



2004 Plan Update

LIGO Systems meeting

22 Jan 04

dhs



Reductions in R&D costs required

- Initial LIGO costs greater, and continuing longer, than anticipated – but unquestionably the first priority
 - Pre-isolator development
 - RFI/EMI retrofit
 - Thermal compensator
 - etc.
- Adjustments in LIGO Lab across the board
 - Equipment (e.g., computing, campus infrastructure)
 - Supplies
 - Personnel (fewer new hires)
 - ...and R&D, mostly in equipment
- Flexibility required at top level of LIGO Lab
 - Uncommitted funds for emergencies
 - If no emergencies, funds can be requested back into e.g., R&D
 - Plan for this – find critical points where putting back elements makes a significant increase in R&D payoff
- 2004 obviously affected
 - 2005 also likely to be 'slow', depending on how things go



Overall model for AdL

- Proposal (February 2003) to NSF requested first funds in 2005
 - » Hear positive vibrations from NSF, but no official response
 - » Earliest anticipated start now in FY 2006 (i.e., Oct 2005)
- Adjustments, and schedules, now assume this start date
- Updated Plan is to (as before) finish designs and prototype testing by start of project funds – about one year later than proposal plan
- Continued recognition of high value of R&D testing
 - » dhs feels that minimum plan is not satisfactory, but with probable re-transfer of funds can 'retire sufficient risk'



Seismic Isolation

- Baseline plan called for complete HAM and BSC isolation systems for installation in LASTI, integration with SUS, etc.
- Replan covers design and fabrication of HAM and BSC mechanical 'carcasses' – planned delivery in Oct '04 --,
- But not instrumentation (sensors, real-time servo equipment)
- dhs sees very high priority to request funds for at least partial instrumentation to allow characterization when pieces arrive



Suspensions

- Baseline plan called for Recycling mirror development, Quad development (in LIGO Lab and UK), and Mode Cleaner fabrication (for LASTI IO MC) in 2004
 - » A bit too much in any event!
- High priority: capitalize on UK funding for Quad development
 - » Maintain high level of activity on design and prototyping
- Replan calls for
 - » Continued Quad design/prototyping (one instead of two),
 - » no additional MCs in 2004 (a 'noise prototype') in 2005),
 - » Deferral of Recycling Mirror design and prototyping until 2006



Input Optics

- Baseline plan called for fabrication of parts for LASTI Mode Cleaner (3 mirrors, suspensions, controllers, etc.) –
 - » put this on hold, possibly until fabrication funds arrive, using first articles
- Baseline plan also called for continued development of isolators, modulators, and design work – this is included in the replan



Core Optics

- Baseline plan for 2004 basically unchanged – consider the selection of test mass material and development of coating technology necessary early R&D achievements
- Coating development
 - » Two vendors (SMA/Lyon and CSIRO)
 - » Series of coating experiments
- Materials for Q, polish, coating experiments
- Some infrastructure equipment – metrology, test stands
- Defer any LASTI/SUS optic finishing to 2005 or 2006
- NOT pursuing metrology aperture upgrade, backup Fused Silica test mass purchase, SV test glass purchase until 2006/need



Auxiliary Optics

- Baseline plan called for development of photon drive, and adaptive optics prototypes, in 2004
- Replan funding calls for deferral to 2006
- dhs sees a high priority for some adaptive optics development to allow integration tests with SUS, probably in 2005



Pre-Stabilized Laser

- Most planned activity in Germany (LZH/MPQ), advancing well
- Baseline has activity in intensity stabilization in LIGO Lab, in 2004-2005
 - » Nice first step finished, paper submitted
 - » Some work this year in the Lab



Interferometer Sensing/Control – 40m

- 40m construction ‘finished’ – process of commissioning dual-recycled interferometer underway
- Baseline called for generous funding of 40m commissioning;
 - » reduced by a factor of two in replan
- Baseline called for tests of a number of ISC pieces (ADC/DAC tests, UHF detector parts)
 - » Some deferred to 2005; many deferred to 2006
 - » Much testing of ISC at 40m to be deferred to Construction phase

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- Recent (Nov LSC) Baseline called for
 - » BSC and HAM isolation systems, with pre-isolators
 - » One test cavity, made of one Quad and one MC
 - » Changeable to a cavity of one Quad and one RM
 - » Complete 3-mirror MC
 - » IO modulation system
 - » 180W laser
 - Replan results in
 - » Pre-isolators
 - » Isolation mechanical systems, nominally no instrumentation
 - » One Quad, one MC
 - » Deferred test of one cavity (Quad/MC) to 2006
 - Allows installation and basic functional tests of suspensions
 - With addition of Seismic instrumentation (to be requested), allows complete servocontrol tests of Quad and MC
 - More testing if time, money, and logic allows; may overlap installation at Observatories



Bottom line

- Replan allows design work to continue, with some deferrals
- Most critical pieces get through critical stages (Quad and PSL with generous help from GEO funding, and the LSC at large)
- Will plan to request funds for urgent needs as indicated; input invited; optimistic for some recovery here
- Hope to hear signals from NSF by mid-year 2004 on construction funds