Detector R&D Tasks

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IDRC Recommendations:

Need to act on IDRC recommendations

1. **The project leadership and IDRC should assemble a coherent list of R&D activities, such that the presence of gaps and overlaps can be determined and addressed**

2. **Each current R&D project should provide, before the end of 2019, key information to the IDRC:**
   - **The objectives of the project**
   - **The anticipated schedule on which the objectives will be met**
   - **The funding available to the project, and the leadership arrangements within it**
   - **The extent to which the project is a CEPC-specific development**
   - **Manpower resources available for the project, including type (student, faculty, engineer, etc) and FTE (question added by us)**

PBS structure for our Detector R&D tasks

1 - Vertex

2 - Tracker

2.1 - TPC

2.2 - Silicon Tracker

2.3 - Drift Chamber

3 - Calorimeter

3.1 - ECAL Calorimeter

3.2 - HCAL Calorimeter

3.3 - DR Calorimeter

4 - Muon Detector

5 - Solenoid

6 - MDI

7 - TDAQ

8 - Software and Computing

R&D tasks to be created under these tasks

e.g. 3.1.1 Crystal Calorimeter

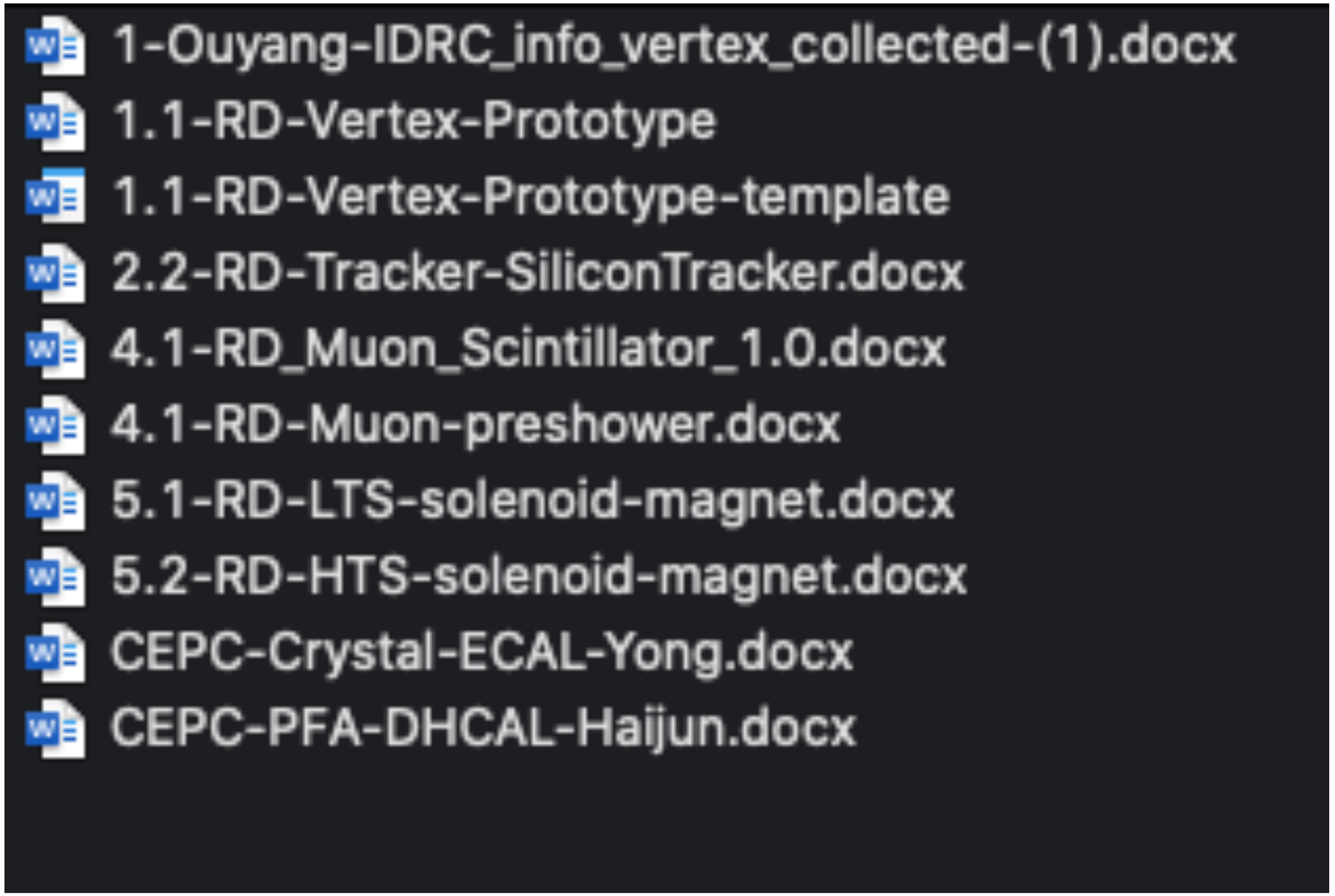
Structure on Indico Page

15:20 - 16:20 **Discussion of Detector Project R&D Tasks** *1h0'*

Speakers: Roberto Ferrari (INFN), Paolo Giacomelli (INFN-Bo), Francesco Grancagnolo (INFN-Lecce), Suen Hou (IPAS), LI Gang (EPC.IHEP), Prof. Zhen An LIU Zhenan (IHEP), Dr. Weidong Li (高能所), Prof. Zhijun Liang (IHEP), Dr. Jianbei Liu (University of Science and Technology of China), Dr. Yong Liu (Institute of High Energy Physics), Prof. Qun OUYANG (IHEP), Dr. Huirong Qi (Institute of High Energy Physics, CAS), RUAN Manqi, Prof. Meng Wang (Shandong University), Haijun Yang (Shanghai Jiao Tong University), Dr. Hongbo ZHU (IHEP), Mr. Zian ZHU Zian (高能所), Prof. Liang Li (Shanghai Jiao Tong University)

- 1. Vertex *15'*
  Speaker: Prof. Qun OUYANG (IHEP)
- 2.1 - TPC *15'*
  Speaker: Dr. Huirong Qi (Institute of High Energy Physics, CAS)
- 2.2 - Silicon Tracker *15'*
  Speaker: Prof. Meng Wang (Shandong University)
- 2.3 - Drift Chamber *15'*
  Speaker: Francesco Grancagnolo (INFN-Lecce)
- 3.1 - ECAL Calorimeter *15'*
  Speakers: Dr. Yong Liu (Institute of High Energy Physics), Dr. Jianbei Liu (University of Science and Technology of China)
  Material: **Slides**
- 3.2 - HCAL Calorimeter *15'*
  Speakers: Haijun Yang (Shanghai Jiao Tong University), Dr. Jianbei Liu (University of Science and Technology of China)
  Material: **Slides**
- 3.3 - DR Calorimeter *15'*
  Speaker: Roberto Ferrari (INFN)
- 4 - Muon Detector *15'*
  Speakers: Paolo Giacomelli (INFN-Bo), Prof. Liang Li (Shanghai Jiao Tong University)
- 5 - Solenoid *15'*
  Speaker: Mr. Zian ZHU Zian (高能所)
  Material: **Slides**
- 6 - MDI *15'*
  Speakers: Dr. Hongbo ZHU (IHEP), Suen Hou (ISAP)
- 7 - TDAQ *15'*
  Speaker: Prof. Zhen An LIU Zhenan (IHEP)
- 8 - Software and Computing *15'*
  Speakers: LI Gang (EPC.IHEP), Dr. Weidong Li (高能所), Mr. Manqi Ruan (IHEP)

Documents received so far



Projects from IDEA (F. Bedeschi)

a. Silicon pixels for vertex detector

b. Silicon detectors for large area trackers

c. Cluster counting drift chamber

d. Dual Readout calorimetry

e. uRwell based pre-shower system ★

f. uRwell based muon system ★

Merged

Vertex Detector

1 – Vertex: IDRC information collected

	objectives of the project	anticipated schedule	funding available(MRMB)/ leadership arrangements	CEPC-specific development	Manpower resources		
					Faculty/ FTE	Engineer/ FTE	Student/ FTE
MOST1	CMOS pixel	2016-2021	5.0/IHEP+CCNU	Aim to develop high resolution and low power consumption pixel sensor	5	1	3
MOST2	CMOS pixel/ prototype	2018-2023	12.0/IHEP+SDU+NWPU+NJU	Aim to build a full-size vertex detector prototype with 25ns time stamp and fast readout pixel sensor	11.2	1	9.3

Vertex Detector

NSFC	CMOS pixel	2016-2022	1.1/IHEP	Aim to optimize the pixel sensing front-end	0.5		0.5
NSFC	SOI pixel	2016-2023	4.0/IHEP	Aim to develop high resolution and fast readout pixel sensor with 3D connection technology	1.5	0.5	0.7
IHEP	CMOS pixel	2015-2018	1.0(finished)	Aim to explore the CMOS process with optimization of sensing diode			

Other tasks:

- 6 - MDI
  - IR design, radiation backgrounds, LumiCal,…
  - Hongbo to provide details by end of last week…

CEPC Detector R&D Project
1.1 Vertex Prototype

Document Responsible:	Joao Guimaraes da Costa
Last saved by on	12/13/19 1:19:00 PM
Revision number:	1

Change history

Revision	When	What changed and why
1	12/12/2019	First draft
		< Add further lines to table as required >

Readme first

i. Please do not delete or modify this section or its structure.
ii. Only change text enclosed by (and including) angled brackets "< … >".
iii. Don't change field directly, instead modify the document options, under File → Properties (or similar)
   - Enter name of person that wrote the document in Document:Summary: Author
   - The project ID number, should follow the rules provided to you earlier. The number should be changed in Document:Custom: PBS.
   - The project name should be changed in Document:Summary: Subject.
iv. In Section *Project Objectives* provide a brief description of the project goals, i.e. why and what is being produced, for PBS item **1.1 Vertex Prototype**. If this project includes identifiable sub-projects you can indicate them in the *Sub-projects Description* Section, otherwise submit a separate document for each of them. The sub-project IDs are free for you to define.
v. Finally, remember to update the *Change History*.

1.1 Vertex Prototype: Project Objectives

<Include a short description of the goals of the project>

1.1 Vertex Prototype: Sub-projects Description

Project ID	Title	Description
1.1.1	CMOS pixel sensor	Full size CMOS pixel sensor with full functionality to be used in a pixel vertex detector
1.1.2	Low-mass ladder	Ladder with low mass to satisfy CEPC requirements
1.1.3	Mechanical structure	Low-mass mechanical structure for pixel detector
		< Add further lines to table as required >

1.1 Vertex Prototype: CEPC Relationship

<Indicate to what extent this project is a CEPC-specific development.>

1.1 Vertex Prototype: Project Schedule

<Enter a rough schedule for the project, indicating the ultimate schedule goal for when the objectives will be met, and some intermediate steps if found important.>

1.1 Vertex Prototype: Funding Availability

<Short statement about the funding sources and amount of funding available. If no funding yet, please indicate that. Indicate if funding is enough or more funds are desirable.>

1.1 Vertex Prototype: Leadership Arrangement

<Indicate who is leading the project and the leadership arrangement within the project. Should identify names and institutions.>

< Briefly summarize the manpower resources available for the project, including type (student, faculty, engineer, etc) and FTEs for each type. >

Type	Average FTE Expected
Faculty	
Postdoc	
Students	
Engineers	