

100402 NGAO LO WFS mini-review Minutes

- ☐ OSM reuse
 - ☒ Action (Rich): Clarify design responsibilities explicitly. Who will ensure that the OSM design meets both LGS and LO requirements?
 - ☐ Reni: This presentation is missing discussion of the precision of motors, ranges, etc. How do we know the motors will meet
- ☐ Overview slide
 - ☒ Action (Kent): We'll want an overview slide of the TTFA design, as well (this might already be later in the presentation)
 - ☐ Sean: The current design precludes K-band operation
 - ☐ Kent: If we need to include K-band, we would use the TTFA design, which includes a real pupil, which could act as a Lyot stop
 - ☐ Rich: We don't want to suffer transmission losses at this point.
 - ☐ Don: Currently K doesn't get to the LOWFS, necessarily. If we change the design, we'll have to redesign for K.
- ☒ Action (Rich): Prepare slide showing the LO WFS performance with and without inclusion of the K-band
- ☐ Performance predictions missing from this presentation
 - ☐ Sean: there is obviously missing from this presentation any discussion of the actual performance achieved by the LO WFS
 - ☐ Rich: Yes, I intend to cover this topic at the performance mini-review on 4/8/10
 - ☐ Sean: For the PDR, you should be sure to flow from the required performance to the specifications on the LO WFS, and then show in the LO WFS design section, that it meets these requirements.
- ☐ TWFS pickoff location
 - ☐ Peter: Where is the TWFS beam picked off?
 - ☐ Kent: In the collimated space before the pupil forming lens after the OSM
 - ☐ Peter: Before the DM? Why?
 - ☐ Rich: We documented this in a KAON. I'll look it up.
 - ☒ Kent (Action): Include a mention of the rationale of this design choice in the LO WFS PD design KAON
- ☐ Optics in the dewar
 - ☐ Don: Is the dewar window powered?
 - ☒ Kent (Action): Ensure answer to this issue is clear in the design memo.
- ☐ J+H filter design
 - ☐ Peter: Rich, did you ever look at the Y-band performance benefit
 - ☐ Rich: Only a quick look. It doesn't seem dramatically compelling, but would be useful in good seeing. Note, we've never included inter-band background in our performance estimates. Kent's radiometry calcs are helping update this in the model
 - ☒ Rich and Kent (Action): Update the performance model for KAON 716 (might be in a revision to KAON 716, depending on time available.)
- ☒ MGS calibration
 - ☒ Kent (action): need to confirm the LO WFS can be put into diversity (e.g. out of focus) without vignetting the beam - need .zmx check of this: one approach is to use the defocus stage of each LO WFS
- ☐ Cryostat Design

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- ☐ Sean: slide 14 has notational issue 'H2RG' not 'HW2RG'
- ☒ Randy (Action): update slide for PDR slide set
- ☐ Don: could you design the cryostat mount to enable easy installation of a 'good quadrant', such as an offset
- ☐ Kent: Well, these H2RG's fail in lots of different ways, its hard to predict
- ☐ Randy: We assume we can offset the dewar slightly once we know the detector
- ☐ Don: Keep in mind you have to maintain your phase diversity capability
- ☐ Kent: So, the question 'are we centered on the array?' opens a lot of discussion of the detectors - I would like a science grade, despite the costs, because it simplifies a lot of other issues (not just mounting, but also the calibration problems, stability, cabling, etc.)
- ☐ Peter: Please put these pros and cons together into your analysis
- ☒ Kent (Action): Update design document to list arguments for and against a science grade H2RG (help justify the cost of this).
- ☐ Detector operating temperature
 - ☐ Sean: Keep in mind that for some sub-optimal detectors, you may need to go colder than 93C to meet your requirements, so your choices of detector and cooling system (Polycold PCC) may be coupled.
- ☒ Polycold cooler
 - ☒ Kent (Action): Please provide Sean the source of the slide with the comparison of the vibration of the cryotiger vs. split sterling cooler, etc. (the yellow backgrounded chart on slide 19)
 - ☐ Don: Can you translate this into motion (from acceleration?)
 - ☐ Rich: We're using this at PTF in a fast beam (but seeing-limited)
 - ☐ Peter: Rich, what is the tolerance on detector position for PTF?
 - ☐ Rich: Good point, here the spec is milliarcsecond or lower, we need to look at this.
 - ☒ Kent (Action): Work with Rich to confirm the lateral vibration induced by the cooler meets the requirement
 - ☐ Sean: I disagree with the volume of zeolite in the dewar; also there's no way of removing to bake it out
 - ☐ Kent: We deliberately want this dewar to be minimal maintenance - seal it up and don't open it.
 - ☐ Sean: My concern is that your zeolite will never give up the water it absorbs upon a few cooldown
 - ☐ Sean: You can calculate these volumes to provide enough margin
 - ☒ Kent (Action): Provide details on the margin in the design. (Criterion is to demonstrate the 'no-maintenance' design will actually work.)
- ☒ Temperature controller
 - ☐ Sean: Lakeshore is our standard at Keck (maybe the 340 model...)
 - ☒ Randy (Action): Update presentation slides for a Lakeshore for PDR (assuming cost isn't a differentiator)
 - ☐ Sean: Remember to put two sensors on the detector, for redundancy
 - ☒ Randy (Action): adopt two sensors for the detector
- ☒ Getter location
 - ☐ Sean: You want the zeolite to be at the coldest spot, there, with enough volume, and you might meet your maintenance-free goal
 - ☒ Randy (Action): revise location of this getter (RD note: I'm not sure which getter unit this discussion was pertaining to.)
- ☒ Array mounting
 - ☐ Sean: Have you checked the max current and heat in the heater wire, to know it couldn't melt the insulation?

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- ☒ Randy (Action): check this and document
- ☐ Pump connector
- ☐ Sean: Keck usually uses KF-25, your choice just needs an adapter
- ☐ No pressure sensor
- ☐ Kent: Do intend to run without a pressure sensor - our experience is that one spends more time maintaining such a sensor than maintaining the dewar. We'll use our temperature sensors and external line monitoring for leaks.
- ☐ Peter: In general, for the DD phase, we'll need to develop maintenance procedures for these dewars (as well as anything else)
- ☒ Optomechanical
 - ☐ Kevin: Now that we have 3 stages for the 3 channels, what protects you from accidentally driving them into each other (e.g. their 'separate focal plane' philosophy is now broken)
 - ☐ Peter: Will all this protection be in software?
 - ☐ Randy: Well, perhaps if the LOWFS motions are small (need to know this number definitively), we might be able to limit it physically
 - ☒ Randy (Action): (With Alex?) Think of ways to protecting against collision, even if the software faults
 - ☐ Peter: Is the choice of commercial mounts for the optics best? Think about the thermal change to -15C, as well as transportation issues getting to the summit.
- ☒ Electronics Design
 - ☒ Kent (Action): 'Hawaii with Leach' figure is blurry. For any future version of this slide, use sharper quality graphic