The Engineering Design Phase

Jim Clarke
Magnetics and Radiation Sources Group
ASTeC
STFC Daresbury Laboratory

Disclaimer

- I am no expert in this
- The situation continues to evolve, it is not set in stone (yet)
- The material presented comes largely from the draft “Project Management Plan” – Ross, Walker, Yamamoto

Goals of the ED Phase

- Complete a fully integrated engineering design of the accelerator
- Design must satisfy the energy, luminosity, and availability goals outlined in the RDR
- Must deliver a more complete and accurate value estimate

- Primary deliverable is the ED Report

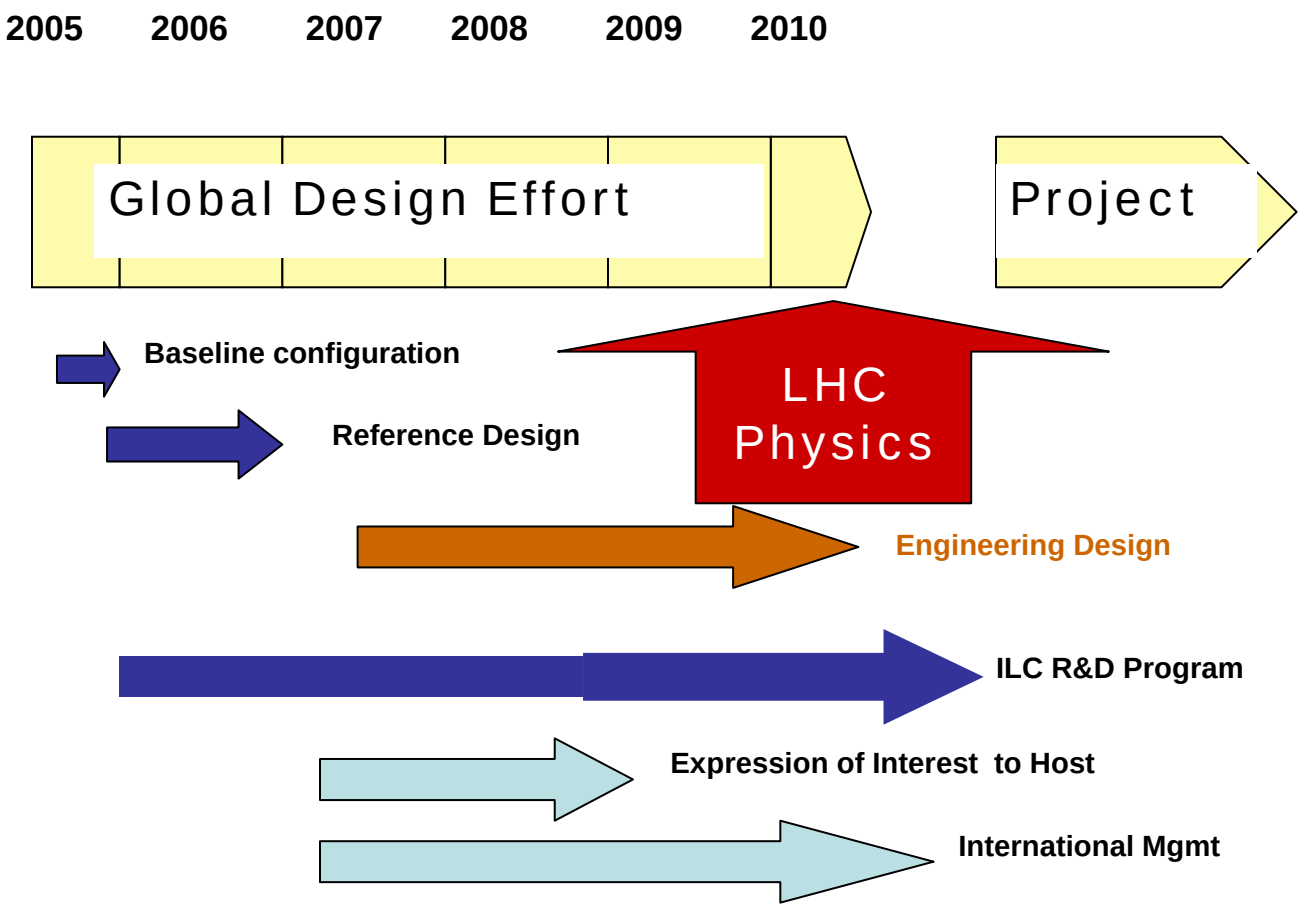
More Specific Goals

- Demonstrate through R&D program that all major accelerator components can be engineered to meet the required performance specifications
- Provide design such that machine construction could start within two to three years
- Mitigate technical risks by providing viable fallback solutions
- A detailed project execution plan including an achievable project schedule and plan for competitive industrialization of high-volume components across the regions
- Limit options and focus R&D and industrialization efforts on those issues where technical decisions are not yet final
- Design the conventional construction and site-specific infrastructure in enough detail to provide the information needed to allow potential host regions to estimate the technical and financial risks of hosting the machine
- Provide a complete value cost estimate for the machine, except for the details not yet completed in the site-specific designs, which includes a funding profile consistent with the project schedule proposed.
- Begin the transition to a project management model suitable for an ILC construction project.

Basic Premise

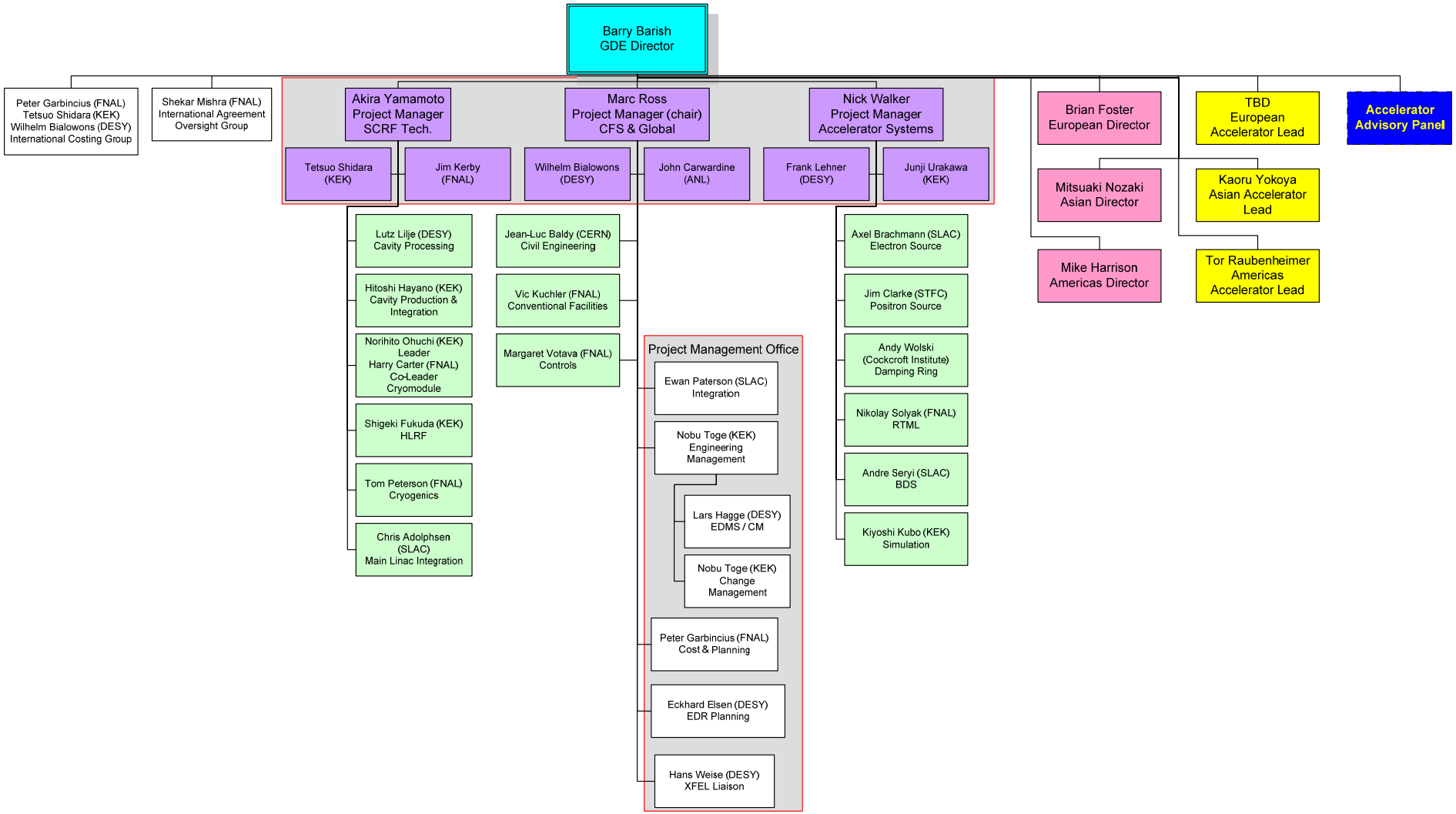
- Basic ILC design (RDR) is sound.
- Selected high-priority R&D is critical for mitigating technical risk and will necessarily remain a focus during the ED phase.
- Cost containment effort is critical, including performance/cost optimization, and an understanding of the performance/cost derivatives (value engineering).
- RDR identified cost drivers (SCRF technology and CFS) will provide guidance for ED planning.
- Systems (engineering) integration will play a central role.
- Initial phase will be accelerator -physics (AP) driven in order to evaluate the performance / risk trade-off for cost reduction.
- Engineering resources need to be identified and brought up to speed over time . The goal is a smooth transition from an AP-driven to Engineering-driven project.

GDE Plan and Schedule



Organisation

GDE ILC Engineering Design Phase Project



Accelerator Systems Technical Area

Scope of the ED phase is to:

- 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.

Technical Groups

- Group leaders are responsible for implementing the EDR R&D and Design effort in their group.
- The work will be specified through a system of work packages.
- Group Leaders are responsible for developing and drafting work packages, including goals, milestones and schedules
- The *Work Package Allocation Process* will be transparent to all and should respect inter-regional balance and existing institutional programs

Work Packages

- ED Project Work Packages will be the primary planning tool that will be used to define and formalize design and R & D efforts.
- Each Work Package will include a statement of work with an associated set of deliverables, a schedule and set of milestones.
- Each Work Package will have a designated Work Package Coordinator who reports to the Technical Area Group Leader
- Formalized through a Project Memorandum of Understanding
- “Institutional Managers” take responsibility for funding the work packages

Review Process

- Periodic, at least two times per year, dedicated Project Review Meetings will be held for the purpose of a formal review of each Work Package
- PRMs will consist of presentations by the Group Leader and the associated Work Package Team members to the Project Manager and the Project Manager's PRM team.
- The Project Manager will chair the PRM and will be responsible for writing the PRM report and submitting it to the Project Director and the Executive Committee.
- Project Review Meetings will typically last 2 to 3 days.

Implications for Positron Source

- Need to establish work packages
- Bear in mind throughout this meeting
- Discussion on Wednesday about best WP breakdown

- Once WP list created, will need to create a task list and rough schedule for each.
- Then expressions of interest by institutes etc
- Once allocations agreed, then MOUs between institutes & ILC

Positron Source KOM

- Focus of Project Managers is cost, cost , cost
- Kick Off Meeting at Daresbury 8/9 Oct
- Review of RDR source design
- What are the cost drivers?
- Where should our ED focus be to reduce the cost without affecting performance (value-engineer)

- PMs are planning R&D meetings for each area in the new year

Monday 8th October

9:00 – 9:10	Introduction – Jim Clarke
9:10 – 9:40	View from the Project Management Office – Nick Walker
	Overview of the Engineering Design phase
	What must we achieve?
	Purpose of this meeting
9:40 – 10:40	The RDR Design – Vinod Bharadwaj
	Explain RDR design
	Highlight weaknesses, inconsistencies, areas of greatest risk
10:40 – 11:00	Coffee Break
11:00 – 12:00	The RDR Cost Estimate – John Sheppard
	Review cost methodology
	Identify cost drivers for the source
12:00 – 13:00	CF & S for the Positron Source – CF & S Rep
13:00 – 14:00	Lunch
14:00 – 14:45	Planning the EDR Phase – Jim Clarke
	Review Gantt chart for EDR, milestones & deliverables
	Do we have the resources required to deliver the project?
14:45 – 15:30	Work Packages & Organisational Structure – Jim Clarke
	Proposed WPs and organisational structure
	Process for allocation of WPs
15:30 – 15:50	Coffee Break
15:50 – 16:50	System Integration – Jim Clarke
	(put all the bits together to form a consistent design and lines of communication with rest of ILC)
16:50 – 17:20	The role of S5 in the EDR – Eckhard Elsen
	Linking RDB to EDR

9:00 – 9:30 The Alternative Source Design – Masao Kuriki (?)
Explain present Compton design
Highlight weaknesses, inconsistencies, areas of greatest risk
9:30 – 10:00 The Alternative Source Cost Estimate – Masao Kuriki (?)
Present cost estimate for Compton Source
Identify cost drivers for the source
10:00 – 10:30 Planning for the Alternative – Masao Kuriki (?)
Review Gantt chart for Compton, milestones & deliverables
When could the Alternative be ready to be put forward for the baseline?
10:30 – 10:50 Coffee Break
Cost Driver Area Discussions
Potential significant configuration changes
Proposed Workplan over EDR Phase
10:50 – 11:35 Target System – Vinod Bharadwaj
11:35 – 12:20 Capture Magnet - Jeff Gronberg
(design and possible prototype of selected type)
12:20 – 13:20 Lunch
13:20 – 14:05 Remote Handling – Vinod Bharadwaj
(and target hall arrangement)
14:05 – 14:35 Auxiliary positron source - John Sheppard
(keep alive)
14:35 – 15:05 RF Systems – John Shepherd (Juwen Wang by webex also?)
(capture RF and other linac systems)
15:05 – 15:35 Lattice design - Feng/Yury by webex
(electron insert & positron transport to DR)
15:35 – 15:55 Coffee Break
15:55 – 17:25 Discussion and Wrap-Up