



Americas Regional Planning Exercises

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Americas Regional Team (ART)

In the Americas region, the ILC program (the RDR effort, and supporting ILC R&D), is executed by the Americas Regional Team, under the coordination of the GDE

ART Director – Gerry Dugan & Mike Harrison
Americas Accelerator Lead – Tor Raubenheimer

ANL-Kwang-Je Kim

BNL-Brett Parker

Fermilab-Bob Kephart, Shekar Mishra, Sergei Nagaitsev

Cornell LEPP- Hasan Padamsee, Mark Palmer

Jefferson Lab -Swapan Chattopadachay, Warren Funk

LLNL -Jeff Gronberg

LBL -Mike Zisman, Christine Celata

SLAC -Tor Raubenheimer, Nan Phinney, Tom Himel

TRIUMF - Shane Koscielniak

Universities- George Gollin



ART Funding

- Most funding is from US DOE HEP office
- Additional funding from US NSF and other countries (Canada) are starting to participate
- DOE ILC accelerator budgets
 - **FY2005: 22 M\$ + ~10 M\$ other funds**
 - **FY2006: 30 M\$ + ~12 M\$ other funds**
 - **FY2007: 60 M\$ (we hope) + ~5 M\$ other funds**
 - FY07, FY08, and FY09 includes detector R&D funding
 - **FY2008: 75 M\$ + SCRF infrastructure (~45 M\$)**
 - **FY2009: 90 M\$ + SCRF infrastructure (~45 M\$)**



Americas Planning: FY06 & FY07

- Plans for 2006 and 2007 were developed from proposals submitted by the labs
 - **Proposals were submitted to Gerry Dugan**
 - Typically proposals amounted to ~2x available funding
 - Gerry selected and narrowed scope to fit in budget
 - Participating labs and Gerry wrote MOUs & task sheets
 - **In 2006, international GDE was just starting and could provide little guidance**
 - **In 2007, GDE R&D Board and RDR Management Board reviewed proposals and provided suggestions for R&D and RDR programs**
- DOE reviewed ART program in April, 2006 and will review again in April, 2007



ART FY06 Budget by Topic

MACHINE AREA	DOE FY06		DOE FY06	NSF FY06
	<i>FTE</i>	<i>M&S Direct</i>	<i>Total</i>	
Program direction and administration	9.50	\$766	\$3,006	\$326
Management	4.10	\$100	\$761	\$0
Global systems	4.47	\$519	\$1,158	\$0
Electron sources	3.35	\$100	\$658	\$0
Positron sources	10.32	\$159	\$1,988	\$0
Damping rings	9.63	\$509	\$2,135	\$0
Bunch compressor	1.30	\$0	\$214	\$0
Main Linacs: Optics, beam dynamics, instrumentation	5.74	\$75	\$988	\$0
Main Linacs: RF systems	16.84	\$1,451	\$4,410	\$0
Main Linacs: Cavities and Cryomodules	16.90	\$3,961	\$7,380	\$242
Beam delivery system	14.38	\$376	\$2,796	\$0
Conventional facilities	2.69	\$519	\$1,039	\$0
Technical Systems	0.00	\$590	\$870	\$0
Reserve			\$2,437	
	99.23	\$9,126	\$29,841	\$568

Most labs are also putting additional funds into ILC R&D. For example, Fermilab is devoting an additional ~\$12 M to developing SCRF infrastructure.



ART FY06 Budget by Lab

<i>Lab/Univ</i>	<i>FTE</i>	<i>DOE FY06</i>		<i>NSF FY06</i>
		<i>M&S</i>		
		<i>Direct</i>	<i>Total</i>	
SLAC	56.18	\$2,683	\$12,300	\$0
FNAL	30.00	\$6,396	\$13,011	\$0
ANL	3.40	\$27	\$300	\$0
Jlab	1.00	\$136	\$522	\$0
Jlab (FNAL MOU)		\$600	\$600	\$0
LLNL	2.25	\$180	\$1,000	\$0
LLNL (SLAC M	0.42	\$50	\$200	\$0
LBNL	3.11	\$42	\$682	\$0
BNL	3.50	\$25	\$600	\$0
Cornell (FNAL MOU)		\$165	\$165	\$0
UNIV	0.00	\$0	\$280	\$568
DOE/NSF/GDE			\$1,146	\$200
sum	99.86	\$9,488	\$29,841	\$768

Most labs are also putting additional funds into ILC R&D. For example, Fermilab is devoting an additional ~\$12 M to developing SCRF infrastructure.



ART Program Breath (2007)

- Design and engineering efforts in support of the GDE Technical Design Report (EDR).
- Cavity and cryomodule work
- RF system development
- Sources, Damping rings, beam delivery
- Global systems
- Technical R&D in support of the US regional interest (proposal to be developed by Osaki panel, formed under the auspices of the LCSGA)



FY07 Lab Requests

MACHINE AREA	DoE FY06 Budget			DoE FY07 Lab Requests		
	FTE	M&S (Direct)	Total	FTE	M&S (Direct)	Total
Program direction and administration	9.5	\$766	\$2,909	12.4	\$1,234	\$4,241
Management	4.1	\$100	\$761	9.6	\$310	\$2,017
Global systems	4.5	\$519	\$1,158	25.0	\$1,787	\$6,645
Electron sources	3.4	\$100	\$658	11.2	\$1,435	\$4,102
Positron sources	10.3	\$159	\$1,988	11.4	\$541	\$3,252
Damping rings	9.6	\$509	\$2,135	15.3	\$617	\$4,239
Bunch compressor	1.3	\$0	\$214	1.2	\$100	\$337
Main Linacs: Optics, BD, instrum.	5.7	\$75	\$988	8.1	\$145	\$1,568
Main Linacs: RF systems	16.8	\$1,451	\$4,410	19.3	\$4,870	\$9,544
Main Linacs: Cavities and Cryomodules	16.9	\$3,961	\$7,380	36.5	\$6,340	\$13,383
Beam delivery system	14.4	\$376	\$2,796	18.6	\$875	\$4,430
Conventional facilities	2.7	\$519	\$1,039	1.6	\$485	\$845
Technical Systems	0.6	\$952	\$1,664	32.9	\$1,514	\$7,503
Reserve			\$1,740			\$3,700
Regional Interest (includes all infrastructure)				107.1	\$18,297	\$39,251
TOTAL	99.9	\$9,488	\$29,841	309.9	\$38,551	#####

Large increases across the program to pursue the R&D but roughly 2x available funds (Presidents FY2007 budget). Meeting in May, 2006 to eliminate duplication and improve coordination between labs.



Global Design Effort R&D

- ILC Global R&D Board reviewed FY07 proposals in light of the GDE ILC priorities
- The RDB generated an R&D table in spring 2006 that prioritized R&D topics
- The R&D Board tried to map this across onto the ART WBS and work packages
 - **Mixed success on this first try – hard to make the mapping and hard to understand connections between proposals – good start**
- Subsequently the results from the RDB task forces will help clarify the R&D goals for many of the systems



FY07 Budget Proposal

MACHINE AREA	<i>FTE</i>	<i>M&S (Direct)</i>	Total	<i>FTE</i>	<i>M&S (Direct)</i>	Total
Program direction and administration	9.5	\$766	\$2,909	10.51	\$780	\$3,373
Management	4.1	\$100	\$761	6.70	\$218	\$1,403
Global systems	4.5	\$519	\$1,158	19.21	\$1,313	\$4,967
Electron sources	3.4	\$100	\$658	4.11	\$28	\$793
Positron sources	10.3	\$159	\$1,988	8.53	\$123	\$2,067
Damping rings	9.6	\$509	\$2,135	8.18	\$447	\$2,337
Bunch compressor	1.3	\$0	\$214	1.20	\$27	\$253
Main Linacs: Optics, BD, instrum.	5.7	\$75	\$988	5.80	\$73	\$1,108
Main Linacs: RF systems	16.8	\$1,451	\$4,410	16.62	\$3,797	\$7,482
Main Linacs: Cavities and Cryomodules	16.9	\$3,961	\$7,380	41.25	\$7,085	\$15,267
Beam delivery system	14.4	\$376	\$2,796	11.48	\$488	\$2,570
Conventional facilities	2.7	\$519	\$1,039	1.60	\$485	\$845
Technical Systems / Engineering	0.6	\$952	\$1,664	17.78	\$823	\$4,028
Reserve			\$1,740	0.00	\$0	\$12,200
Regional Interest				5.00	\$415	\$1,200
TOTAL	99.9	\$9,488	\$29,841	\$158	\$16,100	\$59,894

The details can be found at:

<https://wiki.lepp.cornell.edu/ilc/bin/view/Public/Americas/>



Highlights of FY07 60 M\$ Proposal

- Big increases for cavity/cryomodule and rf sources
 - Fabricate (in industry) 24 and process (at labs) 12 ILC high-gradient cavities
 - Continue R&D on EP processing and develop EP facility at ANL
 - Build 1st US-built cryomodule and design Type-IV cryomodule
 - Build 2 new L-band rf stations with Marx and DTI modulators and CPI and Toshiba klystrons
- Increased effort on global systems: DR kickers, LLRF, controls, and availability related issues
 - Support for ATF2 program PS and instrumentation development
- Increase engineering efforts to start work on EDR



ART FY08-09 Planning

- Program planning and management of the ILC program in the Americas region for the FY08-09 period will rely on a group of WBS level 2 managers
- Under the guidance of the ILC-Americas Regional Director and the GDE Accelerator Design Leader for the Americas, the WBS managers will formulate and guide a collaborative design and R&D program
- This program will utilize the resources in the national laboratories and universities to carry out the GDE-directed R&D and design activities associated with the preparation of the ILC Engineering Design Report
- Two planning meetings in fall 2006



Guidelines for FY08-09 planning

- The scope covers what is needed to complete the Engineering Design Report (EDR), i.e., produce an engineering design for the ILC, and complete the R&D needed to demonstrate feasibility of the key baseline technologies and to finalize baseline design choices
- The plan also include 'regional interest' activities. These are preparatory site-specific activities (Americas site civil engineering, site-specific accelerator design, industrialization activities)
- The plan must be well-coordinated with the GDE priorities and with activities in the other regions
- Once developed, our plans in these areas may need to adapt to GDE planning as this becomes more mature



FY08-09 WBS

- FY08-09 based on FY06-07 ART WBS
 - Main portions are 2.x, 3.x, and 5.x

Level 1 WBS

1.x	Lab program direction and administration
2.x	Design and engineering studies
3.x	R&D for baseline and alternates
4.x	
5.x	Infrastructure for test facilities
6.x	Management reserve
7.x	Regional interest: specific site design, industrialization of US vendors, and public outreach

WBS arranged by Areas and major technical systems

Level 2 WBS

x.1	Management
x.2	Global systems
x.3	Electron sources
x.4	Positron sources
x.5	Damping rings
x.6	Ring to Main Linac
x.7	Main Linacs: Optics, beam dynamics, instrumentation
x.8	Main Linacs: RF systems
x.9	Main Linacs: Cavities and Cryomodules
x.10	Beam delivery system
x.11	Conventional facilities



FY08-09 Planning: WBS L-2 Leads

- **Global systems:** J. Carwardine (ANL)*, R. Larsen (SLAC)
- **Electron sources:** A. Brachmann (SLAC)*, M. Poelker (Jlab)
- **Positron sources:** J. Sheppard (SLAC)*, J. Gronberg (LLNL)
- **Damping rings:** M. Zisman (LBNL)*, M. Palmer (Cornell)
- **Ring to Main Linac and Main Linacs: Optics, beam dynamics:**
P. Tenenbaum (SLAC)*, N. Solyak (FNAL)
- **ML RF systems:** C. Adolphsen (SLAC)*, S. Nagaitsev (FNAL)
- **ML Cavities and Cryomodules:** S. Mishra (FNAL)*, H. Padamsee (Cornell - SRF collaboration leader), J. Mammoser (JLab), M. Kelly (ANL)
- **Beam delivery system:** A. Seryi (SLAC)*, B. Parker (BNL)
- **Conventional facilities:** V. Kuchler (FNAL)*, F. Asiri (SLAC)
- **Regional Interest:** R. Kephart (FNAL)*, E. Paterson (SLAC)

* = lead coordinator



FY08-09 Budget Guidance

- Totals based on guidance from DOE
 - **Two models: ILC only or ILC + SCRF funding**
 - **FY08: 75M\$ + 45M\$ (SCRF Infrastructure)**
 - **FY09: 90M\$ + 45M\$ (SCRF Infrastructure)**
- Provided 1st guidance for Level-2 managers based on expectations of program needs
 - **Iterate and rebalance and 1st proposals**
- Requested plans for both Target 1 & 2 prioritized to facilitate the rebalancing between programs



FY08-09 Budget Guidance

MACHINE AREA	Target 1 FY08	Target 1 FY09	Target 2 FY08-ILC	Target 2 FY08-SRF	Target 2 Total	Target 2 FY09-ILC	Target 2 FY09-SRF	Target 2 Total
Lab program direction and administration	\$3,800	\$4,000	\$4,000		\$4,000	\$4,000		\$4,000
Management	\$1,600	\$2,000	\$2,000		\$2,000	\$2,500		\$2,500
Global systems	\$5,751	\$7,012	\$6,449	\$4,170	\$10,619	\$7,102	\$3,539	\$10,641
Electron sources	\$1,497	\$2,011	\$2,034		\$2,034	\$2,992		\$2,992
Positron sources	\$2,351	\$3,038	\$3,956		\$3,956	\$4,898		\$4,898
Damping rings	\$3,200	\$4,000	\$5,000		\$5,000	\$6,500		\$6,500
Ring to Main Linac	\$537	\$984	\$780		\$780	\$1,877		\$1,877
Main Linacs: Optics, beam dynamics, instrumentation	\$2,426	\$3,037	\$2,992		\$2,992	\$3,429		\$3,429
Main Linacs: RF systems	\$9,125	\$12,372	\$6,284	\$6,056	\$12,340	\$14,866	\$3,167	\$18,033
Main Linacs: Cavities and Cryomodules	\$25,391	\$27,554	\$19,691	\$30,047	\$49,738	\$16,260	\$31,597	\$47,857
Beam delivery system	\$4,282	\$4,874	\$6,115		\$6,115	\$6,556		\$6,556
Conventional facilities	\$4,000	\$7,000	\$4,000		\$4,000	\$7,000		\$7,000
Detectors	\$6,000	\$7,000	\$6,000		\$6,000	\$7,000		\$7,000
TOTAL	\$69,960	\$84,882	\$69,301	\$40,273	\$109,574	\$84,980	\$38,303	\$123,283
Reserve	\$5,040	\$5,118	\$5,699	\$4,727	\$10,426	\$5,020	\$6,697	\$11,717
TARGET	\$75,000	\$90,000	\$75,000	\$45,000	\$120,000	\$90,000	\$45,000	\$135,000



Highlights of FY08-09 Program

- Support for S0/S1/S2 world-wide program
 - **Scope of program (Industrial and S2 support) depends on SCRF funding**
- Development program for rf power sources
 - **Sources provided for ILCTA/S2 test**
- Global systems program with controls, LLRF and support for test facilities
- Broad damping ring program including e-cloud and kicker development
- Strong BDS effort coordinated with UK
- CFS program for EDR and to develop sites



Next Steps for FY08-09

- FY08-09 budget mainly focused on R&D – some support for EDR but likely insufficient
- Planning was based on completion of 60 M\$ program in FY07 but continuing resolution and lower budget will cause elements to be deferred to FY08-09
- Big variation depending on availability of additional SCRF funding
 - **President's FY08 budget to be released this week – we'll see!**
- Some international consideration but need to develop a real integrated international plan



Summary

- ART has been organizing a strong ILC effort
- Planning process has evolved from prioritizing lab proposals towards more of a project structure
- Detailed plans have been developed for FY08-09
 - **These can be used when developing an international plan for the EDR**
 - **WBS arranged by Area and major Technical but need additional effort from TS/GS**
 - **Need to include sufficient engineering for the design effort and need to update the plans for the actual effort in FY07**