Long Range Plans, CHARA++

Gerard van Belle
Lowell Observatory

Long-running affiliate of the array and official meeting rabble rouser

What will be the status of CHARA in 20 years?

2034: The Landscape

- JWST will have flown *and will be done*
- At least one ELT will be operational
- LSST will be operational
  - No bright star data from LSST
- TESS & PLATO will have found many short-period planets around bright stars
- Gaia
  - Bright star data (V<10) will be – at best – questionable
- The field of comparative exoplanetology will be clamoring for data on bright stars
  - and for surface maps
- VLTI: ?
- MROI: ???
- NPOI
  - Operating and upgraded

Possible Futures for CHARA?

- The same old same old?
- Closed?
- Upgraded?
  - AO
  - New combiners
  - New apertures
  - Additional delay lines
- *Which of these models is the most viable?*

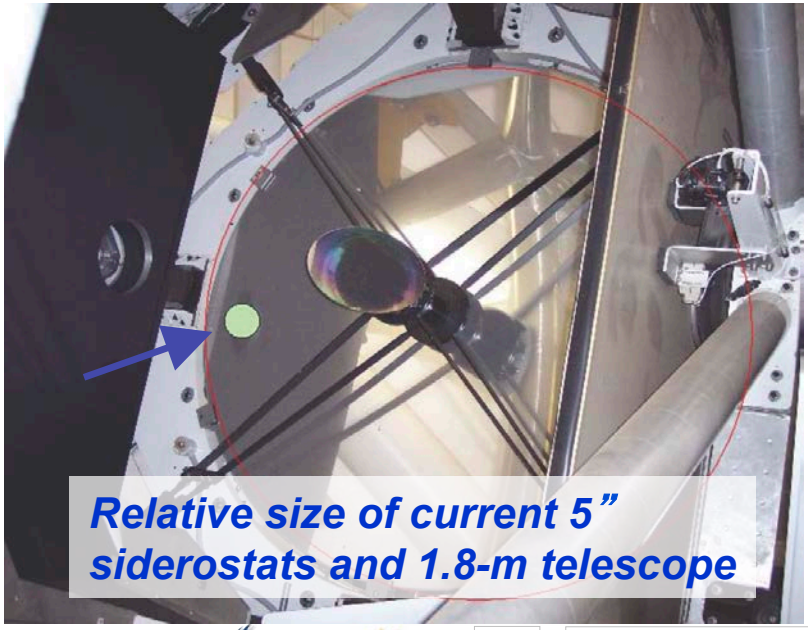
Transformative Technologies?

- Beam combiners
  - Integrated optics?
  - New detectors?
- Adaptive optics
- 3D printing
- Large, cheap apertures

A Discussion Example: Large, Cheap Apertures

NPOI Upgrade

- 12-cm → 1.8-m : factor of 200×
- Similar improvement for CHARA?
  - 1-m → 14-m [!]



Relative size of current 5" siderostats and 1.8-m telescope

More Exotic options

- Carbon fiber telescopes
- 'Light bucket' mirrors
- Membrane mirrors

- *We need to not be requirements queens*
  - Our telescopes need only work on-axis

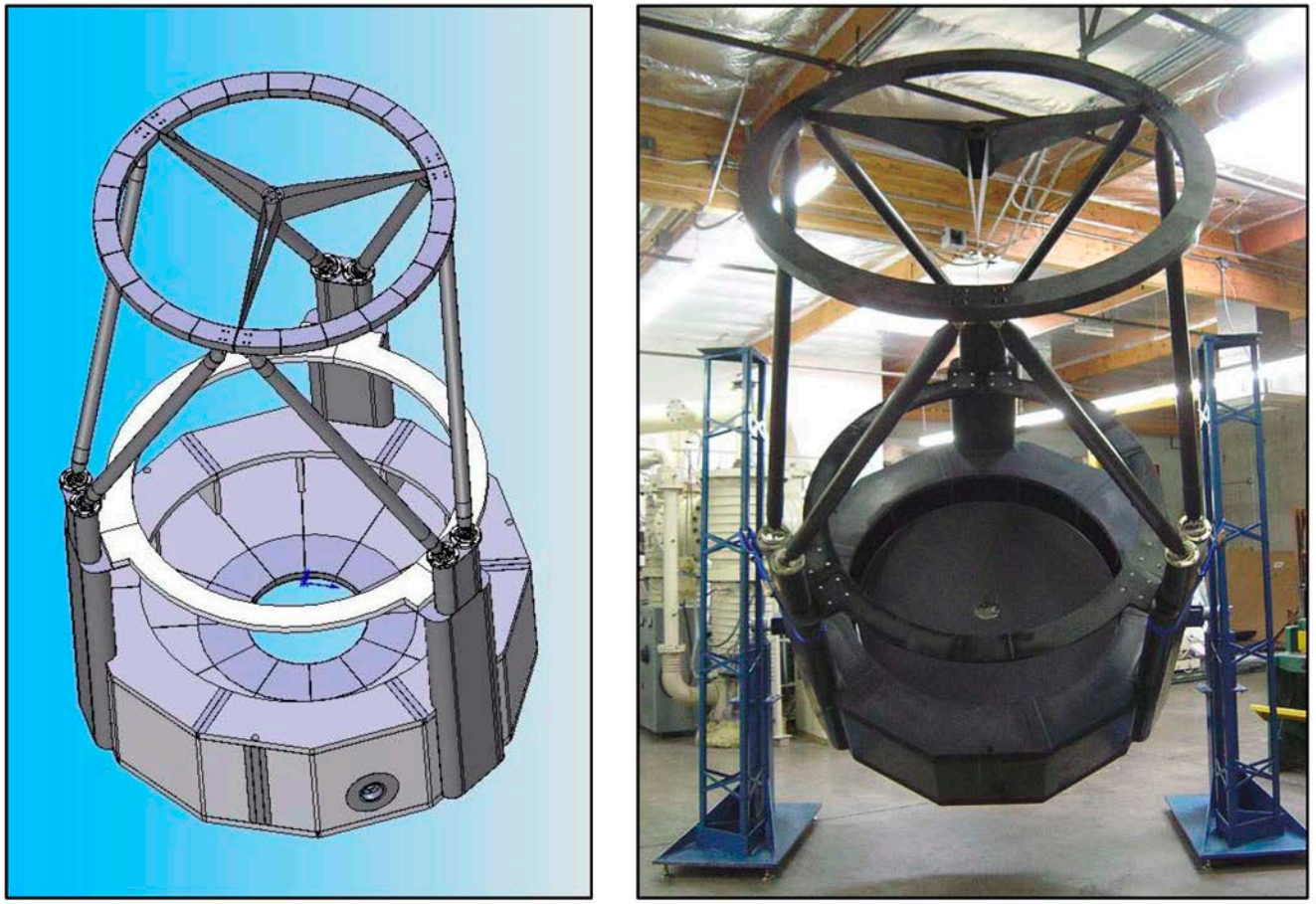


Figure 12 (Left) 3-D design of the NPOI 1.4m Cassegrain telescope (Right) Assembled NPOI Telescope shown in assembly structure at CMA. Complete OTA weight is 115 kg. The telescope is being painted and optics will be completed the end of 2007.

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The Lost Lesson of Hubble

A really incorrect mirror

– *if smooth* –

can be fixed after the fact

SWOT

- Strengths
- Weaknesses
- Opportunities
- Threats

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- S+W: Internal to organization
- O+T: External

- S+O: Invest
- O+W: Decide
- S+T: Defense
- T+W: Damage control

1-2-3

- One: What is the one thing that defines success for CHARA?
- Two: What are the two things that CHARA must do?
- Three: What are the three things CHARA is going to stop doing (or not start)?

What is your h-index?

Planning for the Long Term

- Identify science goals
- Identify context
  - Available dollars, other resources
  - Competition, collaborators
- Make the destination match
  - In particular, the technical design, the eventual organization