Mu2e Status and Progress

D. Glenzinski, Fermilab
(on behalf of Mu2e)
All Experimenter’s Meeting
19 October 2015
Current Status

• Obtained CD-3a July 2014
  – Authorized fabrication of superconductor

• Obtained CD-2/3b March 2015
  – Baselined at $273.7M
  – 3b authorized fabrication of S-shaped transport solenoid and Mu2e experimental hall

• Aiming for CD-3c DOE review in May-June FY2016
  – Authorizes remaining construction
Mu2e Schedule

- **Superconductor R&D**
- **Fabricate and QA Superconductor**
- **Solenoid Design**
- **Solenoid Fabrication and QA**
- **Solenoid Infrastructure**
- **Solenoid Installation & Commissioning**
- **Detector Hall Design**
- **Detector Hall Construction**
- **Detector Construction**
- **Accelerator and Beamline**
- **Cosmic Tests**

**Schedule:**
- FY14
- FY15
- FY16
- FY17
- FY18
- FY19
- FY20
- FY21

**Produced:** February 2015

**Detector Operations**

**Beam line Commissioning**

**September 2015**

D.Glenzinski, Fermilab
Mu2e Construction Photos

- July 2015
  Concrete floor being poured

- August, 2015
  Forming walls

- September, 2015
  Lower level walls completed

• Steady progress being made
### Conductor Progress

<table>
<thead>
<tr>
<th>Component</th>
<th>Prototype Length</th>
<th>Production lengths needed for coil winding</th>
<th>Spare production lengths</th>
<th>Total Production Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport Solenoid (Hitachi)</td>
<td>3 x 1000 m</td>
<td>14 x 1540 m, 22 x 800 m</td>
<td>2 x 1540 m, 2 x 800 m</td>
<td>~ 44 km</td>
</tr>
<tr>
<td>Detector Solenoid 1 (Furukawa)</td>
<td>200 m</td>
<td>8 x 1100 m</td>
<td>1 x 1100 m</td>
<td>~ 10 km</td>
</tr>
<tr>
<td>Detector Solenoid 2 (Hitachi)</td>
<td>200 m</td>
<td>3 x 1750 m</td>
<td>1 x 1750 m</td>
<td>~ 7 km</td>
</tr>
<tr>
<td>Production Solenoid (Furukawa)</td>
<td>200 m</td>
<td>3 x 1700 m, 2 x 1300 m, 1 x 1500 m</td>
<td>3 x 1700 m</td>
<td>~ 14 km</td>
</tr>
</tbody>
</table>

- 4 types of conductor – total 75 km of Al-stabilized cable
- Production orders placed in summer 2014
Conductor Progress

- DS1 Cable completed, delivered
- DS2 Cable completed, shipped
- TS Cable
  - All 768 km of NbTi wire fabricated
  - About ½ Al-stablized cable fabricated
  - Should be done by end 2015
- PS Cable
  - Expect 100m first article soon
  - First deliveries spring 2016
- Meeting specs
• For TS, fundamental structural unit is a “module”
  – 27 modules total
  – Most contain 2 coils
• Prototype TS coil module provided in-kind by INFN & Univ. of Genova
TS Prototype Coil Module Tests

- Cold tested in Jun-Jul at CHL
- Met or exceeded specifications
- Construction Readiness Review in September
  - Recommended “Proceed with procurement”
CD-3c Simulation Campaign

- Utilizing significant off-site resources via OSG
  - Avg ~8k running, recently peaked 20k
  - 24M cpu-hours to date
- Have achieved x10 increase in simulation stats... pursuing “stretch” goal for some targeted samples
Independent Technical Reviews

- Internally-organized, Independent Technical Reviews (since CD-2 review at end of 2014)
  - Solenoid Oversight Cmte Jan 2015
  - Target Station Discussion Feb 2015
  - Mu2e Offline & Computing Mar 2015
  - Tracker Tech. Oversight Cmte Jun 2015
  - Calorimeter Jul 2015
  - Resonant Extraction Aug 2015
  - Tracker Tech. Oversight Cmte Aug 2015
  - PS/DS 50% Final Design Review Aug 2015
  - TS Construction Readiness Sep 2015
  - Cosmic Veto Tech. Oversight Cmte Sep 2015
  - Accel. Controls, Instrumentation, Beamline Oct 2015
  - Radiation Safety Oct 2015
  - Another 8 in Nov-Dec 2015
Summary

• Mu2e is making steady progress
  – Have in hand ~half the needed solenoid conductor, rest by end of 2016
  – Successfully tested prototype TS coil module... fabrication of production coils will begin soon
  – Experimental hall going smoothly
  – Enabled by significant off-site OSG resources, we have generated simulation samples with x10 statistics relative to TDR samples in preparation for spring CD-3c review
  – Collaboration meeting 7-10 Oct to discuss technical and simulation work remaining prior to CD-3c