

SAM PDR comments

M. Boccas, 28 Sept 07

Raw notes taken during review, just polished the wording to make it understandable by others (I hope). My specific questions do not necessarily need to be addressed by team (it's just my in-depth understanding).

Logistics of review

No timed agenda delivered

Not very clear what documents to look at on web site (many appendices, many design notes)

Mapping of charges not explicit

Science

No enough science requirement and goals to answer question 1

Intro

Slide 3: what is EE (0.3")? is 0.3 field stop size?

PSF Strehl close to 1? How realistic even in a model

Slide 10: flux vs absorption? Not clear (to me)

Atmospheric diffraction not modeled: any impact on TCC and operation?

Fast shutter: critical item

No study of ringing effect in poor seeing?

JDSU laser is it warranted clearly at elevation, different gravity vectors, temperature gradients (or shock)?

Worth asking again about hygroscopic coating!

T control of laser box? Not clear.

Slide 21: not clear

SAM requirement document: TBD collimation of input beam

Jitter modelling missing

Test with accelerometers on M2 system

See Jitter due to M2 active control at Gemini

Room to do fast TT on M3 no obvious, significant redesign

Internal laser jitter: dependent of T or other parameters?

No obvious study of not needing fast TT for uplink?

Risks

Pockels cell spare, M2 spare, critical optics due to coatings

LGS WFS design review? Done? Or was it NGS?

Maintenance of laser if can't open it?

Survival of laser: critical element of project, no laser no LGS system hence need to understand durability, maintenance, servicing, replacement over the 10 years

Maintenance and exchange if fails?

Prototyping as risk mitigation: what systems will be prototype (vague)?

Safety

Can't explain eye damage clearly, must be clarified.

Slide 4: not clear what curve is what curve (Soar laser, vs regulation)

Scattered light: can be specular reflection in dome

Plane at low altitude?

Interlock with LLT cover?

Issue with dome out of sync?

Class I when embedded! Maybe a bit strong statement (can be poorly interpreted if not in context)

Warning light in dome (or before entering) is a must

LIS plan to presented and requires CDR

Laser lab testing in lab: safety plan, interlock to door (most risks in early use of laser!)

Optics

Design trade for central obscuration design not explained

Alignment: fluorescence of UV laser on exit window? Using paper, alignment invisible beam not clear, maybe seek info from other groups (astro or others)

How is the LLT alignment axis defined, watch out beam shift through M3 (toward collimator)

Autocollimator flat attachment on protective cover? Strong enough?

What is acquisition field for rough alignment with CCD on rail?

Overall too complicated and too demanding on scarce resources. Use electronic level then spiral search if needed and iterate shimming

Study effect of ghost in laser box window, or coating from other surface?

Summary transmission/throughput would be useful both uplink and downlink

Active focus correction? Yes, LUT required?

Fog on laser box window (temperature gradient, watch mounting)?

Polarization: not fully clear unless one goes in details or read design notes? Goal of 90% might be too optimistic, how does it affect the photon budget?

Dust: access for cleaning all optics anytime

Al mirror for beam dump mirror?

Beam dump after beam expander (coating less sensitive)

Fast TT on m4 is incompatible with LUT? (how is the offload done?)

Focus setup LLT M1-M2: what method is used?

Revision of error budget: done lately? Who is updating it and verifying all sub-systems impact on it?

Mechanics

Baffle to avoid beam depointing and fire? From example in M4 box or tube to LLT

No flammable materials? Watch out electrical wires (we burn some at Gemini)

M1 and M2 fab? Risks not clear?

Dust, friction, tolerance on alignment of 3 flexures: impact on M1 actuators accuracy and meeting the 0.5um.

Iris cover risky, reliable?

Laser box pressurized ?

Handle on LLT cylinder cover for removal and optics cleaning

Details of alignment center m1 to center m2 with 4 screws: using targets? Some thought to make sure mechanics allow alignment.

Welding of spiders deformation in thin blades? Handling of 3 post after attachment

Focus mechanism precision not so clear: prior experience with built system with flexure?

Cooling of laser box? And heat load in dome, not clearly quantified but out of spec apparently (10W is very tight)

Effect of distortion telescope M2 steel baseplate not clear (to me)

Coolant lines above M1: risk of leak

Clearance LLT-dome measured?

LLT tube fully exposed to wind: use isolation material between tube and base to damp vibrations?

Is M2 removal access compromised by LLT

11mm M1 hole too small? Else use piston adjustment on M3, don't just rely on mech fab.

Test backlash of PI asap, else buy model with internal servo (expensive to retrofit in our experience)

Lifting hook on LLT?

Seismic resistance analysis of all new hardware above telescope M1.

Management:

Mpp is not exclusive to LGS and was hard to read without going through the whole SAM project. Info could have been pre-digested or extracted for a thorough review

Spares must be addressed as some point

User manual and documentation could be addressed since it takes usually a long time

Does Soar use ICD, Change Request.

Contingency and traditional, holidays (summer, etc...) are not obvious. What is the current total contingency built into the schedule?

How many nights for tech+science com? Is it compatible with Soar requested science time?

How is time tracked per person? Is there feedback into the plan to improve it?

Is plan being done closely with engineers?

Is shop time adequate in schedule: is there feedback from shop manager?

How are FTE derived: all people are 100% in mpp

How labor cost vs FTE is derived (answered \$40/h average) but not enough info to say about overall cost.

No review of software and electronics

No clear science milestone in mpp. when do you start doing science

Telescope commissioning is not detailed

As always project plan are accurate if detailed: needs more breakdown, no details present from engineers apparently (for example at fabrication level)

Suggest revision every 6 months is insufficient and doesn't allow to spot major delays

Make risk assessment table (technical, management)

Bigger core team for I&T (serious impact if someone leaves in a 2 people team)