

## **System Architecture Meeting Minutes July 25, 2007**

- ☐ Brian's Homework
  - ☐ Hasn't yet started this homework, catching up on non-NGAO projects following the week-long retreat
  - ☐ Rich wondered whether the narrow field relay from "Split Relay", which got written down as 20" FoV, or the one from "Cascaded Relay", which was written down as 30" should rule
  - ☐ Question was put to Claire whether we needed 20 or 30 arcsec?
  - ☐ Rich mentioned high surface counts for Cascaded Relay, and so recommended to Brian to look at a design where each relay (1 and 2) consists of reflective elements (e.g. OAP's)
- ☐ Rich's Homework
  - ☐ Transmission / Background Performance Budget
    - ☐ Upon his return Rich caught up on other projects, then Antonin went to on an LGS run at Palomar
    - ☐ So not yet done - Antonin returns from the LGS run on 7/30
  - ☐ Summary KAON
    - ☐ Rich has circulated a draft of a KAON (started by Anna and Liz) describing the system architecture development process (through the July 9-13, 2007 retreat (TM#8))
  - ☐ Comments
    - ☐ Rich - Viswa has agreed to redraw a consistent schematic for each of the five architectures: will be put into the KAON when ready (probably to replace the Retreat schematics).
- ☐ Don's Homework
  - ☐ Short report confirming that SplitRelay achieves LOWFS performance requirements at the instruments
    - ☐ Don - I'll be deferring to the experts; I've sent a note to Chris Lockwood and Brian Bauman describing what I think needs to be done. We need to get together for an hour and go through the detail. Will hopefully be arranged in a couple days
  - ☐ BMC mirror cost
    - ☐ Don - I sent a note to BMC asking for ROM of a replication of the GPI mirror (4k mirror) as well as a 1k mirror.
      - ☐ Mirror Mounting
        - ☐ 4K mirror has a special mount
        - ☐ 1K mirror inserts into a ZIF socket
        - ☐ It will depend on whether he want the mirror(s) put onto a fast tip/tilt stage
    - ☐ Next generation of electronics drivers
      - ☐ We have a fixed price quote, good for 3 years, so we have a good idea of the cost of this subsystem
  - ☐ Xinetics mirror cost
    - ☐ Chris has supplied a cost estimate of 'catalog' prices for a 1K mirror - many thanks
    - ☐ Rich - we still want a ROM quote on a 4K mirror; Don - yes, will do. I'll also contact CILAS for the same information from them (1K and 4K mirrors)
      - ☐ Rich - are we asking these companies of something specific (e.g. specify a pitch), or are we asking for them to respond to cost effective solutions to our need?
        - ☐ Don - if we want to go through a longer process, we could be more specific, or we could just ask what already built mirror have costed

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- ☐ Rich - for purposes of architecture discrimination, let's just try to get previously built costs - we'll have time for minimizing costs through design choices once we adopt a baseline architecture
- ☐ Anna's Homework
  - ☐ Complete OSM pickoff trade study according to 7/27
    - ☐ Anna - the retreat really helped me put the OSM study into the proper context. It seems that to do all of what we want, there may need to be combination of different approaches. I'm running behind, need another week
    - ☐ Rich - please tell us of any large discriminators by Friday - even a couple sentence email; otherwise, take the extra week and deliver on 8/3
- ☐ Chris' Homework
  - ☐ Working on a write up, probably early next week (not 7/27)
  - ☐ Chris - I don't think there are going to be strong discriminators, aside from issues of whether Large Relay will fit on the platform.
    - ☐ Don - Can't you just patch up the polarization after NGAO, using some special box that just converted the output to the state you want?
    - ☐ Chris - I asked Gene Serabyn just this a while back - there was no magic solution that emerged from those preliminary discussions
    - ☐ Don - At the retreat, we were somewhat unsure of what to do (e.g. how to cost) the requirement of meeting KI requirements. We used \$4M to assume an entire separate AO system just for KI
      - ☐ Rich - where did the \$3M incremental cost for Large Relay and Cascaded Relay come from, since we assumed these could be folded to match the legacy AO system on the other telescope (this statement was confirmed in Don's notes.)
      - ☐ All - we don't know (e.g. we couldn't defend again the \$3M KI incremental cost for these relays; perhaps it was some attempt at quantifying the risk that it couldn't be done?)
      - ☐ Don - how important is it to actually match the polarization?
        - ☐ Chris - SNR is tied to visibility, so this matching is really important.
- ☐ Viswa's Homework
  - ☐ Document surface counts
    - ☐ Doing surface counts on an equal assumptions basis; homework is completed to the original scope
    - ☐ Now Rich has asked me to generate consistent schematics for each of the 5 candidates, which I'll proceed to do
    - ☐ There were a number of questions regarding Viswa's assumptions, the basic answer to which was 'all assumptions are documented in the report' (and they are).
      - ☐ Rich pointed out that if we take out the K-mirror from Cascaded Relay, we'd still need to feed multiple instruments on the output, probably upward looking to avoid gravity flexure, so at best we only save 2 surfaces, and perhaps with the addition cost of more exchangers to pull optics into and out of the beam (switchyard complexity)
      - ☐ Brian points out that to get ADC over a single band, we might get away with a single glass (e.g. trombone) solution, going down from 6 to 4 surfaces.
  - ☐ Brian suggested going on to calculate transmissions, not just surface counts
    - ☐ Viswa said he could do it, for more time - Rich approved
    - ☐ Rich asked Chris if there are measurements of the reflectivity of actual Keck AO surfaces, in the field
      - ☐ Chris said it depends on how long its been since cleaning, but he would dig around for numbers (they may be in Peter's head).

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- ☐ Anna - there is both dust and dirt, but also oxidation of coatings - that's hard to get around without sealing the space
- ☐ Brian - how long has it been since the Keck AO optics have been cleaned
- ☐ A bit later, Rich commented that to get the transmission yet more accurate, we'll need the actual transmission through dichroics, which may uncover unfeasible coating designs. We'll need to accelerate this once we converge on a baseline.
- ☐ Illustrated SolidWorks model for packaging of SplitRelay architecture
  - ☐ Viswa - I've made a simple model of the EI bearing and Nas platform, then talked to Anna about fitting in the instruments, but it wasn't sufficient. I then realized that Jim Bell has posted SolidWorks models of the bearing and platform for Indian Wells, so Jim is going to send me the files by Friday. So, I'll be a few days late, but I'll hopefully have a good model with which to assess the SplitRelay packaging issues.