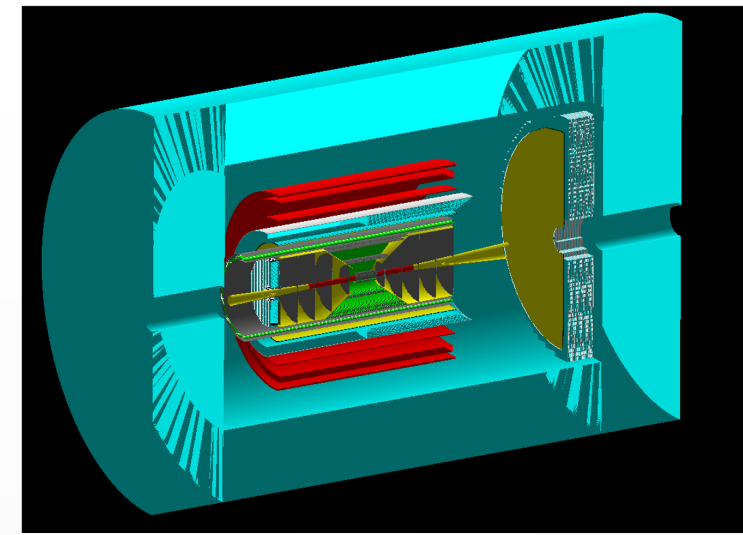


CORE Collaboration Meeting
17 May 2021

CORE MEETINGS WITH EIC PROJECT





I. COSTING II. ENGINEERING

CHARLES HYDE
OLD DOMINION UNIVERSITY
chyde@odu.edu

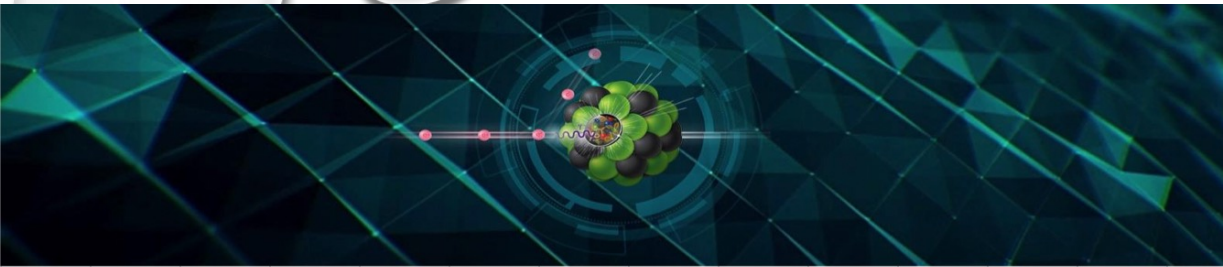


COSTING MEETING: 6 MAY 2021

- Common Costing information for all Detector Proposals
 - Costing will be done in 2021 US\$ (US Commerce Dept)
 - Equipment costing in \$\$
 - Labor costing in hours per category (technician, engineering, etc).
- EIC Costing Template, database of costing information linked to “Call for Detector Collaboration Proposals”
 - FAQ:
 - Additional Material
 - Material to Support Detector Costing
 - <https://indico.bnl.gov/event/10974/contributions/49222/>

-  BABAR-sPHENIX Solenoid Engineering Risk Assessment v2.pptx
-  Costing.forCollaborations.xlsx
-  Costing Info.xlsx
-  Existing BABAR Solenoid - JLab Engineering Risk Assessment v4.docx

Costing.forCollaborations.xlsx



04/11/2021

Read Me on Costing Information

We expect the collaboration initiatives to provide the following costing information

- the costing information needs to be in the provided excel-sheet
- material costs for the different subdetectors
- needed labor hours for the different activities with the respective skill set
- the cost need to be provided in 2021 US-dollars
- for escalation please use the government CPI Inflation Calculator https://www.bls.gov/data/inflation_calculator.htm
- document your basis of estimates, meaning keep all quotes and other documentation you used for the costing
- provide on excel-costing file per subdetector
- Please **do not include** any safety factors, like contingency, risk-factors to the subdetector costs and for labor we want no costs calculated. All of this will be done by the project team
- We expect detailed costing for the subdetectors associated with the **blue highlighted WBS** items in Table 1
- For the **green highlighted WBS** items we request
 - Detector Infrastructure:
We required to detail the infrastructure and integration needs for the detector overall and the subdetectors in particular. For the costing we request you work with the EIC project.
 - Magnet:
If your proposal is built on the existing BARBAR solenoid, we request you detail what refurbishments based on the "Existing BABAR (SPHENIX) Solenoid - JLab Engineering Risk Assessment" document you are planning to undertake, the same for the magnet improvements. For the we request you work with the EIC project. If your proposal is built on a new solenoid, you should follow the costing methodology provided.

Table 1: The cost breakdown for the global detector systems.

EIC Reference Detector Cost Estimate	
WBS	\$M
Detector Management	7.4
Detector R&D	12.1
Tracking	31.1
PID	26.5
Electromagnetic Calorimetry	36.2
Hadronic Calorimetry	33.1
Magnet	29.7
Electronics	17.1
DAQ Computing	8.7
Detector Infrastructure	26.4
IR Integration & Auxiliary Detectors	8.1
Detector Pre-Op & Commissioning	8.7

←fixed

←fixed

CORE-C.Hyde

USER PROCEDURE

Column	Column Name	Action
A	WBS Id (Optional)	Optional: Select EIC WBS
B	WBS Name	Please fill in the detector you cost
C	Activity Description	Describe what you want to buy or do
D	Activity Type (Optional)	Optional: Select Type of Activity
E	Unit	Number of things of the same type
F	Unit Price	Price per part
G	Basis of estimate for Costing	give the info where the cost came from
H	Labor Hours	give the hours needed to do the activity
I	Resource Name	give the skill set needed to do the work
J	Funding Source	please provide the primary funding source
K	% of Funding source	give the procentage the funding source applies to the cost of the item
L	Total Material Cost	calculated from column E and F
M	Duration of activity in days	give the days needed for the activity
N	Projected Start Date of activity	give day activity starts
O,P,Q		get automatically calculated
R	Info	give any additional info you think can be useful

17-May-2021

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EXAMPLE ENTRIES (1 GENERIC, 1 CORE)

WBS ID	WBS Name	Activity Description (Separate between conceptual design, preliminary design, final design, long lead procurements etc.)	Activity Type	Units	Unit Pricing	Basis of Estimate for costing (Pull Down)	Labor Hours	Resource Name (Pull Down)	Funding Source (Pull Down)
ECE06.10.03.03	Hadron Endcap Tracking	GEM-TRD-OD Gem foils	Procurement of Material/ Vendor Fabrication/Leadtime	72	3000	Expert Opinion		Other	Project / In-kind
			Procurement Support			Expert Opinion	100	Mechanical Engineer	Project
			Final Design			Expert Opinion	100	Mechanical Designer	In-kind
ECE06.10.07	Magnets	Central Solenoid: 2.5 Tesla	Final Design	1				Mechanical Engineer	Project
			Procurement of Material/ Vendor Fabrication/Leadtime	1	5000000	Expert Opinion		Other	In-kind
			Procurement Support						
			In-House Testing						
			Installation						

WBS ID	WBS Name	Units	Unit Pricing	Funding Source (Pull Down)	% of Funding source	Direct Materials \$\$	Duration (Working Days)	Projected Start Date	Projected Start Date (Calculate d)	Projected Finish Date (Calculated)	Cost Total (Calculated)	Notes
ECE06.10.03.03	Hadron Endcap Tracking	72	3000	Project / In-kind	60/40	\$216,000	120	4/20/23	4/20/23	10/11/23	\$0	There are potential cost savings of about 30% with the use of microRWELL technology.
				Project	100		20	4/20/23	4/20/23	5/18/23	\$0	
				In-kind	100		20	4/20/23	4/20/23	5/18/23	\$0	
ECE06.10.07	Magnets	1	5000000	Project	100							\$0 Reference detector is \$30M
		1	5000000	In-kind	100	\$5,000,000	500	4/20/23	4/20/23	4/21/25	\$0	

COSTING DATA: Costing.Info.xlsx



Supplier:

CRYTUR, spol. s r.o.
Na Lukách 2283
511 01 Turnov
Czech Republic
Comp. Reg. No.: 25296558
VAT Reg.No.: CZ25296558

Bank: Komerční banka
Account/Bank code: 51-7024120287/0100
SWIFT: KOMBCZPP
IBAN: CZ85 0100 0000 5170 2412 0287

Tel.: +420 481 319 511
crytur@crytur.cz
fakturace@crytur.cz

Delivery address: JSA/Jefferson Lab
Attn: Cynthia Keppel, 12000 Jefferson Avenue , VA 23606 NEWPORT NEWS, United States

Customer

JSA/Jefferson Lab-Accounts Payable
628 Hofstadter Road, Suite 4
VA 23606 NEWPORT NEWS
United States

Your order No.: JSA-18-C0948, Mod 002
Sales order No.: 30/2019/128
Method of transport: FedEx
Delivery terms: CIP

CIP Newport Newa

Item	Article	Quantity	Price/unitTax in %	Price	VAT	Gross
9	PWO single crystals according to the contract JSA-18-C0948, Mod 002	10,000 pcs	1 850,00 0	18 500,00	0,00	18 500,00 USD
			Price	VAT	Gross	
excl. VAT			18 500,00	0,00	18 500,00 USD	
Total:			18 500,00	0,00	18 500,00 USD	

Exempt from VAT in accordance with § 66 of the Act No. 235/2004 Coll. and article 146 of Council guideline 2006/112/ES as amended.

Invoice
302000450

JSA/Jefferson Lab-Accounts Payable
628 Hofstadter Road, Suite 4
VA 23606 NEWPORT NEWS
United States



Invoice No.: 30/2020/450

Date of issue: 19.10.2020
Invoice date: 19.10.2020
Due date: 18.11.2020
Payment method: bank transfer
Reference No.: 302000450
Please, state this symbol with payment

上海西卡思新技术总公司

SHANGHAI SICCAS HIGH TECHNOLOGY CORPORATION

ADD: 1295 DINGXI ROAD, SHANGHAI 200050, CHINA
TEL: 021-52410747 FAX: 021-52410245

INVOICE

BILL TO:

Accounts Payable
JSA, LLC/JEFFERSON LAB
628 HOFSTADTER ROAD
SUITE 4, NEWPORT NEWS,VA 23606
USA

发票编号:
Invoice No.: 20-037
日期:
Date: Mar.10,2020
合同编号:
Purchase No.: JSA-17-C0530

Marks & Nos.	Item#	内容 Descriptions	数量 Quantities	单价 Unit Price	总价 Amount
--------------	-------	--------------------	------------------	------------------	--------------

OPTICAL COMPONENT					
JEFFERSON LAB	1.)	PWO Crystal	132 pc	US\$1,000.00	US\$132,000.00
PWO Crystal		2.05x2.05x20cm			TOTAL: US\$132,000.00
C/NO.1					

Partial payment of 118,800.00 made
4/30/20 - Balance due - JDW per Melissa 13,200.00

Ship to:
The Jefferson Lab (Department of Energy)
EEL BLDING
12000 JEFFERSON AVE.
NEWPORT NEWS,VA 23606
USA

U.S. Department of Energy Contract Number: DE-AC05-06OR23177.

COUNTRY OF ORIGIN: CHINA

TOTAL PACKED IN 1 CASE
TOTAL NET WEIGHT:99KGS
TOTAL GROSS WEIGHT:122KGS

17-May-2021

COSTING INFO: Si TRACKER

Table 1.1: Geometrical parameters of the upgraded ITS.

	Inner Barrel			Outer Barrel			
	Inner Layers			Middle Layers		Outer Layers	
	Layer 0	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	Layer 6
Radial position (min.) (mm)	22.4	30.1	37.8	194.4	243.9	342.3	391.8
Radial position (max.) (mm)	26.7	34.6	42.1	197.7	247.0	345.4	394.9
Length (sensitive area) (mm)	271	271	271	843	843	1475	1475
Pseudo-rapidity coverage ^a	± 2.5	± 2.3	± 2.0	± 1.5	± 1.4	± 1.4	± 1.3
Active area (cm ²)	421	562	702	10 483	13 104	32 105	36 691
Pixel Chip dimensions (mm ²)	15 × 30						
Nr. Pixel Chips	108	144	180	2688	3360	8232	9408
Nr. Staves	12	16	20	24	30	42	48
Staves overlap in $r\phi$ (mm)	2.23	2.22	2.30	4.3	4.3	4.3	4.3
Gap between chips in z (μm)	100						
Chip dead area in $r\phi$ (mm)	2						
Pixel size (μm^2)	(20 – 30) × (20 – 30)			(20 – 50) × (20 – 50)			

Item	Cost (kCHF)
Total	12 039
Pixel Chip	5000
CMOS wafers	3500
Thinning & dicing	1000
Series test	500
Inner Layer Stave	225
FPC construction	43
FPC test	12
HIC assembly & test	30
SF & Cold Plate construction	40
SF & Cold Plate test	20
Stave assembly & test	80
Middle Layers	644
FPC construction	180
FPC test	48
Module assembly & test	117
SF & Cold Plate construction	126
SF & Cold Plate test	48
Stave assembly & test	125
Outer Layers	1789
FPC construction	541
FPC test	144
Module assembly & test	340
SF & Cold Plate construction	240
SF & Cold Plate test	144
Stave assembly & test	380
Support and Installation	1031
Inner Layers End-Wheels	48
Middle Layers End-Wheels	110
Outer Layers End-Wheels	125
Inner Barrel Shell	10
Inner Service Barrel	104
Outer Barrel Shell	62
Outer Barrel Cones	70
Outer Service Barrel	104
Installation mechanics & test	398
Read-out electronics	1200
Data e-links	600
Patch panels	100
Read-out Unit	300
Optical links	200

COSTING SUMMARY

- ALL COSTING DOCUMENTATION WELCOME, AND TO BE SHARED
- PLEASE STUDY THE EXISTING SPREADSHEETS, PROVIDE COMMENTS AND ADDITIONAL DOCUMENTS



PAUSE

DISCUSSION

CORE MEETING with PROJECT ENGINEERING

14 MAY 2020

- Rolf Ent (JLab), Elke Aschenauer (BNL), Walt Akers (JLab), Robert Wimmer (BNL)
- Sketch-UP models of each proposed Detector
 - <https://physdiv.jlab.org/EIC/Menagerie/>
 - Sub-Detector modules are Generic
 - CORE Geometry is not yet accurate in this database: Follow-up expected this week.
 - Video posted to today's indico page
- Some preliminary Mechanical Engineering based on Sketch-up model

CORE IN SKETCH-UP

- Core.skp in [Viewer.Autodesk.com](https://viewer.autodesk.com)
- **Many** details are inaccurate
- Dual RICH is based on update from INFN

