



Plans for the EDR phase

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Beijing Meeting



Introduction

- What is the Engineering Design Review phase, what is necessary and how much effort is required?
- What structures and resources needed to deliver EDR?
- How do we develop our interactions with external bodies & governments?
- **Emphasise: very much work in progress and a snapshot of our current thinking, which has developed rapidly over the last few months and continues to develop. We don't know all the answers & those we think we do know may be wrong. Your input is essential.**



After the RDR

- Period after Beijing and release of the preliminary RDR and costing will be dominated by politics, outreach, reviews etc, probably for at least 6 months.
- Essential to maintain project momentum.
- Requires that clear ideas on shape of post-RDR GDE has been widely discussed and agreed both internally and with external stake-holders.
- Our aim is clear - to produce a engineering design that we believe we can build and which specifies the project in sufficient detail by 2010 to allow “approval to construct”* by participating governments. Need to put in place structure, resources and people to deliver.

* This is what is meant when I talk about “approval” throughout the talk



3 main aims

In order to achieve these goals we must:

- 1) ensure that the internal momentum of the GDE continues to grow and that the tasks the GDE sets itself allow scope for the enthusiasm and commitment of the international ILC community to continue to grow;
- 2) produce the technical information required and agreed by the contracting governments as necessary to proceed to approval of the project;
- 3) ensure that the world-wide R&D programme is coordinated to give the optimum return on the investment of the contracting governments.



Requirements to start construction

- We need dialogue with governments, which presumably must proceed via FALC
- Clear that FALC is not yet ready to give us a lead in what we need to produce to gain construction approval
- In order not to lose momentum, need to make assumptions about what level of detail will be necessary to get approval
- One way to do this is by looking at “similar” projects - the two we have looked at are ITER and XFEL
- ITER fully international project that has approval from all 3 regions
- XFEL predominantly European project about to get full approval - technology very similar to ILC...
- Other projects, ALMA, FAIR, could also be examined



Lessons from XFEL

- We have looked in some detail at the documentation available for these two projects at approval time.
- We surely will need more detail than in the actual XFEL TDR formal documentation to get “approval” - but much more technical work and R&D exists than was put into this documentation; much of which, particularly on the SCRF, is directly useful to the ILC.
- For XFEL, the extra effort required above & beyond ongoing R&D to produce the TDR was ~ 160 FTE years => lower limit for our needs.



Lessons from ITER

- ITER is a very “political” project - most big decisions taken at a high political level.
- We need more technical documentation, particularly if, as we hope, we will have a specific site.
- the ITER level of documentation was significantly less than normally required for US approval to construct; N.B. US has most stringent requirements so we mention US most often - does not mean we take our eye off European & Asian needs!
- EDR will be intermediate step for us to assure ourselves that we have a robust design than can be built. Assume that we can get “approval” from governments on an EDR that will not imply that we “break ground” immediately - this will only happen maybe one or two years later.



GDE size for EDR

- Estimate from individual area systems - timelines from S task forces are roughly compatible with 2010 milestone given reasonable increases in effort from current - e.g. from some of the S task forces ~ factor 2 growth required.
- Similar figure comes from ITER/XFEL.
- Rule of thumb, ~10% of total effort on project required for pre-construction phase => 300 - 400 FTE years.
- Roughly 250 FTE years currently working across all 3 regions on ILC. Not all of those are working in areas relevant to EDR production.
- Points to GDE growth to ~ 400 - 500 FTE years. Seems unlikely that such an increase can proceed under the current paradigm of ad hoc assignment from major laboratories, relatively uncoordinated across broad range of R&D.



GDE evolution

- Many aspects of GDE management work well. Delivery of the EDR therefore evolution not revolution.
- However, EDR will need different GDE skill set - much more engineering design => reform of GDE personnel - EDR GDE should concentrate on central functions, project management, coordination etc. Many people outside current GDE - remember there are only ~35 FTEs in current GDE - are doing vital work in this area; some inside the GDE have changed emphasis and level of activity. Need rationalisation of GDE membership.
- GDE will expand to contain all persons working on the ILC.



GDE Structures

- The Executive Committee will continue as currently constituted, with Director, Regional Directors and Accelerator Directors. The regional perspective brought by Regional Directors will continue to be important throughout the EDR phase.
- Area requiring significant change is RDR Management Group. Worked well for RDR but could not cope with the EDR. Need Project Management Team under a full-time Project Manager (PM).
- The PM will need a team and a secretariat. The secretariat should be based at the GDE office, currently Fermilab and provide secretarial support and for the PM tools: web, Indico, Excel etc. All the PMT need not be centrally located; regional presence?



GDE Structures - PM

- The location of the PM will need to be discussed with the selected candidate. The PM will be funded from central funds as agreed with FALC.
- The search for the PM has already been begun by the EC and is considered a matter of urgency, not least because the definition of some of the EDR structures and the PMT personnel need strong input from the PM. Suggestions/volunteers for suitable candidates very welcome.
- The position of the PM *vis a vis* the EC needs further consideration.
- The functions currently carried out by the R&D, Change Control and Costing Boards will be reviewed with a view to providing the best interface to the PMT.



Delivering the EDR

- To produce the factor two in FTE growth and to improve efficiency and reduce duplication of effort, propose to organise EDR phase by dividing the tasks into work packages which can be **bid for** by consortia, which would be encouraged, as well as by individual labs, universities etc.
- This reduces the problems of coordination and duplication in R&D. It also eases the problem of increasing FTEs since people available for only small fractions of their time but with vital expertise can be efficiently utilised within consortia.
- Consortia will feel obliged to deliver, even at the expense of allocating more FTEs than they might originally have intended.



EDR Delivery - workpackages

- Need to recognise concerns re workpackages. We have to ensure that, having allocated workpackages, we can when necessary amend their scope and even reallocate them at a later stage in the project. Need ability to integrate new effort & resources joining the project e.g. China, India, and give them appropriate responsibility.
- In general the workpackages will be organised in “Area systems”, e.g. damping ring, positron source, etc - but “Technical system”-based workpackages allowed if advantageous.



Workpackage definition

- First ideas on the definition of workpackages will be produced by an ad-hoc working group to be set up by the EC. Need to get this going in advance of PM appointment; we consider this meeting and your input to be the first step in this process.
- First-cut definition will be examined by the EC and used as input to a formal Work Package Definition group, to be chaired by the PM.
- Bids for workpackages “above threshold” will be ranked and recommended to EC by a Work Package Assignment group, to be chaired by PM. This committee will work purely with the technical issues; the final decisions, injecting other relevant factors such as regional balance etc., will be made by EC on basis of these recommendations.
- Formation of strong consortia actively encouraged by project management. There will be flexibility and responsiveness as workpackages progress.
- Part of the deliverables of each work package will be provision of the appropriate sections of the EDR documentation, under direction of PM.



Mechanisms

- To secure the R&D deliverables and the sections of the EDR report would be to have signed MoU with the GDE. GDE is not legal entity, but MoU's are gentleman's agreements and not legally enforceable anyway. A possible model is the MoU for the XFEL.



Mechanisms

- There would clearly be significant advantages in having the new supervision structure that will supersede ILCSC supervision in operation asap - closer connection with funding authorities would make allocation of work packages easier. We will work with FALC and ILCSC to facilitate this.
- The process for site solicitation and if necessary the definition of the selection process should begin within the next year to 18 months. This clearly can only occur through close cooperation between GDE, FALC and ILCSC and must be a high priority after the establishment of the EDR structures.



Open questions

- There are lots!
- Definition of workpackages.
- Organisation of workpackages - here we must learn from our experience of building the major collider detectors such as ATLAS, CMS etc.
- How do we make transition from current R&D activities, organised in very different ways in regions, to one organised in workpackages?
- How is the global R&D steered in the EDR?
- What are the roles of the R&D, CC Boards inside PMT?
- How do the labs./directors/university groups interface into the project outside the workpackage structure?
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Open questions

- This meeting is a good opportunity for us to get your advice and input on these questions and any others you want to bring up.
- Please in the allocated parallel session time have internal discussions in your groups on the EDR organisation and send me your conclusions by Tuesday 6 p.m - please email b.foster@physics.ox.ac.uk Slot in GDE Plenary on Wednesday @ 11:00 for discussion.
- Individual submissions also very welcome.
- I and my EC colleagues are happy to discuss the issues with anyone - just contact us