

tronics is a cylinder 14 cm in diameter and 4 cm thick. Variations with different and smaller form factors are possible.

By using the massively parallel architecture inherent to field-programmable gate arrays (FPGAs), per-imager processing may be performed concurrently by separate computational units within the FPGA. This architecture allows tracking

algorithms to scan the entire FOV for a set of features and then switch to a second operating mode that performs processing targeted to only the imagers capturing those features. This architecture would provide considerable bonus to science by improving the efficiency of long-range survey with no additional mass and very small power cost.

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A Distributive, Non-Destructive, Real-Time Approach to Snowpack Monitoring

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This invention is designed to ascertain the snow water equivalence (SWE) of snowpacks with better spatial and temporal resolutions than present techniques. The approach is ground-based, as opposed to some techniques that are air-based. In addition, the approach is compact, non-destructive, and can be communicated with remotely, and thus can be deployed in areas not possible with current methods.

Presently there are two principal ground-based techniques for obtaining SWE measurements. The first is manual snow core measurements of the snow-

pack. This approach is labor-intensive, destructive, and has poor temporal resolution. The second approach is to deploy a large (e.g., 3×3 m) snowpillow, which requires significant infrastructure, is potentially hazardous [uses a ≈200-gallon (≈760-L) antifreeze-filled bladder], and requires deployment in a large, flat area. High deployment costs necessitate few installations, thus yielding poor spatial resolution of data. Both approaches have limited usefulness in complex and/or avalanche-prone terrains. This approach is compact, non-destructive to the snowpack, provides high

temporal resolution data, and due to potential low cost, can be deployed with high spatial resolution.

The invention consists of three primary components: a robust wireless network and computing platform designed for harsh climates, new SWE sensing strategies, and algorithms for smart sampling, data logging, and SWE computation.

This work was done by Jeff Frolik and Christian Skalka of the University of Vermont for Goddard Space Flight Center. Further information is contained in a TSP (see page 1). GSC-16352-1