the surface nuclei composition. It has been demonstrated that this effect can be measured at long range using neutron detectors on low flying helicopters.

Radiological survey measurements conducted at Government Wash in Las Vegas, Nevada, have shown that the neutron background from the cosmic-soil interactions is repeatable and directly correlated to the geological data. Government Wash has a very unique geology, spanning a wide variety of nuclide mixtures and formations. The results of the preliminary measurements are presented.



Precision grid pattern aerial measurements at 100 foot altitude

This work was done by National Security Technologies, LLC, under Contract No. DE-AC52-06NA25946 with the U.S. Department of Energy.