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## **Why We Need to Get Beyond the Automated Highway System**

***Hank Dittmar critiques the Automated Highway System.***

Presentation by  
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to the

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### **Introduction**

The Surface Transportation Policy Project believes that the Automated Highway Systems project has been flawed since its inception. The project has both flaws in its institutional and scientific approach and in the overall implementability of an Automated Highway System concept involving high speed platooning of vehicles in a "hands-off" mode in a real world environment. This criticism does not imply criticism of the overall Intelligent Transportation Systems program, which we feel has some merit through programs such as traveler information, advanced transit and traffic management, and other safety applications. Nor do we believe that the Intelligent Vehicle research being proposed to replace the AHS effort is fundamentally flawed, as it focuses on providing improved safety through enhancing vehicle capabilities and ultimately the ability of the vehicle operator to respond to safety problems. Some of the research performed by the AHS Consortium may be of real benefit to this Intelligent Vehicle Initiative.

Our concerns with the AHS Consortium effort are briefly summarized below.

### **Fatal Flaws in Design Concept, Scope and Conduct of AHS Research**

- **The AHS program is a solution looking for a problem.** Basically the ISTEA legislation stipulated the development of an AHS prototype or demonstration, presuming that a fully automated highway was the solution to some problem. AHS promoters have ex post facto appended goals of safety, improved mobility and environmental betterment to the program, but that's besides the point. A proper research question might have been: how can advanced telecommunication and control technologies be employed to better link the vehicle, the vehicle operator and the transportation infrastructure to optimize efficiency, safety and community and environmental benefit? Performance targets could have been set for each goal, and a fully automated highway system might have been one of the ways of reaching the goals. Presuming a technological solution before even asking the research question is bad science.
- **The AHS Consortium has an inherently conflicted role.** The Consortium members are charged with simultaneously developing and evaluating the Automated Highway System. As many of the consortium members stand to profit from its introduction (if public subsidy is provided for the highway infrastructure), the AHS consortium has also taken on the job of promoting the Automated Highway System through a series of expensive and heavily marketed roll-outs. To ask the same

people to develop and critique a program is bad science. To have them also act to promote it is even more questionable. For the federal government to actually join the consortium as a member also raises questions about FHWA's ability to independently act to monitor the contract and assure performance and progress.

- **The AHS program has lacked ongoing independent criticism, evaluation and peer review.** All peer review of the program has been conducted from within the Consortium, and to the best of my knowledge, all evaluations of its environmental or societal implications have been funded by the consortium and have remained the work product of the Consortium. This TRB review of the program is the first FHWA funded evaluation of the program outside the control of the Consortium. There is ample precedent for ongoing peer review of these kind of industry-government partnerships. The Partnership for a New Generation of Vehicles has benefited from an ongoing NRC panel which has issued a series of critical evaluations of the research goals, plan and methodology of the PNGV. Similarly, the Human Genome project has allocated funding for independent evaluation of the societal and ethical implications of the project.
- **The AHS program lacks a true systems context.** The Automated Highway System would be one new element in a complex increasingly integrated Intermodal transportation system. In addition the AHS will have complex interactions with the built and natural environment and with societal as a whole. In focusing on technical feasibility and on systems engineering for the AHS system, the project has failed to conceptualize the AHS within this larger environment, and as a consequence has trivialized the real issues facing scale up on an AHS from a nifty demonstration with lots of "gee-whiz" appeal to a broadly implementable application.

## **Problems With Implementing an Automated Highway System**

- **Public Acceptability.** I have seen no evidence that the public is willing to allow its daily commutes to be interrupted while an AHS is constructed within its metropolitan freeway system, or that they are willing to pay for either the public or private costs of the system. Will Americans trust government or corporations to drive their cars for them? Will they pay thousands of dollars extra to equip their automobiles to be AHS capable? Will members of the public who cannot afford to buy AHS capability accept being denied access to a portion of the highway infrastructure? Public outcry over toll proposals and HOV lanes would seem to indicate that the AHS would generate a substantial outcry over a "two-class" highway system. The AHS Consortium has devoted to little attention to researching these issues.
- **How can AHS be "scaled up" to a meaningful system?** While we never doubted that a prototype AHS could be built (after all we've had automated train control for some time), we have long wondered where the AHS will be put in the real world. Will it take away existing freeway lanes on crowded metropolitan interstates? Will we construct second decks on top of existing freeways, or acquire entirely new rights of way? It seems unlikely that enough right of way will be found in enough places to make the AHS implementable in most metropolitan areas across the country. If it is not available on most freeways, then how many automobile manufacturers will offer it? If few manufacturers offer it, then few people will buy AHS capability and few will use AHS lanes. The AHS Consortium has not adequately addressed this issue of scaling up from the prototype.

- **The AHS will likely involve prohibitive public sector construction and operation costs.** For the AHS to achieve its stated safety, mobility and environmental goals, it will have to be broadly applied in metropolitan settings all over the country. It is not clear to me where AHS lanes (typically 2-4 lanes for bi-directional flow and transition) can be placed in our already crowded metropolitan transportation systems. Either lanes will be taken out of general use or entirely new lanes will have to be constructed. The construction of new lanes will be hugely expensive and also disrupt traffic on a large scale. I have seen no evaluation of these costs, which should have been presented front and center at the San Diego roll-out.
- **The claimed environmental benefits of the AHS are questionable, if not entirely spurious.** AHS backers have claimed that the AHS will improve air quality by improving traffic flow. This claim appears to rest on earlier air quality models which claimed hydrocarbon benefits from increases in traffic speed. More recent models indicate that traffic flow improvements actually worsen emissions of another pollutant, NOX. In addition research indicates that most of the traffic flow improvements from added capacity are short term, as added capacity is soon filled by induced travel as motorists change routes, alter timing of their trips and make new trips. In the long run, improved throughput is not a sustainable air quality strategy.
- **The AHS may have substantial negative impacts on non-automated streets and highways.** If the claimed increases in capacity are real, and automated lanes actually do carry more people to downtowns and suburban activity centers, then the AHS would dump substantial additional traffic on the already overcrowded "dumb" streets of our urban and suburban business districts. The AHS backers have not modeled the system impacts of additional traffic carried by the AHS lanes on surface streets and other non-automated freeway lanes. The benefits could be substantially reduced.
- **AHS benefits are likely to be further reduced by safety and reliability concerns.** Concerns about liability (won't AHS operators be assuming liability over vehicle operations?) would be certain to lead to reductions in AHS operating speeds, to increases in following distance between platooned vehicles, to the construction of barriers to prevent vandalism and outside interference, and thus to a reduction in overall benefits as reliability, redundancy and protection from liability become more important than improved throughput and higher speeds. This tradeoff may increase AHS costs dramatically and reduce benefits at the same time.

*The Surface Transportation Policy Project is a nationwide network of more than 800 organizations, including planners, community development organizations, and advocacy groups, devoted to improving the nation's transportation system.*