Software for Generating Strip Maps From SAR Data

Jurassicprok is a computer program that generates strip-map digital elevation models and other data products from raw data acquired by an airborne synthetic-aperture radar (SAR) system. This software can process data from a variety of airborne SAR systems but is designed especially for the GeoSAR system, which is a dual-frequency (P- and X-band), single-pass interferometric SAR system for measuring elevation both at the bare ground surface and top of the vegetation canopy. Jurassicprok is a modified version of software developed previously for airborne-interferometric-SAR applications. The modifications were made to accommodate P-band interferometric processing, remove approximations that are not generally valid, and reduce processor-induced mapping errors to the centimeter level. Major additions and other improvements over the prior software include the following:

• A new, highly efficient multi-stage-modified wave-domain processing algorithm for accurately motion compensating ultra-wideband data;
• Adaptive regridding algorithms based on estimated noise and actual measured topography to reduce noise while maintaining spatial resolution;
• Exact expressions for height determination from interferogram data;
• Fully calibrated volumetric correlation data based on rigorous removal of geometric and signal-to-noise decorrelation terms;
• Strip range-Doppler image output in user-specified Doppler coordinates;
• An improved phase-unwrapping and absolute-phase-determination algorithm;
• A more flexible user interface with many additional processing options;
• Increased interferogram filtering options; and
• Ability to use disk space instead of random-access memory for some processing steps.

This program was written by Scott Hensley, Thierry Michel, Soren Madsen, Elaine Chapin, and Ernesto Rodriguez of Caltech for NASA’s Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1).

This software is available for commercial licensing. Please contact Don Hart of the California Institute of Technology at (818) 393-3425. Refer to NPO-30843.

Software for Probabilistic Risk Reduction

A computer program implements a methodology, denoted probabilistic risk reduction, that is intended to aid in planning the development of complex software and/or hardware systems. This methodology integrates two complementary prior methodologies: (1) that of probabilistic risk assessment and (2) a risk-based planning methodology, implemented in a prior computer program known as Defect Detection and Prevention (DDP), in which multiple requirements and the beneficial effects of risk-mitigation actions are taken into account. The present methodology and the software are able to accommodate both process knowledge (notably of the efficacy of development practices) and product knowledge (notably of the logical structure of a system, the development of which...