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# Transit-Based Smart Parking: An Evaluation of the Travel Effects of the San Francisco Bay Area Field Test

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20<sup>th</sup> Anniversary

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# Project Partners

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- California Department of Transportation
- Bay Area Rapid Transit (BART) District
- California PATH
- ParkingCarma™
- Quixote Corporation
- Verizon Wireless
- Intel
- Microsoft



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# Problem

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- In suburban areas, quick convenient access to park-and-ride lots can be essential to making transit competitive with the auto and reducing VMT and emissions.
  - Most will only walk about 1/4 of a mile to transit stations or stops.
  - Fixed route bus or shuttle feeder services can be expensive to provide and inconvenient to use.
- Currently at many suburban BART stations parking is at or near capacity.
- Expansion of traditional parking facilities can be cost prohibitive.

# Alternative

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- Smart parking management systems have been successfully implemented in many European, British, and Japanese cities to more efficiently use parking capacity at transit stations.
- These systems typically provide real-time information via CMS to motorists about the number of available parking spaces in park-and-ride lots, departure time of the next train, and downstream roadway traffic conditions (e.g., accidents and delays).

# Background

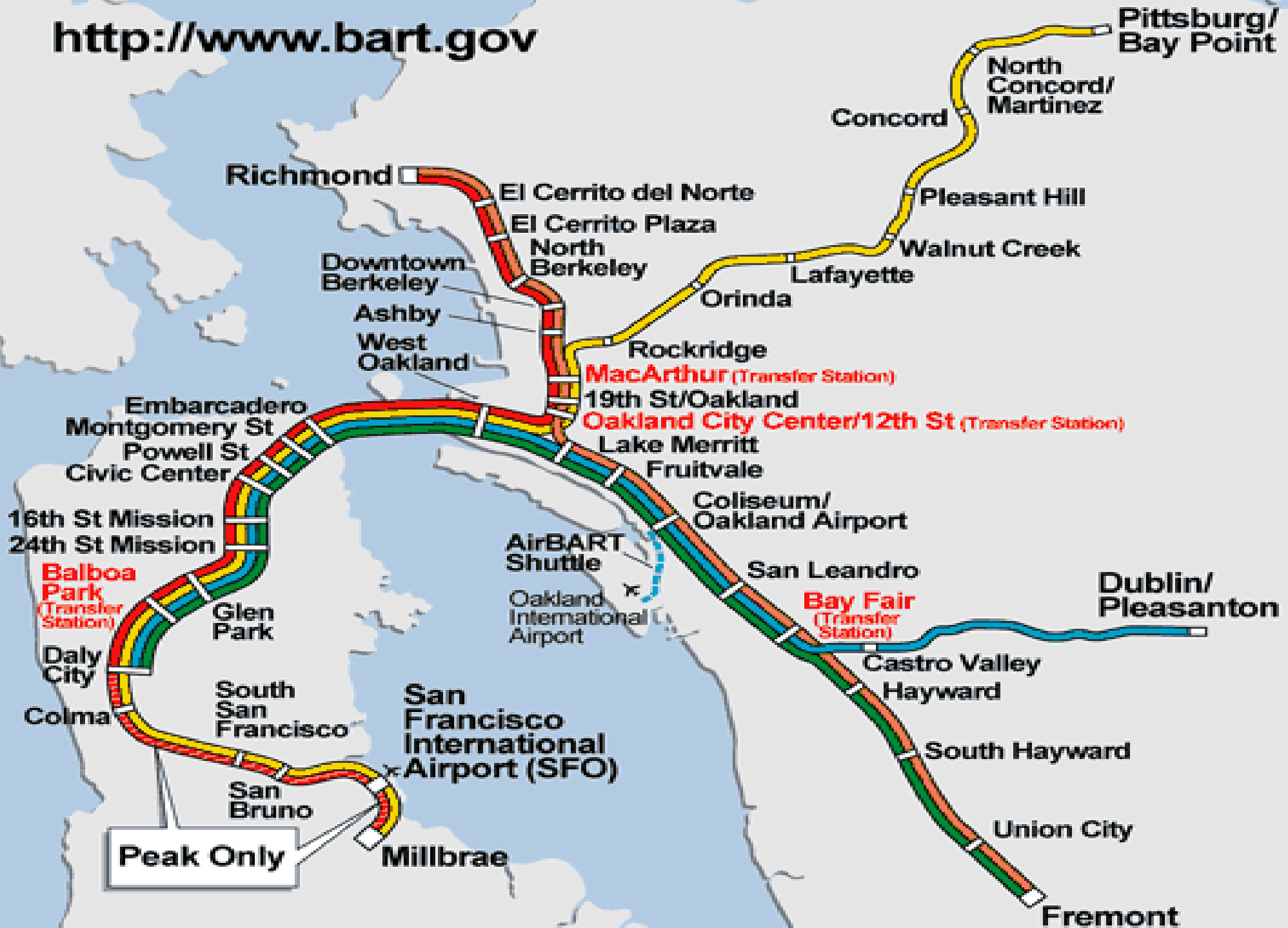
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- The field test was the first transit-based smart parking program in the U.S.
- Similar transit-based systems outside of the U.S. provide motorists with en-route information, but at the time this test was implemented we were not aware of any program with *both pre-trip planning* and *en-route planning*.
- The project received the Best of ITS America award in the research category in 2005.

The field test was launched at the Rockridge BART station in December of 2004.



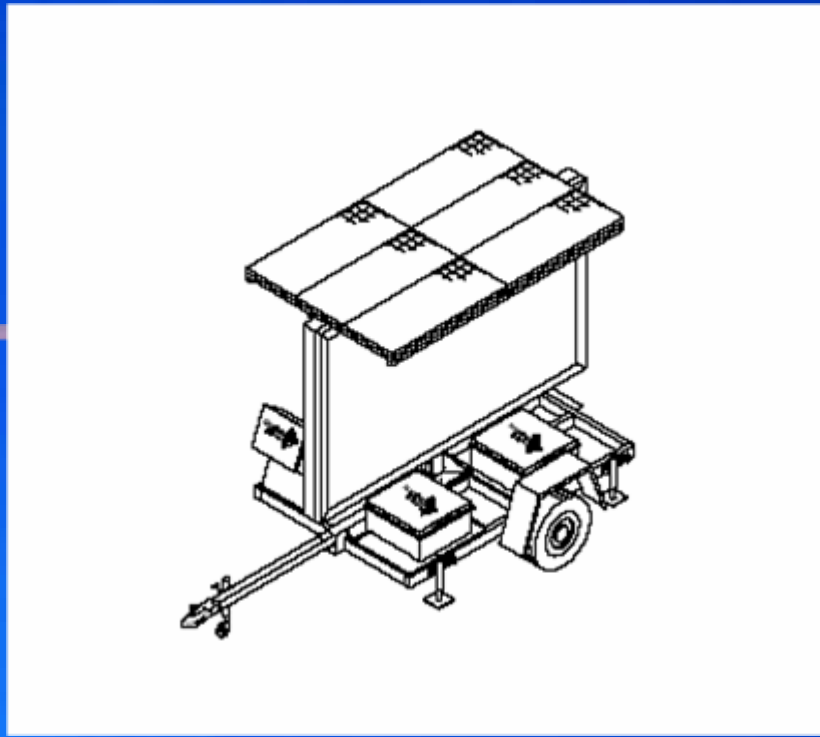
<http://www.bart.gov>





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# Survey

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- Results presented today based on analysis of surveys administered to participants toward the end of the field test (February-March 2006)
  - 177 surveys completed
  - 36% response rate

# Demographic Attributes

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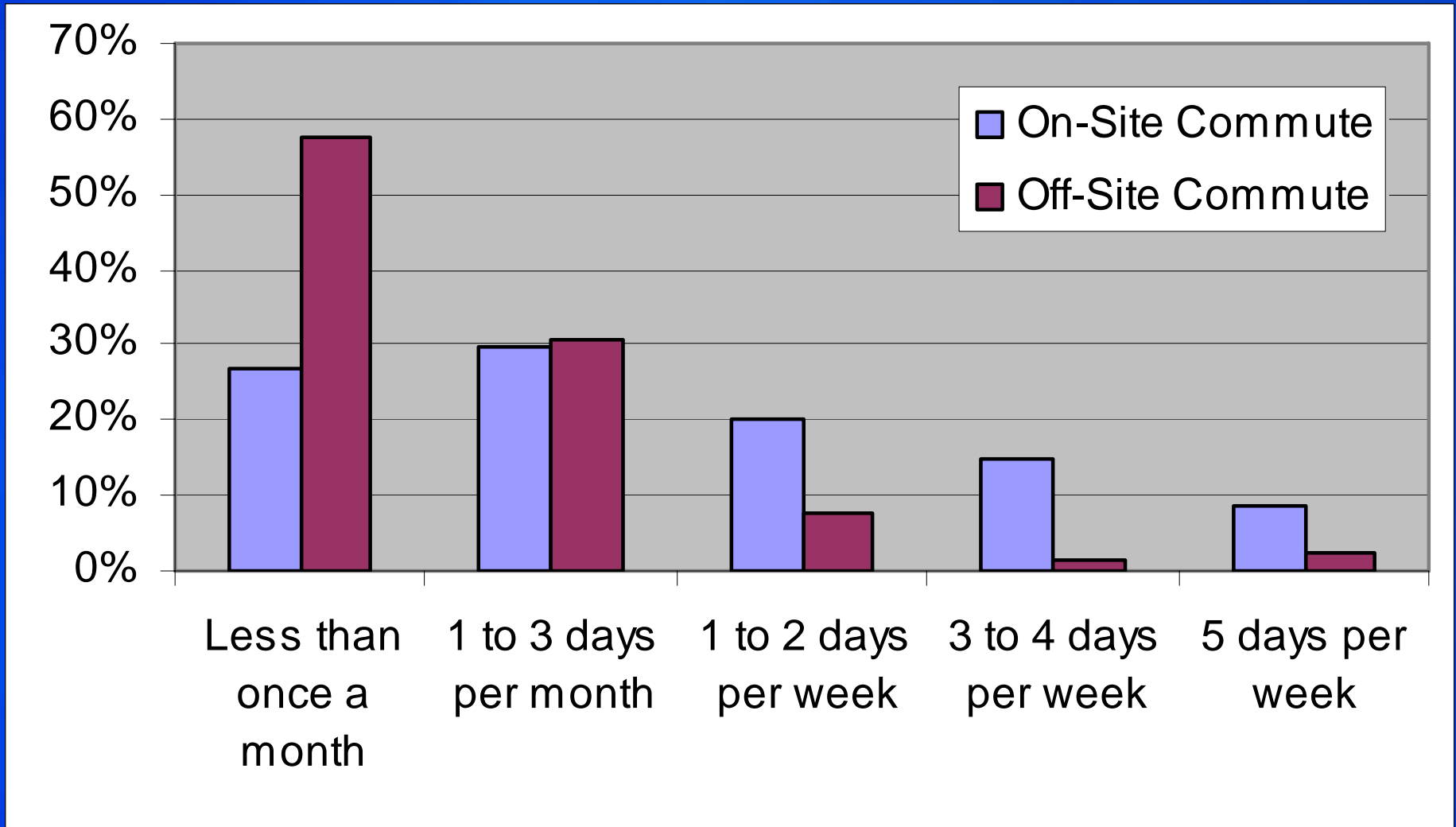
- More women than men (63% vs. 37%)
- Age fairly evenly distributed over the range of 31-60 years
- Highly educated (57% graduate degree or higher)
- Relatively high income level (59% > \$110,000/yr)
- Most common household type includes 1-2 adults with a child or children (40%)
- The average respondent had flexible work hours and worked 40 hours a week
- Rarely provided free parking at their place of work

# Change in Travel

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- To assess change in travel the survey, for example, asks participants questions about
  - Frequency of smart parking use to on-site & off-site work locations
  - How they would typically travel if smart parking was not available

# Distribution of Smart Parking Use



# Change in Commute Mode Choice

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- Increased BART use
  - about 6 more trips per month for average user
- Reduced drive alone commutes
  - 31% to on-site & 56% to off-site locations
- Some reductions in carpool and bus commutes
  - 17% to on-site & 7% to off-site locations
- Modest increase in drive access to BART station
  - about 15% drove to the BART station instead of taking the bus or using a non-motorized mode

# Change in Commute Travel Time

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- Average participant commute time to on-site work location decreased:
  - 47.5 minutes by smart parking and BART compared to 50.1 minutes by alternative commute method

# Change in Vehicle Miles Traveled

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- Factors influencing the change in participant vehicle travel to on-site place of work:
  - Riding BART as their primary mode instead of driving alone
  - Driving to BART instead of taking the bus, walking, or biking
  - Driving to Rockridge to access smart parking instead of driving to a BART station that was closer to or farther from their home

# Change in Vehicle Miles Traveled

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- The average participant reduced their monthly VMT by 9.7 miles
  - Approximately 33% of the total reduction in VMT was offset by
    - an increase in drive access mode to the BART station and
    - driving further to the Rockridge BART station instead of a BART station closer to home

# Conclusions

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- In sum, this evaluation suggest a number of changes in participant travel including:
  - Reduced drive alone commutes
  - Increased transit commutes
  - Reduced commute travel time
  - Reduced vehicle miles traveled
- Preliminary plans in place to expand field test to other BART stations and another metropolitan region in California

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