



LHCb Meeting with LHCC Referees

CERN — March 19, 2001

Submission Date Inner Tracker TDR

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Want to Shift Submission Date From 09/2001 to 12/2001!

Crucial parameters (technology decision!) delayed by beam-pipe design

⇒ SIZE Inner Tracker still not fixed (uncertainty \approx FACTOR 2!)

Reminder:

- size Inner Tracker determined by max. occupancies in Outer Tracker
- particle flux dominated by secondaries from beam pipe

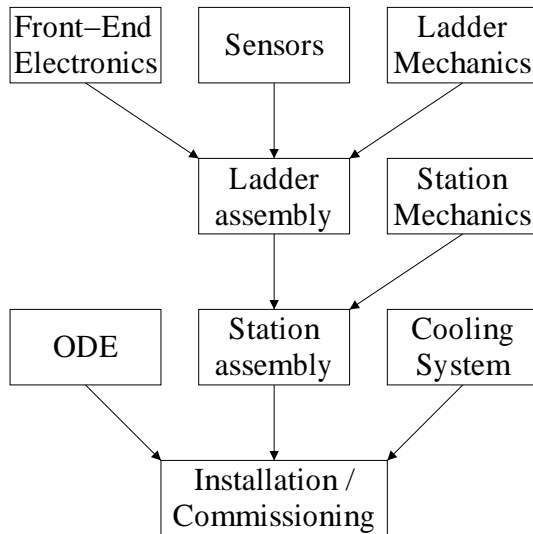
⇒ size Inner Tracker depends crucially on design of beam pipe

- baseline design for beam pipe chosen February 2001
- studies of Outer Tracker occupancies & tracking performance ongoing

⇒ technology decision, start of design work not before April!

Message of this presentation: we can afford the shift!

Estimate Production Time (Full Silicon)



Inner Tracker as in LHCb note 2000-109:

- 11 stations, 40 cm × 60 cm sensitive
- 500 ladders, 1500 sensors

Additional assumptions:

- 2 production centers, running parallel
- production steps strictly sequential

Half-station assembly	1 / week	11 weeks
Half-station debugging	1 / week	11 weeks
Ladder assembly / debugging	10 / week	25 weeks
Sensor acceptance tests	80 / week	10 weeks
Total production time		57 weeks

⇒ allocate **15 months** for detector production (= 65 weeks)

(for $\approx 6 \text{ m}^2$ / prod. center, compare GLAST-BTEM: 6 months for 2.4 m^2)

Tentative Milestones Silicon Inner Tracker

Assumptions as in Inner Tracker Memo 2000-012, Sep. 2000:

- 6 months for installation & “commissioning”
- 15 months for detector production
- 6 months from final order to delivery first batch of sensors
- 6 months for tendering

Assuming old LHC schedule:

Date	Milestone
03/2005	“fully commissioned” Inner Tracker
09/2004	end of production, start of installation
06/2003	start of detector production
12/2002	final order of silicon sensors
06/2002	freeze sensor design, start tendering

⇒ new LHC schedule would allow to shift TDR by ≈ 1 year
(not yet decided where to use the additional 7 months)

Prefer to submit as early as possible !

Roadmap Towards Inner Tracker TDR

Feb 13	LHCb week	Inner Tracker group agreed this roadmap, presented to TB
Mar 28	Tracking meeting	“fi x” Inner Tracker size
Apr 03	Inner Tracker meeting	prepare “technology decision”, inform TB; discuss TDR structure and responsibilities
May 08	LHCb week	TB endorses “technology decision”
Aug 01	-	start writing TDR
Sep 08	LHCb week	all “numbers and plots” available
October	-	TDR circulates in Inner Tracker group
Nov 19	-	present TDR to TB and collaboration
Dec 04	LHCb week	TB endorses TDR
Dec 15	-	TDR presented to referees

⇒ January 2002 LHCC meeting

Input Needed for “Technology Decision” (1)

Price of silicon sensors:

- contacted manufacturers with preliminary list of specifications
(Hamamatsu, SINTEF, Eurisys, SPA Detector, CSEM)
- all declared general interest, no price quotes yet

Maximum ladder length for silicon (Signal/Noise):

- Lab measurements using Ruthenium source and infra-red laser
- results from single sensor (6.7 cm) connected to Helix read-out chip, agree with expectation
- “long” ladders (3-5 sensors) in preparation (mechanics ready)
- setups using SCTA chip in preparation

Demonstration that full-size 3-GEM prototype “works”

- lab measurements under way

Input Needed for “Technology Decision” (2)

“Pitch” requirements from occupancy and momentum resolution

- simulation studies under way (using “realistic” Inner Tracker digitisation)

Required size for each Inner Tracker station !

- need input from Outer Tracker and Tracking Task Force
- tracking “mini workshop” at NIKHEF, March 27/28

Conclusions

- “Late” decision on baseline beam-pipe design delays important choices for Inner Tracker (size still unknown \approx factor 2 !)
- Technology decision, start of design work not before April
- Impossible to submit defensible TDR by September

- Estimated production time would allow to delay TDR by \approx 1 year
- BUT: want to submit as soon as possible
- Worked out a roadmap that would allow submission in December

Ask LHCC to support shift of submission date from 09/2001 to 12/2001