



Response to 1st MAC Mtg

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Highlights - Response Document

- Overall Project Issues
 - **MAC “Bottom up, performance driven design”**
 - Yes, but based on 10 years of design work
 - Push back on baseline design now underway (next talks)
 - Cost consciousness did precede cost information and informed some, but not all decisions in forming the BCD
 - **Manpower level**
 - ~30 FTE is coordinating much large effort (~ 200-300 FTE) in the collaborating laboratories
 - **Communications with HEP community**
 - Many efforts -- Joint meeting, joint MDI panel, reports solicited on change requests (see Andre Seryi talk and Yamamoto representing MDI and WWS).



Highlights - Response Document

- Issues concerning the Baseline Design
 - **Choice of Baseline Gradient**
 - The final choice of gradient will depend on the success of the R&D program (Lutz Lilje). We are developing models to optimize cost vs gradient issues (Chris Adolphsen)
 - **TeV upgrade scenario**
 - The lower-gradient operation discussed in the MAC report was considered at Snowmass, but GDE currently feels the additional cost increase for the 500 GeV machine is difficult to justify
 - **Luminosity performance**
 - The GDE feels that it is highly desirable to maintain the flexibility afforded by the parameter plane approach. We acknowledge that the cost implication of this effective overhead need to be understood. We are presently considering options like reducing the RF initially by factor of 2. (Tor R)



Highlights - Response Document

- Issues concerning the Baseline Design (cont)
 - **Availability**
 - At Vancouver the reliability issues (including the second tunnel) were reviewed in light of the established cost estimates and relevant R&D plans.
 - At present, we do not estimate enough cost savings for a single tunnel solution to warrant the change. (Himel)
 - **CF&S Issues**
 - The GDE identified early that the CF&S is a major cost driver (Garbincius)
 - The GDE acknowledges that the final choice of tunnel depth will be site dependent, and that other site-dependent considerations may prove decisive.



Highlights - Response Document

- Issues concerning the Baseline Design (cont)
 - **Detailed Specific Comments**
 - *e- source klystron arrangement*: two parallel injectors are foreseen to enable maintenance and repair work to be made on one while the other is in service. (not a cost driver)
 - *1.2 km insertion for the e+ system*: the added 1.2 km insert in the positron linac was always meant to be an "Interim Working Decision " so we have consistent design
 - *650MHz DR RF*: The GDE believes that the cost of development of this RF is small compared to the total cost of the RF system and is low-risk.
 - *Timing scheme compatibility with TeV upgrade*: the current scenario of extending the main linac (and tunnels) away from the IP is compatible with the overall timing constraint imposed by the e+ generation scheme.



Highlights - Response Document

- Issues concerning the Baseline Design (cont)
 - **Detailed Specific Comments**
 - *RF flat-top requirement*: the requirement on the LLRF for a 0.1% flat-top is historical from the TESLA TDR and was made to make chromatic effects similar to or smaller than single bunch energy spread
- Change Control Mechanism
 - **We believe the CCB process is working well!**
 - We have had 14 successful change control actions and now costing data and physics community inputs (where relevant) are being considered in most recent changes
 - See Seryi talk on 2mr x 20mr → 14mr x 14mr (an example)
- Cost Estimation
 - **See next talks.**



Highlights - Response Document

- R&D Program
 - **The GDE is making every effort to produce a coordinated global R&D plan.**
 - Ideal R&D Program developed; advice to DoE, PPARC; task forces in different areas created (Willis talk)
 - **High-gradient Cavities (see Lutz Lilje talk)**
 - The R&D Board has set-up two task forces (S0/S1) and S2 producing milestone-driven R&D plans to achieve the required performance goals for:
 - Nine-cell cavities (designated S0);
 - Cavities installed in a cryomodule (designated S1)
 - String of modules performance (S2).
 - **The R&D board is also beginning to scope and prioritize R&D in other areas. Task forces in other areas are being developed**



General Introductory Remarks

- GDE Organization
 - Our main focus is in two areas: 1) coordinating the global R&D program; 2) creating a reference design with costing..
 - Organization divided into these two tasks and global decision making is through Boards in each area. This rather unconventional management is working, but a more conventional project management organization is anticipated for the next step – an engineering design
 - Change Control Process is providing discipline and stability in configuration, while enabling process for design changes.



General Introductory Remarks

- Toward Costing the Reference Design
 - **A value system is used for technical systems, while regional costing is used for host civil costs.**
 - Uniform cost guidelines; WBS, etc have been developed
 - **Cost confidentiality is an important issue and it effects how we are producing, reviewing, and showing our costing information.**
 - **First costing available at ~90% level in Vancouver**
 - Validating costs
 - Studying technical systems with large costs
 - Identified set of design options where cost vs performance is being compared for baseline design changes.



General Introductory Remarks

- Toward a Global R&D Program
 - R&D Board is active in developing an R&D program to support our baseline and alternatives
 - Created an ideal prioritized program and compared with existing program
 - Identified areas needing increased priority (e.g. 10 MW Klystrons)
 - Have given advice to DoE and PPARC on R&D priorities.
 - Developing a set of “task forces” in key areas to plan a global milestone driven program



General Introductory Remarks

- Developing and Optimizing the Design
 - **Accelerator Issues being addressed**
 - Electron Cloud studies have led to mitigation options
 - Possibility of having central damping rings under study
- Value Engineering
 - **Technical Systems**
 - Water, Electrical Systems
 - Magnets
 - **Cost vs Performance**
 - 2mr x 20mr → 14mr vs 14mr
 - Muon shield strategies
 - Future – 1 IR with push-pull for two detectors



General Introductory Remarks

- Reference Design Report
 - **A complete documented technical concept**
 - Three reports : RDR – Reference Design Report : DCR – Detector Concept Report; Companion Volume for Policy Makers and other non experts
 - **Process of Establishing Reference Design**
 - Parametric Optimization of Cost vs Physics Potential
 - WWS consulted on all changes, as well as MDI group
 - ILCSC Parameters Group (R Heuer) reformed and they are working with us to optimize parameters for cost / performance.
 - **Schedule**
 - Most changes before Valencia; some like 1 IR push pull studied but decision deferred for discussions at Valencia.
 - Draft RDR released couple months later – (Beijing February ?)