Project Update

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Interim Deputy Project Director
March 8, 2021

CMB-S4

Who Am I

- Senior scientist at LBNL
- Involved in scientific management and project management of DOE, NSF or both DOE/NSF projects for last 35 years
  - Superconducting Supercollider
  - ATLAS@LHC
  - DUSEL
  - LUX dark matter project
  - LZ dark matter project

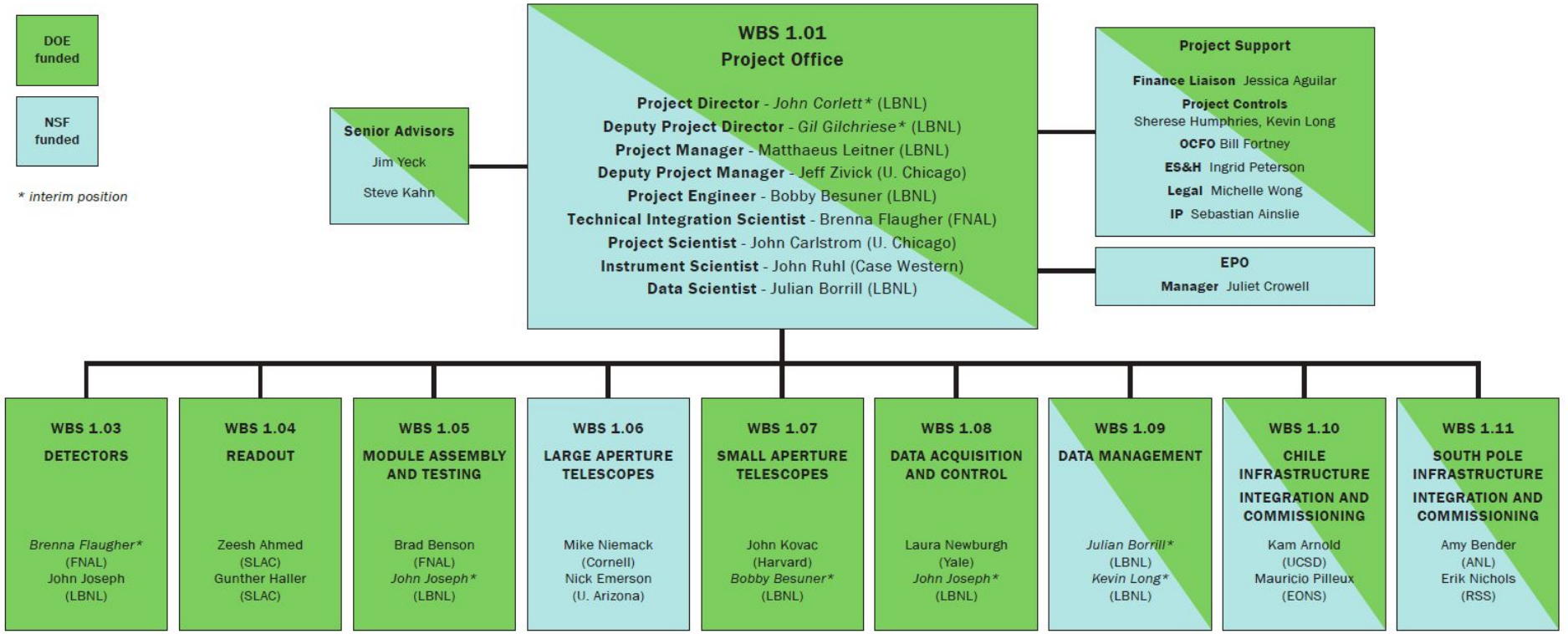
Outline

- Key Project Goals Over the Next Year
- Project Organization
- Design Review Plans
- Configuration Control Plans
- Cost & Schedule Update Plans
- Risk Update Plans
- MOUs/MOAs/SOWs
- Reporting
- Project Documentation
- Key Project Technical Issues
- Conclusion

Key Project Goals

- Obtain Funding
  - DOE
    - Have $5M(FY21) + carry-forward from FY20. Distributing.
    - Made FY22 request. Overall DOE->SC->OHEP->CMB-S4 funding not known. Stimulus?
  - NSF
    - MSIP & MSRI-1 support ongoing work through FY21
    - Proposals to support FY22 and beyond to be submitted before FY21 ends
- Complete Status and Gate Reviews
  - NSF-led MRSI-1 status review by about mid-May. Received charge, working on agenda. Tentative dates May 11-12
  - DOE-led status review? Not decided but probable in summer.
  - NSF Preliminary Design Review - CRITICAL milestone. End of CY21? Plan on this now.
  - DOE Critical Decision 1(CD-1) Review - CRITICAL milestone. End of CY21? Challenging.
  - Director's Reviews will precede(by 6 weeks or so) DOE status, PDR and CD-1 reviews
- Make Technical Progress
  - Principal subject of this collaboration meeting

CMB-S4 Integrated Project Office



Date: 02 / 23 / 2021

Approved: Corlett, John N

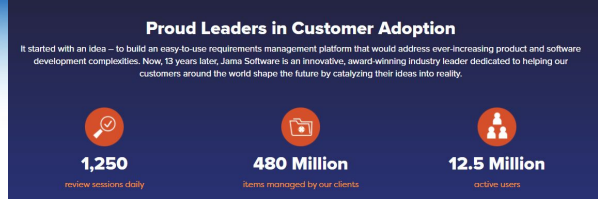
L2 under change control, approved by PD
L3 well advanced, expect approval this month

Upcoming Conceptual Design Reviews (CDRs)

L2	Review Scope	Date	(days)
Detectors	Detectors Design & Fab	6/22/21	2.5
Readout	Readout Design & Fab (Cryo)	6/16/21	2.5 total
	Readout Design & Fab (Cold/Warm)		
Module Ass'y & Test	Module hardware design	6/15/21	
	Module I&T plan		
LAT	SPLAT	5/6/21	1.5
	CHLAT		
	LATR	6/10/21	1.5
SAT	Mount	5/20/21	1.5
	Cryostat		
	Optics		
DAQ	DAQ	5/25/21	2.5 total
DM	DM	5/26/21	
Chile Infrastructure/I&C	Site infrastructure	5/13/21	1.5
	Instrument I&C		
South Pole Infrastructure/I&C	Site infrastructure		
	Instrument I&C		

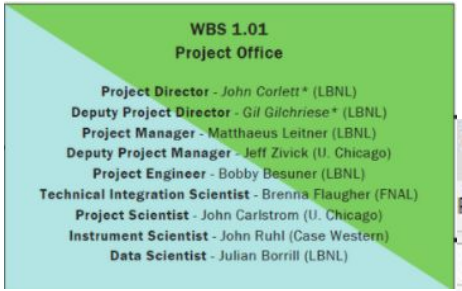
- Design Review Policy/Procedure at cmbs4-doc-673
  - Describes planning/execution/closeout
  - Describes Review Manager role
  - Includes timeline before and after review
  - References review report template
  - Includes suggested charge and content of review materials
- More description at recent Technical Meetings
- Questions? Ask R. Besuner

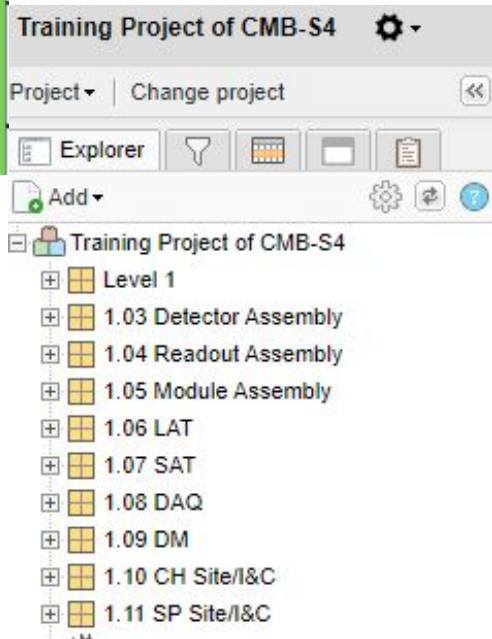
Configuration Control



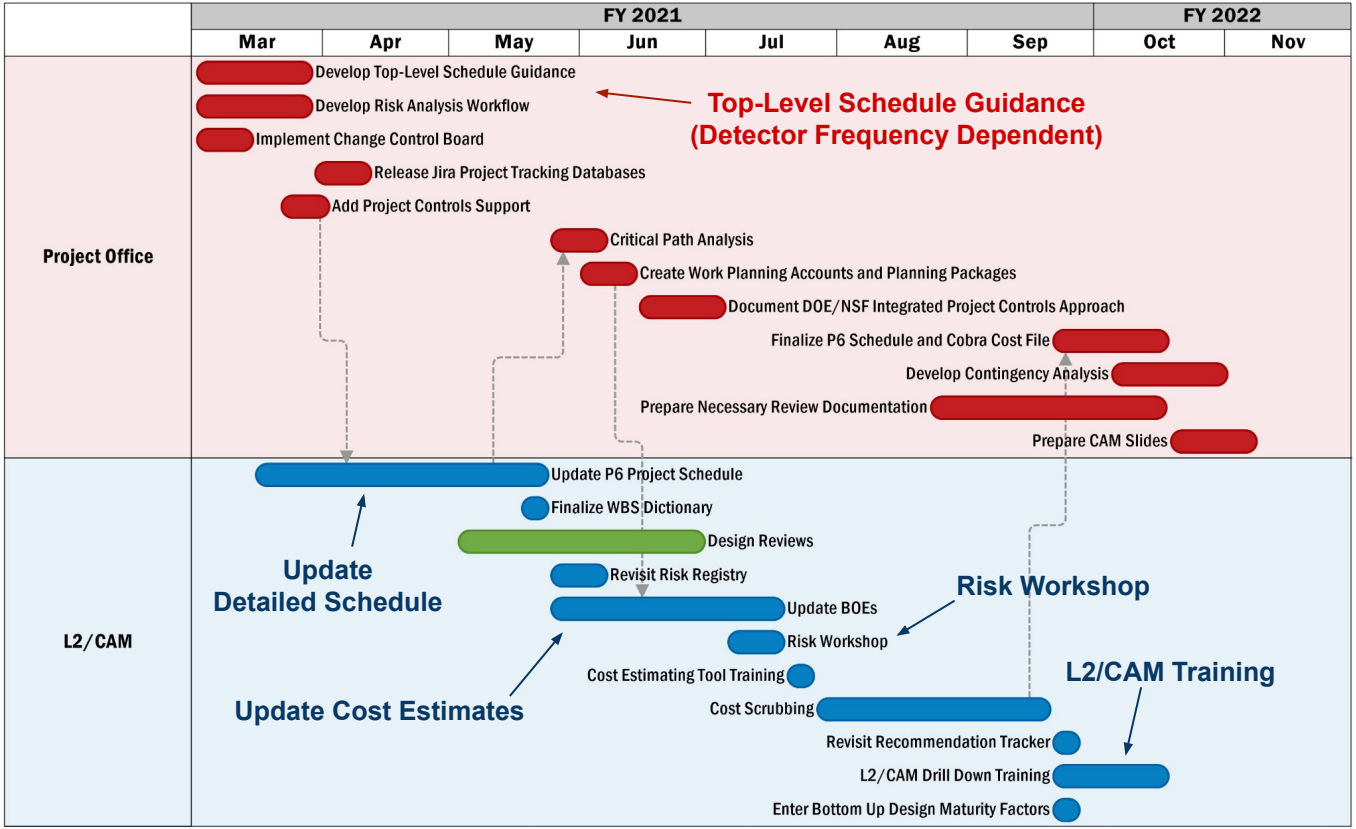
- In process of implementing database tool - JAMA - to capture requirements and point description(Current Best Estimate=CBE) in a controlled way
- JAMA training initiated
- Change Control Board(CCB) defined
- Begin monthly CCB meetings April 7
  - Start with top-level science requirements
  - Work “downward”
  - Ultimately capture CBE
  - Establish baseline and initiate Baseline Change Process
- Goals
  - Establish and exercise system prior to NSF-led status review
  - Preliminary baseline prior to NSF PDR and DOE CD-1
  - This will be challenging, but necessary this year

Questions? Ask
R. Besuner
J. Zvick
M. Leitner





Spring/Summer: Update Cost and Schedule Documents To Prepare For Potential Reviews By End of CY2021



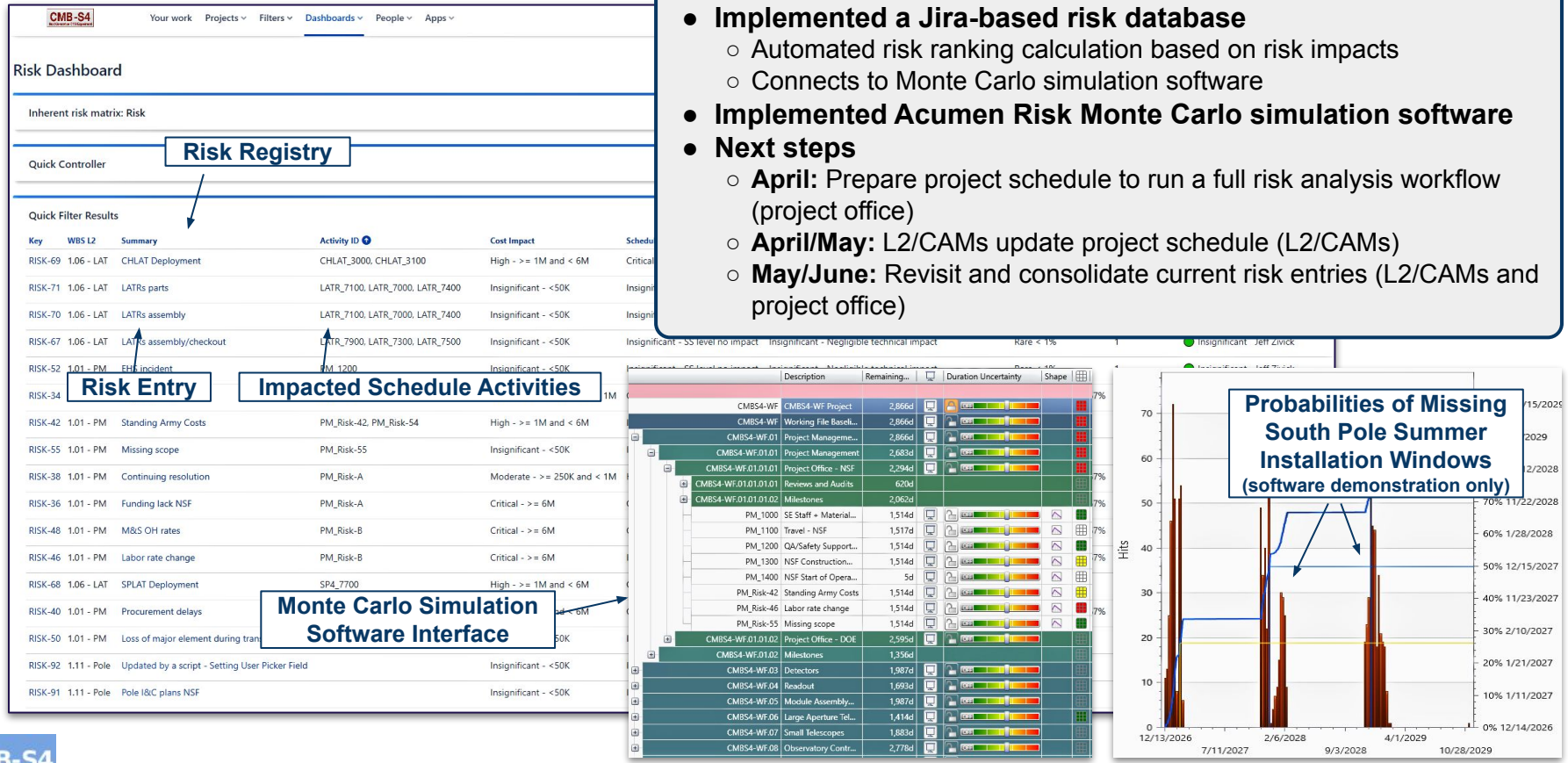
- **May:** NSF Progress Review
  - Top-Level Schedule Defined
  - Risk Analysis Software Implemented
  - Schedule Logic Improved
- **April/May:** L2/CAMs Update Project Detail Schedule
- **May/June:** L2/CAMs Update Cost Estimates
- **July:** Risk Workshop
- **Aug/Sept:** Cost Validation

Schedule likely to be tweaked to match actual agency review schedule

Questions? Ask M. Leitner, J. Zivick

A Risk Registry Database Linked To Monte Carlo Analysis Software Will Establish NSF and DOE Contingency Requirements

- **Implemented a Jira-based risk database**
  - Automated risk ranking calculation based on risk impacts
  - Connects to Monte Carlo simulation software
- **Implemented Acumen Risk Monte Carlo simulation software**
- **Next steps**
  - **April:** Prepare project schedule to run a full risk analysis workflow (project office)
  - **April/May:** L2/CAMs update project schedule (L2/CAMs)
  - **May/June:** Revisit and consolidate current risk entries (L2/CAMs and project office)



MOUs/MOAs/SOWs

MOU: Memorandum of Understanding
MOA: Memorandum of Agreement
SOW: Statement of Work

- MOUs(standard format) with LBNL
  - Framework for potential in-kind contributions to CMB-S4
    - Harvard-Smithsonian: signed
    - CCAT Prime Observatory, Inc: in progress
  - Legal framework for work in Chile. U of Chicago: in progress
- MOAs(bespoke format)
  - Detector fab sites + Intellectual Property Management: NIST concluded, rest in progress
  - Institutional MOAs(signed once) + FY Appendix(update each FY): all institutions receiving funds from LBNL. In progress over next few months
- SOWs
  - Key part of contracts between LBNL and DOE funded institutions
  - In progress. Driven by agreeing on technical scope and getting procurement entities engaged at LBNL(new person helping, Jessica Aguilar) and at each institution

Questions? Ask M. Gilchriese(MOUs/MOAs)
M. Leitner(SOWs)

Reporting

- Regular reporting to the NSF and DOE began months ago
  - DOE
  - NSF
- Quality and detail of DOE and NSF reports expected to improve as designs mature, test results come in, etc

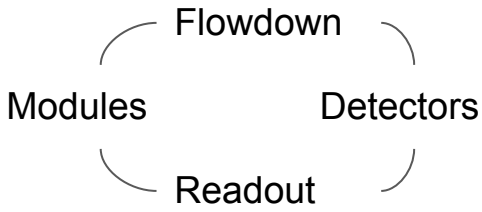
- Financial reporting (specifically for the DOE but similar for NSF)
  - Required monthly from all institutions that receive funding
  - Experience suggests will be painful initially but it's essential
  - Down the road will feed into EVMS systems
  - Please respect this reporting need

Project Documentation Update

- Policy and procedures for using CMB-S4's official document repository, DocDB, is posted to cmbs4-doc-664. Accessible using your CMB-S4 credentials.
- Project Configuration Management Plan, defining approval and revision processes for project documentation is posted to cmbs4-doc-238.
- Technical requirements are loaded to management tool, Jama.
  - Still a lot of work required to update and approve requirements and interfaces.
- Project Design Review Policy and Procedures posted to cmbs4-doc-673.
  - L2 Conceptual Design Reviews scheduled for May and June (dates listed here)
  - Review Recommendations tracked in this google sheet
- Meeting materials and links to relevant information are in Confluence.
- Project CAD Policy and Procedures posted to cmbs4-doc-661.

Key Project Technical Issues

- There are many, many design and technical issues to be addressed at this collaboration meeting
- Keys to moving forward with the Project are given below
- Scope. Is it right and can we, project management, defend it?
- Technical readiness => pass conceptual design reviews(or better)
- Cost containment. Cost growth at this stage of a project is a norm. Must keep costs(including risks) at forefront of technical development
  - Interplay among requirements flowdown, detectors, readout and modules
  - Manufacturability, minimize complexity of detectors/readout...think cheap



Meetings organized by B. Flaugher
Parallel sessions at this collab. mtg.

  - Other area of potential concern now: cost of working at the Pole, how accounted by NSF

Conclusions

- Substantial progress in developing the CMB-S4 Project structure since August 2020 when LBNL was designated as lead laboratory
- Project “machinery” now coming together and will be used to prepare for agency status and gate reviews later this year or early 2022
- Formal technical design reviews for all major elements to be completed by this summer
- Cost and schedule to be updated this summer
- Critical to advance Preliminary Baseline Design and related Report in time for upcoming reviews

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