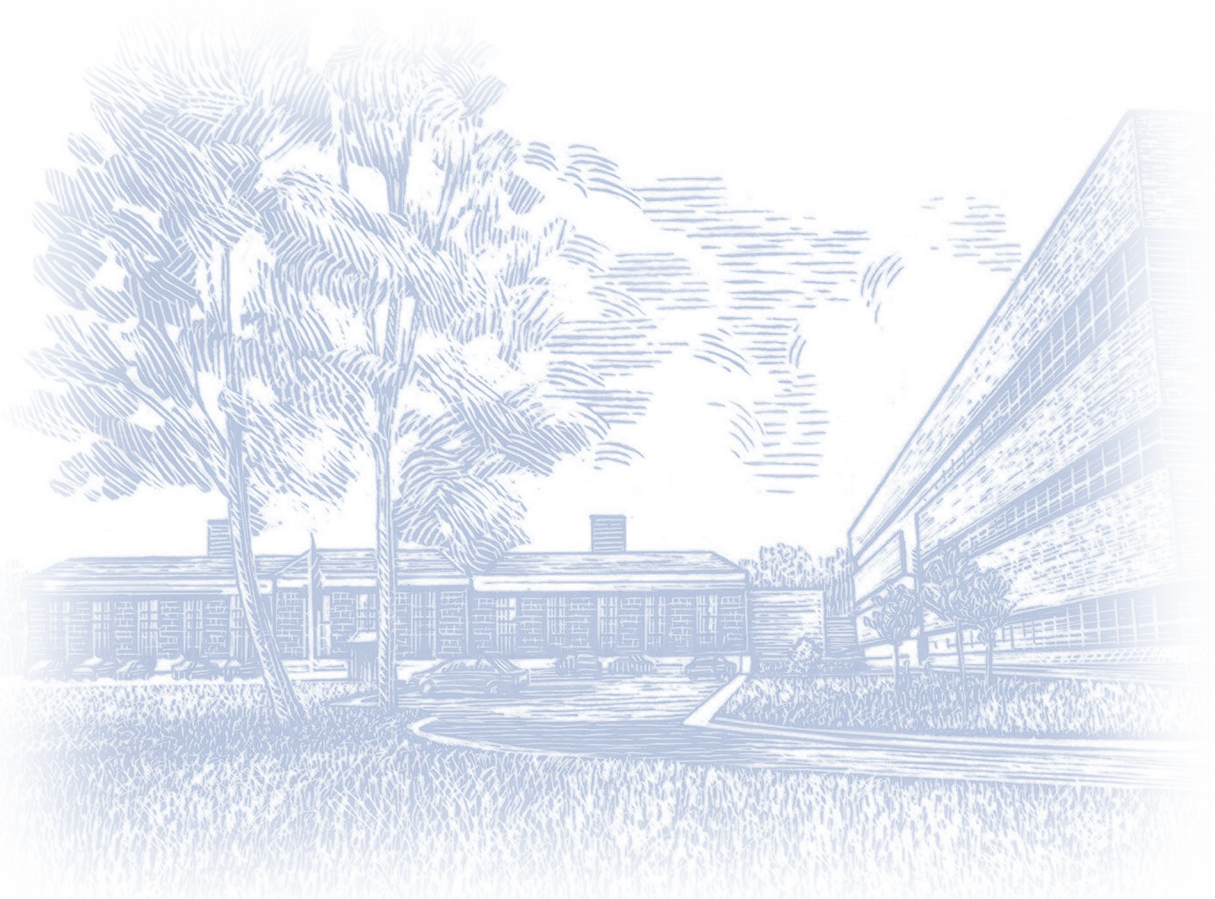


Human Factors Design Of Automated Highway Systems: Scenario Definition

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Attention to driver acceptance and performance issues during system design will be key to the success of the Automated Highway System (AHS). A first step in the process of defining driver roles and driver–system interface requirements of AHS is the definition of system visions and operational scenarios.

Seven operational AHS scenarios were defined, six of which were differentiated by varying three key dimensions: (1) degree to which automated and manual traffic is separated; (2) degree to which automated lanes are separated from one another; and (3) vehicle–following rules (e.g., groups versus individual vehicles). The first scenario (free agent/self–contained) describes a transitional AHS vision representing an intermediate stage of complexity and technology between current highway practices and full automation scenarios. The scenarios are:

1. Free agent/self–contained.
2. No barriers on the highway with individual vehicles.
3. No barriers on the highway with grouped vehicles.
4. Barriers on the highway with individual vehicles.
5. Barriers on the highway with grouped vehicles.
6. Segregated highway with individual vehicles.
7. Segregated highway with grouped vehicles.

The seven scenarios vary in the complexity of the automated and manual maneuvers required, the physical space allowed for maneuvers, and the nature of the resulting demands on the driver.

Figures 1 through 3 depict each scenario's relative position on the three key dimensions. Based on these dimensions, three scenarios were selected for further study. *Free agent/self–contained* was selected since it represents a partial automation scenario. *Barriers on the highway with grouped vehicles* was included because it is the most complicated scenario and includes a shared highway, barriers, and maneuvers that must be performed by vehicle groups. Finally, the *segregated highway with individual vehicles* was selected since it would be the least complex full automation scenario.

These scenarios became the basis for a series of analytical studies and provided a framework to systematically explore impacts on driver behavior. Many of the variables identified via the scenario development process have become candidates for experimental research in this program.

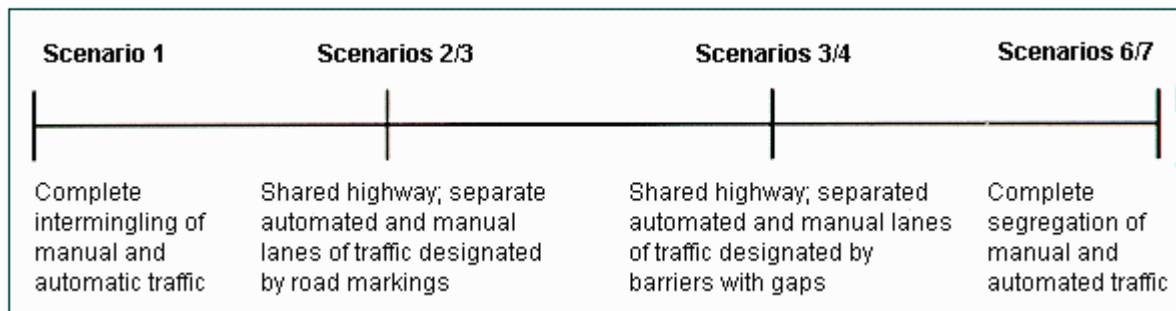


Figure 1. Placement of AHS operational scenarios along the dimension of roadway separation

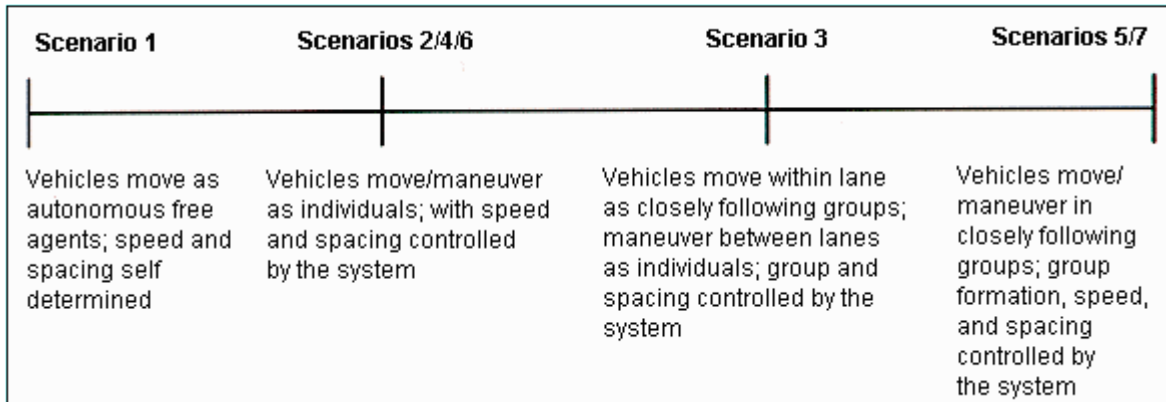


Figure 2. Placement of AHS operational scenarios along the dimension of vehicle control rules

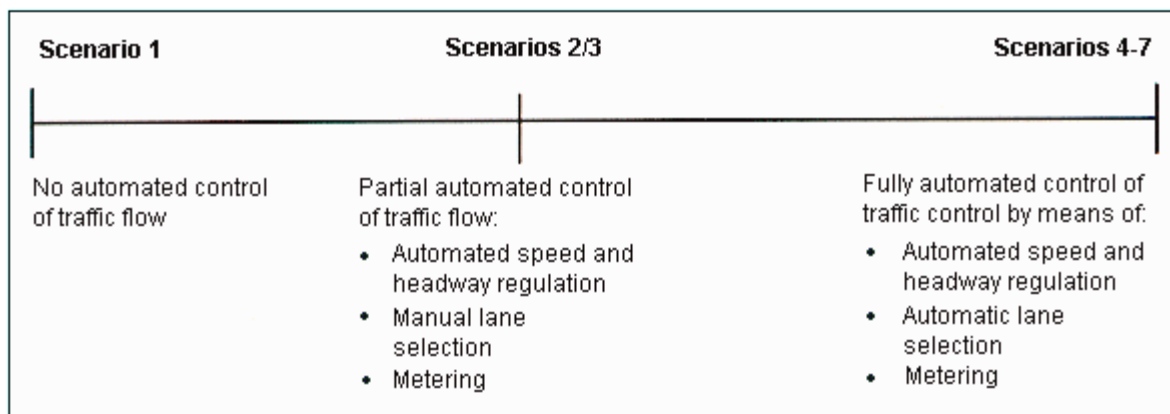


Figure 3. Placement of AHS scenarios along the dimension of control of traffic flow

For More Information

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