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EVALUATION OF THE INFORMATION CONTENT OF A SHUTTLE IMAGING RADAR-B MULTI-ANGLE DATA SET

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ABSTRACT

The Shuttle Imaging Radar-B (SIR-B) sensor aboard the orbiter Challenger during Space Shuttle Flight 41-G, provided the first true digital radar data acquired from a space platform. The SIR-B sensor had a fixed HH polarization, operated at a wavelength of 23.5 cm (L-band), and had the capability of variable look angles ranging from 15 to 60 .

Three different sets of radar data each acquired at a different look angle (28 , 45 , and 58) were collected over an area of Baker County, Florida, on October 9, 10, 11, 1984. These three data sets were preprocessed and digitally overlaid at the NASA Jet Propulsion Laboratory.

Quantitative analysis of the multi-angle SIR-B data was conducted to determine the correlation between the three individual data sets (each a different look angle) and also to determine the information content of the individual channels using principal component transformation techniques. It was found that there are significant differences between the different look angle data sets. The characteristic speckle in the data was also investigated. This information is important for determining the value of such data for mapping earth resources using digital analysis techniques. The results of the analysis are summarized in this paper.