



To: Mike Wilking & Ram Maramara
From: LBNF/DUNE-US Near Detector Subproject
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Internal Assessment of ND the PRISM Integrated Systems Designs with Subject Matter Experts (SMEs)

The PRISM movement system is a vital and unique component of the DUNE Near Detector that directly impacts installation processes, two detector systems (ND-LAr and TMS), and DUNE's competitiveness in leading game-changing neutrino physics. It is a capability that has never before been realized in a neutrino experiment. Given this, we ask that you please work with SMEs to complete an initial assessment of our near detector PRISM integrated system design plans by considering similar systems that have already taken place in other applications. This is important input to confirming the LBNF/DUNE-US Near Detector Subproject's technology choice and proposed risk mitigation strategies. Specifically, we ask that you please address the following charge questions for our current baseline design.

Charge questions:

- **Requirements:**

- Are the system requirements well defined and verifiable?
- Are the system requirements reasonable and achievable? Specifically:
 - Is the flatness of the rails that DUNE Near Site Conventional Facilities committed to consistent with other comparable systems?
 - Is the straightness of the rails that DUNE Near Site Conventional Facilities committed to consistent with other comparable systems?
 - Is the specified maximum lateral load imposed on the rails properly assessed?
- Are there any requirements not being considered that should be included?

- **Design:**

- Does the design meet the requirements?
- Have all relevant loading scenarios been considered?
- Does the roller + pad solution provide sufficient flexibility to accommodate both vertical and horizontal tolerances?
 - Do you foresee any technical, reliability, or operational challenges for the

implementation of this solution?

- Given the flexibility provided by the pads, is the approach to equip each roller with cams sufficient for steering?
- **Risks:**
 - Are there potentially impactful risks that have not been identified that should be considered?
- **Test plans**
 - Is the test plan deficient in any key areas?
 - Are there elements in the test plan that are not necessary?
 - Does the test plan address:
 - Risks that the PRISM system will become inoperable?
 - Risks that the PRISM system will be inoperable due to a guiding issue? (e.g. jamming or binding?)
 - Risks with respect to motors synchronization?
 - Risks with respect to mounting/integration?
 - Risks with respect to reliability?
 - Risks with respect to serviceability?
- **Alternate Options**
 - Is the alternatives analysis sufficient, including the down-select methodology?

Thank you,

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