



Value Engineering related work in Beam Delivery area in Engineering Design phase

For discussion in
BDS group

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Global Design Effort



In the ED phase...

- The Engineering Design Report will document
 - **the baseline design, including detailed engineering and justification of design criteria; ...**
- The cost containment effort is critical, including performance/cost optimization, and an understanding of the performance/cost derivatives (value engineering)...
- Initial phase will be accelerator -physics (AP) driven in order to evaluate the performance / risk trade-off for cost reduction...

Quotes from Draft "ILC Project Management Plan for the Engineering Design (ED) Phase", by International Linear Collider Project Management Team, Marc Ross, Nicholas Walker, Akira Yamamoto (Project Managers)



In the ED phase...Value engineering

- The Value Engineering is the process whereby the total estimated cost of achieving an objective is compared with the lowest possible cost of achieving that objective...



ED phase ... CFS...

- Goals:
 - **iteration of CFS requirements with accelerator designers / engineers (value engineering);**
 - **Detailed evaluation of alternative solutions (e.g. shallow site);**
 - **Preparation of critical information for specific site selection / development;**



ED phase... Accelerator Systems goals

- Define and clearly document performance-driven specifications for the accelerator components and – more critically – CFS;
- Iterate with the relevant engineering groups to understand the cost/performance trade-offs, with CFS as a focus;
- Demonstrate that the accelerator design fulfills the required performance goals (in a cost-effective way), by demonstration via critical R&D or by simulation.
- Maintain design-related risk register, and develop alternative fall-back (risk-mitigating) solutions.



The following slides show Acc. Ph. related WP from the list posted here:

ILC BDS, EDR Area - Mozilla Firefox

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http://www-project.slac.stanford.edu/ilc/acceldev/beamdelivery/edr/

ILC BDS Area. Materials for EDR

Work Packages, Sub-Work-Packages and Tasks for EDR.

WP, and tasks, overall tables in "[docs](#)" directory, DRAFT. (see file "BDS_WP_v*.pdf")

Suggested procedure for Expression Of Interest in BDS EDR work. (see file "BDS_EDR_EOI.pdf" in "[docs](#)").

Detailed description of WP and tasks. (to be posted).

Beam Delivery System Plan for the Engineering Design Phase. (to be posted).

When ILC EDMS will be launched, some materials posted at this page will be moved to the EDMS site.

[Earlier RDR pages](#)

[Beam Delivery pages](#)

The posted WP list is DRAFT !

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<http://www-project.slac.stanford.edu/ilc/acceldev/beamdelivery/edr/>

Full source at V:\ilc\Drop Boxes\Andrei Seryi\08_FY_WP_planning\



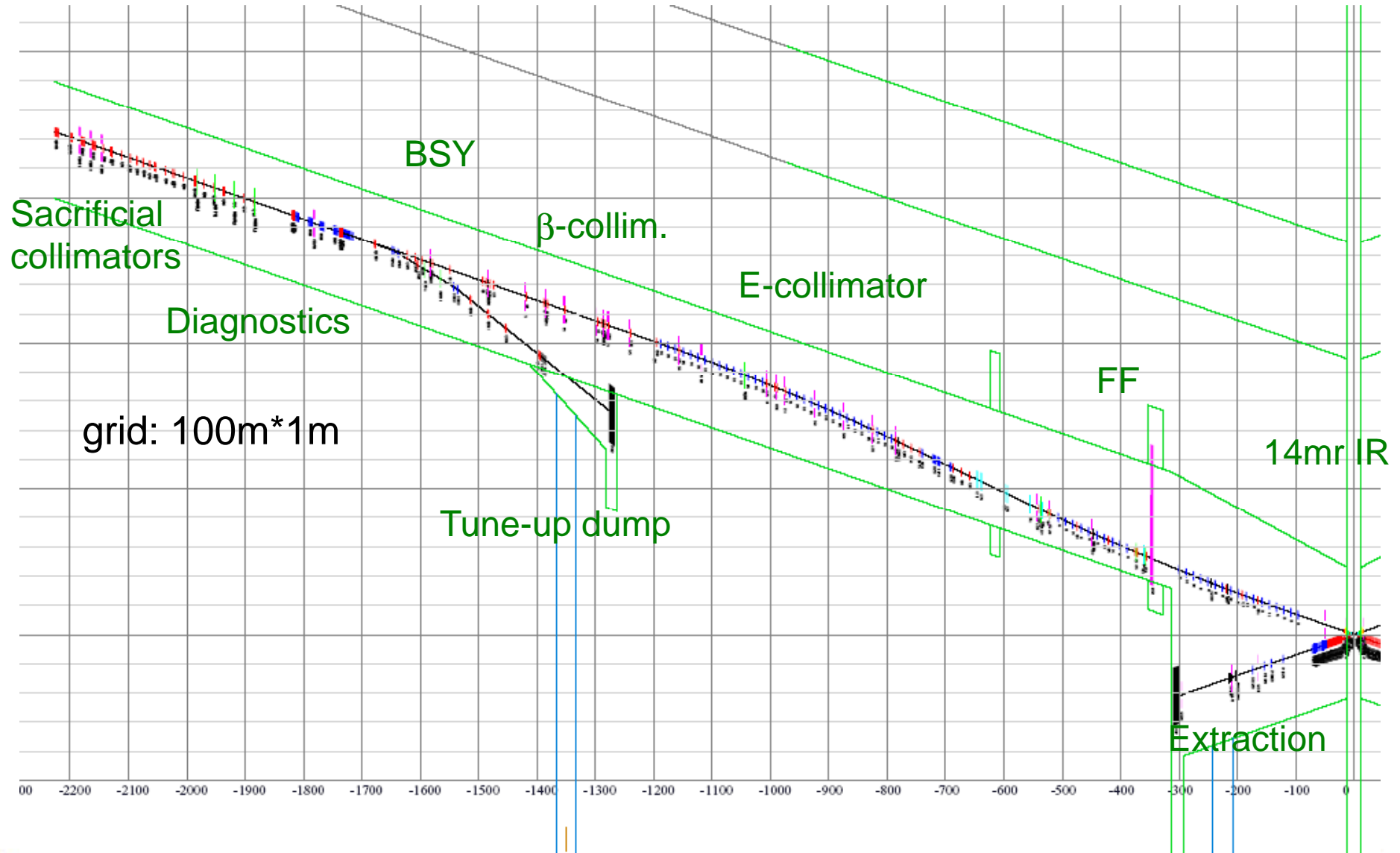
BDS work

- Next slides show work that may be part of Value Engineering
- This qualification is tentative and may be adjusted
- Consider examples for several work-packages. For details, see posted list

WBWP	sub-WP	task	Addressing	Due Year	ED Value Eng
4 IR & IR integration	IR physics design	IR & FD accel. phys. design	tech. risk	YR08	no
		FD Vibration design study	tech. risk	YR08	no
	IR eng. design	Detector moving system design	cost risk	YR08	Val. Eng.
		FD magnet design	tech. risk	YR08	Val. Eng.
		Optimization of CFS requirements	cost risk	YR08	Val. Eng.
		IR cryogenics design	cost risk	YR08	Val. Eng.
		FD mover system design	tech. risk	YR08	no
		IR shielding design	cost risk	YR08	Val. Eng.



BDS beamline



Sept 4, 2007

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BDS 8



Acc & phys reqts & design integ

- **Acc & Det phys. design & optimiz.**
 - **need to include more explicitly: evaluate performance vs parametr (length of systems); document; optimize if needed**
 - ...
 - **BDS Radiation physics study (new: shallow site)**
 - **Extraction line integrated optics design**
 - **Determine field, stability and other tolerances**
 - **Study optics for magnet types standardization**
 - **Study optics for aperture standardization**
 - **Different L* optics perf. & tunability**
 - **Study abnormal optics & MPS issues**
 - **Study Z, 350, 1000 GeV CM performance**
 - **Study High Lumi upgrade path**
 - **Study 1TeV upgrade path for FD, PS, magnets**
 - **Study head-on IR alternative**
 - **Study 2mr IR alternative**

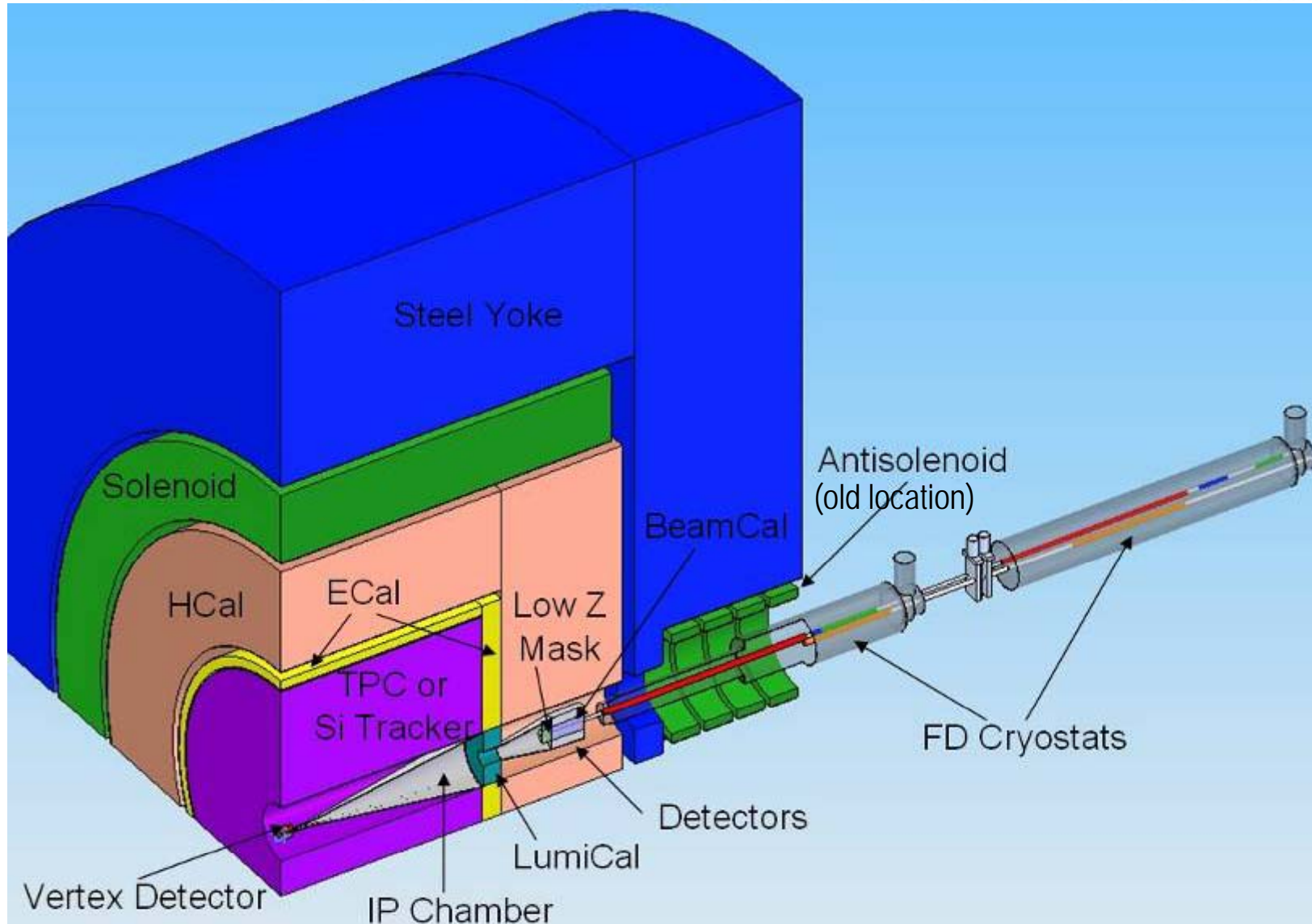


Acc & Det phys. design & optimiz.

- Determine specs & interfaces
 - Define air requirements for CFS
 - Define water reqts for CFS
 - Define stability reqts for CFS
 - Define cranes and coverage reqts for CFS
 - Define cavern size reqts for CFS
 - Define & optimize beamline height
 - Define specs for installation model by CFS
 - Define BDS & IR rad safety rules
 - Define alignment system requirements
- Options design study
 - **Gamma-gamma requirement study**
 - **Fixed target requirement study**
 - **e-e- requirement study**



IR integration, a start



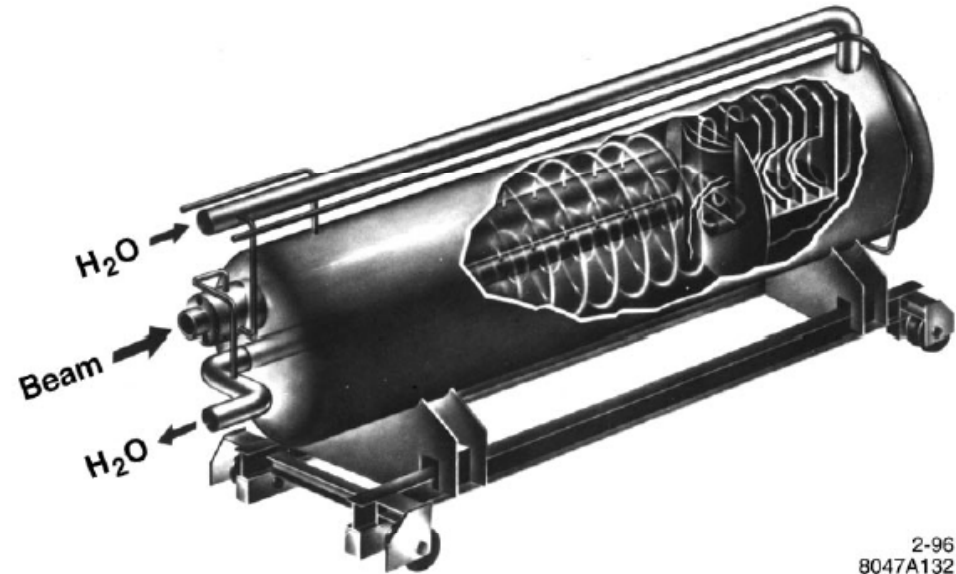


IR & IR integration

- IR physics design
 - Detector moving system design
 - FD magnet design tech.
 - Optimization of CFS requirements
 - IR cryogenics design
 - IR shielding design
- IR hardware options
 - Study Rutherford cable for 14mr

ILC Beam dump

- Design is based on MW dump designed and built at SLAC
- ILC beam dump features
 - 17MW power; rastering of the beam on 30cm double window; upstream donut collimators
 - 6.5m water vessel; 1m/s flow; beam 0.3m off-center; 10atm prevent boiling;
 - three loop water system; catalytic H₂-O₂ recombiner; filters for 7Be;
 - Shielding 0.5m Fe & 1.5m concrete
- EDR work will include physics & engineering design, studies of window irradiation and possibly prototyping the front-end of the window exchange mechanism



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Beam dump system

- Phys. design of beam dump
 - Radiation study of dump area
 - Muons and radiation with shallow dump
- Eng. design of beam dump
 - Design dump widow and remote replacement mechanism Eng. design of beam dump rad water system
 - Eng. design of beam dump shielding
 - Eng. design of beam dump vessel
 - Eng. study of elongated window



BDS magnets & PS

- Design, specify & optimize DC PS
 - Design warm low field bends
 - Optimize number of types and apertures
 - Specify warm quads
 - Specify warm sextupoles, 8 and 10-poles
 - Design magnetized muon walls
- Design, specify & optimize pulsed magnets...
- Design, specify & optimize DC PS
 - Specify requirements to DC PS
 - Optimize PS & cable location and tunnel space
 - Determine 500GeV => 1TeV upgrade path
 - Investigate stringing-corrector option
 - Optimize variety of PS in BDS
 - Design typical PS to needed level of details



Summary

- Need to keep refining the VE tasks in BDS
- Need to describe the tasks in details
- Need to assign VE and other EDR BDS tasks
- This WP list and assignments should be in an advanced stage for BDS kick-off meeting in October