Prospects for ILC Detector R&D Funding

DOE Report (Paul Grannis representing both agencies)
P5 Report
LCDRD funding (FY06-07 Supplement and FY07)
ILC Detector R&D Plan
In 2002, University Consortium for Linear Collider (UCLC) aimed at NSF, and Linear Collider Research and Development (LCRD) aimed at DOE were established to promote LC research at universities - both accelerator and detectors.

First LCRD and UCLC awards were made in FY03.

<table>
<thead>
<tr>
<th></th>
<th>Detector</th>
<th>Accelerator</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>DOE</td>
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<tr>
<td>FY03</td>
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<td>FY06</td>
<td>$1048K</td>
<td>$300K</td>
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</table>

Grannis 9/8/06
University grant process

Relevant bodies (ALCPG, LCSGA, ART ... have screened university proposals and made recommendations to DOE and NSF.

DOE and NSF have done a joint review and selected proposals for support without constraints on who funds, within the overall budget guidance.

Since FY2005, the detector grants have been administered through a single umbrella grant to Univ. Oregon. DOE accelerator grants are to specific universities. NSF uses Cornell for umbrella grant.
“Both DOE and NSF recognize the high priority placed by HEPAP and the recent NRC EPP2010 report on conducting a vigorous R&D program that could lead to the ILC project. Both agencies currently fund university grants for both detector and accelerator research with applicability to the ILC. These programs have been modest but have grown over the past several years.

“Both agencies respond to grants through the peer review process. They welcome proposals for which ILC detector or accelerator R&D is the whole or a component of the effort, as well as for generic research that may have some bearing on ILC issues. In addition, there is often some latitude within existing grant funds to consider new directions. The use of existing grant funds for ILC-related research depends upon the details of each proposal and grant holders are encouraged to speak with their program monitors on the appropriate extent of such activities.”

Grannis
9/8/06
A 2005 WWS panel chaired by C. Damerell compared funded and self-estimated needs for detector R&D in the three regions. The US and Japan lagged behind Europe significantly. The US effort was about 4 times less than Europe, and was funded at about 35% of the estimated need. (Japan received ~$1M new funding recently.)
ALCPG proposes to increase ILC detector R&D at universities to ~$3M in FY2007, with ~$1M early in year for specific deliverables related to tests and ~$2M for the base program later in the year.

If the FY2007 ILC appropriation is at the President’s request (and House markup), DOE will try to meet this goal and continue detector R&D effort and infrastructure at Labs.

DOE/NSF require a plan for multi-year detector R&D with goals, milestones and resource needs. Will peer review proposals, and expect a detector R&D review.
We aim to strengthen the interaction of lab and university detector R&D efforts, and treat program as a coordinated whole.

University detector R&D program will continue and should grow.

Much of the current funding is for generic R&D. Need to plan the transition to detector collaborations & proposals.

There is at present no body that is ideally suited to advise on the relative priority between machine-related R&D and detector R&D. For FY2007, we are using LCSGA for this advice.

Grannis
9/8/06
Rough estimate of R&D phase funding

Out year integral taken from the EPP2010 estimate ($500M over 5 years) plus detector and laboratory SCrf infrastructure, with a canonical ‘project’ profile. Assumes construction funding starts in 2012.

FY2007 is President’s request and House markup; Senate is lower.

Grannis
9/8/06
Action Item 2: Achieving Readiness for the ILC. The United States should launch a major program of R&D, design, industrialization, and management and financing studies of the ILC accelerator and detectors.

U.S. expenditures on R&D for the ILC should be very significantly expanded. The key objective of this R&D program is to reduce both the technical and cost risks of the ILC and to initiate a program that will allow for industrialization of significant portions of ILC components. This effort should continue in the tradition of the broad international collaboration that has been the hallmark of the ILC project to date. The United States should prepare for long-term involvement in the physics program of the ILC as well.

For the accelerator, this commitment should be at a level as high as $100 million in the peak year and could represent a cumulative amount on the order of $300 million to $500 million over the time period prior to the decision to proceed with construction. For detector R&D, the commitment would be near $80 million over the same period, financed in part by the redirection of some university and national laboratory efforts.
Realizing the ILC

The physics questions that the ILC will address require detector capabilities that are beyond the performance of current detectors. To achieve these advances a well-orchestrated detector R&D program is needed. Such a program has been realized in Europe where it is addressing some of the R&D areas that need attention. In the U.S. such a coherent program, including universities and laboratories and centrally managed, is only partially in place. The U.S. efforts on ILC detector R&D are lagging both in terms of funding and manpower. Given that the U.S. wants to play a leading role in the ILC, this problem needs to be addressed and a well-defined U.S. ILC detector program with sufficient funding should be realized.
Detector R&D - WWS

• WWS created the Detector R&D Panel
  – collect information on projects world-wide
  – strengthen coordination and prioritization
  – J-C. Brient (IN2P3), CJS Damerell (RAL), R. Frey (Oregon),
    HankJoo Kim (Kyungpook Natl), W. Lohmann (DESY),
    D. Peterson (Cornell), Y. Sugimoto (KEK),
    T. Takeshita (Shinshu U), H. Weerts (ANL)

• R&D Panel prepared the R&D report to accompany the GDE machine Baseline Configuration Document early this year
  – supported by concepts and R&D teams
Detector R&D - WWS

• R&D Panel Report
  – Draft circulated beginning in January
  – Report updated in April & posted on WWS web page
    • Urgent needs require $32M and 1870 man-years over next 3-5 years - globally
    • Established support over 3-5 years $15M and 1160 man-years - globally
      • Translating man-years to dollars ($100k/man-year)
        – $33M/yr established over 4 years, $22M/yr more required
    • Support notably behind in North America and Japan

• Planning review of R&D
  – Begin in Beijing - Tracking
University Detector R&D in US

This year was the fourth year of support for detector R&D from the agencies since it was first organized by the LCSGA (formerly USLCSG) and the ALCPG.

<table>
<thead>
<tr>
<th>FY05 LCDRD funds</th>
<th>FY06 LCDRD funds</th>
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<tr>
<td>$700,000 – DOE</td>
<td>$1,048,000 - DOE</td>
</tr>
<tr>
<td>$117,000 – NSF</td>
<td>$300,000 - NSF</td>
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</table>

24 projects
25 universities

34 projects
26 universities/labs

http://physics.uoregon.edu/~lc/lcdrd/fy05-awards.html
http://physics.uoregon.edu/~lc/lcdrd/fy06-awards.html
FY07 University Detector R&D in US

We are organizing ourselves in anticipation for increased funding in FY07 – discussed $3M
(5 year R&D plan being developed by ALCPG)

Encouragement led to developing a proposal early for a few (9) high priority, urgent efforts (~$1M)
followed by annual round for another $2M

Supplemental proposal
1 – call for abstracts (received 22)
2 – selection of highest priorities/urgent needs (9)

http://physics.uoregon.edu/~lc/lcdrd/supplement-06a.html
Supplemental LCDRD Proposal

- High Performance Digital Hadron Calorimetry for the International Linear Collider  
  PI - J. Repond
- Development of a Silicon-tungsten Test Module for an Electromagnetic Calorimeter  
  PI - R. Frey
- TPC Development  
  PI - D. Peterson
- Pixel Vertex Detector R&D for Future High Energy Linear e+e- Colliders  
  PI - C. Baltay
- Energy Spectrometers for the International Linear Collider  
  PI - E. Torrence/M. Hildreth
- Pixel-level Sampling CMOS Vertex Detector for the ILC  
  PI - G. Varner
- Detector to Measure the Beam-strahlung Gammas  
  PI - W. Morse
- Long Shaping-Time Silicon Microstrip Readout  
  PI - B. Schumm
- Scintillator Based Muon System R&D  
  PI - P. Karchin

http://physics.uoregon.edu/~lc/lcdrd/supplement-06a.html

This resulting distribution was not by design
FY07 University-based LCDRD Proposal

FY07 proposals will be accepted for continuing and new projects from DOE/NSF funding

One year proposals (third year of 3 year cycle), and future 1-2 year plan (anticipating continuation)

Anticipated timeline

- December 15, 2006 – status reports and new project descriptions due
- May – awards announced - revised budgets/descriptions
- September, 2007 – funded year begins

Details posted on ALCPG web page: http://physics.uoregon.edu/~lc/lcdrd/
Comments are welcomed by all members of the ALCPG exec comm
26 OCT 2006

International Linear Collider
University-based Linear Collider Detector R&D
DOE/NSF funded program
FY 2007

(Grant dates: DOE - Sep 1, 2007-Aug 31, 2008

Guidelines for the FY2007 Proposal Process
FOR CONTINUING DOE or NSF PROJECTS:

Important dates:
December 15, 2006: Status Report due. Please submit to Jim Brau both the original file and a pdf file
for your Status Report. LaTeX is preferred for the original, but Word is also acceptable. A LaTeX
Template and its pdf file are given below. If Word is used for the original, the format and structure
should be the same as shown in the template below. Please also send your status report to George
Gollin in pdf and postscript format.

- In addition, if new senior personnel are included on the project, please provide the following:

  January 15, 2007: Biographical Sketch due for new senior personnel. Send to Jim Brau in pdf format,
together with the original LaTeX or Word file.

  January 15, 2007: “Current and Pending Support” Form due for new senior personnel. Send to Jim
Brau as a Word file.

Instructions for preparing your Status Report and supporting material for continuing projects

Latex and Word Template and "Current and pending support" form

  Latex Status Report template (in preparation)

  Word Status Report template

  pdf version of the Status Report template

  “Current and pending support” form (Word file-NSF; Word file-DOE)
FOR NEW PROJECTS:

Important dates:

December 15, 2006: Project Description due. Please submit to Jim Brau both the original file and a pdf file for your Project Description. LaTeX is preferred for the original, but Word is also acceptable. A LaTeX Template and its pdf file are given below. If Word is used for the original, the format and structure should be the same as shown in the template below. Please also send your project description to George Gollin in pdf and postscript format.

January 6, 2007: Letter of Commitment from your institution’s Office of Sponsored Programs due. The letter should be addressed to and sent to Jim Brau, University of Oregon, the Principal Investigator of the umbrella grant, with a copy to Kent Hardin at the University of Oregon. It should specify the name of the contracting officer assigned to this project.

January 15, 2007: Biographical Sketch due. Send to Jim Brau in pdf format, together with the original LaTeX or Word file.


Instructions for preparing your Project Description and supporting material for new projects

Latex and Word Template and “Current and pending support” form

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US ILC Detector R&D Plan

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<th>FY07 Cost(K$)</th>
<th>FY08 Cost(K$)</th>
<th>FY09 Cost(K$)</th>
<th>FY10 Cost(K$)</th>
<th>FY11 Cost(K$)</th>
<th>Total Cost(K$)</th>
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<td>LEP TOTAL</td>
<td>$ 2,836</td>
<td>$ 2,835</td>
<td>$ 2,835</td>
<td>$ 4,673</td>
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<td>VXD TOTAL</td>
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<td>$ 872</td>
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US ILC Detector R&D Plan

• Add milestones
  – ~ 4 per system over 5 years
• Needs further scrubbing
• then submit to DOE
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P5 Report
LCDRD funding (2006/07 Supplement and FY07)
$3M this year
ILC Detector R&D Plan