# Technical Design Phase 1 – Interim Review

Conducted by the Accelerator Advisory Panel,
Chairman: Bill Willis, co-Chairman: Eckhard Elsen

April 17 – 21, 2009
Tsukuba, Japan
http://tilc09.kek.jp
http://ilcagenda.linearcollider.org/conferenceDisplay.py?confId=3154

The Introduction to the Review Charge and the Context Outline are appended at the end of this Agenda.
Please note the Agenda lists assigned Presenters. In several cases the Presenter listed here will delegate the responsibility for the task.

## *Friday, April 17, 2009*

| | | | |
|---|---|---|---|
| - 12:00 | *Workshop Opening Plenary* | (to be announced) | |
| 14:30 – 15:30 | *The TDP-1 Interim Review* | Project Director | Barish |
| 15:30 – 16:30 | *Project Manager Report* | Project Manager | tbd |

## *Saturday, April 18, 2009*

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|---|---|---|---|
| 09:30 – 12:00 | *CFS* | CFS TA Group Lead | Kuchler |
| 14:00 – 15:30 | *CesrTA TF / Electron Cloud* | CesrTA TF Lead | Palmer |
| 15:30 – 16:30 | *FLASH Test Facility* | FLASH TF Lead | Carwardine |

## *Sunday, April 19, 2009*

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|---|---|---|---|
| 09:00 - 10:00 | *ATF TF* | ATF TF Lead | Seryi |
| 10:00 – 12:00 | *SRF R & D* | SRF Lead | Yamamoto |
| 14:00 – 16:00 | *SRF R & D* | SRF Lead | Yamamoto |

## *Monday, April 20, 2009*

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|---|---|---|---|
| 09:00 – 12:00 | *Accelerator Systems* | AS Lead | Walker |
| 14:00 – 15:00 | *Minimum Machine Design* | MM Lead | Paterson |
| 15:00 – 16:00 | *Project Manager Summary* | Project Manager | tbd |

## *Tuesday, April 21, 2009*

| | | |
|---|---|---|
| *Review and Workshop Summary* | (to be announced) | |

The above times are strictly for guidance, actual times – including coffee/tea breaks – are to be determined.

# Appendix 1: AAP Review at TILC'09

*The Accelerator Advisory Panel (AAP) will carry out its first review of the ILC during the April 2009 TILC in Japan. This document describes the scope of this review in rather general terms and is meant to help prepare the meeting.*

After completion of the Reference Design Report (RDR) in 2007 the ILC has entered the Technical Design Phase which is subdivided into phase 1 (till summer 2010) and phase 2 till the end of 2012. A Project Management Team has been installed that executes the Technical Design Plan (TDP) during this time and regularly updates the goals and verifies consistency of the overall approach. The basis for the activities is the RDR from which the project is expected to evolve.

The AAP is an advisory panels to the ILC director. It is composed of members of the ILC GDE and external members drawn from other projects. It complements the activities of the Project Advisory Committee (PAC) which consists solely of external members. As a panel with access to inside information the AAP is supposed to carry out in-depth technical reviews of the project aligned with the goals of the Technical Design Phase but not necessarily entirely confined to those goals.

To allow for an efficient preparation of the review the AAP has defined an overall context and goals that set the frame for discussion during the first review. These goals have been stated in the attached document. It is hoped that the technical background can be provided that will answer the incurred technical challenges. The topics have been developed in tight consultation with the ILC Executive Committee.

The first review will concentrate on TDP 1 which emphasizes certain focus points and defers the assessment of a more concentrated design effort for other topics to a later date. The focus points are

- Superconducting RF (SRF)
- e-cloud understanding
- Conventional Facilities and Siting (CFS)
- Test Facilities

The AAP will emphasize these topics in the review. The AAP has defined a context to structure the review in a separate document. That outline should serve to develop the detailed agenda and to guide the provision and selection of technical information.

Accelerator systems not mentioned in the focus list have received less financial support during TDP 1. Still, it is important that these areas are sufficiently well understood not to pose technical hurdles when the project is approved and funding is obtained. The AAP has thus defined the review for the accelerator systems such that major hurdles can be discussed and be brought to the

attention of the management. In simple terms: there should be no show stopper for rapid start of construction should the project be approved.

On the other hand all reasonable efforts have to be made to simplify the design of the ILC and reduce the cost. There are many possible options which have been summarized under the term "Minimum Machine". The Minimum Machine has immediate consequences for the tunnel layout and affects many accelerator systems at the same time. The AAP wishes to see the options for the Minimum Machine discussed. Starting from the RDR the respective areas should indicate possibles benefits of a design change and indicate a process that may lead to the change of the design. It should always be attempted to maintain a complete machine design, by default the RDR.

Along with the technical areas, the AAP will also look into the management of the project to understand whether the stated goals of the TDP are efficiently reached and the ILC is ready for construction when the political environment may be. Finally, the overall strategy for realizing a linear collider will be addressed.

# Appendix 2: Context

**Topic** | **Category**

- **Management**
  - ***Are the current management structures adequate to achieve technical readiness for the ILC in 2012?*** — ***Context***
    - use of international resources
    - topical emphasis
    - timing
    - Minimum Machine Overview (details in technical areas)
      - Simplification and rationalization
      - Cost savings
  - ***Does the current process involve the community such that it is prepared to engage when the decision for construction will be taken?*** — ***Context***
    - LHC results become available
    - Energy reach and window will be known
- **CFS**
  - ***Characterization of the process towards final ILC layout*** — ***Context***
    - Tunnel and Depth configurations
      - Cost implication
      - Optimization of power distribution
      - Operational aspects
    - Goals of TDP phase I and II for CFS
      - Completeness of Design?
      - Assessment of effort after TDP.
- **e-cloud**
  - ***Will e-clouds impose an operation limitation for the ILC?*** — ***Context***
    - Is the theoretical understanding sound?
    - What are the uncertainties in extrapolation for the ILC?
    - What are the mitigation techniques?
    - Which aspects of the theory and of the mitigation techniques have been tested experimentally and independently in positron and proton rings?
    - Damping ring test facilities
      - CesrTA
        - e-cloud
        - impedance limitations
      - PEP II
      - KEK B
        - high curent operation
        - future options
      - DaΦne
    - Is there a DR design for the ILC for safe operation wrt e-cloud?
      - What is the design and how has it been verified?
      - What are the remaining uncertainties and how are they covered in the design proposal?
      - What are the side effects: impedance, acceptance, emittance, bunch, etc…
    - What is the operation margin?
      - bunch charge
      - shorter bunches
      - smaller rings
- **SCRF**
  - ***What is the path to finalizing the gradient choice?*** — ***Context***
    - Current experimental status
      - Established standards

**Topic** **Category**

- Extrapolation of results
- Time limitations
- Decision process
- Role of plug compatibility in this process

- ***What is the path towards industrialization?*** ***Context***
  - Current experimental status
    - Established standards
    - Extrapolation of results
    - Internationalization of efforts
  - Outline tendering process
  - Role of Plug compatibilty
- ***Lessons expected from systems tests*** ***Context***
  - FLASH
    - Operational limitations of ILC cavities
      - ILC like mode
        - *Long bunch*
        - *High charge*
        - *High gradient*
      - Experience and characterization of implications for ILC
  - Other facilities foreseen
    - Timelines
    - Benefits

- **ATF/ATF-2**
  - ***Overall goals of the Test Facility Program*** ***Context***
    - International involvement
  - ***Demonstration of final focussing*** ***Context***
    - stability
  - ***Demonstration of 2 pm emittance*** ***Context***
    - reproducibility

- **Accelerator systems**

  *Comprises:*
  *– e- source*
  *– e+ source*
  *– DR injectors*
  *– DR*
  *– Bunch compressor*
  *– Main linac*
  *– Beam delivery and final focus*
  *– Dumps*
  *– Operations and Controls*
  - ***Current baseline layout?*** ***Review***
    - Challenges
    - Alternatives
      - Decision process for alternatives
  - ***What are the technical limitations known today and implications on project timing?*** ***Review***

    *Suppose funding were available today to address the engineering work. Are there any technical hurdles that require research and investigations before engineering could start? Those issues might delay the realization of the project and should be clarified early if on the critical time line.*

| Topic | Category |
| --- | --- |
| **Strategy** | |
| ***TD Phases 1 & 2*** | ***Context*** |
| ***Beyond TD*** | ***Context*** |