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HIGH TEMPERATURE SOIL PROBE FOR WILDFIRE RESEARCH

Sponsor: U.S.D.A. Forest Service, Rocky Mountain Research Station

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The transient temperature distribution in forest soils throughout the active combustion phase and cooling phase of wildfire is of interest in understanding the formation of water repellent soil conditions which effect post-forest erosion, ecology and recovery. The goal of this project is to create a reliable sensing unit that can placed in the soil ahead of a wildfire, monitor surface and subsurface temperatures in forest soils, survive the wildfire events, and store data that can be easily downloaded after retrieval. The unit should be capable of powering up when a threshold surface temperature is reached. The design should incorporate robust and enabling technology found in other remote sampling systems.

Temperature measurements at 1 cm increments are needed to determine threshold temperatures for the creation of water repellent conditions. Temperatures of about 150 C are common during the formation of these conditions and temperatures of greater that 250-300 C often destroy the compounds that create water repellent conditions. Thus know the temperature gradient from above the ground to a depth of about 10 cm is needed.

A past senior design project provided the first proto-type sensor probe. It was tested during a prescribed fire and functioned ok but not suitable for actual wildfire application. Details of their design and the prototype will be available for this year's project.

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