NURail Center Research Report

Massachusetts Institute of Technology

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MIT Regional Transportation Planning and High-Speed Rail Research Group

HSR/R Group 2012-2013 (MIT faculty and graduate students)
Upper row (from L to R): Iori Mori, Ryan Westrom, Prof. Joseph Sussman, and Andrés Archila
Lower Row: Naomi Stein, Soshi Kawakami, Joel Carlson, and Maite Peña

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Overview of Research Activities

- NURail funding is the lynchpin of the activities of the Regional Transportation Planning and High-Speed Rail Research Group.

  http://web.mit.edu/hsr-group

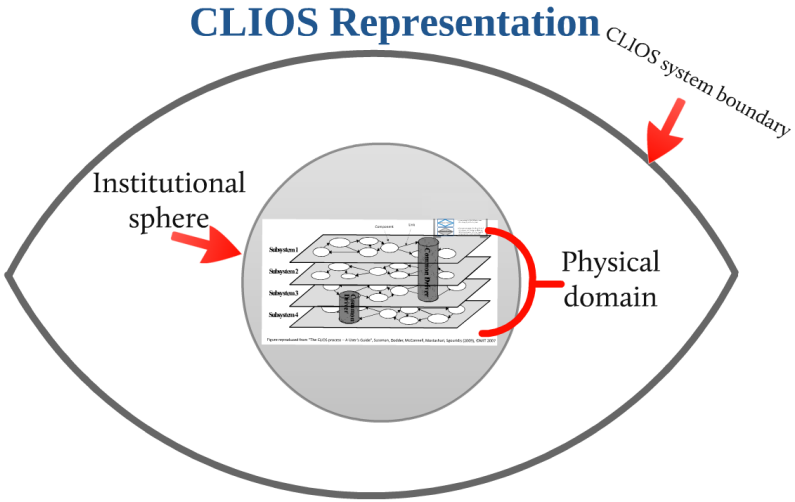
- Complementary research, providing matching funds:
  - MIT Portugal Program (MPP)
  - MIT Transportation Productivity Study
  - MIT Undergraduate Research Opportunities Program (UROP)
  - Region 1 University Transportation Center (UTC)
  - Japan International Transport Institute (JITI)
  - East Japan Railway (endowed chair)

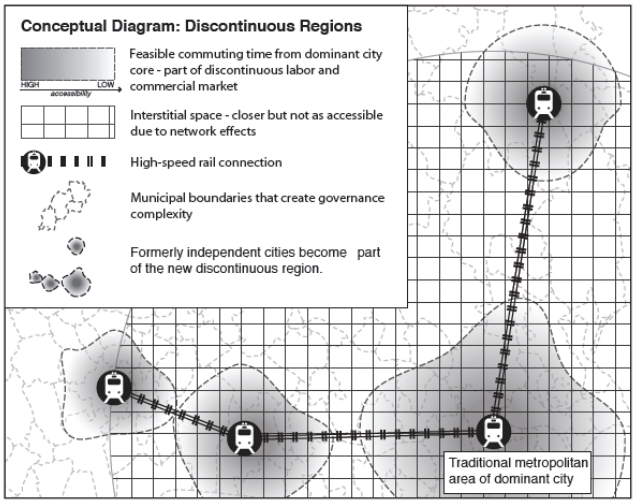
Objective and Scope

- A deeper understanding of HSR and its contributions to critical contemporary issues (CCI), including economic development, energy, and the environment
- The development of a suite of innovative tools of value in studying the above issues
  - CLIOS Process
  - Scenario Planning
  - Real Options Analysis
  - Approximate Dynamic Programing (ADP)

Project List (Ongoing and Complete)

- HSR as a Complex Sociotechnical System (CSS):
  - Transportation in the Northeast Corridor of the U.S.: A Multimodal and Intermodal Conceptual Framework
- HSR Transportation Productivity Study
- HSR in the Digital Society
- Climate Impacts of HSR and Air Transportation
- Rail Industry Strategy for Moving Energy Resources
- Urban Issues Related to HSR – England and Portugal
- Colombian Caribbean Coast Integration HSR





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Some Key Results

- Flexibility and scenarios in HSR project planning reveals hidden opportunities and increases expected value, in addition to adding robustness
- Institutions and organizational structure play a vital role
- HSR can be a catalyst for regional development
- HSR changes users' behavior – e.g., supercommuting
- Effective urban connections to HSR are vital
- A first look at US passenger rail productivity focusing on the past decade in the NEC – HSR, overall, increases productivity
- Air and HSR interact in interesting ways with broad environmental and institutional ramifications

Publications – Papers I

- Archila A.F., Sakamoto R., Fearing R., Sussman J.M. (2014). Productivity of Passenger Rail Transportation Services in the Northeast Corridor. Submitted to TRB
- Stein N.E.G., Sussman J.M. (2014). Uncertainty and Inter-Jurisdictional High-Speed Rail Planning: Insights from Portugal and the United Kingdom. Submitted to TRB
- Jones H., Domingos T., Moura F., Sussman J.M. (2014). Transport Infrastructure Evaluation Using Cost-Benefit Analysis: Improvements to Valuing the Asset Through Residual Value - A Case Study. Submitted to TRB
- Clewlow R.R.L., Sussman J.M., Balakrishnan H. (2013). The Impact of High-Speed Rail and Low-Cost Carriers on European Air Passenger Traffic
- Stein N.E.G., Sussman J.M. (2013). Discontinuous Regions: High-Speed Rail and the Limits of Traditional Governance. TRB

Publications – Papers II

- Sussman J.M., Archila A.F., Carlson S.J., Peña-Alcaraz M., Kawakami S., Stein N.E.G., Westrom R.J. (2013). NEC FUTURE Preliminary Alternatives Report: Public Comment
- Sussman J.M., Archila A.F., Carlson S.J., Peña-Alcaraz M., Stein N.E.G., Westrom R.J. (2012). NEC FUTURE Tier I Scoping Process: Public Comment
- Peña-Alcaraz M., Carlson S.J., Archila A.F., Stein N.E.G., Sussman J.M. (2013). Analysis of High-Speed Rail Implementation Alternatives in the Northeast Corridor: the Role of Institutional and Technological Flexibility. TRB
- Westrom R.J. (2013). An Examination of the Interaction between Two Prospective Transport Technologies: Questioning the Importance of High-Speed Rail in a Driverless Vehicle Society. TRB

Publications – Ph.D Theses

- Shah, N.B. (2012)
  - Influence Strategies for Systems of Systems. (Ph.D. Aero-Astro)
- Clewlow, R. R. L. (2012)
  - Climate Impacts of High-Speed Rail and Air Transportation: A Global Comparative Analysis. (Ph.D. ESD)
- Dunn, T. (2010)
  - The Geography of Strategy: An Exploration of Alternative Frameworks for Transportation Infrastructure Strategy Development. (Ph.D. CEE)

Publications – Theses S.M.

- Archila, A.F. (2013)
  - Intercity Passenger Rail Productivity in the Northeast Corridor: Implications for the Future of High-Speed Rail. (S.M. in Transportation)
- Stein, N.E.G. (2013)
  - Spatial Dimensions of High-Speed Rail: Intermediate Cities, Inter-Jurisdictional Planning, and the Implications for High-Speed Rail in Portugal. (S.M. in Transportation and Master in City Planning)
- Sakamoto, R. (2012)
  - High-Speed Railway Productivity: How Does Organizational Restructuring Contribute to HSR Productivity Growth? (S.M. in Transportation)
- Huang, T. (2011)
  - Financial Impacts of and Financing Methods for High-Speed Rail in Portugal. (S.M. in Transportation)
- Melibaeva, S. (2010)
  - Development Impacts of High-Speed Rail: Megalopolis Formation and Implications for Portugal's Lisbon-Porto High-Speed Rail Link. (S.M. in Transportation)

Future Work

- Comparative Studies of HSR – Portugal and the US
- Market Design Analysis for Capacity Pricing and Allocation in Shared Railway Systems
- HSR Safety in the Northeast Corridor
- Cross-Border HSR Effect: Economic and Social Structure – Southeast Asia
- Continued Focus on Innovative Methods for Analysis

Questions?

http://web.mit.edu/hsr-group

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Research and Innovative Technology Administration

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