Status of the preTDR and Plans for CD-2

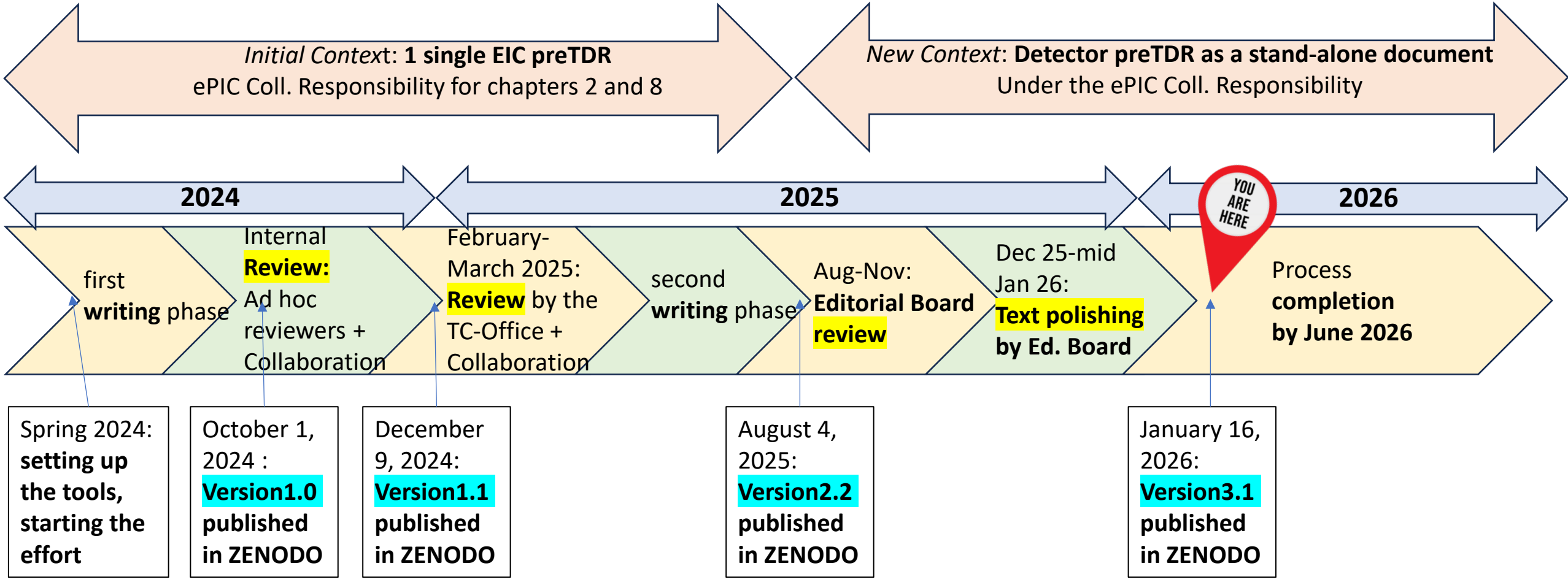
Silvia Dalla Torre, John Haggerty

ePIC meeting
BNL, January 20-23, 2026

BASIC CONSIDERATION

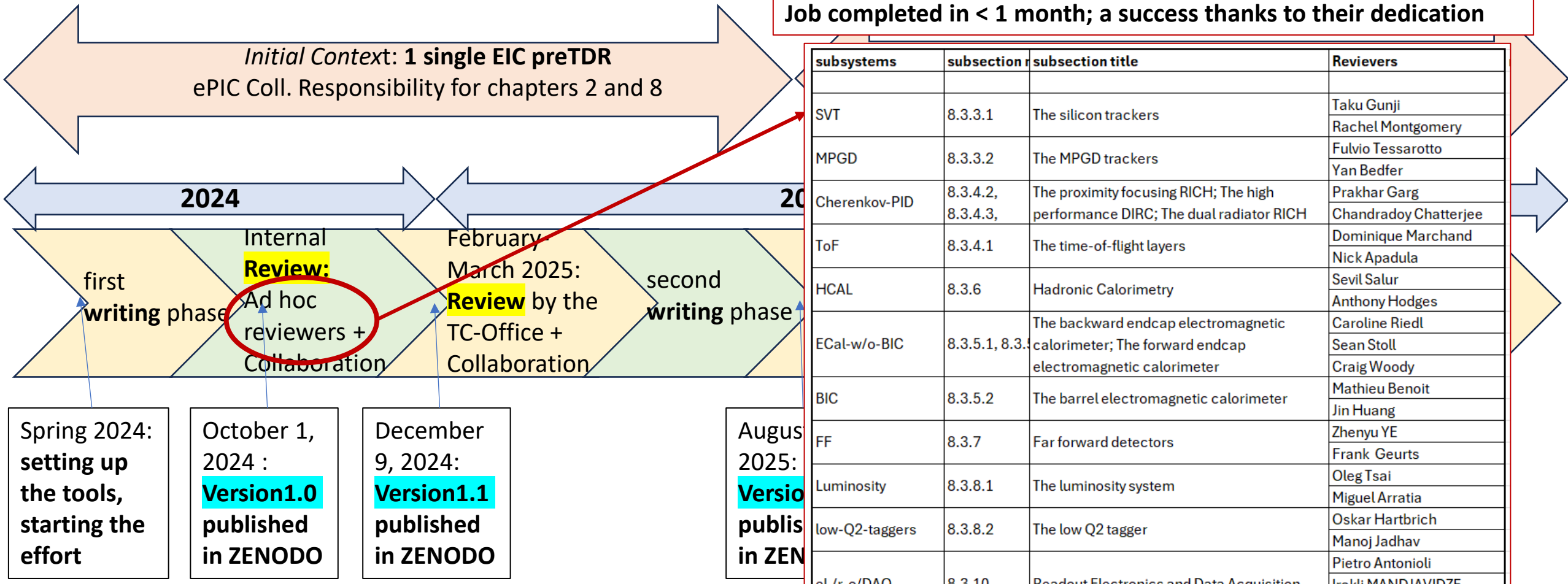
- **Reaching the Detector Readiness level for CD2 and Completing the preTDR are highly correlated efforts: two sides of the same coin**
- **In fact, the preTDR documents the Detector Readiness**
- In the following, the matter is discussed in term of preTDR status and progress; this is largely equivalent to discuss it in term of progressing in the Detector Readiness level

preTDR STEPS



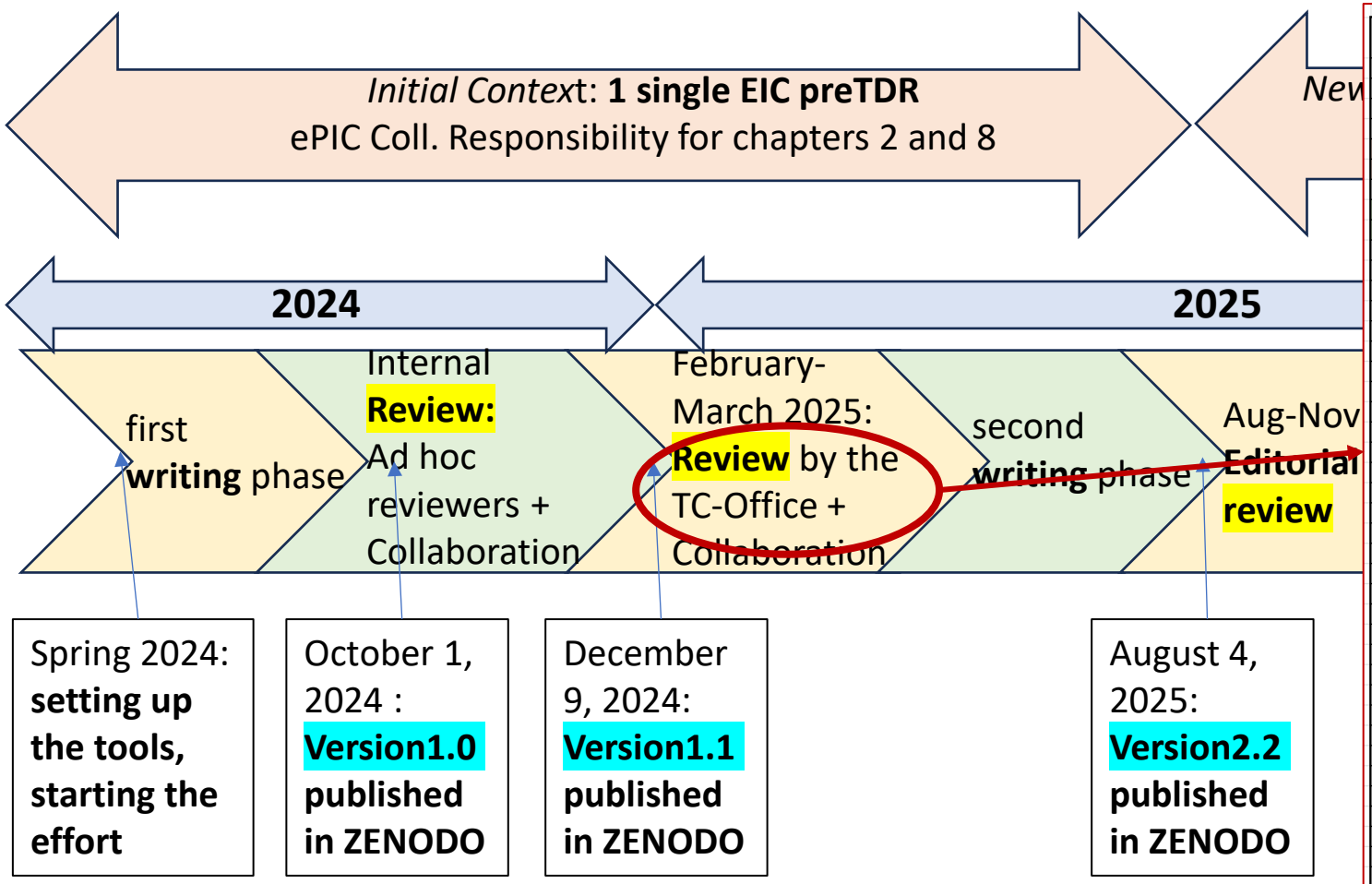
preTDR steps, complementary information and acknowledgements

27 ePIC Colleagues who accepted to serve as internal reviewers;
Job completed in < 1 month; a success thanks to their dedication



subsystems	subsection r	subsection title	Revievers
SVT	8.3.3.1	The silicon trackers	Taku Gunji
			Rachel Montgomery
MPGD	8.3.3.2	The MPGD trackers	Fulvio Tessarotto
			Yan Bedfer
Cherenkov-PID	8.3.4.2, 8.3.4.3,	The proximity focusing RICH; The high performance DIRC; The dual radiator RICH	Prakhar Garg
			Chandradoy Chatterjee
ToF	8.3.4.1	The time-of-flight layers	Dominique Marchand
			Nick Apadula
HCAL	8.3.6	Hadronic Calorimetry	Sevil Salur
			Anthony Hodges
ECal-w/o-BIC	8.3.5.1, 8.3.5	The backward endcap electromagnetic calorimeter; The forward endcap electromagnetic calorimeter	Caroline Riedl
			Sean Stoll
			Craig Woody
BIC	8.3.5.2	The barrel electromagnetic calorimeter	Mathieu Benoit
			Jin Huang
FF	8.3.7	Far forward detectors	Zhenyu YE
			Frank Geurts
Luminosity	8.3.8.1	The luminosity system	Oleg Tsai
			Miguel Arratia
low-Q2-taggers	8.3.8.2	The low Q2 tagger	Oskar Hartbrich
			Manoj Jadhav
el./r-o/DAQ	8.3.10	Readout Electronics and Data Acquisition	Pietro Antonioli
			Irakli MANDJAVIDZE
			Marco Battaglieri
software/computing	8.3.11	Software and Computing	Domenico Elia
			Peter Jones
			David Abbott

preTDR steps, complementary information and acknowledgements



		chapter	section	subsection	sub-subsection	title	TC-office review
							in charge
ePIC		8				**Experimental Systems**	
responsibility			8.1			Experimental Equipment Requirements Summary	
			8.2			General Detector Considerations and Operations Challenges	
Project				8.2.1		General Design Considerations	Prakhar
responsibility				8.2.2		Backgrounds and Rates	Prakhar
				8.2.3		Radiation Level	Prakhar
Joint			8.3			The ePIC Detector	
responsibility				8.3.1		Itroduction	Oskar
				8.3.2		Magnet	
				8.3.3		Tracking	Silvia
					8.3.3.1	The silicon trackers	Silvia
					8.3.3.2	The MPGD trackers	Silvia
				8.3.4		Particle identification	Oskar
					8.3.4.1	The time-of-flight layers	Matt
					8.3.4.2	The proximity focusing RICH	Oskar
					8.3.4.3	The high performance DIRC	Oskar
					8.3.4.4	The dual radiator RICH	Oskar
				8.3.5		Electromagnetic Calorimetry	Prakhar
					8.3.5.1	The backward endcap electromagnetic calorimeter	Prakhar
					8.3.5.2	The barrel electromagnetic calorimeter	all, done
					8.3.5.3	The forward endcap electromagnetic calorimeter	Prakhar
				8.3.6		Hadronic Calorimetry	Matt
					8.3.6.1	The backward endcap hadronic calorimeter	Oskar
					8.3.6.2	The barrel hadronic calorimeter	Matt
					8.3.6.3	The forward endcap hadronic calorimeter	Matt
				8.3.7		Far forward detectors	Matt
					8.3.7.1	The detectors in the B0 bending magnet	Matt
					8.3.7.2	The roman pots and the off-momentum detectors	Matt
					8.3.7.3	The zero degree calorimeter	Matt
				8.3.8		Far backward detectors	Oskar
					8.3.8.1	The luminosity system	Oskar
					8.3.8.2	The low Q2 taggers	Oskar
				8.3.9		Polarimeters	
					8.3.9.1	The electron polarimeters	
					8.3.9.2	The proton polarimeters	
				8.3.10		Readout Electronics and Data Acquisition	Oskar
				8.3.11		Software and Computing	Silvia
			8.4			Detector Integration	
				8.4.1		Installation and Maintenance	
			8.5			Detector Commissioning and Pre-Operations	

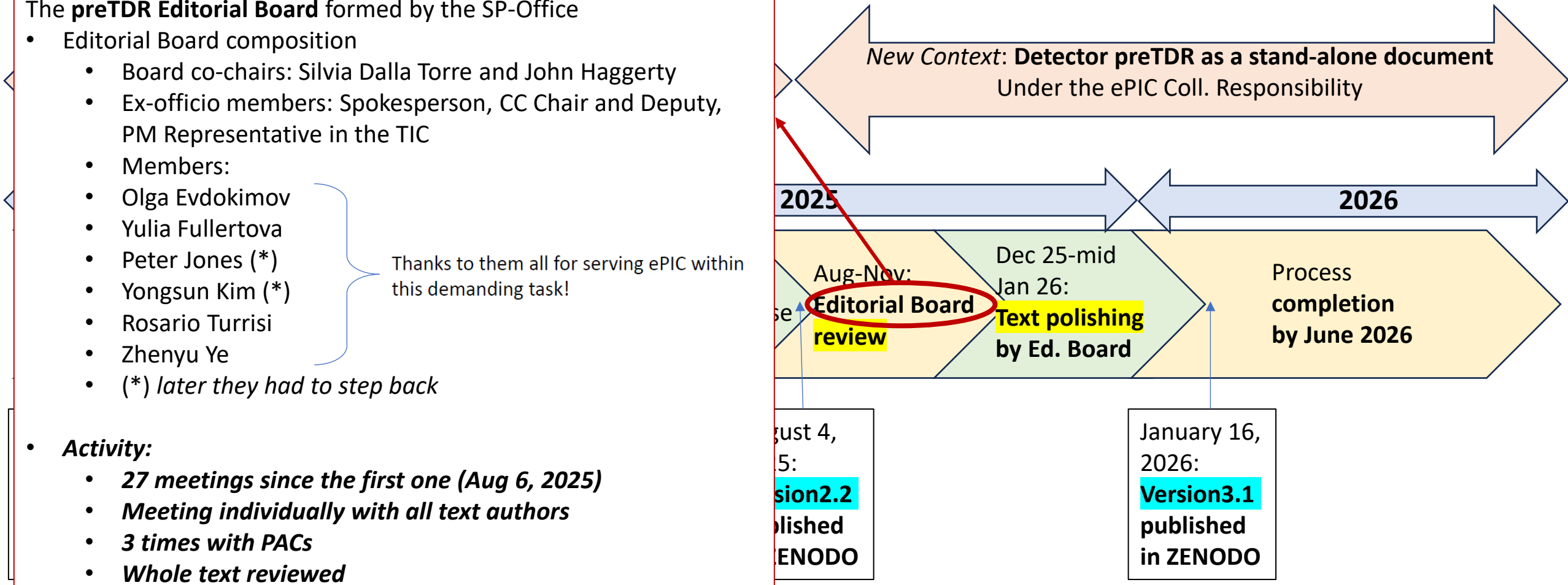
preTDR steps, complementary information and acknowledgements

The **preTDR Editorial Board** formed by the SP-Office

- Editorial Board composition
  - Board co-chairs: Silvia Dalla Torre and John Haggerty
  - Ex-officio members: Spokesperson, CC Chair and Deputy, PM Representative in the TIC
  - Members:
  - Olga Evdokimov
  - Yulia Fullertova
  - Peter Jones (*)
  - Yongsun Kim (*)
  - Rosario Turrisi
  - Zhenyu Ye
  - (*) *later they had to step back*

Thanks to them all for serving ePIC within this demanding task!

- ***Activity:***
  - ***27 meetings since the first one (Aug 6, 2025)***
  - ***Meeting individually with all text authors***
  - ***3 times with PACs***
  - ***Whole text reviewed***
  - ***Whole text polished***



Detector preTDR, document layout

- **Executive Summary**
- **CHAPTER 1 – Introduction**
  - The EIC project and the accelerator complex (high level approach)
- **CHAPTER 2 – Requirements**
  - Present requirements resulting as the evolution of the YR ones
- **CHAPTER 3 – Experimental Systems**
  - Presenting the detector subsystems matching the requirements (mainly individual performance)
- **CHAPTER 4 – Detector Performance for the EIC physics program**
  - Presenting the holistic detector performance by the performance for key physics measurements

Advanced version in Version3.1

- **CHAPTER 5 – Detector-Accelerator interfaces**
  - Integration into the facility

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Important note:

This layout changes the scope of the chapter dedicated to physics (now chapter 4)

- ***No longer extracting "Requirements' from physics studies (old YR approach)***
- ***Requirement are given as educated evolution of YR findings and match the Project requirements***
- ***Physics studies prove in a holistic approach the detector capabilities with subsystems matching the Requirements***

Detector preTDR, Version3.1

https://zenodo.org/records/18271602/files/ePIC_Preliminary_Design_Report_3.1.pdf?download=1

DRAFT
ePIC PDR
January 16, 2026

The ePIC Detector

Preliminary

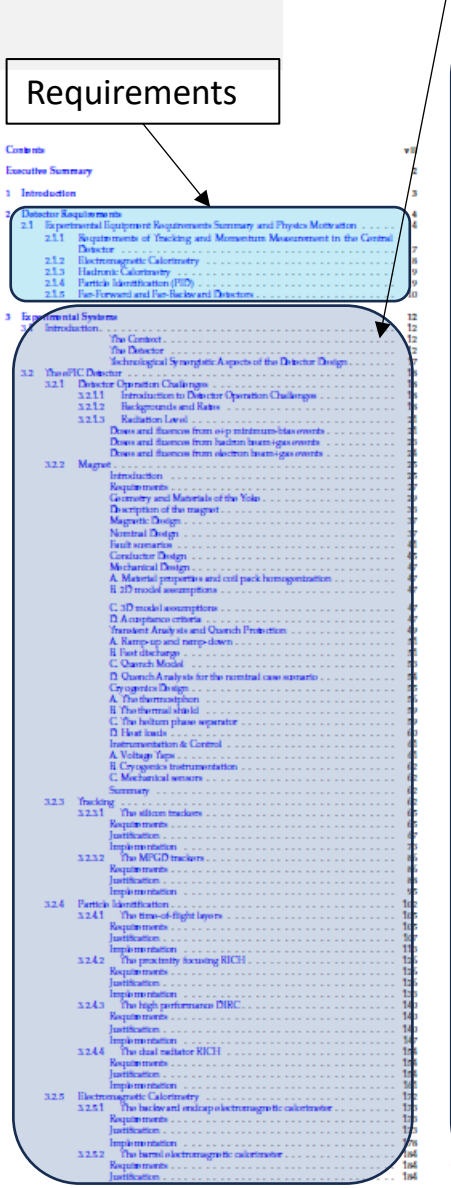
Technical Design Report

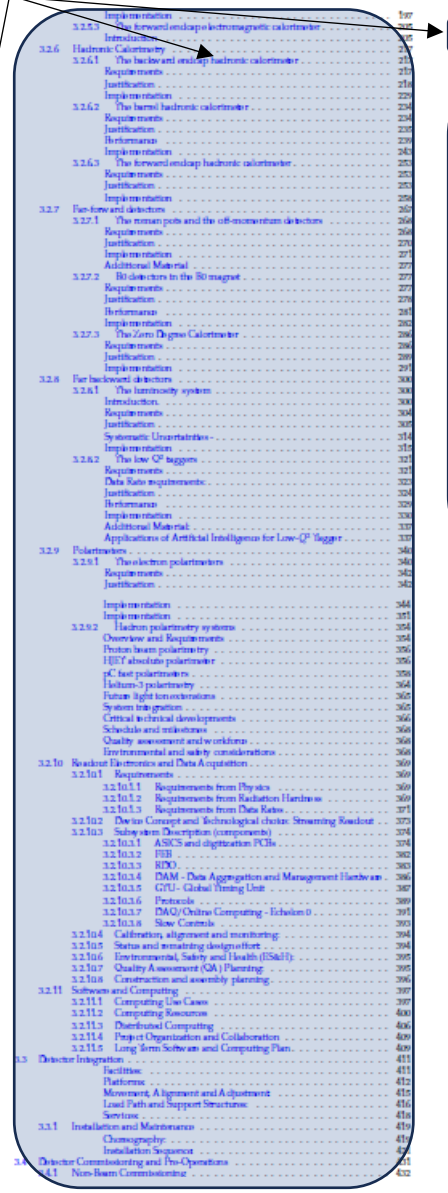
Version 3.1 also to be posted in the pre-brief material for the coming
Director's Review of the EIC Detector (ePIC)
Subproject to Assess Baseline Readiness

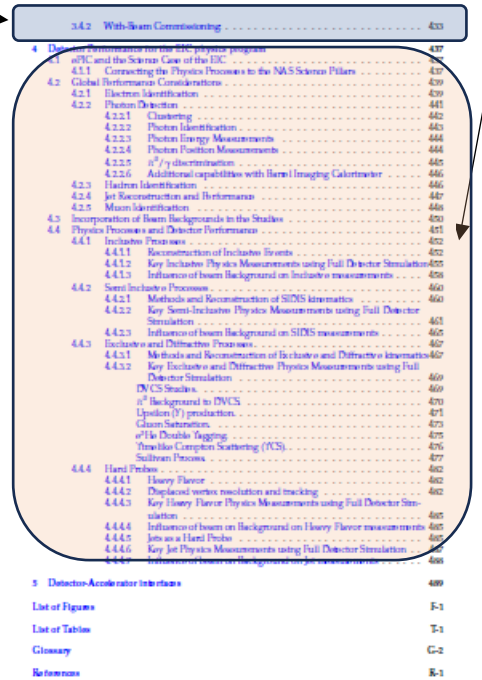
Experimental Systems

Requirements

Detector performance for EIC Physics



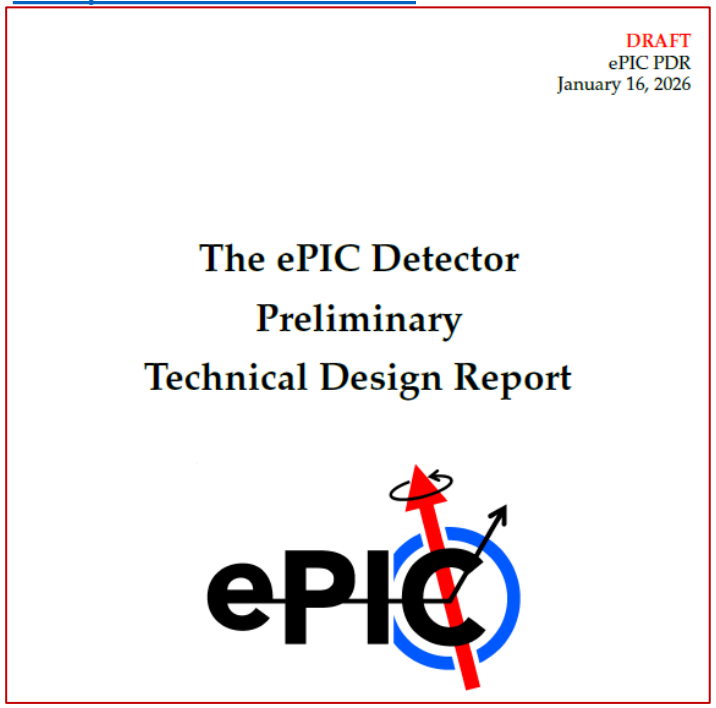




- 395 figures
- 96 tables
- 553 pages

Detector preTDR, Version3.1

https://zenodo.org/records/18271602/files/ePIC_Preliminary_Design_Report_3.1.pdf?download=1



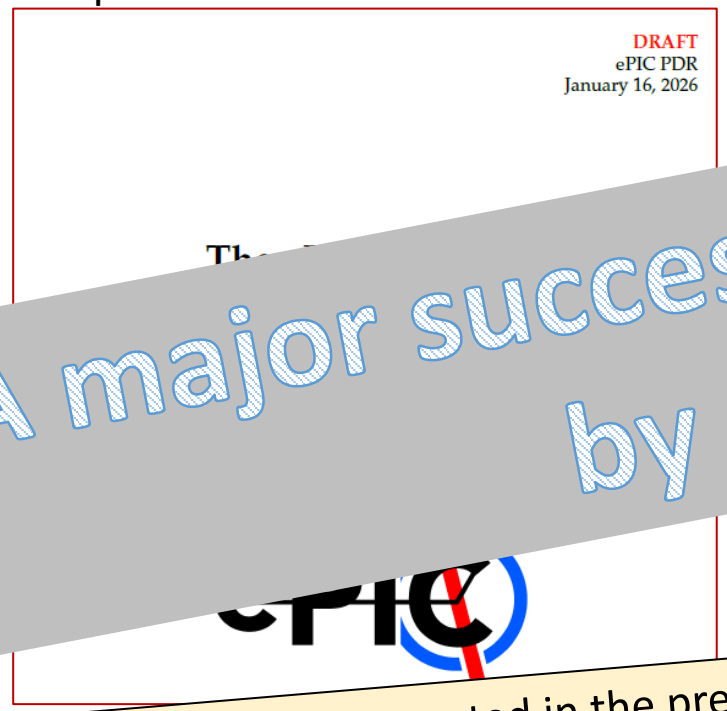
Some more relevant parameters:

- **Technical consolidation of the document** (John H, Dave M.)
  - All latex errors cured
  - Compilation messages are now limited to warnings, also been fixed

- **Plots**
  - 48% accompanied by the requested metadata
  - Need to improve !

Detector preTDR, Version3.1

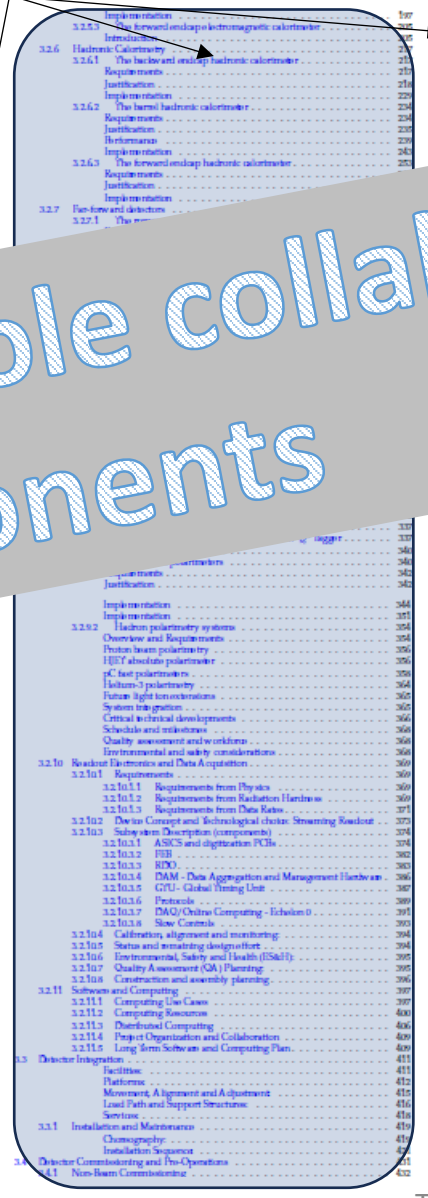
https://zenodo.org/records/18271602/files/ePIC_Preliminary_Design_Report_3.1.pdf?download=1



Experimental Systems

Requirements

Detector performance for EIC Physics



A major success of the whole collaboration by all its components

Version 3.1 also to be posted in the pre-brief material for the coming
Director's Review of the EIC Detector (ePIC) Subproject to Assess Baseline Readiness

- 395 figures
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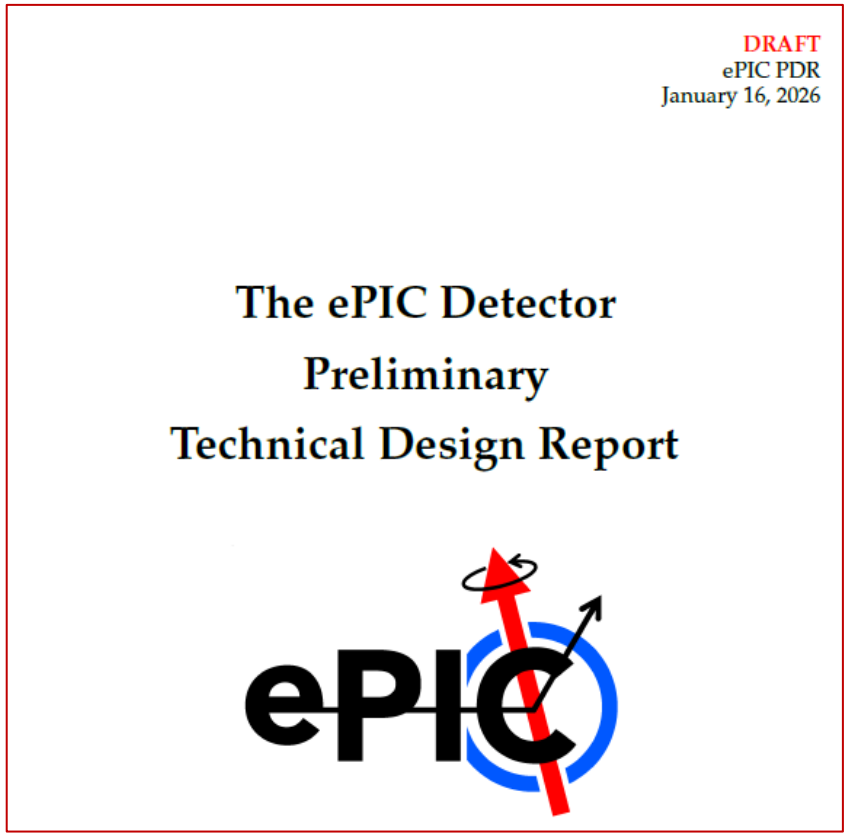
Detector preTDR, Version3.1, a note

https://zenodo.org/records/18271602/files/ePIC_Preliminary_Design_Report_3.1.pdf?download=1



The inclusion of an author's list is an **element of robustness** of the preTDR.

The author's list is a **DRAFT**.
It was extracted from the ePIC phonebook on January 6th, 2026. The analysis of the 2026 SoS is ongoing and the phonebook is being correspondingly updated.

The intent is that the ePIC preTDR is a work of the collaboration and should reflect **collaboration authorship**.

Due to the nature of the preTDR there is **a need to recognize contributions that are not from ePIC Collaborators** (engineers, etc.) A process needs to be defined to capture and recognize these contributions. (CC working with the Publications Committee).

preTDR, what next? 1/5

Complete the document adding the missing texts:

- ***Executive Summary***
- ***Chapter 1 – Introduction***
- ***Chapter 5 – Detector-Accelerator interfaces***

Needed to have a self-consistent document

- **Executive Summary**
- **CHAPTER 1 – Introduction**
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Advanced version in Version3.1

- **CHAPTER 5 – Detector-Accelerator interfaces**
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preTDR, what next? 2/5

Internal feedback to Version3.1

- ***Collect the comments from the collaboration via a google form at:***
  https://forms.gle/83NY4BYo5FARViD29

  - ***Comments to be analyzed and answered / valid suggestions to be implemented***
  - ***The list of received input as wells as feedback to them can be found at:***
    https://docs.google.com/spreadsheets/d/1DPnkMLDAyGt_M8LixKvlS6YEBEfFpB9lfDtMUpPXWTk/edit?usp=sharing

- ***About the Experimental Systems (Chapter 3), collect the feedback from the CAMs***
  - *Please, confirm that the preTDR is in line with the project*
  - *Any further comment more than welcome*

preTDR, what next? 3/5

Editorial Board editing phase

- ***So far, Ed. Board has mainly engaged in***
  - ***Reviewing***
  - ***Basic text polishing***

- ***A true editing effort will start now***
  - ***The editorial privileges will be restricted to the Ed. Board***

- ***The availability of the Editorial Board members to continue has to be checked***
  - ***enlarging the team (when needed)***

preTDR, what next? 4/5

Aspects needing consolidation

- **Subsystem performance** extracted
  - With consolidated detector parameters
  - In the context of the overall detector (= within EICRecon);
  - Using physics events (not only particle guns)
  - Including background
  - *At present, different status for the various subsystems, goal have all of them aligned with the above list*

- **Detector holistic performance** studying key physics channels
  - Move the weight from studies without background complement by a preliminary exploration of the results obtained with background to **making the studies with background the backbone of chapter 4**

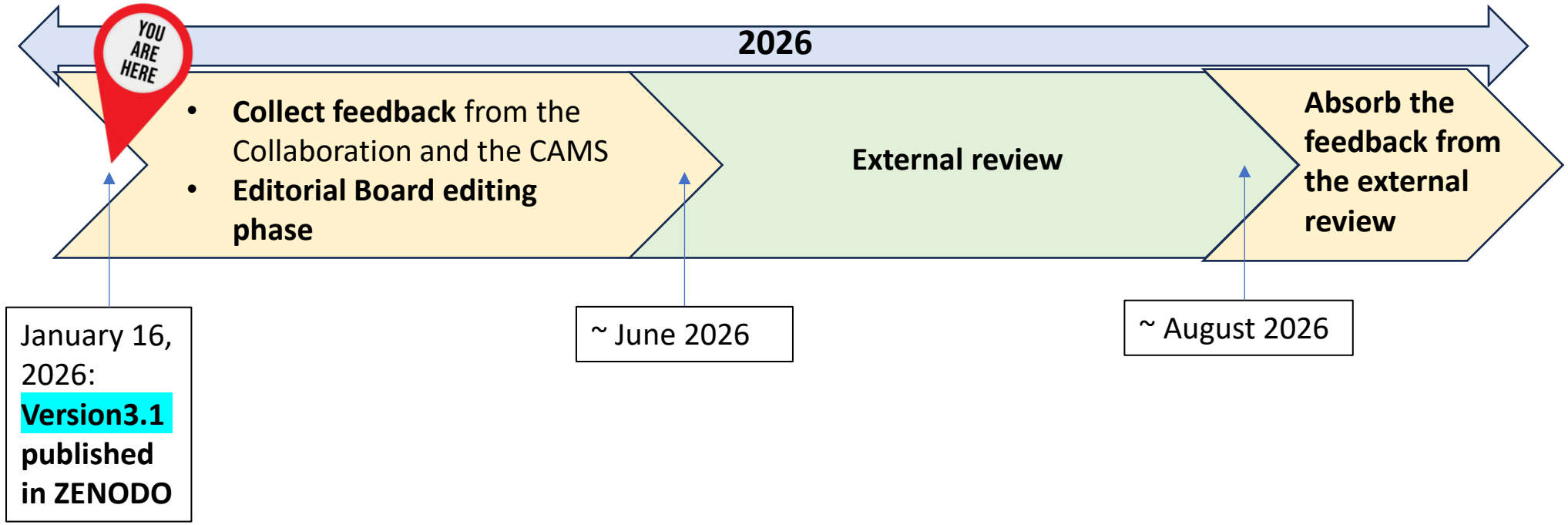
All this requires coordination with simulation campaigns

preTDR, what next? 5/5

External Review

- **By a set of qualified external experts**
  - **An option: DAC members**

preTDR, what next? Summarizing



Parallel to the preTDR process by the ePIC management

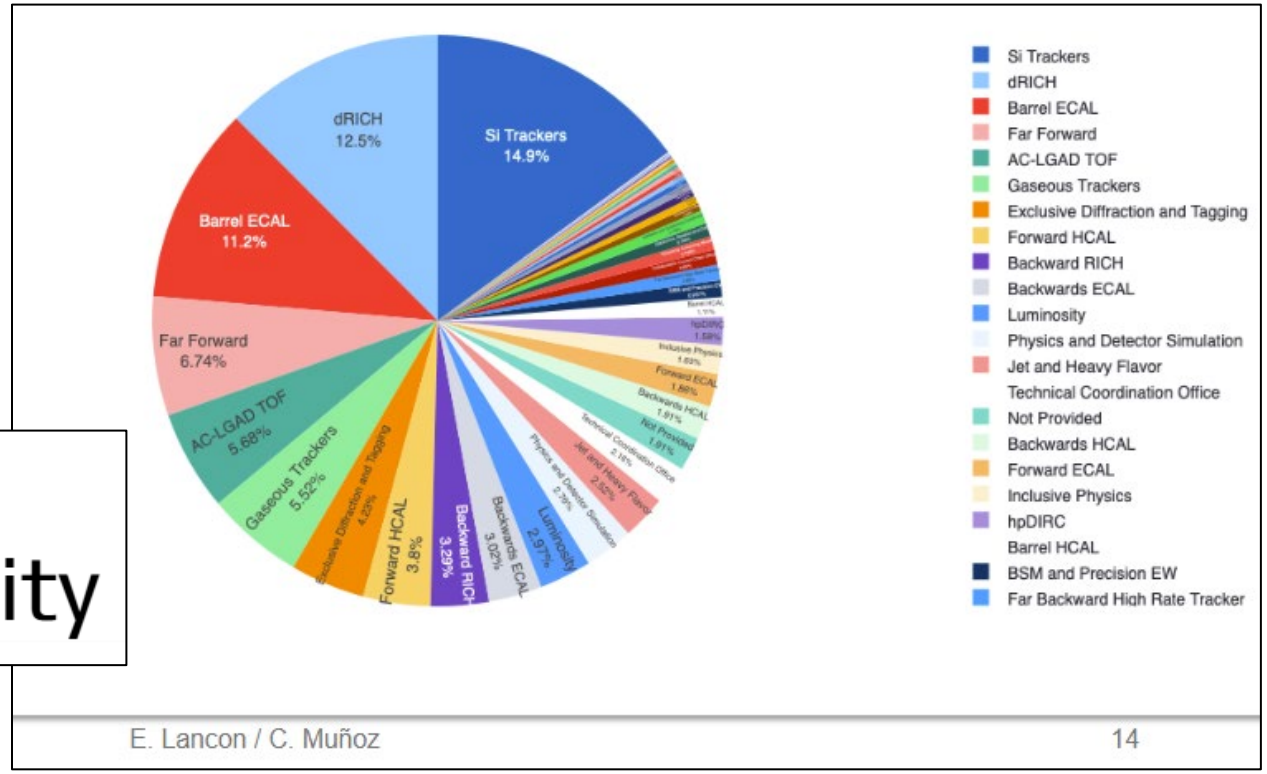
More to be written:

- *The Editorial Board has asked the DSC to remove from their text:*

  "Collaborators and their role, resources and workforce "

  - There was obvious non-homogeneity in the provided information for this CRITICAL item
- **A dedicated document envisaged, based on the SoS_2026 survey and under the responsibility of ePIC management**

This slide shown at the yesterday CC meeting indicates that the raw survey data do not offer a fully consistent picture … more work needed



Thank you