

Request for Qualifications (RFQ) for the Capitol
Corridor Joint Powers Authority (CCJPA) for the
development of a wireless broadband network for
the Capitol Corridor and San Joaquin Intercity Rail
Services

Pre-Submissions Meeting

May 27, 2009

Oakland, California

BART Boardroom: 9 AM

Amtrak Service Yard: 1 PM



Agenda

- Welcome and introductions
- High-level project approach
- The Intercity Rail Services
 - Capitol Corridor
 - San Joaquin
- Railway characteristics
- Technical requirements
- Project variables
- RFQ Submittal Requirements
- Submission documents
- Questions and Answers

- Visit to view the Northern California Fleet



Presenting Today

- Jim Allison, Principal Planner, CCJPA
- Leo Hoyt, Chief of Rolling Stock Procurement, Caltrans Division of Rail
- Andy Morse, Chief of Rail Equipment, Caltrans Division of Rail
- Gerald Fuller, Rail Transportation Specialist, Caltrans Division of Rail
- Monica Paolini, President, Senza Fili Consulting



Purpose of Today's Meeting

- To highlight main points of the RFQ
- To discuss synergies and important relationships that are difficult to convey in the RFQ
- To help you prepare a submittal that is compliant
- To accept your questions, provisionally answer them, then follow with official written responses

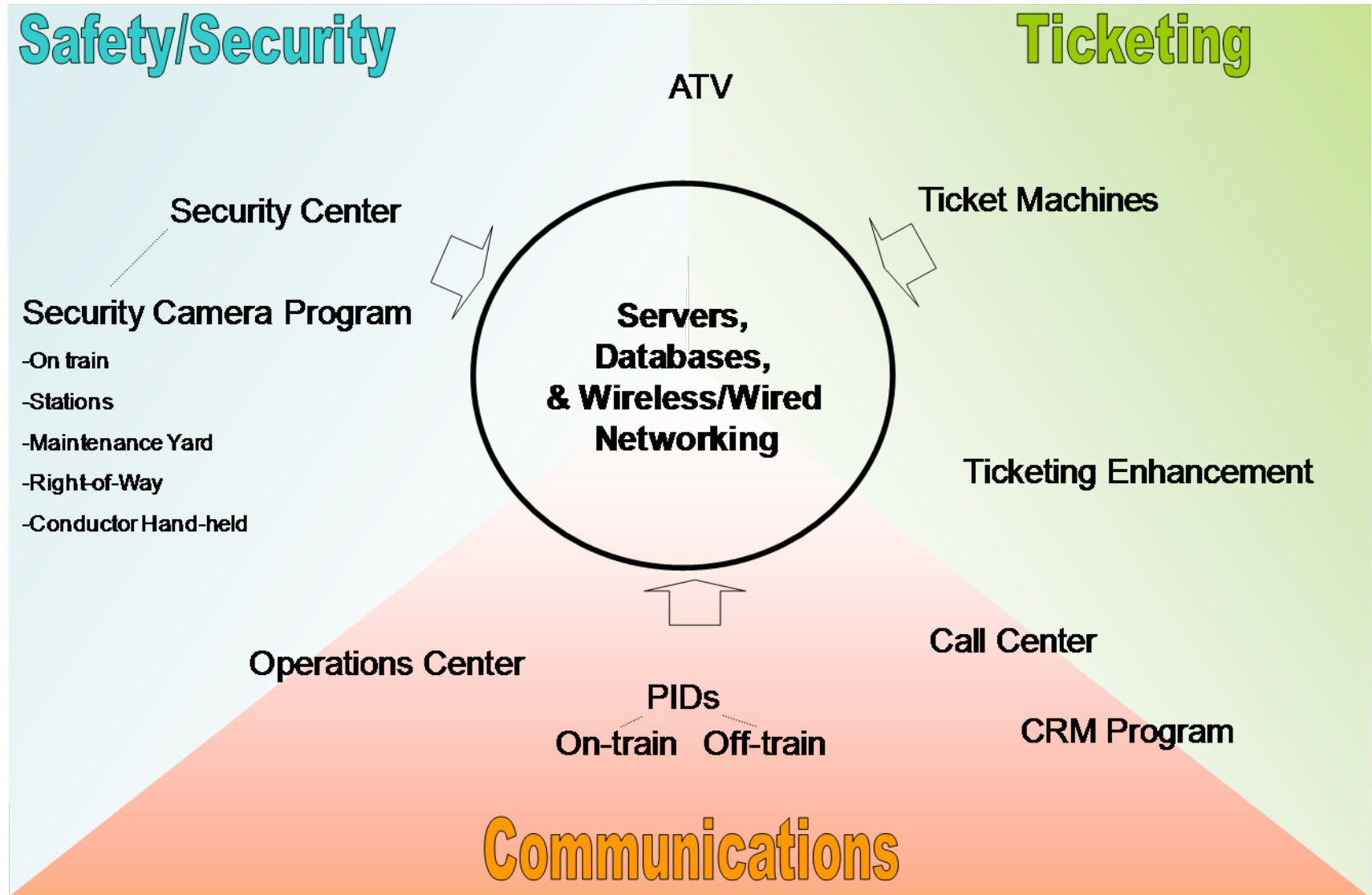


Presentation Assumptions and Rules

- You have reviewed the RFQ document, submission template, and quotation file
- Last opportunity to ask questions
- All questions asked will be restated and a provisional answer will be provided
 - Official answers will be posted on the website on Friday, May 29
- Limited to publicly directed questions
- Save your questions for the Q&A session following this presentation and during the service yard visit



Build Applications on Shared Platform



What are CCJPA/Caltrans Seeking?

- A prime contractor leading a team of sub-contractors who
 - Meets the requirements
 - Has the experience to successfully complete projects in a railway environment
 - Offers a cost-effective and competitive solution



CCJPA and Caltrans Wireless Network

- Provide broadband connectivity to all trains
 - Safety and operational applications to support CCJPA and Caltrans, including PIS
 - Free Internet access to passengers
- Coverage of entire ROW using multiple wireless technologies
 - Wi-Fi on trains and stations
 - Cellular throughout the ROW
 - 5.x GHz and 4.9 GHz trackside base stations
- A single, seamless network that
 - Integrates multiple wireless interfaces
 - Increases the safety and operational efficiency of CCJPA and Caltrans
 - Reduces operational costs
 - Makes service more attractive to passengers
 - Generates additional ticket revenues from new and retained passengers



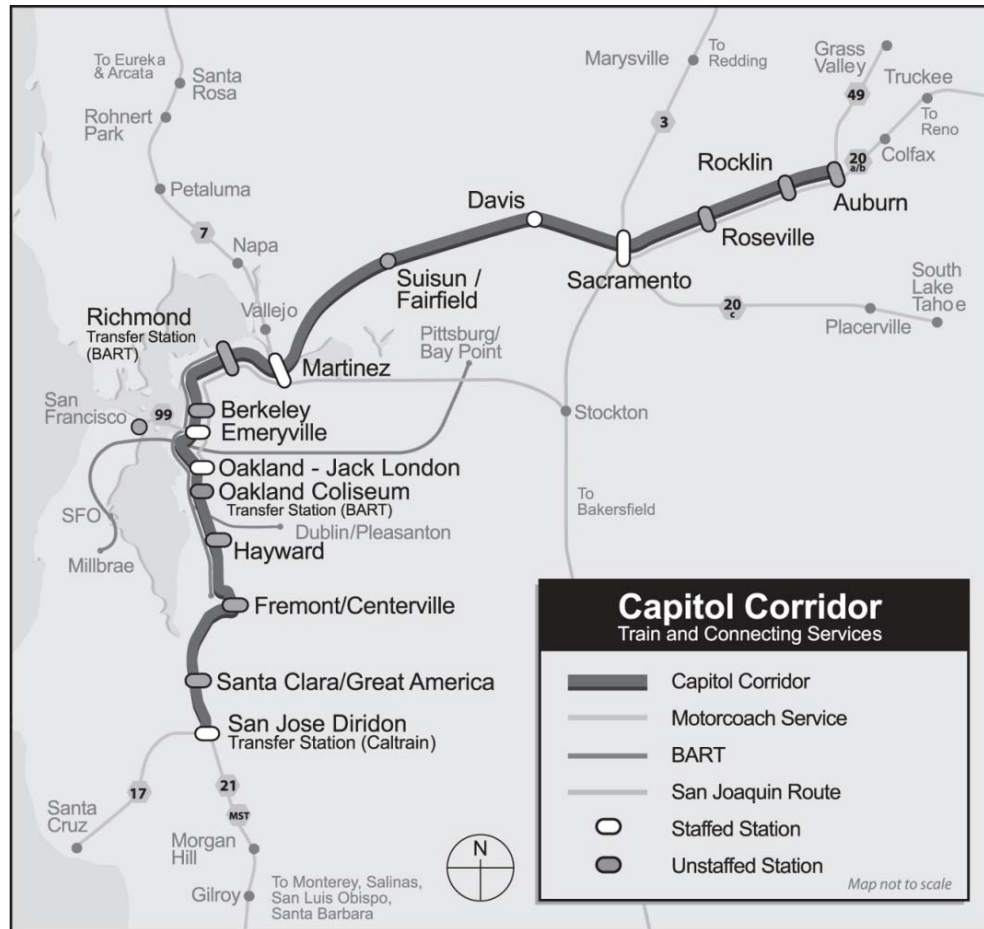
Project Phases

- **Phase 1:** Car installation
 - Wi-Fi in cars
 - Connectivity across cars
 - Connectivity to the land-based networks (cellular, 5.x GHz, 4.9 GHz)
- **Phase 2:** Passenger Information System (PIS)
- **Phase 3:** Construction of a 4.9 GHz and 5.x GHz trackside wireless broadband network to transport traffic to and from the trains
- **Phase 4:** Installation of cameras along the ROW with video analytics software
- **Phase 5:** Installation of Positive Train Control (PTC) equipment on trains



The Intercity Rail Services

Capitol Corridor



San Joaquin



The Capitol Corridor

- 170-Mile Intercity Passenger Rail Service Connecting Sierra Foothills, Sacramento, the San Francisco Bay Area and Silicon Valley/San Jose
- Connecting buses:
 - Reno, South Lake Tahoe, Monterey, Santa Cruz, Santa Barbara
- Partnership among CCJPA, Caltrans, Amtrak, and Union Pacific
- Current train service plan:
 - Weekdays: 32 trains
 - Weekend/holidays: 22 trains



What is the CCJPA?

- Management team overseeing the Capitol Corridor service
 - Service levels/performance standards
 - Funding agreements
 - Fare policy
 - Station equipment cleanliness
 - Customer service
 - Project implementation
- Working relationship among six local transit agencies in the 8-county service area
 - BART provides administrative staff
 - Coordination with other member agency staff
- 16 Board of Directors: 2 from each of the 8 member counties



The San Joaquin

- 365 Route miles Intercity Passenger Rail Service Connecting the San Joaquin Valley cities with the San Francisco Bay Area and Sacramento with the San Joaquin Valley cities
 - 316 miles between Oakland and Bakersfield
 - 49 miles between Sacramento and Stockton
- Connecting buses:
 - Los Angeles, Southern California/Mojave cities, North Coast, Northern Sacramento Valley
- Working relationship among CCJPA, Amtrak, and Burlington Northern Santa Fe, Union Pacific
- Current train service plan:
 - Oakland/Bakersfield: 8 trains; Sacramento/Bakersfield: 4 trains



Railroad Ownership in the Capitol Corridor and San Joaquin

Union Pacific



Burlington Northern
Santa Fe



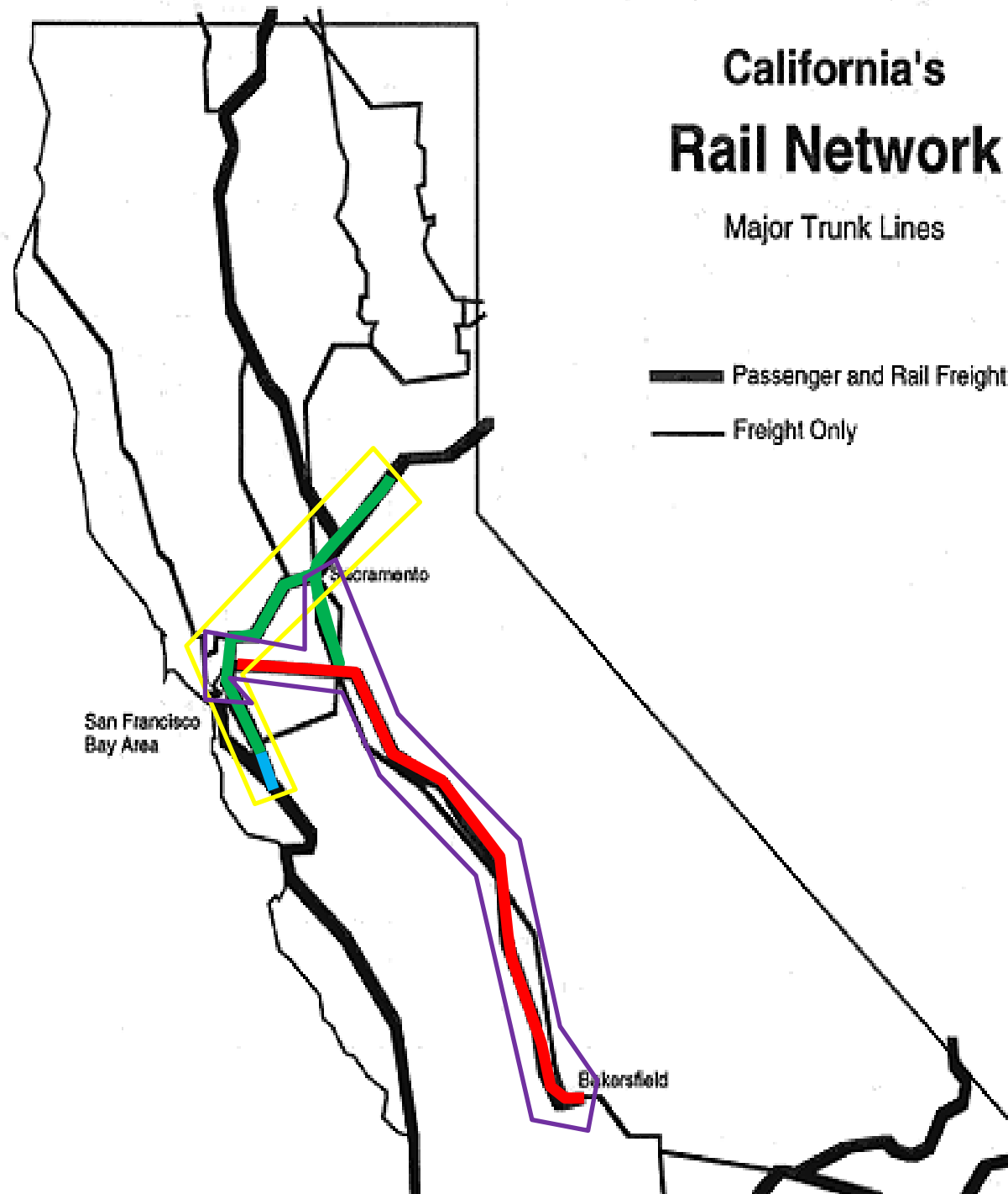
Caltrain



California's Rail Network

Major Trunk Lines

- Passenger and Rail Freight
- Freight Only



Railway Operating Characteristics

- 79 mph maximum speed
- Working railroad
 - Live tracks—flagman requirements
 - Trackside equipment must meet all standards or policies of the host railroad
- Harsh operating environment
 - Vibration + dust + humidity + heat + cold

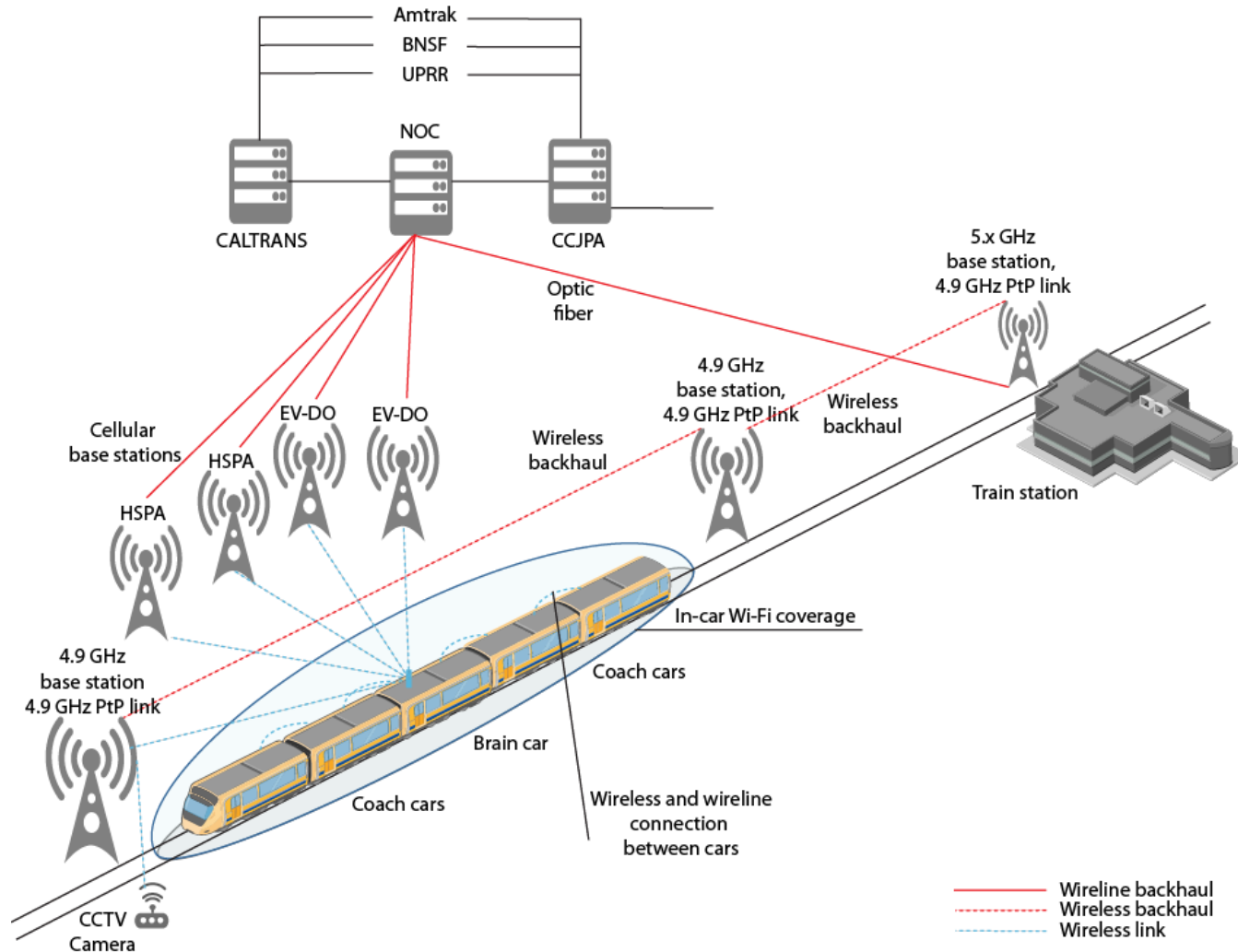


The CCJPA/Caltrans Wireless Network

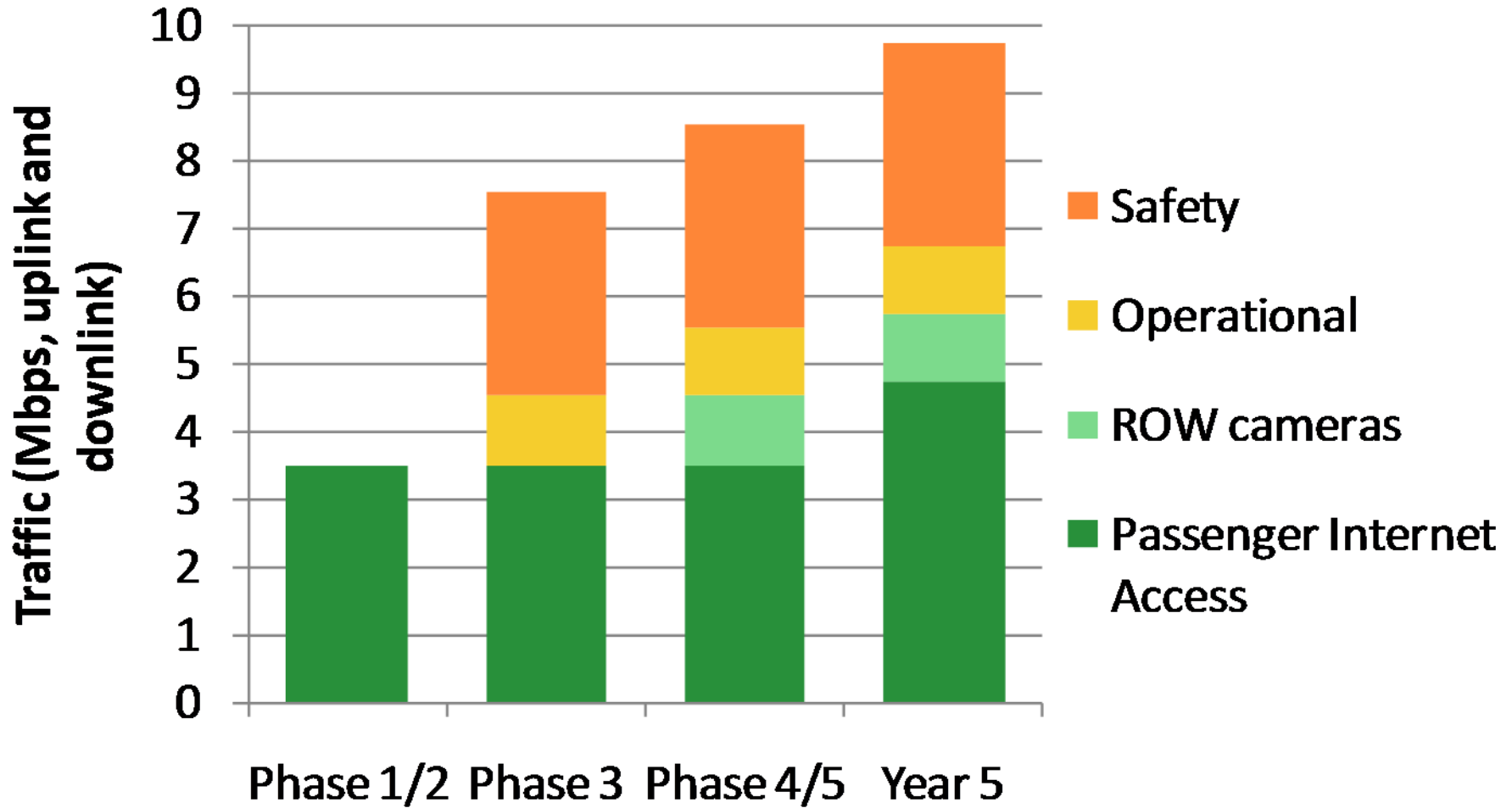
- Multiple air interfaces
 - Cellular, Wi-Fi, OFDMA-based 4.9 GHz/5.xGHz, wireless backhaul (possibly others)
- All air interfaces shall be seamlessly integrated within the same network
- Network supports traffic with different requirements
 - Safety/security applications
 - Operational applications
 - Passenger access
- RFQ is technology neutral, but
 - No single technology will meet all requirements
 - There are constraints on which spectrum bands can be used and where



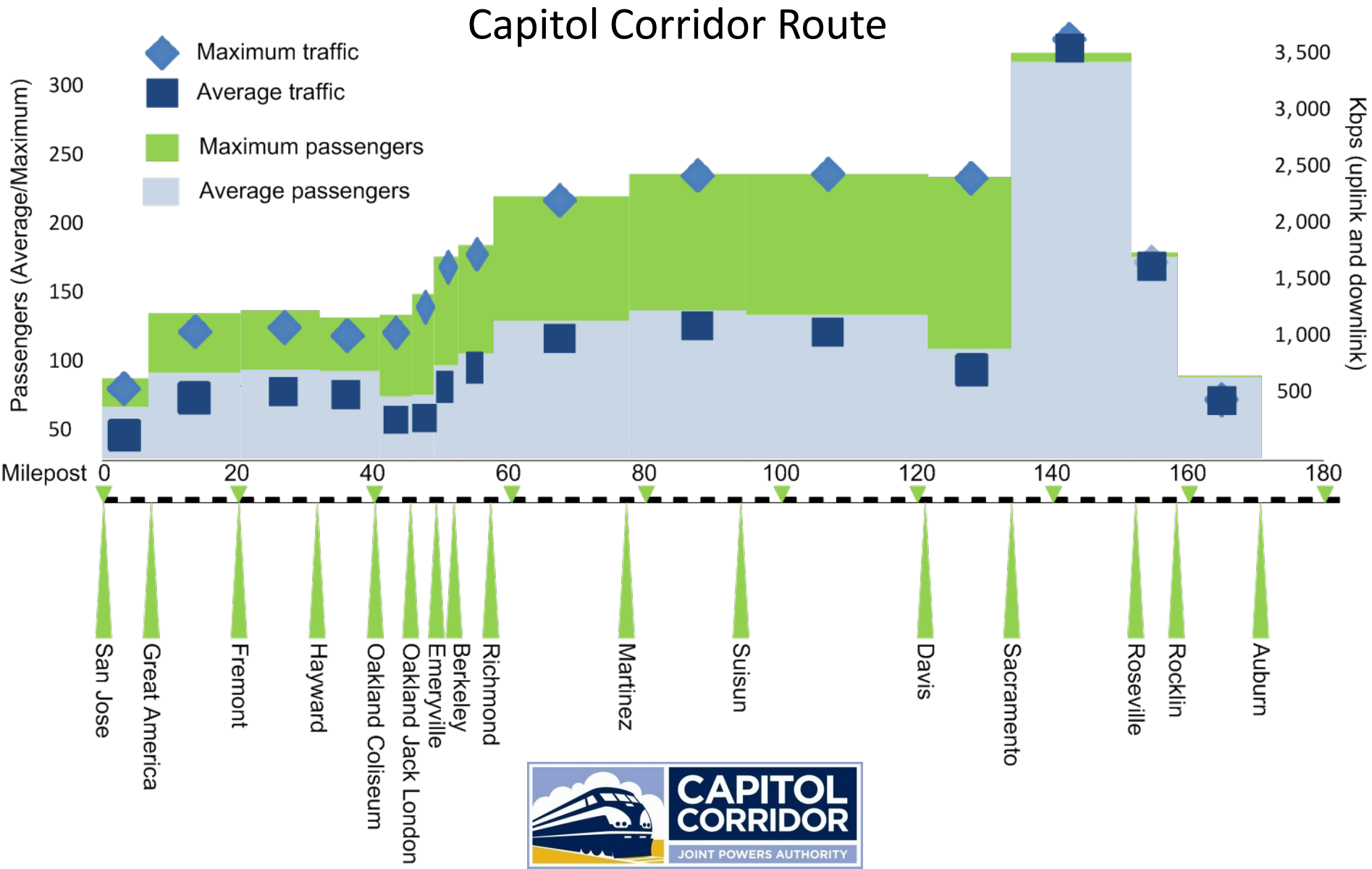
Proposed Network Architecture



Bandwidth Requirements per Train



Passengers and Traffic Requirements



Key Project Variables

- Time constraints for in-car installation given equipment usage cycles
- Host railroad requirements for trackside installation relative to base-station design and density
- Changes of passenger usage levels over time



Resolving Project Variables

- Establish a master contract to implement the project with preliminary quote
 - Initial meetings with Caltrans, Amtrak, CCJPA regarding train installations
 - Initial meetings with UPRR and BNSF to discuss implementation
- Definition of task orders
 - Develop equipment install plans, final quote and specifications
 - Fulfill design and construction requirements consistent with host railroad standards



RFQ Calendar

	Date	Milestone
☑	May 11, 2009	The CCJPA publishes the RFQ.
☑	May 12, 2009	Prospective Contractors can submit questions.
☑	May 22, 2009 3:00 pm PDT	The CCJPA no longer accepts questions from Prospective Contractors. Prospective Contractors planning to attend the pre-submissions meeting shall register their attendance by this date.
☑	May 27, 2009 9:00 am PDT	The CCJPA holds a pre-submission meeting in Oakland, CA, open to Prospective Contractors (attendance is recommended but optional).
	May 29, 2009	The CCJPA publishes addendum to RFQ with answers to Prospective Contractors questions.
	June 22, 2009 3:00 pm PDT	Qualifications Submissions from Prospective Contractors are due.



Qualification Submittal Criteria

- Meet or exceed the technical and performance requirements
- Cost-effectiveness and performance
- Experience of the contractor and of its sub-contractors in
 - Heavy-rail environment
 - Train car installations of networking, telecommunications, and video equipment
 - Support of safety, security, and operational applications
- Financial strength and long term viability of the contractor
- References from contractor's clients and client list
- Selection of sub-contractors and their
 - Track record
 - Strength of the relationship with sub-contractors
- Upgradability, scalability, use of open-standards technologies



Interviews

- Two of rounds of interviews anticipated
 - Shortlisted candidates are invited to the first round
 - Top-tier candidates are invited to a second round
- First interviews – fixed time (1-2 hours) with set format
- Second (or final) interviews
 - Entire business day presentation
 - Extensive Q&A
 - Mixture of set and open format discussion
- CCJPA reserves the right to opt for a single set of interviews



Submission Requirements

- Submission must be based on submission and quotation template—REQUIRED
 - All forms and fields completed
- Prospective contractors may submit supporting documents
 - To provide additional information
 - Not as a replacement of templates



BACKUP SLIDES



Northern California Fleet

Car Type	Quantity	Car Numbers	Brand
Cab Cars	14 each	8301-8314	California Cars
Baggage/Coach Car	6 each	8201-8206	California Cars
Café Cars	14 each	8801-8814	California Cars
Trailer/Coach Cars	32 each	8001-8032	California Cars
Cab/ Baggage Cars	5 each	6961-6965	Surfliner
Trailer/Coach Cars	5 each	6461-6465	Surfliner
Café Cars	2 each	6361-6362	Surfliner
Coach Cars (owned by Amtrak)	3 each	34943, 34953, 34981	Superliner
Coach/Baggage Cars (owned by Amtrak)	1 each	31934	Superliner
Café Cars (owned by Amtrak)	2 each	35003, 35010	Superliner
Coach Cars (*)	14 each	5001-5014	Comet
Café Cars (owned by Amtrak)(*)	3 each	NA	Amfleet
Total fleet	101 Cars		
* planned, not in revenue service			



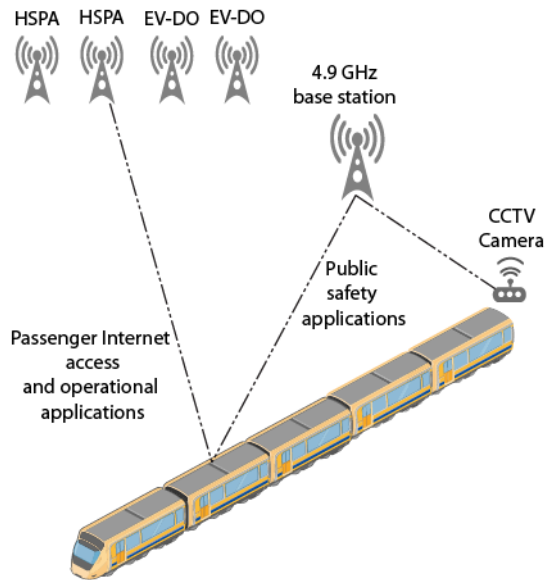
Spectrum Bands, Virtual Networks

Virtual network	In-car Wi-Fi	4.9 GHz	5.x GHz	Cellular
Safety and security applications	Yes	Capitol Corridor, San Joaquin (UPRR): Preferred San Joaquin (BNSF): No	Capitol Corridor and San Joaquin (UPRR): Where 4.9 GHz is not available San Joaquin (BNSF): Preferred	For redundancy
Operational applications (including PIS)	Yes	No	Preferred	Where 5.x GHz is not available and for redundancy
Video feeds from ROW cameras	No	Capitol Corridor, San Joaquin (UPRR): Preferred San Joaquin (BNSF): No	Capitol Corridor and San Joaquin (UPRR): Where 4.9 GHz is not available San Joaquin (BNSF): Preferred	No
Passenger Internet traffic	Yes	No	Preferred	Where 5.x GHz is not available and for redundancy

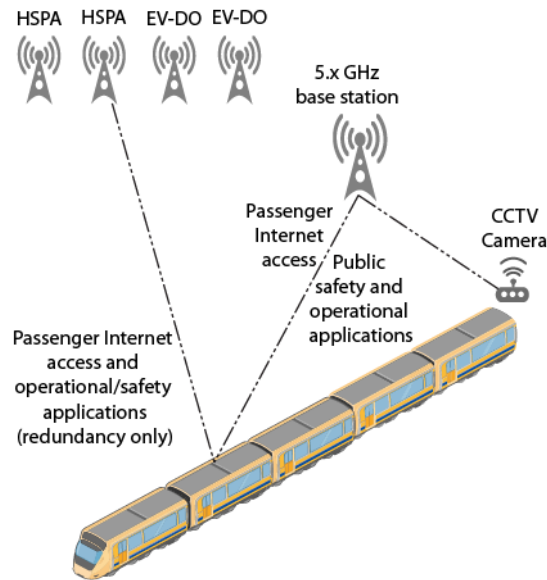


Virtual Network Traffic

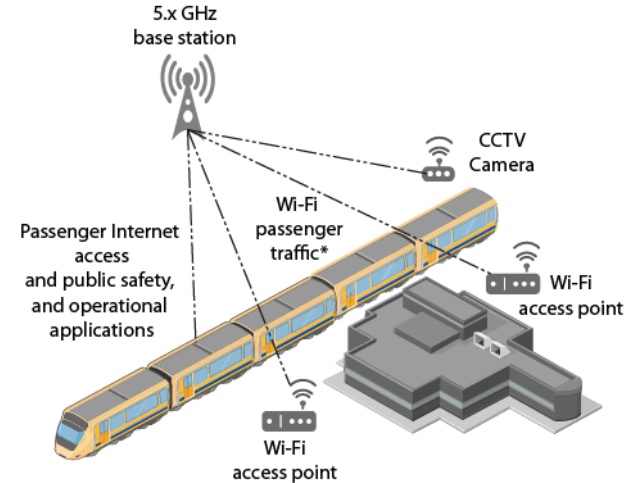
Along the Capitol Corridor and San Joaquin UPRR ROW



Along the San Joaquin BNSF ROW

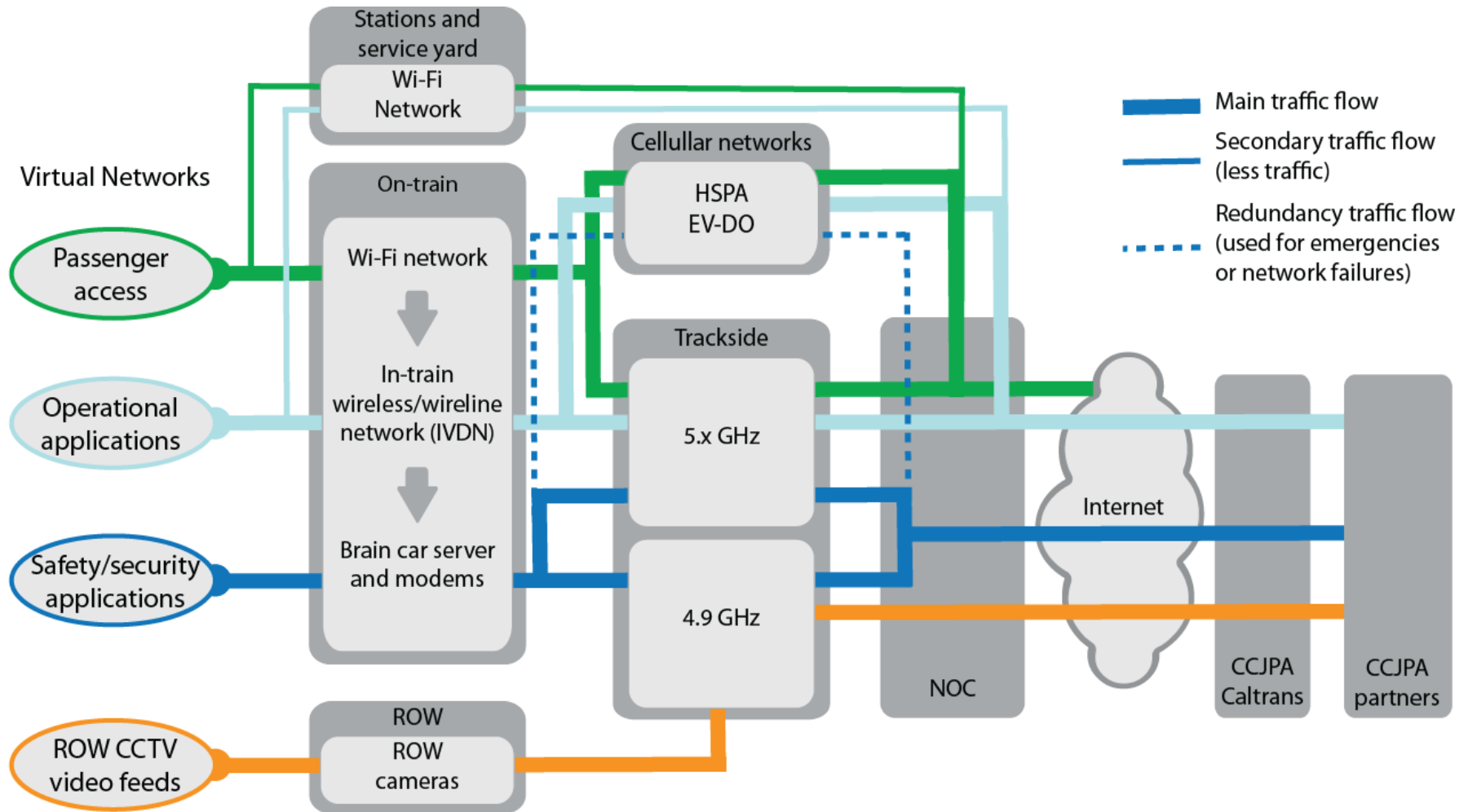


At and near train stations (Capitol Corridor and San Joaquin)

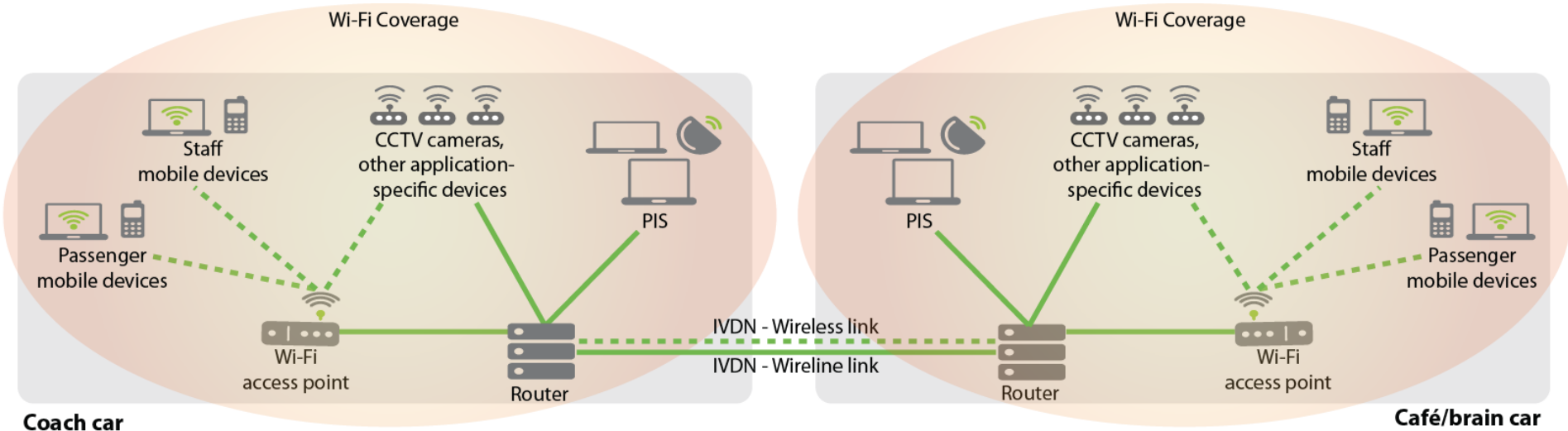


(*) May be carried through wireline Ethernet connection

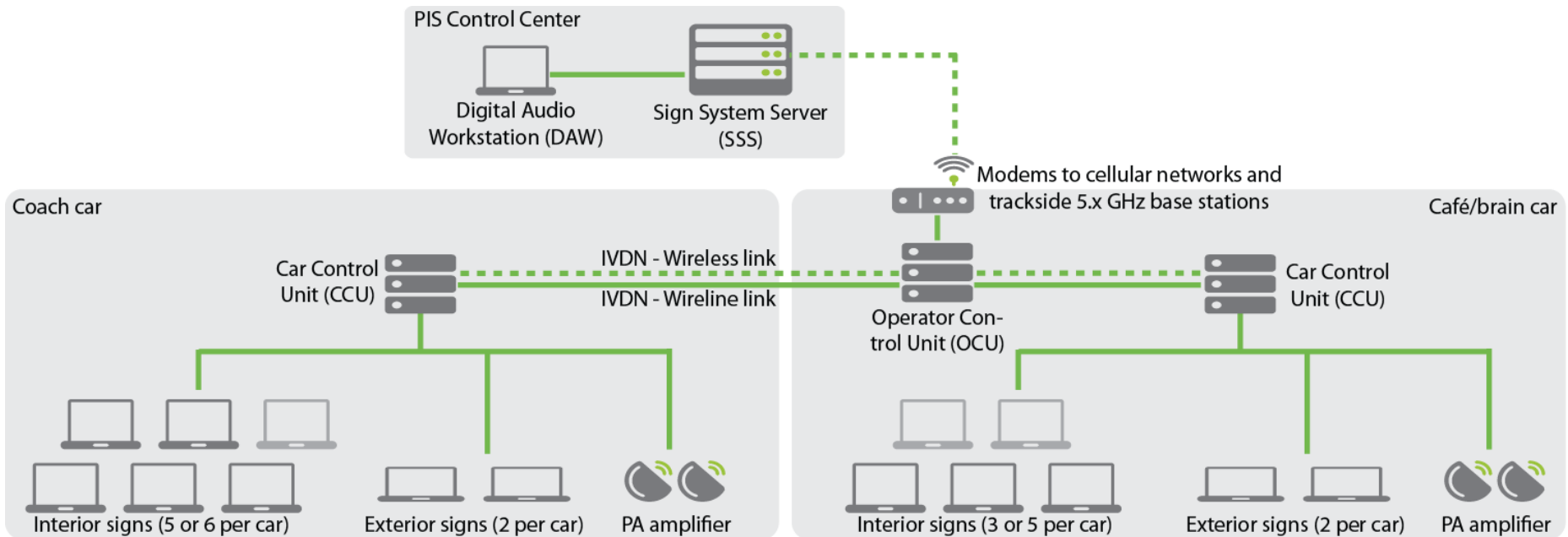
Traffic Flows



IVDN Architecture



PIS Architecture



Bandwidth Requirements: Phases 1-3

Phase 1, Phase 2, Phase 3	Overall Wireless Network	Safety and security applications	Operational applications	Video feeds from ROW cameras	Passenger access
Cellular (multiple modems) - Best efforts, estimates refer to demand					
Total Bandwidth (Mbps)	4.50	-	1.00	-	3.50
Downlink (Mbps)	3.50	-	0.50	-	3.00
Uplink (Mbps)	1.00	-	0.50	-	0.50
In train Wi-Fi network					
Total Bandwidth (Mbps)	11.50	5.00	3.00	-	3.50
Downlink (Mbps)	6.50	2.00	1.50	-	3.00
Uplink (Mbps)	5.00	3.00	1.50	-	0.50



Bandwidth Requirements: Phases 4-5

Phase 4 and Phase 5	Overall Wireless Network	Safety and security applications	Operational applications	Video feeds from ROW cameras (Phase 4)	Passenger access
All wireless interfaces*					
Total Bandwidth (Mbps)	8.51	3.00	1.00	1.01	3.50
Downlink (Mbps)	4.51	1.00	0.50	0.01	3.00
Uplink (Mbps)	4.00	2.00	0.50	1.00	0.50
4.9 GHz					
Total Bandwidth (Mbps)	4.01	3.00	-	1.01	-
Downlink (Mbps)	1.01	1.00	-	0.01	-
Uplink (Mbps)	3.00	2.00	-	1.00	-
5.x GHz					
Total Bandwidth (Mbps)	8.51	3.00	1.00	1.01	3.50
Downlink (Mbps)	4.51	1.00	0.50	0.01	3.00
Uplink (Mbps)	4.00	2.00	0.50	1.00	0.50
Cellular (multiple modems) - Best efforts, estimates refer to demand					
Total Bandwidth (Mbps)	4.50	-	1.00	-	3.50
Downlink (Mbps)	3.50	-	0.50	-	3.00
Uplink (Mbps)	1.00	-	0.50	-	0.50
In train Wi-Fi network					
Total Bandwidth (Mbps)	11.50	5.00	3.00	-	3.50
Downlink (Mbps)	6.50	2.00	1.50		3.00
Uplink (Mbps)	5.00	3.00	1.50		0.50

(*) Cellular, 4.9 GHz, and 5.x GHz. Does not include in-train Wi-Fi throughput.



Bandwidth Requirements: Year 5

Year 5	Overall Wireless Network	Safety and security applications	Operational applications	Video feeds from ROW cameras	Passenger access
All wireless interfaces (*)					
Total Bandwidth (Mbps)	9.71	3.00	1.00	1.01	4.70
Downlink (Mbps)	5.71	1.00	0.50	0.01	4.20
Uplink (Mbps)	4.00	2.00	0.50	1.00	0.50
4.9 GHz					
Total Bandwidth (Mbps)	4.01	3.00	-	1.01	-
Downlink (Mbps)	1.01	1.00	-	0.01	-
Uplink (Mbps)	3.00	2.00	-	1.00	-
5.x GHz					
Total Bandwidth (Mbps)	9.71	3.00	1.00	1.01	4.70
Downlink (Mbps)	5.71	1.00	0.50	0.01	4.20
Uplink (Mbps)	4.00	2.00	0.50	1.00	0.50
Cellular (multiple modems) - Best efforts, estimates refer to demand					
Total Bandwidth (Mbps)	5.70	-	1.00	-	4.70
Downlink (Mbps)	4.70	-	0.50	-	4.20
Uplink (Mbps)	1.00	-	0.50	-	0.50
-Fi network					
Total Bandwidth (Mbps)	12.70	5.00	3.00	-	4.70
Downlink (Mbps)	7.70	2.00	1.50		4.20
Uplink (Mbps)	5.00	3.00	1.50		0.50

(*) Cellular, 4.9 GHz, and 5.x GHz. Does not include in-train Wi-Fi throughput.



The Task Order Process

For each of the five project phases, the CCJPA/Caltrans will issue multiple task orders, which will relate to specific tasks such as network planning, RF surveys, Pilot Installations, car installations, network operations, or more broadly to a collection of work items

Task order components	Section	Contractor	The CCJPA, Caltrans, and rail partners
Planning	6.2.1	✓	✓
Execute task order		✓	✓
Task design	6.2.2	✓	
Task design approval	6.2.2		✓
Test plan	6.2.3	✓	
Deployment		✓	
Interim testing (for cars: before they go back to revenue service)	6.2.4, 6.2.5, 6.2.6	✓	
Interim approval	6.2.6		✓
Final acceptance testing (for cars: in revenue service, in fully installed trainset)	6.2.4, 6.2.5, 6.2.7	✓	
Final acceptance	6.2.7		✓

