Advanced Signal System (CBOSS PTC)

Updated Installation Work Plan

LPMG Meeting
March 27, 2014

Context
Caltrain Modernization Program

- ~$1.5 Billion
- Projects
  - Advanced Signal System (2015)
  - Corridor Electrification and Electric Multiple Units (2019)

Project Description

- Communications Based Overlay Signal System (CBOSS) Positive Train Control (PTC)
- Fiber Optic Network
- Project Requirements
  - Includes federal mandate (PTC)
  - Improves Caltrain performance
- Project Partners
  - FRA, UP, CHSRA, JPB
- Needed for Blended System
CBOSS PTC Requirements

- **PTC**
  - Prevent train to train collisions
  - Prevent over speed derailments
  - Prevent incursions into established work zones
  - Prevent movement through a misaligned switch
  - Interoperability

- **Caltrain**
  - Enhanced crossing safety / performance
  - Improved headways and operational flexibility
  - Enforcement of scheduled station stops
  - Schedule management
  - Employee In Charge

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Project Total Cost and Milestones

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost (in millions)</th>
<th>Milestones</th>
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</thead>
<tbody>
<tr>
<td>Project Planning and Procurement</td>
<td>$5</td>
<td>2010 - 2011</td>
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<tr>
<td>Phase 1 - Critical Design</td>
<td>$25</td>
<td>2012 – 2013</td>
</tr>
<tr>
<td>Phase 2 - Final Design, Data Communications Subsystem &amp; Fiber Backbone Installation</td>
<td>$51</td>
<td>2013 – 2014</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$231</strong></td>
<td></td>
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</tbody>
</table>
Updated Work Plan

3 Segments – South to North

Segment 3
SJ
Santa Clara (S of Lafayette St)

Segment 2
Santa Clara (N of Lafayette St)
Sunnyvale
Mountain View
Palo Alto
Menlo Park
Atherton
Redwood City
SBC
San Carlos
Belmont
San Mateo
San Bruno
SSF (S of Oyster Point)

Segment 1
SSF (N of Oyster Point)
Brisbane
SF

Segment 1 (SSF – SF) 8 Miles

Segment 2 (Santa Clara - SSF) 36 Miles

Segment 3 (San Jose - Santa Clara) 8 Miles
Updated Milestones (Entire Corridor)

Updated DCS Installation Schedule

- DCS Installation*
- Wayside Installation*
- BCCF Office Installation
- CCF Office Installation
- On-Board Installation

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
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<tbody>
<tr>
<td>Revenue Service (Oct 2015)</td>
<td></td>
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</table>

Work Complete to Date

- Fiber Installation Activities
  - Boring, trenching (lateral), pull boxes, conduit
  - Segment 3: 50% complete
  - Segment 2: 10% complete

- Wayside Installation
  - Modules installed at key system points
  - Associated gate activity
  - Segment 3: 70% complete
  - Segment 2: 10% complete

- On-board Equipment Installation
  - Staging started Feb. 10
Installation Pictures

Directional Boring

Hand Trenching near a Signal House

Installation Pictures

Unwinding inner-ducts off the wheel

Tie-in to Control Point Franklin
Installation Pictures

Installing new wires at the rear of the entry rack

Performing end of work ground verification test

Challenges

- Construction on an active railroad
- Customized local processes
- Maximizing productivity
  - Obstacles in boring path
  - Equipment damaged
Outreach

Outreach To Date

• Activities
  – CSCG (4 meetings)
  – LPMG (4 meetings)
  – One-on-one (each of the 17 cities/3 counties)
  – Community Groups, as requested (8 meetings)

• Communication tailored to location
  – Direct mailers, flyers stations
  – Website, social media, email, phone
  – City/County Staff coordination
Complaint Status (Over 6 months)

• Noise
  – 2 people

• Installation activities
  – Disturbed foliage on Caltrain ROW (apologized)
  – Mud tracked on side street (cleaned)
  – Grass damaged (repaired)

Next Steps

• Activities
  – Community Groups Meetings (as requested)

• Communication
  – Addition direct mailer residents
  – Website, social media, email, phone
  – Separate installation and testing notices

• City/County Staff coordination
Questions