



Trends in North American Intelligent Transportation Systems: A Year 2000 Appraisal

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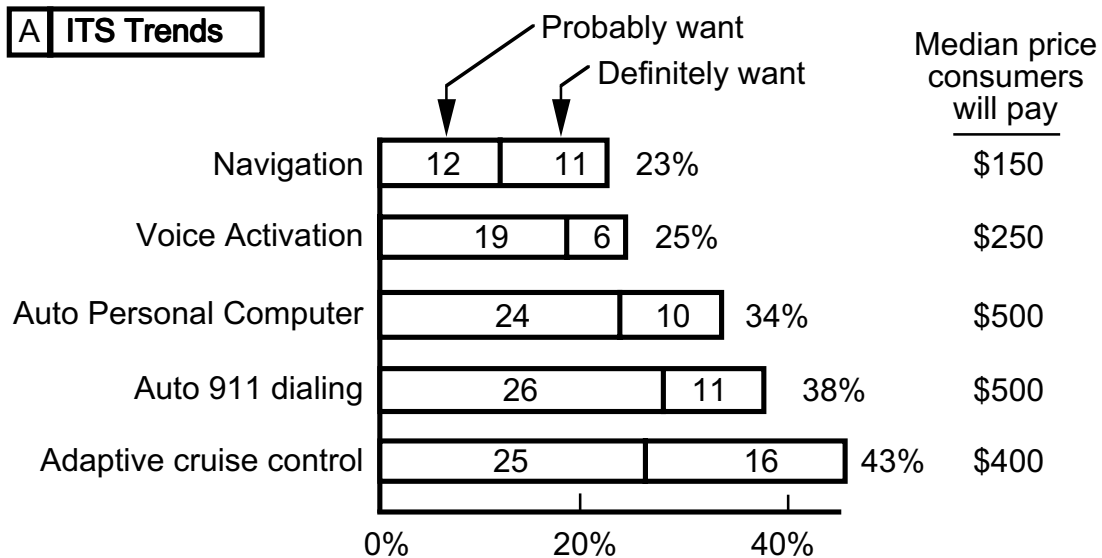
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1 ISSUES

A	general trends	ITS technologies in North America; customer interest in ITS
B	specific trends	describe FCC E911 rule ; impact on Mayday systems, telematics
C		mobile Internet devices ; impact on in-vehicle telematics
D		navigation systems
E		vehicle communication buses, especially IDB
F	product liability	PL concerns for ITS in general; ACC and collision avoidance

2 METHOD Internet search supplemented by personal files and contacts

3 SELECTED FINDINGS



**Predicted Market Penetration (% Cars Produced)
by 2009 from Michigan Delphi**

System	Penetration
Navigation	25%
OnStar-like Service	25%
Collision Warning	22.5%
In-Vehicle Messaging	20%
Adaptive Cruise Control	15%
Automatic Toll Collection	10%

Note:
The report contains a large and detailed table containing predictions by year for various technologies. Readers are encouraged to review that table.

B | FCC E911 Rule and Phones

- to comply, phones must have ALI capability within next few years, probably via GPS
- automatic location identification (ALI) accuracy is 50 m for 67%, 150 m for 95%
- systems sharing ALI will see some cost reductions and market growth
- exponential increases in number of subscribers over time
- wireless subscribers may outnumber wireline subscribers in future
- large growth expected for services resembling OnStar (Mayday plus other services)
- vehicles supporting Bluetooth-capable phones expected within next year
- future support for WAP and VoiceXML (for phone access of internet) is unknown

C | Mobile Internet Devices

- **market for mobile devices will continue to grow**
- leading PDA OS for next year or so will be Palm

Possible future devices	Comment
Phone with PDA functions	phone manufacturers have economy of scale
PDA with phone functions	internet could reduce call costs; voice quality is a concern
Laptop with a phone	probably too bulky
Wearable computer	belt-mounted computer is easy to carry; glasses display can be "geekish" but display area is large
Wrist computer	culturally accepted to wear a device on wrist and look at it for information; small display is limiting
Something else	not yet invented or well known

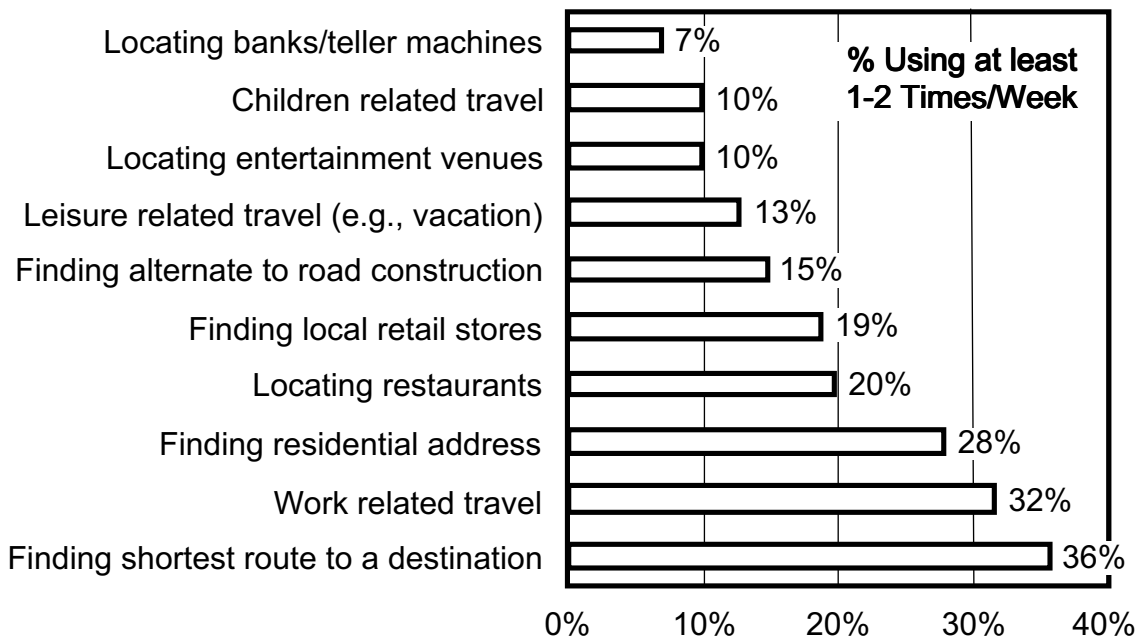
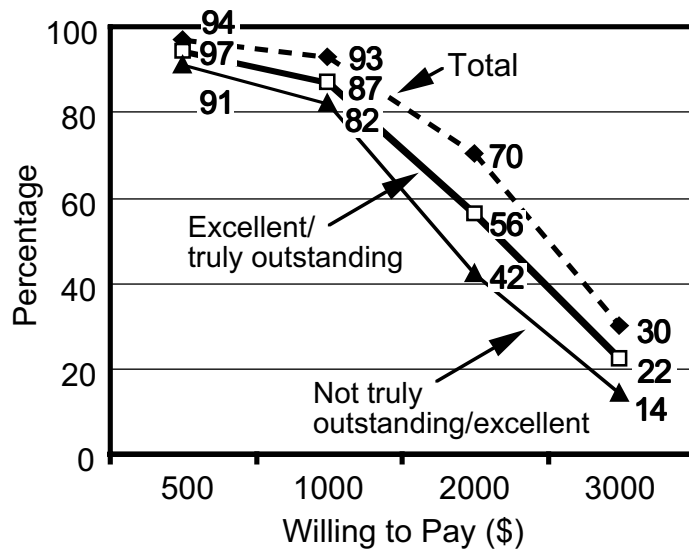
For automotive applications, the following questions need to be addressed:

- What data needs to be synchronized between the car and the portable device?
- How will the device and the car communicate (e.g., IR, Bluetooth, docking station)?
- What will be used for input (e.g., voice, handwriting, gestures?) and output (HUD, eyeglasses)?
- What kinds of information will be exchanged (address lists, email, news, etc.)?
- How much is too much for people to do while driving?

D Navigation Market

Future Developments

- ISO usability test standard developed
- voice input becomes more common
- HUD for output
- wearable computer implementations



E IDB Prediction: Except for certain time-critical, mission-critical systems (e.g., air bags), IDB will be the standard bus.

- Short develop cycles require standard plug and play interfaces.
- The IDB Forum has successfully coordinated its efforts with other related organizations (TSC, AMI-C).
- The engineering community has seen the value of IDB at plugfests.
- The standards are technically sound and build upon existing standards.

F Product Liability NOTE: As the authors are only informed observers of ITS, an attorney-at-law should be contacted for legal opinions relating to product liability.

Primary Legal Issues and Reasons Delay Is Expected

System	Delay	Legal Issues
Adaptive Cruise Control	y	Liability suits; compliance with SAE and ISO practices should provide some protection to manufacturers
Advanced Vehicle Control (AVCS)	y	Negligence, strict product liability, breach of warranty major concerns assuming control from the driver; likely target of legal action
Collision Avoidance/ Collision Warning	y	Defective design liability, strict liability for manufacturing defects, negligence for inducing driver reliance on imperfect systems, failure to install systems in all vehicles
Navigation	n	Liability due to crash-induced distractions (while entering data or reading text), liability due to with map errors (leading to violation of traffic laws); compliance with SAE and ISO standards offers protection

4 FUTURE RESEARCH

1. How does the accuracy of various ITS technology forecasts (Delphi, marketing firms, etc.) compare with each other and with actual market data?
2. How can the relative benefits safety technologies be predicted from the type of device, the impact on driver performance, likely changes in risk-taking, and other factors?
3. How can the success of ITS products be predicted from product characteristics such as the visibility of the device, the visibility of device controls and displays, the specific safety benefit (e.g., reduction in fires, protection of children), and so forth?