Planning and Summary

Michael Witherell

URA visiting committee

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The Fermilab program

A. The Unification of Forces

B. Electroweak Symmetry Breaking

- Run II of the Tevatron: CDF and D0
- US-LHC and US-CMS
- Linear collider R&D

C. Three Generations of Quarks and Leptons

Neutrino and Lepton Flavor Physics

- The US accelerator-based neutrino program: MiniBooNE and NuMI/MINOS

Quark Flavor Physics and CP violation

- Quark flavor physics experiments to operate in 2009: BTeV

D. Particles and the Cosmos

- Sloan Digital Sky Survey
- The Auger Cosmic Ray Observatory
- The Cryogenic Dark Matter Search

Optimizing the physics program

- Make sure the accelerators and detectors operate with good performance and high efficiency.
  - Organize the laboratory to support the program.
  - Improve the luminosity through 2006, then run efficiently
  - Maximize protons delivered to the neutrino experiments.
- Manage the projects well.
- Approve new experimental projects with highest possible standard, only if world-best; build them.
  - MINOS, BTeV
- Do accelerator R&D toward the future.
- Allocate resources appropriately.
- Improve efficiency of operations where possible.

We have trimmed the program to match the resources.

Priorities

- We do the most important setting of priorities at the time of choosing projects.
  - A long and arduous process over some years, typically starting with the Physics Advisory Committee, moving through Director's reviews and HEPAP subpanels/P5, and ending up in the CD-0 approval.
  - Annual retreat with PAC and Long-range planning committee are used to look at the whole program over several years.
- In the shorter term, the most important decisions are about what is included in the plan of work.
  - We are committed to meet the project goals of NuMI in FY 2004, for example, and to follow the Run II plan.
  - Levels of support for analysis of data, R&D on future accelerators and experiments, and theory are annually adjusted to match lab priorities.

Analyzing and Mitigating Risk

- Project managers, Division Heads, and Section Heads have primary responsibility for identifying and analyzing risks and developing a mitigation plan.
  - Risk that critical device will fail, shutting down program
  - Technological and schedule risks on projects and R&D
  - Risks to environment, safety, health, and security
  - Risk of noncompliance, for example, with DOE orders
  - Risk of damaging reputation of Fermilab or the DOE with neighboring communities or federal government
- Directorate has responsibility for setting priorities among these risks, evaluating mitigation plans, and providing resources those plans.
- We also have to consider the risk to the advance of particle physics is Fermilab does not have the strongest possible research program.

Program Planning and The Physics Advisory Committee

- We make good use of the Physics Advisory Committee in determining the scientific program of the laboratory.
- The Fermilab PAC does the most thorough review of experimental proposals of any similar committee in US HEP.
  - review by a technical committee
  - presentations and questions through several PAC meetings leading up to a presentation meeting in April followed by a weeklong retreat at Aspen
  - carefully written reports produced at the end of each meeting
  - extraordinary dedication of an excellent committee
- At the annual June meeting in Aspen, we discuss the program as a whole and priorities for the future.

Physics Advisory Committee

James Alexander,	Cornell University
James Brau,	University of Oregon
Steven Kahn,	SLAC
Takahiko Kondo,	KEK
Andrew Lankford,	Univ. of California/Irvine
Joseph Lykken,	Fermilab
Daniel Marlow,	Princeton University
Hitoshi Murayama,	UC/Berkeley
Natalie Roe,	LBNL
Heidi Schellman,	Northwestern University
Dong Su,	SLAC
Paul Tipton,	University of Rochester
Tejinder Virdee,	CERN
Scott Willenbrock,	University of Illinois

Jeff Appel, Secretary
Jackie Coleman, Program Planning Office

P5: The Roadmap in the intermediate term, ~2010

1. LHC
   - Atlas
   - CMS
2. Quark Flavor
   - BTeV
   - KOPIO
   - (CKM)

Fermilab is host laboratory of those in red.

(opportunities not yet recommended for funding)

3. Particle Astrophysics
   - Auger
   - GLAST
   - Ice Cube
   - CDMS +other DM searches
   - (SNAP)
4. Lepton flavor
   - NuMI-MINOS
   - MECO
   - (additional neutrino opportunities)

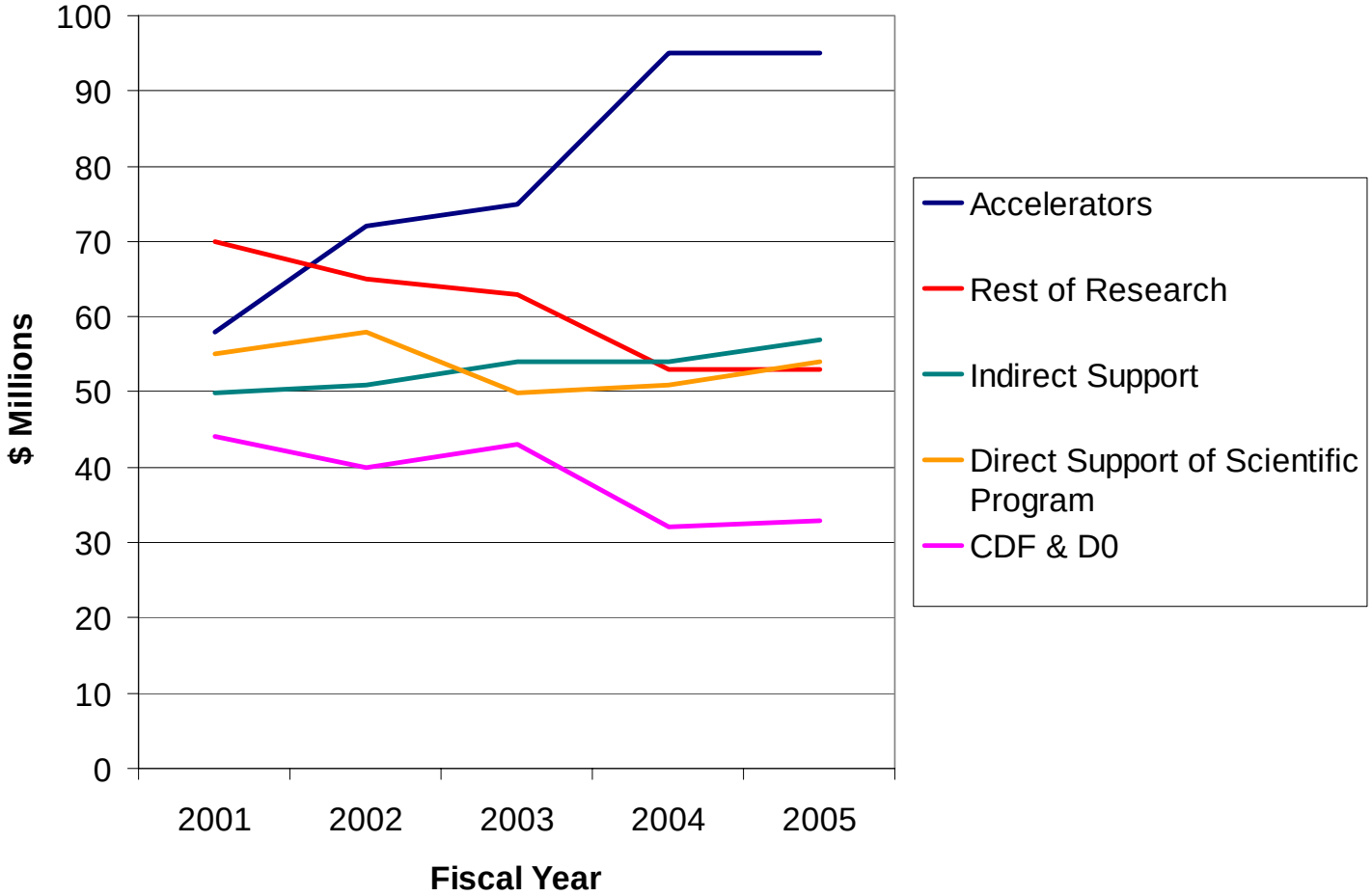
The FY 2005 Budget

FY	02	03	04	05	02-05
HEP	713	716	732	737	3%
Fermilab base	286	285	285	292	2%

Annual budgets in $ millions

- Fermilab budget has been flat from FY 2002 to FY 2004, corresponding to ~$20 M less real effort.
  - We had a Voluntary Early Retirement Program in FY 2003.
- We have managed to support the full accelerator plan.
  - removing silicon detector upgrades
  - less work on the future, infrastructure than there should be
  - very little effort other than on existing commitments
  - redirecting manpower from inside laboratory
- In the President's budget, it will go up ~2% in FY 2005.
  - Run II accelerator improvements stay large.
  - NuMI project ends.
  - BTeV gets a small start.

Total budget is flat, but effort is effectively redirected within lab.



Budget Allocation

- We give initial guidance to the Divisions and Sections with their budget allocation and any new priorities or direction.
- In a series of budget presentations in the fall, the Division and Section Heads present to the Directorate and the other Heads:
  - their mission and task list for the year;
  - what can be done with the budget guidance;
  - the most important things that could not be done;
  - their concerns and issues.
  - We use these meetings to reach conclusions on what the laboratory is able to do each year.
- Meetings with Division and Section Heads throughout the year serve to update all of these areas.

Management meetings

- Weekly

  Directors | All Experimenters | Scheduling

- Biweekly

  Division Heads | Scientific Advisory

- Project Management Groups (mostly monthly)

  NuMI | CDF upgrade | D0 upgrade

  Accelerator | US-CMS | US-LHC

- Other monthly

  Run II Strategy | Lab Administrative | Run II Task Force

Assessments: Advisory committees and major Fermilab and URA reviews

- 1 per year

  URA Visiting Administrative Peer review

- 2-4 per year

  Physics Advisory Committee

  Accelerator Advisory Committee

  Board of Overseers

  Run II Advisory Council

  Director's Reviews

  NuMI BTeV

  US-CMS Run II accelerator

- Continuing program of self-assessment

Major DOE reviews

- Major annual reviews of the laboratory
  - Annual Program Review
  - Operations Review
  - Onsite Review by Office of Science
  - Budget meeting
- Semiannual (Lehman) reviews
  - Run II
  - NuMI
  - US-LHC
  - US-CMS
  - BTeV
- Advisory panels
  - HEPAP
  - P5

Vision I: FNAL hosting Linear Collider

- Linear Collider under construction near Fermilab
  - Fermilab at the center of future discoveries and understanding
  - Major part of Lab activity
- Neutrino Program
  - Based on improvements to the accelerator complex and the experiments over the next ten years
- Large Hadron Collider Program
  - Accelerator and experiment: Fermilab leading center for CMS physics
- Other experiments at FNAL
  - As physics demands
  - Quark Flavor may still be key
  - Other programs
- Astroparticle physics, Accelerator R&D
- Non-particle science

Vision II: FNAL with Linear Collider Offshore

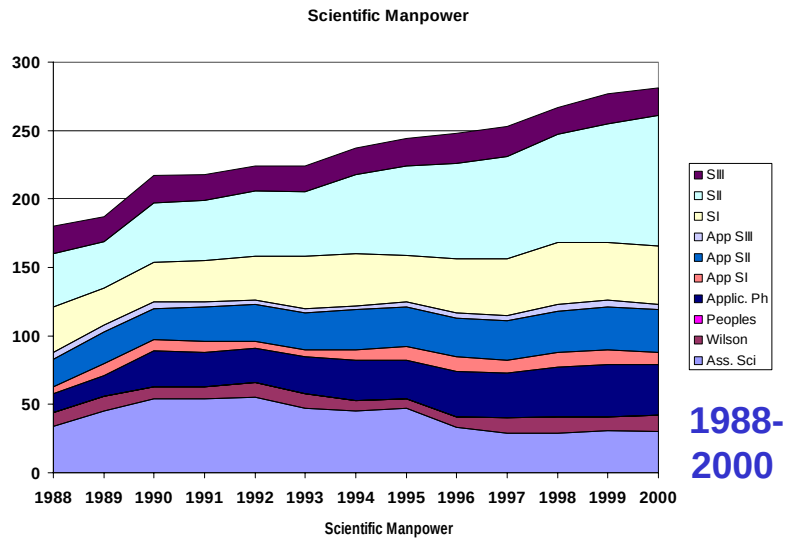
- Fermilab Neutrino Program
  - World leading long baseline program
  - New accelerator-Proton Driver
- Linear Collider offshore
  - Significant Lab resources in this activity
- Large Hadron Collider Program
  - Accelerator and experiment: Fermilab leading center for CMS physics
- Other experiments at FNAL
  - As physics demands
  - Quark Flavor may still be key
  - Other programs
- Astroparticle physics, Accelerator R&D
- Non-particle science

R&D on Future Accelerators

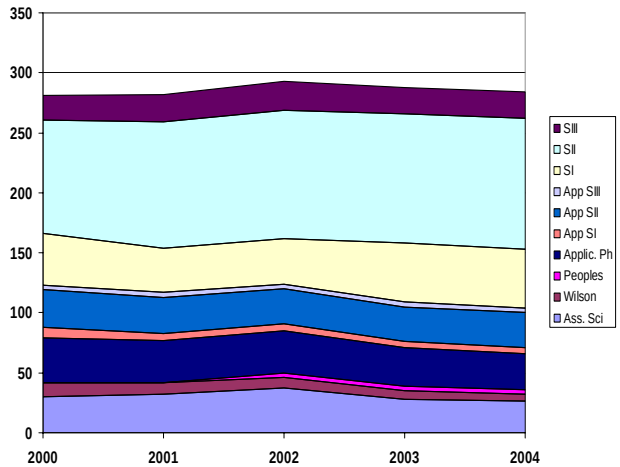
- We are doing accelerator R&D aligned with the future facilities called out in the Fermilab Long-range plan and the SC facilities plan.
  - LHC luminosity upgrade
  - Linear collider
  - Proton driver
- We do a small amount of R&D toward the longer-term future.
  - High-field superconducting dipoles
  - Advanced accelerator R&D
- Other programs doing very good work have been curtailed.
  - Low-field superconducting magnets
  - Muon facilities
- R&D groups have made surprisingly good progress with very little budget.
- We are also working with university programs to provide opportunities for training students.

Scientific Staff Size

- From 1988-2000 the scientific staff (not including postdocs) grew from 180 to 281. This could not continue on a constant budget.
- Since 2000, we have been managing this number to be almost constant (281→284).
  - Wilson and Peoples fellows preserved as best source of new scientific talent
  - Accelerator scientists added in critical areas
  - Few Associate Scientists hired in other areas



1988-2000



2000-2004

Infrastructure program

- The goal is to increase the reliability and robustness of the infrastructure that supports Fermilab's scientific program.
- The Utility Incentive Program (UIP) was very successful over 1998 – 2002 in working through backlog of projects.
  - It won DOE awards.
  - A widely disputed legal opinion issued in 2002 killed the program.
- The most immediate need is work on the electrical distribution infrastructure.
  - Replace 2.4 miles incoming 345kV power line & poles
  - 9 miles of underground 13.8kV feeders and associated switches
- SLI program had this in funding plans starting FY 2005.
  - We recently learned that our project was delayed to at least 2011.
  - $12 M needed over 3 years

Summary

- Run II is proceeding well.
  - The integrated luminosity is ahead of the FY 2004 plan.
  - CDF and D0 are getting out many new physics results.
- The big projects are in good shape.
  - NuMI, US-LHC, US-CMS.
- Neutrino program moves to the next step.
  - MiniBooNE has a large data sample, is collecting more.
  - NuMI will start delivering beam to MINOS at the start of 2005.
- Budgets have hit future experiments and R&D hard.
- BTeV is ready to go.
- The Long Range Plan is emerging.