Meeting Notes:

1. Overview of Controls needs
   1. Presented the powerpoint slides found in our Indico area at <https://indico.fnal.gov/conferenceDisplay.py?confId=5219>.
   2. Mu2e Costing Documents are also located at the above link.
   3. Did a quick overview of the beam path and requirements for both g-2 and Mu2e.  There is more detail in the slides for reference.
   4. Presented the site overview map (see attached) with g-2 and Mu2e service buildings.
2. The immediate need is to update the Mu2e costing BoE documents.
   1. Talked about the current time constrains in the need to complete CD1 before allocated funds can be opened.  Before CD1, we need to update our CDR and costing BoEs.   This needs to be done by March 16th, when these materials will be made available to the Director's Review panel.  And then after a successful Director's Review, there is the Lehman's review.
      1. Also in parallel, g-2 will be seeking their CD1 approval as well.
   2. Talked about the budgetary constraints and how much we can get away with sticking with old existing systems until future moneys allow us to complete the upgrades to such items as the HRMs and Network infrastructure.
      1. Accumulator is no longer used, so additional Camac crates and cards will become available.
      2. Controls would like to find a way to get the HRM and network upgrades completed.
         1. Controls wants to phase out Camac 290 cards as personnel to support them will become an issue.
         2. Booster correction elements use HRMs.
         3. Two MADCs can be replaced with one HRM.
      3. Jim M. suggested maybe using the existing Camac in the existing buildings and putting a HRM in the new g-2 and Mu2e buildings.
      4. We will be monitoring more items on the Camac abort than we were in Pbar.
         1. We can use spare patch panels and Camac 200 modules from the Accumulator as well as the Tevatron.
         2. We need to make a list to give to controls of which devices we will be monitoring at each building.
      5. If our costing is too high, however, the controls costs may have to be moved off project and paid for by other means.
3. Concerns:
   1. **Communication duct bank**:   Communication get to the Pbar/Muon buildings through a duct bank that goes from CUB, to the Pbar/Muon rings tunnel, to AP10.  From the site overview map, it appears that the g-2 and M4 lines will be built where the existing communication duct work runs.
      1. Costing will need to be determined for a new duct bank plus the cables inside.
         1. If we have to pull new cable, should pull singlemode as the cost is not much more.
      2. Greg Brown was not sure if the network fiber cables also ran through the same duct.
      3. *Greg Brown will research the cable duct bank path and provide some costing estimates.*
   2. **Communication Lines in Rad Areas**:  {Information expanded in post-talk discussions} In Mu2e operations, radiation levels in the tunnel enclosures are expected to be much higher than they were for Pbar operations.  As a general rule of thumb is to consider the future levels in the Pbar/Muon rings to be similar to that of Booster.  This brings up a couple of questions for controls?
      1. Does the existing controls communication path (links or ethernet) include tunnel runs that would be impacted by being in a higher radiation area?   The first thing that came to mind was the duct path from CUB to the Pbar/Muon rings, but we should also consider communication paths between the other buildings.
   3. **Controls for Extraction/Experimental Areas**:
      1. Controls for the experiments will need to be tied to the Debuncher.
      2. New cable will need to be pulled to get the Debuncher permit to the M4 lines, g-2 lines and the two experimental buildings.
      3. It is not clear if this costing has been considered by the experiments.
   4. **Recycler Beam Synch**:
      1. Some diagnostics may need RR beam synch.  However, we know we can use some current diagnostics such as BPMs and toroids to see 2.5MHz beam (Pbar extractions).
      2. Pulsed devices such as kickers will need Recycler beam synch clock.  Pbar/Muon buildings currently have MI beam synch but not RR beam synch.
      3. P1 and P2 lines will need to continue to have MI beam synch as long as SY120 remains in operations.
      4. Beam Synch Path:  (**Additional questions for controls**) We need to know what the MI beam synch path is to the Pbar/Muon buildings.  Can existing links that are MI beam synch just be switched over to RR beam synch?  Or do we have to pull new cable?  If cable pulls are needed, where will they need to be pulled?
4. **Immediate needs**:
   1. Have everyone look over the BoEs for their areas and provide updated cost estimates based on the changes in controls needs since they were written.
   2. Have everyone address the questions presented in the above concerns section.