

AGW Specifications for MODS

Probe mirror:

Field range: Center field to 6 arc minutes
Focus range: 25 mm
To accommodate field curvature, and maintain fixed image location guide and wave-front sensing optics.

Guider:

Detector: Steward CCD cameras
512×1024 frame transfer
15 μm pixels
size 7.68 mm × 7.68
Guide Field: 1 × 1 arc-minute or (0.9 × 0.9 see option 3 below)
Guide camera operating f/ratio 3.2
Reduction factor: 4.688:1 for 1 × 1 arc minute field
Image scale: 0.13 mm per arc-second
0.12 arc-seconds per pixel

There are 3 options for the guider:

1. A lens inside the focus of the LBT to reduce the field at the detector. This is the Potsdam approach and is ruled out by the probe mirror location being much closer to the Gregorian focus.
2. A collimator/camera focal reduction system reduction system.
3. A field lens near the focal plane followed by an enlarger of macro lens.

Option 2 can be met with a 35 mm focal length camera lens at f/3.2 and a collimator with a focal length of 164 mm. The overall length of the system will be approximately 370 mm.

Option 3 could use a Schnieder f/2.8 enlarging lens with a focal length of 50 mm. This will require the guide field to be reduced to 0.9 arcminutes square in order to avoid vignetting of the guide field with an oversize pupil. The field lens focal length will be 261 mm and the overall length of the system will be approximately 315 mm.

Wave-front sensor:

Detector:	Steward cameras 512 × 1024 frame transfer 15 μm pixels
Chief ray angle at 5 arc-min:	0.752 deg.
Collimator focal length	90 mm
Pupil size	6 mm This is the largest pupil size able to accommodate the pupil shift with field angle due to non-telecentricity
Pupil displacement @ 6 arcmin:	1.18 mm
Number of microlenses across pupil image:	12
Microlens pitch:	0.5 mm
Separation of SH images on detector:	5 arcsec
Microlens focal length:	15 mm
Image scale:	0.15 arcsec per pixel

This requires a different microlens array than used by the Magellan project (They used a larger CCD hence a larger pupil permitting a longer focal length for the lenslets). If a 30 mm focal length lenslet array is used the spot separation will only be 2.5 arcsec. This could be a problem in bad seeing.

Comparison of Potsdam and OSU proposed microlens arrays:

	OSU	Potsdam
Number of sub-pupils	12 × 12	12 × 12
Image scale	0.15"/ pix	0.26"/ pix
Sub pupil diameter	0.5 mm	0.156 mm
Focal length of lenslets	15 mm.	2.64 mm.
Image separation	5"	3.1"