

## MANAGING AND DISTRIBUTING LARGE ELEVATION DATASETS IN ALASKA

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Elevation data and its derived products are critical datasets for geologists, as well as for many other scientific and general users. In light of this critical need, the Alaska Division of Geological & Geophysical Surveys (DGGs) manages and hosts an “Elevation Datasets in Alaska” web application and makes publically available the supporting web services. The web app allows users to view and download all known, publicly available elevation-based datasets covering Alaska. As of summer 2016 the web app hosts 3.88 Tb of elevation data. The “Elevation Datasets in Alaska” web app operates within the Division’s larger online geologic publication infrastructure, which includes geologic maps, GIS datasets, other web maps, reports, and raw data files. This presentation focuses on the technical aspects of managing, processing, visualizing, and distributing large volumes of elevation-based data.

The three primary categories of publicly available elevation data currently managed in DGGs’s web application are LiDAR, IfSAR, and photogrammetrically derived elevation data. LiDAR datasets consists of point-cloud data and when available derived products, such as hillshade, digital terrain models (DTM), digital surface models (DSM), and intensity images. IfSAR data is available in three categories: DTM, DSM, and orthorectified radar imagery (ORI). Photogrammetrically derived elevation data is available in various formats.

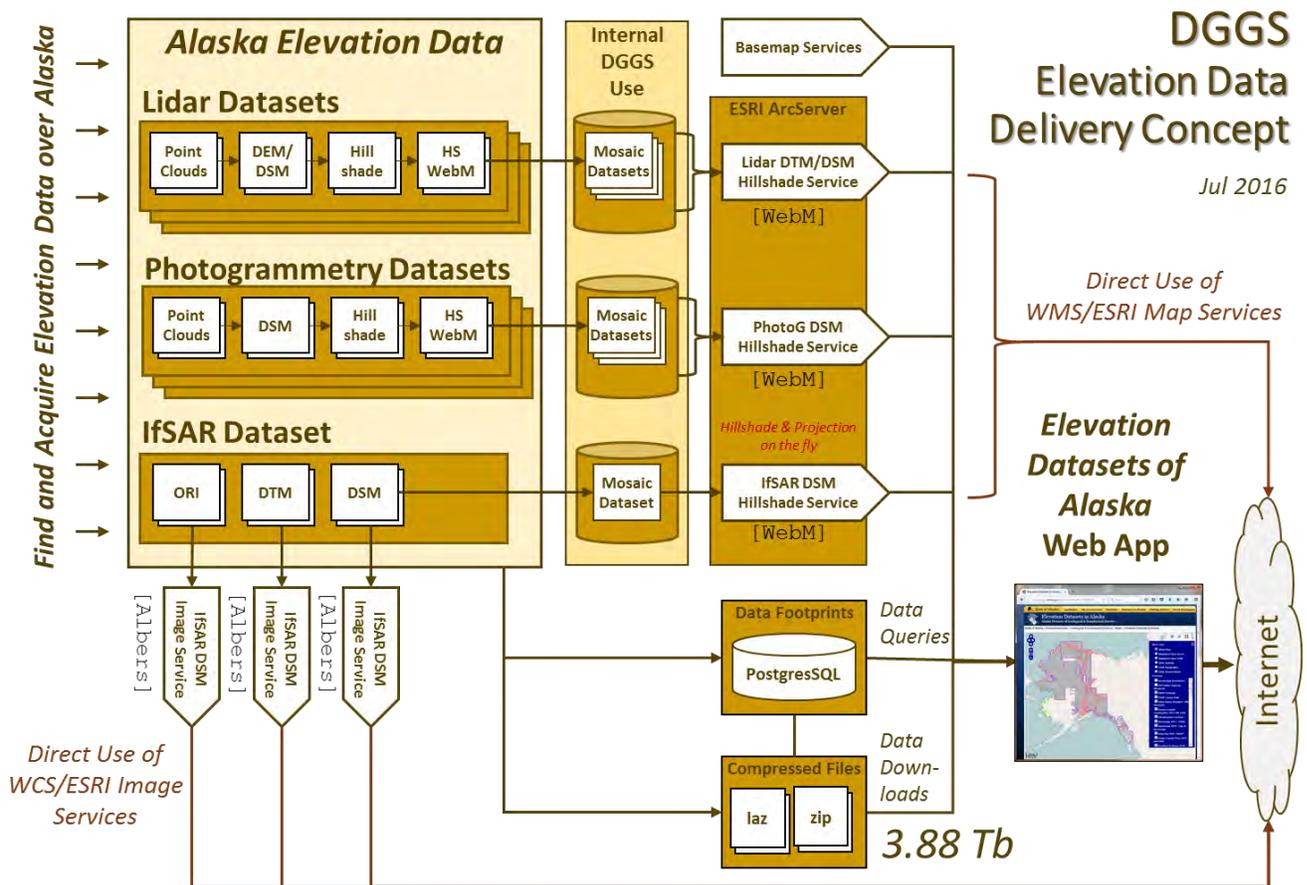
Using the web application, users can view hillshades of the various datasets and download data in regions they interactively identify within the application. In addition, users can view and conduct analysis directly with the elevation data by connecting to our map and imagery services from their own mapping application, such as ESRI’s ArcMap.

The first step in the process to create the application is finding and obtaining publicly available elevation datasets that cover Alaska. The elevation datasets are then organized, processed, and served using Esri’s ArcGIS, along with Blue Marble Geographic’s Global Mapper to make hillshades. Elevation data is available from many different organizations and as a result, each dataset is unique and requires considerable effort to organize and process. Each lidar dataset’s point-cloud files and metadata must be inspected to determine extent footprints, point spacing, projections, and attributing. Raster surfaces (DTM and/or DSM), along with their associated hillshades, are generated at spatial resolutions ranging from 1 to 5 meters. In addition, the point-cloud and raster files are compressed for delivery. IfSAR data, on the other

hand, is delivered by the USGS in a relatively standard format—as 5-meter-resolution DTM and DSM elevation surface rasters together with ORI rasters at either 0.625-meter or 2.5-meter resolution.

Once a dataset’s point-cloud files and derived products are generated, web services are built using ESRI’s ArcServer. A vector-based index service identifies the footprints of all the elevation files, and raster hillshade services provide visualizations of the data. Though these individual services can be viewed independently by users, their primary role is to drive DGGS’s custom “Elevation Datasets in Alaska” web app based on OpenLayers open source JavaScript library.

DGGS continue to populate their “Elevation Datasets in Alaska” web application as more elevation data becomes available and is actively developing a new version with added functionality.



**Organizations that have contributed data:** DGGS, USGS, GINA, AGC/SDMI, NOAA, Open Topography, FEAM, AK DOT & PF, NRCS, The Matanuska–Susitna Borough, The Kenai Watershed Forum, Municipality of Anchorage

[maps.dggs.alaska.gov/elevationdata/](https://maps.dggs.alaska.gov/elevationdata/)