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The ARIA project: Advanced Rapid Imaging and Analysis for Natural Hazard Monitoring and Response.

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ARIA is a joint JPL/Caltech coordinated effort to automate geodetic imaging capabilities for hazard response and societal benefit. Over the past decade, space-based geodetic measurements such as InSAR and GPS have provided new assessment capabilities and situational awareness on the size and location of earthquakes following seismic disasters and on volcanic eruptions following magmatic events. Geodetic imaging's unique ability to capture surface deformation in high spatial and temporal resolution allow us to resolve the fault geometry and distribution of slip associated with any given earthquake in correspondingly high spatial & temporal detail. In addition, remote sensing with radar provides change detection and damage assessment capabilities for earthquakes, floods and other disasters that can image even at night or through clouds. These data sets are still essentially hand-crafted, and thus are not generated rapidly and reliably enough for informing decision-making agencies and the public following an earthquake.

We are building an end-to-end prototype geodetic imaging data system that would form the foundation for an envisioned operational hazard response center integrating InSAR, GPS, seismology, and modeling to deliver monitoring, actionable science, and situational awareness products. This prototype exploits state-of-the-art analysis algorithms from technologists and scientists, These algorithms enable the delivery of actionable products from larger data sets with enhanced modeling and interpretation, and the development of next generation techniques. We are collaborating with USGS scientists in both the earthquake and volcano science program for our initial data product infusion.

We present our progress to date on development of prototype data system and demonstration data products, and example responses we have run such as generating products for the 2011 M9.0 Tohoku-oki, M6.3 Christchurch earthquakes, the 2011 M7.1 Van earthquake, the 2012 Brawley Earthquake Swarm and several simulated earthquake response exercises.