CLIC-ILC Cost & Schedule Agenda – 8feb08

John Carwardine = secretary & rapporteur

this file: http://www-ilcdcb.fnal.gov/CLIC-ILC/Cost & Schedule Sub-Group 8feb08.ppt

10:15-10:20 – Reminder of ILC Confidentiality Protocol (PeterG)

10:20-10:55 – ILC Presentation (Peter Garbincius)

RDR Estimate – instructions, format, basis, status, evolution into TDR est.

examples: Klystrons & Modulators, Beam Delivery System, Schedules

ILC Project Management Plans including Primavera

discussion of needs and desires

10:55-11:30 – CLIC Presentation (Hans Braun)

status and discussion of needs & desires

11:30-11:45 – Integrating parametric studies, risk analyses, and inflation in the cost estimate (John Carwardine)

11:45-12:15 - Common CLIC-ILC Cost & Schedule Activities (All)

Goals – what we need to work on

Plan on how to work together

What can we expect to deliver over what timescale? (pre-) Sendai

logistically, we could not arrange a joint parallel session between

Civil Engineering & Conventional Facilities and Cost & Schedule working groups

maybe this can be done by WEBEX…

ILC-GDE Cost Disclosure Rules

http://www-ilcdcb.fnal.gov/cost-confidentiality-official-njw.pdf

This meeting will involve discussion of actual cost estimating numbers and data

"review" access has been granted by the GDE Executive Committee to cost data

– questions are allowed, but

– no hard copy or e-file

you must agree (or have previously agreed) not to discuss outside of context of this meeting, publish, or post on public web-site any cost estimating information

Agreed for CLIC-ILC meeting: P. Garbincius, J. Carwardine, T. Shidara, S. Weisz, H. Braun, K. Foraz ***– is anyone else participating?***

ILC Cost & Schedule Status

Peter H. Garbincius
ILC-GDE and Fermilab
CLIC-ILC Collaboration Meeting
CERN, February 8, 2008

RDR Estimate – instructions, format, basis, evolution

Examples: BDS (incl CF&S) and Klystrons & Modulators

Project Management Plans – including Primavera

ILC needs

Public References:

http://www.linearcollider.org/cms/?pid=1000437 download Vol 3 - Accelerators
http://ilcdoc.linearcollider.org/record/6321/files/ILC_RDR_Volume_3-Accelerator.pdf

http://www-ilcdcb.fnal.gov/RDR_costing_guidelines.pdf
http://www-ilcdcb.fnal.gov/RDR_Cost_Estimating_Instructions_23may06.pdf
http://www-ilcdcb.fnal.gov/CLIC-ILC/no-cost_roll-up_1june07.xls

http://www-ilcdcb.fnal.gov/CLIC-ILC/no-cost_BDS_KOM_11oct07.pdf
http://www-ilcdcb.fnal.gov/CLIC-ILC/no-Cost_HLRF_KOM_Oct_1-3-07_SLAC.pdf

ILC Beam Delivery System Estimate

- Confidential BDS estimate

  BDS_WBS_v1.9_19dec06.xls – on PHG desktop

- Skim through my summary presentation at EDR Kick-Off Meeting for BDS in October 2007
  http://www-ilcdcb.fnal.gov/CLIC-ILC/no-cost_BDS_KOM_11oct07.pdf

  this includes examples of next lower level spreadsheets from Global & Technical Systems

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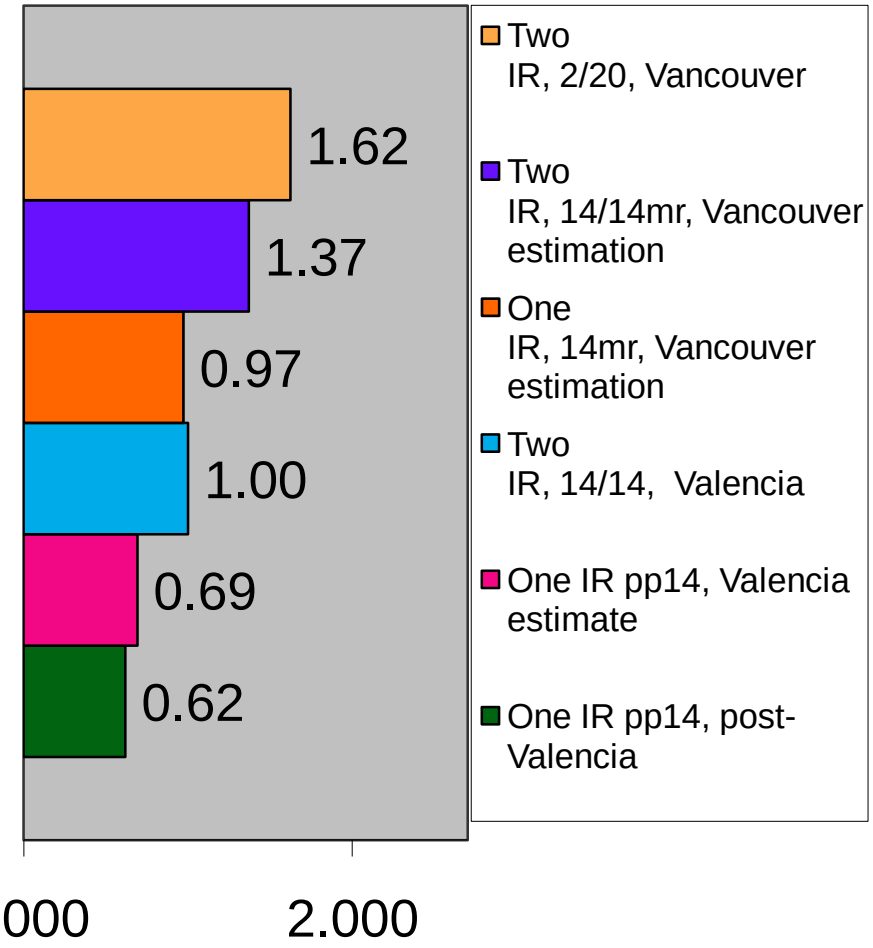
Continuing Evolution & Value Engineering for BDS



Possible savings due to changes in design or assumptions

Savings may not be feasible, and may not be additive, and require more studies

14/14 baseline cost 883844

cost of 20/2 alt (single 5m wall, deassigned shafts & bypass)	**100.00%**	**concequence**
assign e+ bypass back to BDS from e+	1.86%	TPC does not change
assign shafts 2 & 3 back to BDS from linac	3.63%	TPC does not change
use two 9&18m muon walls instead of one 5m wall	2.26%	can collimate 1e-3 instead of 2e-5
move cost of spare FDs to operation cost	-1.87%	risk that spare FDs will not be produced and will not be available if needed
decrease size of collider hall from 32*72*40m to 32*54*35m & assume surface detector assembly	-5.53%	cannot assemble detector underground and commission the BDS. Do not accept it for separeted halls as independence of commissioning is required.
do not install PS for 1TeV at the start	-2.83%	harder 1TeV upgrade
do not install full cooling capacity for 1TeV	-6.03%	harder 1TeV upgrade
Reduce number of bends	-0.65%	E upgrade more difficult
Decrease vacuum chamber aperture	-0.57%	more losses and background
Reduce number of movers	-0.11%	more complex tuning
Shorten extraction lines by 100m and rely on sweeping	-0.79%	MPS issues in beam dumps
Shorten the separate low E e+ tunnel	-1.01%	cannot access part of beamlines of IR which is OFF
Combine two IR halls, by increasing sum of crossing angles to ~28mrad, on surface detector assembly, decreased collider hall size to 98*32*35m	-5.84%	In this case one can simultaneously commission beamline and make final assembly at other IP, then move detector to the commissioned IP. Self shielded detector would add benefits. Transition from push-pull may be smooth. This saving already included in 14/14 with smaller hall
Change construction of tapered tunnel (which is 2*1400m): make taper starting only when beamlines separated by 3m, thus reduce tapered tunnel to 2*1000m and replace the rest 2*400m with usual TBM tunnel	-1.51%	Difficult access around beamlines in BSY region
Replace full power tune-up dump with low power (see sub table for evaluation)	-2.97%	MPS and operation issues, full power dump may be needed elswhere
Total acceptable savings for baseline	**-17.33%**	
Total savings applicable to 14/14 case	**-12.33%**	

Combine tune-up dump with one of main dumps, total:	**2.37%**	MPS & operation issues, and accessibility of collider hall
less cooling capacity at point 2&3	-2.67%	
less beam dump halls & hardware	-2.28%	
increased cost of main dumps	1.81%	
magnets in additional transport line	1.44%	
vacuum system of additional transport line	4.07%	

Replace full power tune-up dump with low power, total:	**-2.97%**	MPS & operation issues, high power dump may be needed elswhere
less cooling capacity at point 2&3	-2.52%	
less cost of tuneup dumps	-0.45%	

Remove service tunnel, total:	**1.46%**	issues with access, T stability in tunnel, cabling, laser rooms, etc
remove service tunnel	-5.83%	
move shafts 2&3 by 1000m closer to IP and incur higher cost of cryo tranfer line (8k/m)	1.81%	use this as less cost impact
or: build a BDS dedicated shaft 1750m from IP	3.63%	do not sum this one as higher cost impact
build partial service tunnels near IR along extraction and near BSY, total 2*600m, excavation, not TBM	3.54%	
build 20 alcoves with volume 300CY, excavation	0.25%	
increased overhead of power supplies	1.13%	
increased cost of cables	0.57%	

Savings may not be feasible, and may not be additive, and require more studies

	actual	**with savings added**
Cost of 20/2 alt	**1.000**	**0.827**
Cost of 14/14 small hall	**1.368**	**1.245**

ILC High Level RF Power Estimates

Ray Larsen (SLAC) & Shigeki Fukuda (KEK)
Team Leaders

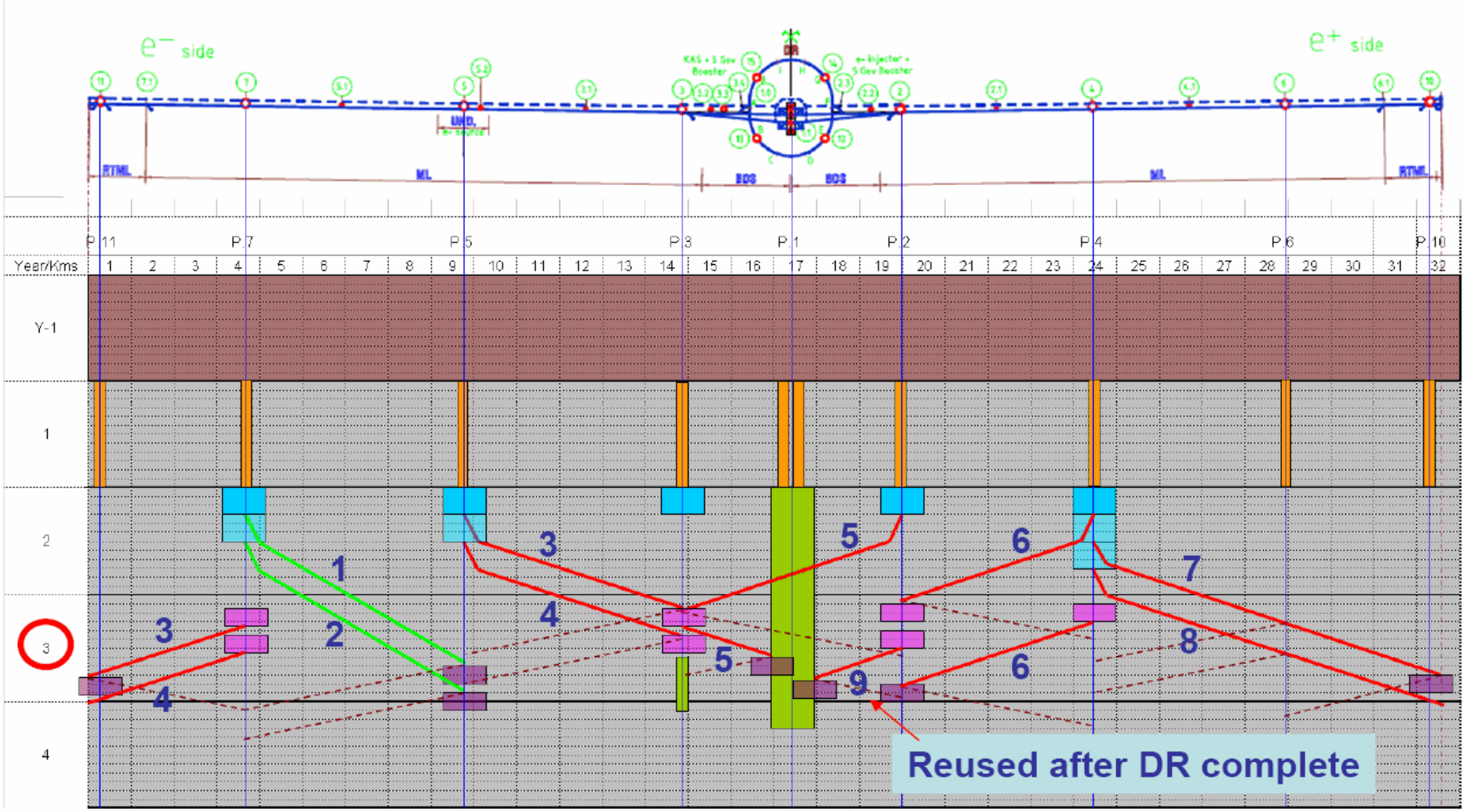
- Skim through RayL's summary presentation at EDR Kick-Off Meeting for HLRF in October 2007
  http://www-ilcdcb.fnal.gov/CLIC-ILC/no-cost_HLRF_KOM_Oct_1-3-07_SLAC.pdf

- view Confidential HLRF estimate spreadsheets

  HLRF WBS SUM 121906 R26 rsl-mn.xls – on PHG desktop

ILC Schedules – need a lot of work!

- Top-down goal of 7 year construction period
  - Do as much design, contractor selection, industrialization, etc. as possible beforehand
  - Does not include commissioning of accelerators
- Is this even possible technically, logistically, or financially?
- (non-integrated) schedule examples (RDR III-6.3):
  - Martin Gastal – CF&S – shafts, tunnels, and caverns
  - Bob Kephart – Cryomodule industrialized production
  - Ewan Paterson – Funding profile
- How do we manage and control all of this?
  - Multiple TBM operations, concurrent installation?
  - Multiple world-wide vendors of high-tech components



TBM $\varnothing_{finished}$=5m
MS TBM ∅=5m
Cavern finishing
Shaft/cavern excavation
TBM setup
TBM transport
TBM removal
Finishing work

9 TBMs for RTML, ML, BDS
But 5 are transported and reused

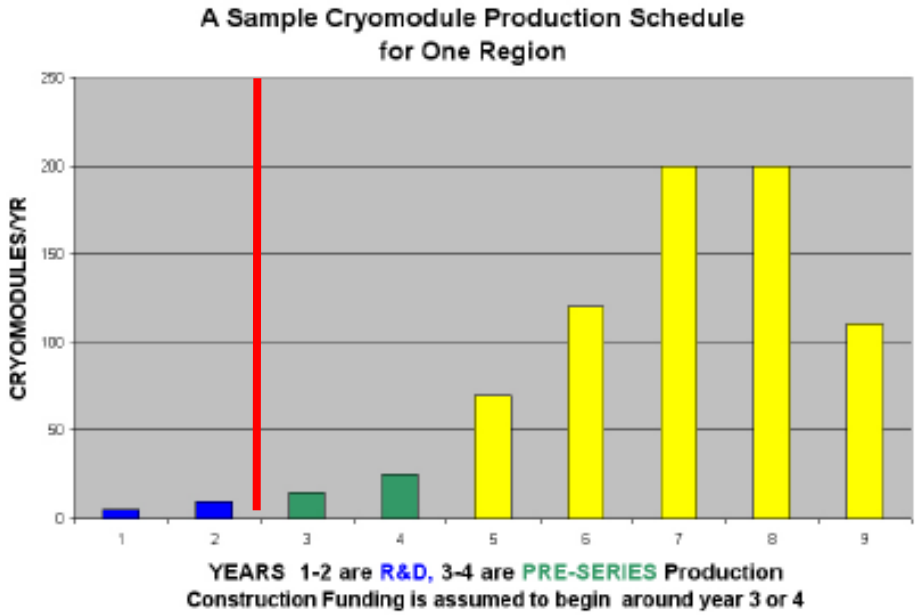
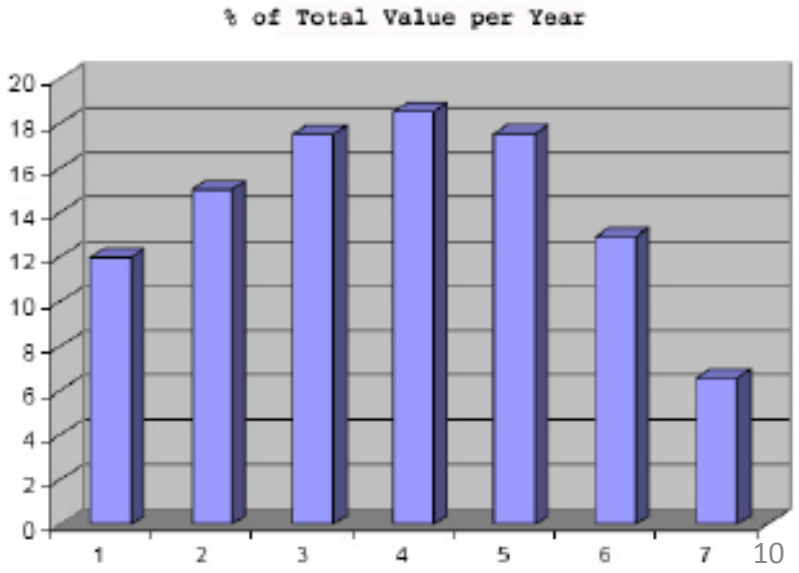


FIGURE 6.3-3. A possible model schedule for cryomodule production shows 1/3 of the required ILC cryomodules produced in one of three regions. R&D and pre-series devices lead to 5 years of series production (yellow). The position and magnitude of the peak of series production will vary with changes to the available construction and test infrastructure.



ILC Project Management Plans

- a multi-B€, complex, international, project
  - Expect to quickly outgrow MS Project
  - Need integrated cost & schedule, enterprise level Project Management tools, stable, well supported, preferably commercial
  - Options considered:
    - Primavera – most users world-wide, international support, used by most US National Labs and Projects
    - OpenPlan – also used in US, e.g. Fermilab projects
    - CERN EVM & PPT – Bill Willis & PHG investigated in Jan06 – could not get promise of continuing CERN support
- Goal: implement PM discipline during TDR phase
- Purchased Primavera P6 (web-based) licenses

P6 Functionality by Level

concurrent

Level 4 – Complete Solution		Remaining Level Functionality		
Level 4 Components	Key Functionality	Level 3	Level 2	Level 1
Client (planning and scheduling)	Includes Planning and Scheduling (client): • Multi-project support • Security and administration • Master program integration • Resource leveling • Advanced baseline management • Report creation	Not included	Not included	Not included
Web Project, Resource, Portfolios	• 100% Web • Planning and scheduling one project at a time • Intuitive, interactive PM • High-level resource planning • Analyze capacity vs demand • Portfolio performance	Included	Partial -No resources -No portfolios - Can only view task and update project status	Not included
Advanced Portfolio & Capacity Planning	• Strategic planning and optimization of: – portfolios – capacity • Calculated KPIs	Included	Not included	Not included
Dashboards	• Standard and configurable views • Unlimited number	Included	Included	Not included
Collaboration	• Personal and project workspaces • Communication center • Discussion threads, doc mgt, workflow	Included	Included	Not included
Timesheet	• Capture and track time • ADA Section 508 compliant	Included	Included	Included
API	• Open API for easy integration	Included	Included	Included

5 L4 Planner Scheduler, 5 L3 Engineer (myPrimavera), 1 L2 TM-Collaborator, 1 L1 Team Member

Need to implement:

- Hardware – evaluated Primavera-endorsed, off-site, commercial host - reduce in-house costs contract held up by ILC budget situation in US
- Project Management Support Team
  - Goal is 3 experts centralized at PM office at Fermilab plus local help for the PMs at KEK and DESY
  - Shouldn't rely on sci/eng to invent it themselves
  - Couldn't secure experienced PM people from US Labs
  - Completed call for tender for consulting firms to get ILC PM Office and tools started
    contract held up by ILC budget situation in the US
  - Obvious place where ILC can use PM assistance!

What help does ILC Project Management Team Need?

- Can/should we reopen question of EVM & PPT?
- Experienced Scheduling Expert(s)
- Project Management Team members
  - Either experienced in Primavera or able to learn
- Develop the plan to implement PM tools both for TDR and for the actual construction project
- Evolving the ILC Estimate for completeness and to facilitate (parametric) studies – DataBase?
- What else?

What does ILC need for Project Management Support and when?

Short term – immediately:

Plan, Plan, Plan, Plan!

improvements to RDR estimate – DataBase?

implement Primavera

start managing a sample of TD Work Packages including Earned Value

Through the TD period:

improved estimates: requirements, instructions, templates, etc.

Evolve from Bill of Materials to activity-based WBS

Integrated Cost/Schedule/EV

Value Engineering and other cost reductions

Use TD experience to show we can manage ILC

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