Americas

US ILC R&D Program

US Program Status FY08

GDE Update

- Collaboration – regional
- Collaboration - Projects
- Siting & Governance

ART Program – FY09 ->

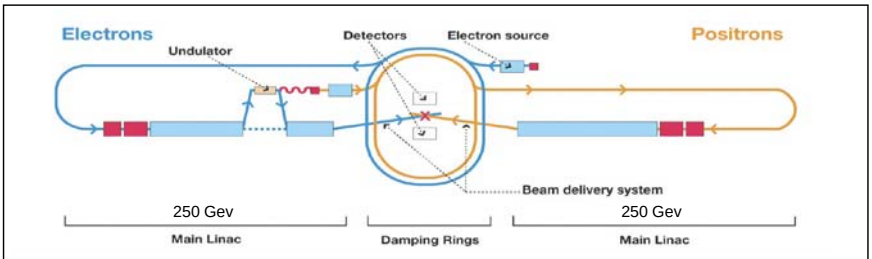
- Overall Strategy
- New WBS
- Electron Source R&D
- Global Systems R&D
- Accelerator Physics
- Management

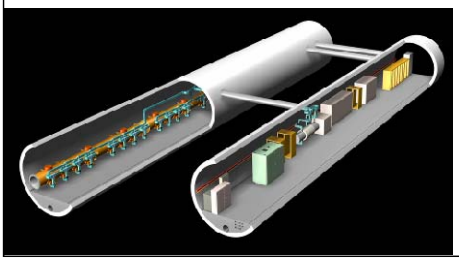
Issues

Summary

Americas

ILC Baseline Design





e+ e- Linear Collider

Energy	250 Gev x 250 Gev
Length	11 + 11 km
# of RF units	560
# of cryomodules	1680
# of 9-cell cavities	14560

2 Detectors push-pull
2e34 peak luminosity
5 Hz rep rate, 1000 -> 6000 bunches per cycle
IP spots sizes: σ_x 350 – 620 nm; σ_y 3.5 – 9.0 nm

Americas

ART FY08 Status

- The FY08 omnibus spending bill capped US DOE FY08 ART funding at $15M (SRF $5M). Since we were 3 months into the fiscal year with a $60M CR guidance this was tantamount to a 'cease work' for the balance of FY08. NSF Cornell support was minimally impacted.
- All spending was halted ~ 1 Jan and a count of funds remaining at the labs indicated an unobligated balance of ~ $2.5M under the cap. A skeleton program continues in FY08.
  - GDE Common Fund ($400K)
  - GDE Collaboration management (4 FTE's: Barish, Ross, Harrison, Carwardine) + some travel for meetings
  - CESR TA support ($1m)
  - 'Keep alive' SRF program (~$1.5M)
- There is some level of 'generic' support through the FY08 base program

Americas

ART FY08 Status

- Nonetheless since the last ART review progress has been made in many areas (~ 60% average duty factor since last May)
  - High gradient on US (and other) cavities
  - Type IV cryomodule design close to completion (plug & play)
  - Cavity processing facility at ANL under commissioning
  - e-cloud R&D at CESR TA has started
  - Marx modulator testing
  - ATF2 at KEK is starting to operate with beam. Significant US hardware component
  - MDI progress

Mike Harrison
DOE/NSF ART Review
June 08

GDE Regional : Japanese Roadmap Report on Prospects for Particle Physics (Atsuto Suzuki KEK DG, Sendai, March 2008)

Americas

- Community's master plan
  - Highest priority is given to ILC.
  - Before the ILC experiment commences, flavor physics at KEKB and J-PARC, and energy frontier physics at LHC are promoted.
  - The above two goals should be pursued in a single master plan.
- Action plans before the ILC approval
  - ILC R&D
  - Completion/commissioning of J-PARC
    - ➢ Considering the world competition, it is urgent to improve neutrino intensity
  - Continuation of KEKB/Belle with upgrading

GDE Regional: Federation of Diet Members for promotion of the ILC project

Americas

- Built in 2006 (June 15th):
- Members: At present more than 60 Diet members.
- Chair: Mr. Kaoru Yosano (former Cabinet Secretary, Minister of MEXT, METI,,,)
- Secretary: Mr. Takeo Kawamura (former Minister of MEXT)

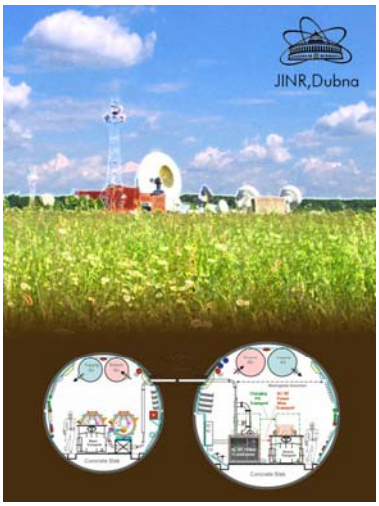
2006
June Foundation of the Federation
Sep. KEK visit of the Federation members

2007
Jan. ~ May --- a series of Workshop (1st – 7th)
Lecture by prominent physicists, economists, industry sector, etc.
June ~Nov. Discussion on the preliminary report by Federation
Nov. Publish preliminary report (1st summary report)

2008 June 11th - forum for promotion of advanced accelerator technology and science established. Industry- government-academia alliance to pursue R&D for next- generation accelerators. Mitsubishi, Toshiba, KEK, etc….

Americas

GDE Regional – Russia



JINR Dubna site proposal for ILC

G.Trubnikov

Joint Institute for Nuclear Research

Sendai, March 2008

Ar

GDE Regional: Dubna Siting: Layout of ILC in the Moscow Region

Americas

GDE Regional: Russian Satellite Communication Center
Possible starting point of ILC layout

Americas

GDE Regional: India

- **Over the past 18 months we have seen significant interest from India in SRF technology development. Indian National lab complex slated for large growth during the next 5 years**
- **Bi-lateral agreements with Fermilab, KEK**
- **GDE visit March 08**

Collaboration between India and Japan for SCRF technology

Indian-Japanese collaboration for electropolishing: Sankar, Sokhey, Hayano and Bose.

Indian Participation
to be discussed

- Basic R&D for Cavity
  - Preparation process for high gradient
- Cryomodule design
  - Join the "plug-compatible" design effort,
- Test facility and Test
  - Join the facility construction and qualification of the facility and the cavities,
- Asian cooperation
  - To be discussed
  - In parallel to global lab-to-lab cooperation program

Visiting Authorities and Laboratories in India
Agenda

Day	Visiting	Note
3/10	Japanese Embassy, IUAC (Delhi)	
3/11	RRCAT (Indore)	
3/12	DAE (Delhi) to meet Atomic Energy Chairperson (A. Kakodkar)	
3/13	TIFR (Mumbai)	
3/14	VECC (Kolkata)	

Americas

GDE Regional: UK Budget Issues

- In Dec. As part of a bigger funding crisis the new UK funding agency (STFC) announced that the UK will drop the ILC from their program. The FY08 resource level was projected at ~40 FTE's,
- Recent parliamentary inquiry somewhat unimpressed
  - *" the Science and Technology Facilities Council, and particularly its chief executive, Keith Mason, for lamentable planning, leadership and communication"*
  - *"the UK looks like an "unreliable" and "incompetent" partner when it comes to science."*

Americas

GDE Regional: UK Budget Issues

House of Commons
Innovation, Universities, Science and Skills Committee

Science Budget Allocations: Government Response to the Committee's Fourth Report of Session 2007–08

Seventh Special Report of Session 2007–08

Ordered by The House of Commons to be printed 11 June 2008

STFC has honoured all of its existing commitments to its international partners but decided to reduce future investments in some. Although, it is true STFC has chosen not to ramp-up investment in the current International Linear Collider project, STFC will continue to participate in developing global strategies for future Linear Colliders and continues to honour its commitments to the common development fund. These decisions have been taken on the basis of peer-review evidence. This ensures that the UK's substantial investment in the Large Hadron Collider at CERN is exploited before embarking on a further facility of such scale. The US Congress seems to share this analysis and has massively cut US spending on the ILC.

Certainly a change of tone if nothing else

Mike Harrison
DOE/NSF ART Review
June 08

Americas

GDE Global – Project Collaboration

- **US/UK funding decisions have added greater impetus for GDE collaborative involvements**
  - **Building close collaboration with the XFEL Project at DESY. It will provide all SRF development, except high gradient and including large scale mass production, facility commissioning in 2013, industrialization, etc.**
  - **Taking advantage of alignments and synergies where they will exist within the US program:- generic SRF program, Project X development, etc**
  - **Undertaking steps to integrate linear collider (ILC and CLIC) R&D efforts, where beneficial to both sides (meeting on 8-Feb, May 13/4). Examples –sources, damping rings, beam delivery, conventional facilities, detectors. Five joint working groups have been set up with visibility at the recent Dubna meeting.**

Americas

GDE Global – Governance & Siting

As part of the preparation activities for Project Proposal the GDE has started to think about both Governance and Siting strategy.

- **ILCSC will be the lead on the siting strategy**
- **Desired features, requirements, cost and other information for potential hosts**
- **What is asked from hosts?**

- **GDE will be the lead on governance**
- **Do we remain committed to a truly global governance model? If so, what are the key features of such a model? What can we learn from the recent past (ITER, ALMA, SKA)?**
- **In such a global model, what is the role of the "host" country?**
- **If not global then a CERN-like treaty based model ?**

Ultimately, there will be a global, high level process that decides on the governance, siting and the model for host versus non-host responsibilities but the ILC should be willing to provide guidance on these issues.

Americas

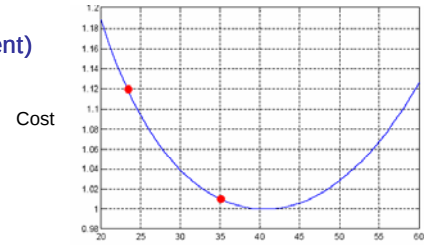
ILC Global R&D Program

What are the drivers for the global program ?

Cost Risk
- Main Linac RF systems (cavity gradient & yield, cryomodules, HLRF etc..
- Conventional construction/facilities

Technical Risk
- Electron cloud effects in the damping rings
- Beam delivery system (small beams)

Production Risk (industrial involvement)
- Technology transfer
- Volume production



Americas

ILC Re-planning Exercise

DRAFT

ILC Research and Development Plan for the Technical Design Phase

Release 1
Rev 3
May 2008

ILC Global Design Effort

Director: Barry Barish

Prepared by the Technical Design Phase Project Management

Project Managers: Marc Ross, Nick Walker, Akira Yamamoto

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Americas

US ILC Program – P5 (selected quotes)

If the optimum initial energy proves to be at or below approximately 500 GeV, then the International Linear Collider is the most mature option with a construction start possible in the next decade.

The cost and scale of a lepton collider mean that it would be an international project, with the cost shared by many nations. –

- International negotiations will determine the siting; the host will be assured of scientific leadership at the energy frontier.
- A requirement for initial energy much higher than the ILC's 500 GeV will mean considering other collider technologies

Whatever the technology of a future lepton collider, and wherever it is located, the US should plan to play a major role.

The panel recommends for the near future a broad accelerator and detector R&D program for lepton colliders that includes continued R&D on ILC at roughly the proposed FY2009 level in support of the international effort. This will ensure a significant role for the US even if the ILC is built overseas.

Americas

The ART FY09 Program

- **The FY09 presidents budget shows US ILC at $35.3M (the recent House mark-up shows slightly more science support than the president)**
- **The out year assumption is constant level of effort for the next several years**
- **No detailed US ILC multi-year program yet but it is conceptually compatible with the new GDE R&D plan.**

Strategic goals for ART ->

- **Preserve collaborative commitment to the GDE**
- **Provide contributions to the ILC R&D program which are unique to the US**
- **Support a value engineering effort in the medium term**
- **Maintain US presence in ILC SRF R&D**
- **Project X synergy (SRF, HLRF, LLRF, accelerator physics)**

Americas

ART Program Planning (last year assumptions from Gerry's presentation to this committee !!)

	FY08 FTE	FY08 M&S	*FY08 Total*	FY09 FTE	FY09 M&S	FY09 *Total*
BY GENERAL CATEGORY						
WBS 1: Management	16.28	$1,120	*$5,242*	21.98	$1,320	*$6,893*
WBS 2: ILC Accelerator Design and Engineering	56.19	$1,233	*$12,763*	88.56	$2,182	*$21,206*
WBS 3: ILC R&D	81.17	$13,379	*$32,482*	100.63	$23,848	*$49,552*
WBS 5: ILC Infrastructure and test facilities	42.16	$5,436	*$14,426*	56.12	$5,532	*$17,571*
WBS 7: Regional Interest R&D and Infrastructre	8.50	$6,305	*$8,788*	17.00	$20,500	*$26,816*
Detectors			*$7,000*			*$8,000*
Reserve			*$2,699*			*$4,962*
TOTAL	204.29	$27,472	*$83,400*	284.29	$53,382	*$135,000*

- FY07 actual budget was $42M after the end of the FY07 CR. We were expecting $60M.
- Anticipated FY08 budget was $60M (Presidents, House, Senate, Conference)

Americas

US ART Program - major elements (2009 – 2012)

- Cavities & Cryomodules – Fermilab (ANL, JLAB, Cornell)
- RF Systems – SLAC
- Damping rings electron cloud – Cornell (DOE & NSF)
- Beam delivery systems/MDI – SLAC (BNL)

Americas

ART DOE FY09 Funding by System

Program Element	$M	%
GDE & Lab Management	4.99	14.3
Electron Source	0.94	2.7
Damping Rings	2.51	7.1
Beam Delivery	4.51	13.1
Accelerator Physics	1.63	4.8
Global systems	1.82	5.9
RF Technology (SRF + systems)	16.07	43.1
Conventional Facilities	0.98	2.8
Contingency	1.92	6.2

Americas

ART FY09 Allocations - $35.3M total

Institution	$K
SLAC	11913
Fermilab	11697
JLAB	2097
BNL	2100
Argonne	1436
LLNL	200
LBL	260
Cornell	2724 + ~5000 (NSF)
GDE/ART	3389 +(1916)

Americas

ART FY09 $35M Program – SRF Technology

- **Reduction of ~ 50% from the $60M level**
  - **Maintain US presence in the GDE SRF program but no out year ramp up.**
  - **No industrialization (tech transfer only).**
  - **Consistent with 2012 systems tests (joint goal between ART & Fermilab).**
  - **Gradient program at JLAB & Cornell (+ANL/Fermilab)**
  - **Cryomodule prototyping at Fermilab (cryomodule engineering, cryomodule parts, testing etc….. $25M over 4 yrs)**
  - **Note: cryomodule development assumes some Fermilab infrastructure (horizontal test stand, cryomodule assembly facilities, cryomodule test stand)**
  - **ILC separated from generic SRF funding**

Americas

US ART Program – Global Cavity Program

Americas	FY06 (actual)	FY07 (actual)	FY08	FY09	FY10	TOTAL TDP1	FY11	FY12
Cavity orders	22	12	0	10	10	**54**	10	10
Total 'process and test' cycl	40	5	45	30	**120**	30	30	
Asia	**FY06 (actual)**	**FY07 (actual)**	**FY08**	**FY09**	**FY10**		**FY11**	**FY12**
Cavity orders	8	7	15	25	15	**70**	39	39
Total 'process and test' cycl	21	45	75	45	**186**	117	117	
Europe	**2004-06 (actual)**	**2007 (actual)**	**2008**	**2009**	**2010**		**2011**	**2012**
Cavity orders	60			838		**898**		
Total 'process and test' cycl	14	15	30	100	**159**	354	354	
Global totals								
Global totals	90	19	15	873	25	**1022**	49	49
Global totals	**0**	**75**	**65**	**150**	**175**	**465**	**501**	**501**

Approximate regional parity in cavity processing and testing thru FY10

Americas

ART FY09 $35M Program – Accel Systems

- **Electrons**
  - 20% reduction
- **Positrons**
  - US efforts eliminated
- **Damping Rings**
  - All effort eliminated except e-cloud R&D at CESR-TA (with NSF) and lab support for the same
- **RF systems**
  - Hardware deliverables reduced - preserve R&D at SLAC in HLRF
- **Beam Delivery System**
  - 10% reduction
- **Accelerator physics/Global systems**
  - 50% reduction
- **Conventional Facilities**
  - No bid to host or site categorisation

Americas

ART Program - Hosting

The concept of the requirements for an ILC host has been relatively stable for the past few years. The host would be expected to provide ~50% of the total cost. This is made up of the site specific costs together with contributions summing to 33% of the remaining value costs. The host would also be expected to donate any land needed by the Project. In order to construct and operate the machine successfully the host would need to have wide ranging involvement in all the various technical elements of the program; with the SRF systems prominent.

As a Non-Host then depending on the number of collaborating countries the contribution would probably lie in the range of 10-25%. Technical involvement does not need to be across the board and targeting specific sub-systems for contributions will be necessary.

A program at the anticipated level of FY09 lacks the resources to provide a broad-based R&D program consistent with a host scenario.

Americas

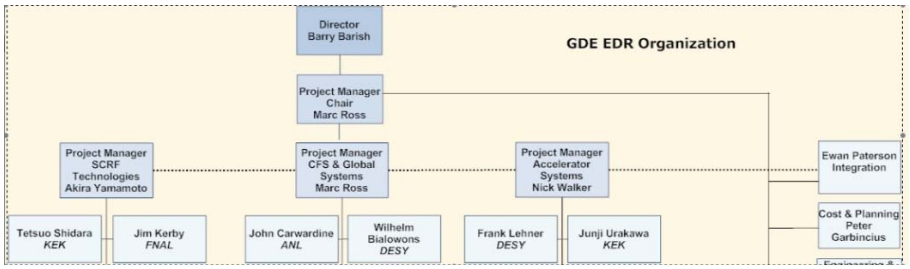
ART Program – new WBS for FY09

The new WBS structure is a significant simplification over something aimed at a construction project – simplified management, reporting, logistics etc…

Cavity & Cryomodule	**31.88**	**$4,149**	**$2,661**	**$3,131**	**$9,940**
Cavity Coordination & Management	**1.68**	**$241**	**$74**	**$181**	**$496**
Cavity Coordination & Mgmt @ FNAL	0.50	$97	$0	$77	$173
Cavity Coordination & Mgmt @ JLab	0.50	$54	$18	$29	$100
Cavity Coordination & Mgmt @ Cornell	0.20	$25	$6	$19	$50
Cavity Database	0.48	$66	$50	$57	$173
Cavity Fabrication	**0.67**	**$71**	**$18**	**$36**	**$125**
Large Grain single-Cell Cavities @ JLab	0.67	$71	$18	$36	$125
Cavity QC and Tuning	**0.00**	**$0**	**$0**	**$0**	**$0**
Cavity Processing and Vertical Testing	**10.72**	**$1,327**	**$231**	**$733**	**$2,291**
Cavity Processing & Vertical Testing @ Cornell	1.50	$180	$60	$144	$384
Cavity Processing & Vertical Testing @ JLab	6.26	$671	$79	$300	$1,050
Cavity Processing @ ANL	1.08	$221	$75	$95	$391
Cavity Vertical Testing @ FNAL	0.91	$123	$8	$94	$225
Cavity Processing @ ANL/FNAL Facility	0.97	$131	$10	$100	$241
Cavity Gradient R&D	**3.78**	**$475**	**$126**	**$300**	**$901**
Cavity Gradient R&D @ Jlab	2.23	$239	$46	$114	$400
Cavity Gradient R&D @ Cornell	0.50	$80	$55	$81	$216
Cavity Gradient R&D @ ANL	0.20	$40	$5	$15	$60
Cavity Gradient R&D @ FNAL	0.85	$116	$19	$90	$225
Cavity Dressing	**2.71**	**$367**	**$370**	**$334**	**$1,071**
Cavity Dressing @ FNAL	2.71	$367	$370	$334	$1,071
Cavity Horizontal Testing	**2.90**	**$393**	**$250**	**$335**	**$978**
Cavity Horizontal Testing @ FNAL	2.90	$393	$250	$335	$978
Cavity & Cryomodule Component R&D	**0.68**	**$87**	**$64**	**$71**	**$223**
Cavity R&D - Value Engineering	0.48	$66	$50	$57	$173
Cryomodule Component R&D - Value Engineering	0.20	$21	$14	$14	$50
Cryomodule	**7.15**	**$969**	**$1,270**	**$930**	**$3,170**
Type IV Cryomodule design	1.93	$262	$200	$229	$691
Cavity & Cryomodule Safety Analysis	0.48	$66	$50	$57	$173
Type IV Cryomodule Components (except cavities)	0.39	$52	$750	$159	$962
Cryomodule Magnet Design	0.48	$66	$100	$65	$231
Cryomodule Instrumentation Design	0.48	$66	$70	$60	$196
Cryomodule Assembly	3.38	$459	$100	$360	$918
Dressed Cavities for S1 Global	**1.60**	**$219**	**$258**	**$210**	**$687**
Two Dressed Cavities for S1 Global	1.33	$181	$176	$164	$521
Two Couplers for S1 Global	0.26	$38	$82	$46	$166

Americas

ART Program – GDE Management



US stills plays a significant role in the GDE management

Americas

ART Program – GDE SRF Management

Regional/Intsitutional Effort:
- Director-US: Mike Harrison
- Director-EU: B. Foster
- Director-AS: M. Nozaki

Technical Effort (ML (SCRF) Technology):
- Project Manager: A. Yamamoto
- Associate Managers: T. Shidara, J. Kerby,

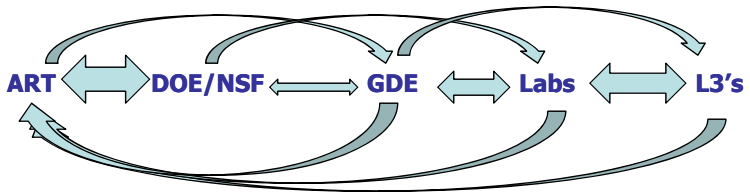
* Group leader, ** Co-leader

Regions	Institute	Institute Leaders	Cavity (Process) L. Lilje*	Cavity (Prod./Int.) H. Hayano*	Cryomodule N. Ohuchi* -H. Carter**	Cryogenics T. Peterson*	HLRF S. Fukuda*	ML Integr. C. Adolphsen
US	Cornell Fermilab SLAC ANL J-lab	H.Padamsee R. Kephart T.Raubenhaimer W. Funk	H.Padamsee M. Shekhar	C.Adolphsen	M. Champion	T.Peterson	R. Larsen	C. Adolphsen
EU	DESY CERN Saclay Olsay INFN Spain	R.Brinkman J. Delahaye O. Napoly G. Wormser C. Pagani	L.Lilje TBD	L. Lilje TBD S. Pratt C. Pagani	Parma F. P.	Tavian		
AS	KEK Korea Inst. IHEP Indian Inst.	K.Yokoya	Hayano, Noguchi, Saito TBD	Hayano TBD	Tsuchiya/ Ohuchi TBD	Hosoyama/ Nakai TBD	S. Fukuda TBD	Hayano/Ohuchi TBD

Americas

ART Program – ART Management

Recent ART Program development has relied on an iterative process



Difficult to be precise about exactly how the priorities are established in ART but it involves multi-lateral discussions at several levels

Program management (cost & schedules etc..) follows the lab line management with ART oversight

Americas

ART Program – Electron sources

international linear collider

ILC-Americas
General Electron Source R&D plan for FY09-FY12

Work scope period: FY09 - FY12
Work Package Leader: Axel Brachmann/ Matt Poelker
Laboratory: SLAC/Jlab
Date: 05/15/08

Scope

Three general projects:

- **Source laser R&D (SLAC)**
- **Polarized photocathode development (SLAC)**
- **DC electron gun development (JLAB)**

Synergies include SBIR's at SLAC, CEBAF AIP, BNL, FNAL

			Data				
L3 Title	WBS L4	Description	Sum of FY09 FTE	Sum of FY09 Dir Labor (K$)	Sum of FY09 Dir M&S (K$)	Sum of FY09 Indir (K$)	Sum of FY09 Total (K$)
1.2.1 Electr	1.2.1.1	Electron Source R&D @ Jlab	1.50	$195	$73	$107	$375
	1.2.1.2	Electron Source R&D @ SLAC	1.80	$265	$100	$195	$560
1.2.1 Electron Source R&D Total			3.30	$460	$173	$302	$935
Grand Total			3.30	$460	$173	$302	$935

Americas

ART Program – Global systems

			Data				
3 Title	WBS L4	Description	Sum of FY09 FTE	Sum of FY09 Dir Labor (K$)	Sum of FY09 Dir M&S (K$)	Sum of FY09 Indir (K$)	Sum of FY09 Total (K$)
.8.1 Globa	1.8.1.1	High Availability Systems @SLAC	1.00	$160	$95	$127	$382
	1.8.1.2	Control system high availability @ANL	1.00	$193	$90	$89	$372
	1.8.1.3	Control system high availability @FNAL	0.48	$66	$25	$53	$144
.8.1 Global Controls Total			2.48	$419	$210	$269	$898
.8.2 Instru	1.8.2.1	Advanced beam monitors for ILC	0.97	$131	$100	$114	$345
.8.2 Instrumentation and Feedback Total			0.97	$131	$100	$114	$345
.8.3 LLRF	1.8.3.1	LLRF control system analysis	0.97	$131	$75	$110	$316
.8.3 LLRF Total			0.97	$131	$75	$110	$316
.8.4 Cryod	1.8.4.1	Cryogenic System Design	0.97	$131	$25	$102	$258
.8.4 Cryogenics Total			0.97	$131	$25	$102	$258
.8.5 Magn	1.8.5.1	(blank)	0.00	$0	$0	$0	$0
.8.5 Magnets Total			0.00	$0	$0	$0	$0
rand Total			5.38	$812	$410	$596	$1,817

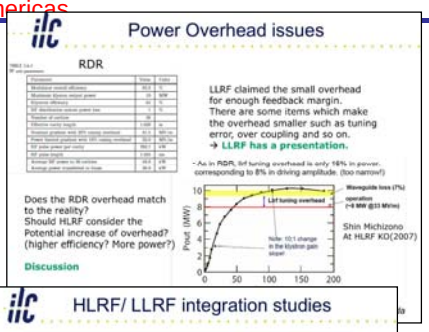
We are considering consolidating more effort into the LLRF R&D in collaboration with DESY/XFEL. This also fits in with the concept of the Fermilab system test.

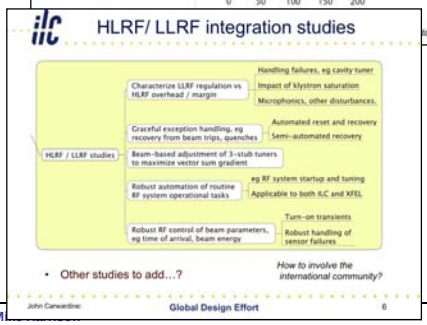
High availability system development will continue

Cryogenic design with Fermilab as the global lead

Americas

ART Program – Global systems: LLRF





RF System tests with ILC-spec beam (gradient ≤ quench, beam loading, long pulses)

- Cavity 'vector sum' control with gradient spread, running close to quench limits
- RF Station power budget / overhead
- Configuration of power distribution for all operational conditions (QI and Pk)

- ***Part of "9mA studies" at FLASH (3nC / bunch, 2400 bunches @ 3MHz, 5Hz)***
- ***Longer-term program for NML, STF,…***

LLRF is a major GS focus for TDP Phase I:

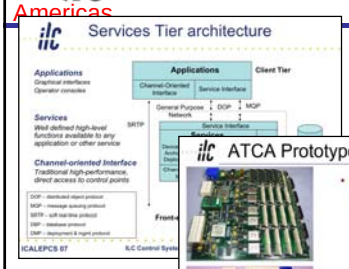
- Beam studies + Generic LLRF dev't
- Will require support on Controls and Instrumentation & Feedback

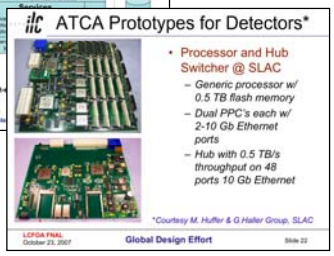
Generic LLRF Development

- RF and vector sum auto-calibration
- Reference line development
- Automation of operations and fault recovery

Americas

ART Program – Global systems: high availability controls





Major topic areas

- **High Availability**
- **Remote resource management**
- **Services framework**
- **Automation & feedback**

Momentum & visibility building in the worldwide community

- **Growing international participation: ANL, DESY, FNAL, IHEP, KEK, SLAC, …others**
- **Connections with ITER Controls Group**
- **Invited papers at PAC07 and ICALEPCS07**
- **SBIR Ph-1 grant on Services Architecture**

Growing community interest in ATCA/uTCA

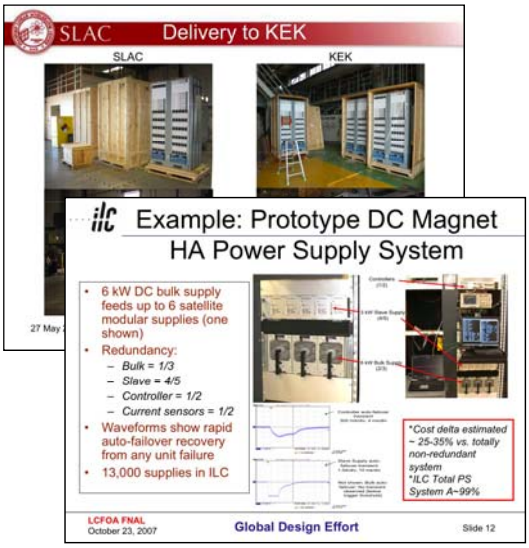
- **Selected by DESY for XFEL LLRF & Controls**
- **Collaboration with detector groups (ILC, CMS,…**
- **Completion of a draft spec "ATCA for Physics"**
- **VME-ATCA adapter module by SAIC**
- **2-day workshop on ATCA/uTCA for Physics at IEEE NPSS in Dresden**

ART Controls was all but brought to a stand-still by the FY08 budget

Key expertise has been lost to other programs

Americas

ART Program – Global systems: high availability power supplies



High Availability power supplies:

- M+1 redundant power modules
- Redundant regulators
- 38 power supply units delivered to KEK for ATF2

Development will continue in FY09

- Redundant power modules for bipolar power supplies
- Modular diagnostic monitoring for prediction of failures and post-mortem analysis

Mike Harrison
DOE/NSF ART Review
June 08

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ART Program – Accelerator Physics

			Data				
Title	WBS L4	Description	Sum of FY09 FTE	Sum of FY09 Dir Labor (K$)	Sum of FY09 Dir M&S (K$)	Sum of FY09 Indir (K$)	Sum of FY09 Total (K$)
5.1 Accel	1.5.1.1	Accelerator physics at FNAL	1.99	$270	$70	$214	$553
	1.5.1.2	Wakefields studies at SLAC	1.90	$237	$0	$151	$388
	1.5.1.3	Accelerator physics at ANL	0.94	$193	$0	$67	$260
	1.5.1.4	Start-to-end simulations -- SLAC	1.35	$160	$0	$102	$262
	1.5.1.5	Electron Cloud Simulations & KEK-B Tests	0.75	$85	$25	$61	$171
5.1 Accelator Physics Total			6.93	$944	$95	$594	$1,633
rand Total			6.93	$944	$95	$594	$1,633

The Fermilab program is responsible for the RTML design + some ML - Solyak group

Argonne is positron production & capture simulations – Wai Gei + student

Synergy with APS undulator analysis & simulation

SLAC work is based on their historic expertise in ML/Damping Ring simulations – Yunhai Cai et al

Additional work in CESR TA collaboration from LBL & SLAC that has an accelerator physics component – Pivi

Requests for additional support (pending) in positrons:

Lithium Lens based production – Mikhailichenko (Cornell)

Rotating target simulations – Gronberg (LLNL)

Mike Harrison
DOE/NSF ART Review
June 08

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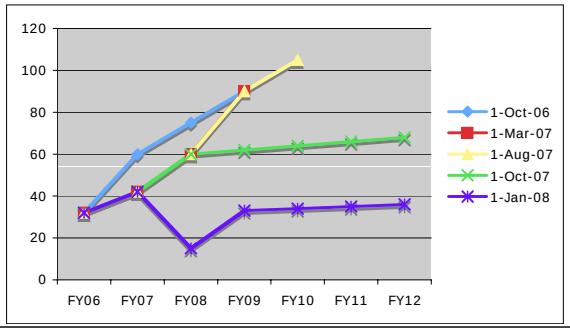
ART Program Issues – Fiscal Planning & Stability

The chart shows the time evolution of ART funding - actuals + projected. Since Aug of last year the projected FY09 funding has fallen from $95M -> $60M -> ~$30M. This tends to make detailed planning difficult. We need better consistency.



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ART Program Issues – Continuing Resolution

There will be a Continuing Resolution at the start FY09. It will last for (at least) six months.
I am arguing for the restoration of a $35M allocation from OHEP based on the happenings of FY08. In the event that we are held to a $15M rate CR allocation then:

1. Selectively delay resumption of work for the duration of the CR – do not peanut butter
2. Program elements that do not delay gracefully will need full funding
   - GDE support/common fund
   - CESR TA
3. Selectively initiate programs that do not require major M&S expenditures i.e. gradient tests
4. Attempt to ensure that some allocation goes to each institution

The impact of a ~16 month funding disruption will impact all elements of the ART program. Discussions with OHEP continue .....

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Summary

- The ART planning assumptions have changed dramatically in the past 12 months
- The recent US & UK funding decisions result in a more R&D like (less –engineering like) phase for the next few years.
- The US Program is well aligned with the GDE R&D program as well as the national and lab based programs.
- The fully international nature of the Project, while interesting (and unique) from an organisational perspective, provides a certain degree of resiliency (US & UK down, India & Russia & Spain up)
- We (GDE) are aiming to have a project proposal ready on the ~2012 timescale
- A continuing resolution in FY09 at a $15M rate will prove very difficult