

Operation Plans/Budgets FY2007-2011



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Program Advisory Committee
2 December 2004
MIT

LIGO-G040515-00-M

Background and Issues

- Current LIGO Cooperative Agreement runs through September 2006
- Advanced LIGO approved by NSB for FY2007 start, but NSF funding prospects for FY2007 uncertain
 - » Possibility of delay to FY2008 or slow start in FY2007 very real
 - » Likely to remain unknown until Jan 2007
- How to mesh LIGO operations with simultaneous fabrication of AdvLIGO
 - » Optimize observing program with potential upgrades for Initial LIGO

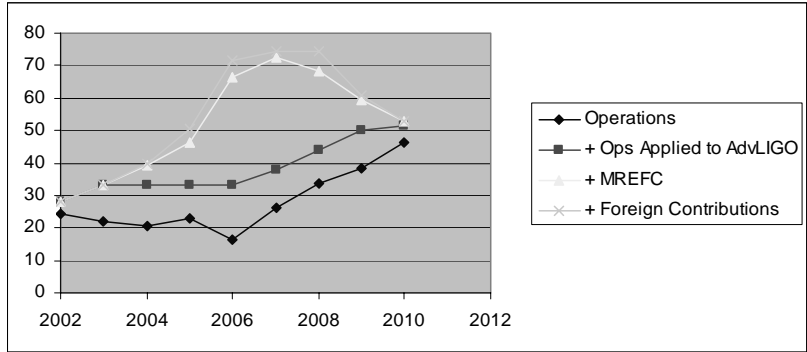
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LIGO *Advanced LIGO Proposed Funding*

- From original AdvLIGO proposal (FY2004 start)
- Assumed stable funding for LIGO Lab operations



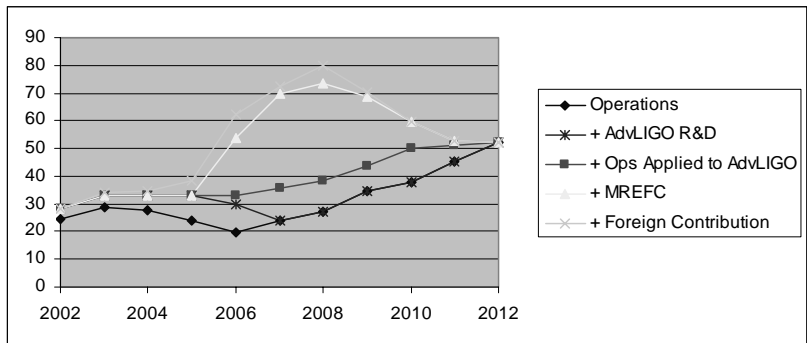
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LIGO *Initial Revision/Stretch-out*

- Revised profile with FY2006 start
- Differentiate Ops funds for AdvLIGO R&D and fab
- Top level shift of schedule
 - Not based on detailed program plan

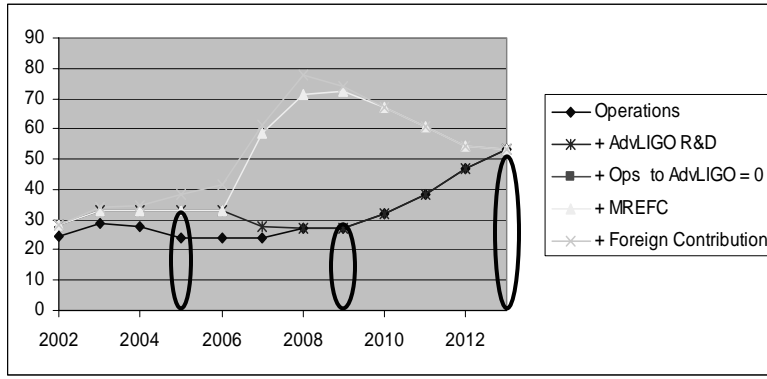


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- Current estimate—FY2007 start
- All AdvLIGO fabrication funds rolled into MREFC
- Detailed program planning underway
 - Also not based on detailed program plan

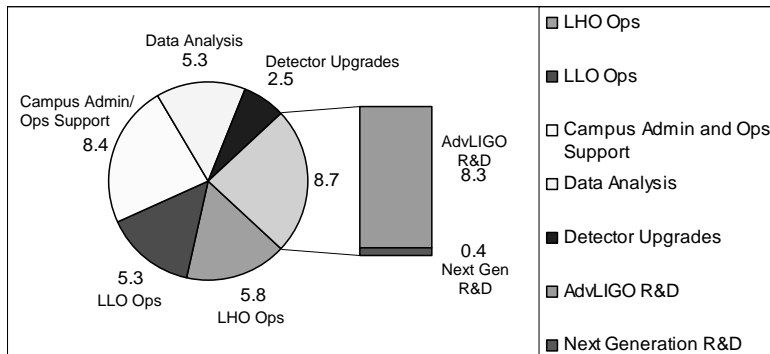


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- Approximate breakdown by “physics” functions as opposed to organizational units
- Budget sums to >\$33M due to carry-forward

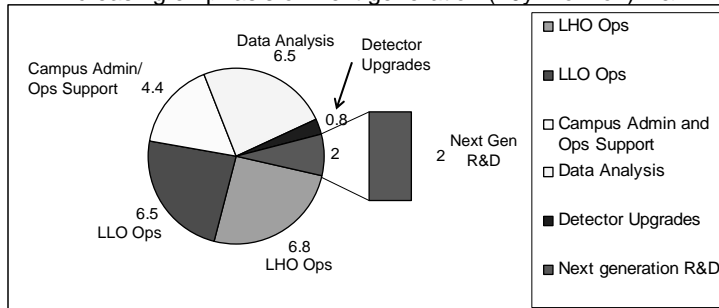


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- Continue to operate interferometers until fabrication complete to minimize downtime
 - » Site operations, data analysis continue at ~ same level
 - » Reduced campus ops support—staff shifted to MREFC
- AdvLIGO R&D ended
 - » Increasing emphasis on next generation (20yr horizon) R&D

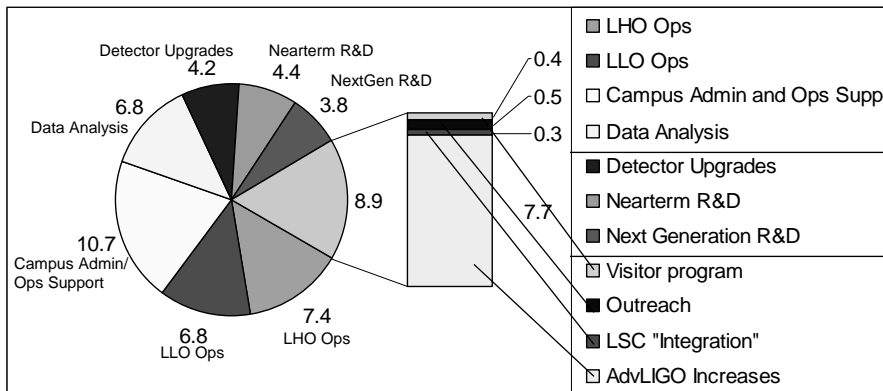


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- Current ops budget escalated
- R&D and detector upgrades
- New scope



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- AdvLIGO offers new flexibility
 - » Narrow banding
 - » Ability to tune frequency in narrow-band mode
- Conversions from broad-band configuration to narrow-band will take time and equipment
 - » Detector upgrades budgeted to exploit new capabilities
- Near-term R&D also needed to take full advantage
 - » Control law development, variable reflectivity mirror control, ...
- Next generation R&D
 - » Penn State workshop: 5-10% of total cost
 - » QND tests, control schemes
 - » Cryogenics, underground operation
 - » Shaped beams, large-scale diffractive optics
 - » High power optical components

- Advanced LIGO complexity ~ 2-3 times initial LIGO
 - » Simple counting of servo systems, control requirements
- Data analysis extends toward lower frequencies
 - » Increased data analysis computational needs
- Hardware maintenance costs increase by \$5M/year ?
 - » Not much experience with some components (lasers, etc)
 - » Some increase in staff required to support
- Smaller amounts for new inclusions
 - » Incorporate visitor program in operations budget (separate grant)
 - » Increased staffing, maintenance for Outreach (separate grant)
 - » Costs to integrate LSC with Lab
 - Teaching relief for Spokesperson ?
 - Enhanced LIGO visitor program ?
 - Others?



Summary

- Budgeting underway for FY2007-2011 operations
 - » Challenge of integrating with the AdvLIGO MREFC
 - » Costs to support AdvLIGO operation are uncertain, but will require an increase over Initial LIGO level
- Possible options for FY2007
 - » Submit 5 year proposal in Summer 2005 with two budgets
 - One assuming FY2007 AdvLIGO start
 - One assuming later start
 - » Supplemental funding for FY2007
 - Delay renewal proposal until Summer 2006 and hope for clearer picture on AdvLIGO
 - » Others?