

TDR and ePIC engagement

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ePIC Collaboration Meeting
ANL, January 8-13, 2024

From Elke (July 2023)

What Is Coming Up – TDR

We will start the process of writing a draft TDR later this year, and then this will continue towards a first version of a TDR in 2024.

Working model will be similar as we used to create the CDR, Elke/Rolf with engagement of ePIC leadership, and a mix of the project CAMs and EPIC WG representatives. At the late phases the editing rights will become more restricted. We plan to use where we can input from the CDR, YR, proposals, technical notes, etc.

Chapter 2: Physics Goals and Requirements (*should be short, < 50 pages*)

- 2.1 EIC Context and History (like CDR 2.2 or YR section 1)
- 2.2 The Science Goals of the EIC and the Machine Parameters (like CDR 2.3)
- 2.3 The EIC Science (follow YR structure)
- 2.4 Scientific Requirements

Chapter 3: Interaction Region 6 Overview (Elke/Rolf contributing)

Chapter 8: Experimental Systems (*can be long such that we can use as standalone detector TDR*)

- 8.1 Experimental Equipment Requirements Summary (like CDR 8.2)
- 8.2 General Detector Considerations and Operations Challenges (YR 10, CDR 8.3)
- 8.3 EIC Detector
- 8.4 Detector R&D Summary
- 8.5 Detector Integration
- 8.6 Detector Commissioning and Pre-Operations

Chapter 11: Commissioning (Elke/Rolf contributing)

Appendix-B: Integration of a Second Experiment (mainly emphasizing feasibility, luminosity sharing, polarization with two experiments, and first-order checks of magnets/acceptance)

Where ePIC would like to play a major role ?

We should also contribute on physics

A standalone TDR would need a physics requirement section ...

An absolute must

Starting a discussion to build-up an ePIC view about TDR

@ Coordinator meeting Oct. 27, 2023

- The detector TDR sections 8.3 (ePIC detector) and 8.4 (Detector R&D summary) should be handled by the collaboration
 - Including DSCs (Of course, in synergy with CAMs)
 - Including CC WG Groups (in particular, about electronics and DAQ streaming read-out model)
 - Software, data analysis and data preservation should be driven by the SCT and deputies
- The TDR session 2.3 (The EIC science) should be based on our analysis and physics coordinator and WGs

What follows is the result of discussions/inputs involving

- Coordinators
- PM
- EB

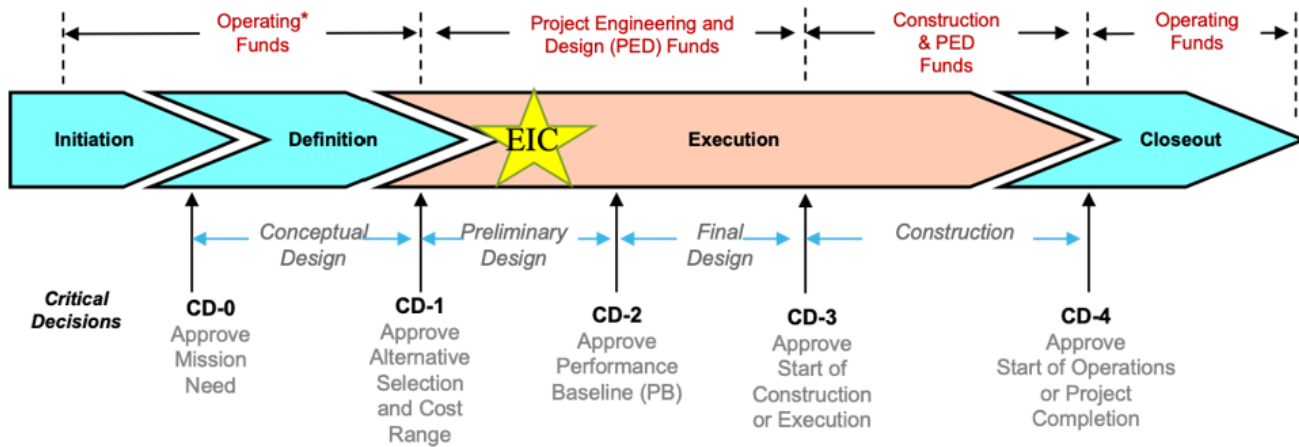
The main message already anticipated to the Collaboration at the General meeting on Dec. 1, 2023

Goals

- In late 2024:
 - The ePIC contributions to the EIC TDR (Chapters 2,8)
 - The EIC TDR is the top priority
 - Precise timescale driven by EIC project requirements
 - An extended version of the ePIC detector section from the EIC TDR with appropriate front matter, published in a scientific journal (such as NIMA, JINST, PRC)
 - Derived from TDR Chapter 8
 - An ePIC Physics Performance long paper published in a scientific journal (such as NIMA, JINST, PRC)
 - Derived and expanded from TDR Chapter 2 (Section 2.3)
 - It will be important to properly credit major contributions, especially by early-career scientists
 - To be addressed by the ePIC Publication Committee

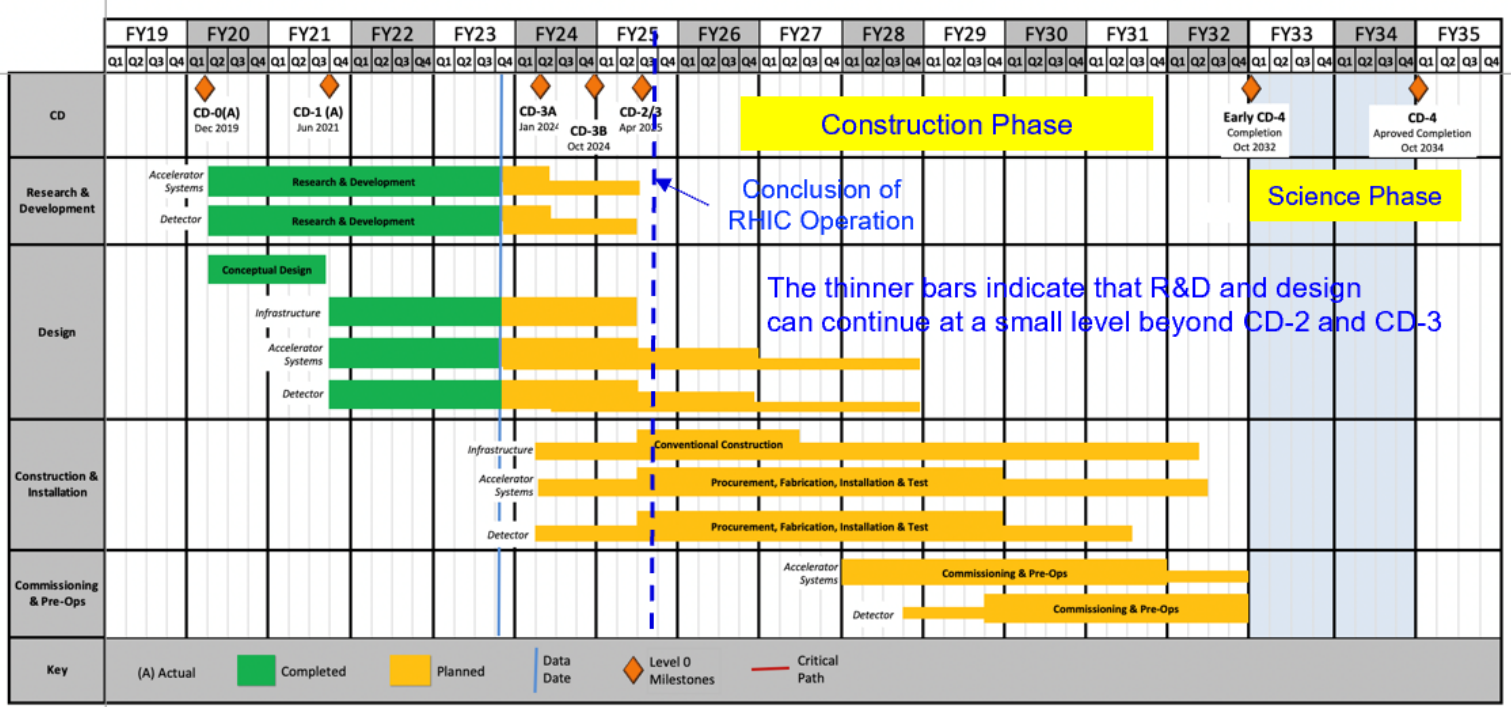
EIC Schedule

EIC Critical Decision Plan	
CD-0/Site Selection	December 2019 ✓
CD-1	June 2021 ✓
CD-3A	January 2024
CD-3B	October 2024
CD-2/3	April 2025
early CD-4	October 2032
CD-4	October 2034



CD-2:
 Approve preliminary design for all subdetectors
 Design Maturity: >60%
 Need “pre-”TDR
 Baseline project in scope, cost, schedule

CD-3:
 Approve final design for all subdetectors
 Design Maturity: ~90%
 Need full TDR



Timelines

- Timelines

- **Process design phase:**

- Collect feedback from CC management, PM and EB
 - Initial communication to Collaboration in December 1 General Meeting
 - Discussion/Collaboration feedback at the January ePIC Collaboration Meeting

WE ARE HERE

- **Structuring the effort:**

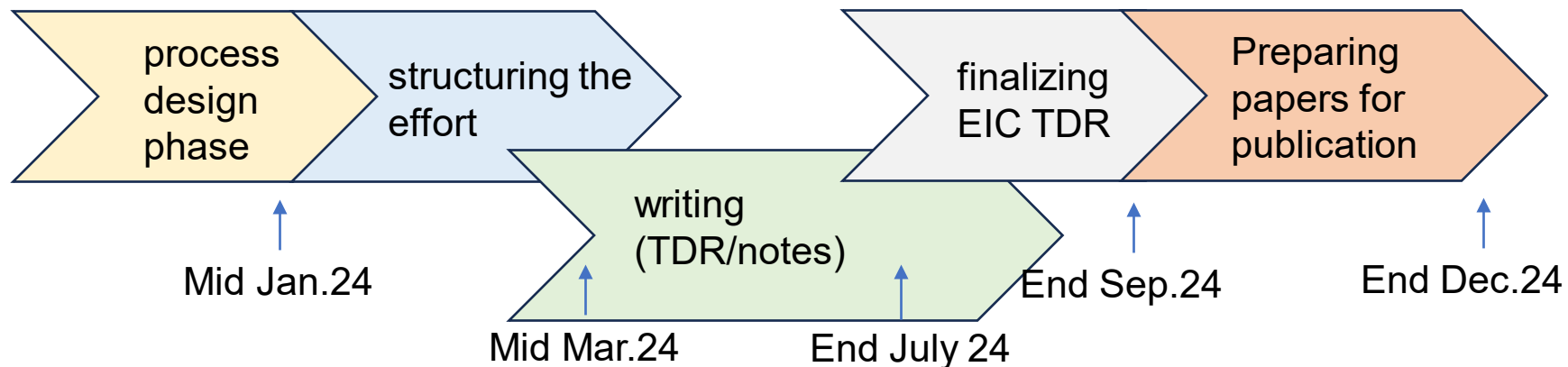
- TDR Outline (PM) and publications (SP Office and coordinators with input from the Collaboration)
 - Organize simulation, analysis and hardware (R&D, test beam, lab studies) efforts

- **Writing:** writing the TDR (starts earlier), publications and supporting notes

- **Finalizing EIC TDR:** polishing the text for the EIC TDR

- **Preparing papers for publication:** prepare technical and physics papers for publication

- *This is an overall timeline - the milestones for the TDR and two papers can differ*



TDR – structuring the effort

TDR

- PM Serves as the “managing editors” for the ePIC Contributions to the EIC TDR
- TDR Chapter 2
 - **Holistic detector performance** (short form)
 - The TC Office acts as “editor”
 - Organized/supervised by CC WG conveners
 - **Physics performance and science reach** (short form)
 - The ACs acting as “editors”
 - The Physics WGs as subgroups for text drafting
- TDR Chapter 8
 - **Detector description and basic performance**
 - Project CAMs/Collab. DSL’s acting as “co-editors” for their sections
 - The DSCs provide studies, material, text, etc.
 - **Software, Analysis and Data Preservation**
 - Project CAMs and SCCs acting as “editors”
 - The electronics/DAQ CC WG and the software WGs

ePIC publications

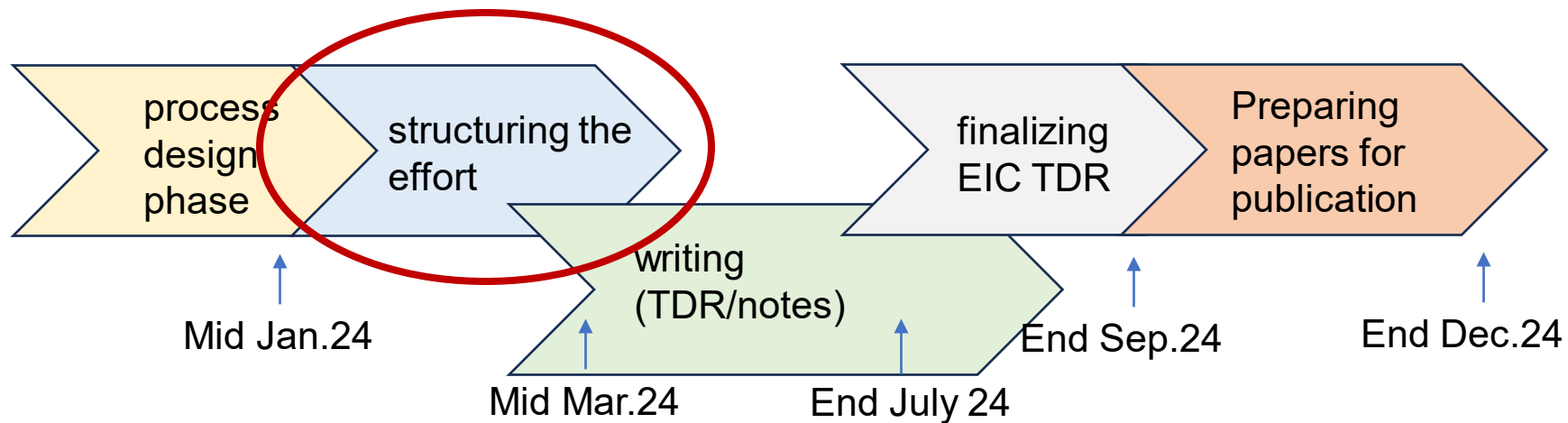
- ePIC SP-Office serves as the “managing editors” for the ePIC publications
- ePIC Physics Performance Publication:
 - **Holistic detector performance** (extended text)
 - The TC Office acts as “editor”
 - Organized/supervised by CC WG conveners
 - **Physics performance and science reach** (extended text)
 - The ACs acting as “editors”
 - The Physics WGs as subgroups for text drafting
- ePIC Detector Publication
 - **Detector description and basic performance**
 - DSL’s acting as “editors” for their sections
 - The DSCs provide studies, material, text, etc.
 - **Software, Analysis and Data Preservation**
 - SCCs acting as “editors”
 - The electronics/DAQ CC WG and the software WGs for text drafting

The first step: structuring the effort

- **STRUCTURING** = Define the **needed ingredients** and the **planning (with timelines)** for all the 3 activity areas of ePIC
- The 3 areas:

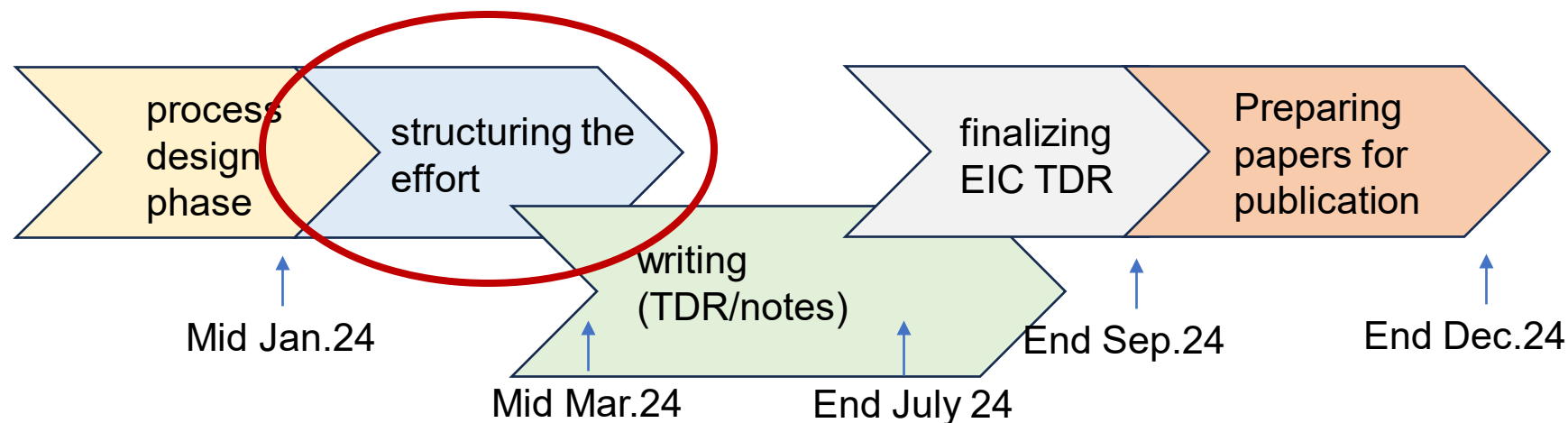
- **S & C** **Physics** **Detector Subsystems**

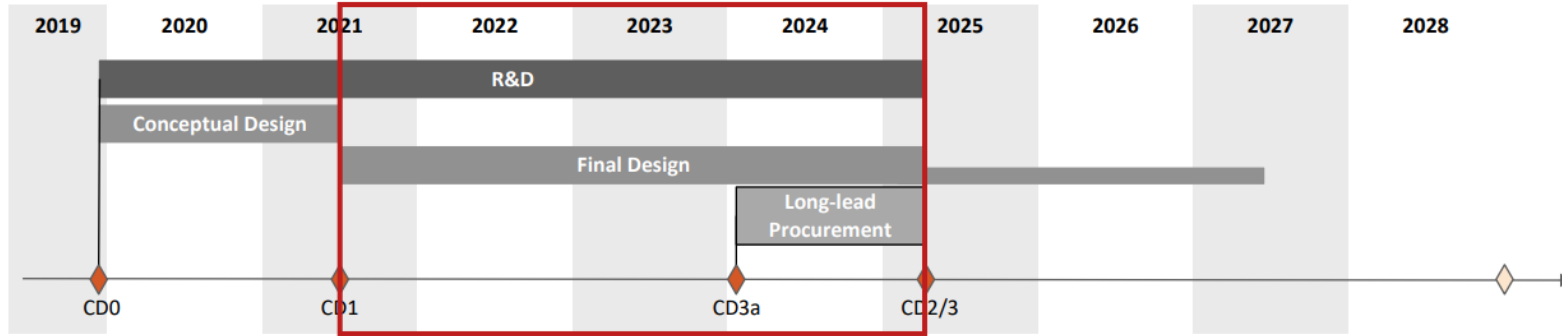
- **Structuring plan to be prepared by mid February**
 - Analyzed in a dedicated meeting
 - Start activity
 - In parallel, Apply improvements, when needed
- **Finalized within mid MARCH at a second dedicated meeting**



The first step: structuring the effort

- **S & C - coordinated by SCCs**
 - **Define the list of actions to be completed by May/June 2024**
 - making use of the outcome of the “Simulation and software readiness for the TDR” workfest (see report in the afternoon)
 - Not all wishes can be satisfied: an educated selection considering priorities for TDR success has to be defined
 - The amount of work should be compatible with the time window
 - *A planning month by month will allow to monitor the progress*

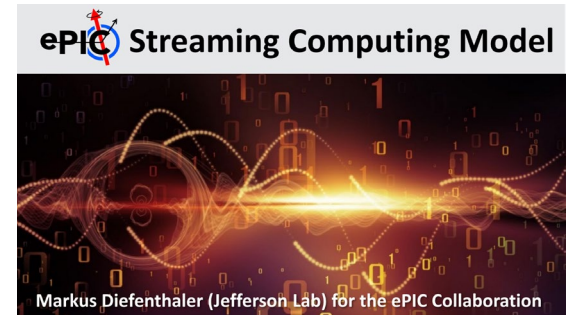




CD2/3 and TDR

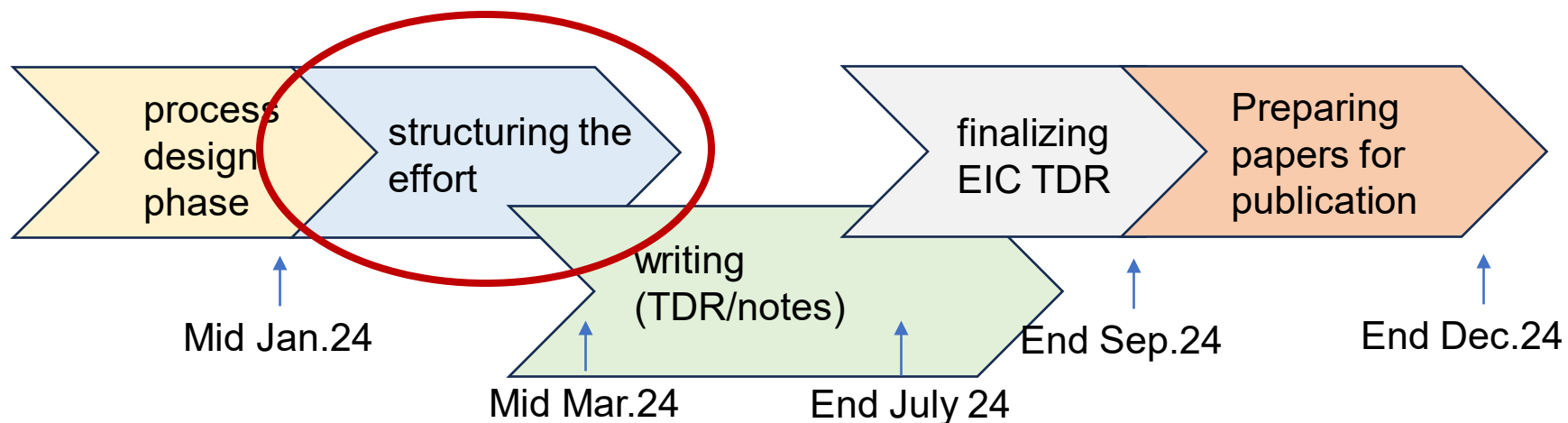
Milestones Prior to CD2/3 and TDR

- Software and simulation readiness for TDR preparation (and subsequent phases of the CD process).
- Provide for each use case detailed estimates on the compute resources; update the networking and storage estimates according to format of streaming data format that is currently being defined.



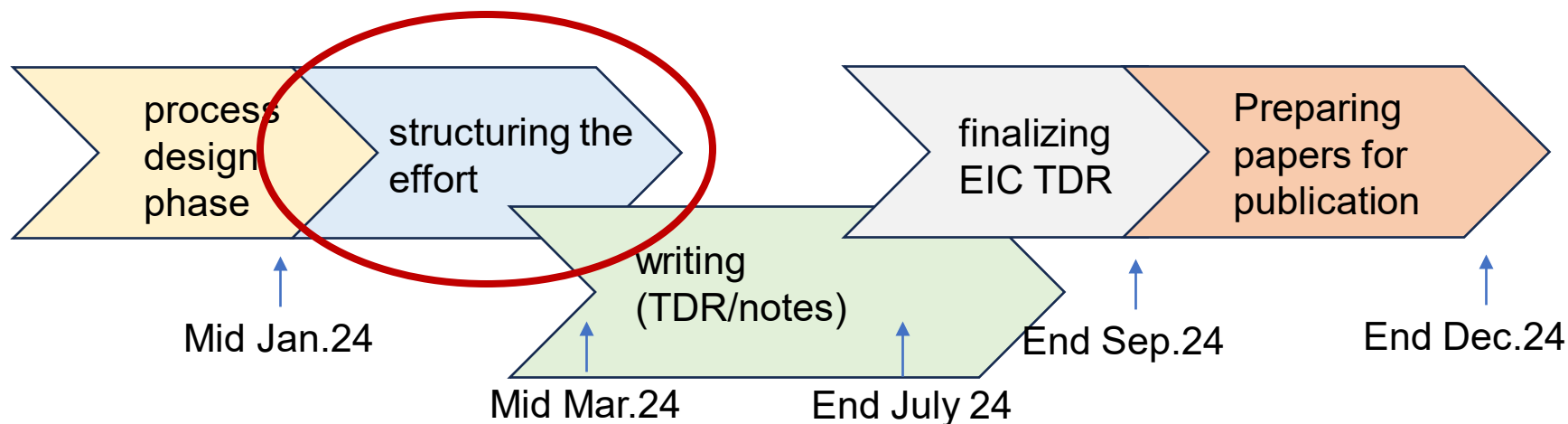
The first step: structuring the effort

- **Physics - coordinated by ACs**
 - **Define the list of studies to be performed**
 - Use as guidance the set of plots that ECCE/ATHENA presented in their reports at DPAP
 - Complete this list when some relevant hole respect to the NAS physics scope is identified
 - Define an activity planning, that should include preparatory work using non-final simulation data
 - *A planning month by month will allow to monitor the progress*
 - *The planning should include the writing period*



The first step: structuring the effort

- **Detector subsystems - coordinated by TC-office**
 - **Define for each subsystem with the goal of 90% design completion**
 1. The lab/testbeam/prototyping needed
 - Educated selection of the most essential studies taking into account the available time
 2. The simulation studies to prove the subsystem performance
 - Check the correct implementation in the simulation of the detector response using information from lab/testbeam exercises or from literature (validation)
 - *A planning month by month will allow to monitor the progress*
 - *The planning should include the writing period*



Document Management

Suggested:

- To be integrated in the TDR management system
- A set of overleaf documents for the publications
- Need of technical support (from the labs!) for editing to be sure at any time that the file are technically correct, that they compile, etc.
 - Backup Overleaf to github to manage disasters
 - Do we need an individual to manage the repositories?