# The VLBA Sensitivity Upgrade Project

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NRAO's current VLBA Sensitivity Upgrade Project is a two-pronged development effort that will yield the first significant increases in the instrument's sensitivity since its construction in the 1980s. Modern technology allows enhanced performance, flexibility, and compatibility to be achieved at relatively modest cost.

The primary effort targets a nearly sixfold increase in the sensitivity of continuum observations, in the moderate to high frequency bands, through expansion of the entire data path bandwidth downstream from the IFs. The project goal is to reach 4-Gbps operation, corresponding to 2-bit Nyquist sampling of two 500-MHz IFs, by 2011.

The upgrade includes a new "Digital Backend" sampler-filter module, which will replace the analog data path through the existing baseband converters and samplers. A new, wider-band "Mark 5C" disk-based recording system will transmit the 4-Gbps data stream to a new, flexible software correlator system. Development is well advanced in all three subsystems; the status of each will be reviewed in this presentation.

Although the 4-Gbps goal is specified for 2011, the new equipment could be in place in 2009, with wideband operation available for the most scientifically compelling observations. Mean throughput would then be expanded simply by adding additional recording media and, to a lesser extent, additional correlation processing capacity.

Upgrades to the VLBA's spectroscopic sensitivity are achieved by replacement of the low-noise amplifiers in receivers at selected frequency bands with new, more sensitive devices. The first such upgrade, for the 22-GHz band, was completed earlier this year. An average reduction of 38 percent in zenith SEFD was achieved.