

EOS Meeting Report

Envisioning and sustaining science at Summit Station, Greenland
By Lora Koenig, Bruce Vaughn, Jack Dibb

Summit Station Science Summit;
Arlington, VA, 28–29 March 2017



Figure 1: Transporting atmospheric flask measurements in the clean sector of Summit Station, Greenland. Photo Credit: Matt Okraszewski

Summit Station, in the center of the Greenland ice sheet is a vibrant interdisciplinary research hub that has served as a crucial component of the Arctic observing system for nearly three decades. The scientific yields from Summit are numerous, but operating remote stations is resource intensive, requiring strategic planning and scientific vision to remain at the cutting edge of scientific research. The Summit Station Science Summit (March 28-29, 2017) was supported and hosted by the National Science Foundation to update scientific vision and direction for Summit.

A multidisciplinary group of about 30 scientists, including remote participants, reviewed science activities at Summit, defined future scientific research questions and goals, and made

community-based recommendations on science-enabling future scenarios and governance. A full report can be found here (<http://www.geosummit.org/?p=699>).

The group emphasized that Summit's high latitude, high altitude site that lacks local influences, serves as a flagship for process-based scientific discovery ranging from questions about the outer reaches of space to the bedrock below the Greenland ice sheet and all points in between. Additionally, the group emphasized that Summit remains the only site on the Greenland ice sheet with a long enough history of climatologic, atmospheric and glaciological measurements to understand, model, and place current changes in a broader context. Consensus encouraged funding agencies to recognize the vital importance of the climate-length records collected at Summit to a broad swath of the scientific research and modeling communities and encouraged governance practices be established to make Summit a protected site, similar in stature to the Long Term Ecological Research Sites, with a core set of community measurements. These measurements, including temperature, accumulation, cloud properties, aerosol concentrations and others, would directly benefit society by documenting current Arctic climate and by providing constraints on global predictions of sea level rise. It was determined that *Summit is scientifically powerful because it leverages a suite of scientific measurements, co-located over time and at one point in space, allowing researchers to go beyond their own study and put their research into the larger climate perspective.*

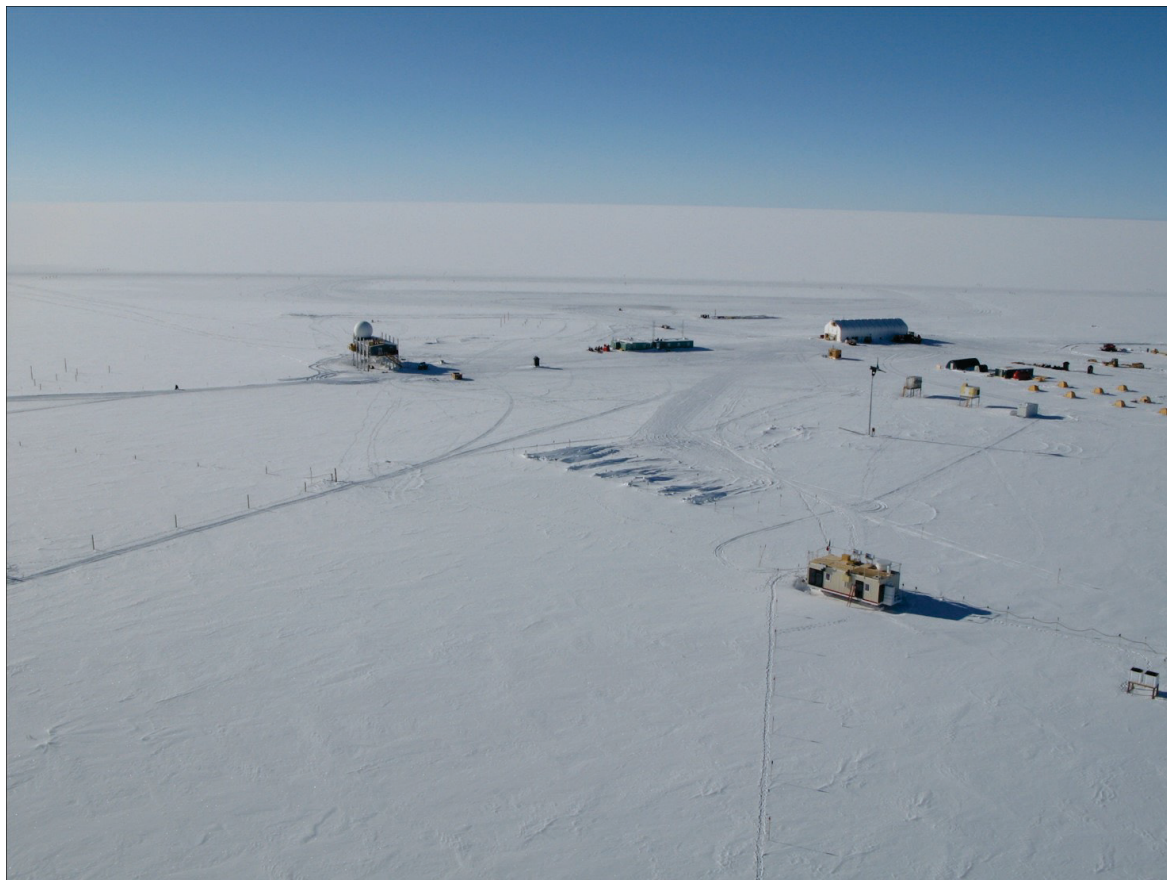


Figure 2: Aerial view of Summit Station, Greenland in 2010. Photo Credit: Polar Field Services

For the future, the group outlined the impacts on science given different logistics/operating scenarios, ranging from very-sparse operations of the station, to those that provide year-round personnel and/or power, to fully-robotic operations. Logistics scenarios that maintained year-round measurements to study processes that directly relate to improving atmospheric, climate and ice sheet models, calibrating satellites, and determining long-term trends and variability for studying key scientific processes were recommended. The expansion of Summit for future astrophysics studies was recommended and emphasis was placed on maintaining a clean snow and air sector under any expansion scenario. The group outlined a future vision of automated and robotic measurements and encouraged continued efforts to collect and publicly disseminate Summit data sets broadly and efficiently.