

# Transportation is a Critical Infrastructure



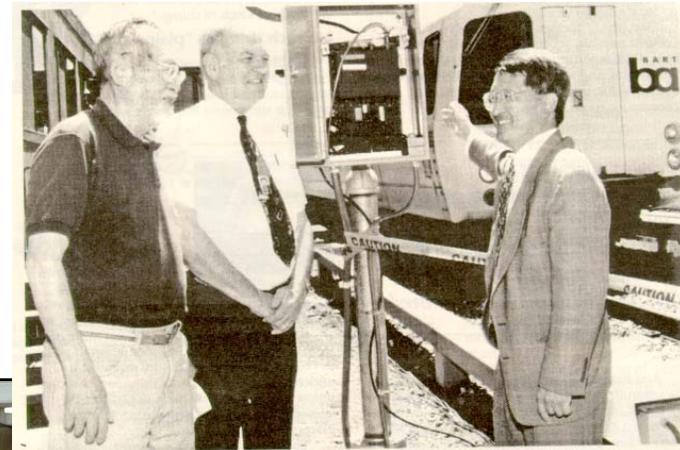
System integration and technology development applied to high consequence transportation problems involving the safety, security, reliability, and efficiency of the nation's highway, rail, air and public transportation systems

## Sandia Areas of Expertise

- Airworthiness Assurance Non-Destructive Testing Validation Center
- FAA Air Transportation Oversight System
- Airport Security
- High Speed Ground Transportation
- Military logistics interface with public transportation infrastructure
- Ports of entry
- Energy, Greenhouse Gas, and Economic Analysis

# BART work to improve the safety and reliability of public transportation

- Improve capacity and service:
  - Advanced Automatic Train Control
- Reduce maximum power demand
- Increase safety
- Suppress noise
- Partners
  - BART
  - GE Harris Harmon
  - Hughes
  - FTA and ARPA
  - Sandia



*BART subway station*

*Sandia algorithms help smooth BART subway rides with new train control techniques*

# Publications and References

**An Analysis of the Costs of Running a Station Car Fleet, R. M. Zurn, February 1995, SAND95-8208**

**Energy Storage and Alternatives to Improve Train Voltage on a Mass Transit System, S. P. Gordon and W. S. Rorke, April 1995, SAND95-8222**

**Optimization of Automatic Train Control for Energy Management and Service Reliability, S.P. Gordon, R.M. Wheeler, T.J. Sa, D.A. Sheaffer, November, 1999, SAND2000-8206**

**BART Advanced Automated Train Control System uses as a case study for the High Consequence Engineering/High Integrity Software conference**





# The PROTECT Chem-Bio Demonstration Program

**PROTECT: Program for Response Options and Technology Enhancements for Chem-bio Terrorism**  
**Lead Labs: Sandia National Labs, ANL**

- **PROTECT demonstrates integrated systems for defense of infrastructure facilities.**
- **The Washington DC subway system is the initial focus for development activities**
  - **chemical detection testbed**
  - **CB-EMIS crisis management information system**
  - **single station demo (12/01)**
- **Airport systems are also under development**



**PROTECT is a DOE Domestic Demonstration and Application Program (DDAP) to improve infrastructure facility protection.**