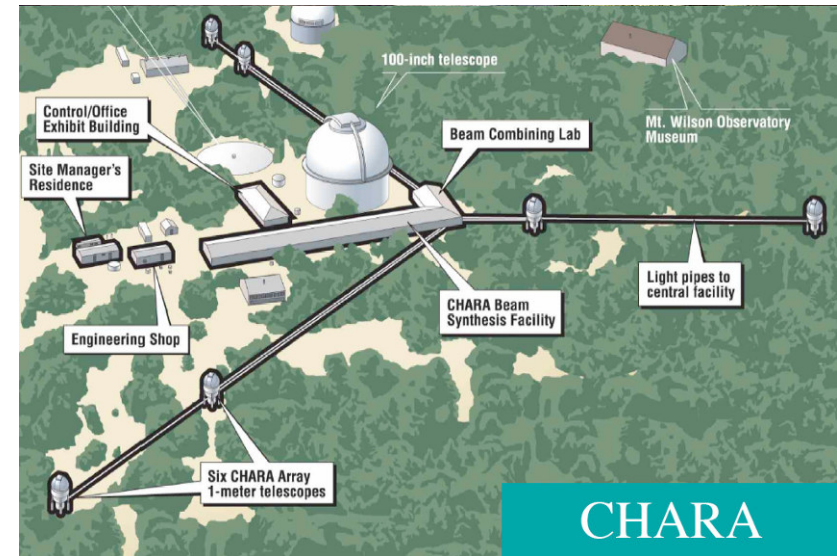




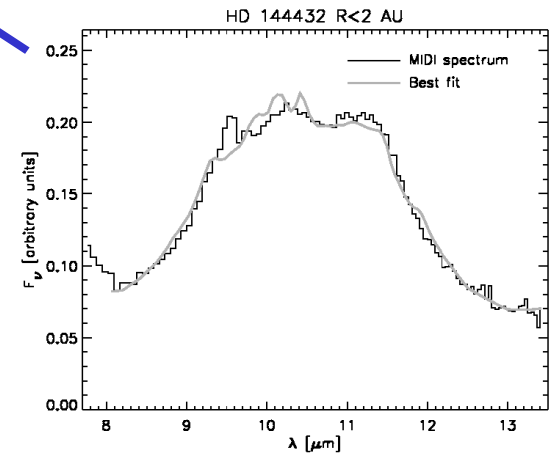
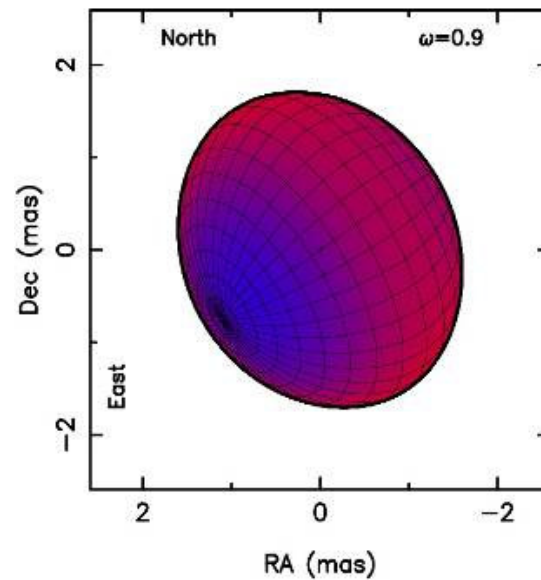
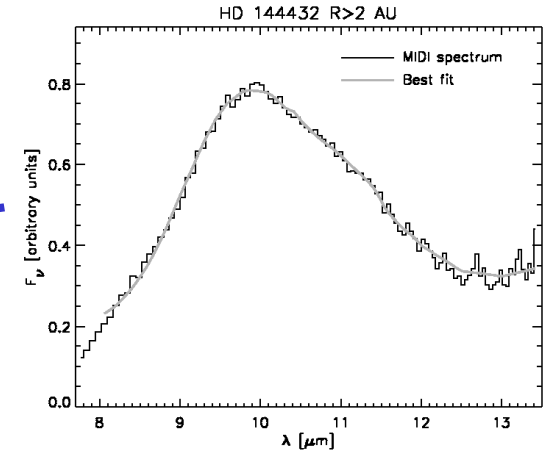
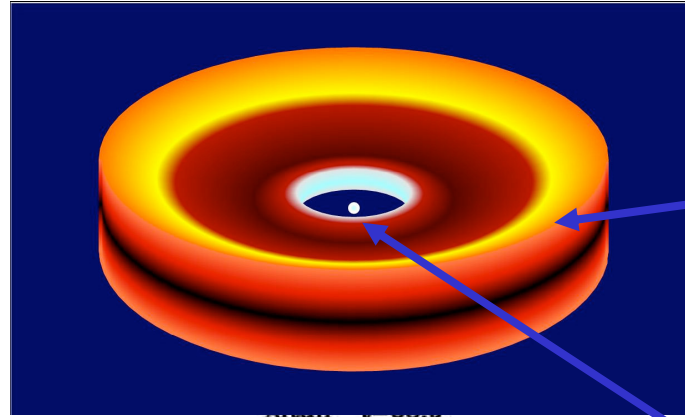
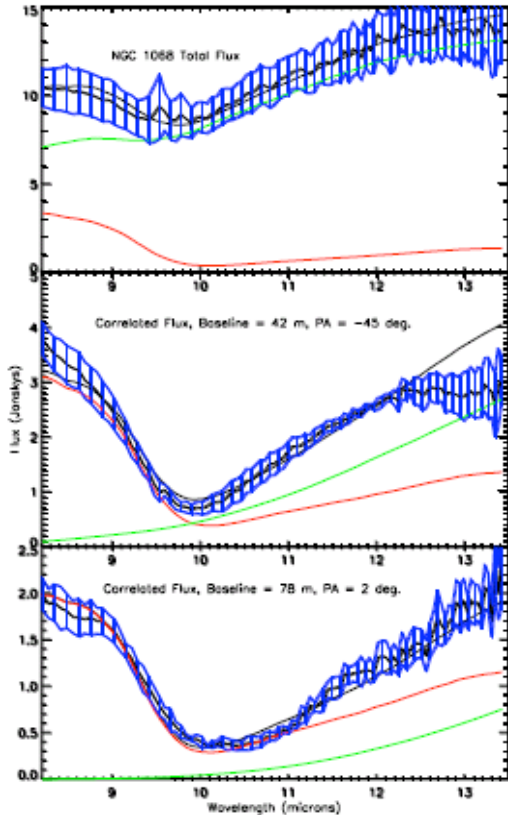
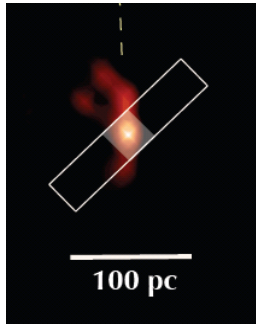
# The Magdalena Ridge Observatory Interferometer: a high-sensitivity imaging array

David Buscher <[dfb@mrao.cam.ac.uk](mailto:dfb@mrao.cam.ac.uk)>  
and the MROI team

# The first generation of facility interferometers is now online



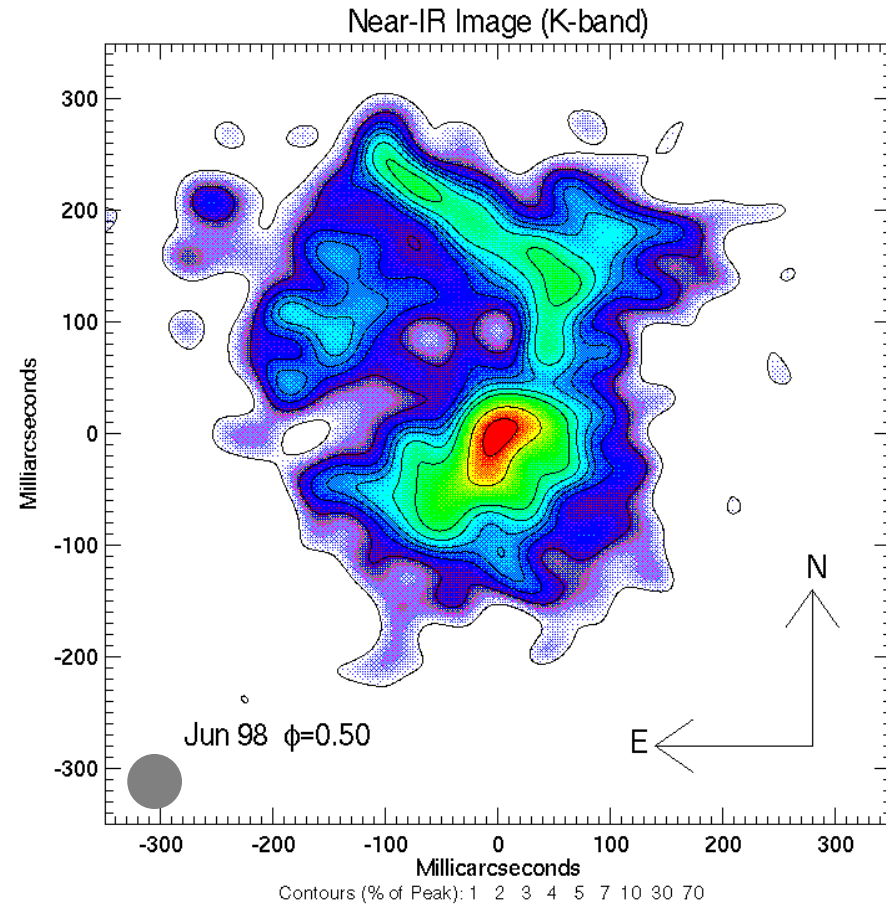
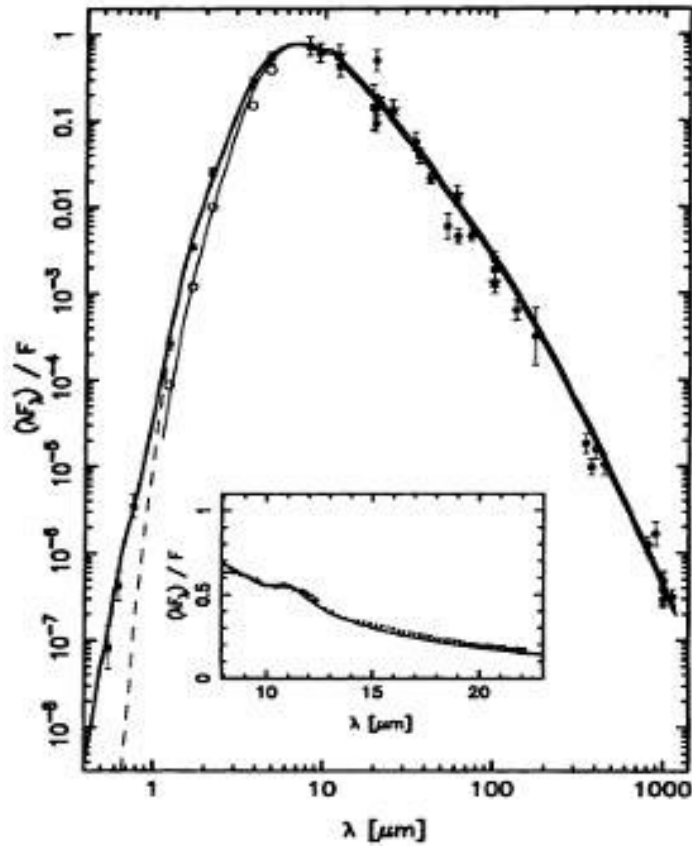
# Over 40 astrophysics papers were published in the last year alone



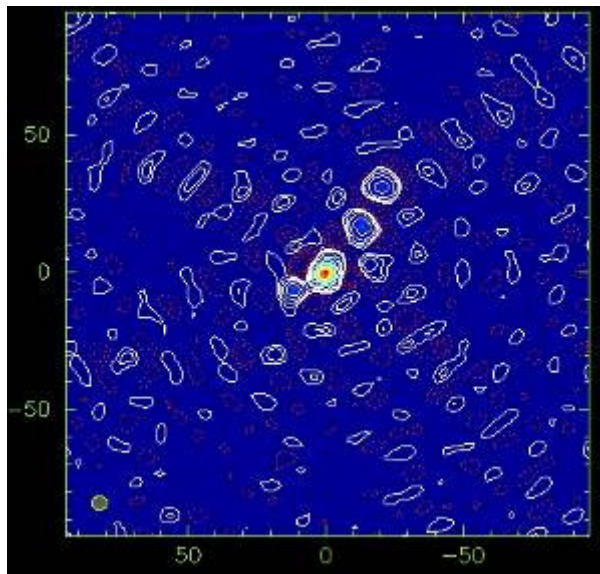
# What is needed now?

- Longer baselines?
- Bigger apertures?
- More spectral resolution?

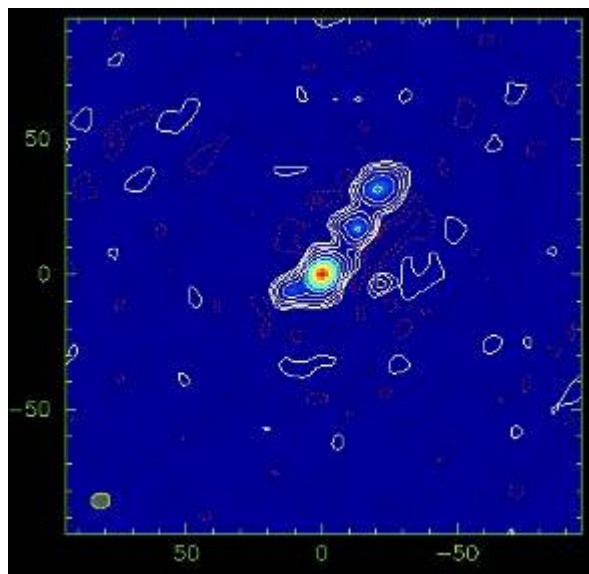
# We need to move from modelfitting to imaging



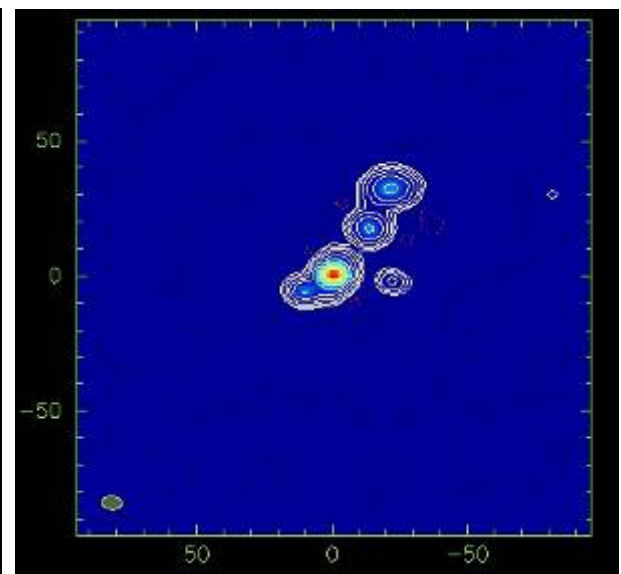
# Imaging needs many telescopes



4 telescopes

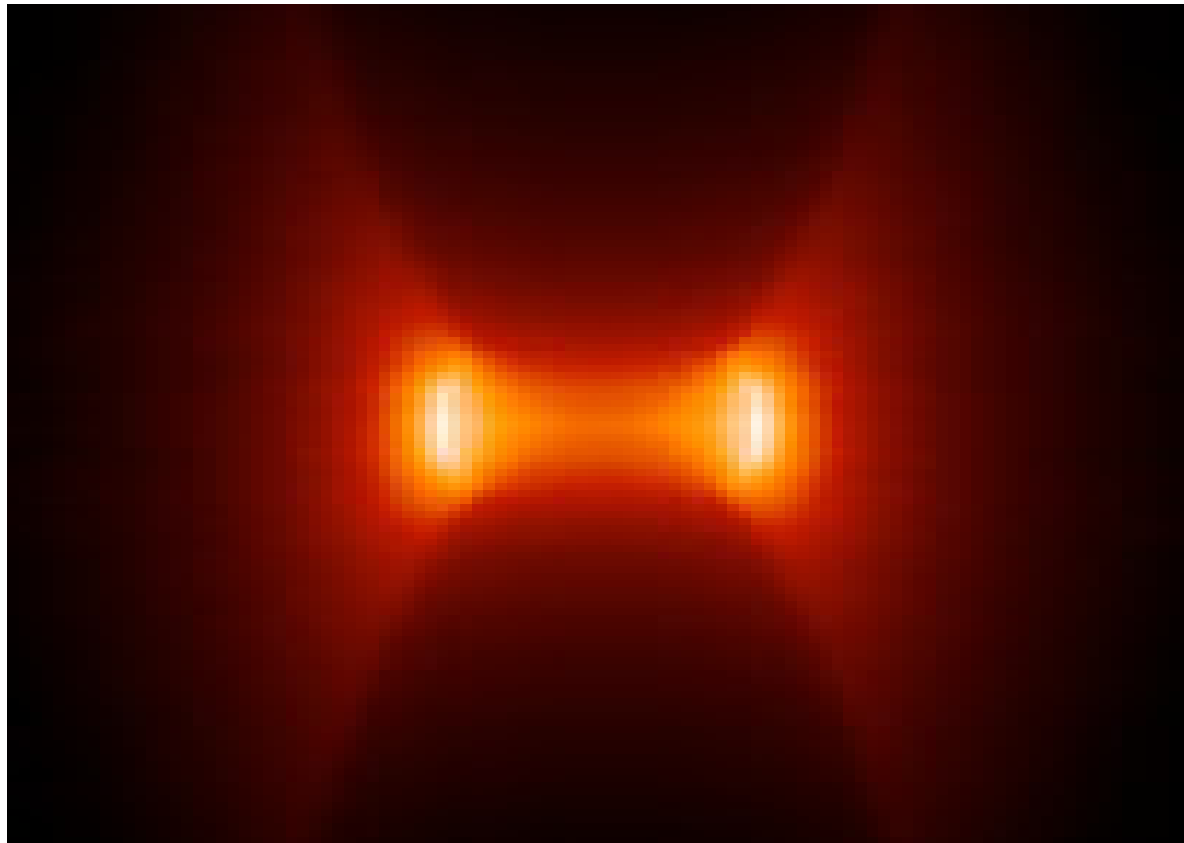


6 telescopes



8 telescopes

We need the sensitivity to access the really interesting classes of target



# The fringe tracker determines the faintest object we can observe

- The fringe tracker must achieve a usable signal-to-noise ratio in an integration time fixed by the atmosphere.
- If we cannot fringe-track on a target, we can never observe it interferometrically, no matter how much observing time we have.
- Using larger apertures does not help much.



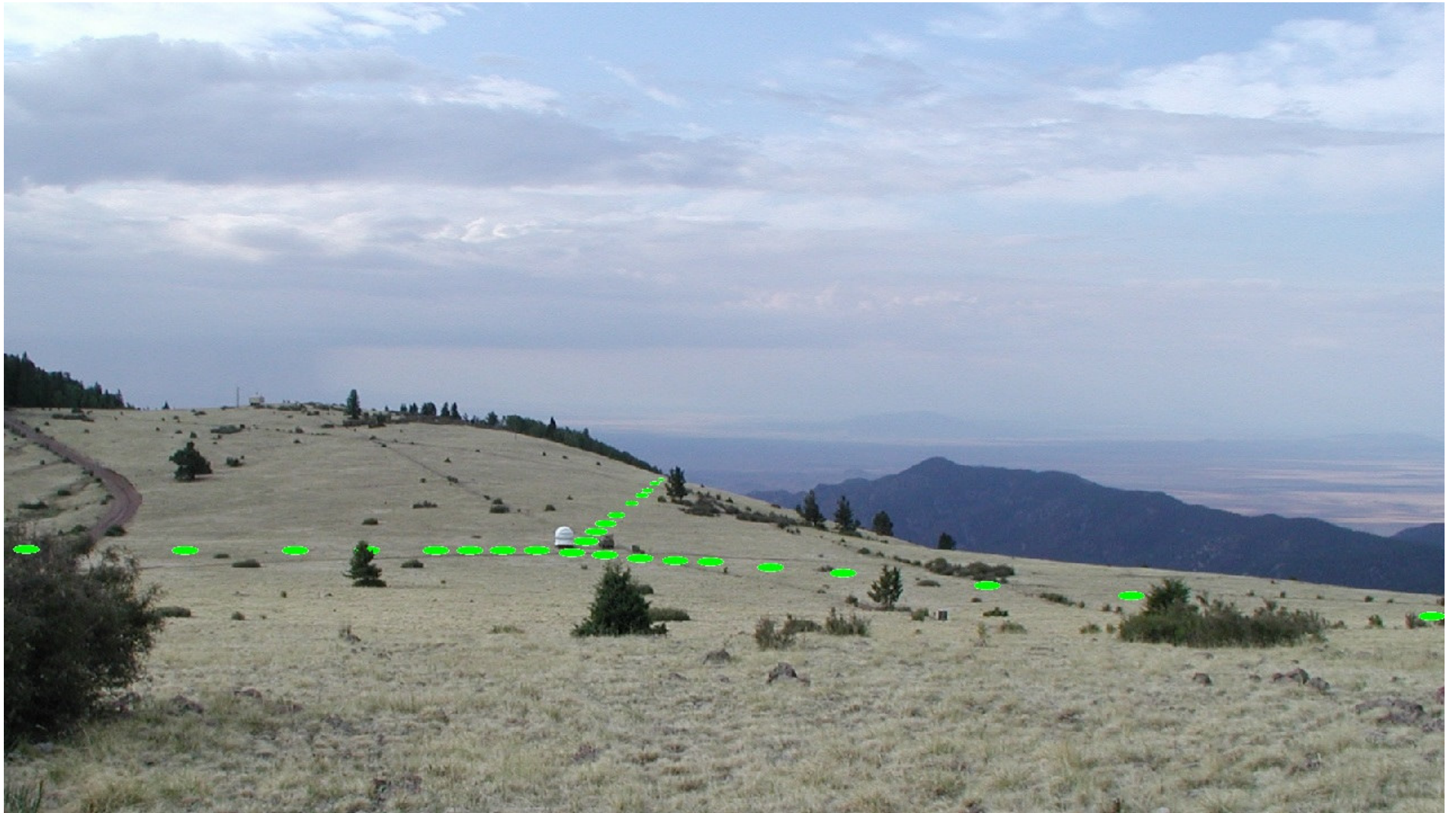
The Magdalena Ridge Observatory is a  
Congressionally-funded project in New Mexico



The MRO Interferometer is being built by a partnership between NMT and the Cavendish

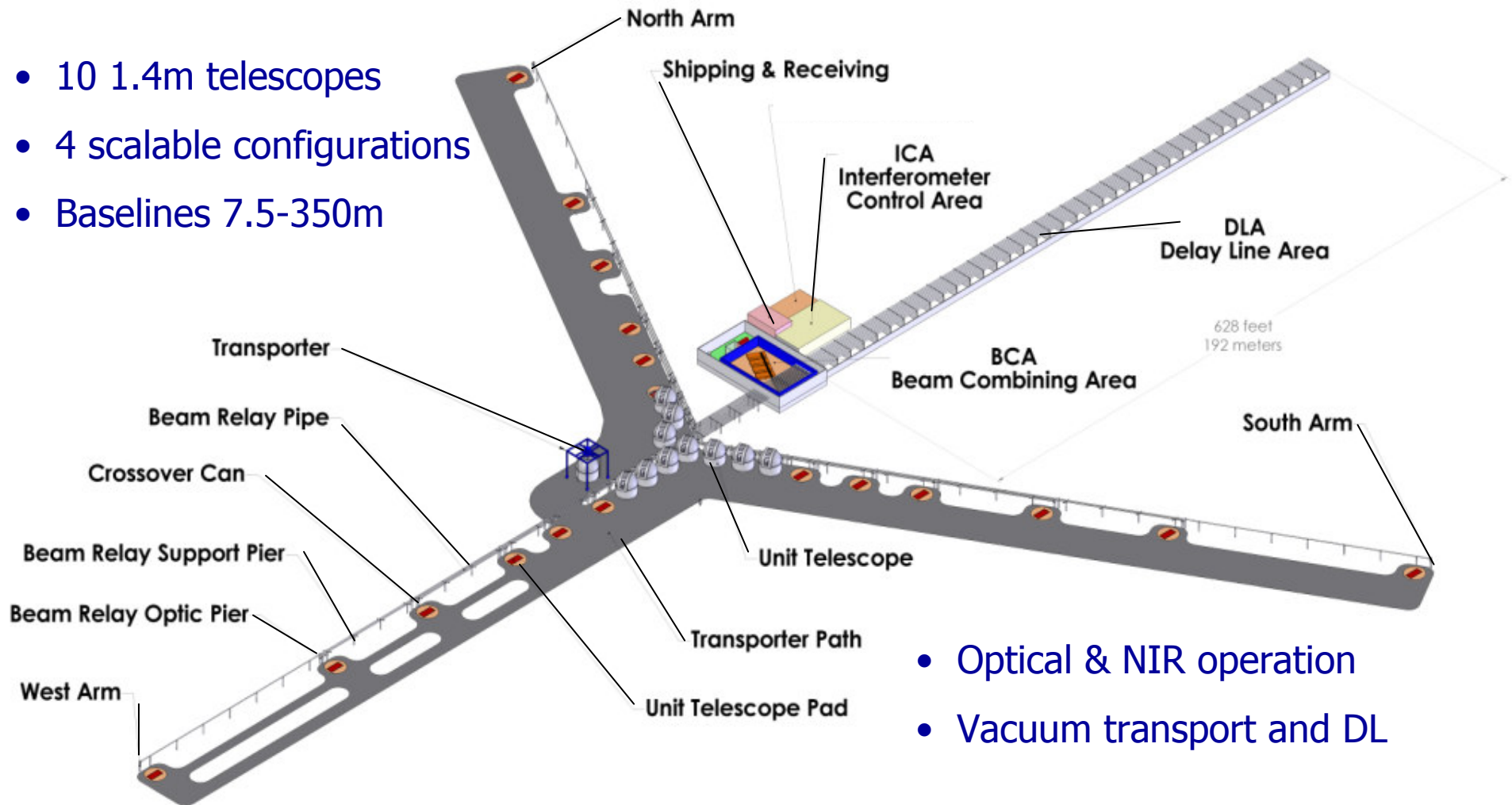


The MROI site at 10,500ft is nearly ideal for an interferometer

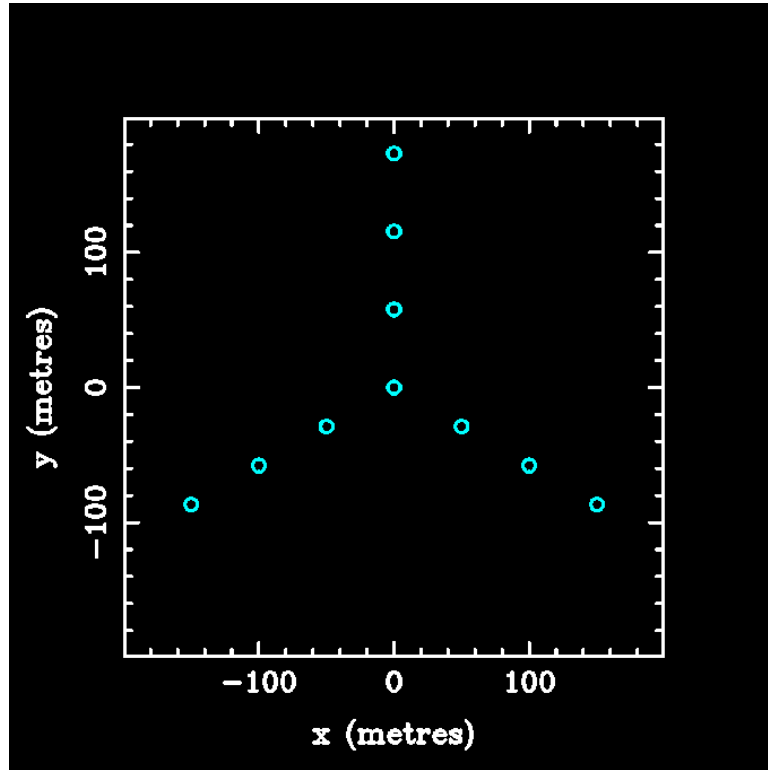


# The MRO Interferometer is optimized for imaging and sensitivity

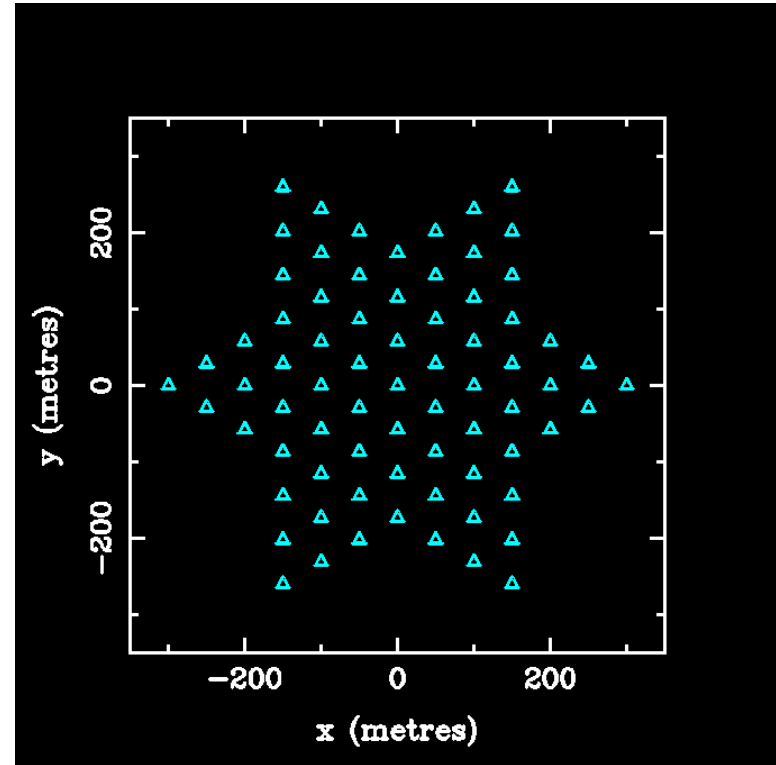
- 10 1.4m telescopes
- 4 scalable configurations
- Baselines 7.5-350m



# With 10 relocatable telescopes, MROI will have unequalled imaging capability

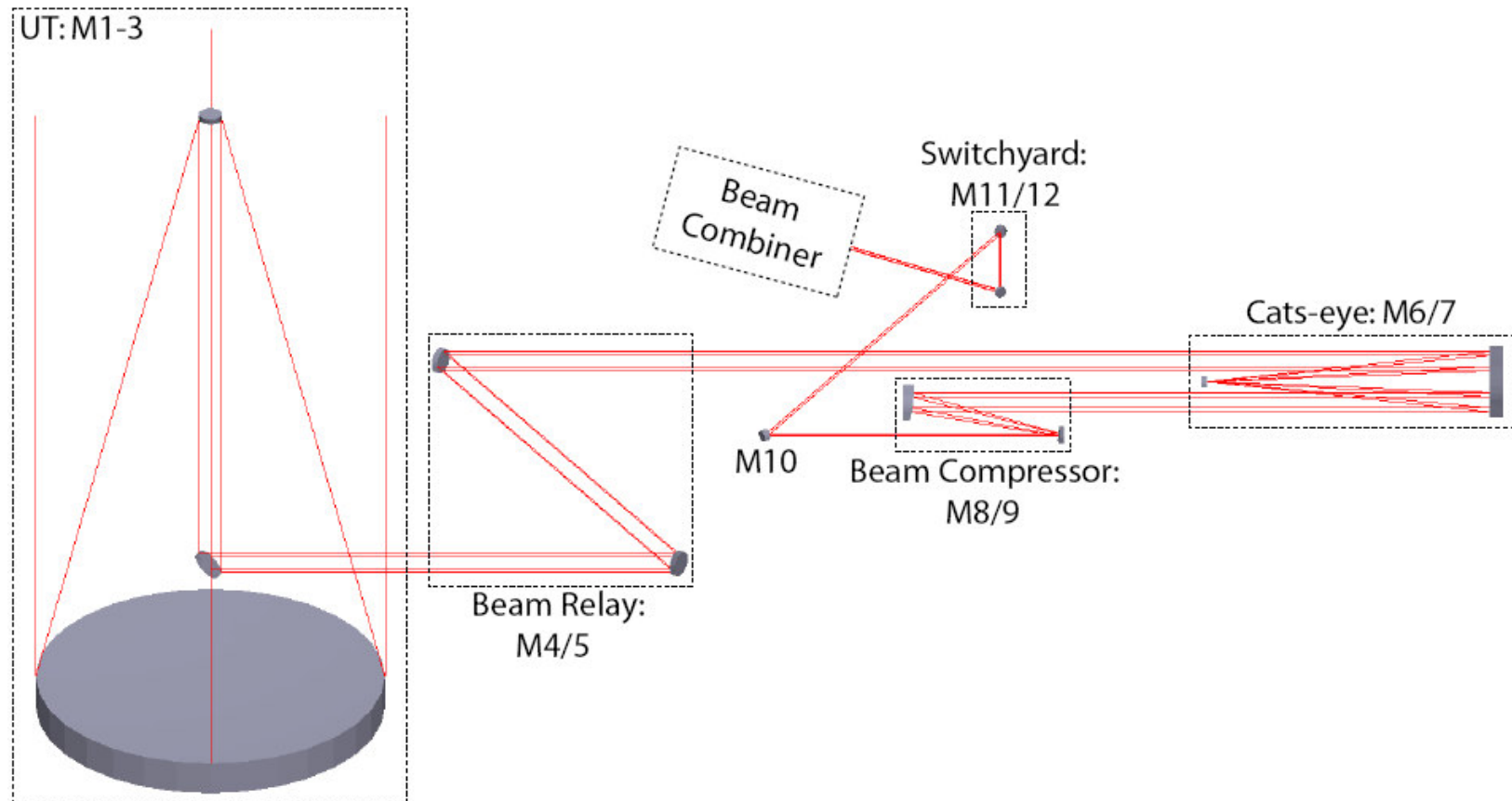


Array layout

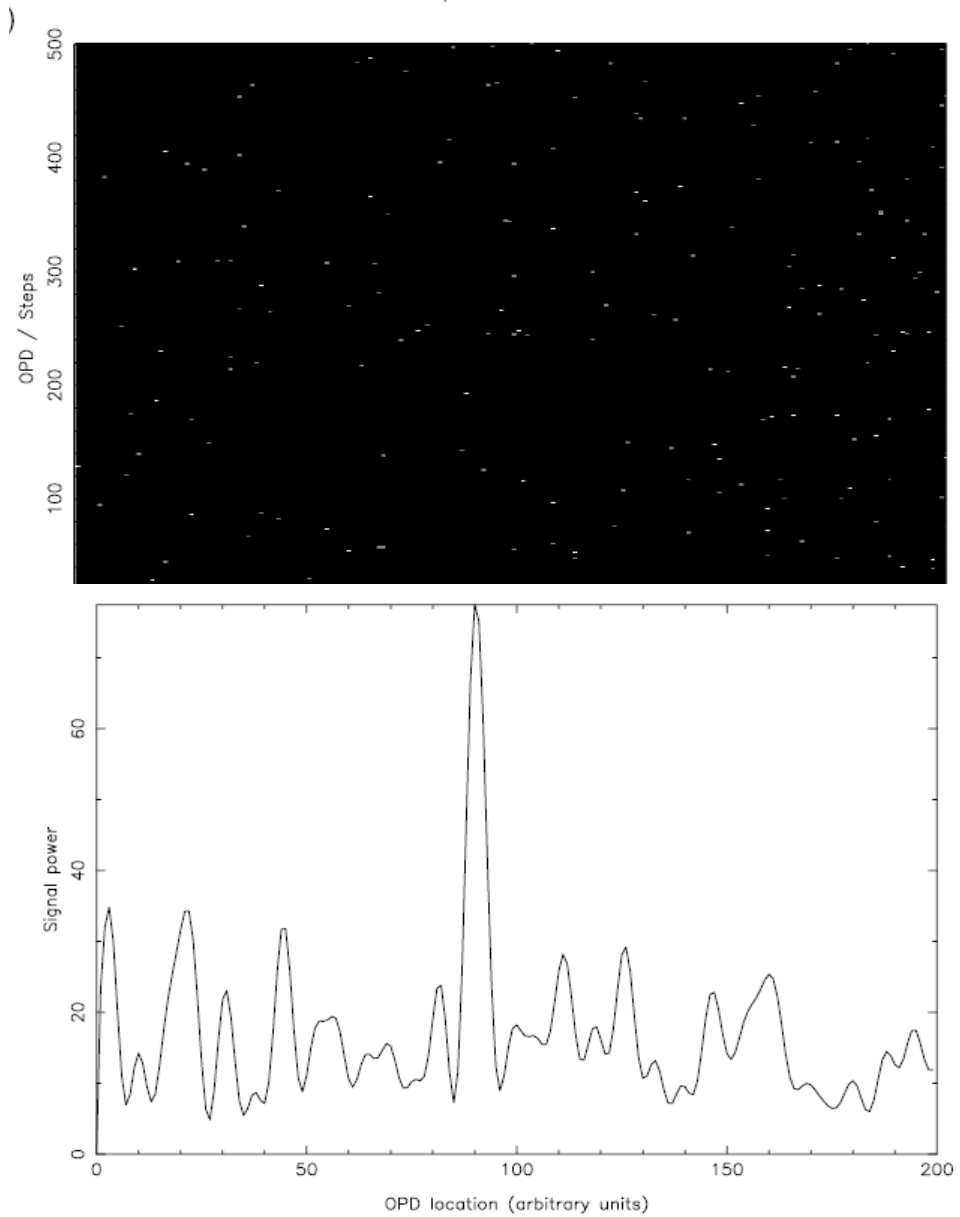


Instantaneous (u,v) coverage

# The beam train is optimized for maximum throughput



With group delay coherencing, it will be able to track fringes on 14<sup>th</sup> magnitude targets



# MROI Schedule and Team

- Team

- Manager – E. Bakker
- System Architects – D. Buscher & C. Haniff
- Scientist – M. Creech-Eakman
- Software – T. Coleman
- Controls – C. Parameswariah
- DL – M. Fisher et al.
- Beam Combiners – J. Young
- Alignment System & Optical Designs – C. Jurgenson
- Site Characterization – D. Klinglesmith

- Schedule

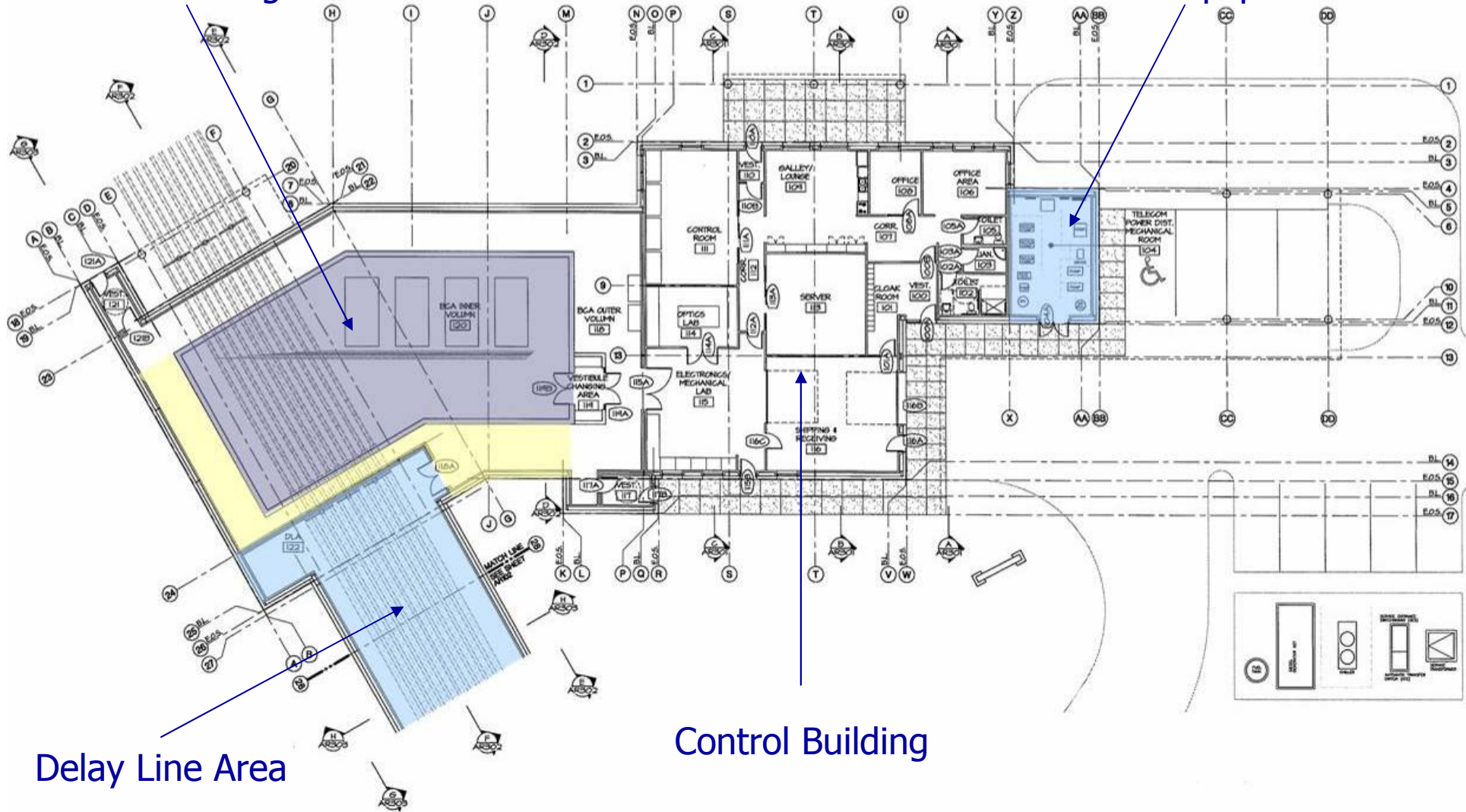
- Buildings and infrastructure – Aug '06-Aug '07
- Telescopes – Oct '07-Nov '09
- DL Carts – Oct '07
- NIR Arrays – Feb '08
- First closure phase – Aug '08
- Commissioning thru Sept '10
- Shared-risk science begins



# Notice to Proceed on the interferometer buildings was issued August 4<sup>th</sup>

Beam Combining Area

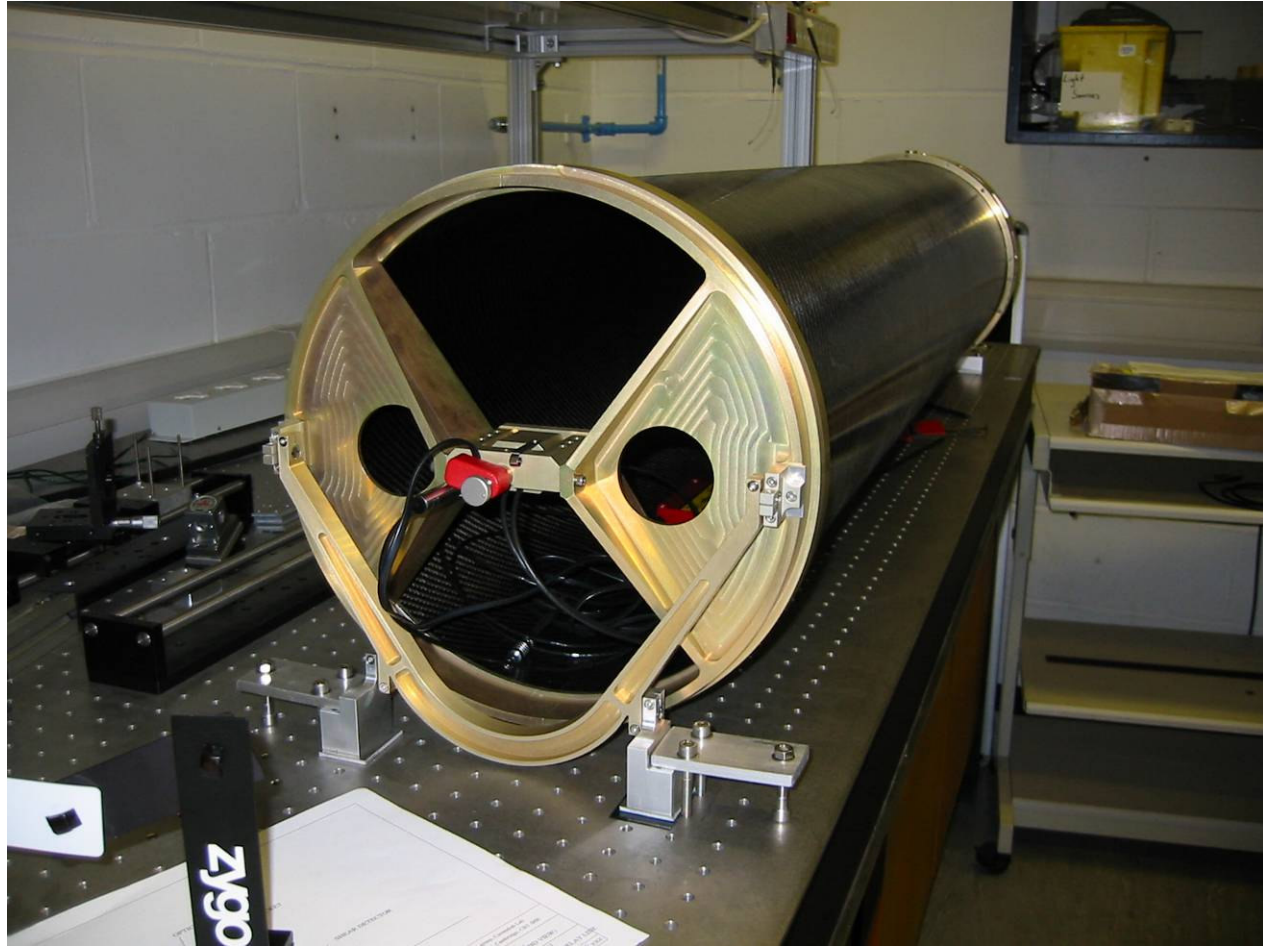
Mechanical Equip. Room



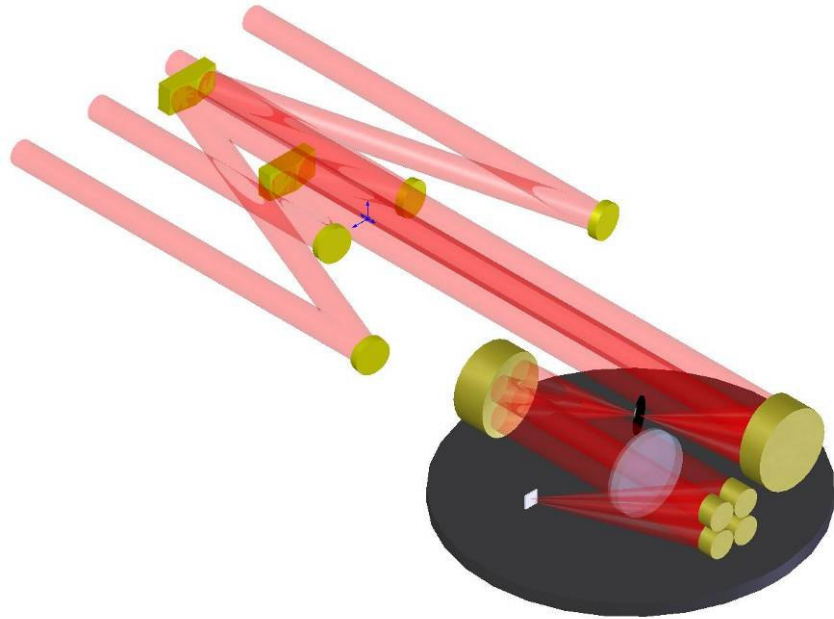
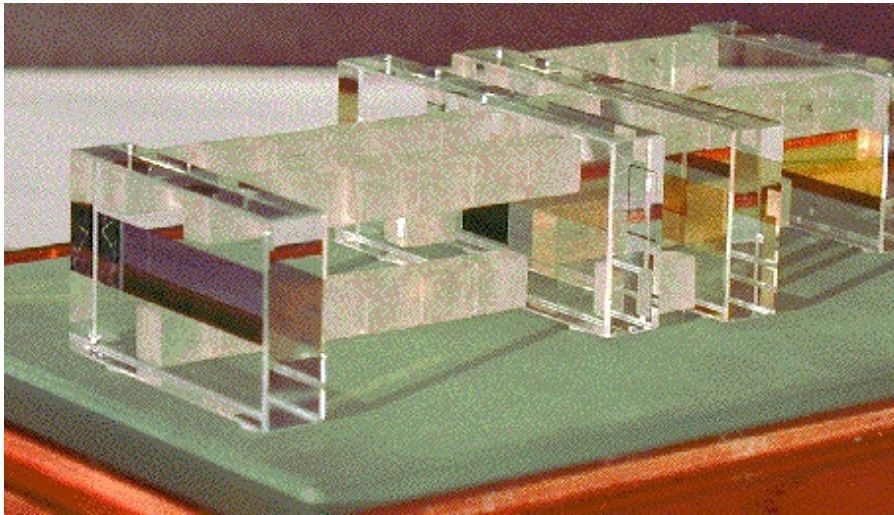
Delay Line Area

Control Building

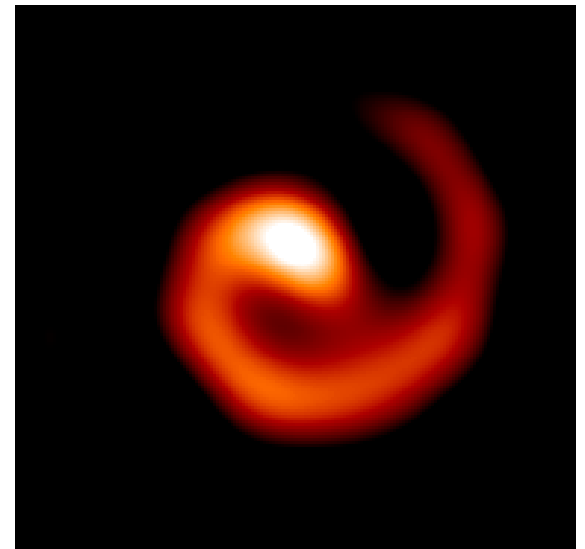
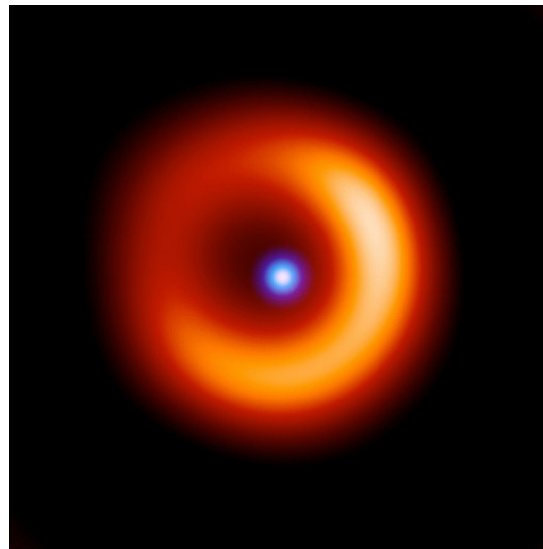
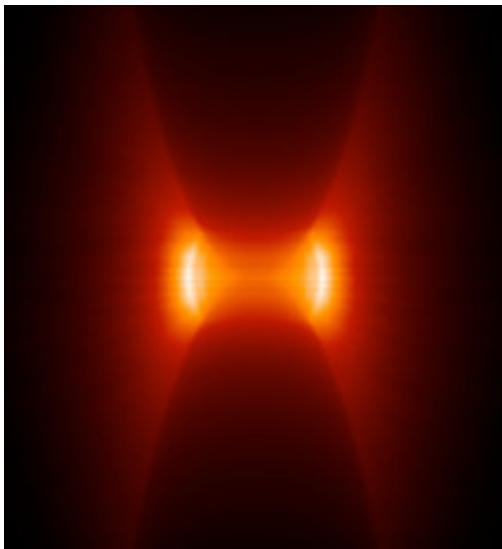
# The first delay line prototype is under construction in Cambridge



# The Beam Combiner downselect is due in November



# The MROI design is focused on 3 key Science Missions

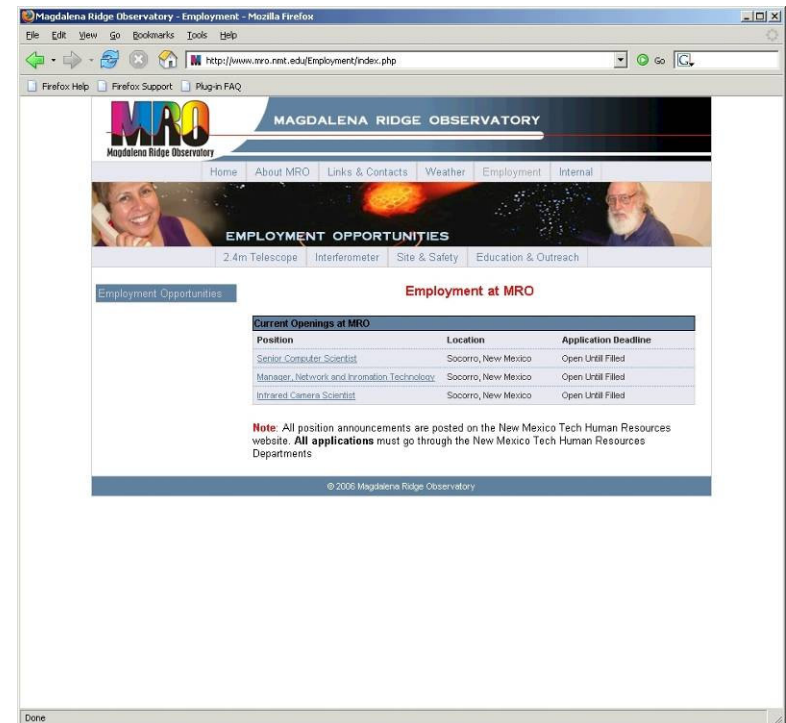


MROI can (in theory) obtain  $\sim 10\text{cm}$  spatial resolution on GEO satellites



# Open Positions

- Lead Opto-Mechanical Engineer
- Mechanical Engineer
- Instrument scientist
- Programmers
- Postdocs and students
- <http://www.mro.nmt.edu>



The screenshot shows a Mozilla Firefox browser window displaying the Magdalena Ridge Observatory website. The page features a navigation menu with links for Home, About MRO, Links & Contacts, Weather, Employment, and Internal. Below the navigation is a banner for 'EMPLOYMENT OPPORTUNITIES' with sub-links for 2.4m Telescope, Interferometer, Site & Safety, and Education & Outreach. The main content area is titled 'Employment at MRO' and contains a table of current openings.

Position	Location	Application Deadline
Senior Computer Scientist	Socorro, New Mexico	Open Until Filled
Manager, Network and Information Technology	Socorro, New Mexico	Open Until Filled
Infrared Camera Scientist	Socorro, New Mexico	Open Until Filled

**Note:** All position announcements are posted on the New Mexico Tech Human Resources website. **All applications** must go through the New Mexico Tech Human Resources Departments.

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