

Transportation Challenges:

Implications for Engineering Systems Research

The Transportation Enterprise

- **Collection of modes and industries**
- **Shared public and private Responsibilities**
- **Multiple technologies**
- **Multiple objectives**
- **Old/emerging constraints**
- **The public is directly involved**

Private Sector

- **Responds to market forces; to public-sector incentives/disincentives**
- **Increasingly global in scope and outlook**
- **Generally excludes external costs**
- **Relatively dynamic and adaptive**

Public Sector

- **Responds to political forces and public opinion**
- **Leverage primarily via regulation, taxation, and investment**
- **Balances economic, environmental, and social interests**
- **Entrenched organizations; adapts slowly**

Challenges

- **Energy/Environment**
- **Capacity/performance/growth**
- **Finance**
- **Emergencies**
- **Institutions**
- **Safety**

Questions

- **What mix of modes, development patterns, and pricing strategies do we want?**
- **How should governments promote these outcomes? And at what pace?**
- **What sorts of analyses will aid the decision-making process.**

**Can new engineering
systems approaches help?**

Scope of Analysis

- **Component**
- **Modal subsystem**
- **Modal system**
- **Multimodal system**
- **Enterprise**

Analysis

Capabilities/Characteristics

- **Appropriate decomposition**
- **Appropriate precision**
- **Explicit treatment of uncertainty and risk**
- **Strikes a balance: technical sophistication with decision-making environment**
- **Scenarios and choices; not “optimums”**
- **Communications: an integral component**