



# Accelerator System Kick-off Meeting

**e- source**

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# Accelerator System Kick-off Meetings

- WHAT is it exactly we wish to achieve?
- HOW do we exactly intend to do it?



# The WHAT: Charge for Meetings

- The EDR, to be completed in 2010, will contain an updated ILC value estimate and a project execution plan. Prioritization of Engineering Design Activities to be done in support of the EDR will be based on risk mitigation, cost reduction and project preparation. The EDR will be based on an assessment of the RDR technical content and its value estimate.
- We believe that the RDR value estimate has sufficient detail to
  - **Permit trend analysis for the cost reduction/optimization and**
  - **Give guidance for the R&D and industrialisation that must accompany the engineering design process of the EDR.**
- The primary focus of the EDR kick-off meeting is to consider the planned EDR design and industrialisation effort.



# The WHAT: Charge for Meetings

- Accelerator Systems specific:
  1. **Assess the technical maturity of the RDR design and the completeness of the value estimate**
  2. **Evaluate plans for the EDR design work including development and incorporation of items presently outside the baseline**
  3. **Examine proposed Work Packages and comment on how they support the EDR goals.**



# “Plain English” Goal #1

- Review the design
  - **Does it work? (better: *is the performance acceptable*)**
  - **Are there still concerns on performance?**
    - (this will touch of risk assessment and R&D plans)
- Review the cost estimate
  - **Examine each element in Cost Engineers Value Matrix (Tech./Global Group versus Area System)**
    - Check for inconsistencies (numerology, unit prices)
    - Identify cost items that are ‘questionable’
      - Cost metrics from existing machines
- Quantify the “Engineering Value” (= worth/cost)
  - **Identify CFS drivers (requirements)**
  - **Attempt to evaluate performance/cost derivatives**
  - **Critically review each design decision wrt to its cost impact (derivative)**
- *Are the cost increments / performance gains justified*



## “Plain English” Goal #2

- Make a plan for the next three years that includes the known ‘alternative designs’
  - **Clearly define achievable (realistic) scope**
  - **Identify resources problems (many!)**
  - **Identify ACD issues**
    - Why do we have them? (lower cost? Better performance?)
    - What needs to be done to see if they are truly beneficial (selection criteria)



## “Plain English” Goal #3

- Work package definitions.
  - This links up with goal #3 via planning.
  - Developing a WBS (rows in a Gantt chart) should yield Work Packages
- Develop (for example: BDS,DR) lists
  - Into a structured plan or WBS
  - Need to massage these into the correct structure to deliver our goals for the EDR
  - In addition, complexity of WPs must reflect available resources.
- These meetings can only be the start of this activity
  - An additional iteration will likely be required once key well-defined milestones/deliverables are identified.



# Top-Level Goals from Draft EDR Plan Document

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





# The How

- Goal 1 will require
  - **Accelerator expertise**
  - **Cost experts (preferable experienced machine builders)**
- Who are the 'PM Team'?
  - **Preferably a core group should attend all the (AS) reviews**
    - Maintain consistency
    - Swap notes!
    - PM must be involved!!
  - **Additional experts as needed / identified**
- What are the 'deliverables' of these meetings?
  - **How do we document the results?**
  - **As a report? Who writes the report? How is it used?**
  - **Feedback from PM Team – how is this handled?**
  - **How quickly can such a document be produced if it is required**
- How will we summarize at the October ILC meeting?



## Electron Source KOM comments

- Cost perspective: system ~2.2% RDR TPC (145MILCU)
  - **Not going to save much here**
  - **CFS dominant at 40% system cost (58MILCU)**
  - **CSRF (5GeV linac) comes next at 31%**
- Warm beamline components (conventional accelerator systems), including gun, laser and RF capture (critical R&D) <30% of system cost.
- Must balance EDR activities/priorities with this in mind.



# Electron Source KOM comments

- Given potential cost impact, primary focus will be on producing ‘conceptually engineered’ solution, which minimises CFS costs while maintains required performance:
  - **System integration**
  - **Some suitable level of magnet and vacuum engineering**
  - **Beam dynamics issues**
- **Goals:**
  - **detailed layout of beamline components in housing (3D CAD) → particular underground space requirements**
  - **Improved specification of (warm) components to consolidate/verify value estimate**
- **Defining exactly what “conceptually engineered” and “Improved specification” mean given the associate cost should be part of the KOM agenda.**



# Specifics (real goals)

- Step 1: consolidate the RDR
  - **Bring RDR system design/specification/costs into ILC-EDMS Baseline Document**
  - **(This should be much more detail than the RDR text)**
- Step 2: Identify critical engineering path
  - **WPs, milestones etc. to achieve level of engineering design we want.**
  - **(Will include necessary beam dynamics WPs)**
  - **Identify early the need for prototyping (real money!)**
- Step 3: R&D (**←not the focus for the KOM**)
  - **Define WPs, milestones, schedule for critical (high-priority) R&D (if any).**
  - **Must be realistic given our predicted resources**
  - **e.g. Laser – when do we need to start to develop the laser system?**
    - Note the RDR says there are no show-stoppers.

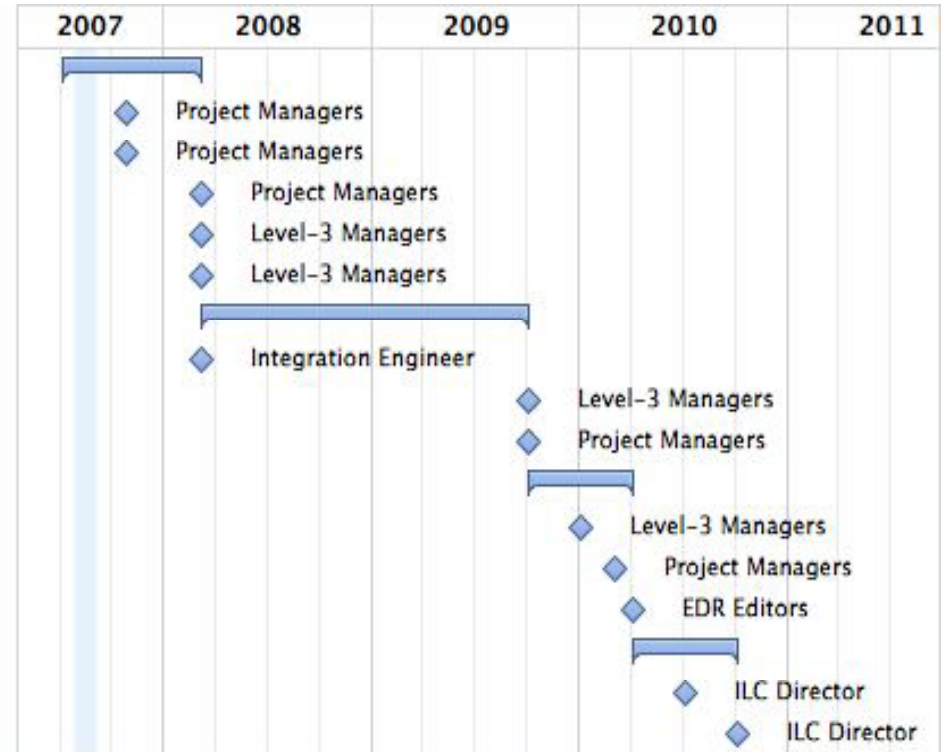
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# Top-Level EDR Project Schedule

## Task

- **1) Planning Phase**
  - 1.1) Release project guidance, tools, organizational info
  - 1.2) Release Engineering Project Management Plan
  - 1.3) Change Control template released
  - 1.4) Release accelerator areas WBS dictionaries
  - 1.5) Release preliminary list of accelerator area work packages
- **2) Execution Phase**
  - 2.1) WBS Level 1-3 Responsibilities & Interfaces reconciled
  - 2.2) Key technical issues answered for Engineering Design
  - 2.3) Completion of integrated value engineering exercise
- **3) Report Preparation Phase**
  - 3.1) First draft of EDR content provided by Level-3 managers
  - 3.2) Complete internal review of draft EDR
  - 3.3) Draft EDR released for external review
- **4) Review & Approval Phase**
  - 4.1) International Independent EDR Review
  - 4.2) Final EDR released



- Need to understand exactly what Planning Phase and Execution Phase mean for e- system.
  - i.e. filling in the details and e- specific milestones



# What is contained in a WP description

- A title
- An indication of the branch through which it is connected
- A statement of content, including goals, purpose and meaning for the baseline EDR.
- Work package coordinator
- Key institutions and associated institutional contacts.
- Deliverables
- Schedule
- Milestones
- Resources
- Statement of support – i.e. to what extent are the resources available
- Industrial connections, if any.
- Work supporting the baseline
- Work supporting alternates to the baseline, if any à the expected benefits, criteria for judgment and scheduled review process.



## Additional stuff (more for Marc to comment on)

- WP structure
  - **Should aim for well-defined 6-10 WPs**
  - **(WPs have a start, middle, end and deliverable)**
- Schedule
  - **Identify relationships and constraints between WPS**
    - May cause an iteration in WP definition
    - John C. to play a role here
- WP allocation
  - **Statement of our policy, specifically concerning magnets, vacuum etc.**
- Relationship to CFS and ML Tech:
  - **How best to manage the cross-connects (cf recent email exchange between Peterson and Sheppard concerning cryogenics)**