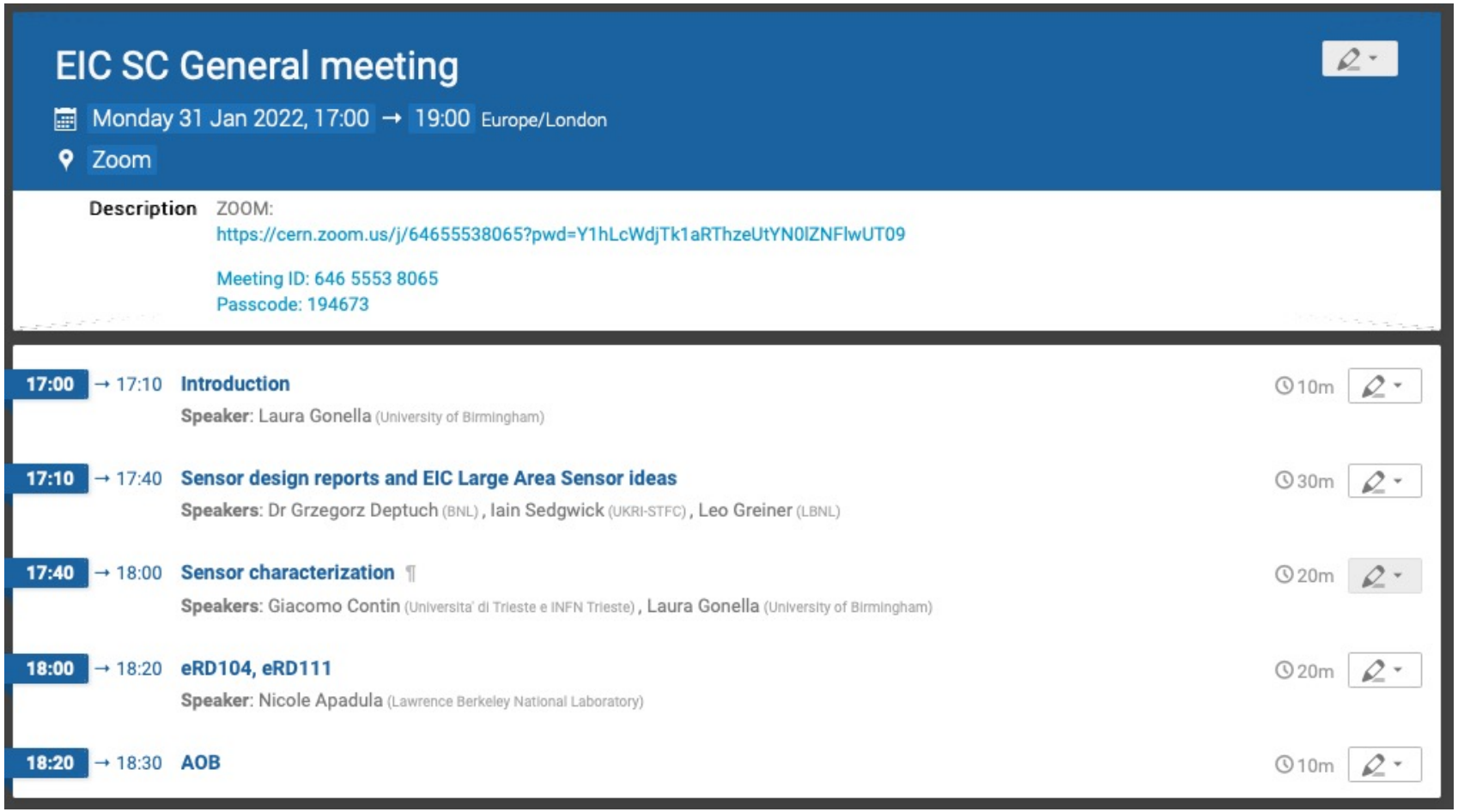
EIC SC general meeting - Introduction

31 January 2022

L. Gonella on behalf of the EIC SC coordination

Today's agenda

- The agenda is organised around the two areas of activities of the EIC SC
  - Sensor design and characterisation
  - Detector design (modules, staves/discs, mechanics, cooling, readout, power, …)



EIC SC General meeting

Monday 31 Jan 2022, 17:00 → 19:00 Europe/London

Zoom

Description ZOOM:
https://cern.zoom.us/j/64655538065?pwd=Y1hLcWdjTk1aRThzeUtYN0lZNFlwUT09

Meeting ID: 646 5553 8065
Passcode: 194673

17:00 → 17:10	**Introduction** **Speaker**: Laura Gonella (University of Birmingham)	10m
17:10 → 17:40	**Sensor design reports and EIC Large Area Sensor ideas** **Speakers**: Dr Grzegorz Deptuch (BNL), Iain Sedgwick (UKRI-STFC), Leo Greiner (LBNL)	30m
17:40 → 18:00	**Sensor characterization** ¶ **Speakers**: Giacomo Contin (Universita' di Trieste e INFN Trieste), Laura Gonella (University of Birmingham)	20m
18:00 → 18:20	**eRD104, eRD111** **Speaker**: Nicole Apadula (Lawrence Berkeley National Laboratory)	20m
18:20 → 18:30	**AOB**	10m

Sensor design and characterisation

- Sensor design and characterisation activities are carried out largely in collaboration with ITS3

- EIC SC designer institutes BNL, LBNL, RAL involved in the ITS3 WP2 (sensor design) activities currently targeting the first ITS3 engineering run (ER1)
  - Contribution of IP blocks, *see reports today by Iain and Grzegorz*
  - ER1 submission planned for April 2022

- Reminder:
  - The EIC will use the same sensor as the ITS3 for vertex layers, i.e. a wafer-scale, stitched sensor, thinned and bent around the beam pipe
  - The EIC will derive from the ITS3 sensor a stitched but not wafer-scale sensor for use in staves and discs → we call this the EIC Large Area Sensor (LAS)

Sensor design and characterisation

- Work needs to start to understand the requirements of the LAS in view of design work that should aim to begin after the ITS3 ER1 submission to have a first prototype next year
  - Yield of the 65 nm process → this will be known later this year when the ITS3 ER1 is received from fabrication and tested
  - What sensor size(s) would be optimal to tile staves and discs → this needs a study (simulations, modelling) that considers the physics performance that needs to be achieved together with aspects of mechanics/integration (and yield vs cost to be folded in when available)
  - How do we go from sensors to modules → this will require R&D on interconnection technologies
  - On the topics of LAS design *Leo and Iain will present some ideas* they have been working on

Sensor design and characterisation

- A number of EIC institutes have also joined the ITS3 WP3 (sensr testing) WG and requested setups for MLR1 characterisation
  - A dedicated meeting on this topic took place last week organised by Giacomo, "EIC SC – ITS3 MLR1 tests" https://indico.bnl.gov/event/14561/
  - Giacomo will report on the meeting outcome, status and plans of this activity

EIC SC activities: eRD111 and eRD104

From: **Rolf Ent** ent@jlab.org
Subject: [eicug-users] Delay in EIC Project Detector R&D for FY22
Date: 18 January 2022 at 02:22
To: eicug-users eicug-users@eicug.org
Cc: Aschenauer, Elke elke@bnl.gov, Patrizia Rossi rossi@jlab.org, Thomas Ullrich thomas.ullrich@bnl.gov

RE

Dear EIC User Group Members,

on August 18th we sent you a mail announcement on the FY22 start of the EIC Project Detector R&D, constrained to detector R&D of common interest and of priority for all or most of the envisioned proto-collaboration detectors. Since that time, the various eRD groups submitted their initial detector R&D proposals, and feedback from followup meetings and discussions was integrated. We really do appreciate the efforts of the EIC community to work with us on this.

Based on your input, a draft plan was made to implement (some of) the proposed detector R&D work that would directly address project risk.

Start was delayed by the ongoing FY22 continuing resolution in the United States, which comes with uncertainty and funding hurdles. The continuing resolution was initially to December 3rd, and then extended to February 18th. The funding limitations under continuing resolution impact overall EIC Project progress and schedule. Similar, under these continuing resolution conditions funding is just not in place yet to start detector R&D.

Given this situation, we have to unfortunately inform you that it seems unlikely we can start the much-needed EIC project detector R&D before earliest April 1.

We understand the hardship, and very much realize the impact on the detector schedule, but as mentioned above the continuing resolution conditions affect all the EIC Project schedule. We will only know the exact impact once the FY22 funding levels are better known. Please work with us, we will do what we can to mitigate.

Best regards,

Thomas Ullrich, Patrizia Rossi, Elke Aschenauer, Rolf Ent

Continuing resolution means funding from the project for eRD111 and eRD104 will not be available until 1 April.

We have some milestones set for April and June (highlighted in the next slides).

We should assess the impact on those.

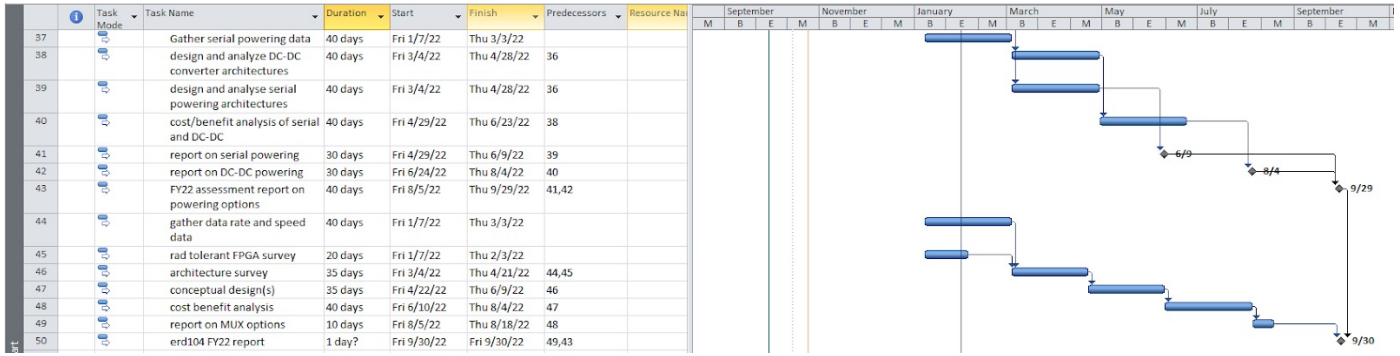
EIC SC activities: eRD104

- ERD104: Silicon Services Reduction
  - https://drive.google.com/file/d/1qkXA-oA3nigDVWiC83pEq1RbFw4EzdCu/view?usp=sharing
  - No reports today

Topic	Institutions involved	Contact Person
Powering System	University of Birmingham, STFC RAL PPD	Laura Gonella (Univ of Birmingham) Fergus Wilson (RAL)
Readout system	ORNL, BNL	Jo Schambach (ORNL)

Milestone Description FY22	Date
report on serial powering	2022/04/29
report on DC-DC powering	2022/06/24
FY22 assessment report on powering options	2022/09/29
erd104 FY22 report	2022/09/30

See Leo's talk at EIC SC general meeting in Nov 21
https://indico.bnl.gov/event/13658/



	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Na
37		Gather serial powering data	40 days	Fri 1/7/22	Thu 3/3/22		
38		design and analyze DC-DC converter architectures	40 days	Fri 3/4/22	Thu 4/28/22	36	
39		design and analyse serial powering architectures	40 days	Fri 3/4/22	Thu 4/28/22	36	
40		cost/benefit analysis of serial and DC-DC	40 days	Fri 4/29/22	Thu 6/23/22	38	
41		report on serial powering	30 days	Fri 4/29/22	Thu 6/9/22	39	
42		report on DC-DC powering	30 days	Fri 6/24/22	Thu 8/4/22	40	
43		FY22 assessment report on powering options	40 days	Fri 8/5/22	Thu 9/29/22	41,42	
44		gather data rate and speed data	40 days	Fri 1/7/22	Thu 3/3/22		
45		rad tolerant FPGA survey	20 days	Fri 1/7/22	Thu 2/3/22		
46		architecture survey	35 days	Fri 3/4/22	Thu 4/21/22	44,45	
47		conceptual design(s)	35 days	Fri 4/22/22	Thu 6/9/22	46	
48		cost benefit analysis	40 days	Fri 6/10/22	Thu 8/4/22	47	
49		report on MUX options	10 days	Fri 8/5/22	Thu 8/18/22	48	
50		erd104 FY22 report	1 day?	Fri 9/30/22	Fri 9/30/22	49,43	

EIC SC activities: eRD111

- ERD111: Silicon Services Reduction
  - https://drive.google.com/file/d/1EWf-F-GvzuijadqsPZMNtIgB8_K423aH/view?usp=sharing
  - Nikki will give a talk on staves and discs work

Topic	Institutions involved	Contact Person
Forming modules from stitched sensors	INFN Trieste, UK groups (Daresbury, Lancaster, Liverpool, Birmingham), INFN Bari	Giacomo Contin (INFN Trieste) Domenico Elia (INFN Bari) Roy Lemmon (Daresbury)
Staves and Discs	LBNL, LANL, INFN Trieste, INFN Bari, UK groups (Daresbury, Lancaster, Liverpool)	Nikki Apadula (LBNL) Walter Sondhem (LANL) Roy Lemmon (Daresbury)
Mechanics, integration and cooling	LBL, LANL, UK groups, JLAB,	Ernst Sichtermann (LBNL) James Fast (JLAB)

Milestone Description FY22	Date
report on modules options/optimizations	2022/08/08
report on baseline stave designs	2022/04/27
report on baseline disc designs	2022/06/08
report on simple disc and stave models	2022/12/21 (FY23)
up-to-date silicon tracking CAD models	2022/06/15
report on mechanics conceptual design	2022/07/27
ERD111 report for FY22	2022/09/21

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