

STEPS TOWARD A STREAMING RADIO TELESCOPE: AN IBOB
CORRELATOR

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The data acquisition and imaging systems of next generation telescopes like the SKA will need to be integrated, so that the telescope produces calibrated images directly. One model for data reduction uses a priori knowledge of the target image region to determine calibration parameters and feeds back new data to improve the baseline model. The final result is an improved model of the desired source region. An important input to this processing is the primary dish beam (voltage) pattern, which must be characterized over the field of view and in the directions of strong interferers.

Our approach to these issues is to develop a 4-element hardware correlator based on the Interface Break Out Board (IBOB) designed and built by the Berkeley Wireless Research Center. This correlator provides a test bed for prototyping a streaming telescope design, as well as giving immediate measurements of voltage patterns on existing telescopes. With a 50 MHz bandwidth, this instrument is optimized for acquisition of beam patterns using interferometry on a narrow-band source (radio satellite, maser). The control system is highly flexible and self-contained. It can run as a dumb back-end processor, or interact with the telescope control system through a simple software interface. This architecture was chosen so that the correlator is easily ported to multiple observatories operating in the centimeter (ATA) or millimeter (CARMA) wavelength range. The correlator writes its output directly into MIRIAD format (at least for now). In this talk we review the system and present beam patterns and holography acquired at the Allen Telescope Array.

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