## HIGH THROUGHPUT PHENOTYPING OF COTTON USING REFLECTANCE, TEMPERATURE, HEIGHT AND LIDAR SCANNING Andrew N. French Doug Hunsaker Kelly Thorp Bob Strand U.S. ALARC, USDA-ARS Maricopa, AZ Michael Gore Plant Breeding and Genetics Section, Cornell University Ithaca NY Kevin Bronson U.S. ALARC, USDA-ARS Maricopa, AZ

## **Abstract**

High-Throughput Phenotyping (HTP) is an emerging discipline that will greatly speed selection of heat and drought tolerant cotton varieties. In 2013 and 2014 a tractor-based HTP system was deployed to assess phenotypes of 35 upland cotton varieties as part of the Regional Breeders Testing Network (RBTN). The system collected precision geo-located observations of reflected light, radiometric temperature, acoustic plant height and 2D LIDAR scanning over four rows at a time. Active light-source sensors were used to quantify cotton canopy cover, infrared thermometers to measure canopy and soil temperatures, acoustic transducers to measure cotton plant heights, and LIDAR to measure cotton leaf and boll distributions. Results from the surveys and implementation of a data processing, management and visualization system will be discussed.