

Intelligent Transportation Systems  
Joint Program Office (ITS JPO)

**If We Had Coordinated, We Would Have  
Saved - Analyzing Empirical Human  
Service Transportation Data from Two  
Rural Communities**

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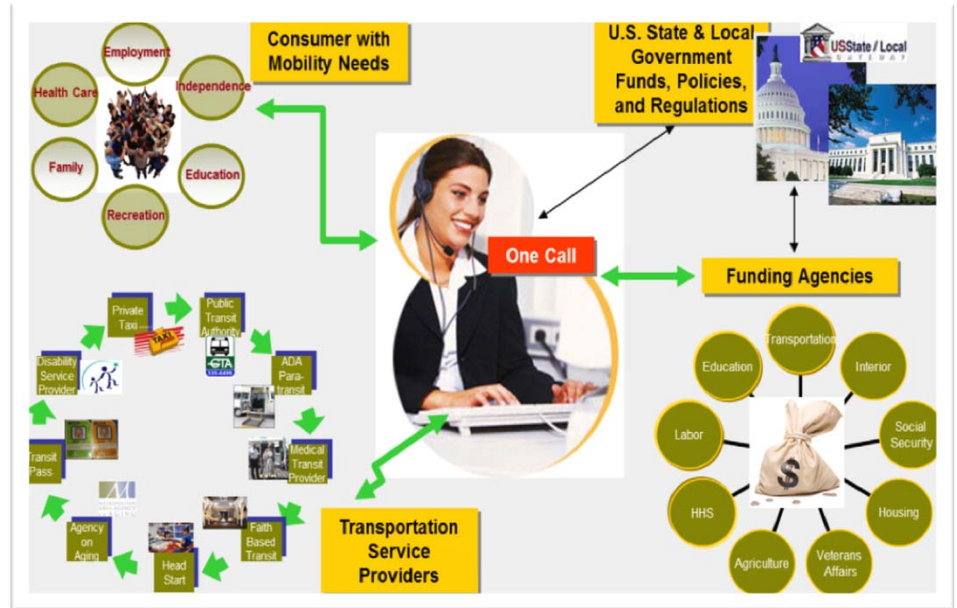
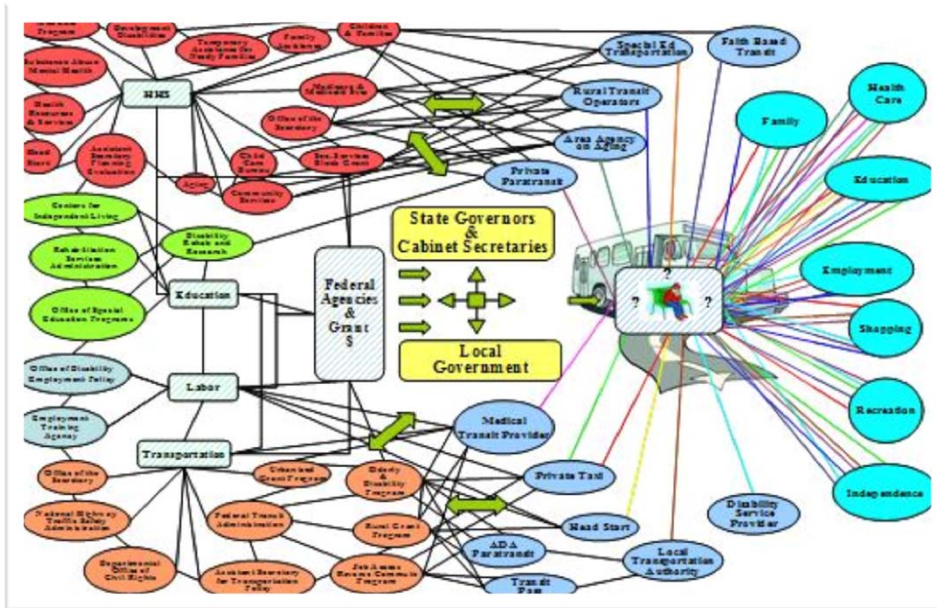
2013 NRITS Conference

# Challenges and Opportunities

*Service Coordination + Technology Integration*



*Better Service for Travelers + Reduced Government Spending on Transportation*

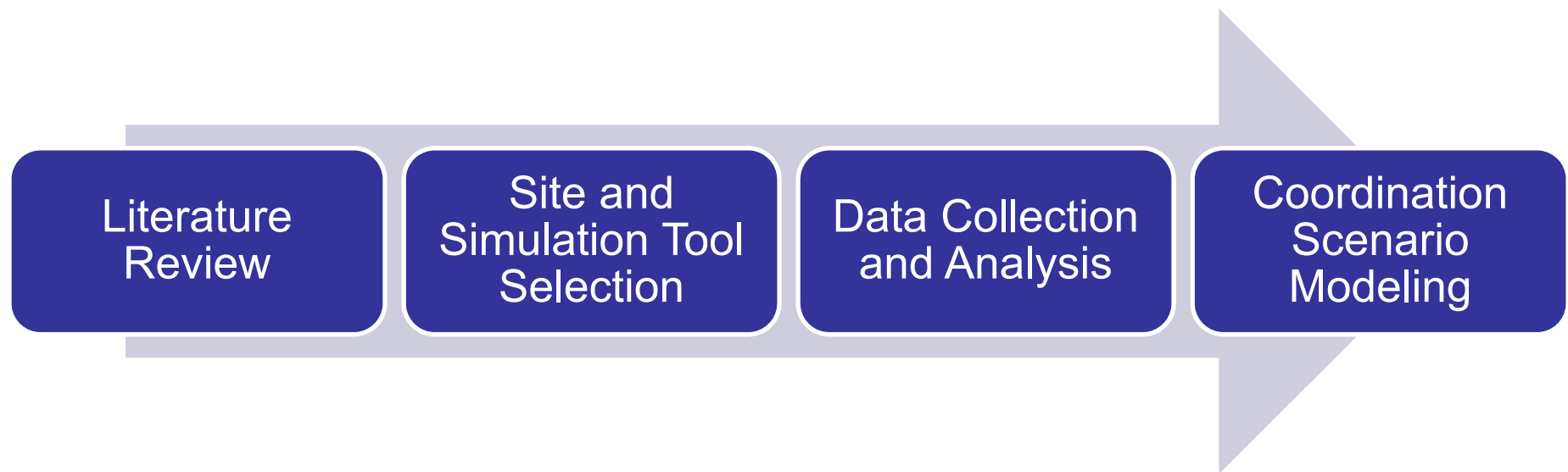


U.S. Department of Transportation  
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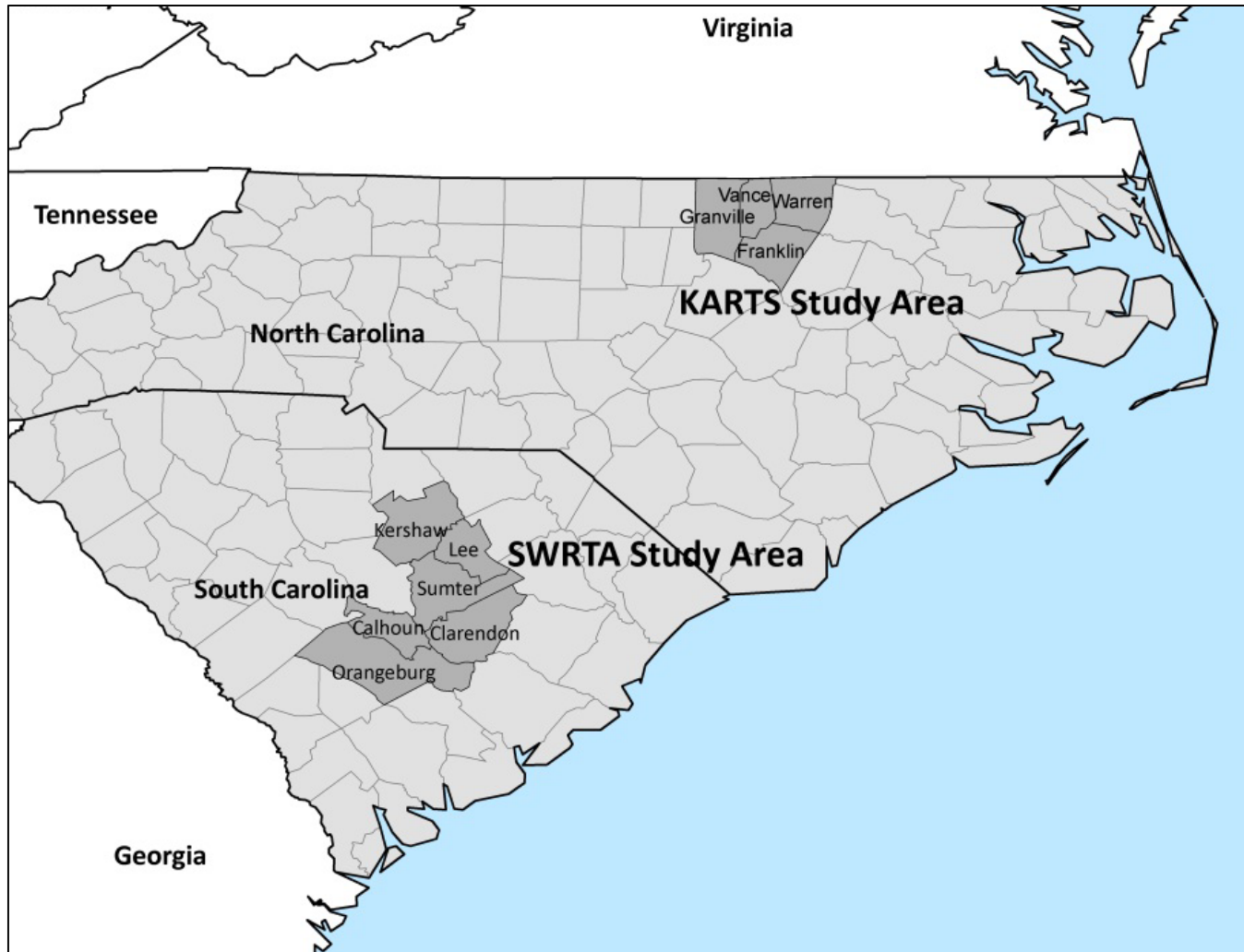
# Simulating MSAA Coordination Impacts

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- A study sponsored by USDOT
- Study scope: estimate impacts (such as savings in VMT) based on simulations of various coordination scenarios using real travel data
- Expected outcome: define reasonable expectation of cost savings to hopefully encourage further transportation coordination among federal departments that fund transportation for their clients.



# Simulation Background Facts



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# Simulation Background Facts (cont.)

	KARTS (NC)	SWRTA (SC)
Service Area (sq. mi.)	1,746	4,049
Population (2010)*	186,929	331,020
% of Population Age 60 and Over (2010)*	13.6%	14.3%
% of Population below Poverty **	18.6%	20.2%

\*2010 US Census; \*\*2007-2011 American Community Survey, 5 year estimates

- Two typical weekdays
  - September 18 & 19, 2012
- Simulated scenarios
  - Some Coordination (3 groups): Medicaid Only; Aging Only; & All Other Trips
  - More Coordination (2 groups): Medicaid Only; & All Other Trips
  - Full Coordination: All Trips

	KARTS (NC)	SWRTA (SC)
# of Paratransit Trips	1,041	1,474
Medicaid Trips (%)	339 (33%)	664 (45%)
Aging Trips (%)	347 (33%)	274 (19%)
Other HST Trips (%)	355 (34%)	536 (36%)
Subscription Trips (%)	837 (80%)	866 (59%)



# SWRTA Performance Measures

Performance Measures	Scenario #1 Some Coordination	Scenario #2 More Coordination	Scenario #3 Full Coordination	% Difference (Scenario 1 and 3)	% Difference (Scenario 2 and 3)
Total Vehicle Hours (hrs.)	1,141	1,105	1,024	-10%	-7%
Total Revenue Hours (hrs.)	1,024	1,000	925	-10%	-7%
Total Vehicle Distance (mi.)	21,634	20,525	18,826	-13%	-8%
Total Revenue Distance (mi.)	17,126	16,519	15,424	-10%	-7%
Passengers per Revenue Hour	1.53	1.57	1.69	11%	8%
# of Vehicles Used	Day 1: 51 vehicles - Day 2: 65 vehicles				

Results are aggregated over both days of simulation.

# KARTS Performance Measures

Performance Measures	Scenario #1 Some Coordination	Scenario #2 More Coordination	Scenario #3 Full Coordination	% Difference (Scenario 1 and 3)	% Difference (Scenario 2 and 3)
Total Vehicle Hours (hrs.)	730	700	672	-8%	-4%
Total Revenue Hours (hrs.)	660	630	604	-9%	-4%
Total Vehicle Distance (mi.)	14,989	14,714	13,946	-7%	-5%
Total Revenue Distance (mi.)	12,429	12,173	11,514	-7%	-5%
Passenger per Revenue Hour	1.65	1.73	1.81	9%	4%
# of Vehicles Used	Day 1: 37 vehicles - Day 2: 32 vehicles				

Results are aggregated over both days of simulation.



# Individual Trip Times by Scenario

	Scenario	Average Trip Time (minutes)		
		Some Coordination	More Coordination	Full Coordination
<b>SWRTA</b>	Medicaid Only (45%)	57.8	57.8	54.8
	Aging (19%)	48.6	50.6	53.2
	Others (36%)	53.9	51.8	52.9
	<b>Total</b>	<b>54.3</b>	<b>53.8</b>	<b>53.6</b>
<b>KARTS</b>	Medicaid Only (33%)	45.2	45.2	51.4
	Aging (33%)	47.8	52.2	53.3
	Others (34%)	50.0	53.9	52.9
	<b>Total</b>	<b>47.7</b>	<b>50.5</b>	<b>52.5</b>

Results are aggregated over both days of simulation.





# Conclusions

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- For service providers:
  - The number of total and revenue VMT and VHT decreased 8-10% and 7-13%, respectively, as the number of coordinated trips increased.
  - Reductions in deadhead miles were significant in SC (~1,100 miles), but NC reductions were small (~130 miles) as coordination increased.
  - Small reductions in deadhead hours were seen in both case studies as coordination increased.
  
- For individuals:
  - The affect of coordination on average trip times was inconclusive
    - SWRTA saw overall decrease (0.7 minutes);
    - KARTS saw overall increase (4.8 minutes)
  - No group had trip times consistently increase or decrease across case studies
  - Inconsistencies may be due to different distributions of trips by group, as well as the size of the service area.



# Acknowledgements

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- ITS Joint Program Office
- Federal Transit Administration
- RouteMatch Software
- Santee-Wateree Regional Transit Administration (SWRTA)
- Kerr Area Rural Transit System (KARTS)

