TDR Editing

Sunday CEPC TDR Meeting
Aug 03, 2025

Joao Guimaraes

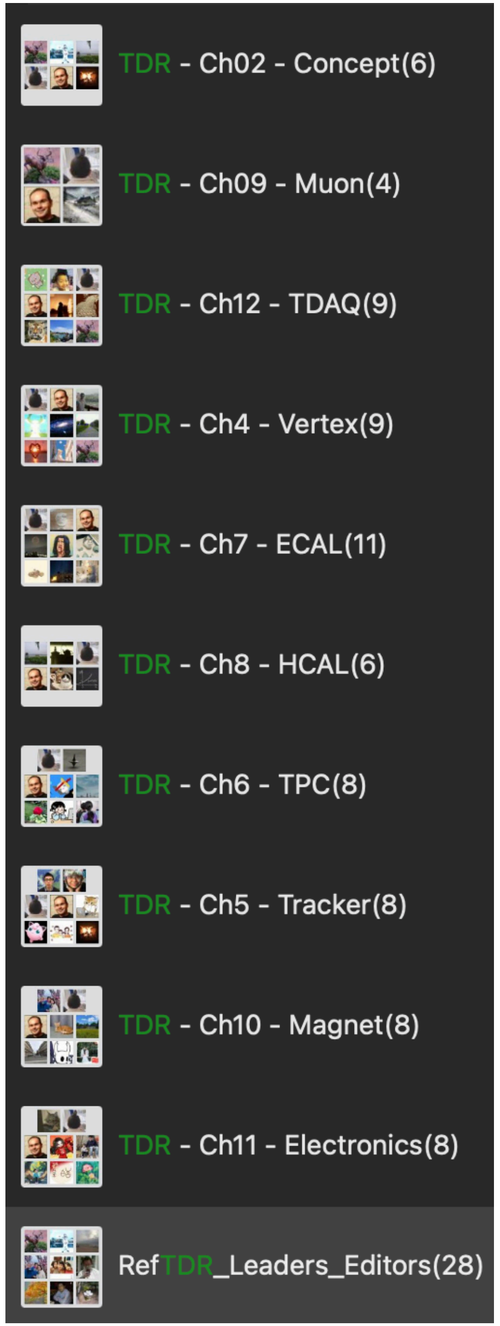
Keeping track of modifications

- **Spreadsheet monitoring the status in IHEP docs:**
  - https://docs.ihep.ac.cn/link/ARF4C648FCA57D4CF281A8E821A110229E
  - 文件名：Status of TDR.xlsx
  - 文件路径：AnyShare://ZHANG Zhaoru(zhangzr)/CEPC Det TDR/Status of TDR.xlsx

- Please fill in your input now, and **keep it updated** as we move along

- We will try to do the same!

- Provide feedback for improvements



Keeping track of modifications

Blue section of the spreadsheet is for chapter leaders

Chapter	Overall Complete	Chapter structure	Updated date	Tables				Figures	
			Ready for check	Unified format	Significant digits	Change to pdf	Unified Macro	Total of not perfect figures	remaining to be updated
Executive summary	100%	100%		100%	100%		100%		
1 Introduction	100%	100%		100%	100%		100%	1	0
2 Concept of CEPC Reference Detector	90%	100%		90%	90%	90%		3	0
3 MDI and Luminosity Measurement	100%	100%	31-Jul	100%	100%	100%	100%	23	1 - 3.27;
4 Vertex Detector	95%	95%		100%	100%	100%	100%	23	1 - 4.22;
5 Silicon Trackers	100%	100%		100%	100%	100%	100%	21	0
6 Pixelated Time Projection Chamber	95%	100%	25-Jun	100%	100%	100%			
7 Electromagnetic calorimeter	95%	98%	21-Jul	95%	95%	98%	100%		
8 Hadronic calorimeter	95%	100%	31-Jul	100%	100%	100%	100%		
9 Muon Detector	95%	100%	2-Jul	100%	100%	100%	100%	4	4
10 Detector magnet system	100%	100%	31-Jul	100%	100%	100%	100%	33	0
11 Readout Electronics	100%	100%	30-Jul	100%	100%	100%		6	0
12 Trigger and Data Acquisition	100%	100%	26-Jul	100%	100%	100%	100%	3	0
13 Offline software and computing	100%	100%	28-Jul	100%	100%	100%	100%	1	0
14 Mechanics and integration	95%	95%	30-Jul	100%	100%	100%	100%	32	32
15 Detector and physics performance	95%	100%	1-Aug	100%	98%	100%	100%	2	2

Update status using “blue” color so that we can know it is up to date

Executive Summary

- Xinchou will fine tune it
  - Comment added:
  - The CEPC reference detector was designed and optimized primarily for the Higgs program, and for the low luminosity Z runs for initial physics and calibrations. Some of the detector components will likely be upgraded with future technologies to fully explore the physics potential of the tera-Z program offered by the CEPC accelerator.

Chapter 2

- From Haijun today:
  - All tables and pictures in chapter 2 are up to date

- From my side:
  - Need to re-check, some text improvements regarding requirements and challenges might need to be done

Chapter 3

- Haoyu reported yesterday it is OK
  - But there are missing studies that will take too long to include. How long?
    - Need to make sure these missing results are clearly stated, and that the other chapters are correctly using the estimates

- From my side:
  - One plot is still listed as missing. Don’t know if it has been updated
  - Need to re-check, in particular the consistency with other chapters
    - Integration of MDI and Luminosity parts was a problem a few days ago
    - At first glance things are much improved in this version

Chapter 4

- Zhijun yesterday reported:
  - Several figures to be updated: Figure 4.16, caption to be updated with more explanation for cooling and service. Figure 4.17, the whole figure to be updated. Figure 4.18, caption to be updated. Figure 4.19, photo will be updated with high quality photo. Figure 4.23, caption to be updated with more details
  - New comments from IDRC (Gregor), received on Thursday still to be addressed - estimate Monday

- From my side:
  - Need to check comments from Gregor
  - Need to re-check cabling and cooling
  - Check beam backgrounds
  - Recheck english and connections to other chapters

Chapter 5

- Yan Qi yesterday reported:
  - Silicon Tracker, almost ready and will finish the final refinement before Aug 5

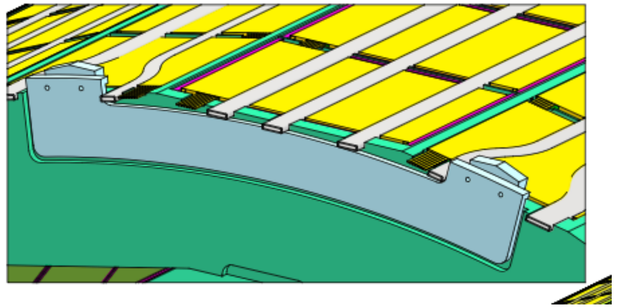
- From my side:
  - It would be good to know more specifics on the refinements. Aug 5 is the deadline to send the final version to IDRC, so we should only make minor changes, otherwise it should be clearly stated
  - Need to re-check cabling and cooling
  - Check beam backgrounds
  - Recheck english and connections to other chapters

Chapter 6

- Huirong yesterday reported:
  - Gaseous Tracker, almost ready including the comments and recommendation from the IDRC and editors. the update version will be refreshed before Aug. 4
- From my side:
  - English needs improvements
  - Issue with FEA and concerns from IDRC member need clarification
  - Need to re-check cabling and cooling
  - Check beam backgrounds

Chapter 7

- Yong yesterday reported:
  - ECAL is fine, except Figure 7.23 (b), which will be updated once the latex server is back to normal.
- From my side:
  - Many people check this chapter
  - Connection to the mechanics chapter needs to be improved. Fig. 7.11 needs to be changed or removed. It is already in chapter 14
  - Need to re-check cabling and cooling. Cooling pipe outside seems incorrect



Chapter 8

- Sen Qian yesterday reported:
  - All figures are upload. It is seams ok. we also improving the quality of the language
- From my side:
  - English certainly still needs improvement
  - Not clear how much active editing is happening. It still seems significant
  - Need to check mechanics and connection to chapter 14
  - Need to check cabling and cooling.

Chapter 9

- Xiaolong yesterday reported:
  - We can not have a pdf version of Fig.9.13(a), so considering to remove Fig. 9.13. We are updating the Fig.5 with more details, including cables.
- From my side:
  - Muon detector details still need to be worked out. More technical drawings should be added
    - Not major technical showstoppers but detector needs to be properly described without insconsistencies
    - e.g. readout cables now likely to be round, while electronics graph say they are flat cables
    - Still needs careful checking
  - Need to check mechanics and connection to chapter 14
  - Text still needs improvements

Chapter 10

- Feipeng yesterday reported:
  - Magnet OK
- From my side:
  - Need to re-check
    - In particular overlaps with Chapter 14

Chapter 11

- Weiwei yesterday reported:
  - Electronics OK

- From my side:
  - Need to check
  - Check cabling and connections to detector chapters and chapter 14 services

Chapter 12

- Fei Li yesterday reported:
  - DAQ OK

- From my side:
  - Need to do final check. English was already pretty good before.
  - Check if rates are consistent with new background estimates

Chapter 13

- Weidong yesterday reported:
  - Offline Software and Computing is ready

- From my side:
  - Need to do final check but english was already pretty good
  - Check connection with performance chapter

Chapter 14

- Xiaoyan yesterday reported:
  - The mechanics chapter still needs some FEA calculations and service content added, to be completed by the 5th
  - A summary table with cables and pipes will be added. Table needs to be checked
- From my side:
  - A lot of progress made in the last few days
  - Services section missing and need to check cable/pipe summary table
  - Add references to the different chapters
    - Make sure the connection information is consistent with every chapter
  - Improve text/english overall

Table 14.4: Inventory of cable and pipe

	Cooling pipe		Cable	
	Size (mm)	Quantity	Size (mm)	Quantity
Barrel muon detector	/	/	ϕ8	72×2
Barrel HCAL	ϕ12	96×2	ϕ2 ϕ1	5568×2 2784×2
Barrel ECAL	40×10	80×2	ϕ2 1×1	480×2 240×2
Barrel OTK	ϕ5.5	220×2	ϕ5	110×2
TPC	6×6	12×2	ϕ6 ϕ10 ϕ1 ϕ3	248×2 1 744×2 248×2
ITK	ϕ6.4	81×2	ϕ5	96×2
VTX	ϕ10	6×2	ϕ5	48×2
LumiCal	/	/	30×6	4×2
Endcap OTK	ϕ3	160×2	ϕ5	48×2
Endcap ECAL	40×10	16×2	ϕ2 1×1	152×2 76×2
Endcap HCAL	ϕ12	32×2	ϕ2 ϕ1	3072×2 1536×2
Endcap muon detector	/	/	ϕ8	48×2

Chapter 15

- Mingshui yesterday reported:
  - almost finished, except BIB simulation to be understood, ww fusion analysis to be updated

- From my side:
  - A lot of work lately on editing. I expect it to be good, but need to check
  - Check connection with chapter 2 and software chapter
  - Everyone should check connection to their own chapter performance

Chapter 16

- No input yesterday

- From my side:
  - Need to check
  - Some formatting and text needs improvement. Perhaps too much AI :-)

Chapter 17

- Miao He yesterday reported:
  - Cost is ok

- From my side:
  - Check next slide
  - Make sure there are no other changes

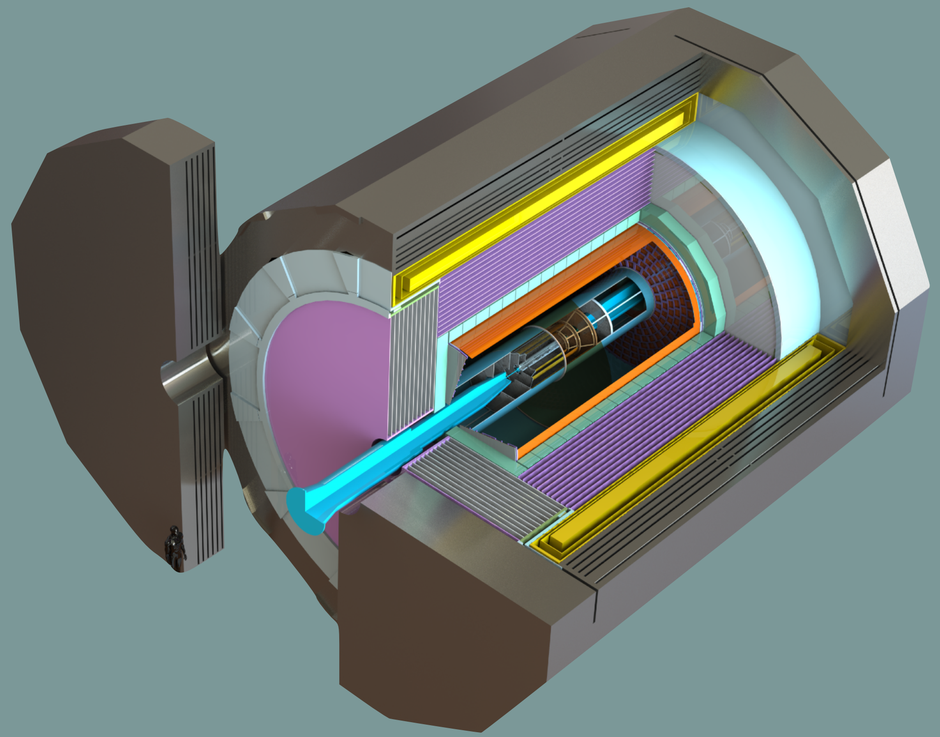
Chapter 17 - Cost status from He Miao

- In the version v0.5.1, cost breakdown for each detector system with some descriptions are included since it will be sent to IDRC members. While in the version to be published, they are going to be removed but only a summary table will be kept.
- Investigated each of the IDRC comment regarding cost with related L2s after the IDRC review.
- A summary report at the TDR meeting on May 20
  - TPC: +905 kCHF for a couple of missing items
  - BGO: visited new suppliers with new technologies, aiming for expected price
  - SiPM: got quotes, a factor of two reduction expected in 5-10 years
  - Glass scintillator: 40% difference among suppliers, chose the lowest one for now
  - Muon: Use equivalent cost per channel, minor impact on cost
  - Magnet: internal review of the designe organized, no major issue

  } No update for TDR
- Total cost in the TDR: 332.3 MCHF (Apr.) → 333.2 MCHF (already in the July version)

Cover

CEPC Reference TDR

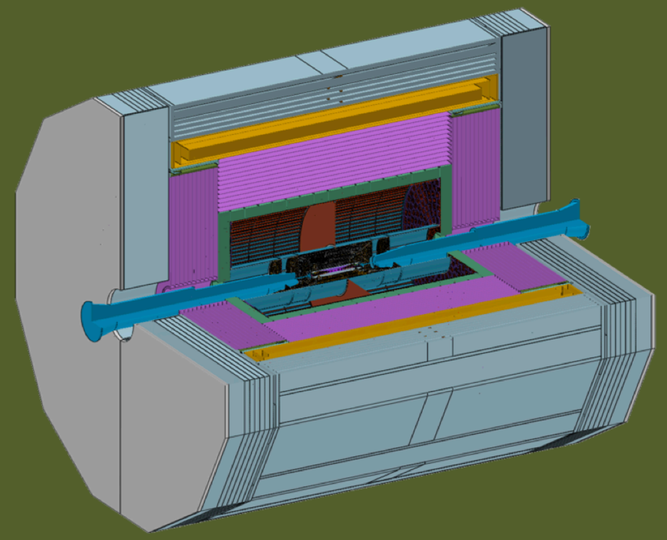


Draft v0.5.0

CEPC Reference Detector

Technical Design Report

Version: v0.5.0 build: 2025-07-15 07:37:45+08:00



IDRC review possible dates and deadlines

Date		IDRC Members	TDR Readiness date
Aug 19	Evening	9	**Aug 5**
Aug 20	Afternoon	8	Aug 6
	Evening	10	
Aug 21	Afternoon	8	Aug 7
	Evening	11	
Aug 22	Evening	8	Aug 8
Aug 26	Evening	9	**Aug 12**
Aug 27	Afternoon	8	Aug 13
	Evening	9	
Aug 28	Evening	8	Aug 14