

## **Concepts for a Next-Generation VLBA**

Jonathan D Romney

(1) Long Baseline Observatory, Socorro, NM, 87801, <https://www.lbo.us>

Past major upgrades of the VLBA's capabilities spanned the years 2007-2012. These included:

- New 4-8 GHz receivers, and enhanced bandwidth and sensitivity at K and W bands.
- Expansion of the instrument's maximum data transmission capacity from 256 to 2048 Mbps (substantially funded by AUI and NSF).
- Transition to the more flexible and expandable DiFX software correlator.

In fiscal year 2016, the US National Science Foundation “divested” 50% of previous VLBA support, which has now been replaced by funding from the US Naval Observatory (USNO). Despite the corresponding reduction of up to 50% in the time available for general astronomical observing, these changes also open new opportunities for significant instrumental upgrades. New instrumentation, at many points along the entire data path from receivers to the correlator, may be of significant value to USNO and various other US government agencies. We are nearing completion of an overall development plan covering such upgrades.

We expect potential new funding partners’ interests to focus on specific elements of the overall data path that will provide improvements matched to their requirements. In this situation, we must support separate, asynchronous implementations of new elements. These must be designed to maintain compatibility with the currently adjacent elements, while also providing the desired eventual capabilities even if this results in a temporary over-specification.

One general approach to this situation is to insist on adherence to universal standards that both support the expected maximum capabilities (at reasonable cost), and are also likely to be maintained reasonably far into the future.

This talk will review the aspects emphasized above for all elements of the VLBA data path.