**510**

# SATELLITE IMAGE MAPPING OF THURSTON ISLAND AND ITS APPLICATION IN THE RECONNAISSANCE SURVEY OF THE DECEMBER 1946 U.S. NAVY SEAPLANE CRASH SITE

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Commercial and government orbital sensor systems combined with other resource data from the U.S. Geological Survey may offer an effective way of mapping to support projects developed or designed for special tasks in Antarctica as well as underpin geo-spatial data base users. In this study, satellite panchromatic and multi-spectral images are fused to develop an image map database. To fuse the Landsat 15-m panchromatic image files, each 30-m Landsat multi-spectral image was interpolated to 15-m pixels. The geometric registration routine converted the 4-band multi-spectral data to the same pixel size as the panchromatic image. This routine required the registration of the multi-spectral data using image-to-image x and y control points. Using the appropriate panchromatic image as the base file, the routine developed a planimetric transformation by selecting several well-distributed control points in the base and correlating their UTM coordinates to corresponding x and y positions in each multi-spectral image. These points were then applied in a least-square regression analysis to derive a second-order polynomial transformation of a representative multi-spectral band with less than a 2-pixel root mean square error. Following the transformation to 12.5 by 12.5-m output pixels, the researchers used a high pass box filter to enhance higher spatial frequency components of each output color image. Owing to the unsuccessful collection of geodetic ground control data, digital terrain elevation data needed for the ortho-rectification of the images were not available for this project. To demonstrate its utility of this image map database, it is applied in the reconnaissance survey of the December 1946 U.S. Navy seaplane crash site. An expedition to recover the bodies of the Navy seamen left behind on Thurston Island has been in the making for several years. These resources are examined in this study to determine their applicability and potential for supporting geo-spatial user need in keeping with the National Science Foundation's U.S. Antarctic Research Program.