



LIGO Financial Status (June 2002)

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The Twelfth Program Advisory Committee (PAC12)
Massachusetts Institute of Technology
June 27 - 28, 2002

To present

- Status of existing Grants and Cooperative Agreements
- Proposal for FY 2002 – FY 2006
- Status of FY 2002 Operations
- Work Plan for FY 2003 Operations

LIGO Funding

- LIGO construction project (NSF PHY-9210038) \$272,100,000
- Construction related R&D (NSF PHY-9210038) \$20,000,000
- Operations (NSF PHY-9210038) \$68,700,000 (\$68,580,000 actually funded)
- Advanced R&D (NSF PHY-9700601, PHY-9801158) \$10,200,000
- Operations and management (NSF PHY-0107417) \$28,000,000 (\$160M proposed for FY 2002 – FY 2006)

LIGO Related Funding

- REU program (NSF PHY-9210038) \$48,000
- LIGO visitor's program (NSF PHY-99528300) \$34,245 (1996)
- LIGO visitor's program (NSF PHY-9603177) \$656,025 (1997-99)
- LIGO visitor's program (NSF PHY-9986274) \$780,000
- 1999 Edoardo Amaldi conference (NSF PHY-9972068) \$25,000
- 2001 Edoardo Amaldi conference (NSF PHY-0116886) \$5,000
- 2002 Advanced Detector Workshop (NSF PHY-0224894) \$5,000

Funding History

**MRE
Funds**

Fiscal Year	Construction (\$M)	R&D (\$M)	Operations (\$M)	Advanced R&D (\$M)	Total (\$M)
1992-94	35.90	11.19	-	-	47.09
1995	85.00	3.95	-	-	88.95
1996	70.00	2.38	-	-	72.38
1997	55.00	1.62	0.30	0.80	57.72
1998	26.00	0.86	7.30	1.82	35.98
1999	0.20	-	20.78	2.28	23.26
2000	-	-	21.10	2.60	23.70
2001 (10 mo.)	-	-	19.10 (10 mo.)	2.70	21.80 (10 mo.)
Total (10 mo.)	272.10	20.00	68.58	10.20	370.88

Construction Project

Operations

No cost extension to June 2003

- Originally scheduled to end September 30, 2001

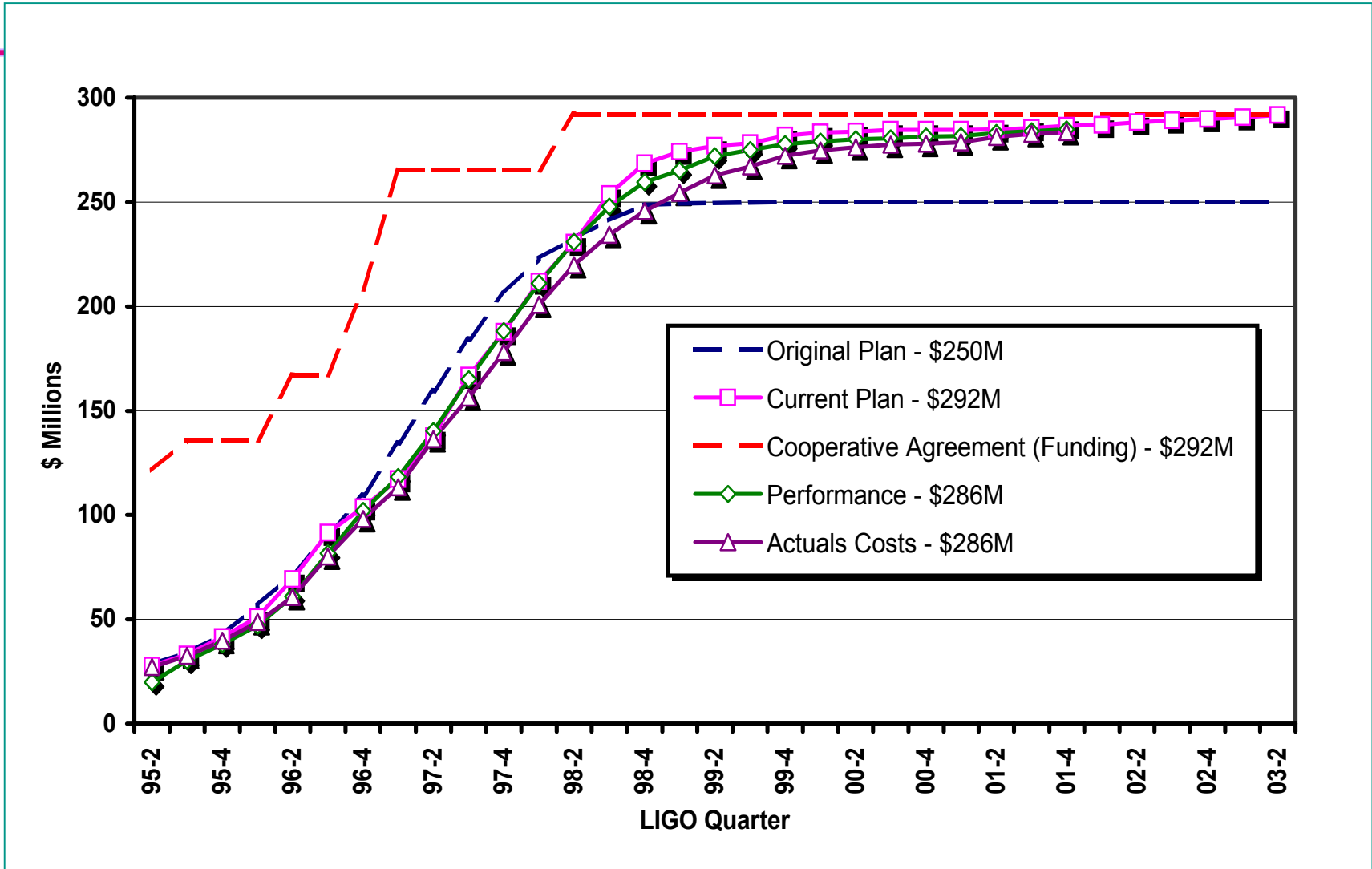
Four Open Tasks:

- Livingston Building (punch list items remain)
- Hanford Laboratory Building (50 percent complete)
- Detector (hardware phased to learn from commissioning--\$500K remaining to spend)
- Data Analysis System (\$2.6M remaining to spend)

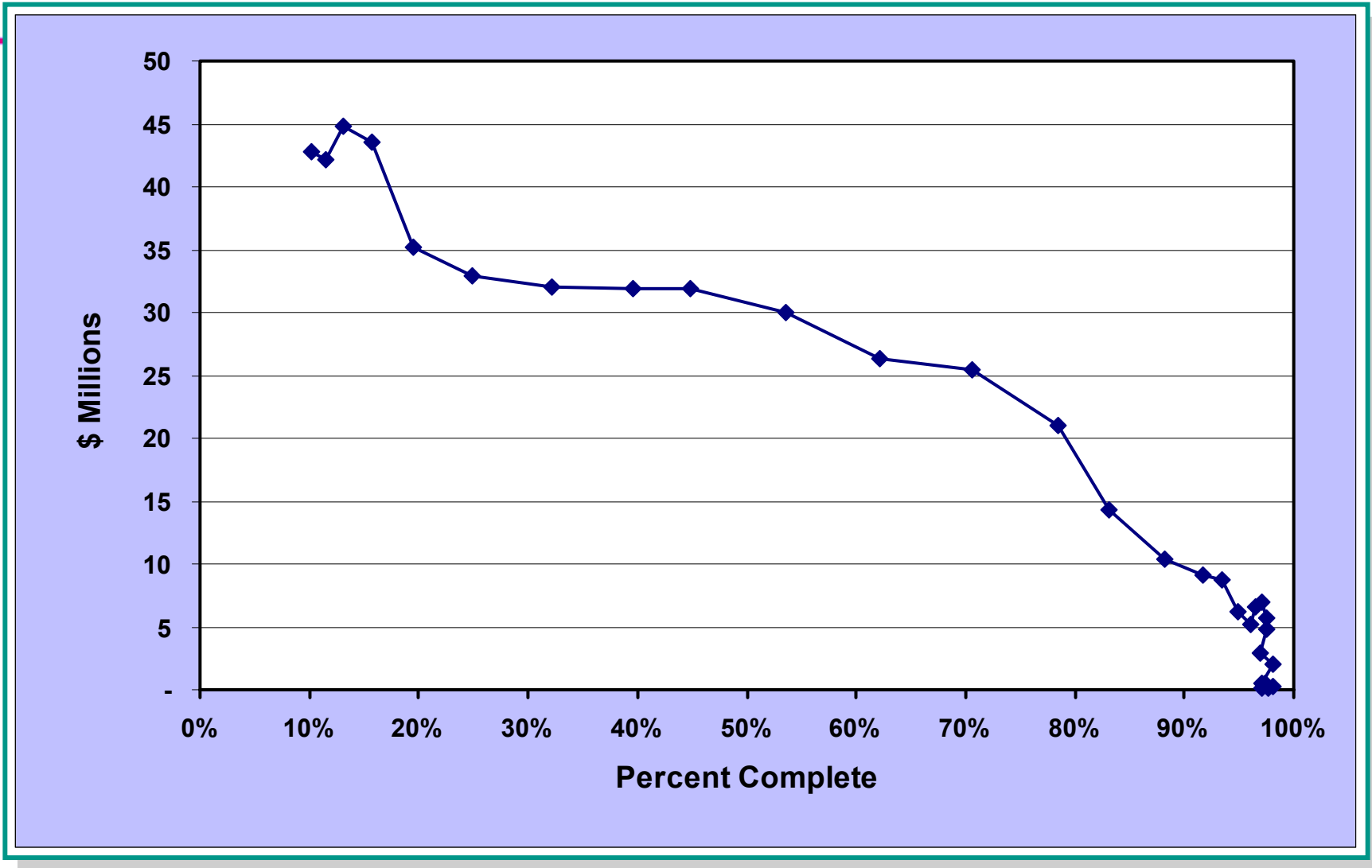
Construction Cost Status

End of May 2002 (all values \$K)

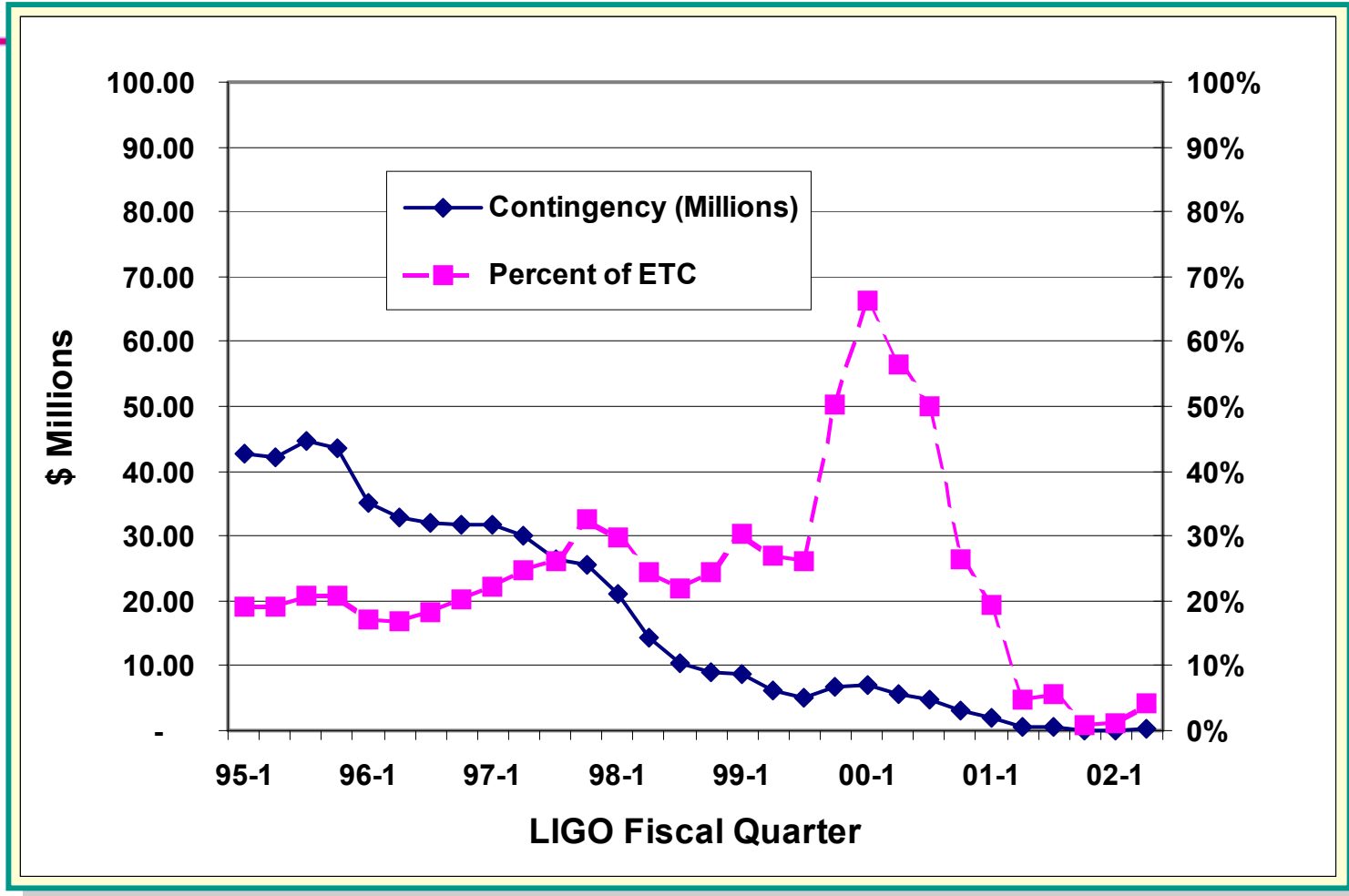
WBS		Budget	Actual Costs (5/02)	Open Encum- brances	Estimate- to- Complete	Total
Completed Tasks						
1.1.1	Vacuum Equipment	44,047	44,047			44,047
1.1.2	Beam Tube	47,004	47,004			47,004
1.1.3	Beam Tube Enclosure	19,338	19,338			19,338
1.1.4	Civil Construction	53,493	53,493			53,493
1.1.5	Beam Tube Bake	5,570	5,570			5,570
1.3.1	Lab Operations	6,291	6,291			6,291
1.3.2	Research & Development	15,860	15,860			15,860
1.4.1	Project Management	14,561	14,561			14,561
1.4.2	Support Services	820	820			820
1.4.3	Document Control	830	830			830
1.4.4	Office Operations	3,845	3,845			3,845
Subtotal Completed Tasks		211,660	211,660			211,660
Open Tasks						
1.1.4	Livingston Construction	2,562	2,312	138	112	2,562
1.1.4	Hanford Building	2,760	1,470	1,190	100	2,760
1.2	Detector	59,415	58,599	301	515	59,415
1.4	Data Analysis	15,463	12,362	294	2,566	15,222
	Contingency	240	-	-	481	481
Total		292,100	286,402	1,923	3,774	292,100



Contingency vs. Percent Complete



Contingency vs. Time

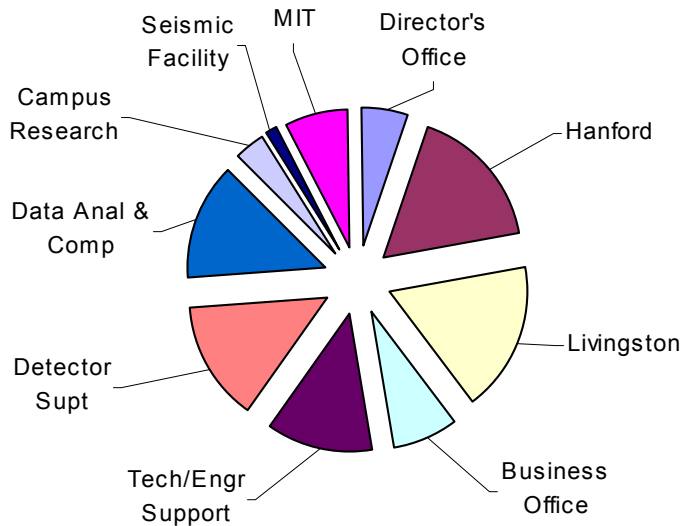


“Old” Operations Status

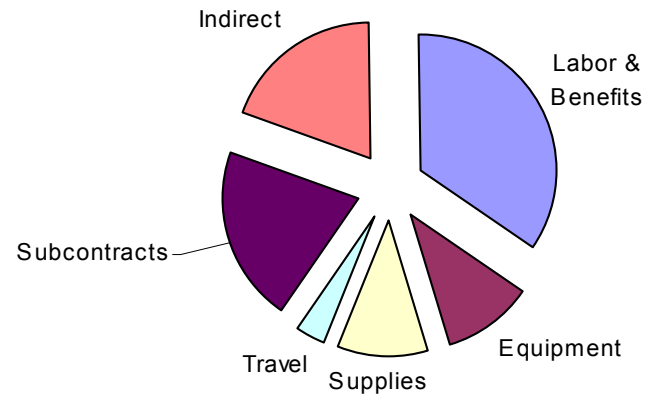
Fiscal Year(s)	Award	Costs	Encum- Bran- ce	Available
1997-8	\$7,600,000	\$6,928,750	0	\$671,250
1999	20,780,000	15,270,777	0	5,509,223
2000	21,100,000	22,377,577	0	(1,277,577)
2001 (10 mos.)	19,100,000	24,050,773	25,219	(4,975,992)
Total	\$68,580,000	\$68,627,877	\$25,219	(\$73,096)

FP 2001 Expenses

Operations WBS



Cost Category



\$24.05 million
 (Does not include Advanced R&D)

NSF PHY-9700601

- **\$1.3 million**
- **Closed**

NSF PHY-9801158

- **\$8.9 million**
- **Period of Performance: September 1998 – August 2002**
- **Spent through May 2002: \$8.24 million**
- **Open Encumbrances: \$0.55 million**
- **Available \$0.11 million**
- **Task open to new charges: Low Frequency Seismic Isolation**

Advanced R&D Expenses

FY 1998 – FY 2002

<i>Task</i>	<i>Amount</i>
<i>Active Thermal Controls</i>	173,745
<i>Resonant Sideband Extraction</i>	486,765
<i>Seismic Isolation</i>	2,088,545
<i>Stochastic Noise Sources</i>	1,358,046
<i>Thermal Noise Interferometer</i>	1,351,563
<i>High Power Laser</i>	312,621
<i>Core Optics Development</i>	681,455
<i>Sapphire Core Optics</i>	1,126,030
<i>Advanced Photodetectors</i>	126,136
<i>Fiber Research</i>	207,914
<i>Seismic Prototype</i>	5,831
<i>High Power Test Lab (LLO)</i>	59,000
<i>LASTI (MIT)</i>	42,884
<i>Technology Demonstrator (Stanford)</i>	764,134
Total	\$ 8,784,669

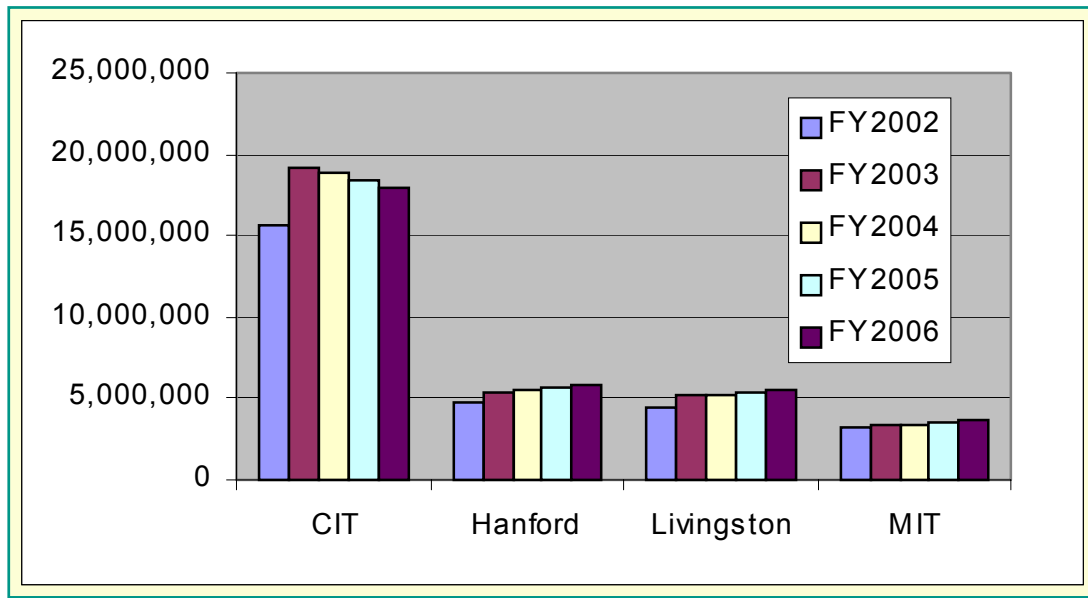
Future Operations (FY 2002-2006)

- Proposal Budget submitted September 2001 (after many iterations)
- \$28 million provided for FY 2002 Operations in February and May 2002 (NSF PHY-0107417)

	FY 2002 (\$M)	FY 2003 (\$M)	FY 2004 (\$M)	FY 2005 (\$M)	FY 2006 (\$M)
Operations	\$24	\$29	\$30	\$30	\$30
Advanced R&D	\$4	\$4	\$3	\$3	\$3

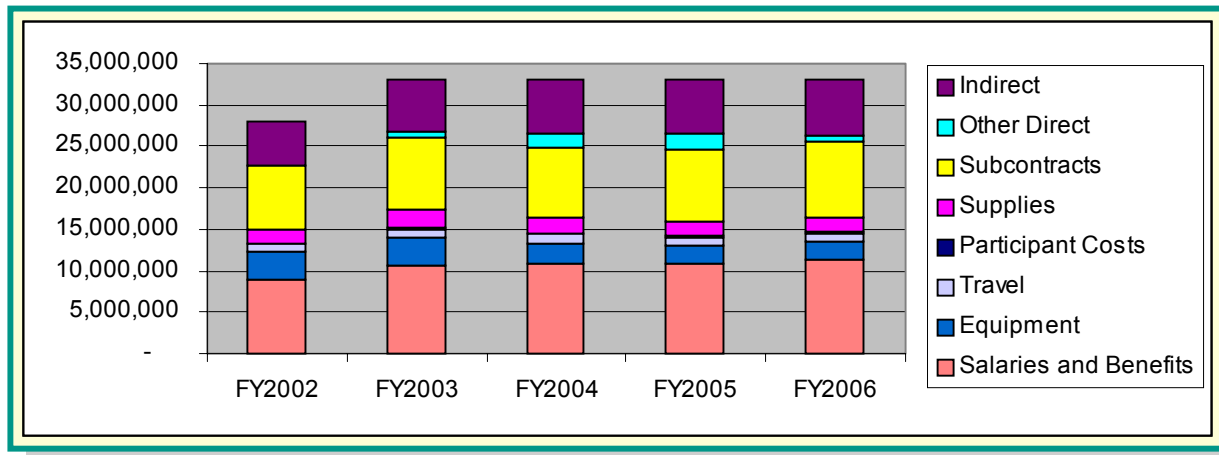
Proposal Budget by Location

Location	FY2002	FY2003	FY2004	FY2005	FY2006
CIT	15,574,955	19,129,542	18,822,123	18,415,444	17,991,714
Hanford	4,762,652	5,405,780	5,551,840	5,706,276	5,868,325
Livingston	4,459,705	5,165,062	5,226,551	5,375,890	5,531,542
MIT	3,202,687	3,299,615	3,399,486	3,502,390	3,608,419
Grand Total	28,000,000	33,000,000	33,000,000	33,000,000	33,000,000



Proposal Budget by Cost Category

Cost Category	FY2002	FY2003	FY2004	FY2005	FY2006
Salaries and Benefits	8,877,356	10,524,544	10,793,996	10,935,752	11,343,325
Equipment	3,410,593	3,464,014	2,601,855	2,158,366	2,169,625
Travel	1,029,000	1,055,080	1,043,569	1,018,197	1,052,494
Participant Costs	20,000	60,000	70,000	70,000	70,000
Supplies	1,618,257	2,254,879	1,958,895	1,803,753	1,848,101
Subcontracts	7,631,822	8,795,461	8,507,815	8,711,357	8,985,966
Other Direct	123,998	572,363	1,592,807	1,754,181	749,368
Indirect	5,288,973	6,273,658	6,431,062	6,548,393	6,781,120
Total	28,000,000	33,000,000	33,000,000	33,000,000	33,000,000

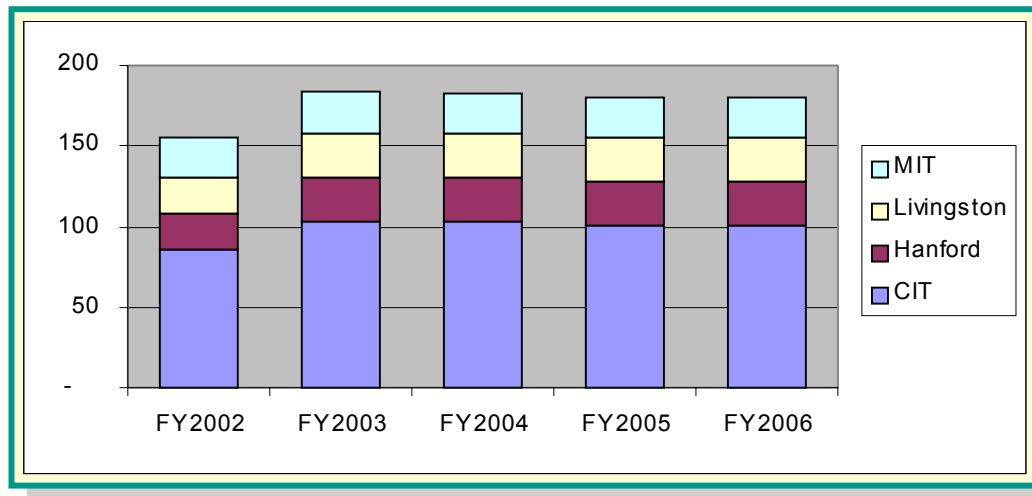


Proposal Budget for Advanced R&D

WBS	FY2002 Amount	FY2003 Amount	FY2004 Amount	FY2005 Amount	FY2006 Amount
MIT (Stochastic Noise, Advanced Photodetectors, Controls)	655,153	674,808	695,052	715,903	737,380
Thermal Noise Interferometer	176,697	172,815	176,953	181,216	-
Advanced Stabilized Lasers	-	50,662	-	148,048	-
Core Optics (including Sapphire)	1,176,464	81,797	122,470	-	-
Interferometer Sensing and Control	-	205,010	117,882	51,253	-
Seismic Isolation (Livingston)	890,937	137,304	-	-	-
Suspensions and Fibers	658,799	1,381,377	555,924	-	-
Low Frequency Noise Suppression	400,000	413,148	440,863	450,054	459,521
Resonant Sideband Extraction	-	240,614	240,631	246,508	252,561
Advanced Controls	-	188,677	177,695	221,833	226,096
Advanced Input Optics	-	347,423	365,918	308,891	-
New Tasks	41,951	106,367	106,612	676,294	1,324,441
Grand Total	4,000,000	4,000,000	3,000,000	3,000,000	3,000,000

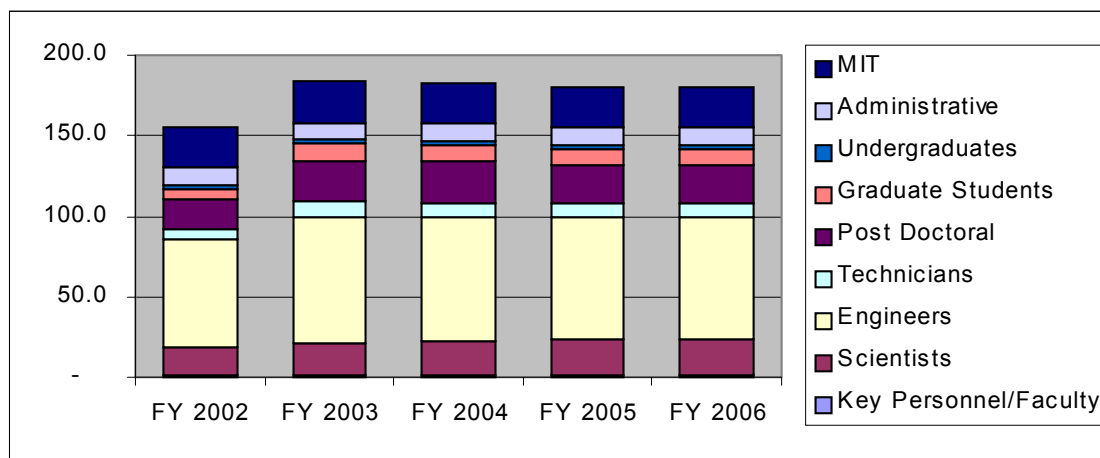
Staff (Budgeted) by Location

<i>Location</i>	<i>FY2002</i>	<i>FY2003</i>	<i>FY2004</i>	<i>FY2005</i>	<i>FY2006</i>
CIT	85	103	103	100	100
Hanford	23	27	27	27	27
Livingston	22	28	28	28	28
MIT	25	25	25	25	25
Total	155	183	183	180	180



Staff (Budgeted) by Category

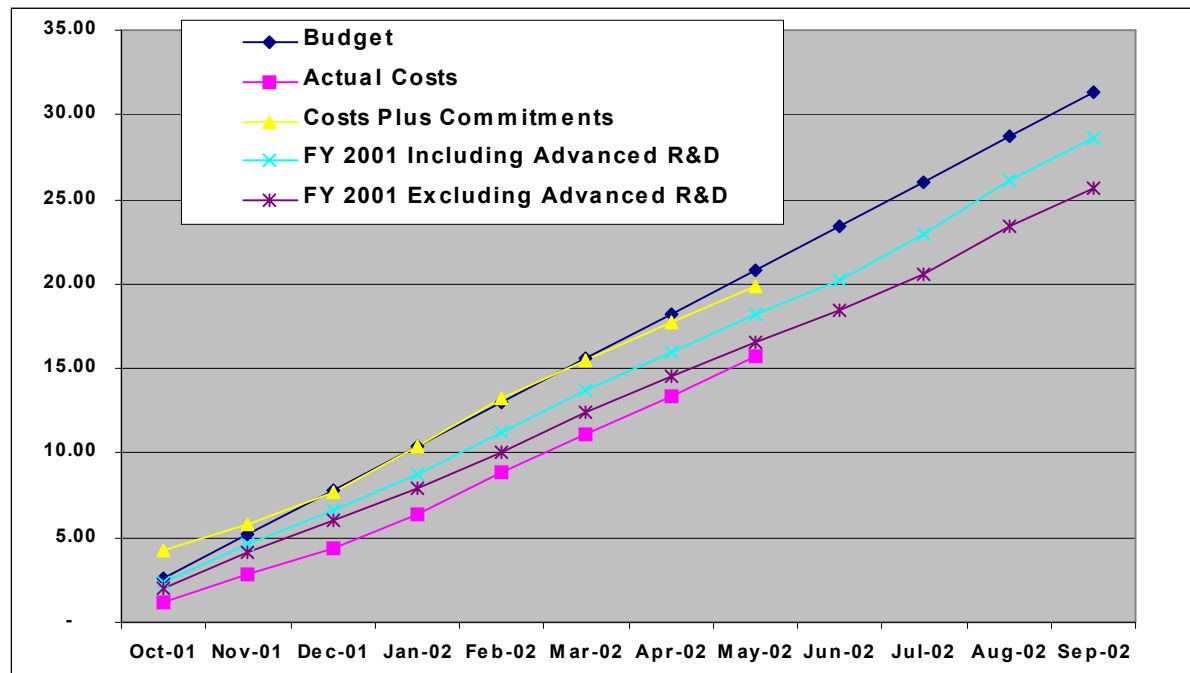
	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006
Key Personnel/Faculty	1.3	1.3	1.3	1.3	1.3
Scientists	17.8	19.8	20.8	21.8	21.8
Engineers	66.3	78.8	77.3	75.8	75.8
Technicians	6.0	9.0	8.5	9.0	9.0
Post Doctoral	18.8	25.3	25.8	24.3	24.3
Graduate Students	7.0	11.0	11.0	10.0	10.0
Undergraduates	2.5	2.5	2.5	2.5	2.5
Administrative	10.4	10.7	10.7	10.7	10.7
MIT	25.0	25.0	25.0	25.0	25.0
Total	155.1	183.3	182.8	180.3	180.3



FY 2002 Cost vs. Budget

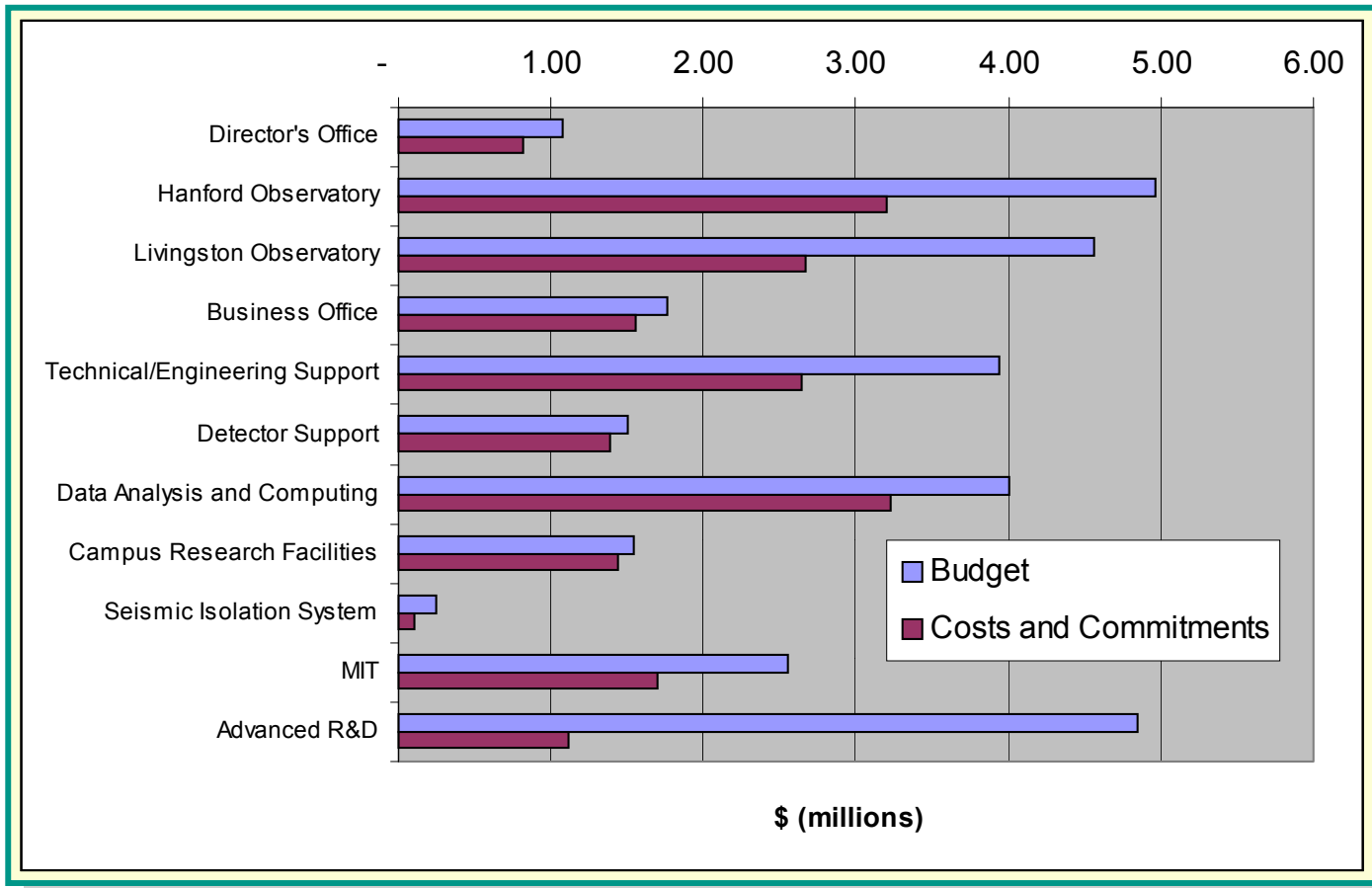
- \$3 million carryover from FP 2001 Operations (budgeted)
- Spending out the FY 1998 Grant for Advanced R&D first

FY 2002 Operations

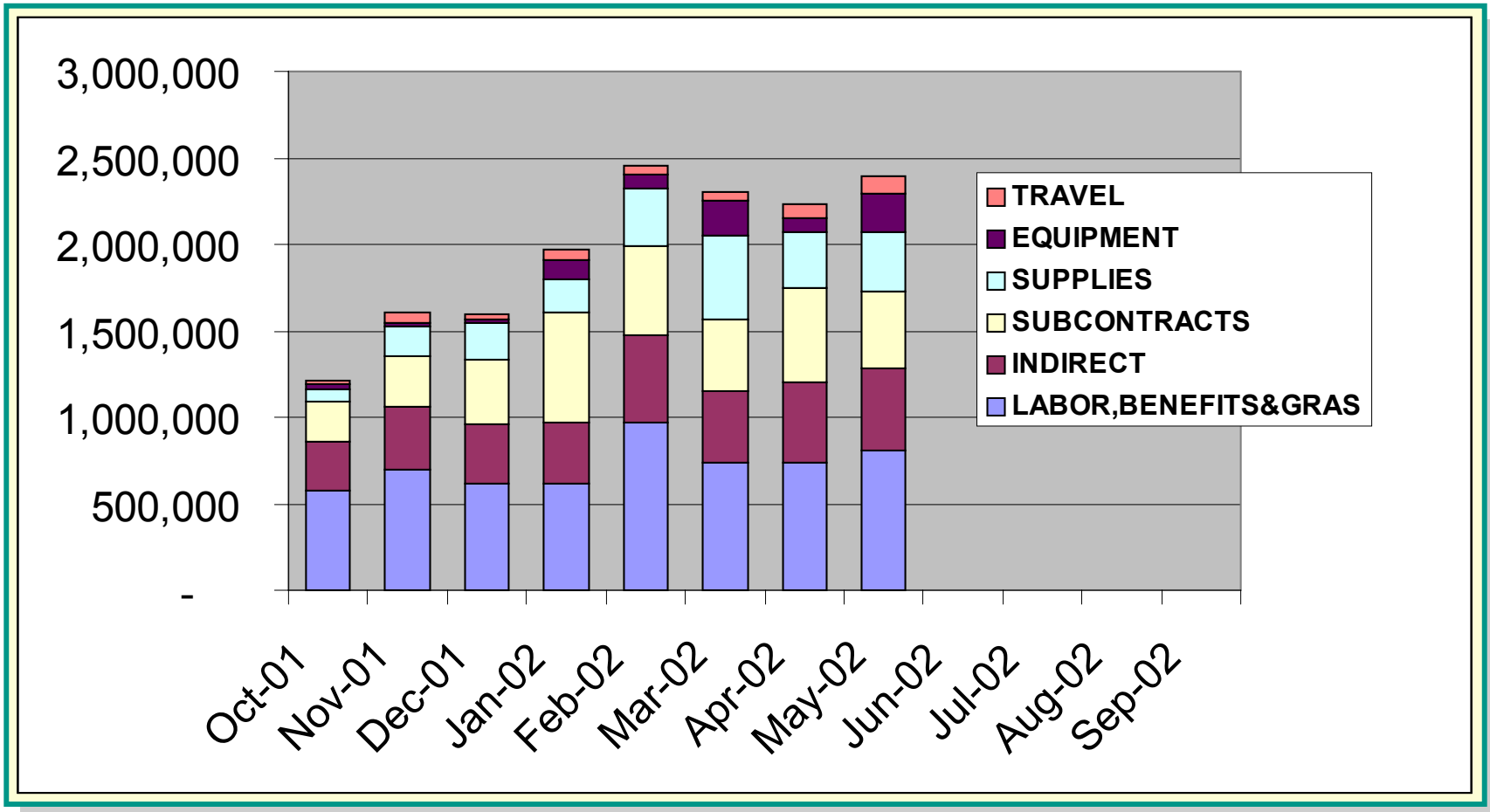


FY 2002 Costs and Commitments by WBS

Through May 2002



FY 2002 Costs by Category



Work Plan for FY 2003 Operations

- Work Plan for FY 2003 due to NSF August 1, 2002
- Budgeting exercise underway
- No significant changes, generally consistent with proposal submitted last year, reviewing staffing in light of current understanding
- \$33 million
 - \$29 million for Operations
 - \$4 million for Advanced R&D