

SIR-C GROUND DATA PROCESSOR SYSTEM:
PROCESSING ALGORITHM DESIGN AND DATA QUALITY ANALYSIS RESULTS
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The Spaceborne Imaging Radar-C (SIR-C), the third in a series of space shuttle based synthetic aperture radar systems (**SAR**) sponsored by the National Aeronautics and Space Administration (NASA), is planned for two space shuttle flights in 1994: the first one in April and the second one in August. SIR-C will operate aboard the space shuttle **Endeavour** in conjunction with **X-SAR**, which is developed by the German Space Agency (**DARA**) and the Italian Space Agency (**ASI**). **SIR-C/X-SAR** will be the first spaceborne SAR with the capability of simultaneous acquisition of multi-frequency, multi-polarization data. The SIR-C Ground Data Processing System, developed by the Jet Propulsion Laboratory (**JPL**) under the contract with NASA, is to process the SIR-C signal data into a variety of data products for distribution to the earth and space science community.

This paper starts with an overview of the SIR-C radar system, the ground data processing system and the science data products. Emphasis is placed on special data processing and calibration techniques implemented on the SIR-C processor to cope with the unique challenges incurred by radar systems operating from the space shuttle platform. These challenges include large state vector errors, large attitude errors and high attitude drift rates.

The second part of the paper is to present early quality analysis results of the data acquired from the first flight in April 1994. These quality analysis results include the impulse response function performance, the geometric performance as well as the **radiometric** and **polarimetric** calibration performance of the end-to-end system,

The SIR-C radar will image over more than one hundred sites through out the world. Among them are nineteen **supersites** selected by the science team for a variety of scientific disciplinary studies. A few number of calibrated, precision products will be produced between the two space shuttle flights. Some of these early images will be shown in the presentation. Additionally, there are some data acquired over sites in China, such as **Hotien East**, **Beijing**, **Tien Shari** and **Dun Ilung**, etc. Some of these images will also be presented if they have been processed by the time of the Symposium.

Included in the final part of the paper is a summary of the experiences and lessons learned from the development and operations of the ground data processor system. The goal is to apply the experiences and technologies gained from the SIR-C to benefit the future spaceborne SAR missions.