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“VLBI2010 Antenna Specifications”

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VLBI2010 Antenna Specs

Diameter: 12m or larger

- **Multiple antenna decision points** (Note that these may change since there is significant dependence on assumptions of average slew time, average integration time, antenna/positioner cost, costs for feed, receiver, cables, etc):
    - Instead of >=16 m single antenna use two 12 m
    - Instead of >=20 m single antenna use three 12 m
    - Instead of >=24 m single antenna use four 12m

Surface accuracy: rms departure from parabaloid = less than or equal to 0.1 lambda at 36 GHz

Broadband frequency range: 2-18 GHz desired; 2-15 GHz required (antenna, sub-reflector, feed, LNA, IF processing)

Optics: To be determined (TBD)

- Brian will be responsible for specifying this
- Ruediger will enquire whether the Kildal feed opening angle can be changed.

Pointing accuracy: 0.1 beamwidth at 36 GHz

Slew time: max 30 s to _ beamwidth at 36 GHz

- Wolfgang will investigate this
- is _ beamwidth good enough (since we may only be on source for a few seconds) ?
- Choice of positioner configuration is up to the designer
- Needs to withstand nearly continuous operation with >2500 long slews per day
- MTBF for motors and gear boxes, at least 2 year.
- Replacement and maintenance of motors and gear boxes needs to be convenient and inexpensive

Capable of robust automated (remote or programmed) operation:

Stability of the reference point: The structure needs to be reproducible to the extent that a model for the reference point can be generated that depends only on temp and elevation angle and is accurate to 0.5 mm (or 0.1 mm?).

- Will invar rods be needed?
- Will tilt meters be needed?
- Possibly discuss with the manufacturer the possibility of installing special sensors to monitor at the 0.1 mm level?

Wind speed spec: TBD

- Who will be responsible for specifying this?
- Spec for full performance (e.g. surface accuracy, pointing, slew time, stability of the reference point)
- Spec before stow
- Spec for survival
- Need to look at wind conditions at candidate sites and decide how much lost observing can be tolerated, possibly refer to Dave DeBoer ATA memo on conditions at Hat Creek
- Is a radome a cost effective solution?

Temp range: -40 C to +40 C

Tie to the external reference point: TBD

- who will be responsible for specifying this?

- Will the intersection of axes need to be accessible?
- At the minimum, the manufacturer should provide a set of point that are accessible and that can provide a direct relation to the ref point.

Foundation:

- antenna base: flange