PROJECT SUMMARY

Intellectual Merit

The technique of spaceborne Interferometric Synthetic Aperture Radar (InSAR) provides an excellent means of observing deformation over broad areas that is highly complementary to the measurements provided by the global network of GPS receivers. Over the past three years the WInSAR consortium has grown to 45 member institutions pursuing science investigations ranging from the study of deformation associated with earthquakes, volcanoes, and glaciers to land subsidence and InSAR algorithm development. Recent policy changes at the European Space Agency as well as the 2006 launch of the *ALOS* satellite have enabled WInSAR to go global. Accordingly the facility component of WInSAR has moved to UNAVCO from the Southern California Earthquake Center. Here we propose to continue the maintenance and expansion of the WInSAR archive and software. Our proposal will facilitate InSAR research for US scientists. The science themes, as formulated by the WInSAR users, include:

- The earthquake cycle throughout the world including the San Andreas Fault and Basin and Range;
- Volcanic activity throughout the world including South America, Hawaii, Aleutians and Cascade/Yellowstone;
- Groundwater and coastal hazards throughout North America;
- Mountain building in South America and the Himalayas;
- Rifting in Iceland and East Africa; and
- InSAR noise source mitigation and time series analysis.

The objectives of the proposed work are to:

- Develop a robust multi-satellite SAR data ordering, distribution & archiving system;
- Purchase new data both globally and over North America in support of WInSAR science themes; and
- Work toward open-source community InSAR software.

We request a total of $150K/year ($50K each from NASA, NSF and USGS) for 3 years to maintain the data distribution and archive facility at UNAVCO as well as to acquire SAR data and make it available to the WInSAR consortium members. This proposal for $100K/year includes the contributions from NASA and NSF. A separate proposal will be submitted to USGS.

Broader Impacts

These science objectives are highly complementary to the Plate Boundary Observatory objectives of EarthScope. GeoEarthScope provides partial funding for the purchase of InSAR data and the development/maintenance of the archive at UNAVCO. This proposal provides the additional funding needed to support the science activities outside of EarthScope such as the study of volcano deformation in the Aleutians, Hawaii, and South America and surface subsidence due to groundwater withdrawal. A major strength of this proposal is integration or research and education. WInSAR data are used in 21 courses at 14 of the top research universities in the US. WInSAR data have been used in 26 PhD and MS theses since 2000. The students come from all background and ethnic groups. The research results are widely published (at least 34 refereed journal publications in the past three years) and many innovative web pages to capture the interest of young students.