Changes in the Technical Note

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General

- text concerning GaAs sensors is taken out
- Mechanical frame text changed
- New responsibilities for new collaborators
- New timelines
- ECAL-E and ECAL-P treated similarly
- (almost) no changes in the perfromance section

Chapter 1-4

Introduction:

minor changes, ECAL-E and ECAL-P explained with similar particularity

Requirements and Challenges:

Fig. 2 changed (consistent with the Executive summary)

System Overview:

ECAL-P, new structure (1X0, 2 X0), new picture of the mechnical frame, silicon sensors (Calice type).
ECAL-E text updated.

Expected Performance

Nothing changed

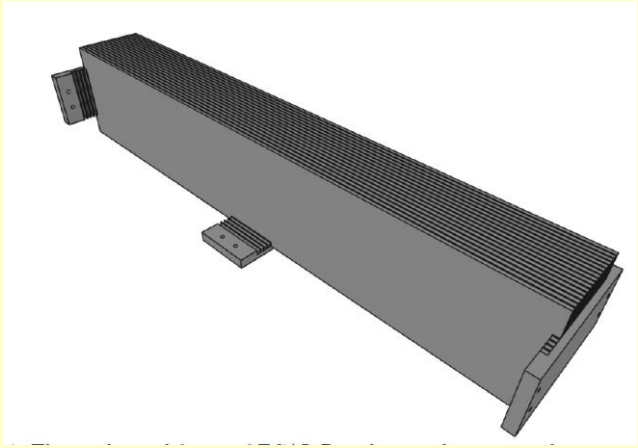
Chapter 5 - 6

Technical description:

New mechanical frame, tungsten plates

Silicon sensors (as in the previous version), GaAs dropped

Assembled detector plane with Kapton traces



Characteristics of SKIROC-2 (similar to FLAXE)

New picture of a instrimented sensor plane for ECAL-E

Interfaces and Integration:

Nothing changed, only ECAL-P

Data Acquisition

Nothing changed, only ECAL-P

Chapter 7

Installation, Commissioning and Assembly:

The ECAL-E will be fully assembled and tested at LAL Orsay and shipped to DESY. After arrival a system test will be performed and the status of all components will be documented. The time foreseen is two weeks.

The ECAL-P assembly requires the presence of participants from four institutes engaged in building the ECAL-P:

- UW - for the mechanical frame and the tungsten plates.
- TAU - for installing the sensor planes between the tungsten plates.
- AGH-UST - for installing the readout electronics.
- ISS - for software support and slow control.

The assembly will take place at DESY.
The tasks to be performed are then

- Inserting the tungsten plates, plate by plate, and the sensor planes in between.
- Connecting the FEBs and the electronics.
- Performing a cosmic run for function tests of components.

It is assumed that it will take a day to install one tungsten plate and one sensor plane, and perform the function tests. The tungsten plate will be inserted into the mechanical frame followed by cabling and connection of FEBs, HV and LV as well as DAQ. After performing a noise check, data from cosmics will be collected during the night. This cycle will be repeated for the 15 plates. It will thus take 15 days to complete these tasks. This will be followed by a full system test for about 5 days. Another 10 days will be needed to perform the ECAL-P calibration in the DESY test-beam. The full assembly is thus expected to take about a month. With an added contingency to solve unforeseen problems, the total time estimate for ECAL-P readiness to be moved into the experiment is thus 1.5 months.

Chapter 7

7.2 Installation

For the final installation in the experimental area, it is assumed that:

- the table on which the ECAL-E and ECAL-P is placed is installed;
- all LV, HV and data cables are installed to connect the ECAL-E and ECAL-P subsystems with the rack.

The installation steps, with the estimated duration and the number of participants, are as follows:

- Moving the ECAL-E and ECAL-P to the area and place it on the table. The rough weight estimate is 50 kg and thus a crane will be needed.
  Duration: 1 day;
  Person power: 1 technician (DESY), 2 physicists for ECAL-E and ECAL-P each.
- Moving the electronics racks to the area next to the ECAL-E and ECAL-P (time and person-power included in the previous item).
- Performing the survey, to precisely define the position of ECAL-E and ECAL-P;
  Duration: 1/2 day;
  Person-power: experts from DESY/XFEL survey, 1 physicist for ECAL-E and ECAL-P each.
- Connecting the cables between ECAL-E and ECAL-P and the rack.
  Duration: 1 day;
  Person power: 1 electronic engineer, 1 technician, 1 physicist ECAL-E and ECAL-P each.
- Testing of HV, LV and data connections. Duration: 1 day plus 2 days in reserve for potential replacements;
  Person-power: 1 electronics engineer, 2 physicists ECAL-E and ECAL-P each.

Hence for the installation of the ECAL-E and ECAL-P in the area between 3.5 to 5 days are needed for each of them. The process will be performed by 2 physicists, 1 electronic engineer and 1 technician (partly provided by DESY), and the DESY survey team. A summary is given in the resource loaded schedule in appendix A.

Some items to be discussed:

- Do we need cosmic trigger during installation?
- Is the calibration strategy still valid ?

Chapter 8 - 9

ORAMS:

Only minor changes in the text

Project Organisation:

ECAL-E and ECAL-P will be built in a joint effort of the AGH-University of Technology (AGH-UST) Cracow, the Kyushu University (KU), the Laboratoire de Physique des 2 Infinis Irène Joliot-Curie, (IJC) Paris, the Laboratoire Leprince-Ringuet (LLR) Paris, the Institute of Space Science (ISS) Bucharest, the Tel Aviv University (TAU), the Universitat de Valencia (IFIC), and the Warsaw University (UW). These institutes will provide the human and financial resources needed for the design, production, test, commissioning and operation of ECAL-P. The group of AGH-UST comprises 5 experienced researchers, specialised in ASIC design, 1 technician and several students. From the Kyushu University one researcher specialised on sensors will join, the Laboratoire -Ringuet Paris will contribute with mechanics, sensor assembly and electronics of ECAL-E with 2 researchers. From the ISS group, 3 physicists experienced in software and data handling are included. The TAU group comprises 3 experienced physicists, 1 part-time technician (full time technician will be hired in the near future), one postdoc, and several under-graduate students. In the Universitat de Valencia one experienced researcher and one Ph.D. student will perform the gluing, and the Warsaw University with 2 experienced researchers, one Postdoc and engineering support design and build the mechanical frame of ECAL-P.

Chapter 8

Cost estimate (ECAL-E and ECAL-P)

Component	Cost (kEur)	responsible lab (origine of estimates)	Quality factor	Status
Mechanics	50	IJC, UW (previous projects)	1	design
Sensors	220	KU, LLR, IFIC, IJC, TAU (offer by the vendor)	1	Prototyping
FE ASICs	330	AGH-UST, IJC, LLR (recent submissions)	2	Redesign
PCBs	52	AGH-UST, LLR, IJC, TAU (previous production)	1	
DAQ	37	IJC, TAU (FCAL experience)	1	
Power supplies	40	AGH-UST, IJC, TAU (current offers)	1	
Tooling	55	IJC, IFIC, TAU	1	
Tungsten	60	LLR, TAU (offer by the vendor)	1	
Auxiliary components	50	experience from previous projects	1	
Total sum	894			

Chapter 9

Responsibilities

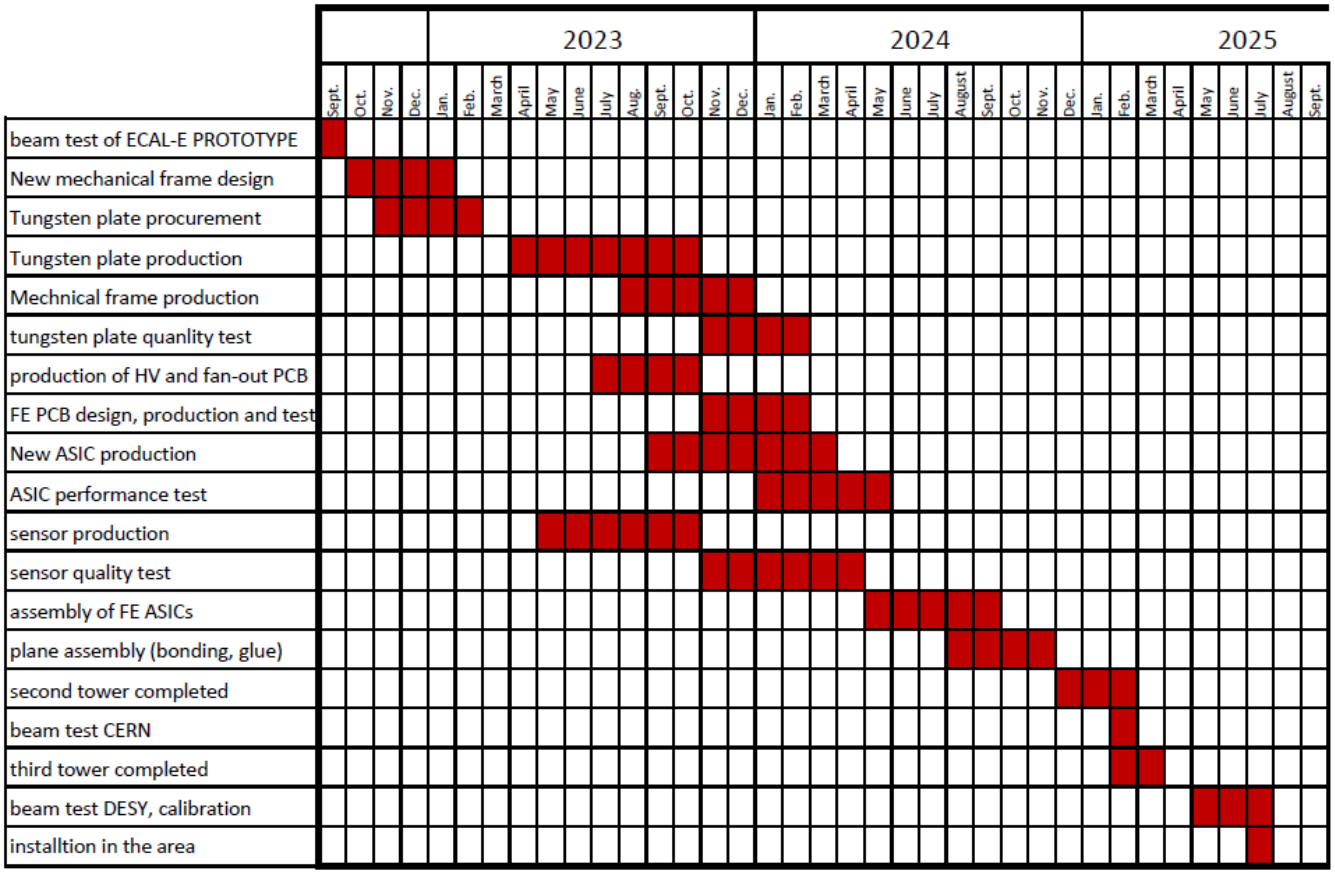
Institute/University	contribution to ECAL-E
IFIC	contacts of sensors pads with read-out traces using conductive glue, sensors
IJC	sensors, readout, DAQ, PCB
KU	sensors, contact to Hamamatsu
LLR	sensors, PCB, assemly, tools, precise tungsten plates

Institute/University	contribution to ECAL-P
AGH-UST	FE-ASICs development and production, DAQ
ISS	slow control, software, computing infrastructure
TAU	sensors, assembly of detector planes, DAQ
UW	mechanical frame, precise tungsten plates

Chapter 9

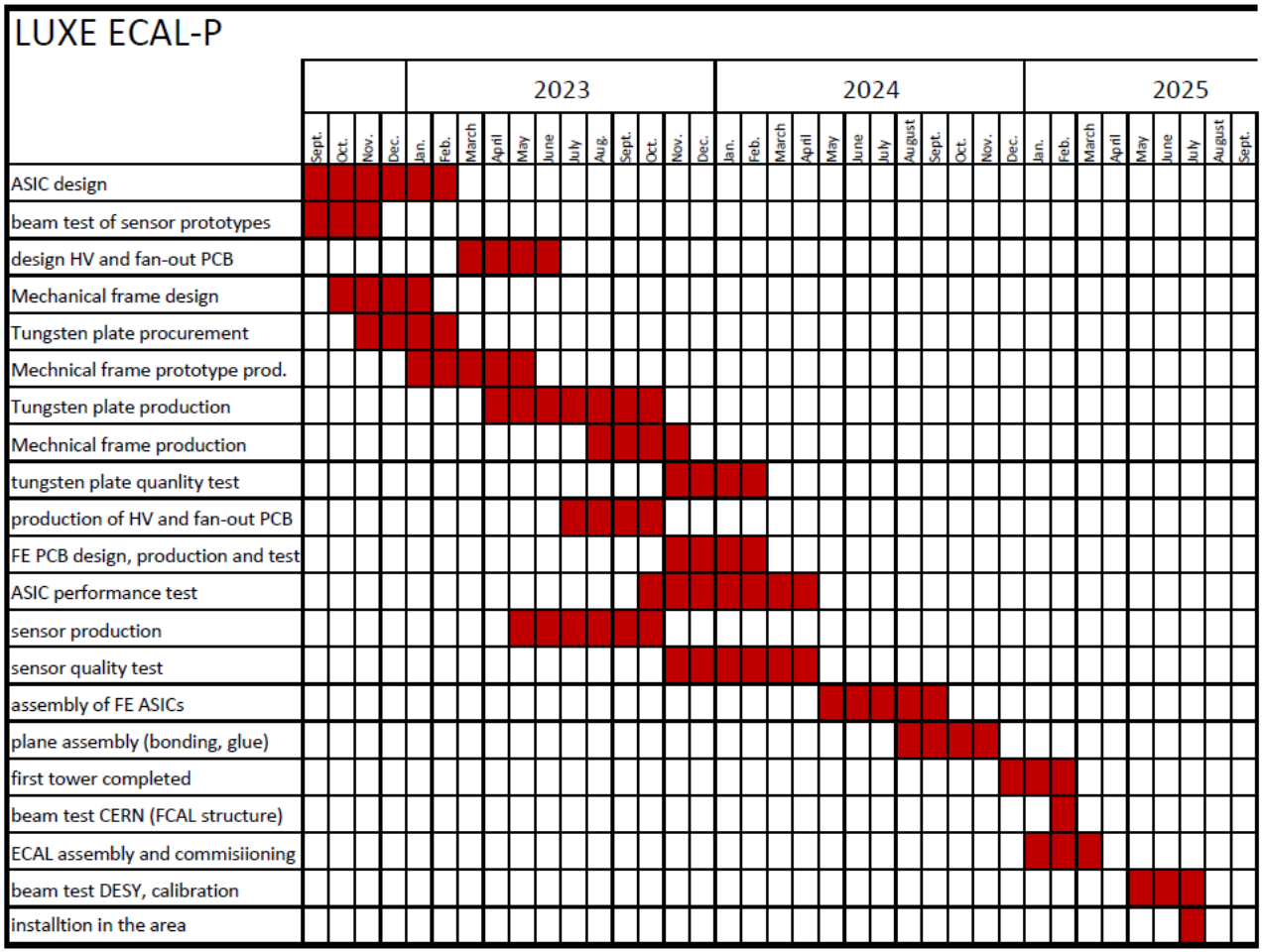
Schedule

LUXE ECAL-E



Chapter 9

Schedule



Chapter 9

Risk Management:

Nothing changed

Further Tests planned:

GaAs dropped