

Panel questions for Friday

1. The panel would like to see the data used to make the pie charts of population by season, as shown in Ian's presentation.

Answer:

All on-ice labor is captured in population profile. This is the file that was used for the pie charts. The updated file is linked below:

https://docushare.icecube.wisc.edu/dsweb/Get/Document-89827/ICU_population_master_spreadsheet_v110521.xlsx

Detail of the driller labor is captured in WBS 1.2.8 and data is provided in this file:

<https://docushare.icecube.wisc.edu/dsweb/Get/Document-89823/Population%20Profile%20Formatted%20Hourly%20per%20Season%20Data.xlsx>

The installation (instruments and cables) and testing labor is either in kind or is on project; it is captured in the population profile. Management labor is captured in the cost workbook in WBS 1.1 and is in the population file as well.

Management labor is cross-trained in on-ice activities: drill refit and testing, instrumentation testing and installation. They will participate in all activities as part of the on-ice crew. The organization charts shown are meant to illustrate lines of responsibility and authority. On ice, the organization is very flat and all crew are hands-on all the time. This is the model that was used during Gen1 and proved to be very effective and efficient. IceCube Upgrade will follow exactly the same model.

2. This morning it was said that IceCube is planning a bottom-up reassessment of project risk, and shipping and logistics risk is a subset of that. IC said they are not prepared to share that yet as it is going through quite a bit of revision. What are the potential impacts of this planned revision on the cargo plan that was presented today?

Answer:

We do not anticipate that the cargo plan and methodology will change as a result of the bottom-up project risk assessment. The cargo shipping schedule that was shown is based on an assumed 7-year project schedule. The 7-year plan has schedule risks due to many ongoing factors, e.g. trucking. Therefore, cargo shipping schedule may change as a result of overall project schedule risk assessment, which will include risks associated with external factors.

The cargo planning methodology is robust and flexible and integrated with the contractor logistics methodology. It allows the project to refine and adjust the cargo plan to any set of external project risks. At this time the cargo shipping schedule is based on an assumed project schedule that is not approved and is not optimized. As a result, some items appear to have insufficient float between the time of completion and time of shipping from the point of origin. This is being worked as part of schedule optimization. Updated master cargo spreadsheet with mitigation strategy is linked below. :

https://docushare.icecube.wisc.edu/dsweb/Get/Document-89826/ICU_cargo_master_spreadsheet_v110521.xlsx

There may be additional risk identified that might require more effort to mitigate for example by putting in more schedule contingency for cargo movement, or by extending crew stays or by having trained alternate crew members available to deploy. Extending stays or bringing in additional crew might enable some delayed tasks to be completed if there was time in the constrained summer season and billets available. Another possibility is that we could establish stronger stretch goals to be accomplished by extending stays. That way, we could further mitigate delays due to cargo issues or other factors that could negatively impact the completion of on-ice tasks with the possibility of reducing risk for the subsequent season if some or all of the stretch goals were met.

The main project risks at this time are cancellation of next field season 2022-23 and the impact it may have on our partners who are providing nearly all in-ice components as in-kind contributions. While the recovery from cancellation of a field season would involve further delay in schedule beyond two years, mitigation of its impact requires fixing a schedule for field seasons as quickly as possible.

3. Please provide a Gantt schedule showing all open activities to complete between now and shipping, down to the WBS 3 level that shows dependencies/predecessors/successors and reserves. Please identify those elements known to be higher risk along with a short synopsis and plans to mitigate for each. If not evident, please identify critical paths.

Answer:

Gantt chart to level 3 has been uploaded. It is not very informative as it shows all horizontal lines. It may be better to look at short-float items in the Cargo Spreadsheet. We have added explanation of mitigations for all items with float of less than 1 month to the document.

The project critical path runs directly through 3 field seasons. See Gantt chart provided for critical path.
<https://docushare.icecube.wisc.edu/dsweb/Get/Document-89836/Critical%20Path%20On%20Ice%2020211104.pdf>

Gantt charts for each field season in detail have also been added.

https://docushare.icecube.wisc.edu/dsweb/Get/Document-89837/FieldSeason_1_Gantt.pdf

https://docushare.icecube.wisc.edu/dsweb/Get/Document-89838/FieldSeason_2_Gantt.pdf

https://docushare.icecube.wisc.edu/dsweb/Get/Document-89839/FieldSeason_3_Gantt.pdf

Smartsheet does not support predecessors/successors for Gantt view.

4. Please provide the resource allocation output from SmartSheet that supports the activities shown in the provided GANTT charts.

Answer:

Resource allocation for 7-year plan provided. It must be noted that the 7-year schedule is not an approved project schedule and is not fully optimized. It was developed as a part of cost estimation exercises for various scenarios.

<https://docushare.icecube.wisc.edu/dsweb/Get/Document-89822/Cost%20Workbook%20snapshot%2020211104%201920.xlsx>

5. What criteria is provided for relocation of a planned hole in the event of debris blockage?

Answer:

Moving individual hole X,Y positions by even up to approximately 5 m does not impact the operation of the array. Beyond 5 m, the project would need to analyze Monte Carlo simulations of the detector. There are two considerations: first, this requires another GPR scan as the first run did not provide the level of precision required to make informed decisions on hole placement. Second, the final placement of the holes will be determined by firm drilling during the FS2. We have budgeted 4 extra firm holes to handle this risk.

Criteria include:

- Distance from neighboring strings, in particular IceCube / DeepCore string 36
- Minimum distance of 15 m to neighboring string
- Low probability of hard/metal objects
- We will make a list of alternate locations once precise GPR data is available