High Resolution Topography of Polar Regions from Commercial Satellite Imagery, Petascale Computing and Open Source Software

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Surface topography is among the most fundamental data sets for geosciences, essential for disciplines ranging from glaciology to geodynamics. Two new projects are using sub-meter, commercial imagery licensed by the National Geospatial-Intelligence Agency and open source photogrammetry software to produce a time-tagged 2m posting elevation model of the Arctic and an 8m posting reference elevation model for the Antarctic. When complete, this publically available data will be at higher resolution than any elevation models that cover the entirety of the Western United States.

These two polar projects are made possible due to three equally important factors: 1) open-source photogrammetry software, 2) petascale computing, and 3) sub-meter imagery licensed to the United States Government. Our talk will detail the technical challenges of using automated photogrammetry software; the rapid workflow evolution to allow DEM production; the task of deploying the workflow on one of the world's largest supercomputers; the trials of moving massive amounts of data, and the management strategies the team needed to solve in order to meet deadlines. Finally, we will discuss the implications of this type of collaboration for future multi-team use of leadership-class systems such as Blue Waters, and for further elevation mapping.