



Talk to LSC Meeting

July 21, 2007

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Executive Director, LIGO

G070502-00-M





Topics to be discussed

- S5-progress and the end game
- Enhanced LIGO
- Advanced LIGO
- Funding
- LIGO-Virgo
- Education & Outreach
- Proposal for the next operating grant for LIGO Laboratory
- Other things of interest



Status of S5, Enhanced LIGO, Advanced LIGO

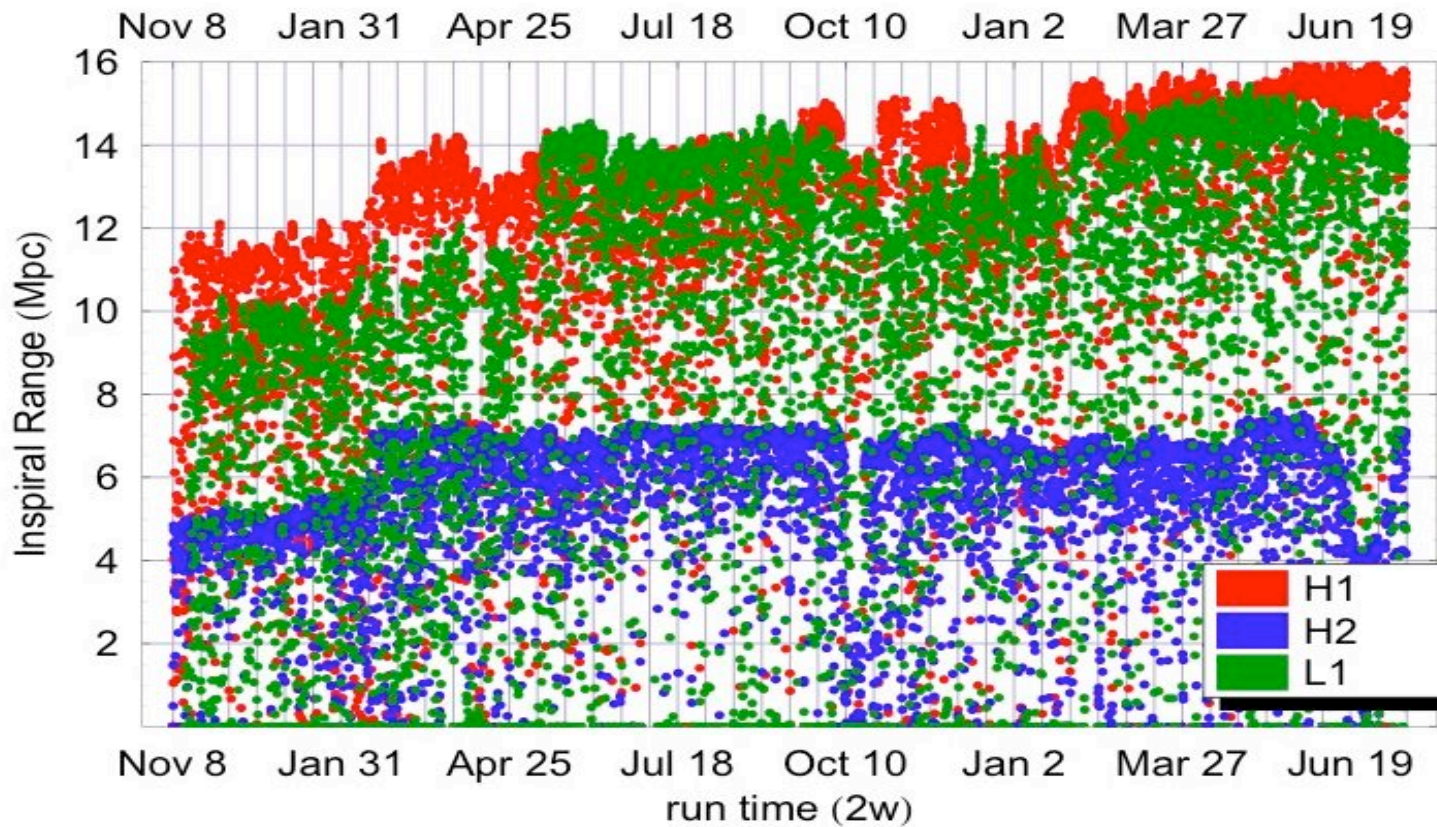


Status of Run

- S5 going well-- end in sight!
- Already have 1 year of LLO-LHO coincidence data
- 4 km IFO range keeps improving
 - H1 has reached 16 Mpc
- Duty cycles are reasonably good

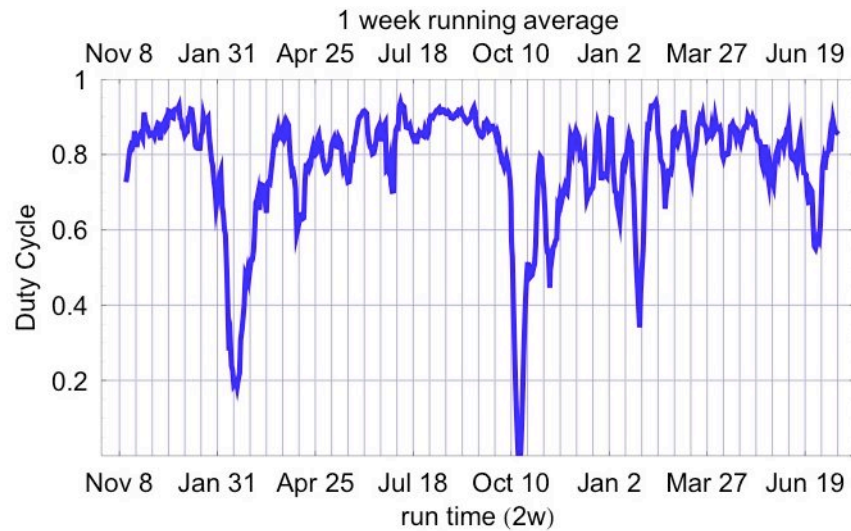
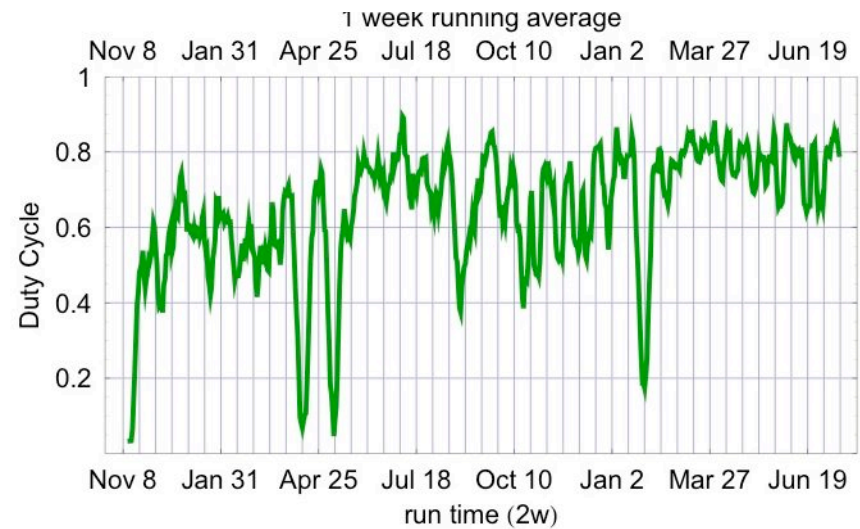
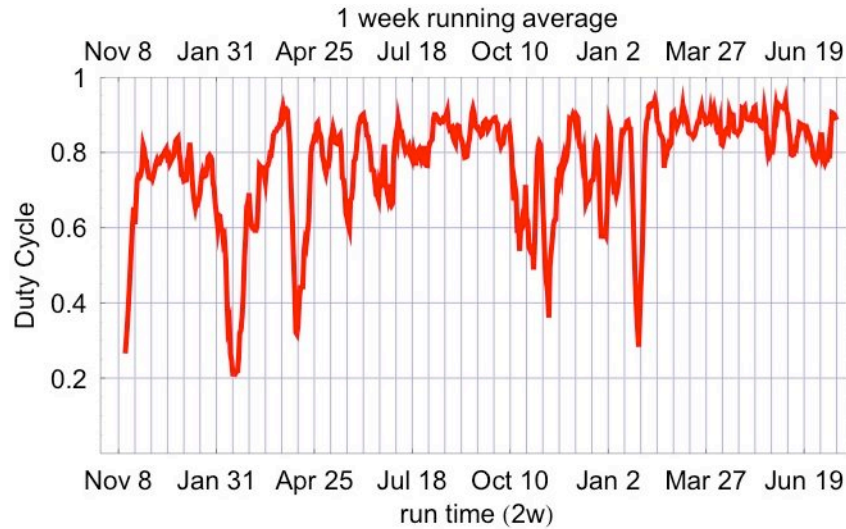


Status of S5 run- combined range





IFO duty cycle



A significant milestone reached last week

-- 1 year of 2-site coincidence data--



When will the run end?

- Criteria
 - Enough data; e.g 1 year triple coincidence
 - Enough concurrent running with Virgo; 4 months is ok with Virgo
 - Enhanced LIGO ready to begin installation after ~1 month of post-run activities
- Current projection of end of run
 - Projected triple coincident 1 year data set ~early October
 - 4 month anniversary of start of run with Virgo; September 18
 - Schedule (time early) for Enhanced LIGO gives end of run ~late-September

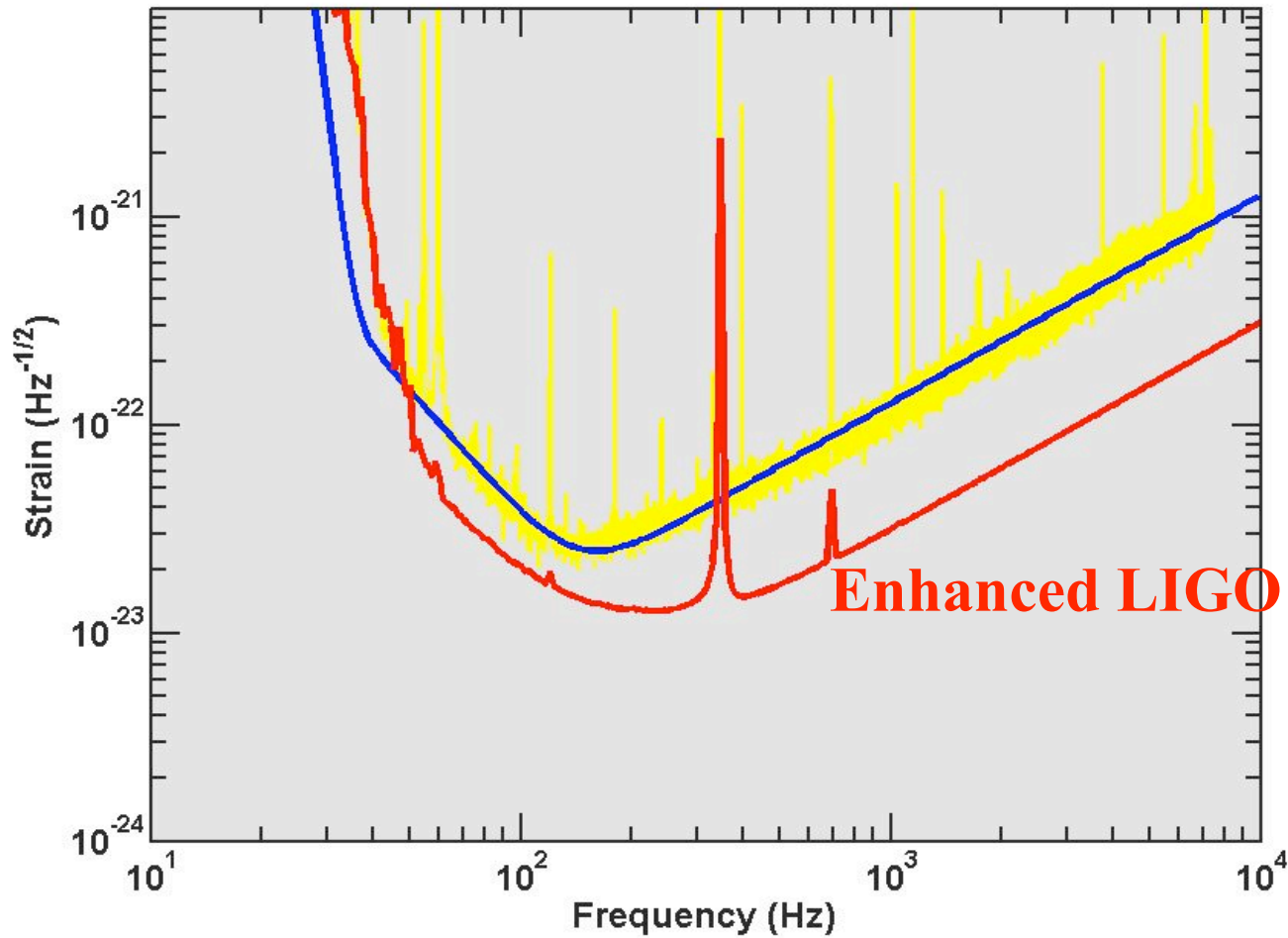


After S5--Astrowatch

- Have some capability on-line in case nearby supernova,
- Discussion of how best to do this within world-wide community-
 - Expressions of interest from TAMA, GEO, resonant bars
- What about LIGO involvement (in addition to GEO)?
 - There is interest in running H2 when it doesn't interfere with enhanced LIGO work
 - Student carry most of the load-- already significant interest
 - Need students willing to commit to ~6months or more at Hanford
 - Many students have expressed interest
 - If so, only analyze data if external trigger (observation of SN)
- I want to encourage this to happen
 - LIGO Lab will help support cost of students
- Faculty members--please give this serious consideration if your students ask for you ok



Enhanced LIGO





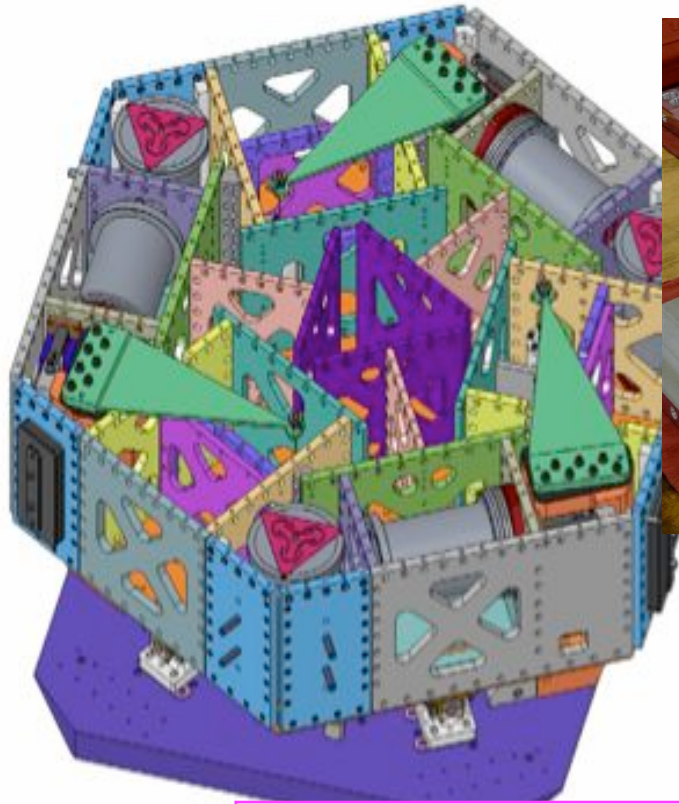
Status of enhanced LIGO

(See technical talk by Rana on Thursday)

- Enhanced LIGO is going ahead on schedule
- Hardware is being built and tested
 - Uses designs and prototypes for Advanced LIGO
 - Reduces risk for Advanced LIGO and give early experience with Advanced LIGO technology
- Schedule
 - Ready to begin installation in September 2007 (time early)
 - Commissioning of full ELI begins summer 2008
 - Science run with enhanced LIGO (S6) begins in early 2009
- Had Internal review (Norna et al) May 2007
 - Things still look good

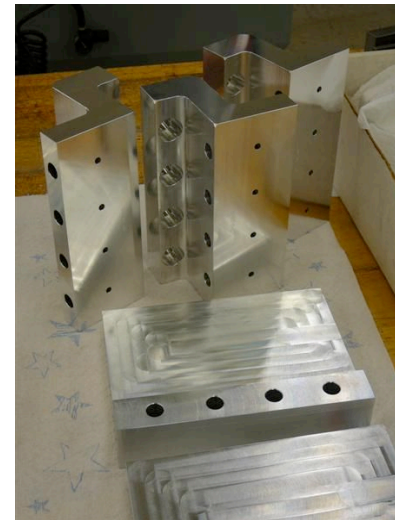


Active Seismic Platform Design Selected



*Now in full
Production at*

*High
Precision
Devices, Inc.*

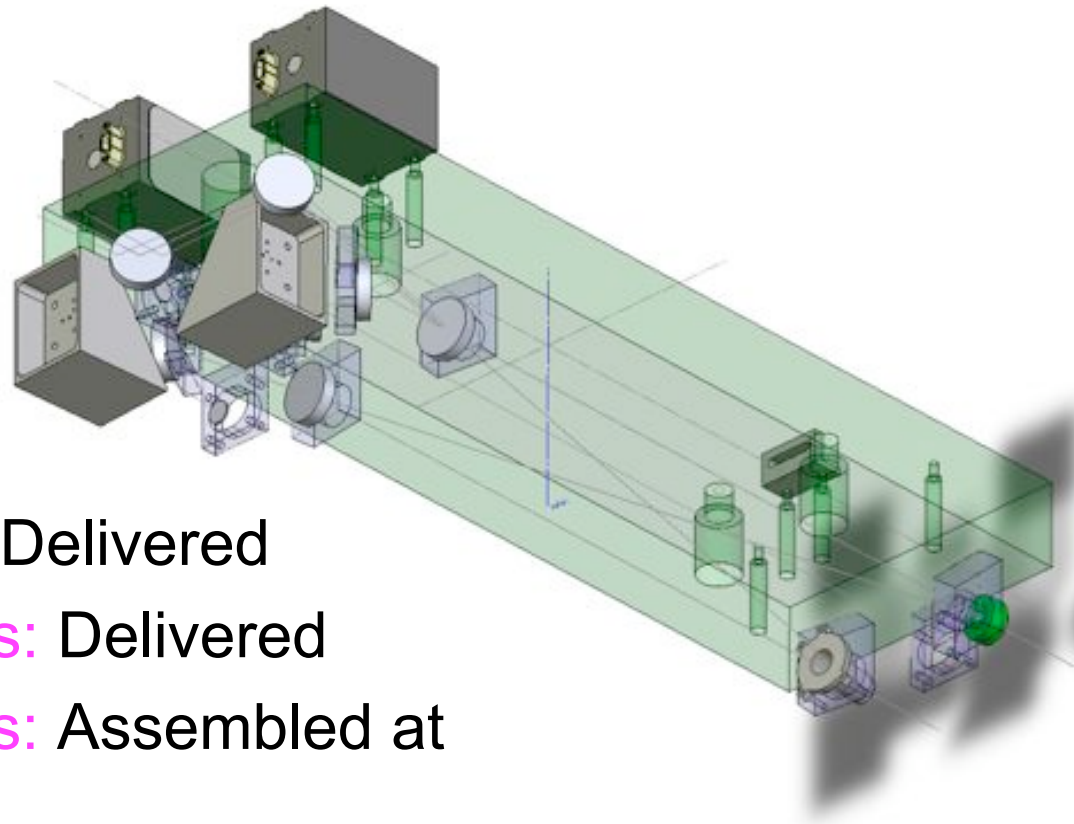


Subsystem readiness: PSL

- **AEI/LZH 35W laser:** 1st unit operational, tested at LZH with integrated LIGO CDS controls, delivered to CIT
- **PSL table:** New unified PSL/IO table design adopted, optics on order
- **Remote pump diode & electronics rooms:** layouts configured, under safety review



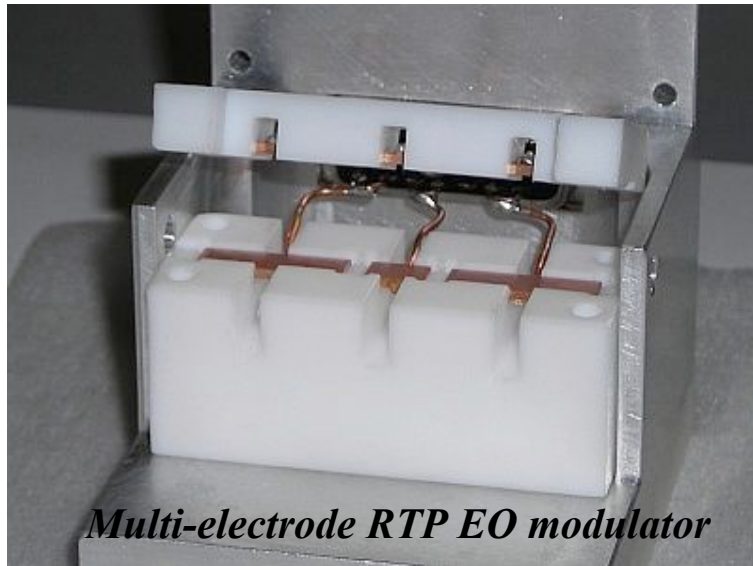
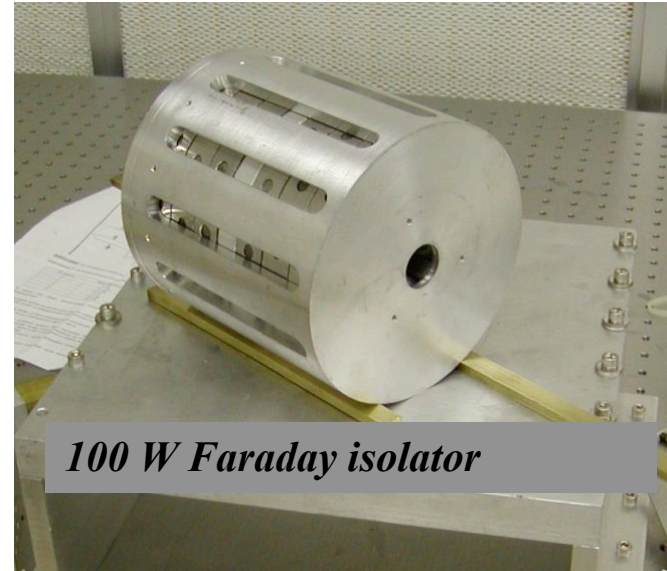
ISC: OMC Assembly



- OMC cavity bodies: Delivered
- Superpolished optics: Delivered
- Beamsteering tip/tilts: Assembled at ANU, under test
- In-vacuo detectors/electronics: Fabricated and under test.

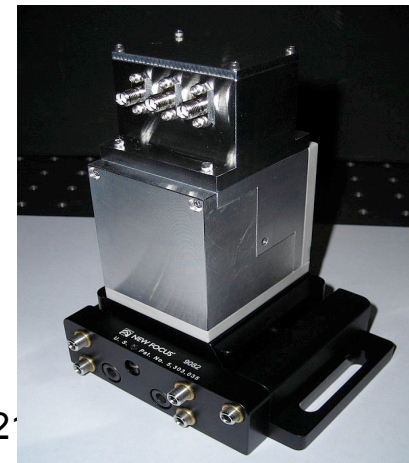
High-power input optics

- UF demonstrated first articles for both modulator and Faraday isolater
- Now in production, on schedule for integration

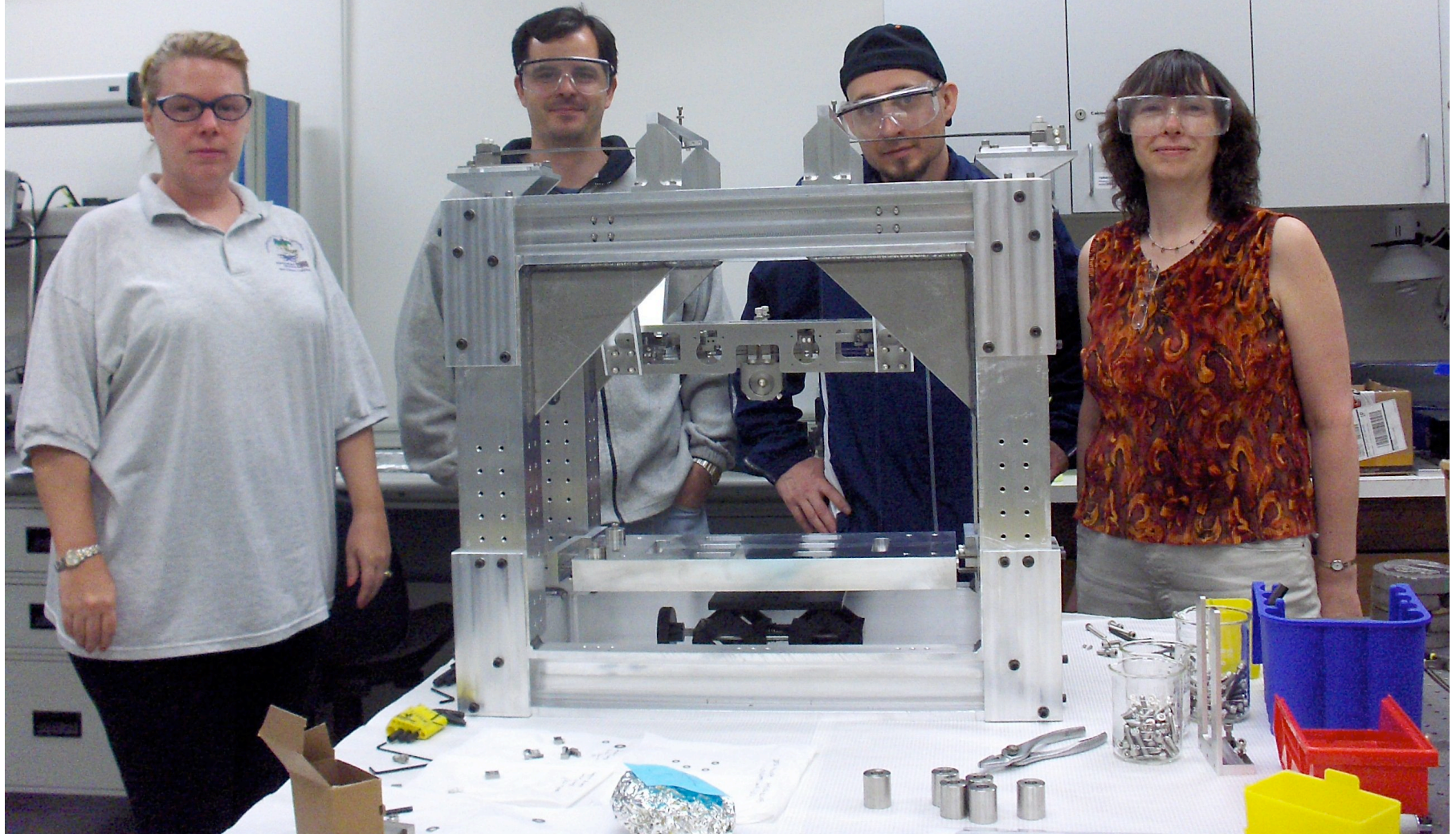


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Talk at LSC meeting; 7-2



OMC SUSPENSION TEAM WITH FIRST ARTICLE





Status of Advanced LIGO

- Ready to start construction at beginning of FY2008 (October 1, 2007)
- Latest NSF review of project status--June 2007
 - We said project is ready to go
 - progress with R&D is consistent with our planned start of construction;
 - un-inflated cost and overall start-finish schedule is unchanged;
 - But need \$4.32M more to cover increased inflation projected by OMB/NSF bringing total cost to \$209.44M
 - \$\$ contingency has increased from 26% to 28%
 - because of more efficient way to handle administrative costs for project



Status of Advanced LIGO

- Report of NSF review
 - Review committee gave us high grades, agreed that we're ready to start construction;
 - Recommended extra \$4.32M to cover inflation.
 - Recommended helpful modification in funding profile
 - Technical-- development of coatings is important and should continue during construction
- So now construction start awaits the conclusion of the budget process for FY08 in Washington.



NSF and LIGO funding for FY2008

- Both House and Senate Appropriations committees have “marked-up” their bills for FY2008
 - Very good budgets for NSF--big increases over this year in both versions for NSF research (~10%) and for NSF big projects (MREFC)
 - NSF MREFC funding appropriation includes our full request for \$32.75M for Advanced LIGO!!
 - Operations funding is solid/
 - Still ahead--
 - Passage of bills by full House and full Senate
 - Conference committee to resolve any differences in two versions
 - President’s signature
 - Could take many months for all of this to be resolved



LIGO-Virgo status

- VSR1 began May 18, 2007!!!
- Virgo and LIGO working well together on both data analysis and run planning
 - Data analysis groups have merged and are working well; joint white paper& analysis plans happening
 - Joint run planning committee is considering what happens post-S5/VSR1
- I'm very please at how well the collaborations are working together in the spirit of cooperation and mutual respect. A basis for long-term success



Education and Outreach--what's new?

New Goal--- a science education center at Hanford-- build on successful SEC at Livingston

- Timing-- we want to build science education center while LHO shut down for Advanced LIGO installation (~2011-2012)
- In June, Fed Raab, Dale Perry, Joe Giaime and others presented the need, justification and desire to NSF---to see how they'd respond.
- NSF responded well--- strong encouragement to continue down this path leading to a serious proposal



Next Cooperative Agreement with NSF and new operations grant

- Will cover 5-year period FY2009-FY2013
 - Operation of interferometers for S6 with enhanced LIGO
 - Data analysis and science from S5 and S6
 - Expanded education and outreach
 - Preparing to operate Advanced LIGO
 - R&D to reduce risks for Advanced LIGO, for enhanced Advanced LIGO and for future capabilities
- ~\$158M (not for Advanced LIGO which has separate funding)



Next Cooperative Agreement with NSF and new operations grant

- Requires proposal from LIGO Lab
 - Final draft by August 1, 2007
 - Submitted to NSF by Caltech September 2007
 - Peer review ~ November 2007
 - To NSB in spring 2008 for \$\$ in October 2008
- Big deal, must be done right, lots of work by lots of Lab people with help from LSC people
- Status--near final draft is almost ready. Will meet August 1 target.

Other items of interest

- LIGO Student Fellowships
 - Application period extended to August 1--
an opportunity for interested students!!
- GWIC meeting
 - Columbia to host Amaldi7 in July 2008
 - GWIC Roadmap for the field
 - Ground, space--based, theory, numerical relativity
 - ~30 year time horizon
 - Committee--GWIC members; Jay will be the chair



GWIC Global Roadmap for the field

- **Charge---**
 - Develop global roadmap for field with 30-year horizon.
 - Consider ground and space based capabilities, theory and NR, and possible impact of new technologies and approaches
 - A perspective to optimize the global science in the field should form the basis for this roadmap
 - Take account known national and regional planned projects.
 - Identify relevant science opportunities and the facilities needed to address them.
 - Roadmap should address what should happen when to reach goals in a timely manner, key decision points, strategies, etc.
- **Community input is important and will be sought**
 - Town meetings, by e-mail, etc.



Summary of important news

- S5 is going very well, end in sight
- Enhanced LIGO
 - Metal being cut, looks in good shape and ~on schedule
- Advanced LIGO ready to start construction in FY2008
- FY2008 funding for Advanced LIGO and LIGO Lab looks solid
- Proposal for LIGO Lab funding for FY2009-FY2013 being written
- GWIC has initiated a Global Roadmap for the field