Introduction

Welcome to the 2021 Traffic Simulation Survey. The TRB Standing Committee on Traffic Simulation (ACP80) is conducting this survey to get a better understanding of current and emerging uses of traffic simulation and the challenges faced by traffic simulation software users.

Which best describes your organization?

- ○ National transportation agency/ministry
- ○ State, provincial, or prefectural transportation agency/ministry
- ○ Municipal or local government agency
- ○ Toll bridge or toll road operator
- ○ Public transportation agency
- ○ Planning agency such as an MPO or RPC
- ○ Consulting firm
- ○ Academic or research institution
- ○ Simulation software developer or reseller
- ○ [ ] Other (please describe)

Where is the organization's primary base of operations?

- ○ United States - AASHTO Region 1 (CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VT)
- ○ United States - AASHTO Region 2 (AL, AR, FL, GA, KY, LA, MS, NC, PR, SC, TN, VA, WV)
- ○ United States - AASHTO Region 3 (IA, IL, IN, KS, MI, MN, MO, OH, WI)
- ○ United States - AASHTO Region 4 (AK, AZ, CA, CO, HI, ID, MT, ND, NE, NM, NV, OK, OR, SD, TX, UT, WA, WY)

- ○ Canada
- ○ Mexico, Central America, or Caribbean
- ○ South America
- ○ European Union (EU 27)
- ○ United Kingdom
- ○ Other Western Europe (non-EU)
- ○ Eastern Europe (non-EU)
- ○ Middle East or Northern Africa
- ○ Sub-Saharan Africa
- ○ China, Hong Kong, Macau, Singapore, or Taiwan
- ○ Japan or South Korea
- ○ Other Central, East, or Southeast Asia
- ○ Bangladesh, Bhutan, India, Nepal, Pakistan, or Sri Lanka
- ○ Australia or New Zealand
- ○ Other Oceania
- ○ Multinational

Organization Size

- ○ 0 to 5 employees
- ○ 6 to 10 employees
- ○ 11 to 20 employees
- ○ 21 to 50 employees
- ○ 51 to 100 employees
- ○ 101 to 200 employees
- ○ 201 to 500 employees
- ○ 501 employees or more

Please describe your role(s) in the organization (mark all that apply)

- ☐ Senior management
- ☐ Middle management

- [ ] Staff member with responsibility for application of simulation software
- [ ] Staff member with responsibility for review of simulation models developed by others
- [ ] Staff member with responsibility for interpretation/application of simulation results
- [ ] Professor/instructor
- [ ] Academic/research staff
- [ ] Student
- [ ] Microsimulation software developer
- [ ] Sales/marketing
- [ ] Other (please describe)

How many years of simulation modeling experience do you have?

- ○ Less than one
- ○ 1 or 2
- ○ 3 to 5
- ○ 6 to 10
- ○ 11 to 15
- ○ 15 to 20
- ○ 21 or more

Which best describes your gender?

- ○ Man
- ○ Woman
- ○ Non-binary / third gender
- ○ Prefer not to say

In the past year, how many traffic simulation projects have you worked on?

- ○ 0
- ○ 1
- ○ 2
- ○ 3 or 4
- ○ 5 to 9
- ○ 10 or more

Block 3

What were the main reasons you did not work on any simulation projects this year? (Please mark all that apply)

- ☐ No relevant projects or analysis needs
- ☐ Insufficient funding
- ☐ Work was done by others
- ☐ Need more technical training
- ☐ Need better technical guidelines
- ☐ Stakeholder resistance to simulation
- ☐ Dissatisfaction with previous simulation projects
- ☐ [ ] Other (please explain)

Modeling Experience 1

For the largest simulation project, what type of simulation was performed?

- ○ Microscopic
- ○ Mesoscopic
- ○ Macroscopic

- ○ Four-step travel demand forecasting
- ○ Sketch-planning
- ○ Multi-resolution modeling
- ○ [ ] Other (please describe)

For the largest project, what was the approximate total centerline roadway distance that was simulated?

- ○ Less than 1/2 mile (less than 1 km)
- ○ 1/2 to 1 mile (1 to 2 km)
- ○ 1 to 2 miles (2 to 3 km)
- ○ 3 to 5 miles (4 to 8 km)
- ○ 6 to 10 miles (9 to 16 km)
- ○ 11 to 20 miles (17 to 34 km)
- ○ 21 to 50 miles (35 to 80 km)
- ○ 51 to 100 miles (81 to 160 km)
- ○ 101 to 200 miles (161 to 320 km)
- ○ 201 to 500 miles (321 to 800 km)
- ○ 501 miles (801 km) or more
- ○ Aviation facilities on air side only (behind security screening)
- ○ Pedestrian facilities only
- ○ Rail facilities only
- ○ [ ] Other (please explain)

For the largest project, what features were included in the model?

- ☐ Freeway
- ☐ Divided highway (non-freeway)
- ☐ Rural undivided highway
- ☐ Suburban arterial street
- ☐ Urban arterial street

- [ ] Sub-arterial streets/highway
- [ ] Toll plazas
- [ ] Pedestrian paths
- [ ] Bicycle paths
- [ ] Roundabouts
- [ ] Traffic signals
- [ ] Ramp meters
- [ ] Intelligent transportation systems devices
- [ ] Connected/automated vehicles
- [ ] Electric vehicle charging infrastructure
- [ ] Public transportation infrastructure (bus stops, light rail, etc.)
- [ ] Freight rail infrastructure
- [ ] Air-side aviation infrastructure
- [ ] Other (please describe)

For the largest model, what were the main objectives of the study?

- [ ] Resolve existing problems with freeway operations
- [ ] Identify future problems with freeway operations
- [ ] Support detailed freeway design decisions
- [ ] Resolve existing problems with arterial operations
- [ ] Identify future problems with arterial operations
- [ ] Support detailed arterial design decisions
- [ ] Analyze traffic operations in work zones / support construction traffic management
- [ ] Analyze pedestrian circulation inside/near buildings
- [ ] Analyze bicyclist or pedestrian facilities on public streets/highways
- [ ] Analyze public transportation facilities (bus, passenger rail, etc.)
- [ ] Analyze air-side aviation facilities
- [ ] Analyze freight transportation facilities (road or rail)
- [ ] Other (please describe)

What difficulties were encountered in the largest model?

	No problem	Minor problem	Moderate problem	Serious problem	Severe problem	Extreme problem
Defining project scope/objectives	○	○	○	○	○	○
Determining existing roadway/facility geometrics	○	○	○	○	○	○
Determining/reconciling existing motor vehicle traffic volumes	○	○	○	○	○	○
Determining/reconciling existing pedestrian or bike traffic volumes	○	○	○	○	○	○
Determining existing traffic signal or ramp meter timings	○	○	○	○	○	○
Determining existing traffic speed or delay	○	○	○	○	○	○
Determining existing traffic queue length	○	○	○	○	○	○
Determining existing traffic pattern (origin-destination)	○	○	○	○	○	○
Overall quality control for model building	○	○	○	○	○	○
Replicating existing physical layout of roads, streets, and other facilities	○	○	○	○	○	○
Replicating existing traffic volumes	○	○	○	○	○	○
Replicating existing queuing and delay	○	○	○	○	○	○
Reasonableness of vehicle paths/route choices under existing conditions	○	○	○	○	○	○
Determining expected future physical layout of facilities	○	○	○	○	○	○
Determining future traffic signal timings	○	○	○	○	○	○

	No problem	Minor problem	Moderate problem	Serious problem	Severe problem	Extreme problem
Determining future motor vehicle traffic volumes	○	○	○	○	○	○
Determining future pedestrian traffic volumes	○	○	○	○	○	○
Reasonableness of future traffic speeds/delays, such as model "locking up"	○	○	○	○	○	○
Reasonableness of vehicle paths/route choices under future conditions	○	○	○	○	○	○
Maintaining consistency with other models or forecasts	○	○	○	○	○	○
Glitches in animations or other graphical outputs	○	○	○	○	○	○
Difficulty interpreting results	○	○	○	○	○	○
Lack of conclusive results	○	○	○	○	○	○
Unrealistic stakeholder expectations	○	○	○	○	○	○
Stakeholder distrust or dissatisfaction with model	○	○	○	○	○	○
Level of effort required to replicate existing physical layout	○	○	○	○	○	○
Level of effort required to replicate existing traffic volumes, speeds, queues, or delays	○	○	○	○	○	○
Level of effort required to replicate existing traffic patterns (origin-destination)	○	○	○	○	○	○
Level of effort required to model future conditions	○	○	○	○	○	○
Other 1 (please explain)	○	○	○	○	○	○
Other 2 (please explain)	○	○	○	○	○	○

Modeling Experience 2

For the second-largest project, what type of simulation was performed?

- ○ Microscopic
- ○ Mesoscopic
- ○ Macroscopic
- ○ Four-step travel demand forecasting
- ○ Sketch-planning
- ○ Multi-resolution modeling
- ○ [ ] Other (please describe)

For the second-largest project, what was the approximate total centerline roadway distance that was simulated?

- ○ Less than 1/2 mile (less than 1 km)
- ○ 1/2 to 1 mile (1 to 2 km)
- ○ 1 to 2 miles (2 to 3 km)
- ○ 3 to 5 miles (4 to 8 km)
- ○ 6 to 10 miles (9 to 16 km)
- ○ 11 to 20 miles (17 to 34 km)
- ○ 21 to 50 miles (35 to 80 km)
- ○ 51 to 100 miles (81 to 160 km)
- ○ 101 to 200 miles (161 to 320 km)
- ○ 201 to 500 miles (321 to 800 km)
- ○ 501 miles (801 km) or more
- ○ Aviation facilities on air side only (behind security screening)
- ○ Pedestrian facilities only
- ○ Rail facilities only
- ○ [ ] Other (please explain)

For the second-largest project, what features were included in the model?

- [ ] Freeway
- [ ] Divided highway (non-freeway)
- [ ] Rural undivided highway
- [ ] Suburban arterial street
- [ ] Urban arterial street
- [ ] Sub-arterial streets/highway
- [ ] Toll plazas
- [ ] Pedestrian paths
- [ ] Bicycle paths
- [ ] Roundabouts
- [ ] Traffic signals
- [ ] Ramp meters
- [ ] Intelligent transportation systems devices
- [ ] Connected/automated vehicles
- [ ] Electric vehicle charging infrastructure
- [ ] Public transportation infrastructure (bus stops, light rail, etc.)
- [ ] Freight rail infrastructure
- [ ] Aviation infrastructure on air side (behind security screening)
- [ ] Other (please describe)

For the second-largest model, what were the main objectives of the study?

- [ ] Resolve existing problems with freeway operations
- [ ] Identify future problems with freeway operations
- [ ] Support detailed freeway design decisions
- [ ] Resolve existing problems with arterial operations
- [ ] Identify future problems with arterial operations
- [ ] Support detailed arterial design decisions
- [ ] Analyze traffic operations in work zones / support construction traffic management

- [ ] Analyze pedestrian circulation inside/near buildings
- [ ] Analyze bicyclist or pedestrian facilities on public streets/highways
- [ ] Analyze public transportation facilities (bus, passenger rail, etc.)
- [ ] Analyze air-side aviation facilities
- [ ] Analyze freight transportation facilities (road or rail)
- [ ] Other (please describe)

What difficulties were encountered in the second-largest model?

	No problem	Minor problem	Moderate problem	Serious problem	Severe problem	Extreme problem
Defining project scope/objectives	○	○	○	○	○	○
Determining existing roadway/facility geometrics	○	○	○	○	○	○
Determining/reconciling existing motor vehicle traffic volumes	○	○	○	○	○	○
Determining/reconciling existing pedestrian or bike traffic volumes	○	○	○	○	○	○
Determining existing traffic signal or ramp meter timings	○	○	○	○	○	○
Determining existing traffic speed or delay	○	○	○	○	○	○
Determining existing traffic queue length	○	○	○	○	○	○
Determining existing traffic pattern (origin-destination)	○	○	○	○	○	○
Overall quality control for model building	○	○	○	○	○	○

	No problem	Minor problem	Moderate problem	Serious problem	Severe problem	Extreme problem
Replicating existing physical layout of roads, streets, and other facilities	○	○	○	○	○	○
Replicating existing traffic volumes	○	○	○	○	○	○
Replicating existing queuing and delay	○	○	○	○	○	○
Reasonableness of vehicle paths/route choices under existing conditions	○	○	○	○	○	○
Determining expected future physical layout of facilities	○	○	○	○	○	○
Determining future traffic signal timings	○	○	○	○	○	○
Determining future motor vehicle traffic volumes	○	○	○	○	○	○
Determining future pedestrian traffic volumes	○	○	○	○	○	○
Reasonableness of future traffic speeds/delays, such as model "locking up"	○	○	○	○	○	○
Reasonableness of vehicle paths/route choices under future conditions	○	○	○	○	○	○
Maintaining consistency with other models or forecasts	○	○	○	○	○	○
Glitches in animations or other graphical outputs	○	○	○	○	○	○
Difficulty interpreting results	○	○	○	○	○	○
Lack of conclusive results	○	○	○	○	○	○
Unrealistic stakeholder expectations	○	○	○	○	○	○
Stakeholder distrust or dissatisfaction with model	○	○	○	○	○	○
Level of effort required to replicate existing physical layout	○	○	○	○	○	○
Level of effort required to replicate existing traffic volumes, speeds, queues, or delays	○	○	○	○	○	○

	No problem	Minor problem	Moderate problem	Serious problem	Severe problem	Extreme problem
Level of effort required to replicate existing traffic patterns (origin-destination)	○	○	○	○	○	○
Level of effort required to model future conditions	○	○	○	○	○	○
Other 1 (please explain)	○	○	○	○	○	○
Other 2 (please explain)	○	○	○	○	○	○

Block 4

Which activities should the ACP80 committee emphasize over the next year? (Choose up to 3)

- ☐ Publication of technical guidelines such as the Traffic Systems Simulation Manual (TSSM)
- ☐ Webinars with high-level overviews of simulation projects and applications
- ☐ Webinars about when to use simulation (strengths, weaknesses, alternatives)
- ☐ Webinars about the technical process of building and calibrating simulation models
- ☐ Webinars about simulation research
- ☐ Other (please describe)