POLARIMETRIC APPLICATIONS OF THE UAVSAR INSTRUMENT

Scott Hensley, Howard Zebker, Cathleen Jones, Thierry Michel, Alex Fore, Bruce Chapman

The UAVSAR instrument, employing an L-band actively electronically scanned antenna, had its genesis in the ESTO Instrument Incubator Program and after 3 years of development collected about 120 of hours engineering and science data during its final year of development. System design was motivated by solid Earth applications where repeat pass radar interferometry can be used to measure subtle deformation of the surface, however flexibility and extensibility to support other applications were also major design drivers. Initial testing was carried out with the NASA Gulfstream III aircraft, which has been modified to accommodate the radar pod and has been equipped with precision autopilot capability developed by NASA Dryden Flight Research Center. With this the aircraft can fly within a 10 m diameter tube on any specified trajectory necessary for repeat-pass radar interferometric applications. To maintain the required pointing for repeat-pass interferometric applications we have employed an actively scanned antenna steered using INU measurement data.

As part of the engineering and science application phases fully polarimetric data was collected over various sections of the San Andreas and Hayward faults in California, the Lost Hills area where active deformation due to oil pumping has been previously measured, area around a geothermal energy site around the Salon Sea and the two volcanic area of Long Valley in California and Mt St Helens in Washington state. Additionally, data was collected in a novel multi-aspect angle fully polarimetric mode for several sites. This talk will present an overview of the UAVSAR polarimetric capabilities, discuss the new polarimetric modes and present some preliminary applications of the polarimetric data sets.