US-MTD: Preparations for CD-2
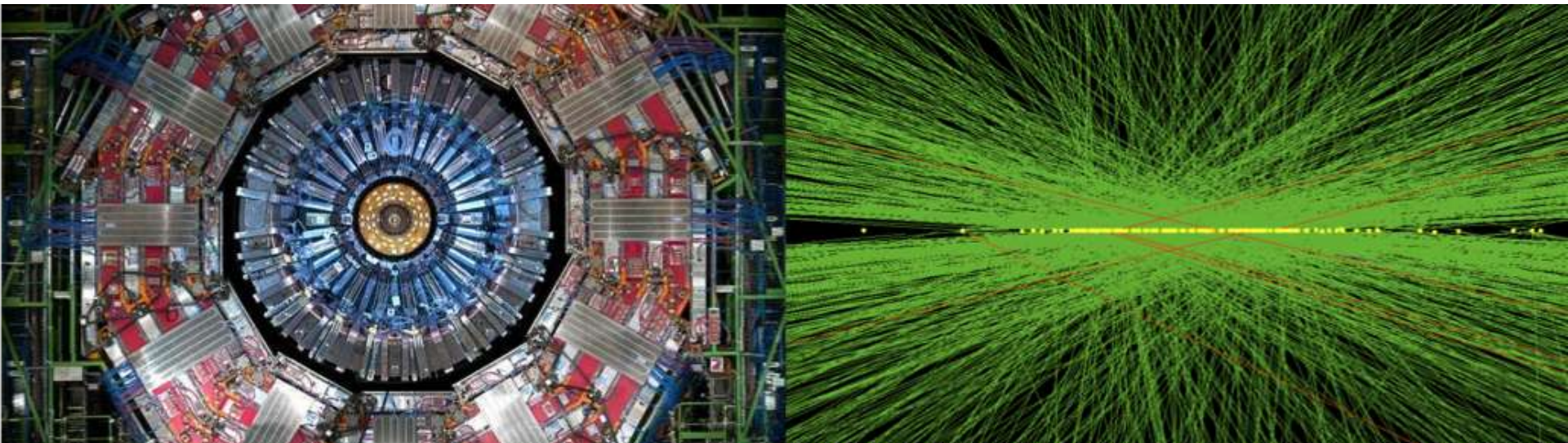
Frank Chlebana (MTD Deputy L2 Manager)
Fermilab

Feb 24, 2021

Summary of Homework Items

■ Homework for the next three weeks, prioritized:

1. **Prepare for the RMB meeting**. Annotate your Word file.
   - Send this to CN and FC by ***10am FNAL time on 24 Feb***.

2. **Update the COVID calendar and work-type** assignments for near-term activities in P6. Make any necessary updates in this google workbook. Revisit once BCR 103 and 102 are complete.
   - Do this by ***COB 26 Feb***.

3. **Update the Estimate Uncertainties for your L4 area**. Make any necessary updates in this google workbook. Revisit once BCR 103 and 102 are complete.
   - Do this by ***COB 2 March***.

4. **Examine production-era M&S purchases in P6 and do a line-item comparison with CORE expectation.** Requires access to both P6 and the MTD MoMa and Costbook. Ask CN and FC for help. Revisit once BCR 103 and 102 are complete.
   - Do this by ***COB 9 March***.

5. **Update all quotes.** If there is an M&S item in your L4 area that has a quote that is more than 6 months old, make a call now and get an updated quote.
   - Do this by ***COB 12 March***.

ETROC - Contributed Labor

ETROC	CY18	CY19	CY20	CY21	CY22	CY23	CY24	CY25	CY26
SMU Eng Grad Stud	0	2816	1103	1780	1720	320	0	0	0
SMU Phys ASIC Des	0	0	516	1220	880	320	0	0	0
SMU Phys Grad Stud	0	887	1840	0	0	0	0	0	0
SMU PhD	0	0	0	0	3280	1000	0	0	0
FNAL Scientist	0	0	276	431	500	151	0	0	0
FNAL RA	0	0	0	0	760	1008	0	0	0
FNAL ASIC	837	693	2304	4568	3584	384	0	0	0
FNAL Engineer	0	0	650	2318	2049	1300	0	0	0
University Grad	0	0	0	0	0	40	940	0	0
University Postdoc	0	0	0	0	0	168	0	0	0

	CY18	CY19	CY20	CY21	CY22	CY23	CY24
Scientist	1	1	0.75	0.75	0.75	0.75	0.75
RA				0.5	0.5	0.5	0.5
Grad Student	1	1	1	1	1	1	1
PostDoc				0.5	0.5	0.5	0.5

Propose to add additional hours to existing activities in order to increase the contributed labor and to reflect the current effort

Enhance the QA/QC effort in CY24

Need to make sure we have identified individuals

Provide Bill with spread sheet: Activity, hours, resource type...

ETL-Assembly – Contributed Labor

ETL-Assembly	CY18	CY19	CY20	CY21	CY22	CY23	CY24	CY25	CY26
FNAL Electronics Engineer	0	294	366	299	456	200	0	0	0
FNAL Electronics Technician	0	0	161	240	16	0	0	0	0
FNAL Mechanical Engineer	0	16	206	1013	560	140	0	0	0
FNAL Mechanical Technician	0	0	80	165	194	418	601	441	0
FNAL Scientist	0	1	108	562	80	0	0	0	0
FNAL RA	0	8	632	1448	1812	1020	90	270	0
University Grad Stud	0	300	240	800	1280	1910	2745	2310	0
University Postdoc	0	324	610	2339	2032	2320	1052	1188	0
University Scientist	0	736	710	1398	880	400	238	242	0
BU Electronics Engineer	0	0	0	1468	640	500	0	0	0
NA Electronics Technician	0	0	53	494	169	180	519	441	0
NA Mechanical Technician	0	616	1417	2204	2540	340	339	221	0
NA Undergrad	0	360	1060	1001	640	330	1049	441	0
KA Electronics Technician	0	14	2	0	0	0	0	0	0
KA Mechanical Technician	0	0	40	8	0	0	0	0	0
UCSB Mechanical Technician	0	570	233	500	297	0	0	0	0
UCSB Undergrad	0	0	0	0	160	800	384	376	0

Add additional hours to existing activities for FNAL Scientist and RA
Provide Bill with spread sheet: Activity, hours, resource type...

ETROC QA/QC

Activity ID	Activity Name	Planned Start	Planned Finish	Planned Du	Planned Lab	Planned No	Planned Material	Responsi	Performin	Estimate Ty	Resource IDs
DOE-CD1-402.8-FC2-5.4.2.6 ETL - Frontend ASICs v3 development (CD-2)		22-Mar-22	23-Jul-24	589d	10394h	4348h	$1,915,950.66				
TL1005155	Specify test requirements for ETROC3	14-Jul-22	27-Jul-22	10d	88h	0h	$0.00	FN	FN	L4	FN_U_PT_EXP_PHYST, FN_U_PT_EXP_PHYST
TL1005235	ETL - Purchase irradiation testing hardware for ETROC3	28-Jul-22	25-Aug-22	21d	0h	0h	$1,127.00	FN	FN	M3	c_FN_MS_STND_FY19
TL1005225	ETL - Purchase testing hardware for ETROC3	28-Jul-22	17-Aug-22	15d	0h	0h	$28,175.00	FN	FN	M3	c_FN_MS_STND_FY19
TL1005195	Develop test board for ETROC3	18-Aug-22	17-Oct-22	42d	274h	0h	$0.00	FN	FN	L4	c_FNd_ELTN_DESIGN_EN, FN_U_PT_EXP_PHYST
TL1005635	E.FE.4 - ETROC3 submission (preproduction)		10-Oct-22	0d	0h	0h	$0.00				
TL1005675	ETL - T4 - ETL EDR		10-Oct-22	0d	0h	0h	$0.00				
TL1005185	Develop testing software and firmware for ETROC3	18-Oct-22	15-Nov-22	21d	180h	0h	$0.00	FN	FN	L4	c_FNd_ELTN_DESIGN_EN
TL1005245	Commission test-stand for ETROC3	16-Nov-22	16-Dec-22	21d	197h	0h	$0.00	FN	FN	L4	c_FNd_ELTN_DESIGN_EN, FN_U_PT_EXP_PHYST
TL1005255	ETL - T4 - Preproduction ETROC3 ready for submission		17-Nov-22	0d	0h	0h	$0.00				
TL1005295	Inspect and sort preproduction ETROC3	29-Mar-23	4-Apr-23	5d	0h	40h	$0.00	UN	UN	L4	CMS-HL_AVE_U_GRAD
TL1005305	ETL - T5 - Preproduction ETROC3 available for module preproduction prototyping - Batch 0		4-Apr-23	0d	0h	0h	$0.00				
TL1005325	Perform initial functionality tests of preproduction ETROC3 - FNAL	5-Apr-23	2-May-23	20d	397h	0h	$0.00	FN	FN	L4	c_FNd_ASIC_DESIGN_EN, FN_U_PT_EXP_PHYST, c_FNd_ELTN_DESIGN_EN
TL1008865	Perform initial functionality tests of preproduction ETROC3 - SMU	5-Apr-23	2-May-23	20d	0h	140h	$0.00	FN	SM	L4	CMS-HL_FN_SM_P_PHYS_ASIC_DES, CMS-HL_FN_SM_P_PHYS_GRAD_STUD
TL1009845	Perform initial functionality tests of preproduction ETROC3 waveform sampling - SMU	5-Apr-23	2-May-23	20d	0h	160h	$0.00	FN	SM	L4	CMS-HL_FN_SM_P_ENG_GRAD_STUD
TL1010005	Perform initial functionality tests of preproduction ETROC3 - FNAL (COVID2)	5-Apr-23	2-May-23	20d	240h	0h	$0.00	FN	FN	L4	c_FNn_ENGNRING_PHYST
TL1005345	ETROC3 SEU testing (irradiation) - FNAL	3-May-23	28-Jun-23	40d	160h	0h	$0.00	FN	FN	L4	FN_U_PT_EXP_RA
TL1005335	ETROC3 TID testing (irradiation) - FNAL	3-May-23	28-Jun-23	40d	320h	0h	$0.00	FN	FN	L4	FN_U_PT_EXP_RA
TL1008945	ETROC3 SEU testing (irradiation) - SMU	3-May-23	28-Jun-23	40d	0h	0h	$0.00	FN	SM	L4	CMS-HL_FN_SM_P_PHYS_GRAD_STUD
TL1008955	ETROC3 TID testing (irradiation) - SMU	3-May-23	28-Jun-23	40d	0h	0h	$0.00	FN	SM	L4	CMS-HL_FN_SM_P_PHYS_GRAD_STUD
TL1009355	Perform final functionality tests of preproduction ETROC3 - FNAL	3-May-23	31-May-23	20d	397h	0h	$0.00	FN	FN	L4	c_FNd_ASIC_DESIGN_EN, FN_U_PT_EXP_PHYST, c_FNd_ELTN_DESIGN_EN
TL1009365	Perform final functionality tests of preproduction ETROC3 - SMU	3-May-23	31-May-23	20d	0h	140h	$0.00	FN	SM	L4	CMS-HL_FN_SM_P_PHYS_ASIC_DES, CMS-HL_FN_SM_P_PHYS_GRAD_STUD
TL1009855	Perform final functionality tests of preproduction ETROC3 waveform sampling - SMU	3-May-23	31-May-23	20d	0h	160h	$0.00	FN	SM	L4	CMS-HL_FN_SM_P_ENG_GRAD_STUD
TL1010015	ETROC3 SEU testing (irradiation) - FNAL (COVID2)	3-May-23	28-Jun-23	40d	160h	0h	$0.00	FN	FN	L4	c_FNn_ENGNRING_PHYST
TL1010025	ETROC3 TID testing (irradiation) - FNAL (COVID2)	3-May-23	28-Jun-23	40d	320h	0h	$0.00	FN	FN	L4	c_FNn_ENGNRING_PHYST
TL1010035	Perform final functionality tests of preproduction ETROC3 - FNAL (COVID2)	3-May-23	31-May-23	20d	240h	0h	$0.00	FN	FN	L4	c_FNn_ENGNRING_PHYST
TL1007575	ETL - T4 - Preproduction ETROC3 chip level testing results ready		28-Jun-23	0d	0h	0h	$0.00				
TL1007585	ETL - T4 - Preproduction module with ETROC3 ready for system testing		28-Jun-23	0d	0h	0h	$0.00				
TL1007595	ETL - T4 - Service hybrid available for system testing with ETROC3		28-Jun-23	0d	0h	0h	$0.00				
TL1007605	ETL - T4 - Backend available for system testing with ETROC3		28-Jun-23	0d	0h	0h	$0.00				
TL1007615	System testing with preproduction ETROC3 - FNAL	29-Jun-23	24-Aug-23	40d	640h	0h	$0.00	FN	FN	L4	FN_U_PT_EXP_RA, c_FNd_ELTN_DESIGN_EN
TL1005645	E.FE.5 - ETROC3 ready for production		21-Jul-23	0d	0h	0h	$0.00				
TL1005355	Evaluate results of system testing with preproduction ETROC3	25-Aug-23	31-Aug-23	5d	180h	0h	$0.00	FN	FN	L4	FN_U_PT_EXP_RA, c_FNd_ELTN_DESIGN_EN
TL1005365	ETL - T4 - Preproduction ETROC3 testing results available		31-Aug-23	0d	0h	0h	$0.00				
TL1005375	Conduct ETROC3 production readiness review	5-Sep-23	5-Sep-23	1d	8h	0h	$0.00	FN	FN	L4	FN_U_PT_EXP_PHYST
TL1005385	ETL - T4 - ETROC3 production readiness review done		5-Sep-23	0d	0h	0h	$0.00				
TL1005395	ETL - T5 - Frontend ETROC3 development done		5-Sep-23	0d	0h	0h	$0.00				
TL1005435	ETL - Specify QC test requirements for production ETROC3 - FNAL	6-Sep-23	19-Sep-23	10d	276h	0h	$0.00	FN	FN	L4	FN_U_PT_EXP_PHYST, c_FNd_ASIC_DESIGN_EN, c_FNd_ELTN_DESIGN_EN
TL1005445	ETL - T4 - Production ETROC3 ready for submission		6-Sep-23	0d	0h	0h	$0.00				

We have specified activities for testing the pre-production ETROC3 (chip level and system testing)

These testing procedures would form the basis for the QA/QC tests

Pre-production ETROC to handed over to the ETL-Assembly for module-level testing

ETROC QA/QC

TL1005445	ETL - T4 - Production ETROC3 ready for submission		6-Sep-23	0d	0h	0h	$0.00				
TL1005405	ETL - Prepare purchase order for production ETROC3	6-Sep-23	3-Oct-23	20d	16h	0h	$0.00	FN	FN	L4	c_FNd_ASIC_DESIGN_EN
TL1008875	ETL - Specify QC test requirements for production ETROC3 - SMU	6-Sep-23	19-Sep-23	10d	0h	40h	$0.00	FN	SM	L4	CMS-HL_FN_SM_P_PHYS_ASIC_DES, CMS-HL_FN_SM_P_PHYS_GRAD_STUD
TL1010045	ETL - Specify QC test requirements for production ETROC3 - FNAL (COVID2)	6-Sep-23	19-Sep-23	10d	40h	0h	$0.00	FN	FN	L4	c_FNn_ENGNRING_PHYST
TL1005465	ETL - Purchase QC testing hardware for production ETROC3	20-Sep-23	10-Oct-23	15d	0h	0h	$5,801.67	FN	FN	M3	c_FN_MS_STND_FY19
TL1005425	ETL - Develop database interface	20-Sep-23	16-Nov-23	42d	202h	0h	$0.00	FN	FN	L4	FN_U_PT_EXP_RA, FN_U_PT_EXP_PHYST
TL1005455	ETL - SVT - Vendor fabricates production ETROC3	5-Oct-23	8-Feb-24	84d	0h	0h	$0.00	FN	FN		
TL1005475	ETL - Update QC test software for production ETROC3	11-Oct-23	8-Nov-23	21d	0h	168h	$0.00	UN	UN	L4	CMS-HL_AVE_U_POSTDOC
TL1005485	ETL - Update QC test firmware for production ETROC3 - FNAL	11-Oct-23	8-Nov-23	21d	240h	80h	$0.00	FN	FN	L4	c_FNd_ELTN_DESIGN_EN
TL1007625	ETL - T4 - ETROC QC testing procedures ready		8-Nov-23	0d	0h	0h	$0.00				
TL1005655	E.FE.6 - ETROC3 ready for module production		11-Jan-24	0d	0h	0h	$0.00				
TL1005515	ETL - Receive production ETROC3 [CORE]	9-Feb-24	9-Feb-24	1d	0h	0h	$1,039,509.90	FN	FN	M3	FN_MS_EXMP_FY19
TL1005525	ETL - Inspect and sort production ETROC3	12-Feb-24	16-Feb-24	5d	0h	76h	$0.00	UN	UN	L4	CMS-HL_AVE_U_GRAD
TL1005535	ETL - QC and sort production ETROC3 - Batch 1	19-Feb-24	22-Mar-24	25d	0h	200h	$0.00	UN	UN	L4	CMS-HL_AVE_U_GRAD
TL1005545	ETL - Ship production ETROC3 to bump bonding vendor - Batch 1	25-Mar-24	5-Apr-24	10d	0h	16h	$0.00	UN	UN	L4	CMS-HL_AVE_U_GRAD
TL1005555	ETL - QC and sort production ETROC3 - Batch 2	25-Mar-24	26-Apr-24	25d	0h	200h	$0.00	UN	UN	L4	CMS-HL_AVE_U_GRAD
TL1005547	ETL - Ship production ETROC3 to bump bonding vendor - Batch 1 (M&S)	25-Mar-24	25-Mar-24	1d	0h	0h	$1,172.60	FN	FN	M3	c_FN_MS_STND_FY19
TL1005735	ETL - T4 - ETROC3 batch 1 available for module production		5-Apr-24	0d	0h	0h	$0.00				
TL1005565	ETL - QC and sort production ETROC3 - Batch 3	29-Apr-24	3-Jun-24	25d	0h	200h	$0.00	UN	UN	L4	CMS-HL_AVE_U_GRAD
TL1005575	ETL - Ship production ETROC3 to bump bonding vendor - Batch 2	29-Apr-24	10-May-24	10d	0h	16h	$0.00	UN	UN	L4	CMS-HL_AVE_U_GRAD
TL1005577	ETL - Ship production ETROC3 to bump bonding vendor - Batch 2 (M&S)	29-Apr-24	29-Apr-24	1d	0h	0h	$1,172.60	FN	FN	M3	c_FN_MS_STND_FY19
TL1005585	ETL - Ship production ETROC3 to bump bonding vendor - Batch 3	4-Jun-24	17-Jun-24	10d	0h	16h	$0.00	UN	UN	L4	CMS-HL_AVE_U_GRAD
TL1005595	ETL - QC and sort production ETROC3 - Batch 4	4-Jun-24	9-Jul-24	25d	0h	200h	$0.00	UN	UN	L4	CMS-HL_AVE_U_GRAD
TL1005597	ETL - Ship production ETROC3 to bump bonding vendor - Batch 3 (M&S)	4-Jun-24	4-Jun-24	1d	0h	0h	$1,172.60	FN	FN	M3	c_FN_MS_STND_FY19
TL1005605	ETL - Ship production ETROC3 to bump bonding vendor - Batch 4	10-Jul-24	23-Jul-24	10d	0h	16h	$0.00	UN	UN	L4	CMS-HL_AVE_U_GRAD
TL1005607	ETL - Ship production ETROC3 to bump bonding vendor - Batch 4 (M&S)	10-Jul-24	10-Jul-24	1d	0h	0h	$1,172.60	FN	FN	M3	c_FN_MS_STND_FY19
TL1005615	ETL - T4 - ETROC Production Complete		23-Jul-24	0d	0h	0h	$0.00				

Specify QC test requirements
Purchase QC testing hardware
Develop database
Update test software / firmware for QC testing

Testing development done by Engineers, Scientists, RA, Postdoc, Grad Students

Inspect / sort production ETROC3
Four batches:
    QC / sort
    Ship to bump bonding facility

Testing done by Grad Students