

NGAO LGS WFS Preliminary Design Risk Register

11/21/09 version 1 R. Dekany

NGAO LGS WFS Risk Register

RISK ID	Type	Risk Description	Consequences	Likelihood	Severity	Overall Assessment (L x S)	Mitigation	Comments, Notes, and Supporting Documents Links
1	Procurement	Baseline LGS WFS CCD's unavailable	Design mods necessary, but little schedule slip is change made by downselect date; move to 240 x 240 array could impact RTC design and AO Control design	4	2	8	We have baselined a 256 x 256 pixel MIT/LL CCD-56 derivative chip for NGAO LGS WFS. If necessary, we can fall back to an MPI/HLL pnCCD (264 x 264) or consider an E2V CCD220 (240 x 240) L3CCD. Possible upslope to ESO Large Visible AO WFS Detector (1680 x 1680), if available, could simplify the Fixed Asterism LGS WFS design.	http://www.eso.org/sci/meetings/dfa2009/Presentations/Downing_AOWFS_DFA2009-3.ppt
2	Procurement	Downselected LGS WFS CCD's are late	Project delay and increased costs	2	3	6	We will make our detector downselect with sufficient lead time to allow for appropriate schedule slack.	None.
3	Optical	One-year transmission spec failed due to large coating degradation	Reduced NGAO correction performance	3	3	9	We will consider witness tests of alternative vendors Na D2-optimized coatings to determine best longevity	http://www.oir.caltech.edu/wiki/oir/bin/view/Keck/NGAO/FlowdownSummary
4	Optical	Fratricide found to have unexpectedly adverse performance consequences	Reduced NGAO correction performance and/or increase in cost of LGSF Laser subsystem; possible loss of observing efficiency if fluctuations in Rayleigh scatter require overly frequent WFS sky subtraction	3	4	12	We will perform detailed scattered light analysis and physical optics modeling of fratricide in the detailed design phase.	KAON 490
5	Mechanical	Flexure and thermal stability of LGS WFS found unacceptable	Rework of design and fab with increased project costs	2	3	6	We will perform FEA and thermal modeling in the Detailed Design phase to estimate expected variations and iterate design to meet specs.	None.
6	Mechanical	Patrolling WFS OSM shown unreliable or unstable	Rework of design and fab with increased project costs	2	4	8	We will look to prototype an OSM unit (design shared with LO WFS) early in the detailed design phase.	KAON 562 KAON 565
7	System	Differential WFS focus calibration proven difficult to implement	Each Fixed Asterism LGS WFS has additional focus term error, which may degrade tomographic reconstruction; Patrolling WFS focus errors may degrade LO WFS NGS sharpening, resulting in higher science path tip-tilt errors	3	2	6	Individual focus stages can be reintroduced to the design if a detailed look at the calibration procedure reveals it to be necessary	KAON 692
8	System	Open-loop MOAO correction limited by poor calibration of LGS WFS	Reduced NGAO correction performance	3	3	9	Monitor progress with VILLAGES to determine experimental limits imposed by WFS non-linearity.	None.

Likelihood of Occurrence

Level	Definition
5	Very High > 70%, almost certain
4	High > 50%, more likely than not
3	Moderate > 30%, significant likelihood
2	Low > 1%, unlikely
1	Very Low < 1%, very unlikely

Severity of Occurrence

Level	Performance Risk Definition
5	Project Failure
4	Significant reduction in science return
3	Moderate reduction in science return
2	Small reduction in science return
1	Minimal or no impact to science return

