Note

Intelligent Transportation Systems: From Hometown Solutions to World Leadership

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I. INTRODUCTION

To acknowledge the pervasive reach of intelligent transportation systems (ITS) technology, both in the U.S. and abroad, this note explores ITS from many levels. Primarily, the federal legal framework calling for development and implementation of ITS at the regional level is described and illustrated. Then, choice of technology and technological adaptation are discussed as methods to alleviate privacy concerns implicated by ITS implementation both in the U.S. and the European Union. Next, challenges to ensuring broader interoperability are contemplated by comparing disputes over the use of transponder technology in the U.S. and the European Union. The discussion concludes with a discussion of the continuing future importance of ITS and the opportunity for the U.S. to lead in making energy efficiency a goal in global ITS development.

At the outset, it should be noted that the states spur innovation within the federal framework of the U.S., "serv[ing] as laboratories for

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the development of new social, economic, and political ideas."[1] The Supreme Court has repeatedly made this contention, recognizing that "state innovation is no judicial myth."[2] This spirit of learning from local efforts prompted the exposure of the considerable ITS deployments in the author's home town of Parker, Colorado that follows.

II. THE FEDERAL FRAMEWORK FOR ITS PROGRAMS

Federal law mandates the promulgation of regulations by the Secretary of Transportation regarding State management of "highway safety,"[3] "traffic congestion,"[4] "public transportation facilities and equipment,"[5] and "bridges"[6]. Congress also prescribed the issuance of "guidelines and requirements for the State development, establishment, and implementation of a traffic monitoring system for highways and public transportation facilities and equipment."[7]

States have the right to elect compliance with any of the suggested management systems.[8] Additionally, highway projects funded by federal dollars require the concurrence of the Secretary of Transportation on "installations . . . promot[ing] the safe and efficient utilization of the highways" approved by "State transportation department[s]."[9] Toward these ends, Congress passed the Transportation Equity Act for the 21st Century (TEA-21) providing that the Secretary of Transportation develop a "National ITS Program Plan."[10] TEA-21 called for the establishment of a "National Architecture and Standards" to "promote interoperability among, and efficiency of, intelligent transportation system technologies implemented throughout the United States."[11]

Accomplishing these goals and mandates are ITS, traffic monitoring tools defined in federal regulations promulgated by the United States Department of Transportation (USDOT) as, "electronics, communications,

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1. Fed. Energy Regulatory Comm'n v. Miss., 456 U.S. 742, 788 (1982).
2. *Id.*
3. Management Systems, 23 U.S.C.A. § 303 (a) (3) (current through Pub. L. No. 110-113 approved Nov. 8, 2007). See also Highway Safety Programs, 23 U.S.C.A. § 402 (current through P.L. 110-113 approved Nov. 8, 2007) (§ (a) calling for the Secretary of Transportation to approve State "highway safety programs" by issuing guidelines regarding "traffic control" and "surveillance of traffic for detection and correction of high or potentially high accident locations;" and § (b) (3) encouraging the States "to use technologically advanced traffic enforcement devices").
4. 23 U.S.C.A. § 303 (a) (4).
5. 23 U.S.C.A. § 303 (a) (2).
6. 23 U.S.C.A. § 303 (a) (2).
7. 23 U.S.C.A. § 303 (b).
8. 23 U.S.C.A. § 303 (c).
9. Standards, 23 U.S.C.A. § 109 (d) (current through Pub. L. No. 110-113 approved Nov. 8, 2007).
10. Pub. L. No. 105-178, § 5205, 112 Stat. 457 (1998).
11. Pub. L. No. 105-178, § 5206 (a) (2), 112 Stat. 457 (1998).

or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system."[12] The USDOT has developed the National ITS Architecture as "a common framework for ITS interoperability."[13] The National ITS Architecture consists of standards that ensure interoperability between the various ITS systems.[14] The USDOT ITS Joint Program Office works with "Standards Development Organizations" to develop useful ITS standards.[15]

USDOT further prescribed the development of regional ITS architectures.[16] Regional ITS architectures articulate: regional geographic contours;[17] "participating agencies and other stakeholders;"[18] allocation of responsibility among the various actors via "operational concept[s];"[19] agreements on "project interoperability, utilization of ITS related standards, and the operation of the projects;"[20] system requirements;[21] interface and communication requirements;[22] "ITS standards supporting regional and national interoperability;"[23] and project implementation sequencing.[24] Developers seeking to maximize the benefits of systems interoperability can download the Turbo Architecture 4.0 software for free.[25] The software "supports development of regional and project ITS archi-

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12. Definitions, 23 C.F.R. § 940.3 (current through 72 F.R. 62034 approved Nov. 1, 2007).

13. 23 C.F.R. § 940.3.

14. U.S. Department of Transportation, *ITS Standards*, http://www.iteris.com/itsarch/html/standard/standard.htm.

15. *Id.* The following Standards Development Organizations participate in setting standards that will also accommodate technological innovation:

AASHTO (American Association of State Highway and Transportation Officials)[,] ANSI (American National Standards Institute)[,] APTA (American Public Transportation Organization)[,] ASTM (American Society for Testing and Materials), IEEE (Institute of Electrical and Electronics Engineers)[,] ITE (Institute of Transportation Engineers)[,] NEMA (National Electrical Manufacturers Association)[,] SAE (Society of Automotive Engineers)[, and] ISO (International Organization for Standardization)[.] *Id.*

Information on current standards is also available online. ITS Standards, *ITS Standards Program Resources for Developers & Deployers*, http://www.standards.its.dot.gov/.

16. Regional ITS Architecture, 23 C.F.R. § 940.9 (a) (calling for participation by: "[h]ighway agencies; public safety agencies (e.g., police, fire, emergency/medical); transit operators; Federal lands agencies; State motor carrier agencies; and other operating agencies necessary to fully address regional ITS integration.")

17. 23 C.F.R. § 940.9 (d) (1).

18. 23 C.F.R. § 940.9 (d) (2).

19. 23 C.F.R. § 940.9 (d) (3).

20. 23 C.F.R. § 940.9 (d) (4).

21. 23 C.F.R. § 940.9 (d) (5).

22. 23 C.F.R. § 940.9 (d) (6).

23. 23 C.F.R. § 940.9 (d) (7).

24. 23 C.F.R. § 940.9 (d) (8).

25. U.S. Department of Transportation, *Turbo Architecture*, http://www.iteris.com/itsarch/html/turbo/turbomain.htm.

tectures using the National ITS Architecture as a starting point."[26]

Public bodies, ranging from State transportation authorities to counties and municipalities, employ ITS.[27] These governmental actors use various technologies, such as video cameras, magnetic sensors, radio frequency communications systems, and satellite technology to collect data on infrastructure use and congestion.[28] To enhance roadway efficiency, the information collected is processed and ultimately shared with the public through the media, like State transportation department websites[29] and "dynamic message signs."[30]

III. DEVELOPING AND IMPLEMENTING REGIONAL ITS IN COLORADO

Consistent with USDOT regulations, development of ITS architectures occurs at the regional level.[31] State transportation plans and the National ITS Architecture guide the development process.[32] Regional ITS plans are limited by the financial investments that the participating entities can provide.[33] Thus, regional ITS architectures may cross municipal boundaries[34] or even span state lines.[35] And, when federal agencies

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26. *Id.*

27. See Town of Parker, Colorado, *Traffic Signal Information*, http://www.ci.parker.co.us/public_works/roads_traffic/traffic_signals.aspx) (indicating, in text and graphical illustration, the interplay of State, County, and Town ownership and operation of traffic signals in the Town of Parker, Colorado). Private companies provide similar services by deploying mobile data collection facilities or "geographic analysts." NAVTEQ, http://www.navteq.com (select the "In the Field" option on the interactive panel). Navteq touts itself as the top driver of European and North American in-vehicle navigation systems, routing websites, and wireless devices. Its traffic information is made available through the Weather Channel website Weather.com, *Current Cities Featuring Live Traffic*, http://www.weather.com/common/help/traffic_cities.html (disseminating "Traffic Reports" from the "Driving & Traffic," including real-time traffic information in many major cities).

28. See generally, Federal Highway Administration, *Freeway Management and Operations Handbook*, 15.2 Current Practices, Methods, Strategies, and Technologies (Sept. 2003), http://ops.fhwa.dot.gov/freewaymgmt/publications/frwy_mgmt_handbook/chapter15_01.htm#15-2.

29. *See id.* at 15.4.2, http://ops.fhwa.dot.gov/freewaymgmt/publications/frwy_mgmt_handbook/chapter15_03.htm (describing "Washington State DOT Road Weather Information for Travelers" provided at: www.wsdot.wa.gov/traffic); see also Colorado Department of Transportation, *Traffic Info*, http://www.dot.state.co.us/# (providing comprehensive traffic and road conditions data via the "Traffic Info" tab).

30. See ITS, USDOT, *Deployment Statistics*, Metropolitan Surveys, Arterial Management, http://www.itsdeployment.its.dot.gov/SurveyOutline1.asp?SID=AM (citing the various types of information relayed to the public through "dynamic message signs," including: "[t]ravel time," "[i]ncident information, and "[w]eather alerts; links to national deployment survey results for fiscal year 2006 are located on the right hand side).

31. See generally, 23 C.F.R. § 940.9.

32. 23 C.F.R. § 940.9 (a).

33. *Id.*

34. E.g., Denver Regional Council of Governments, Regional Intelligent Transportation Systems Strategic Plan (Mar. 2002).

35. See *Conservation Law Found. v. Federal Highway Admin.*, 2007 WL 2492737, *15 (D.

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are involved in the development process, ITS deployments must be considered among other alternatives as prescribed by the National Environmental Policy Act.[36]

To further illustrate the translation of federal policy and regulations into local implementation, the experiences of the Colorado Department of Transportation (CDOT); the Denver Regional Council of Governments (DRCOG); Douglas County, Colorado; and the Town of Parker, Colorado are described here. Primarily, the CDOT and the Transportation Commission of Colorado divided the State of Colorado into fifteen distinct "Transportation Planning Districts."[37] Municipalities outside these metropolitan areas may form "Regional Planning Commissions" by executing "intergovernmental agreements."[38] The "Greater Denver Metropolitan Planning Region" encompasses the governments comprising the DRCOG.[39] Thus, the States dominate the articulation of regional geographic definitions and identification of the relevant actors.[40]

In Colorado, the separate planning entities, like DRCOG, provide substantial guidance for its member municipalities in complying with the USDOT ITS framework regulations.[41] The DRCOG is a "non-profit association of [fifty-two] local governments . . . dedicated to making the

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N.H. 2007) (footnote 24) (describing "a cooperative program being undertaken by New Hampshire, Maine, and Vermont to develop a regional traveler and tourism information system comprising databases containing construction, incident, accident, delay, tourism event information, weather conditions, and a system providing for public access to these information databases on the Internet"); see also *Edwards & Assocs., Inc. v. Black & Veatch, L.L.P.*, 84 F. Supp. 2d 1182, 1185 (D. Kan. 2000) (describing the "Kansas and Missouri Departments of Transportation . . . study assess[ing] transportation needs in the Kansas City metropolitan area" that "address[ed] those needs through deployment of an intelligent transportation system (ITS)" toward "mak[ing] traveling safer and more efficient by utilizing technology such as roadway sensors and cameras to monitor traffic and alert drivers of problems, hazards or other delays"); see also *Lockheed Martin IMS Corp. v. Delaware Dept. of Transp.*, No. 15626-NC 1997 WL 252641, at *1-*2 (Del. Ch. May 5, 1997) (concerning the Delaware Department of Transportation (DelDOT) entering the New Jersey "Consortium (New Jersey Highway Authority, New Jersey Turnpike Authority, Port Authority of New York and New Jersey, and South Jersey Transportation Authority)" to implement an electronic toll collection system).

36. 42 U.S.C. §§ 4321 *et seq.* (2006); *Conservation Law Found. v. Federal Highway Admin.*, 2007 WL 2492737, *15 (D. N.H. 2007) (accounting ITS deployment as one of many other "Transportation System Management" techniques considered, including: no action, widening highways, and enhancing alternative mass transportation systems).

37. Colorado Department of Transportation, *Rules and Regulations*, Statewide Transportation Planning Process and Transportation Planning Regions, 2 C.C.R. § 604-2 (IV) (A), http://www.dot.state.co.us/Rules/ (accessed via the "2 CCR 604-2" link) (describing the geography of "Transportation Planning Region Boundaries").

38. *Id.* at (IV) (B).

39. *Id.* at (IV) (A) (2).

40. See 23 C.F.R. § 940.9 (d) (1) - (2).

41. See 23 C.F.R. § 940.9 (d) (3) - (8).

nine-county Denver Region a great place to live, work and play."[42] In accomplishing its "focus on quality of life issues . . . includ[ing] mobility" and "planning for the future,"[43] DRCOG developed a "Regional Intelligent Transportation System (ITS) Strategic Plan" and a "Regional ITS Architecture."[44] The Strategic Plan suggests technology to "improve traffic flow and transit trips" and "provide[s] the basis for funding decisions regarding . . . deployment," while the Regional Architecture "define[s] the technical and institutional relationships among transportation related agencies" to achieve interoperability of systems in the Denver region.[45]

Douglas County then relies on "Road Sales and Use Tax" revenue as the primary financial basis for transportation projects in its jurisdiction.[46] Inter-government revenue and grants from state and federal governments, along with "Road & Bridge Property Tax," and developer contributions round out the financial basis.[47] As an illustration, $9.6 million in improvements to Lincoln Avenue in Parker, Colorado were contributed by: Douglas County ($6.5 million); the Town of Parker and developers, including a local Charter School ($2.65 million); and Urban Drainage ($.45 million).[48] The high reliance on tax revenue helps the county leverage State and Federal funding in order to construct "new and improved roads and transportation systems," like the Town of Parker ITS.[49] Continued tax revenue helps "[provide] state-of-the-art transportation systems to ensure mobility for this vital sector of [the] community."[50]

In the Town of Parker, Colorado, CDOT, Douglas County, and the Town of Parker (Parker) itself have invested in ITS deployed at the numerous intersections within the municipal boundaries.[51] Parker also manages ITS equipment under "CDOT jurisdiction."[52] Much like Parker,[53] Douglas County controls traffic signals with a "central computer system"

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42. DRCOG, *What is DRCOG*, http://www.drcog.com/index.cfm?page=whatisDRCOG?.

43. DRCOG, *About DRCOG*, http://www.drcog.com/index.cfm?page=aboutDRCOG.

44. DRCOG, *Intelligent Transportation Systems (ITS)*, http://www.drcog.com/index.cfm?page=IntelligentTransportationSystems (containing links to both documents).

45. *Id.* (noting that both these documents are in the revision process and will be reviewed in December 2007).

46. Douglas County Public Works, Douglas County Connection, Vol. II, Issue I, 2 (Spring 2007) (available online at: http://www.douglas.co.us/publicworks/engineering/documents/DCPWInMotionfinal.pdf).

47. *Id.*

48. *Id.* at 4.

49. *Id.* at 3.

50. *Id.* at 4.

51. Town of Parker, Colorado, *Traffic Signal Information*, http://www.ci.parker.co.us/public_works/roads_traffic/traffic_signals.aspx).

52. See *Id.* (including a graphical depiction of the management of signals).

53. Interview with David Aden, Traffic Engineer, Town of Parker, Colorado, (Nov. 5, 2007) (Mr. Aden, P.E., referred to the computer system as "Traffic Central").

receiving real time video data via fiber optic connections.[54] "Video image processing"[55] uses data retrieved to adjust signal timing leading to "improve[ed] travel times, reduce[d] delays, and better . . . traffic volume distribution," as well as "reductions of emissions [and] fuel costs."[56] For instance, when a vehicle approaches an intersection and stops at a red light, a virtual button is pushed that prompts the signal to change according to an analytical algorithm performed by the central computer.[57] The controlling algorithm may prompt a signal change in a matter of seconds, or even produce immediate changes, for example, when the video image processor detects a specific vehicle queue length from the subject intersection.[58]

ITS also serves a "traffic calming" function on Mainstreet in Parker by making the urban core safe and accessible to pedestrians.[59] The solar powered crosswalk warning devices employed on Mainstreet, shown in Figure 1 below, are activated when a pedestrian pushes a button mounted to device. These devices are particularly innovative because of they don't rely on energy from the existing electrical grid.

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54. Douglas County, Colorado, *Transportation Capital Improvements Program: Progress Report 1996 through 2006*, 16 (May 2007), http://www.douglas.co.us/publicworks/engineering/documents/DouglasCountyReportfinal.pdf.

55. Federal Highway Administration, *Freeway Management and Operations Handbook*, 15.2.6.4, http://ops.fhwa.dot.gov/freewaymgmt/publications/frwy_mgmt_handbook/chapter15_01.htm#15-2.

56. Douglas County, Colorado, *Transportation Capital Improvements Program: Progress Report 1996 through 2006*, 16 (May 2007), http://www.douglas.co.us/publicworks/engineering/documents/DouglasCountyReportfinal.pdf.

57. Interview with David Aden, Traffic Engineer, Town of Parker, Colorado (Nov. 5, 2007) (explaining the adaptive signal control process to this author in his office, where a laptop retrieved video of virtual squares that became highlighted as vehicles approached and stopped at the intersection of Colorado Highway 83 and Lincoln Avenue).

58. *Id.* (describing the functioning of another video image processor located southward of the intersection of Colorado Highway 83 and Arapahoe Road (north of the Douglas County line in Arapahoe County, Colorado), a particularly busy traffic point prone to congestion and long lines). See also Arapahoe County, *Managing Transportation Systems*, http://www.co.arapahoe.co.us/departments/pw/transportaionplan/emergingtechnologies/managetranssys.asp (providing information on the county's ITS deployments).

59. Timothy Beatley, GREEN URBANISM: LEARNING FROM EUROPEAN CITIES (2000).

FIGURE 1: SOLAR POWERED CROSSWALK WARNING DEVICE AND
BUTTON ON MAINSTREET IN PARKER, COLORADO[60]
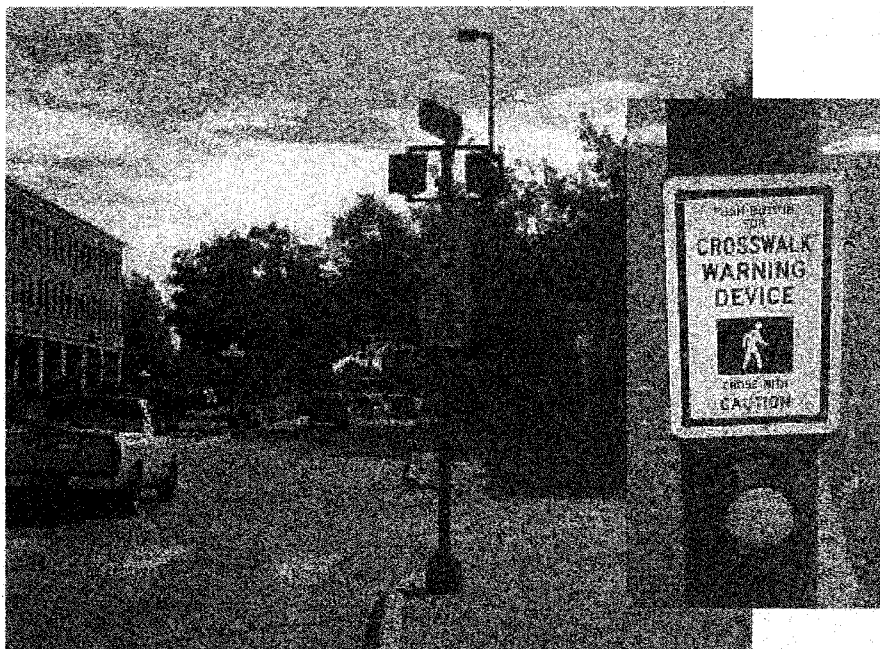
IV. CHOOSING AND ADAPTING TECHNOLOGY TO PROTECT
MOTORIST PRIVACY

Gathering and sharing traffic data necessarily involves monitoring individual activities and implicates privacy concerns.[61] Not surprisingly, "the original legislation that established the [ITS] program required . . . develop[ment] in light of concerns about privacy."[62] Additional federal legislation, the Driver's Privacy Protection Act[63] for example, "restricts the availability of personal information identifying an individual without the consent of the individual."[64] The statute protects, among other things, the driver's photograph.[65] State statutes generally offer more protection than the federal law, restricting misuse of remote cameras for example.[66] But, given the modern prevalence of ITS in the U.S., and the federal

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60. Photograph courtesy of Joshua D. Prok.
61. Dorothy J. Glancy, Privacy on the Open Road, 30 Oh. N U L. Rev. 295, 296 (2004).
62. *Id.* at 369 (citing Pub. L. No. 102-240, 105 Stat. 2189 § 6054).
63. 18 U.S.C. §§ 2721 – 2725 (2006).
64. Glancy, Privacy on the Open Road, 30 Oh. N U L. Rev. at 370.
65. *Id.* (quoting 18 U.S.C. § 2725(3)).
66. *Id.* at 373-74 (citing California Civil Code § 1708.8 (b) that created a "constructive invasion of privacy" cause of action).

government's efforts to maintain and coordinate ITS archival data, motorist privacy is potentially imperiled more than ever.[67] Recent concerns over homeland security suggest that ITS may be increasingly adapted for "law enforcement and intelligence purposes."[68]

FIGURE 2: "INDUCTIVE LOOP DETECTOR SYSTEM"[69]
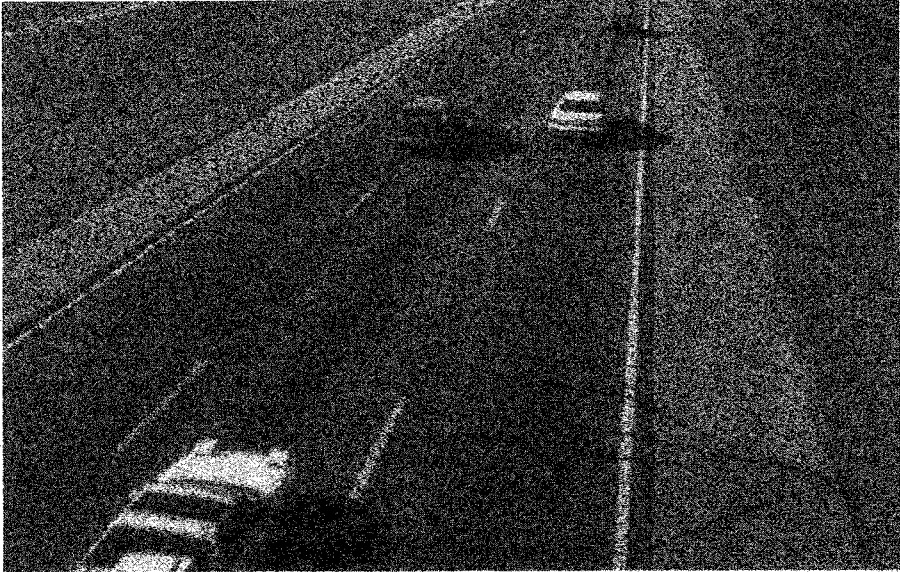
Technological advances have moved ITS away from reliance on "impersonal" techniques that maintained vehicle anonymity.[70] Thus, "inductive loop sensors," illustrated above in Figure 2, once embedded in roadways to detect the presence of the "conductive metal" undercarriages of over-passing vehicles, have been replaced by video image processors.[71] Moving away from technology embedded in the road avoids labor costs incurred during regular roadway maintenance, including peri-

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67. *Id.* (describing the effect of federal funding to increase ITS deployments and the "archived data user service" that stores information on individual motorists).

68. *Id.*

69. Federal Highway Administration, *Freeway Management and Operations Handbook*, Figure 15-1: Inductive Loop Detector System, http://ops.fhwa.dot.gov/freewaymgmt/publications/frwy_mgmt_handbook/chapter15_01.htm#15-2.

70. Glancy, Privacy on the Open Road, 30 Oh. N U L. Rev. at 302.

71. Federal Highway Administration, *Freeway Management and Operations Handbook*, 15.2.6.1 Inductive Loop Sensors, http://ops.fhwa.dot.gov/freewaymgmt/publications/frwy_mgmt_handbook/chapter15_01.htm#15-2; Interview with David Aden, Traffic Engineer, Town of Parker, Colorado (Nov. 5, 2007) (accounting the Town of Parker's experience moving from inductive loop sensors to video image processing).

odic resurfacing.[72] However, video image processing potentially eables "targeted surveillance."[73]

After all, surveillance video has evidentiary value in some jurisdictions.[74] For the Town of Parker, however, the limitations of its chosen technology remove the possible risks to motorist privacy normally associated with video systems.[75] As this author can attest to, the Parker equipment produces grainy, monochrome video feedback.[76] The video data provided, therefore, makes it nearly impossible to identify vehicle make, model, and color, let alone the driver's identity or license plate information.[77]

Other agencies deploying ITS choose video systems that produce better quality, color feedback, however.[78] An example is the "pan & tilt" closed circuit television platforms that allow operators 360 degree viewing capability along an "azimuth" axis and a ninety degree vertical adjustment range.[79] These units are typically housed in "dome enclosures" to enhance aesthetics and increase pan and tilt speeds, as illustrated in Figure 3 below.[80] "Color cameras have a distinct advantage over monochrome cameras in providing color information that can aid incident verification, assessment and management," creating feedback with higher evidentiary value.[81] These systems can be programmed to restrict their

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72. Interview with David Aden, Traffic Engineer, Town of Parker, Colorado (Nov. 5, 2007) (describing the change to video image processing as a way to prevent installation costs associated with cutting asphalt or concrete to embed the inductive loop sensor each time the roads are resurfaced, typically every few years). However, reliance on video image processing has the disadvantage of decreased functionality in the snow, which is an annual problem in Colorado. *Id.* See also Federal Highway Administration, *Freeway Management and Operations Handbook*, Table 15-2: Strengths and Weaknesses of Commercially Available Sensor Technologies, http://ops.fhwa.dot.gov/freewaymgmt/publications/frwy_mgmt_handbook/chapter15_01.htm#15-2 (describing the "require[d] pavement cut" as a weakness of inductive loop sensors, while identifying inclement weather effects and lens maintenance requirements as weaknesses of video image processors). See also *id.* at Table 15-3: Traffic Output Data, Communications Bandwidth, and Cost of Commercially Available Sensors (indicating inductive loop systems have low purchase costs, while video image processors' "multiple lane, multiple detection data" collection capability may balance its higher purchase cost).

73. Glancy, Privacy on the Open Road, 30 Oh. N U L. Rev. at 302.

74. 116 A.L.R. 5th 373 (stating that "automatic camera or video surveillance system" footage has evidentiary value in jurisdictions ascribing to the "silent witness theory" that require foundation evidence "on the reliability of the photographic process").

75. Interview with David Aden, Traffic Engineer, Town of Parker, Colorado (Nov. 5, 2007).

76. *Id.* (viewed from Mr. Aden's laptop in his office).

77. *Id.*

78. *Id.*

79. Federal Highway Administration, *Freeway Management and Operations Handbook*, 15.2.9.3 Pan & Tilt, http://ops.fhwa.dot.gov/freewaymgmt/publications/frwy_mgmt_handbook/chapter15_02.htm.

80. *Id.*

81. *Id.* at 15.2.9.1 Cameras.

purview, with "lens presets" and "reset" functions.[82] Additionally, the video feedback may be edited to preserve motorist privacy.[83]

FIGURE 3: DOME-ENCLOSED SURVEILLANCE CAMERA AT THE DU LIGHT RAIL STATION[84]
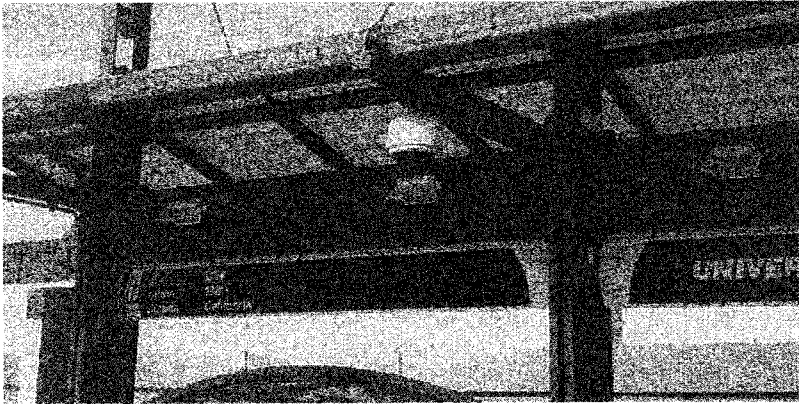
The use of automatic vehicle identification (AVI) technology is also a powerful ITS capable of "target[ing] and track[ing] specific vehicles and the individuals in them."[85] As an example, in enforcement applications, digital cameras perform "license plate recognition" by associating photographic data with vehicle and owner records in computerized databases.[86] Radio frequency identification devices (RFID) are another example, consisting of a radio transmitter installed in a vehicle that communicates a unique frequency to a "roadside communication unit."[87] Commonly referred to as "transponders," this technology is often used in electronic toll collection systems (ETC) in the U.S.[88] Transponder technologies vary according to the type of information stored by the in-vehicle unit and the type of communication interface with the receivers installed in the infra-

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82. *Id.* at 15.2.9.3 Pan & Tilt.

83. Interview with Parker Traffic Engineer (explaining that areas of enhanced video feedback may be "blurred" to alleviate privacy concerns).

84. Photograph courtesy of Joshua D. Prok.

85. Glancy, Privacy on the Open Road, 30 Oh. N U L. Rev. at 296.

86. *Id.* at 305.

87. Federal Highway Administration, *Freeway Management and Operations Handbook*, 15.2.7.1 Automatic Vehicle Identification, http://ops.fhwa.dot.gov/freewaymgmt/publications/frwy_mgmt_handbook/chapter15_02.htm; Dorothee Heisenberg, NEGOTIATING PRIVACY: THE EUROPEAN UNION, THE UNITED STATES, AND PERSONAL DATA PROTECTION, 150.

88. Federal Highway Administration, *Freeway Management and Operations Handbook*, 15.2.7.1 Automatic Vehicle Identification, http://ops.fhwa.dot.gov/freewaymgmt/publications/frwy_mgmt_handbook/chapter15_02.htm.

structure.[89] ETC systems may exact fixed tolls or enable "dynamic pricing" that adjusts toll rates to maintain efficient traffic flow.[90]

In 2004, a "Federal Communications Commission [(FCC)] Report and Order" defined a bandwidth[91] for "Dedicated Short Range Communications [(DSRC)] in ITS Applications."[92] DSRC systems are more powerful and sophisticated two-way communications devices similar to RFID technology.[93] The FCC, however, denied DSRC the same privacy protection enjoyed by wireless telephone communications as "customer proprietary network information" under federal law.[94] Several state statutes pertaining to electronic tracking devices provide more protection for motorists than federal law.[95] This pattern led a learned commentator to conclude that "considerable uncertainty remains about the privacy of the new ITS communications applications" in the U.S.[96]

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89. *Id.* (classifying transponders into three classes:

Type I. Type I transponders are read-only tags that contain fixed data, such as a vehicle identification number. They can initially be programmed either at the manufacturing facility or by the agency issuing the transponder; however, they cannot by reprogrammed without returning the transponder to the manufacturer.

Type II. These transponders have read/write capability. In these transponders, some of the memory contains permanent information (such as vehicle identification number) and cannot be reprogrammed. However, additional memory can be provided and may be reprogrammed or written remotely from the reader. This type of transponder is typically used in toll systems to record time, date, and location of entry, and account balance for vehicles.

Type III. These transponders are also known as "smart cards." They have extended memory and are capable of full two-way communication. With this system, vehicles can be warned of incidents, congestion, or adverse weather conditions, enabling drivers to take alternative routes. This type of system requires sophisticated technology for both the roadside and vehicle-based equipment.)

90. Federal Highway Administration, *Congestion Pricing: A Primer*, VII. Frequently Asked Questions, How does dynamic pricing work?, http://www.ops.fhwa.dot.gov/publications/congestionpricing/sec7.htm (explaining,

[w]ith dynamic pricing, tolls are continually adjusted according to traffic conditions to maintain a free-flowing level of traffic. Under this system, prices increase when the tolled lane(s) get relatively full and decrease when the tolled lane(s) get less full. The current price is displayed on electronic signs prior to the beginning of the tolled section. This system is more complex and less predictable than using a fixed-price table, but its flexibility helps to consistently maintain the optimal traffic flow. Motorists are usually guaranteed that they will not be charged more than a pre-set maximum price under any circumstances.)

91. Glancy, Privacy on the Open Road, 30 Oh. N U L. Rev. at 311 (explaining, "[t]he FCC Order allocates to Intelligent Transportation Systems radio frequencies between 5.850 and 5.925 GHz and adopts the ASTM E2213-03 (ASTM-DSRC) communications standard that extends wi-fi (IEEE standards 802.11 and 802.11a) to vehicles traveling at high speeds.")

92. *Id.* at 372.

93. *Id.* at 372; Elizabeth E. Joh, Essay, *Discretionless Policing: Technology and the Fourth Amendment*, 95 Cal. L. Rev. 199, 216 (2007).

94. *Id.* at 312, 372-73 (citing Federal Communications Commission Report and Order 03-324 (Feb. 2004) and 47 U.S.C. §222 (h) (1)).

95. *Id.* at 373.

96. *Id.*

As technology continues to advance, the U.S. continues to take a reactive, sectoral regulatory approach to privacy.[97] The resultant situation of flux and uncertainty contrasts with the situation in the European Union where the member states "think proactively about privacy threats entailed in new technology, and . . . regulate the technology before privacy abuses occur."[98] The "Directive on the Protection of Individuals With Regard to the Processing of Personal Data and on the Free Movement of Such Data" (Data Protection Directive) provides for the protection of individuals' "right to privacy, with respect to processing of personal data" in the Member States.[99] "Controllers," or privacy agencies, assure compliance with the Data Protection Directive in each Member State.[100] This proactive approach, as applied to ITS, led to an interpretation of the Data Protection Directive as encompassing protection of individuals' license plate numbers in France.[101]

Pertaining to RFID in commercial applications, "European [entities deploying the technology] assume that they will be bound" to comply with the Data Protection Directive.[102] When the inclusion of RFID technology into passports was mandated by the International Aviation Organization, for example, Europeans accordingly encrypted the data signals.[103] However, the U.S. government proposed passport production without encryption.[104] Thus, without an overarching proactive mandate to protect individual data, U.S. passport data is theoretically retrievable by anyone able to get an RFID scanner within the frequency range of the embedded radio signal.[105] Accordingly, compromised RFID communications may be required before U.S. law provides protective solutions.[106] Meanwhile, individuals in the U.S. must request that agencies take protective measures while deploying RFID to communicate their personal data, such as assigning anonymous account identification information to their electronic toll transponders.[107]

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97. Heisenberg, NEGOTIATING PRIVACY, 139; INTERNET AND COMPUTER LAW 663 (Peter B. Maggs, John T. Soma, James A. Sprowl eds., 2005) (describing Congress' sectoral approach to privacy law as "a variety of legislation in response to the problems posed by improvements in the collection and distribution of information about individuals").

98. Heisenberg, NEGOTIATING PRIVACY, 139.

99. Directive 95/46/EC of the European Parliament and the Council, art. I, Oct. 24, 1995, O.J. (l 281) 31, *in* INTERNET AND COMPUTER LAW 722 (Peter B. Maggs, John T. Soma, James A. Sprowl eds., 2005).

100. *Id.* at art. 6, § 2, 723.

101. Glancy, Privacy on the Open Road, 30 Oh. N U L. Rev. at 305.

102. Heisenberg, NEGOTIATING PRIVACY, 140.

103. *Id.*

104. *Id.*

105. *Id.* (noting a common thirty foot transmitter frequency range).

106. See *id.*

107. See Federal Highway Administration, *Congestion Pricing: A Primer*, VII. Frequently

V. OTHER CHALLENGES TO ACHIEVING ITS INTEROPERABILITY

Interoperability concerns were a major stumbling-block for the deployment of "smart cards" in ETC systems for congestion pricing in the Netherlands.[108] The Dutch system contemplated that "[d]rivers would insert the cards and the amount of the fare would be automatically deducted from the card as the cars pass under electronic scanning devices," or otherwise video of the driver's license plates would be used to assess periodic tolls.[109] Dutch ITS deployers worried that German motorists, for example, would get a free ride through the system if a German license plate could not be recognized, and the toll would be left uncollected.[110] An analogous concern in the U.S. manifests when illegal immigrants drive unregistered vehicles through ETC systems.

As previously explained, the federal government sought to solve the free rider problem by establishing the National ITS Architecture to achieve the goal of interoperability: coordination and communication amongst the various agencies deploying ITS technology.[111] Toward realizing pervasive the ITS deployment envisioned by the federal government, American businesses compete aggressively, even in the courts, for contracts to deploy transponder technology on behalf of State agencies.[112] But, government and business entities have also clashed over access to resulting ITS architectures in the U.S., specifically over access to transponder architectures.[113]

In *Oregon v. Heavy Vehicle Electronic License Plate, Inc.* (HELP), the State of Oregon sought access to a multi-state RFID system created by HELP, a non-profit corporation, that was "technically interoperable" with the motor carrier identification system operated by the Oregon De-

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Asked Questions: Wouldn't electronic tolling invade a motorist's privacy?, http://www.ops.fhwa. dot.gov/publications/congestionpricing/sec7.htm (answering in the negative, since "[t]olling agencies have devised a method to protect the public's privacy by linking the transponder and the driver's personal information with a generic, internal account number that does not reveal the driver's identity and that is not disclosed to other organizations" or "a motorist can open an anonymous account if he or she so chooses.")

108. Beatley, *supra* note 59 at 158-160.

109. *Id.* at 159.

110. *Id.* at 160.

111. See 23 C.F.R. § 940.3.

112. See *Lockheed Martin IMS Corp. v. Delaware Dept. of Transp.*, No. 15626-NC 1997 WL 252641, at *1-*2, *5-*6 (Del. Ch. May 5, 1997) (where the Delaware Chancery lacked jurisdiction to rule on Lockheed's complaint regarding DelDOT's use of New Jersey procurement procedures regarding a project connected to the New Jersey Consortium, because Lockheed had a remedy in New Jersey).

113. See *Oregon v. Heavy Vehicle Electronic License Plate, Inc.*, 198 F. Supp. 2d 1202, 1204 (D. Or. 2002) (hereinafter referred to as "HELP").

partment of Transportation (ODOT).[114] HELP licensing agreements, however, prevented its transponders' use "in non-HELP systems, [without its] advance approval."[115] Divergent fee collection methods and "availability of the information processed during" transponder communication led to failed negotiations and brought the parties to court.[116] The court found Oregon's general policy favoring ITS interoperability lacked "clearer establishment" and "justification of its critical importance-from the Oregon legislature" that could have provided the State a right to utilize the HELP transponders.[117] The court further legitimized the HELP restriction clauses to protect its investment and denied ODOT's request for declaratory relief regarding "misappropriation, conversion, tortuous interference with an economic relationship, or any other tort."[118]

Instead of reactively resolving disputes, the Member States of the European Union, have worked proactively to establish international ETC system legislation.[119] Specifically, the Commission contemplates an "European service" built on an "obligation for operators to make interoperable receivers available to users who want them."[120] Acknowledging existing toll collection systems in Rome and London, that control city center access, the Commission prescribes a progressive migration from ground-based systems to its preferred satellite-based technology.[121]

Such legislation furthers the goal of interoperability while it protects investments in the short to medium term.[122] Similar legislation protects investments that concerned the court in *HELP*, and creates governmental rights that could have resolved the case in Oregon's favor. Thus, the same pattern of European leadership, shown above in regards to privacy matters, translates to other areas of ITS litigation.

VI. FUTURE U.S. LEADERSHIP IN ITS

In 1996, Federico Peña, former Secretary of Transportation in the Clinton Administration, set a lofty goal of equipping the "largest metro-

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114. *Id.* (describing the Heavy Vehicle Electronic License Plate (HELP) "PrePass" and "Green Light" transponder systems).

115. *Id.*

116. *Id.* at 1204-05 (explaining that ODOT charged a $35.00 annual fee and used the transponder data like "traditional weigh station logbook" data, whereas HELP charged $.99 for each "bypass event" and limited the information collected to fee processing).

117. *Id.* at 1209.

118. *Id.* at 1208-1209.

119. See Commission of the European Communities, Proposal for a Directive of the European Parliament and of the Council on the widespread introduction and interoperability of electronic road toll systems in the Community, Apr. 23, 2003, COM (2003) 132 final, 26 (available online at: http://ec.europa.eu/ten/transport/revision/doc/com_2003_0132_en.pdf).

120. *Id.* at 25.

121. *Id.* at 25-26.

122. See *id.*

politan areas" in the U.S. with "complete intelligent transportation infra-
structure" by 2005.[123] Since that time, the Joint Program Office has
tracked ITS deployment with national surveys.[124] Survey results from fis-
cal year 2006 indicated that some fifty-four percent of signals operated in
104 metropolitan areas surveyed enjoy the benefits of "closed loop or
central system control."[125] The "Pittsburgh, Beaver Valley," Pennsylvania
metropolitan area leads the nation with one hundred percent centralized
control, while the "Denver, Boulder," Colorado area stands near the na-
tional average at fifty-three percent, and "Fresno," California ranks dead
last with just seven percent deployment.[126]

The benefits of centralized control are exemplified by the experience
of Los Angeles, California, where:

> [t]he Automated Traffic Surveillance and Control Program (ATSAC) . . . has
> operated computerized signal control systems since 1984. As of 1994, it in-
> cluded 1,170 intersections, and 4509 detectors for signal timing optimization.
> It reportedly decreased fuel consumption 13 percent, decreased air emis-
> sions 14 percent, reduced vehicle stops 41 percent, reduced travel time 18
> percent, increased average speed 16 percent, and decreased delay by 44
> percent.[127]

These remarkable efficiency improvements seem even more important
today as the price of oil has skyrocketed to a relatively stable price near
three dollars per gallon in the U.S.[128]

Transportation efficiency is not only important to the U.S., how-
ever.[129] The United Nations recently called on the U.S. and China to take
more of a leadership role in reducing climate change.[130] While alluding to
the scientific consensus on human contribution to global warming, the
Secretary General exhorted the "world's policymakers to . . . [speak]
clearly and in one voice" by capping emissions.[131] As the foregoing data

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123. ITS Joint Program Office, Federal Highway Administration, *Tracking the Deployment
of the Integrated Metropolitan Intelligent Transportation Systems Infrastructure in the USA:
FY2004 Results*, 7 (Jul. 2005), http://www.itsdeployment.its.dot.gov/pdf2004/metropolitan_
summary_report2004.pdf.

124. *Id.*

125. ITS, USDOT, *Deployment Statistics*, Signalized Intersections Under Closed Loop or
Central System Control, 2006 National Summary, http://www.itsdeployment.its.dot.gov/Results.
asp?year=2006&rpt=M&filter=1&ID=303.

126. *Id.*

127. ITS, USDOT, *Benefits*, http://www.itsbenefits.its.dot.gov/its/benecost.nsf/0/D09C8BDF
23D1A116852569610051E2C5?OpenDocument.

128. See Jad Mouawad, *OPEC Finds Price Range to Live With*, N.Y. Times, Dec. 6, 2007
(accessed online at http://nytimes.com on Dec. 6, 2007).

129. See Elisabeth Rosenthal, *U.N. Chief Seeks More Climate Change Leadership*, N.Y.
Times, Nov. 18, 2007 (accessed online at http://www.nytimes.com on Nov. 18, 2007).

130. *Id.*

131. *Id.*

from Los Angeles suggests, ITS have proven to be powerful tools to en-
hance efficiency, and lower emissions.[132]

On a global level, the annual World Congress on ITS has united the
international community since its initial meeting in France in 1994.[133] Re-
cently, Beijing hosted the 14th World Congress on ITS, consisting of "ad-
ministrative and technological sessions, exhibitions, technological studies,
interactive sessions, [and] citizen education" on the theme: "ITS for a
Better Life."[134] "Promot[ing] international communication and coopera-
tion on ITS" was a goal of the event involving some 5,000 government
and industry registrants, more than 200 businesses, and over 50,000 visi-
tors.[135] Future World Congresses to be hosted by the U.S.A. in 2008,
Sweden in 2009, and Korea in 2010, show the international community's
strong commitment to enhancing ITS.[136]

Paul R. Brubaker's remarks in Beijing show the visionary leadership
of the U.S. in ITS implementation toward achieving the important goals
of efficiency and environmental protection:

> In 2025, I can imagine big cities all over the world where traffic flows seam-
> lessly, even in bad weather, even in work zones—on all roads, across all
> transportation modes, all the time. I can imagine vehicles without tailpipes
> and those that emit nothing more than water vapor. I can imagine major
> highways that are free of crashes, because drivers are warned about current-
> condition hazards—like fog or icy patches—and quickly re-routed to safer
> roadways. I can imagine busy business districts where drivers find parking
> right away, without circling—a colossal waste of time and fuel. I can imag-
> ine a quiet commute to and from work—because traffic helicopters are no
> longer hovering to report the bad news about crashes and breakdowns, and
> people have the information they need to choose the most efficient route,
> mode, and time of day for travel. I can imagine freight moving seamlessly
> across transportation modes to get to its destination on time and keep busi-
> nesses thriving.[137]

The federal government can continue to enhance the National ITS

132. See ITS, USDOT, *Benefits*, http://www.itsbenefits.its.dot.gov/its/benecost.nsf/0/D09C8
BDF23D1A116852569610051E2C5?OpenDocument.

133. 14th World Congress on ITS, *Congress History*, http://www.itsworldcongress.cn/Project
ShowBrowse.asp?BigClassName=Congress&BigClassType=1&SmallClassName=Congress%20
History&ID=679.

134. 14th World Congress on ITS, *Congress Introduction*, http://www.itsworldcongress.
cn / ProjectShowBrowse . asp ? BigClassName = Congress & BigClassType = 1 & SmallClassName =
Congress%20Introduction&ID=677.

135. *Id.*

136. See 14th World Congress on ITS, *Congress History*, http://www.itsworldcongress.cn/
ProjectShowBrowse . asp ? BigClassName = Congress & BigClassType = 1 & SmallClassName =
Congress%20History&ID=679.

137. Research and Innovative Technology Administration, USDOT, *Remarks for Mr. Paul
R. Brubaker Administrator, Research and Innovative Technology Administration U.S. Depart-
ment of Transportation, at the 14th World Congress On Intelligent Transportation Systems Minis-*

Architecture by providing federal funding for regional ITS projects, under the Transportation Infrastructure Finance and Innovation Act.[138] Local governments and concerned communities can also promote ITS deployment through local tax revenues, similar to the "Road Sales and Use Tax" imposed in Douglas County, Colorado.[139] Cooperative funding by federal and local agencies can enhance the telematics[140] architecture to achieve the full "vehicle infrastructure integration" sought by the ITS Standards Program.[141]

The European Union may also be providing more leadership in the telematics area, especially in regards to integrating satellite technology into ITS deployments.[142] The "GALILEO European satellite positioning system" is expected to be operational in 2008, providing "[m]ore accurate and efficient systems [for] motorists and authorities" regarding:

> navigation and guidance systems based on digital mapping enhanced by safety information transmitted to drivers on static hazards (black spots, etc.) and dynamic hazards (black ice, dense traffic, etc.) that they are likely to encounter[;] traffic information which can be filtered so as to respond precisely to the needs and situation of drivers[;] accident alert system for the automatic transmission of essential information to the nearest emergency service unit[; and] "tracking", eg monitoring vehicles used for the carriage of hazardous goods, stolen vehicles or vehicles used for criminal activities.[143]

Not surprisingly, the Federal Motor Carrier Safety Administration recently announced a demonstration program to equip U.S. and Mexican trucks with "satellite tracking technology" and "allow real-time tracking of truck location, documenting every international-border and state-line crossing."[144] The program aims at enhancing compliance with "safety

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ters Plenary Session Beijing, China, (Oct. 10, 2007), http://www.its.dot.gov/press/2007/14th congress_brubaker.htm.

138. 23 U.S.C. §§ 610-610 (2006).

139. DOUGLAS COUNTY PUBLIC WORKS, DOUGLAS COUNTY CONNECTION, VOL. II, ISSUE I, 2 (Spring 2007) (available online at: http://www.douglas.co.us/publicworks/engineering/documents/DCPWInMotionfinal.pdf).

140. Joh, *Discretionless Policing*, 95 Cal. L. Rev. at 216 (using the term as, "a catchall . . . to describe the use of telecommunications for sending, receiving, and collecting information . . . between cars and private or public infrastructures" including RFID and DSRC).

141. ITS Standards, *ITS Standards and the USDOT Research Initiatives*, http://www.standards.its.dot.gov/learn_Research.asp#vehicle (listing the baseline standards for deployments under the initiative).

142. Communication from the Commission, European Road Safety Action Programme, art. 5.3.5, COM (2003) 0311 final (available online at: http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=COMfinal&an_doc=2003&nu_doc=311).

143. *Id.*

144. USDOT, Office of Public Affairs, *Safety Rules Reinforced with Satellite Technology for Mexican, U.S. Trucks Participating in the Cross-Border Trucking Demonstration Project*, (Nov. 5, 2007), http://www.dot.gov/affairs/fmcsa1107.htm.

standards and U.S. trade laws."[145] The satellite information will identify only company and vehicle number to maintain driver privacy.[146] Following the European lead, therefore, may provide the federal government another useful tool during the current turmoil over homeland security effects surrounding the porous U.S.A.-Mexico border.

Using renewable energy to provide more cost-efficiency in powering ITS should be another goal in the U.S. Photovoltaic systems, or solar panels, already provide the "most cost-effective long-term" solutions for electricity generation in "remote location[s] where accessing an electrical grid is infeasible or inexpensive."[147] As of November 2007, the Town of Parker had deployed twenty-six photovoltaic generators to power warning sign lights in school zones.[148] Convenience prompted this operating procedure, because installation costs from trenching power lines and connecting to the electrical grid are avoided.[149] Although solar power currently supports limited-capability video image processors, deployment of the power source is limited by the higher energy demands of more complex systems.[150] Instead, the current industry trend favors using light-emitting diode (LED)[151] technology to make signals more efficient, which can decrease electrical consumption by some ninety percent.[152]

Distributed wind systems also provide cost effective renewable energy solutions when coupled with solar and battery systems.[153] Such "hybrid power systems" can be more cost effective than diesel generation.[154] The Environmental Protection Agency (EPA) recommends that Denver continues to pursue distributed micro-turbine wind generation as an alternative fuel, as demonstrated by a project at "Police Station #4" in the city.[155] The EPA further touts micro-turbine technology as the "cutting

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145. *Id.*

146. *Id.*

147. Suedeen G. Kelly, *Alternative Energy Sources, in* ENERGY LAW AND POLICY FOR THE 21ST CENTURY 13-1, 13-18 – 13-19 (2000).

148. Interview with David Aden, Traffic Engineer, Town of Parker, Colorado (Nov. 5, 2007).

149. *Id.*

150. *Id.*

151. Wikipedia, *Light-emitting diode*, http://en.wikipedia.org/wiki/Light-emitting_diode (defining LED as a "semiconductor diode that emits incoherent narrow-spectrum light when electrically biased in the forward direction of the p-n junction").

152. Interview with David Aden, Traffic Engineer, Town of Parker, Colorado (Nov. 5, 2007); see also Environmental Protection Agency, *Local Action Plan Recommendations Denver, Colorado*, http://yosemite.epa.gov/gw/StatePolicyActions.nsf/LookupLocalExhibits/Colorado+:+Denver (expecting LED retrofitting in Denver to "reduce annual emissions of carbon dioxide by 8,894 tons," the "equivalent to removing 1,094 cars from the road").

153. Kelly, *Alternative Energy Sources*, at 13-21.

154. *Id.*

155. Environmental Protection Agency, *Local Action Plan Recommendations Denver, Colorado*, http://yosemite.epa.gov/gw/StatePolicyActions.nsf/LookupLocalExhibits/Colorado+:+

edge . . . cornerstone in the distributed generation field."[156] By embracing these renewable energy systems, the U.S. can take the lead in decreasing or even eliminating the demands on the electrical grid from ITS deployment.

FIGURE 4: RECENT INTERSECTION INFRASTRUCTURE
CONSTRUCTION IN PARKER[157]

VII. CONCLUSION

A recent photograph of the intersection of Mainstreet and Chambers Road in Parker, shown below in Figure 4, illustrates the challenge lying ahead as urban sprawl continues in America. The choice remains to be made whether new development will use renewable energy to power ITS and other technologies at intersections. In this vein, Parker has already employed solar powered crosswalk warning devices and school zone warning signals discussed above to make streets safer for school children and pedestrians. By the admission of its Traffic Engineer, however, Parker has made such innovations on the basis of avoiding costs associated with connecting the existing electric grid rather than "going green."[158]

But that is exactly what our nation needs to do: go "GREEN."[159] By

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Denver; Denver, *Sustainable Initiatives*, 2010 Programs and Plans, http://www.denvergov. org/ES/SustainableInitiatives/tabid/386886/Default.aspx.

156. *Id.*

157. Photograph courtesy of Joshua D. Prok.

158. Interview with David Aden, Traffic Engineer, Town of Parker, Colorado (Nov. 5, 2007).

159. *See* Edward H. Ziegler, American Cities, Urban Collapse, and Environmental Doom, 60 Planning & Environmental Law 7 (Jan. 2008) (calling on the next president to "pledge to be America's first GREEN president").

embracing the ITS lessons from the states, and the rest of the world, the federal government can spur more interoperable and energy-efficient development in ITS to make transportation systems safer, more efficient, and respectful of motorist privacy. Government agencies need to perform long term economic analyses, therefore, to prove the cost advantages to powering ITS with solar and microturbine generation systems.[160]

While the U.S. federal government may now be waking up to the efficiency benefits of ITS powered by renewable energy, small towns like Parker are likely ahead in this effort. This exploration of ITS has occurred, however, as the U.S. Congress passed new energy legislation, namely the Energy Independence and Security Act of 2007.[161] This legislation increases Corporate Average Fuel Economy Standards to increase efficiency.[162] The bill also calls for improvements in "transportation electrification" and provides incentives for "advanced technology vehicles manufacturing."[163] The applicability of these latter provisions to ITS indicates the continuing importance of ITS as a means to the end of enhanced transportation efficiency desired by the American people. More specific legislation, and funding, can commit the U.S. to world leadership in the development of industries powering ITS with renewable energy that can be deployed across the globe in ITS World Congress member states.

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160. *See* Kelly, *supra* note 147.

161. Pub. L. 110-140 (H.R. 6), 121 Stat. 1492 (December 19, 2007).

162. H.R. 6 § 102 (amending 49 U.S.C. 32902 (b) to raise the fuel economy standard to thirty-five miles per gallon by 2020).

163. H.R. 6 §§ 131, 136.

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