Project Overview/Update:
Advanced Signal System
CBOSS PTC

Board of Directors
September 5, 2013
CBOSS PTC - What is it?

• Communications Based Overlay Signal System Positive Train Control
• Fiber Optic Network
• Project Requirements
  – Includes federal mandate (PTC)
  – Improves Caltrain performance
• Project Partners
  – Federal Railroad Administration, Union Pacific, California High-Speed Rail Authority
• 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
# Project Total Cost and Milestones

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost (in millions)</th>
<th>Milestones</th>
</tr>
</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>
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<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>
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</tbody>
</table>
Segments – South to North

Segment 1 (SSF – SF) 8 Miles

Segment 2 (Santa Clara - SSF) 36 Miles

Segment 3 (San Jose - Santa Clara) 8 Miles

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
San Mateo County
San Carlos
Belmont
San Mateo
San Bruno
SSF (S of Oyster Point)

Segment 1
SSF (N of Oyster Point)
Brisbane
SF
Installation Milestones (Entire Corridor)

- Data Communications Subsystem Installation*
- Data Communications Subsystem Testing
- Wayside Interface Units Installation*
- Backup Central Control Facility (BCCF) Office Installation
- Central Control Facility (CCF) Office Installation
- Onboard Installation
- Segment 3 CBOSS PTC Static, Dynamic, Pre-FRA & FRA Testing *
- Segments 2 & 1 CBOSS PTC Static & Dynamic Testing *
- Work Windows:
  - 8pm – 4 am weekday
  - 8pm – 6am weekend
  - Day work when possible

<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>Milestones</td>
<td></td>
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<td>Revenue Service (Oct 15)</td>
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</table>

6 Month Demonstration Testing
## Milestones (Example San Jose)

<table>
<thead>
<tr>
<th></th>
<th>Fall ‘13</th>
<th>Winter ‘13/14</th>
<th>Spring ‘14</th>
<th>Summer ‘14</th>
<th>Fall ‘14</th>
<th>Winter ‘14/15</th>
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<tbody>
<tr>
<td><strong>Data Communications Subsystem Installation</strong></td>
<td>Bore /Trench Three weeks</td>
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<td>Inner-Duct Two weeks</td>
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<td>Radio Frequency Base Two weeks</td>
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<td>Cable One week</td>
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<td>Stations</td>
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<tr>
<td><strong>Wayside Interface Units</strong></td>
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<td>Wayside Installation Eight weeks</td>
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<td><strong>Testing</strong></td>
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<td>Static Testing One week</td>
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<td>Data Communications Subsystem Test One week</td>
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<td>Dynamic Testing One week</td>
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<td>FRA Related Testing TBD</td>
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Fiber Installation

**Trench** (with mini excavator or by hand, within the Caltrain right of way)

**Conduit placed in trench** (~42” deep x 9.5” wide, within the Caltrain right of way)

**Potholing** (Vacuum-excavation preparing the job site, within the Caltrain right of way)
Fiber Installation continued

**Boring** (required at many crossings, within the Caltrain right of way)

**Conduit on tunnel or bridge** (clamps/hangers, may require lane closure during off-peak hours)
Base Station Installation

Pour foundation

Base station footprint

Example 80’ pole already on right of way
Base Station Map

Segment 1 (BS 01, TBS 4, 3, 2 and 1)

Segment 2 (BS 09 through BS03)

Segment 3 (BS 11, BS10)
Base Station Installation

- 14 Base Stations within the Caltrain right of way
  - Many near Caltrain stations
  - Located within the ROW in the following cities:
    - San Francisco (5)
    - Unincorporated San Mateo County
    - Brisbane
    - Palo Alto
    - Burlingame
    - Sunnyvale
    - San Mateo (2)
    - Santa Clara
    - San Jose

- 8 x 8 ft. shelter and 40-80 ft. poles
- Average two weeks installation per base station
Outreach

• Pro-active Approach
• Activities (March – August 2013)
  – City/County Staff Coordination Group (3 meetings)
  – Local Policy Maker Group (2 meetings)
    ▪ Next meeting follow-up on night work activities
  – One-on-one (each of the 17 cities/3 counties)
    ▪ Provided fact sheets, and tentative jurisdiction schedule
    ▪ Discussed tailored outreach and review process for communication material
  – Federal and State Staff Quarterly Call
    ▪ Follow-up e-mail with project update
On-going Outreach

• Project Information Distribution
  – Website (fact sheets, presentations, FAQ)
  – Dedicated project hotline line and project e-mail
  – Weekly updates on website, social media and through construction e-notice
  – Direct mailers along both sides of the tracks

• Next Steps
  – Permits / Installation coordination
  – Continue outreach coordination (each jurisdiction)
  – Continue briefing interested groups, as requested
Questions