ILC Mechanical & Electrical Review and CFS Baseline Technical Review

from Wednesday, 21 March 2012 at **09:00** to Friday, 23 March 2012 at **18:00** (Europe/Zurich)
at **CERN (6-2-024 - BE Auditorium Meyrin)**

CFS TDR design status
Survey & alignment

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STATUS

Introduction:

- In the Reference Design Report published in August 2007, the chapter dealing with survey and alignment was written by Jean-Pierre QUESNEL from CERN (who has retired)

- He had also validated in parallel the WBS and prepared the cost estimate

- The text submitted for the Reference Design Report, as well as the cost estimate had been validated by the responsible in charge of survey & alignment of other laboratories: SLAC, Fermilab, KEK and DESY.

STATUS

Hypotheses considered in 2007:

- The strategy and associated techniques for the alignment of the machine are known; they were used for the alignment of the LHC. The cost estimate is mostly based on a scaling w.r.t the LHC.

- As ILC can be built on a new site, it was considered that :
  - All the infrastructure needed for survey and alignment is new and has to be built
  - All the metrological equipment has to be purchased
  - A GIS has to be setup, as well as a Survey database; professional softwares need to be developed or purchased.

- Constitution of a group of 32 persons in order to supervise the work (organization, management, quality control and specific alignment tasks)

TOWARDS TDR

- Objectives:
  - Fill out the Reference Design Report published in August 2007
  - Provide a realistic cost
- Information needed:
  - Are the hypotheses considered in 2007 still applicable?
  - Are the component alignment tolerances still the same?

Area	Type	Tolerance
Sources, Damping Rings and RTML	Offset	150 μm (horizontal and vertical), over a distance of 100 m.
	Roll	100 μrad
Main Linac (cryomodules)	Offset	200 μm (horizontal and vertical), over a distance of 200 m.
	Pitch	20 μrad
	Roll	
BDS	Offset	150 μm (horizontal and vertical), over a distance of 150 m around the IR.

TOWARDS TDR

- Per complex (RTML, ML, DR,…) and sub-complex, the following information would be very helpful:
  - ✓ Tunnel length
  - ✓ Number of beam
  - ✓ Type & number of components
  - ✓ Pre-alignment requirements
  - ✓ Fiducialisation requirements (no fiducialisation needed versus systematic geometrical measurements within a given precision and accuracy)

  Is such an information already available?

- Milestone:

  ➔ a first draft of TDR report and cost ready for the IWAA 2012 (September 2012), in order to be discussed with the persons in charge of the survey and alignment in the other laboratories: SLAC, Fermilab, KEK and DESY.

TOWARDS TDR

- Some first points to be addressed:

  - ✓ In the layouts and CAD models:
    - ✓ One vertical shaft for surveyors every 2.5 km
    - ✓ Survey galleries parallel to the tunnel allowing to link the two sides of the tunnel

  - ✓ In the RDR:
    - ✓ No mention of the final focus, BDS area and detector area
    - ✓ There was some R&D mentioned concerning automatic process for the determination of the geodetic networks. Is this still needed?
    - ✓ Will you need remote adjustment and alignment systems in given area (tighter alignment tolerances, severe environment with radiation fluences)?