

NGAO WBS 3.1.3 System Architecture Minutes

- ☐ Attended by: Dekany, Gavel, Neyman, Velur, Wizinowich by video; Bauman attempted to join by phone (but we weren't connected).
- ☐ System Architecture Homework (Assigned at Team Meeting #8, UCSC 7/13/07)
 - ☐ Need model to determine if split relay option fits (VV)
 - ☐ Done. Viswa has drafted a KAON describing the volume limits of DNIRI and LGS WFS package (**needs a KAON # from Peter**)
 - ☐ Largest change: LGS WFS pickoff and package needs to move downstream of DNIRI pickoff to fit (and because it has to rotate)
 - ☐ **Action: Viswa will complete this KAON and post by 8/28**
 - ☐ LOWFS achieve req'd tip/tilt error on science instrument
 - ☐ Done. Don and Brian wrote a memo (uncited) describing the challenges
 - ☐ **Action: Viswa will incorporate Don/Brian's informal memo into his SplitRelay packaging KAON by EOD 8/28**
 - ☐ CascadedRelay feasibility package (BB)
 - ☐ Done. Brian has produced a feasibly packaged design; now in hands of Jim Bell in order to produce a simple SolidWorks model
 - ☐ **Action: Don will write up CR optical relay package KAON by EOD 9/6**
 - ☐ Surface counts (VV)
 - ☐ Done. Viswa has posted a memo to the SysArch page.
 - ☐ **Action: Rich will add surface tables to KAON 499 by EOD 8/28 (along with nice new schematics) - Done 8/27.**
 - ☐ Interferometer optical needs met by design (CN)
 - ☐ Done. Chris has written a KAON
 - ☐ LargeRelay can replicate the optical path of 1st generation Keck 2 AO, so can support the interferometer directly
 - ☐ CascadedRelay 1st stage can in theory support K1 as well - packaging feasibility has not been shown
 - ☐ BB's CascadedRelay point design package does *not* do this
 - ☐ In general, led by Peter, we argued that we could bring Cascaded and Keck 2 into commonality for less \$ than the \$3M shown in the ranking matrix - suggests it could be reduced to \$1M? It's likely we won't need a separate AO system just to support K1, if we adopt the CascadedRelay baseline architecture
 - ☐ Could MEMS be significantly cheaper or more expensive?
 - ☐ Done. Don received updated quote from BMC for 64x64 MEMS DM (400 um pitch) in line with previous estimates (contact Don for details)
 - ☐ Confirm large DM cost for LargeRelay (DG)
 - ☐ Partly done. Don sent inquiries to CILAS and Xinetics; heard by from CILAS - answer was even higher than expected
 - ☐ More careful analysis of K1 upgrade engineering costs
 - ☐ Not yet finished. Peter detailed in KAON 502 the potential reuse savings for hardware - software hasn't been handled, but there *may* be some software reuse savings for any architecture
 - ☐ Action: None other than Don's previous cost exercise (above)
 - ☐ Convincing upgrade plan
 - ☐ Done. Peter produced KAON 500 detailing a number of steps that could be taken (the sequencing)
 - ☐ Conclusion: You can address the programatic concerns for K1 Upgrade by such techniques has building a full lab development system (and driving up the costs to be comparable to other architectures).
 - ☐ Early K1 Upgrades are a viable approach for any architecture.
 - ☐ There was discussion and general agreement that there may be elements of K1 that could be reused for any architecture
 - ☐ We will explicitly consider cost savings through K1 AO reuse of components
 - ☐ Need community demand for add'l benefits (SA)
 - ☐ Not done. Will not be relevant to architecture baseline at this point.
 - ☐ FRD's
 - ☐ Work is concentrating on Section 7 (AO) and Section (8) LGSF of the v0.1 FRD draft document
 - ☐ Chris N. has distributed a draft section of the FRD
 - ☐ **Action: Peter read draft section and provide feedback to Chris by EOD 8/27**
 - ☐ Risk Register
 - ☐ Chris has distributed a version of a new KAON based on his previous table
 - ☐ Action: Peter to provide feedback to Chris by EOD 8/27
 - ☐ KAON 499 - System Architecture Definition
 - ☐ Ranking Matrix
 - ☐ **Dekany to add summary of changes, possible with footnotes for cells by 8/28**
 - ☐ Cells b9, d14, f14
 - ☐ Cells f29-30 for K1 support costs
 - ☐ Cell e57 - Peter has a plan, including lab copy of instrument, but this would drive up cost of this option.
 - ☐ What is the LOWFS patrol FoV? Cell E70
 - ☐ **Done. KAON 504 concluded 180" diameter TFoV. Is a mark against Upgrade K1 architecture (since the rotator is limited to 120" diameter.)**
 - ☐ Is 30" relay adequate?
 - ☐ **Done. Was discussed by AOWG and seems okay in terms of science field of view**
 - ☐ Not as certain in terms of PSF patrol range, dither ranges, cost curves; not bigger due to anisoplanatism....
 - ☐ Decision of 30 over 20" seems to rely on Stellar Pops science case that hasn't been detailed, but some (e.g. Koo) thought bigger is better
 - ☐ **Action: Max to document in an appropriate format (ScRD vs. KAON?) by 8/30**
- ☐ Are there other (new, post retreat) concerns that would change our minds about the rankings?
 - ☐ Implementation options in face of uncertain fundraising
 - ☐ No change to rankings. We believe CascadedRelay has the most flexibility for flexible program phasing (modulo K1 upgrade at the very low funding levels)
 - ☐ Risk analysis
 - ☐ No significant difference compared to what we thought
 - ☐ Transmission calculations
 - ☐ Dekany commented that our more detailed analysis of transmission has raised questions regarding the differential increase in observing time and laser power required for CascadedRelay.
 - ☐ There followed some discussion about CascadedRelay saving surfaces in the HOWFS (e.g. no MEMS in HOWFS - reminder by Gavel). This is not captured in KAON 499, but is an offset to increasing laser power requirements.
 - ☐ CascadedRelay provides a huge improvement in DNIRI sensitivity from cooling
 - ☐ In the end, we acknowledge the transmission price to be paid for CascadedRelay (about 10% transmission, absolute to narrow-field instruments), but judge the sum of all benefits to outweigh this cost (which itself appears the greatest drawback of CascadedRelay).
- ☐ Other NGAO Work packages
 - ☐ Cost Estimates (activity partially outside of 3.1.3)
 - ☐ Don has been busy; will work on this one hard beginning tonight - considered his top priority
 - ☐ **Action: Don will draft a full cost estimate of the entire CascadedRelay by EOD 8/27**
 - ☐ **Don will add a new column (off to the right) that is the Keck 1 Upgrade cost by EOD 8/27**
 - ☐ Uplink AO trade study
 - ☐ Don's second priority
 - ☐ **Don will complete a draft of uplink AO TS by EOD 8/30**
 - ☐ SRD
 - ☐ Don has been pushing ahead with the SRD, has posted v13 to TWiki (on KAON's page v1.13 next to KAON 456)
 - ☐ Rich has some concern that SRD and FRD's move in parallel (generally shared)
 - ☐ **Action: Chris and Viswa should read SRD v13 by EOD 8/27; Chris to punchlist discrepancies and follow-up with Don**
- ☐ Finally, we all solemnly nodded our heads and....
 - ☐ We endorsed CascadedRelay as our baseline architecture (SplitRelay 2nd, with K1 upgrade always an option depending on funding.)
 - ☐ Dekany commented on the transparency and thoughtfulness of this process and was excited to pursue the new baseline in more detail
 - ☐ The system architecture team concurred unanimously and optimistically
- ☐ [Note: It was subsequently decided to hold one more WBS 3.1.3 telecon to wrap up outstanding 3.1.3 deliverables - tentatively 8/29/07 at 3pm PDT by video (please inform Rich of your whereabouts for the meeting.)