



CALIFORNIA

HIGH-SPEED TRAIN

ATC for the California High Speed Rail Project



FLY CALIFORNIA
Without ever leaving the ground.

Presented by
Ed Mortlock, ATC Engineer
California High-Speed Train Project

IRSE North American Section - AGM Conference - Omaha -
May 17, 2010



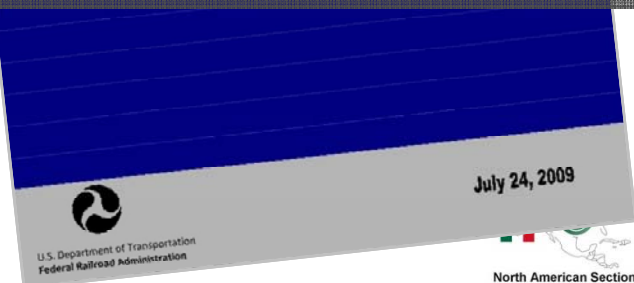
North American Section



HSR in America

Transform the Nation's Transportation System

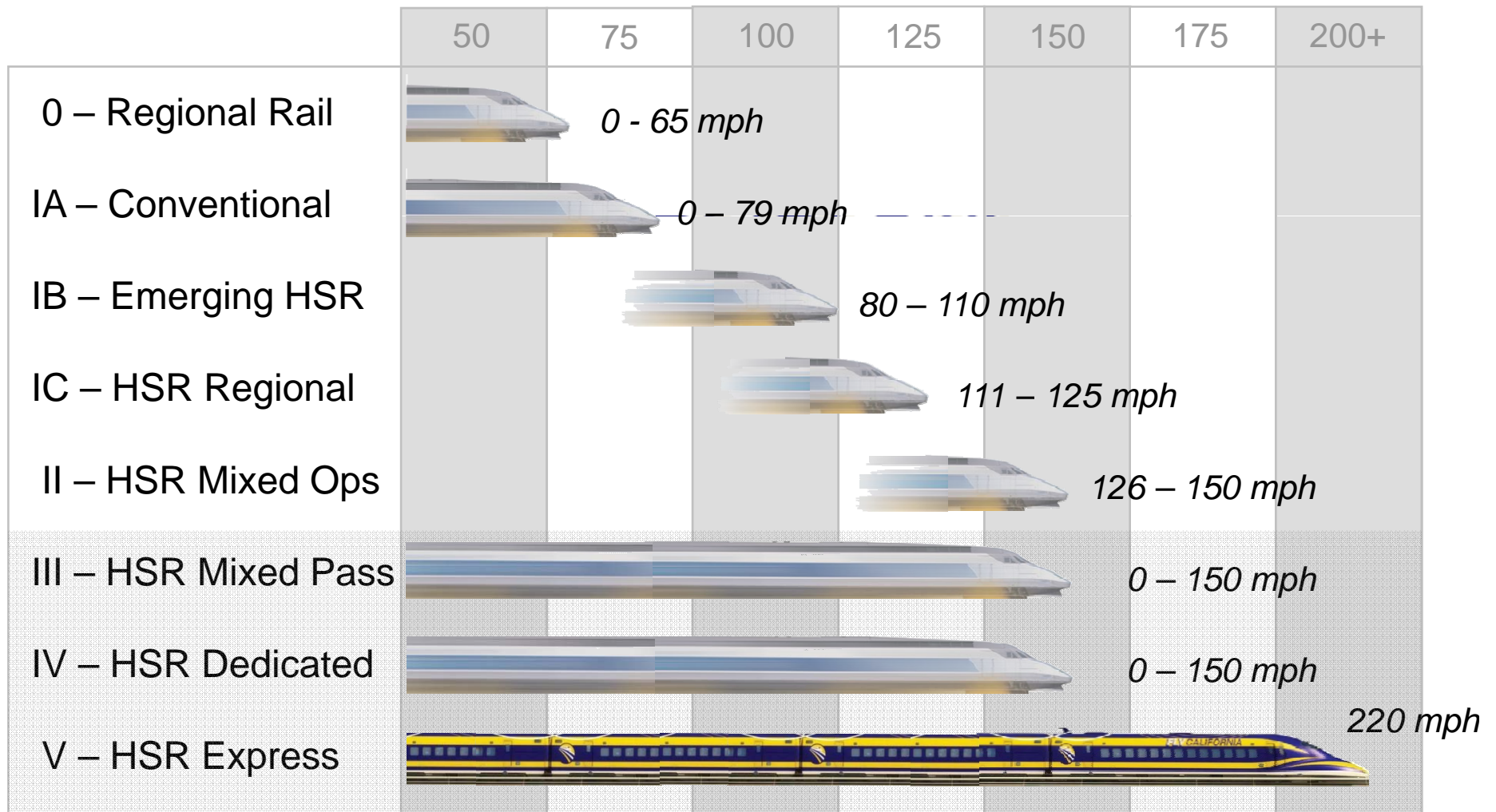
- *Ensure safe and efficient transportation choices*
- *Build a foundation for economic competitiveness*
- *Promote energy efficiency and environmental quality*
- *Support interconnected livable communities*






HSR in America

Proposed Tier Structure





California High-Speed Train Project

- 
- A topographical map of California is shown in the background, with a yellow line tracing the proposed high-speed rail route. The route starts in the San Francisco Bay Area, travels south through the Central Valley, and then follows the coast through the South Coast and Inland Empire regions.
- 800 route miles
 - 26 Stations
 - 220 mph maximum Operating Speed
 - 250 mph maximum design speed
 - Proven HSR Technology
 - Train Control System
ATC / 3 min. headways

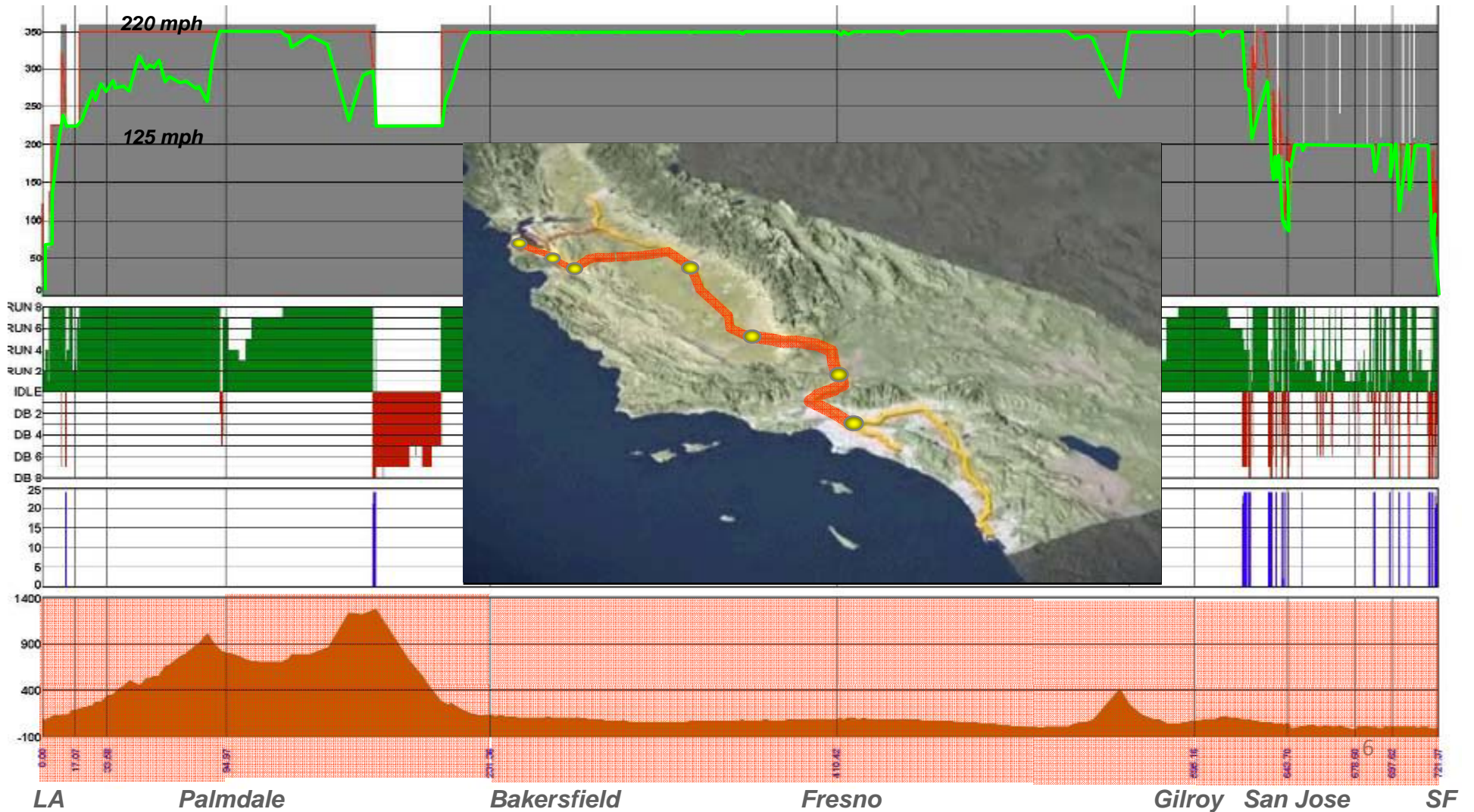


THE PROJECT

California High-Speed Train Project

- Links the major urban centers
- Connects the Central Valley both north and south
- Meets trip times
 - Sacramento to LA
~ 2 hrs 20 min
 - LA to San Diego
~ 1 hrs 20 min
 - SF to LA
~ 2 hrs 40 min







THE PROGRAM

Project Phasing

- Phase 1 – San Francisco to LA / Anaheim
 - San Francisco to San Jose
 - San Jose to Merced
 - Merced to Fresno
 - Fresno to Bakersfield
 - Bakersfield to Palmdale
 - Palmdale to Los Angeles
 - Los Angeles to Anaheim
- Extension - Merced to Sacramento
- Extension - Los Angeles to San Diego
- Study – Altamont





THE PROGRAM

Altamont Pass
AECOM

**San Francisco
- San Jose**
HNTB

Merced - Sacramento
AECOM

Merced - Fresno
AECOM

Merced - San Jose
Parsons

Fresno - Bakersfield
URS / HMM / Arup

Bakersfield - Palmdale
URS / HMM / Arup

Palmdale - Los Angeles
HMM / URS / Arup

Los Angeles - San Diego
HNTB

Los Angeles - Anaheim
STV





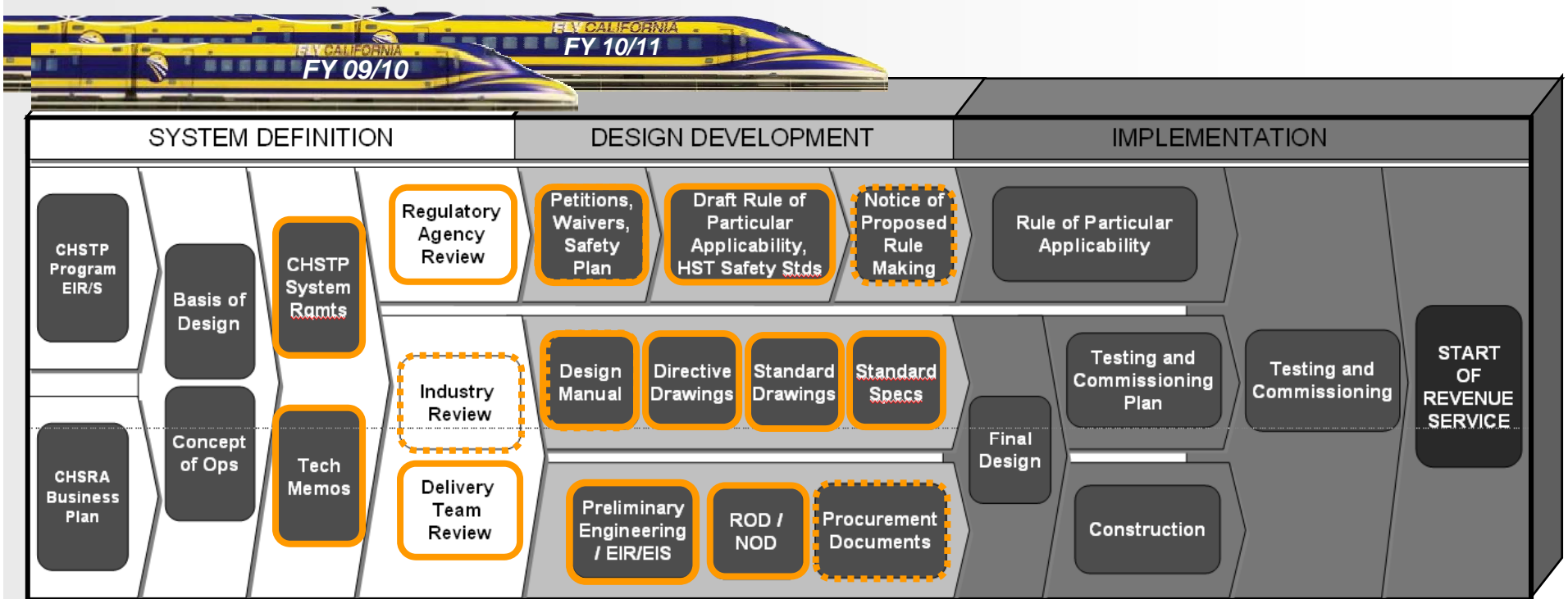
KEY DATES

- Completion of systems specifications – June 2011
- First contract award – June 2012
- Completion of Test Track – 2015
- First segment running revenue trains – 2018
- Full revenue service San Francisco to Los Angeles – 2020



THE STATUS

Where are we now?

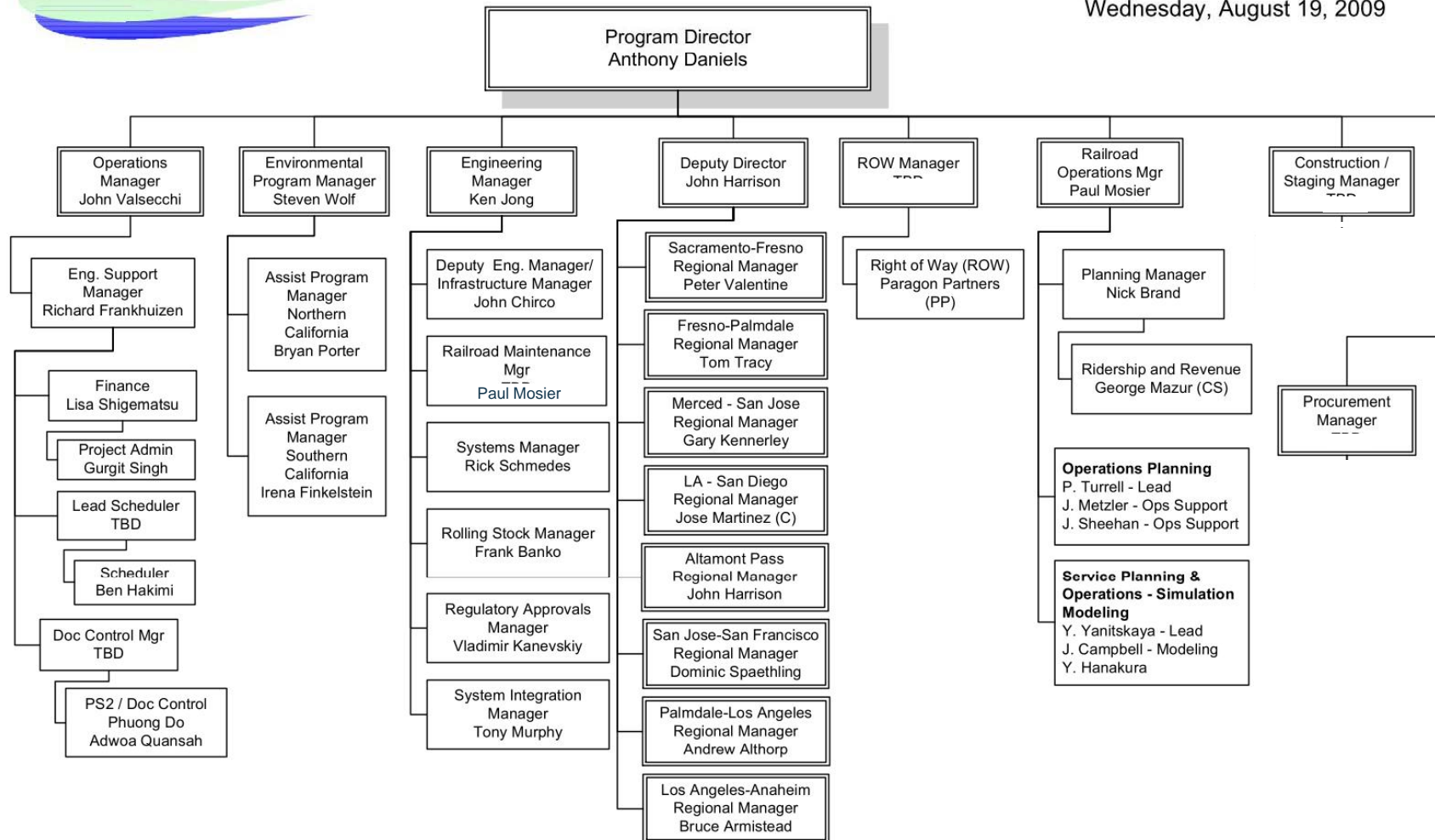




THE ORGANIZATION

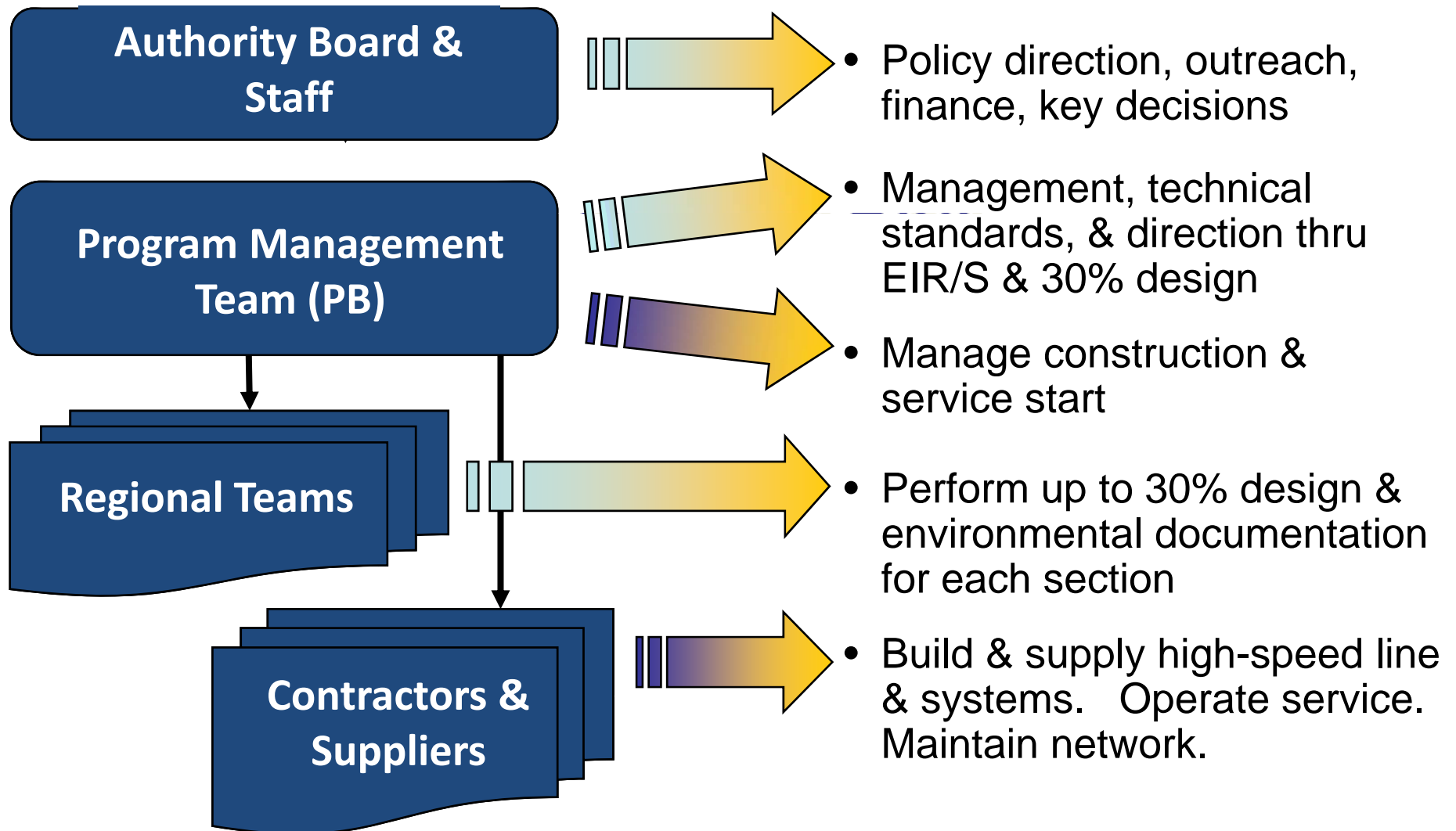
Project Management Team (by function)

Wednesday, August 19, 2009



THE ORGANIZATION

Implementation Team Roles





Basis of ATC Design

- Basis of design will be consistent with the approach to all CHST systems; following the Technical Specification for Interoperability (TSI) for command-control and signaling subsystem of the trans-European high speed rail system
- The TSI is being used as a framework for developing the Rule Of Particular Applicability (RPA) with the FRA.
- TSI is based on the ERTMS/ETCS system
- ATC System Requirements (SRs), which are high level, have been developed and submitted to the FRA for review and comment
- The SRs are not being defined in great detail, however their scope has been expanded from purely interoperability to whole-system requirements



Basis of ATC Design Cont'd

- The TSIs only address interoperability between subsystems (ATC to rolling stock for example); additional SRs have been developed (such as interlocking requirements) so a full ATC system can be presented to the FRA
- Revenue-Proven is a fundamental criteria for system qualification
- Even though the European TSI has been used as a framework, ERTMS/ETCS is only one of the candidate systems that are being considered, others include TVM 430, and Shinkansen D-ATC.



Basis of ATC Design Cont'd

- Current focus is now on Design Criteria preparation and specification writing is about the start.
- Early work was to identify site requirements for houses and other equipment enclosures to allow the Regional Teams to find space to accommodate them.
- The final design will be to the 30% level; for ATC this will be a functional and performance based specification with minimal detailed specifics that will avoid steering proposers to one particular technology



Technology Selection

- An in-depth study has been completed to identify the clear candidate technologies
- ERTMS, TVM430, and Shinkansen ATC systems are clear front runners
- There are gaps identified between these proven systems and the regulatory and technical specifics that must be satisfied including:
 - Radio frequency spectrum availability
 - Meeting specifics for Positive Train Control
 - Broken rail detection



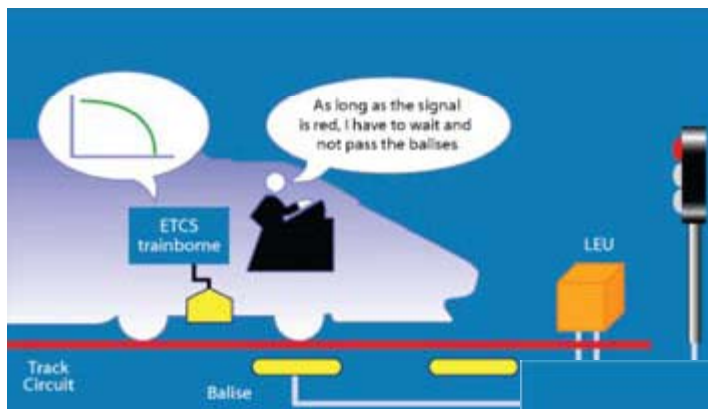
Conceptual Architecture





ERTMS Levels

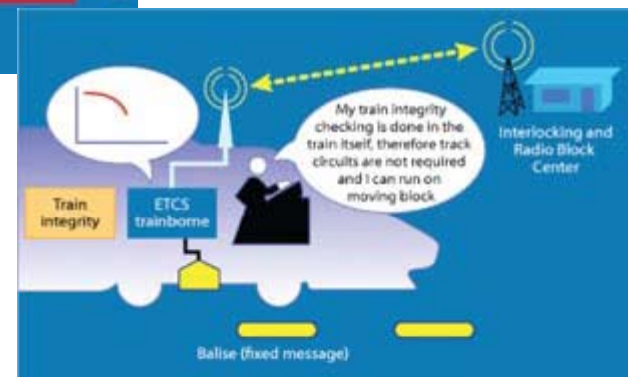
Level 1

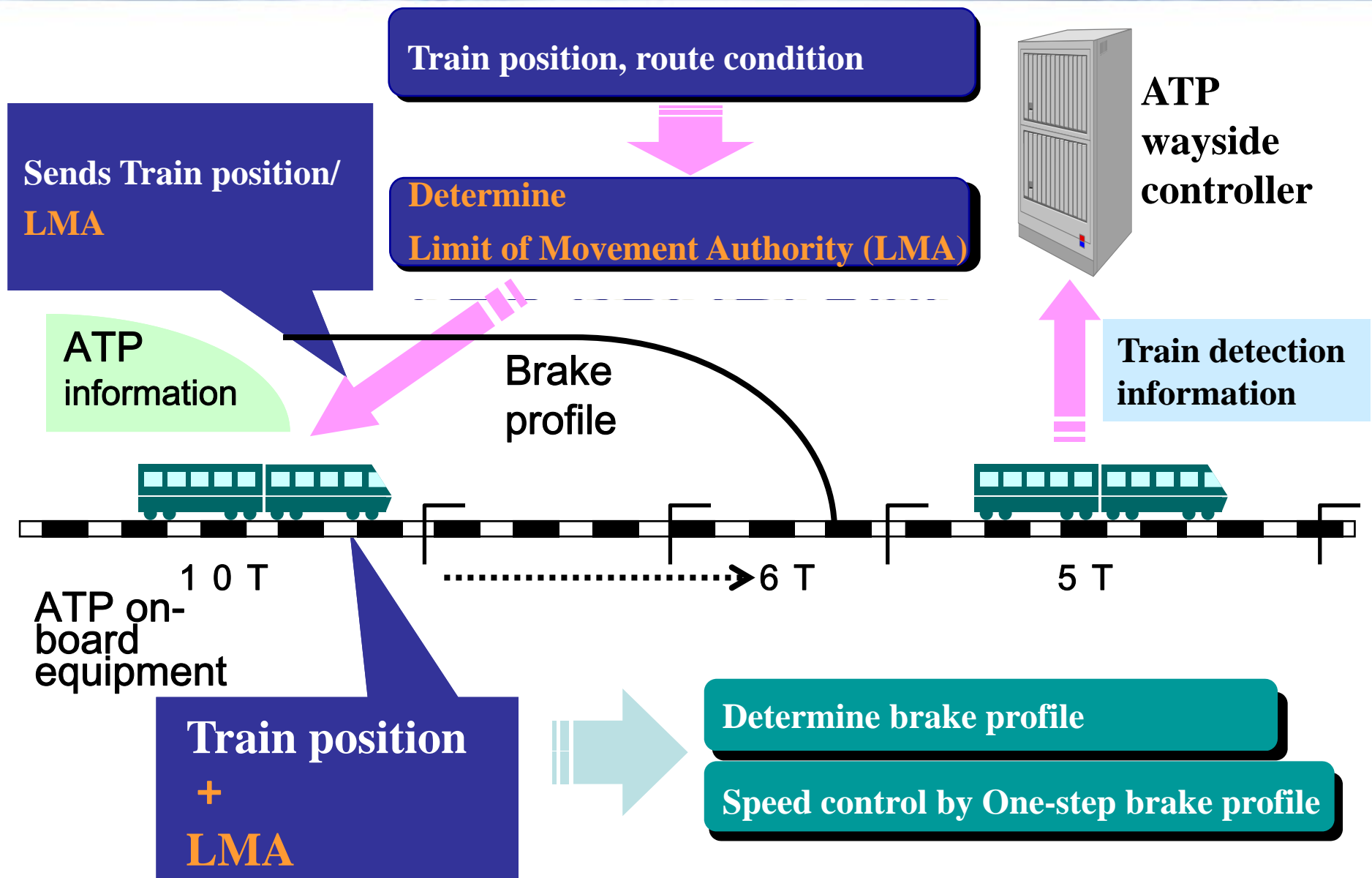


Level 2



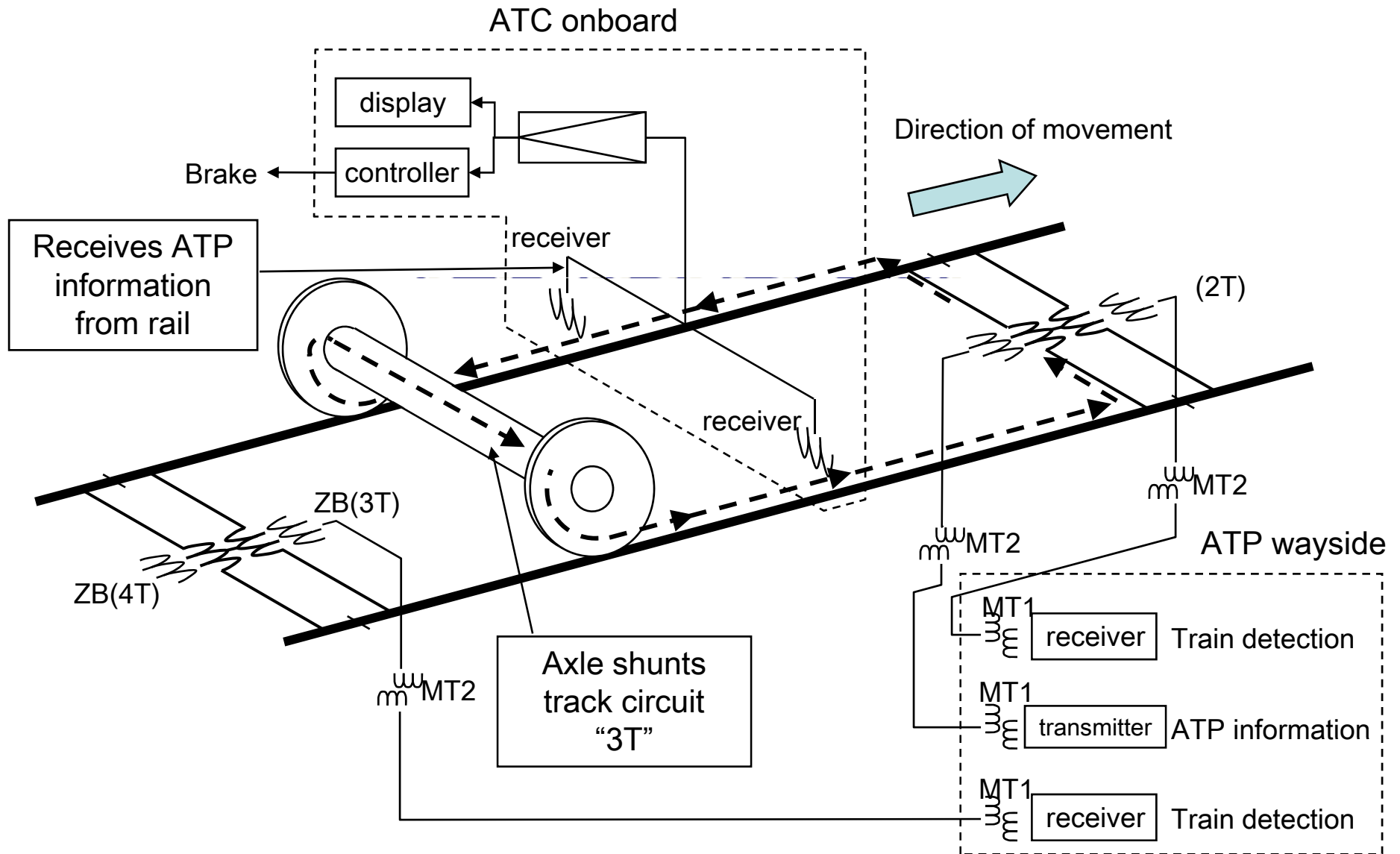
Level 3







Shinkansen ATC Concepts





System Requirements

- 46 High level System Requirements have been developed for the ATC system, supplemented by several related communications SRs
- The SRs are packaged and submitted to the FRA for review and comment
- When reworked in response to comments and discussions, the SRs will form the basis of the Rule of Particular Applicability (RPA)
- Design Criteria are being developed as part of the SRs, additional design criteria will be developed for the levels of detail below that required to form the RPA



Technical Memoranda

- Preparing Technical Memoranda to identify details for land and structure space needs;
 - Train control system level description
 - Train control system site requirements
- Working with Operations Group on areas where the space needs can be minimized (e.g. low signals instead of high ones at interlockings only)
- Working with communications and traction power groups in an effort to combine space requirements in common or subdivided enclosures



Interface Definitions

- Further work underway for ATC interface requirements to other subsystems including:
 - Rolling stock space, power, physical and functional interface requirements:
 - Intrusion, seismic, extreme weather, and other sensors and the train control response to alarms and events
 - Communications requirements for bandwidth and network distribution to support train control and other subsystem needs – spectrum search underway
 - Infrastructure interfaces including space, power, clearances from OCS, maintenance access, etc.



Shared Corridors



- There are two potential shared corridors:
 - Peninsula (Caltrain)
 - Los Angeles (Metrolink)
- Configuration not finalized
- Impacts on many aspects of CHST

- ATC issues include:
 - Headway
 - PTC Interoperability
 - Lock out of freight trains
 - Dispatching





Next Steps

- Conduct a Request for Information with ATC suppliers worldwide
- Complete the Design Criteria
- Write the specifications
- Develop the subsystem interface requirements and work into control documents and the specifications
- Finalize contract packaging
- Advertize, bid and build the system



WANT TO LEARN MORE?

- Go to the Authority's website
www.cahighspeedrail.ca.gov
- Contact the Authority
California High-Speed Rail Authority
925 L Street, Suite 1425.
Sacramento, CA 95814
(916) 324-1541
- Stay tuned!
 - Watch for project level environmental review process underway in your neighborhood



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Governor Schwarzenegger
[Visit his website](#)
[Statement on High-Speed Train](#)

The Official Site of California's Proposed High-Speed Train System

By linking all major cities in California with a state-of-the-art new transportation choice, high-speed trains will move people and products across our state like never before.

President Obama
[Statement on High-Speed Train](#)

What's New?

Aug 6 - Board Institutes Initiatives to Ensure Project Schedule, Budget and Accountability
[Press Release](#)

Aug 4 - CHSRA to Host Project Phasing Workshop
[Media Advisory](#)

Jul 28 - CA High Speed Rail Project Program Summary Report
[PDF Report](#)

Jul 23 - On track: LA Metro Supports High-Speed Trains
[Press Release](#)

Jul 13 - **Announcement RE: Executive Order S-13-09**
As a result of the Governor's Executive Order S-13-09, the California High-Speed Rail Authority office will be closed the first, second and third Friday of every month through June 2010. We apologize for this inconvenience and thank you for your patience.

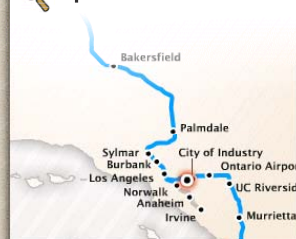
More "What's New?"

In The News

Jul 23 - House to Vote on High-Speed Rail Funding. National Infrastructure Bank
[The New York Times](#)

Jul 17 - Put job creation on the fast track

Explore the Route



Video Gallery

Explore state-of-the-art renderings of the high-speed train system



Learn More

[Protecting the Environment](#)
[Financing High-Speed Trains with Public-Private Partnerships](#)
[Creating Jobs and Boosting our Economy](#)
[Improving Transportation and Reducing Traffic](#)
[Central Valley](#)
[Northern California](#)
[Southern California](#)
[Fiscal Year 2009/10 Budget](#)

Board Materials

Board Meetings

September 3, 2009 at 10:00 am
Board Workshop follows - Note: there will be a 30 minute intermission between adjournment of the board meeting and beginning of the workshop.
Sacramento City Hall
915 I Street
Sacramento, CA 95814
[August Board Meeting Documents](#)
[Executive Director's Report](#)

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Q & A ?

