

EIC\_NET general meeting  
December 2023

P. Antonioli, INFN Bologna

- Main update: EIC RRB meeting outcomes (7-8 December)
- Very miscellanea news:
  - Next ePIC meeting
  - 2024 EIC\_NET planning



# EIC RRB (generalities)



**Short version:** "RRB is the place where funding agencies coordinate about how to share resources"

## Purpose

The purpose of the Electron-Ion Collider Resources Review Board (EIC-RRB) is to provide coordination among the different funding partners during both the detector development and construction phase of the project and during the operations of the experiments that follow. The RRB will focus on the construction, commissioning, and early operations in its early years. The RRB shall provide oversight of resources utilized for detector construction and planning, which is the ePIC detector in the EIC project scope. The RRB will function as the body that reaches agreement on scope entailed in common projects, as appropriate, which shall be funded by members of the RRB. The RRB will be responsible for annually agreeing on and endorsing ePIC detector commitments from the members. The RRB will monitor progress toward overall ePIC detector funding and construction. At the appropriate time, the RRB will include in its purview common computing needs of the EIC detector(s).

December meeting attended by DoE rep, EIC management, funding agencies reps + national PI (observers) + ePIC management

- attendees (in person): UK, Taiwan, South Korea, Japan, Canada, Czech, Poland (no fund. Ag.) Italy France
- in-camera meeting for funding ag. Representatives on 7th December morning. Shown our initial spending profile!
- **short version:** in terms of resources only UK, Canada, Italy and France are in an advanced stage (== sign agreements next year)



Istituto Nazionale di Fisica Nucleare

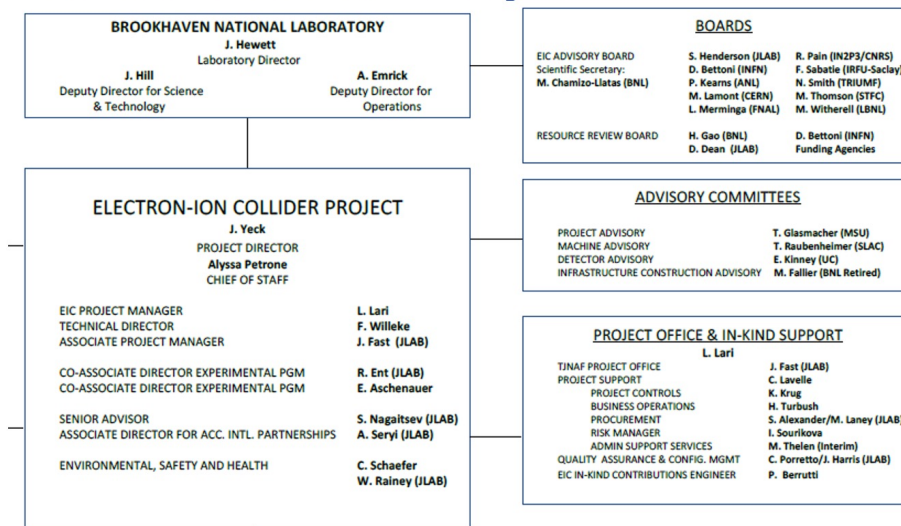
D. Bettoni (GE), R. Nania (CSN3) (observer: P.Antonioli (RN))



# The many committees/boards/collaboration...



## EIC Boards and Advisory Committees



EIC Advisory Board → facility/accelerator  
 EIC Resource Review Board → experiments  
 DAC Detector Advisory Committee →  
 review/advise R&D projects + ePIC status

- DOE, BNL, and JLab envision an EIC facility that is “fully international in character.”
- EIC Advisory Board provides oversight and advice on the construction of the facility, focusing on the accelerator (BNL, TJNAF, LBNL, ANL, FNAL, TRIUMF, IN2P3, CEA, STFC, INFN, CERN).
- EIC RRB to provide oversight of the experiments

Detector Advisory Committee 2023		
Name	Institution	Expertise
Edward Kinney	Boulder CO	EIC Science, general
Ken Wylie	CERN	ASICs/electronics
Petra Merkel	FNAL	R&D, Integration
Antonis Papanestis	Rutherford Appleton Laboratory	Particle Identification
Peter Krizan	U Ljubljana	Particle Identification
Ana Amelia Machado	University of Campinas, Brazil	Particle Identification, Sensors
Heidi Schellman	Oregon State	Computing
Brigitte Vachon	McGill	Electronics
Stefano Miscetti	INFN Frascati	Calorimetry
Etiennette Auffray	CERN	Calorimetry
Andrew White	U. Texas Arlington	Tracking
Chi Yang	SDU China	Tracking

**EIC Accelerator Collaboration** → to be launched next May 2024 at IPAC2024, arising from accelerator workshops, “meeting place” for international contributions to the accelerator. Chairs: Prof. Carsten Welsch (Univ. of Liverpool, UK) and Prof. Andrei Seryi (JLAB and Old Dominion University)



## Status of accelerator scope discussions

This table does not imply any commitment. It reflects discussions with international partners

Country/Institution Funding Agency	Scope	Lead Lab
CERN	FCC-EIC areas for collaboration	
Canada	SRF / Cryomodules	JLAB-TRIUMF
France - IN2P3 <sup>1)</sup>	SRF / Cryomodules	JLAB-IJCLAB
France – CEA <sup>1)</sup>	Superconducting magnets spin rotators	BNL-CEA/Irfu
Italy <sup>2)</sup>	Vacuum coating measurements	BNL-INFN/LNF
United Kingdom <sup>3)</sup>	SRF / Cryomodules	JLAB-UK

← 14 M\$

← Conto terzi via LNF O(1 M\$)

<sup>1)</sup> France-IN2P3-CEA plan joint request to Ministry

<sup>3)</sup> UK-EIC proposal in the last phase of review by UKRI

<sup>2)</sup> Covered with INFN funds

- ❖ ASIC development ongoing and likely to extend past CD-2, advise push all detector groups to use planned readout electronics at the earliest possible stage.
- ❖ Wide use of SiPM requires specification very soon for CD-3a. In some systems (e.g., Dual Radiator RICH), significant infrastructure required for cooling and heating (annealing) services.
- ❖ **Charge 5:** Is the projected design maturity of the further detector components likely to be accomplished by the end of 2024 for CD-2 and CD-3?
  - Overall maturity of the design and integration is good, but some systems still have R&D cycles to accomplish in roughly a year(!)
  - Silicon Vertex tracker is tied with ALICE ITS3 development, and  $\mu$ RWELL foils are produced only at CERN so R&D/design is less controllable.
  - Overall concern with changing availability of silicon foundries and suppliers.

*INFN well positioned with ALCOR, critical path in 2024*

*Annealing / cooling systems for dRICH highlighted ("significant")*

*High CERN-dependence on MAPS and  $\mu$ RWELL*

# Updates on overall schedule



CD-0, Mission Need Approved

DOE Site Selection Announced

CD-1, Alternative Selection and Cost Range, Approved

CD-3A, Long Lead Procurement Approval (Review 11/24)

CD-3B, Long Lead Procurement Approval

CD-2/3, Performance Baseline/Construction Start

December 2019

January 2020

June 2021

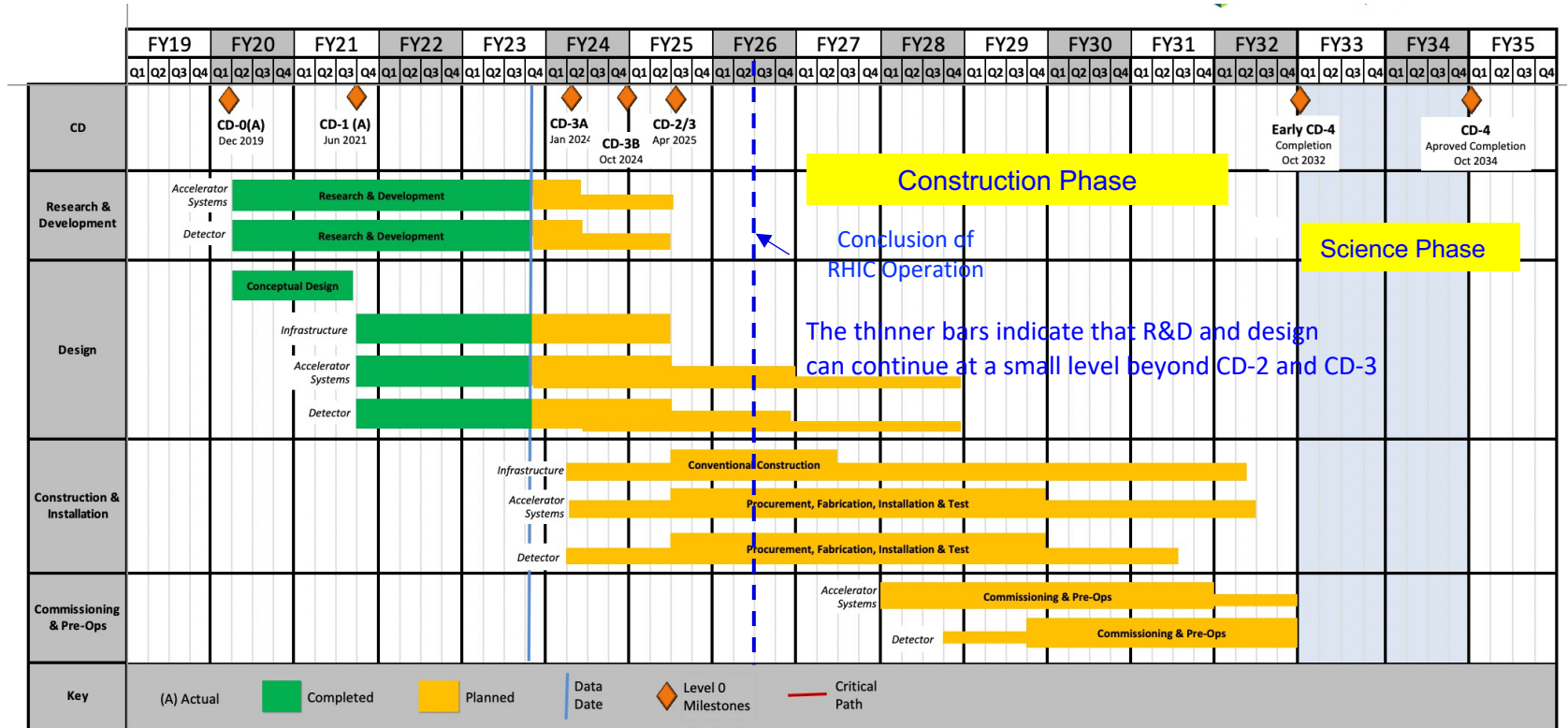
January 2024

October 2024

April 2025

Project schedule to be read in conjunction with “detector schedule” (next slide)

CD-3A reviewed in November → expected approval Jan 24



Construction Phase

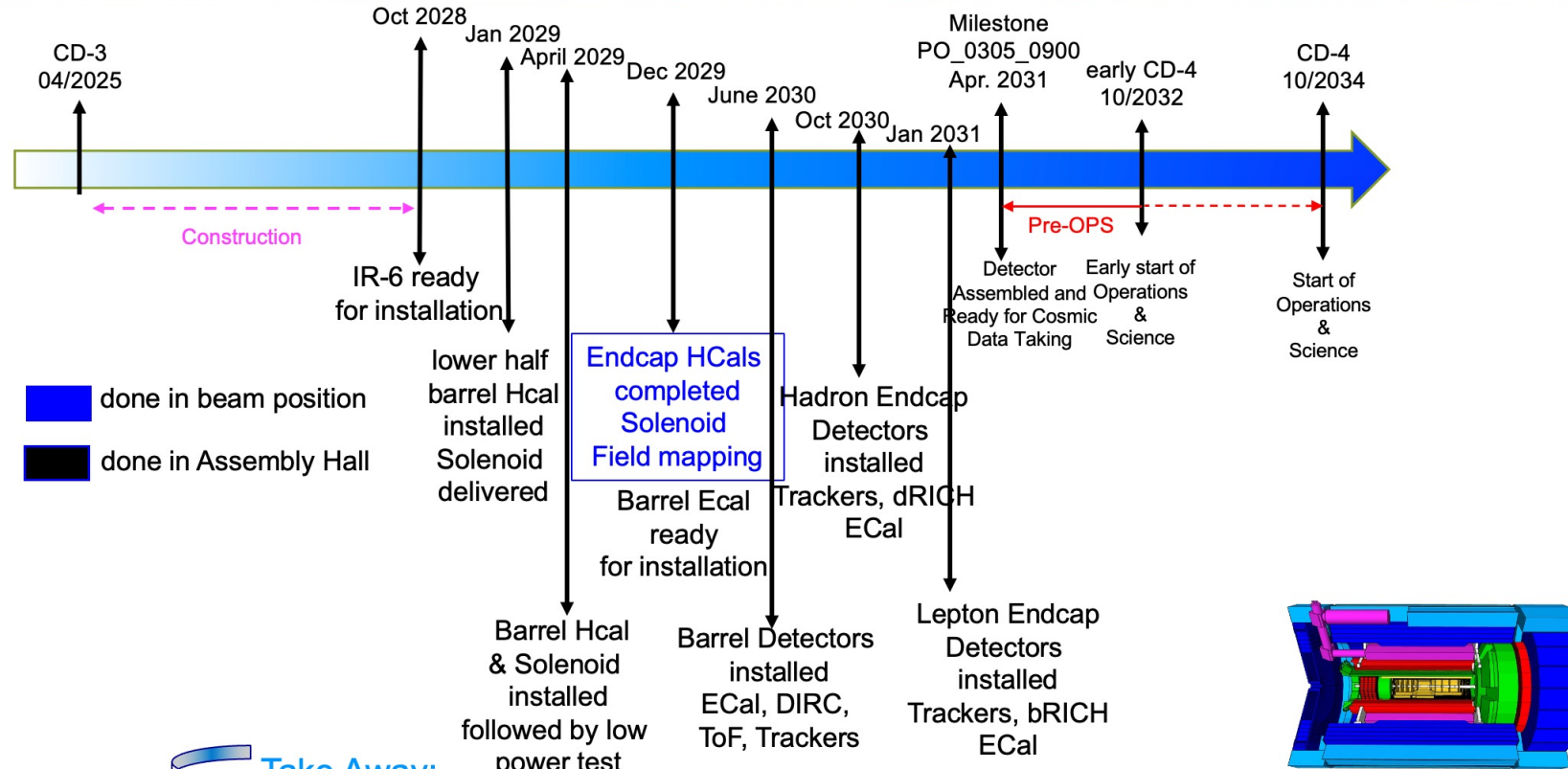
Conclusion of RHIC Operation

Science Phase

The thinner bars indicate that R&D and design can continue at a small level beyond CD-2 and CD-3

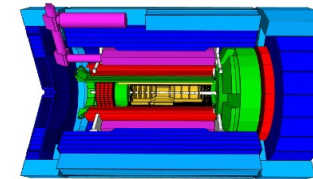


# High Level Installation Schedule



## Take Away:

- Solenoid and Barrel HCal need to be ready by Jan 2029
- **all other subdetectors need to be ready between 06/29 to 06/30** depending on their location in the detector



Note deadlines for “INFN” detectors: trackers (SVT and uRWELL) and dRICH between June and October 2030

Note: the CD-4A and CD-4 are deadlines somehow confusing for funding agencies....

# EIC RRB (agenda)



13:25	→ 13:30	<b>Meeting Goals</b> Speakers: Haiyan Gao (BNL), Diego Bettoni (INFN) RRB-Dec2023-Goal...
13:30	→ 13:50	<b>Report from the EIC Advisory Board</b> Speaker: Stuart Henderson (JLab) Henderson RRB Re...
13:50	→ 14:10	<b>Report from the Detector Advisory Committee</b> Speaker: Edward Kinney (University of Colorado) RRB-DAC-12-07.pdf RRB-DAC-12-07.pptx
14:10	→ 14:40	<b>Short Reports on Nuclear Physics LRP (US, Japan and Europe)</b> Speakers: USA/Haiyan Gao (BNL), Japan/Taku Gunji (Tokyo University) and Europe/Diego Bettoni (INFN) 2023-LRP-RRB-HGa... gunji_NP_Japan_2... NuPECC LRP.pdf
14:40	→ 15:00	<b>EIC Project Status</b> Speaker: Jim Yeck (BNL) EIC Project Status-...
15:00	→ 15:20	<b>EIC Path to CD-2/CD-3</b> Speaker: Luisella Lari (BNL) EIC_IKC_Path_to_C...
15:20	→ 15:50	<b>EIC Project Detector Overview</b> Speakers: Elke Aschenauer (BNL), Rolf Ent (Jefferson Lab) EIC.Exp.Program.v...

How we set agreements for in-kind contributions in 2024?

## ePIC status

16:10	→ 16:30	<b>Report from the ePIC Collaboration Spokesperson</b> Speaker: John Lajoie (Iowa State University) EIC RRB - Report fr...
16:30	→ 16:50	<b>Report from the ePIC Technical Coordinator</b> Speaker: Silvia Dalla Torre (INFN) RRB_20231207-08...
16:50	→ 17:40	<b>Further Discussion</b>
18:00	→ 20:00	<b>Hosted Dinner</b>
FRIDAY, 8 DECEMBER		
08:00	→ 08:45	<b>Breakfast</b>
08:45	→ 09:15	<b>Report from the ePIC Computing Coordinator</b> Speaker: Markus Diefenthaler (Jefferson Lab) Diefenthaler-EICRR...
09:15	→ 09:45	<b>Host labs' computing support and partner expectations</b> Speakers: Amber Boehnlein (Jefferson Lab), Eric Lancon (BNL) ECSJI-EIC-RRC-Dec...
09:45	→ 10:15	<b>Discussion on Threshold for Member versus Observer Countries</b> Speakers: Haiyan Gao (BNL), Diego Bettoni (INFN)

ePIC & the TDR

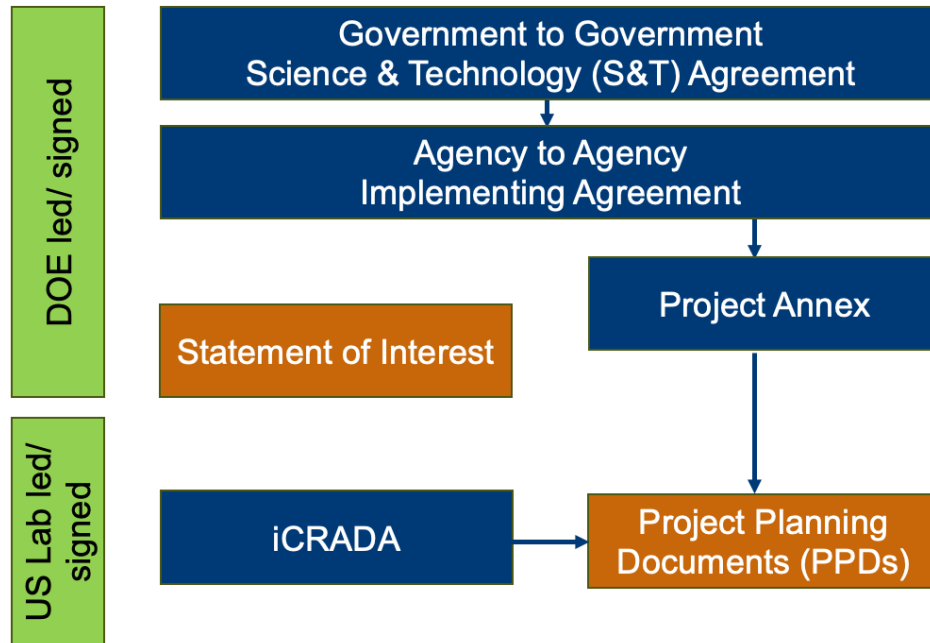
How we will contribute for computing?

Will we pay common funds? How much?

10:45	→ 11:15	<b>Common Funds</b> Speakers: Elke Aschenauer (BNL), Rolf Ent (Jefferson Lab), Jim Yeck EIC.Common.Fund...
11:15	→ 12:00	<b>Further Discussion on Agreements &amp; Common Funds</b> Speakers: David Dean (JLAB), Luisella Lari (BNL), Maria Chamizo Llatas (BNL)

Main link: <https://indico.bnl.gov/event/20635/>

# In-Kind Agreement Types



■ binding (contractual)

■ not-binding

- Towards CD-2 DoE wants to validate baseline assumptions for IKC for accelerator (5% → accelerator 30% --> detector)
- Roughly speaking... 100 M\$ + 100 M\$ (US budget rule, including salaries)
- Technically the next steps will be signing International Cooperative Research and Development Agreement + PPD
- Templates provided...
- iCRADA very high level, financial envelope – PPD details
- INFN IKC might be O(20 M\$) [ US budget including salary ]

In order to baseline the EIC Project (CD-2) it is requested that appropriate binding and not-binding agreements are signed, in particular if significant/critical item are provided as IKC.

All iCRADA will be made conditional to CD-2/3 approval

(note 1: UK might contribute very significantly in IKC, application to UKRI for 53 M£)  
(note 2: considering US budgeting the 100 M\$ target might be secured by Italy/France/UK)



# 1<sup>st</sup> Wave of Milestones for Detector IKC

Agency	Milestone	Target Date
Italy-INFN	Outcome on detector solenoid funding (CD-3A scope)	December 2023
US-NSF	Outcome on MSRI funding (CD-3A scope)	January 2024
UK	UKRI outcome on funding proposal	January 2024
Italy-INFN	JLab iCRADA draft on magnet	February 2024
Italy-INFN	BNL iCRADA draft on magnet	March 2024
Italy-INFN	iCRADAs on magnet signed	May 2024
France-IN2P3	PPD draft	May 2024
France-CEA	PPD draft	June 2024
UK	PPD draft	August 2024
Italy-INFN	JLab iCRADA signed (excluding magnet scope)	August 2024
Italy-INFN	PPD draft / excluding magnet scope	August 2024
France-IN2P3	JLab iCRADA and BNL iCRADA signed (draft in Jun/Jul)	September 2024
France-CEA	JLab iCRADA signed (draft in Jun/Jul)	September 2024
UK	JLab iCRADA signed (draft in Jun/Jul)	September 2024
	<b>CD-2/CD-3 Director's Review / All PPDs signed</b>	<b>November 2024</b>
	<b>CD-2/3 OPA review</b>	<b>January 2025</b>
	<b>CD-2/3 ESAAB</b>	<b>April 2025</b>

## INFN will contribute to the magnet

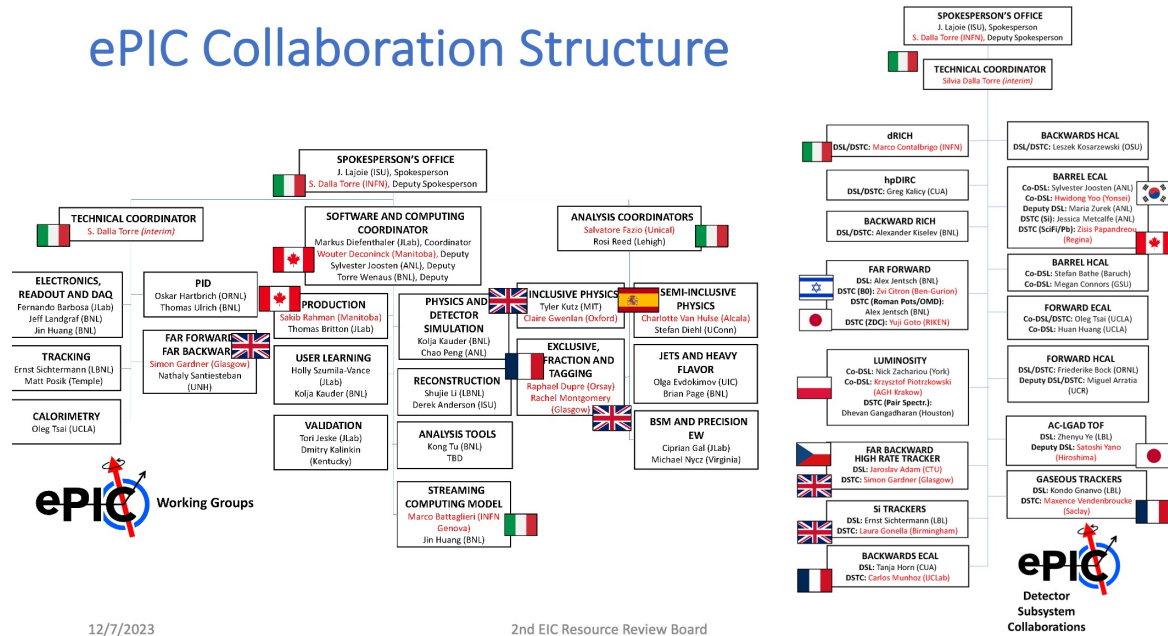
- iCRADA will be followed by D. Bettoni
- PPD contact to be defined

## INFN IKC to detector

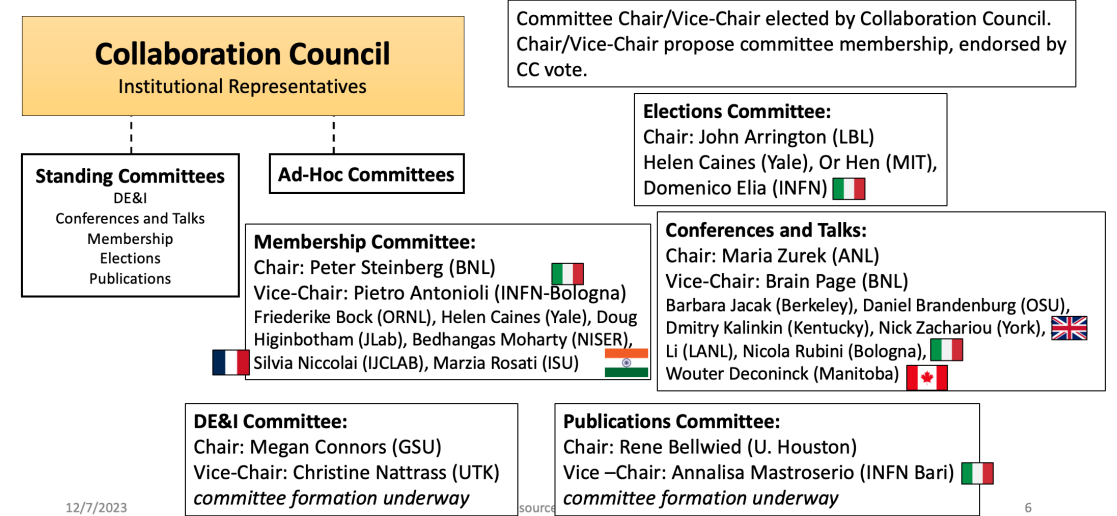
- iCRADA will be followed by D. Bettoni
- PPD contacts: P. Antonioli, R. Nania (by role: RN + pres. CSN3)
- It is agreed of having just one IKC and one PPD for INFN detectors: the PPD will have dRICH, SVT, uRWELL sub-sections

- I will work closely with dRICH, SVT and uRWELL INFN contacts and in chain... with all during coming months towards this PPD!
- Note this will happen in parallel while we prepare **application for CSN3 sigla "ePIC"** (June 2024 + preventivi) and **TDR**

## ePIC Collaboration Structure



## Newly Formed ePIC Committees



Nice to see many Italian flags ;-)

Note: in SVT D. Elia now co-convener of WP4 "Layers and Disks"

## Technical Design Report (TDR) – Detector, the needs

**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)

From the Project Management talk,  
ePIC Meeting, Warsaw, July 2023

Chapter 8 could be at max 200-250 pages.  
Full TDR will be 1000 pages including the machine  
→ so our detector parts here will be O(10-20) pages!!!

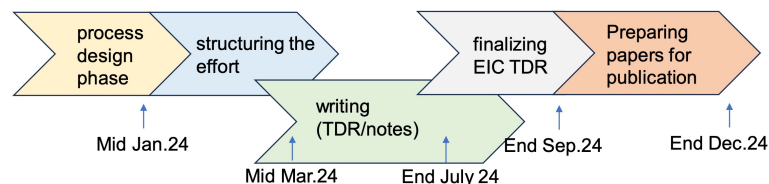
## TDR – the ePIC goals and timelines

- The ePIC contributions to the EIC TDR (Chapters 2,8)
  - The EIC TDR is the top priority
  - Precise timescale driven by EIC project requirements
- Scientific production/dissemination
  - 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)*

Plus two major papers from ePIC!

Critical for CSN3 scrutiny! Full TDR O(1000) pages

Involve juniors in analysis/physics performance





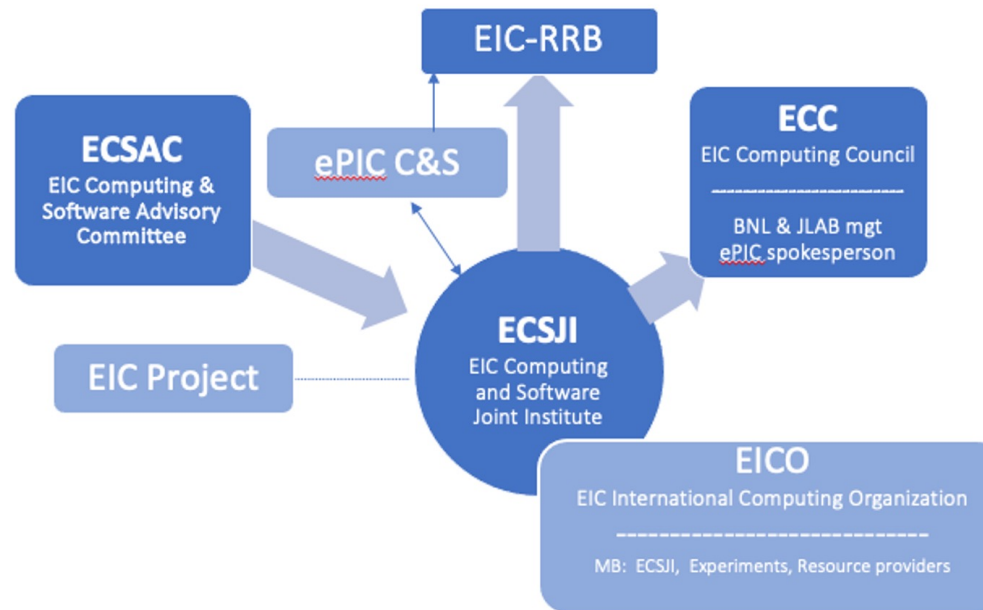
# Computing

- Presented and well received ePIC Computing model
- Presented role of ECSJI (EIC Computing and Software Joint Institute)



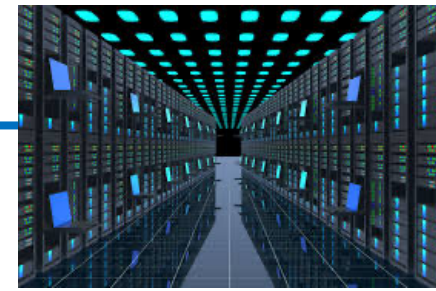
## Organization & Governance

- The Institute aims to provide efficient support to the EIC while acknowledging organizational differences at the two labs.
- The proposed governance model ensures that EIC experiments, accelerator simulations, and theoreticians are well supported in matters of computing and software, the Institute's performance is monitored, and reporting is clearly defined.

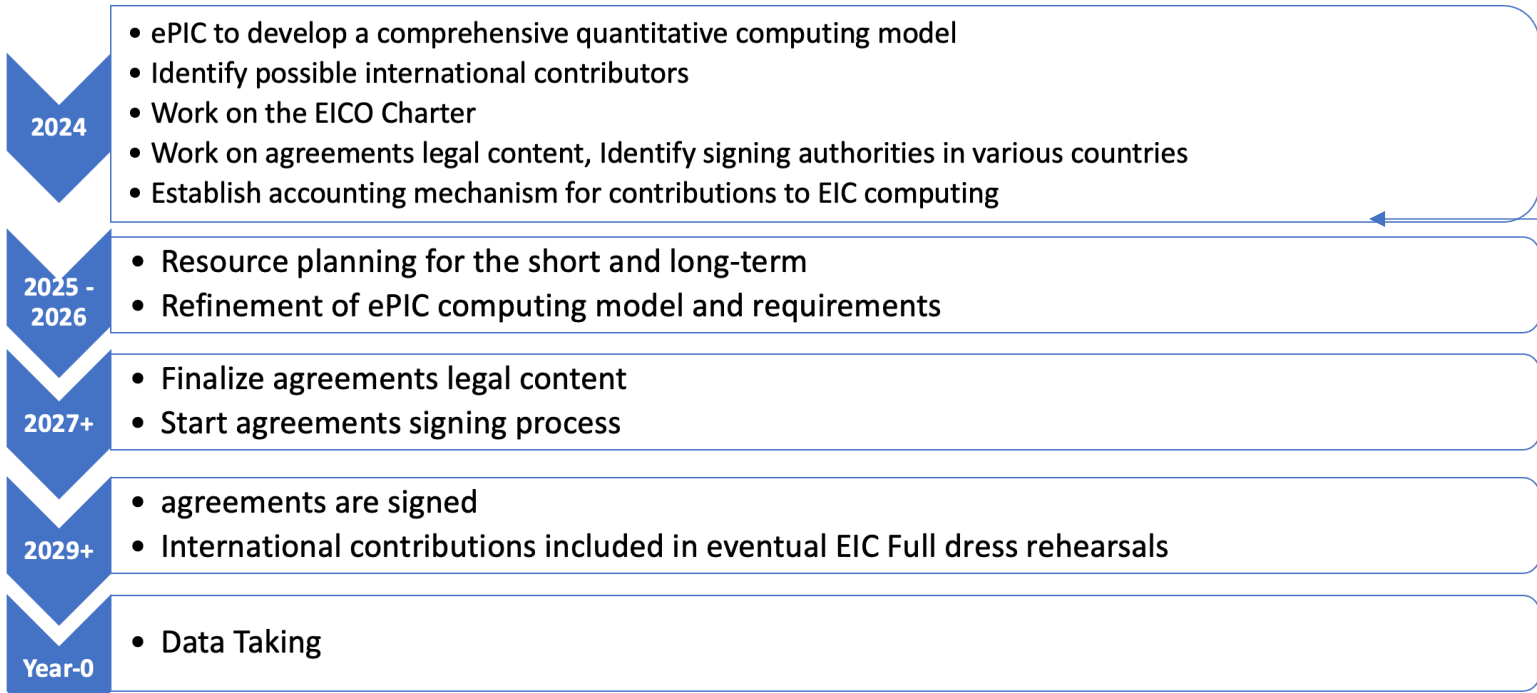


Many actors in EIC computing, noting EICO will be where some INFN rep. will sit! Charter to be discussed/approved

- EIC computing already using OSG, plan it to enter/use **WLCG** (LHC community)
- This fits well with INFN requests (Andrea + Domenico/Giuseppe held preliminary meetings)
- Canada/UK and Italy highlighted as initial partners engaging already in on-going discussions



## Proposed computing agreements timeline



Next year just “preparation work”

- It is clear real agreements will happen **after** iCRADA for IKC accelerators & detectors
- There was vagueness on “accounting mechanisms” and how resources provided in-kind would be accounted. Need to keep attention in this area to avoid surprises!
- INFN approach: provide in-kind with local resources, EIC shows willingness to concentrate as much as possible. Need to find right balance at least for big contributors. We indicated a 10% of LHC computing resources as target (based on scaling FTE and assuming approx 40-50 FTE)

## Initial discussion not at all conclusive

See slides from Rolf (“brainstorming”)

- What is in? Lodging, operation costs (gas, electricity...), detector upgrades, maintenance costs of detectors, ....
- DoE keen in having common funds in line with EIC being “truly international in character”
- ePIC management would favor start common funds “sooner” (i.e. 2025) to support critical R&D/testing + pave the way
- RRB asked EIC leadership to come to **next meeting** with a real proposal (what is included, what not). Funding agencies want clarity. Link to computing costs to be clarified as well as metrics (# staff, # staff + post-doc, FTE, ...)

At INFN level, a high cost of EIC common funds pro capite might impact on membership (as paying author) in other collaborations. It will depend also a lot on actual costs.

Next RRB meeting will be in Italy (INFN headquarters) 3-4 June 2024

<https://indico.bnl.gov/event/20473/>

Nice EIC\_NET attendance: 12 people

## January 2024 ePIC Collaboration Meeting

9–13 Jan 2024  
US/Central timezone



### Overview

Timetable

Contribution List

Registration

Participants

Accommodation

Travel

Argonne Campus Map

Venue

Code of Conduct

FAQ

Invitation Letter

Local Organizers

Student Support

Things To Do Around Argonne


The 4th semi-annual meeting of the ePIC Collaboration is scheduled to take place from January 9th to 13th, 2024, at [Argonne National Laboratory](#) in the USA. The meeting will primarily be conducted in person, with broadcasts available over Zoom.

The meeting agenda will include plenary sessions that provide status reports on the collaboration and the EIC project, parallel 'workfest' sessions, and a guided tour of the [Advanced Photon Source \(APS\) facility](#) and [Argonne Leadership Computing Facility \(ALCF\)](#) at Argonne. The meeting's overarching focus will revolve around planning for 2024, the Technical Design Report, and CD-2/3 preparations.

**Registration is now CLOSED.** The deadline for registration and site-access request was **December 5th for foreign nationals and December 12th for US citizens.**

To book accommodation at the Argonne Guest House, please follow the instructions provided at [this link](#).

 **Starts** 9 Jan 2024, 08:00  
**Ends** 13 Jan 2024, 19:20  
US/Central

 9700 S Cass Ave, Lemont, IL 60439, United States  
[Go to map](#)

### Local Organizers

 [pdahlberg@anl.gov](mailto:pdahlberg@anl.gov)

 [sjoosten@anl.gov](mailto:sjoosten@anl.gov)

 [zurek@anl.gov](mailto:zurek@anl.gov)



## EIC\_NET General Meetings:

- 22 March: update on group activities
- 27 September: outcome of CSN3 // planning presentation
- 13 December: test beam updates

Final dates to be circulated in January

## EIC\_NET Annual Meeting:

- June (exact date to be considered with respect to CSN3 calendar: 27-28 June with arrival 27 June morning. End of work late afternoon on Friday, if needed people departs Saturday morning)
- consider to host the meeting!
- format: 1 day and half, "easy" destination
- status of TDR, INFN planning, iCRADA... outcome of June RRB

We need to formalize/check INFN ePIC members + LNF exit soon

Note that with more than 10 members in one institution we get an additional vote/rep.