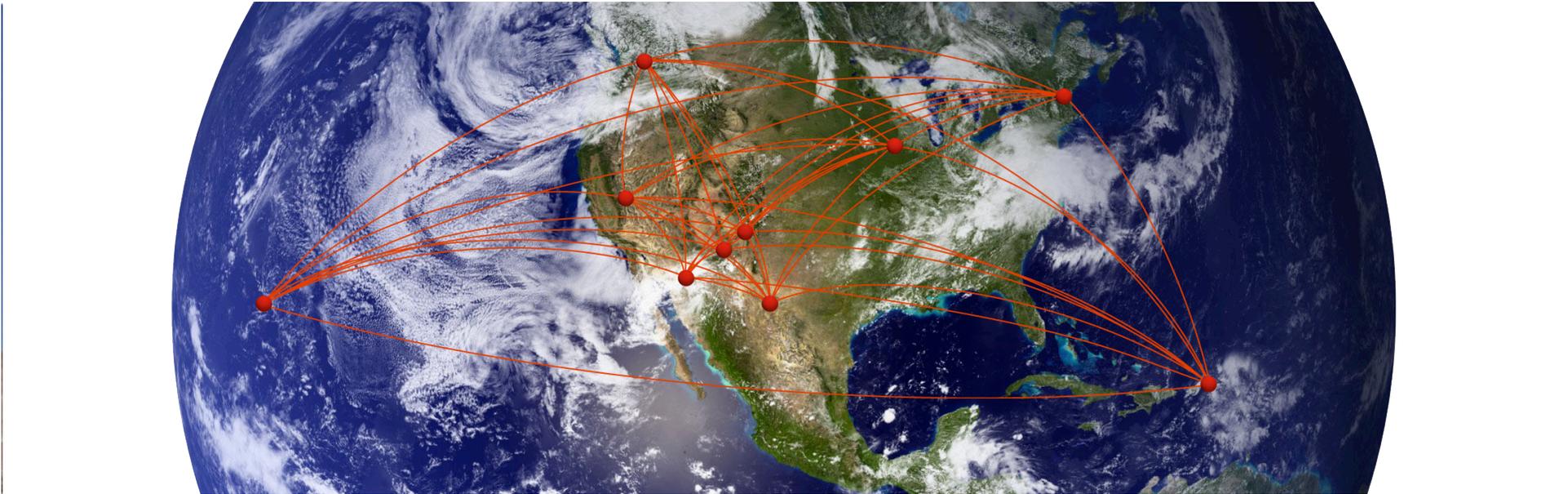


# THE VLBA: Toward a New Operating Paradigm



**Bob Dickman**  
NRAO New Initiatives Office

Atacama Large Millimeter/submillimeter Array  
Expanded Very Large Array  
Robert C. Byrd Green Bank Telescope  
Very Long Baseline Array



## Background

## **Scientific Opportunities with the VLBA Are Now Greater Than Ever**

➤ **You will hear more at this workshop...**

# VLBA Technical Developments

The VLBA is far more powerful than it was at its birth in 1993:

- Default user data rates are now 512 Mbps vs. 64 Mbps initially; 2 Gbps later this year
  - Expanded media pool (thanks to partners and NSF)
- A “software” correlator – a cluster using Adam Deller’s DiFX program suite – has replaced the original hard-wired VLBA correlator
  - Scalable
  - New capabilities, e.g., one-pass correlation for data sets >128 Mbps, fields with multiple phase centers, commensal observations of fast radio transients, etc.
- NSF grant for set of full C-band receivers (4-8 GHz) has enabled construction to begin: Gives access to 6.7 GHz CH<sub>3</sub>OH maser transition
- Delivery of EVLA phased array is close (Deller, Lazio), and some 2 years ahead of original schedule; done under EVLA RSRO commissioning program

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## Partnerships

- Long-standing partnerships with the VLBA have been important from the instrument's beginning.
- Partnerships have made much of our scientific and technical progress possible
- Current partners include:
  - USNO
  - MPIfR
  - UNAM/CONACyT de Mexico
  - Numerous university-affiliated partners
  - RadioNET (transnational access agreement)

## The Current State of the VLBA

## VLBA Operational Status

- Operational health of the array is good
  - Operating budgets are in difficulty
  - Partnerships with USNO, MPIfR, RadioNet have helped alleviate problems in the short term:
    - USNO: 5 year agreement to support VLBA operations in exchange for daily UTI monitoring
    - MPIfR: Support for VLBA operations
    - RadioNET: 3- year agreement under FP7; modest support for trans-national access. Ends this year.
- VLBA Operations cannot be sustained in their present form



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# The VLBA Operational Concept Must Change

- Original operational paradigm, with fully open access driven by scientific merit, is no longer financially sustainable
- Science-driven “mission” model:
  - ~5-year operational horizon if funding permits
  - We will seek to extend this only if compelling justification exists

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  - *“Proposals for time on the VLBA, EVLA, and GBT will be considered for designation as NRAO Key Science Projects. An NRAO Key Science Project designation is intended to identify, and enable the successful completion of, those projects that are timely, fundamental, and will have a significant science impact on the wider astronomy and astrophysics communities. The designation of an approved observing program as a Key Science Project is based on its scientific ranking from the proposal review process, nomination by the NRAO Time Allocation Committee, and final selection and approval by the NRAO Director’s Review” (NRAO eNews, 2, No. 9, Sept. 2009)*



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  - Ten Antenna Array: Suspending the operation of some VLBA antennas will be necessary unless additional operations funding is found.
    - This will limit the scientific capabilities of the array (*cf. Craig Walker's talk*)



## Summary:

- It is essential to put the VLBA on a financially sound operating footing. Time is short
- The current scope of the instrument is in jeopardy: How to avoid antenna closures, reductions in reliability, etc.?
- Access to the instrument is becoming more complex and likely more limited
- NRAO believes that partnerships will be a key to the next 5 years. Examples:
  - Exclusive-use, institutional partnerships such as USNO-NSF partnership:
    - 5-year major contribution to operational support in exchange for daily UTI-UTC geodetic monitoring
    - Dedicated access to instrument facilitated by NRAO
  - Additional partnerships of this type are possible
  - New models also possible: e.g., Partnerships with Scientific Collaborations
    - Guaranteed access to telescope time in exchange for operational support
    - Partners responsible for internal scientific governance of partnership
    - Multi-institutional, may be international

