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External Calibrator for HI Observatories (ECHO)[1] JACOB BURBA, DANIEL C. JACOBS, JUDD BOWMAN, MICHAEL BUSCH, MARC LEATHAM, Arizona State University, ABRAHAM NEBEN, Massachusetts Institute of Technology, BENJAMIN STINNETT, LAUREN TURNER, Arizona State University — A new generation of radio arrays is being developed that use large numbers of low-cost elements, such as phased tiles of dipole antennas, to map Hydrogen at very high redshift. These maps are three dimensional tracers of matter and energy when the universe was only 400,000 years old and covers scales much larger than previously possible. Calibration of the primary beams of phased dipole arrays has been found to be crucial to analysis of observations from the the Murchison Widefield Array (MWA), the Precision Array for Probing the Epoch of Reionization (PAPER), and the upcoming Hydrogen Epoch of Reionization Array (HERA). The goal of the Experimental Calibrator for HI Observatories (ECHO) is to map the primary beam response using a drone-mounted transmitter which is flown along a pre-programmed flight path designed to cover the entire sky. As a test of this method, beams of calibrated reference dipoles were mapped and compared with measurements by an alternate method. Here we present the results of these tests.

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Jacob Burba
Arizona State University

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