T2+2™ Market Overview

Advanced Traffic Management Systems

March 4, 2009

Foresight Science & Technology, 430 Angell St., Providence, RI 02906
Voice: 401-273-4844; Fax: 401-273-4744; Web: http://www.foresightst.com/

Advanced traffic management systems (ATMS) are a subset of intelligent transportation systems (ITS), and as such it is difficult to determine exactly what falls under which heading. As a result, please note which of the below data refer specifically to ATMS and which to ITS. Wherever possible, data on ATMS is used.

Market Niche Size			
Market Size in Dollars	***Growth Rate***	***Base Year***	***Detailed Basis for Estimate***
€658 million (ATMS- Western Europe)	3.6%	2006	According to Frost and Sullivan, video detection solutions for ATMS are growing at a compound annual growth rate (CAGR) of 3%, overhead sensors (which are replacing loop detection systems) are growing at 4%, and coordinated signal systems are growing at 3%.[1]
~$1.55 billion (ATMS- United States)	3.6%	2007	According to ITS expert J.L. Chen, the U.S. overall ITS market was approximately $5 billion in 2007.[2] By taking a ratio of the 2006 European ATMS (€658 million) market to the 2006 overall ITS market as forecast by Frost & Sullivan (€2.15 billion)[3] − 31% − and applying it to the U.S., an approximate ATMS market of $1.55 billion is derived. Using this methodology, the growth rate in the U.S. market is the same as that of the European market.
€450 million (ITS- China & Hong Kong)	N/A	2006 & 2007	Due to the 2008 Olympics and Beijing and the rapid urbanization of China, the Chinese government has become more willing to invest in ITS projects.[4]
€548 million (ITS- India)	N/A	2007-2010	As a result in of the enormous "Golden Quadrilateral" project, India is has allocated significant funds for ITS spending, It is estimated that every 100km of the ~6,000km Quadrilateral will require €2.7 million worth of ITS.[5]

The market size and growth rate is a function of the number of people in the market and the anticipated rate of buying. As markets transition between emerging, growth, shakeout, mature, and declining, the basis for competition and the number of competitors usually changes, along with the factors influencing adoption of innovation. The number of and growth rate for customers suggests how many units might be sold.[6]

---

[1] "Strategic Analysis of the Advanced Traffic Management Systems Market in Western Europe," May 31, 2007. Frost & Sullivan web site (subscription required). http://www.frost.com/ (accessed March 3, 2009).
[2] Chen, J.L. "Intelligent Transport System." National Dong Hwa University, Taiwan web site. http://wnai.csie.ndhu.edu.tw/jlchen/class/07_car/its_1st_960919.pdf (accessed March 4, 2009).
[3] "European Intelligent Transportation Systems Markets," Frost and Sullivan web site (subscription required), February 14, 2002. http://www.frost.com/ (accessed January 31, 2009).
[4] "Strategic Analysis of the Advanced Traffic Management Systems Market in Western Europe," May 31, 2007. Frost & Sullivan web site (subscription required). http://www.frost.com/ (accessed March 3, 2009).
[5] Ibid.
[6] For a detailed discussion of the "innovativeness dimension," see Everett M. Rogers, *Diffusion of Innovations*, 4th ed. (New York: Free Press, 1995). For further readings related to market phases and innovation, see also James Utterback, *Mastering the Dynamics of Innovation* (Boston: Harvard Business School Press, 1996) and Vijay K. Jolly, *Commercializing New Technologies: Getting from Mind to Market* (Boston: Harvard Business School Press, 1997).

Our Current View on the Phase of the Market	
Today	***Trend***
Growth	Growth

Based on statistics from the U.S. Department of Transportation, there is considerable room for growth in the ATMS market. As of 2007, only 53% of intersections in surveyed cities were under closed loop or central system control, and only 4% of intersections in surveyed cities had adaptive signal control. Additionally, only 6% of the freeway ramps in surveyed cities had meters, and only 2% of surveyed freeway miles had variable speed limit capabilities.[7] When these data are combined with the expected growth of the EU's Transport Innovation Fund from €429 million in 2008/09 to €3 billion in 2014/15[8] and the benefits of the Obama administration's expected emphasis on infrastructure spending, it makes the ATMS market appear to be one of near- and mid-term growth.

Markets can also be described in terms of the basis for competition (best technological performance, best value or the price/performance tradeoff that best matches the end-users' preferences, lowest cost, or best availability or the ability to get the product quickly). This dimension helps to define the context in which a commercialization strategy must be developed.

Basis for Competition in the Arena	
Today	***Trend***
Best Value	Best Value

Generally speaking, the U.S. government makes public infrastructure spending decisions based on a cost/benefit analysis, taking factors other than price into consideration.[9] This appears to be the same in Europe, where government involvement and a focus on quality and durability in addition to price makes value seem to be the most important competitive factor.[10]

In each market there may be stakeholders and companies with significant market share that will influence the introduction of your technology. Some organizations or companies that will likely influence the introduction of this technology are the following:

---

[7] "Deployment Statistics." Department of Transportation Research and Innovative Technology Administration web site. http://www.itsdeployment.its.dot.gov/SurveyOutline1.asp?SID=fm (accessed March 4, 2009)

[8] "Strategic Analysis of the Advanced Traffic Management Systems Market in Western Europe," May 31, 2007. Frost & Sullivan web site (subscription required). http://www.frost.com/ (accessed March 3, 2009).

[9] "Commentary on the July 2008 U.S. DOT Transportation Policy Proposal." National Transportation Policy Project. September 10, 2008. http://209.85.173.132/search?q=cache:Kn8rGmFVV1IJ:www.bipartisanpolicy.org/ht/a/GetDocumentAction/i/8281+dot+cost/benefit&hl=en&ct=clnk&cd=7&gl=us&client=firefox-a (accessed March 3, 2009).

[10] "Strategic Analysis of the Advanced Traffic Management Systems Market in Western Europe," May 31, 2007. Frost & Sullivan web site (subscription required). http://www.frost.com/ (accessed March 3, 2009).

Examples of Major Competitors in the Arena		
Competitor	***Relevance***	***Web Site***
Siemens ITS	Siemens is a leader in ATMS, and provides turnkey systems and systems integration.[11]	http://www.itssiemens.com/en/t_nav112.html
U.S. Traffic	American division of market-leading British company Peek Traffic. Provides numerous ATMS products including controllers, signals, SmartToll, and others.[12]	http://www.peektraffic.com/index.htm
Q Free	"Q-Free is a leading global supplier of solutions and products for Road User Charging and Traffic Surveillance having applications mainly within electronic toll collection for road financing, congestion charging, truck-tolling, law enforcement and parking/access control."[13]	http://www.q-free.com
Transdyn	Transdyn provides ATMS for roadways as well as bridges and tunnels. Transdyn systems are currently in place on 1,200 miles of roadway and on some of the most important U.S. bridges, including the George Washington Bridge and the Delaware Memorial Bridge.[14]	http://www.transdyn.com/markets/transportation/index.html
Image Sensing Systems	Company that provides software based detection solutions that combine "embedded software signal processing with sophisticated sensing technologies."[15]	http://www.imagesensing.com/

[11] Ibid.
[12] Peek Traffic Ltd. web site. http://www.peektraffic.com/index.htm (accessed March 4, 2009).
[13] "Q-Free – About Q-Free ASA," Q Free web site. http://www.q-free.com/index.php?option=com_content&task=view&id=22&Itemid=59 (accessed March 4, 2009).
[14] "Transdyn, Inc. – Transportation," Transdyn web site. http://www.transdyn.com/markets/transportation/index.html (accessed March 4, 2009)
[15] Image Sensing Systems Inc. web site. http://www.imagesensing.com/ (accessed March 4, 2009).

Examples of Key Stakeholders or Networking Channels with Contact Information		
Stakeholder	***Relevance***	***Contact Information***
Intelligent Transportation Society of America	Advocacy organization for intelligent transportation systems in the United States.[16]	1100 17th Street NW, Suite 1200 Washington, DC 20036 Tel: 202-484-4847 http://www.itsa.org
Intelligent Transportation Systems Society of Canada (ITS Canada)	"ITS Canada is a professional non-profit society, with the inter-related goals of fostering ITS applications, promoting government-industry cooperation and strengthening the ITS industry."[17]	5694-4 Highway 7 East, #402 Markham ON L3P 1B4 Canada Tel: 905-471-2970 http://www.itscanada.ca/english/index.htm
Southwest Research Institute	A leader in design, development, and deployment of Advanced Traffic Management Systems (ATMS), Southwest Research Institute (SwRI) has been implementing ATMS since the early 1990s. SwRI integrates new technologies and equipment into existing ATMS and Traffic Management Centers (TMC). SwRI is also active in the development and administration of state and national standards for ATMS.[18]	P.O. Drawer 28510 San Antonio, Texas 78228-0510 Tel: 210-522-3914 http://www.swri.org/4ORG/d10/its/atms/default.htm
Institute of Transportation Engineers	"The Institute of Transportation Engineers is an international educational and scientific association of transportation professionals who are responsible for meeting mobility and safety needs. ITE facilitates the application of technology and scientific principles to research, planning, functional design, implementation, operation, policy development and management for any mode of transportation."[19]	1099 14th Street, NW, Suite 300 West Washington, DC 20005-3438 Tel: 202-289-0222 http://www.ite.org/
U.S. Department of Transportation	"The Research and Innovative Technology Administration	1200 New Jersey Avenue, SE Washington, DC 20590

[16] ITS America web site. http://www.itsa.org (accessed March 3, 2009).
[17] "About ITS Canada," ITS Canada web site. http://www.itscanada.ca/english/aboutitscanada.htm (accessed March 3, 2009).
[18] Southwest Research Institute web site. http://www.swri.org/ (accessed March 3, 2009).
[19] "Institute of Transportation Engineers – ITE: About ITE," Institute of Transportation Engineers. http://www.ite.org/aboutite/index.asp (accessed March 3, 2009).

Research and Innovative Technology Administration	(RITA) coordinates the U.S. Department of Transportation's (DOT) research programs and is charged with advancing the deployment of cross-cutting technologies to improve our Nation's transportation system."[20]	Tel: 800-853-1351 http://www.rita.dot.gov/

Users' abilities to buy the technologies they want are constrained by relevant government regulations and by relevant industrial standards and certification requirements. These requirements indicate test and evaluation procedures that can speed market acceptance if incorporated into concurrent engineering.

Examples of Regulations, Standards, and Certifications		
Identifier and Promulgator	***Description***	***Comments***
Standard for Functional Level Traffic Management Data Dictionary (TMDD) (ITE TM 1.03) Institute of Transportation Engineers	"…contains data elements for roadway links and for incidents and traffic-disruptive roadway events. Includes data elements for traffic control, ramp metering, traffic modeling, video camera control traffic, parking management and weather forecasting, as well as data elements related to detectors, actuated signal controllers, vehicle probes, and dynamic message signs."[21]	Includes three message groups (Manage Assets, Manage Transportation Related Information and Remote Operational Control of Traffic Control Devices) that are "necessary to convey key data within and between traffic management centers and other ITS centers."[22]
Object Definitions for Signal Control and Prioritization (SCP) (NTCIP 1211) NTCIP	"Defines the management information base for Signal Control and Prioritization (SCP) Systems. It defines individual parameters that represent the configuration, status, and control information that is unique to an SCP and also defines specific groupings of these parameters and others to address the operational configuration, monitoring, and control of the device/entity in a baseline system configuration."[23]	Part of the National Transportation Communications for ITS Protocol (NTCIP) family of standards.[24]

[20] "RITA | About RITA," Department of Transportation Research and Innovative Technology Administration web site. http://www.rita.dot.gov/about_rita (accessed March 3, 2009).
[21] "Search Results | ITS Standards Program | RITA," Department of Transportation web site. http://www.standards.its.dot.gov/StdsSummary.asp (accessed March 3, 2009).
[22] "ITS Standards Fact Sheet: AASHTO-ITE TM 2.1, Standards for Traffic Management Center-to-Center Communications," Department of Transportation web site. http://www.standards.its.dot.gov/fact_sheet.asp?f=17 (accessed March 4, 2009).
[23] Ibid.
[24] "Document Numbers and Status," NTCIP web site. http://www.ntcip.org/library/documents (accessed March 4, 2009.

NTCIP Simple Transportation Management Framework (STMF) (NTCIP 1101) NTCIP	"…describes the simple transportation management framework used for managing and communicating information between management stations and transportation devices. It covers integrated management of transportation networks, networking devices, and transportation specific equipment attached to NTCIP-based networks."[25]	Part of the National Transportation Communications for ITS Protocol (NTCIP) family of standards.[26]

Entry barriers are obstacles that remove customer segments from the market for some period of time. They limit the size of the addressable market in general or the market share that can be captured. These barriers must be overcome or avoided to have a successful market entry. Our work to date suggests the following entry barriers may prevent customer segments from buying this type of technology for some period of time.

Market Entry Barriers	
Name of Barrier	***Description/Why***
High Initial Investment	Despite the tendency of the purchasers to use cost/benefit analysis rather than price to make buying decisions, ATMS have a high initial cost, which has discouraged investment.[27]
Local Budget Restraints	Both in the U.S. and Europe, much of the spending on roads is in the domain of local governments. These authorities often have very tight budgets, and cannot afford to invest in new technologies.[28]
Lack of Standards	As a result of the different parties involved with installing and monitoring ATMS (local, State, federal, etc.) and the gaps in time between the installation of different systems, different ATMS can be unable to communicate with each other.[29] As interconnectivity is essential for functionality,[30] the lack of standards could prevent ATMS purchases.

Market drivers are forces that strengthen or weaken the importance of end-user needs over time. Practice level drivers are micro-economic; they affect the end-user directly. They influence the selection of substitutable goods and thus affect market share. Arena level drivers affect the organizations and industrial sectors in which the end-users work.

---

[25] "NTCIP Simple Transportation Management Framework (STMF)." NTCIP web site. http://www.ntcip.org/library/standards/default.asp?documents=yes&qreport=no&standard=1101 (accessed March 4, 2009).

[26] "Document Numbers and Status," NTCIP web site. http://www.ntcip.org/library/documents (accessed March 4, 2009.

[27] "European Intelligent Transportation Systems Market," February 14, 2002. Frost & Sullivan web site (subscription required). http://www.frost.com/ (accessed March 4, 2009).

[28] "Strategic Analysis of the Advanced Traffic Management Systems Market in Western Europe," May 31, 2007. Frost & Sullivan web site (subscription required). http://www.frost.com/ (accessed March 3, 2009).

[29] "Open Advanced Traffic Management System Lowers Cost." *Advanced Highway Maintenance and Construction and Technology.* May 2007. California Department of Transportation web site. http://www.dot.ca.gov/research/researchreports/two-page_summaries/ahmct_adv_ (accessed March 4, 2009).

[30] "Strategic Analysis of the Advanced Traffic Management Systems Market in Western Europe," May 31, 2007. Frost & Sullivan web site (subscription required). http://www.frost.com/ (accessed March 3, 2009).

They influence the overall demand for goods like this technology and its substitutes. They affect when and how much of the total addressable market is actually going to be in the market and buying.

Market Drivers	
Name of Driver	***Why Significant***
Congestion Levels	Traffic congestion in the United Sates cost the economy $78 billion in 2007 according to the Urban Mobility Report, making the improvement of existing infrastructure critical.[31]
Environmental Concerns	Traffic congestion resulted in the loss of 2.9 billion gallons of fuel in the U.S. in 2007 as well as the emission of the associated CO_2.[32] Such environmental damage increases the need for smoother traffic flow, which can be provided by ATMS.[33] Additionally, the EU has implemented a target of reducing vehicle emissions by 130g/km, further driving the need for ATMS.[34]
Increased Adoption of Wireless Technology	ITS and ATMS infrastructure requires large amounts of bandwidth and reliable cellular technology. As the data transmission capabilities of cellular networks increase, ITS and ATMS become more valuable.[35]

To understand the market there are some metrics and statistics that can help you visualize the demand on a broad scale. Below are some of the quantifiable pieces of data that may be useful in describing the demand for a new technology.

Appendix

Name of Metric	*Description*
Cost of Road Traffic Injuries	In the EU, the cost of road traffic injuries is estimated to be €180 billion.[36] In the US, accidents cost $164 billion, according to AAA.[37]
ITS Resource/Operations Guide	"A comprehensive listing of over 500 documents, videos, websites, training courses, software tools, and points-of-contact related" to ATMS and ITS.[38] The Guide can be viewed at the following URL: http://www.resourceguide.its.dot.gov.
NAVIGATOR	Example of an ATMS project implemented in Atlanta, Georgia. Includes results

[31] "Annual Study Shows Traffic Congestion Worsening in Cities Large and Small." September 18, 2007. Texas Transportation Institute web site. http://mobility.tamu.edu/ums/media_information/press_release.stm (accessed March 4, 2009).
[32] Ibid.
[33] "Strategic Analysis of the Advanced Traffic Management Systems Market in Western Europe," May 31, 2007. Frost & Sullivan web site (subscription required). http://www.frost.com/ (accessed March 3, 2009).
[34] Ibid.
[35] "Intelligent Transportation Systems - Enabling Technologies and Innovations (Technical Insights)," Technology Drivers. June 30, 2007. Frost & Sullivan web site (subscription required). http://www.frost.com/ (accessed March 4, 2009).
[36] "Strategic Analysis of the Advanced Traffic Management Systems Market in Western Europe," May 31, 2007. Frost & Sullivan web site (subscription required). http://www.frost.com/ (accessed March 3, 2009).
[37] "Car Accidents in the US cost $164.2 Billion." March 5, 2008. Washington Accident Book web site. http://www.washingtonaccidentbook.com/library/car-accidents-in-the-us-cost-1642-billion.cfm (accessed March 4, 2009).
[38] "ITS Operations/Resource Guide | RITA." Department of Transportation web site. http://www.resourceguide.its.dot.gov (accessed March 4, 2009).

	in terms of environmental benefits an improved traffic flow as well as contact in the Georgia Department of Transportation.[39] This information can be viewed at the following URL: http://www.fhwa.dot.gov/environment/cmaqpgs/amaq/03cmaq7.htm.

[39] "NAVIGATOR- Advanced Traffic Management System (ATMS)- Atlanta, GA." U.S. Department of Transportation Federal Highway Administration web site. http://www.fhwa.dot.gov/environment/cmaqpgs/amaq/03cmaq7.htm (accessed March 4, 2009).