Answers to Sept 11 Questions

- 1. Descope/upscope items - please provide both preferred/ scheduled and need-by dates...

Answers to Sept 11 Questions

- 2. Please provide a schedule of expiration of descope options throughout project. please focus on dates.

Answers to Sept 11 Questions

- 3. Provide top 5 risks in rank order (worst->least) for each major subsystem.

Answers to Sept 11 Questions

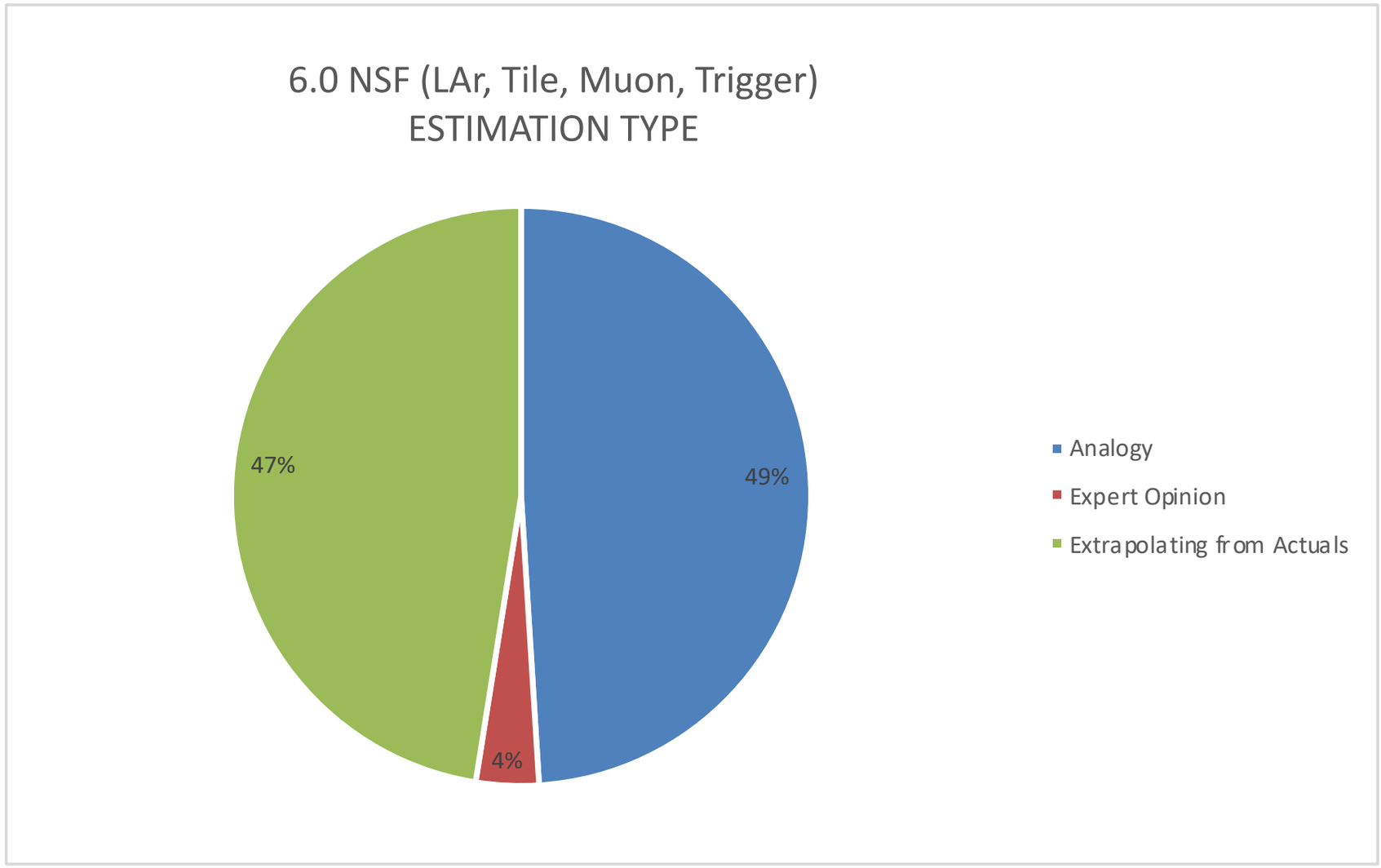
- 3. Provide top 5 risks in rank order (worst->least) for each major subsystem.
  - Tile:
    - Cost scores for Tile all at 1(Low); Schedule score up to 3(Med)
      - Reasonable responses for all
    - RN-06-05-04-005: (120) delay in receiving LV box parts from collaborator
    - RN-06-05-03-003: (90) ELMBMB production yield lower than expected
    - RN-06-05-01-003: (60) radiation certified MB component no longer avail.
    - RN-06-05-04-001: (60) LV brick redesign due to unavailable component
    - RN-06-05-03-001: (60) ELMB2 potential delays due to CERN board production

Answers to Sept 11 Questions

- 4. Please provide a rank-ordered list of remaining work packages (in the pre-MREFC project) - what are you most concerned about? Please mention your “plan B's”.

Answers to Sept 11 Questions

- 5. Please provide the total project BOE distribution - pie chart format.



Answers to Sept 11 Questions

- 6. Columbia mgt decision to implement 30 subawards generates a cost impact ~$186k ... was this to support EV reporting? What did the project gain from this change?
  - This is to further increase robustness of accounting: for example, Chicago is committed to three deliverables:
    - Tile Main Board
    - Trigger HTT (TFM)
    - Trigger Global Algorithm (Hadronic Event Reconstruction)
  - With one sub award, we would have received one monthly invoice from Chicago, with three, we will get one invoice per deliverable

Answers to Sept 11 Questions

- 7. What risks are being carried forward by the project by the (aggressive?) scheduled downselect of the ADC in December? e.g. radiation tolerance of the ADC ASIC version 3? Please clarify statement on radiation tolerance of commercial ADC option.

Answers to Sept 11 Questions

- 8. What is the schedule risk of the late delivery of the production version of lpGBT?

Answers to Sept 11 Questions

- 9. Please restate/clarify Scientific travel – where is it covered in the MREFC award? Suggest: please produce List of significant things not in there yet.... don't let us find them.
  - To our knowledge, nothing is missing from the RLS
  - We will NOT cover any scientific personnel travel during MREFC
    - Segregation of funding makes that very complex
    - For this review, we are supporting people, from operations funding, which has very broad mandate

Answers to Sept 11 Questions

- 10. For each subsystem - what are the (5) major technical requirements, and what is your assessment of your ability to meet them (and what is the basis of that assessment?). Please trace one major science/technical specification from the international ATLAS specification, through your US ATLAS specification set, indicate where addressed in design, and demonstrate how you intend to assess compliance.

Answers to Sept 11 Questions

- 5 major Tile specs:
  - 6.5.1 Main Board (iATLAS spec doc in EDMS)
    - Serialize data at 560 MHz
    - Digitize with noise <= 3 ADC counts
    - Radiation tolerance to ATLAS simulations
  - 6.5.3 and 6.5.4 LVPS (iATLAS spec doc in EDMS)
    - Provide +10V (acceptable range 8-16 v) to main Board
    - Radiation tolerance to ATLAS simulations
- Compliance:
  - 6.5.1:
    - all functionality demonstrated in prototype tests
    - Radiation certification for all components expect 2 replacements (retesting now)
  - 6.5.3,6.5.4:
    - All functionality demonstrated in prototype tests
    - Radiation re-testing in progress on replacement components

Answers to Sept 11 Questions

- 11. Please describe the connections between the EPO manager, the L2 managers, and the EPO proponents at the partner universities. How is communication/coordination occuring between these groups? How specifically will the project take advantage of community initiatives like QUARKNET? Give examples of joint activities being considered.

Answers to Sept 11 Questions

- 12. How exposed is the US project to CERN Project Management uncertainties in schedule? If CERN schedule drifts across many subsystems, could the US project be negatively impacted beyond current expectations?
  - Two cases:
    - Schedule shifts in deliverables US project depends on
    - Overall CERN schedule shift

External Dependencies

- The L3 talks have slide(s) on external dependencies where they exist, quick summary:

WBS		Collaborator components	Comments				
6.4.1	FE Electronics						
6.4.2	FEB2	lpGBT, VL+	Prod start 1/2023, 40k/all lpGBT available end 2021/mid-2022				
6.4.3	BE Electronics						
6.5.1	Main Board						
6.5.3	ELMB MB	ELMB2 spec	Available				
6.5.4	LVPS						
6.6.1	sMDT						
6.6.3	TDC						
6.6.4	CSM	lpGBT, VL+, GBT-SCA, (FEAST)	Prod start 1/2021, CSM has 390 days of float				
6.6.5	L0MDT						
6.8.1	L0Calo						
6.8.2	HTT						
6.8.3	Global Event Processor						

  - lpGBT is latest to arrive, likely to impact CSM, but current version good enough for all work until production
    - First CSMs needed in early 2024, so minimal impact

Overall Schedule Shift

- This Fall, meetings to discuss need for shift in LS3
  - All indications are LS3 may be delayed by one year (schedules very tight for some ATLAS and CMS deliverables, significant risk realized for accelerator)
  - Decision should be announced November 27
  - If LS3 is delayed, float increases by one year
    - It is our intention to move forward as planned, staying with our baseline
    - However, we are all human, and float increase will affect our approach
  - To address this, have added a “CERN delay” risk

Overall Schedule Shift

- CERN delay risk?
  - To estimate the impact of a CERN delay risk, can look at Phase-I, as LS2 was delayed by 6 months **after** we baselined
    - Both NSF and DOE Phase-I projects were governed by DOE 413.3b
  - In LAr in Phase-I, we used up all the CD-2 schedule contingency + the added amount from the LS2 delay
    - Available time influences decisions on how to address features found during integration
    - However, while we used up ~18 months of schedule float (in a 4 year project), we only used 9% contingency, of which 0 went to "standing army" costs, but maybe 2% can be assigned to extra checks we would not have done if the extra 6 months had not been available
  - In TDAQ in Phase-I, similar situation
    - Of ~25% contingency drawn, none to "standing army" but maybe ~2-7% can be linked to extra time available
- We have added a risk with cost impact 2-7% of $55M base cost, moderate probability (i.e. 63% in simulation), now our biggest risk