

# TAILGATING ON SPYWAYS: VANISHING ANONYMITY ON ELECTRONIC TOLL ROADS

Catherine Thompson\* and Dr. Ian Kerr\*\*

“Every technology comes wrapped in a story.”<sup>1</sup>

- Agre, 1995

## Summary

Intelligent Transportation Systems (ITS) technology can charge drivers toll fees without asking them to slow down and pay tokens at highway entry points. The difficulty with ITS technology from a privacy perspective is that toll road operators must locate drivers post-trip to collect toll fees. This invariably requires identification of toll road users. In one case, an anonymous driving option was created in consultation with members of the privacy community for a toll road in Toronto, Canada called the “407”. Citing lack of interest by the public, the toll road company recently discontinued the anonymous option. By unwrapping the story of vanishing anonymity on the 407 in Toronto, we hope to promote the use of anonymous driving options in general, before current toll payment

---

\* LL.B. (Candidate), Faculty of Law, University of Ottawa (cthom022@uottawa.ca). Catherine wishes to express her gratitude to Prof. Kerr for the opportunity to work on this project.

\*\* Canada Research Chair in Ethics, Law & Technology, Faculty of Law, University of Ottawa (iankerr@uottawa.ca). Ian wishes to extend his gratitude to the Social Sciences and Humanities Research Council, to the Canada Research Chair program, to Bell, Canada and to the Ontario Research Network in Electronic Commerce for all of their generous contributions to the funding of the research project from which this paper derives: *On the Identity Trail: Understanding the Importance and Impact of Anonymity and Authentication in a Networked Society* (www.anonequity.org).

<sup>1</sup> Philip E. Agre “Information Technology and Democratic Institutions” *Red Rock Eater News Service* (23 July 1998) online: Red Rock Eater News Service, ¶ 38, online

<http://legalminds.lp.findlaw.com/list/rre/msg00006.html>> [hereinafter Agre on democracy].

methods become entrenched through the economic pressures of standardization and the dependence on the secondary uses of driver data. Part of fulfilling this objective may involve bringing a joint privacy complaint against toll road operators in Canada and Australia, in partnership with the University of New South Wales' Baker & McKenzie Cyberspace Law and Policy Centre.<sup>2</sup>

### **Philip Agre's warning 10 years ago**

The story of vanishing anonymity on electronic toll roads was first rapped by UCLA information studies Professor Philip E. Agre ten years ago, when he wrote a series of articles on Intelligent Transportation Systems. The technology was in its early stages, but Agre voiced concerns about the shrinking ability to refuse collection of driver pattern data,<sup>3</sup> the temptation to use data for secondary uses,<sup>4</sup> and the entrenchment of toll payment options.<sup>5</sup> The study of an electronic toll road in Toronto shows that Agre's predictions are coming true.

---

<sup>2</sup> Baker & McKenzie Cyberspace Law and Policy Centre, online: <<http://www.bakercyberlawcentre.org>>

<sup>3</sup> Consent to the collection of personal information when using electronic toll roads might "become a practical necessity for large parts of the population." See Philip E. Agre, "Reasoning about the future: The technology and institutions of Intelligent Transportation Systems" (1995) 11 *Santa Clara Computer & High Tech. L. J.* 129 ¶ 7 (Lexis). [hereinafter Agre on ITS].

<sup>4</sup> Agre predicted that "imperatives of law enforcement will surely wear down any institutional protections for individualized ITS data." *Agre on ITS, supra*, note 3, at 131.

<sup>5</sup> Says Agre: "the economic forces for standardization make it unlikely that individuals, or even sizeable organized groups, would have an adequate bargaining position to force architectural modifications to large-scale systems that are already in place." *Agre on ITS, supra*, note 3, at 135. "If this scheme requires the routine capture of individualized data, then that convention will most likely become entrenched in the market. Conversely, if a scheme based on anonymous transactions becomes established then that scheme will most likely become entrenched instead." *Agre on ITS, supra*, note 3, at 133.

## Highway 407, Toronto, Canada

Highway 407 runs east and west for 108 kilometres just north of Toronto, Canada. There are currently 44 exit and entry points.<sup>6</sup> A group of companies came together to form 407 International Inc. to bid on the Government of Ontario's sale of Highway 407.<sup>7</sup> Their bid was accepted in May 1999 at a cool \$3.1 billion.<sup>8</sup> Starting in 1999, that company became party to a 99-year contract with the Government of Ontario that gives it the latitude to determine toll payment methods and amounts.<sup>9</sup> The Highway 407 toll system can determine the time of day you enter the highway, your vehicle class, the distance you traveled and whether your smart card transponder is correctly mounted and validly used.<sup>10</sup> The type of information typically collected in the billing process is the driver's name, mailing address, e-mail address, telephone number, vehicle plate, and driver's licence transaction history. The toll road company has access to the government's vehicle registration and driver's license databases to help charge tolls.<sup>11</sup> The sophistication of Highway 407's ITS system was once described as "innovative, and to date unprecedented."<sup>12</sup> The plate recognition system is 99.999 per cent accurate when the plate is visible, i.e. when there is no mud or rust on it.<sup>13</sup>

---

<sup>6</sup> Maps, 407 International Inc., online : <[http://www.407etr.com/customerservice/custserv\\_maps.asp](http://www.407etr.com/customerservice/custserv_maps.asp)>

<sup>7</sup> The following companies formed the 407 International Inc. consortium: *SNC-Lavalin*, online:

<<http://www.snclavalin.com>>; *Macquarie Infrastructure Group* online:

<<http://www.macquarie.com.au/au/mig/assets.htm>>; *Grupo Ferrovial*, online:

<<http://www.ferrovial.com/ferrovialenglish/marcos/index.asp?u=1>>; *Cintra*, online:

<<http://www.cintra.es/interior.asp?MP=1&MS=20>>; *CDP Capital Americas*, online:

<[http://www.lacaisse.com/LaCaisse/Filiale/En/HTML/197\\_En.aspx?FilialeKey=PresentationFiliale](http://www.lacaisse.com/LaCaisse/Filiale/En/HTML/197_En.aspx?FilialeKey=PresentationFiliale)>

<sup>8</sup> "Share Purchase Agreement" between International 407 Inc. and the Government of Ontario, online:

<<http://www.407etr.com/pdf/saleagr/SPA.pdf>> [hereinafter Agreement].

<sup>9</sup> Section 14(1)(g) of the *Highway 407 Act* states the concessionaire has the right to "determine the methods of payment of tolls, fees and interest." *Highway 407 Act*, S.O. 1998. c 28., online:

<<http://www.canlii.org/on/laws/sta/1998c.28/20041008/whole.html#BK17>>

<sup>10</sup> Tolls explained, 407 International Inc., online: <<http://www.407etr.com/tolls/tolls.asp>>

<sup>11</sup> Schedule 23, *Agreement, supra*, note 8, online: <[http://www.407etr.com/pdf/saleagr/Schedule\\_23.pdf](http://www.407etr.com/pdf/saleagr/Schedule_23.pdf)>

<sup>12</sup> Colin Bennett, Charles Raab, and Priscilla Regan, "People and place: Patterns of individual identification within intelligent transportation systems" in David Lyon, ed., *Surveillance as Social Sorting: Privacy, Risk*

## Privacy community involvement

The privacy community and the government of Ontario were successful with including a clause in the sale agreement obliging the company to provide an anonymous account option. The clause says the company “shall not require any personal information in order for an anonymous account to be opened.”<sup>14</sup> Ontario’s Information and Privacy Commissioner’s Office and the government of Ontario worked with toll road operators to create an anonymous driving option culminating in a 1998 report by the IPC. The option developed by the IPC for the Crown Corporation that sold the highway did not involve recording personal information and allowed individuals to pay through a numbered bank account.<sup>15</sup> Says the report:

[W]ith an *anonymous transponder account*, an individual is not required to provide any identification whatsoever. All financial transactions are done via cash to ensure true anonymity. During the registration process, no personal information is required — an account is opened and a security deposit is prepaid by cash. When the IPC first presented the anonymous option, the OTCC’s initial proposal required anonymous account clients to visit the OTCC Operations Centre to

---

*and Automated Discrimination* (Routledge, 2002) at 128. [hereinafter People]. The technology has the following components: Gantry Mounted Equipment located at exist and entrance ramps and includes cameras, antennas, Video Detection and Classification units (VDAC), light sources; Roadside Toll Collection (RTC) Units that that process information from Gantry mounted equipment for transmission to Operations Centre; Fiber Optic Cable and Communication Systems that transmit data to an Operations Centre; Toll Transaction Processor (TTP) that receives data at the Operations Centre and tabulates trips for billing purposes; Revenue Management System (RMS) that does toll calculation, account and billing system at Operations Centre. See Schedule 21, *Agreement, supra*, note 8, online: <[http://www.407etr.com/pdf/saleagr/Schedule\\_21.pdf](http://www.407etr.com/pdf/saleagr/Schedule_21.pdf)>

<sup>13</sup> Interview with Dale A. Albers, Manager, Public Relations, 407 International Inc., Nov. 15, 2004. Tel: 905-264-5221. [hereinafter Albers interview]. According to Albers, the technology is smart enough to know when it’s not smart enough, meaning, there are built-in thresholds that prevent the automated system from continuing until a human can review its work. For example, when the system is not sure whether a character on the plate is a P or a D, it will ask a person instead of guessing.

<sup>14</sup> Schedule 23, *Agreement, supra* note 8, online: <[http://www.407etr.com/pdf/saleagr/Schedule\\_23.pdf](http://www.407etr.com/pdf/saleagr/Schedule_23.pdf)>

<sup>15</sup> “407 Express Toll Route: How you can travel the 407 anonymously.” Commissioner Ann Cavoukian, IPC report 1998, online <<http://www.ipc.on.ca/docs/407-e.pdf>> [hereinafter IPC Report].

replenish their account, whereas regular transponder account clients could pay through a variety of means. Since it was important that the anonymous transponder option be as convenient to use as the regular transponder option, this solution was not acceptable to the IPC. The OTCC then explored the idea of having anonymous transponder clients replenish their account at any chartered bank or trust company, without providing any identification. Through extensive discussions with the financial community, the OTCC was successful in achieving this objective.<sup>16</sup>

## **Current toll payment options**

Despite the clause in the sale purchase agreement, and despite clear direction on how to achieve anonymity by the IPC, the anonymous option described above does not exist.

There are currently three ways individuals can pay toll fees which are calculated on a per kilometre basis. First, travelers who do not set up a transponder account are billed by having the rear of their vehicles photographed. License plate information is sent to the government of Ontario and they disclose license plate registrant names and mailing address.<sup>17</sup> Second is the transponder account. Drivers provide personal information by signing a lease agreement for the transponder. There are two payment options. One is to pay the toll fee online using a credit card or through pre-authorized charges on a credit card or bank account.<sup>18</sup>

---

<sup>16</sup> *Ibid*, at 5.

<sup>17</sup> *Ibid*. Despite there being no notice that personal information will be collected leading up to the highway, the act of driving on Highway 407 constitutes consent to the collection of personal information according to the company's privacy policy: "As a state-of-the-art, open access electronic toll highway legislated to provide service under the Highway 407 Act, when **you choose** to travel 407 ETR, **you consent** to the retrieval of your personal information as the registered owner of the vehicle plate, by use of the highway. This information is supplied to us from the Ministry of Transportation (MTO) to bill you for use of the 407 highway and collect payment." Privacy Policy, 407 International Inc., online:

<[http://www.407etr.com/about/about\\_privacy.asp](http://www.407etr.com/about/about_privacy.asp)>

<sup>18</sup> Our Payment Terms, 407 International Inc., online :

<[https://www.407etr.com/customerservice/custserv\\_terms.asp](https://www.407etr.com/customerservice/custserv_terms.asp)>

Third, *in theory*, is what the toll road company calls its *anonymous option*. This option is not described on Highway 407's website, but a frontline telephone agent at 1-888-407-0407 may describe an "anonymous" transponder account option to customers specifically requesting that information.<sup>19</sup> Individuals wanting to set up such an account must present themselves at 6300 Field Avenue West, Toronto, Canada, corner Highway 27, between 8 a.m. and 6 p.m. Identification must be presented as well as proof of license plate ownership, although telephone agents said they do not record the personal information presented. Credit card information must be submitted to be kept on file should the driver go below their mandatory \$150 account balance.<sup>20</sup>

### **Why was the anonymous account option discontinued?**

*There are no standards requiring an anonymous option*

Standard setting initiatives are still in the development stages. The U.S. Transportation Department takes the position that the private sector should develop its own standards. In Canada, Intelligent Transportations Systems are also not subject to standards.<sup>21</sup> The U.S.

---

<sup>19</sup> We say "may" because not all telephone agents were aware of an anonymous account option.

<sup>20</sup> The description of the anonymous option varied when speaking with Dale Albers, Public Relations Manager at the toll road company. According to him, personal information is recorded on paper and the file is sent to the company's disaster recovery site. According to Albers, a disaster recovery site is a site where organizations store essential computer equipment, etc., in case of an emergency. The files for anonymous accounts are kept under lock and key, and can only be accessed by high ranking members of the toll road company such as the VP of customer service. Their policy is to only access personal information if they are served a warrant by law enforcement. *Albers interview, supra*, note 13.

<sup>21</sup> Interview with Colin Rayman, ITS Canada General Manager, Nov. 15, 2004. Tel: (905) 472-5319. At present there is only Transport Canada's ITS Architecture principles which serve as a guide to the ITS community. One principle includes providing the option to open "cash based accounts for travellers that wish to be completely anonymous." Rayman described the standards as not very detailed and unenforceable, although he believes Transport Canada could oblige federally-funded ITS projects to comply with these standards. Transport Canada, "Canadian Architecture for Intelligent Transportation Systems: Logical Architecture -Volume I, Description and Data Flow Diagrams." Prepared by IBI Group in association with Lockheed Martin, September 2000, online: <<http://www.its->

Department of Transportation is supporting a consensus approach within industry to develop ITS standards. The department also states “the program is coordinating U.S. ITS standards efforts with international standardization activities.”<sup>22</sup> ITS Canada says it signed a memorandum of understanding with ITS America, as well as ITS organizations in other parts of the world.<sup>23</sup> Although Canada is not participating in U.S. ITS standards development, American standards are likely to be adopted in Canada.<sup>24</sup>

This is troublesome from a participatory democracy perspective. As Agre once warned, leaving implementation to vendors makes efforts to influence standardization collapse under their own weight. Agre also warned us to not be seduced into legitimizing widespread adoption of standards by characterizing the change as a social movement.<sup>25</sup>

*The ‘not popular’ excuse vs. unrealistic administrative burdens*

The highest number of anonymous transponder accounts simultaneously operating on the 407 was twenty one. Now, in a pool of more than six million transponder accounts, there are only four anonymous transponders.<sup>26</sup> As Colin Bennett, Charles Raab and Pricilla Regan made clear:

---

sti.gc.ca/Architecture/English/docs/logical/Volume%20I%20-%20Description%20and%20Data%20Flow%20Diagrams.pdf> at 3.

<sup>22</sup> ITS Standards, U.S. Department of Transportation, online <<http://www.standards.its.dot.gov/standards.htm>>

<sup>23</sup> ITS Canada, online: <<http://www.itscanada.ca/english/aboutitscanada.htm>>

<sup>24</sup> This is consistent with Transport Canada’s strategy on ITS Architecture Principles: “... for reasons of compatibility and interoperability, it is similar to the U.S. ITS Architecture, the Canadian version takes account of unique aspects of the Canadian context such as bilingualism, the metric system of measurement, population dispersion and climatic extremes.”Transport Canada, “Intelligent Transportation Systems Research & Development Plan for Canada” (April 2003), online: <<http://www.its-sti.gc.ca/en/randd/Innovation-Through-Partnership.htm>>

<sup>25</sup> See *Agre on democracy*, *supra*, note 1 for a discussion of participatory design, incrementalism, experimentation, and identity.

<sup>26</sup> *Albers interview*, *supra*, note 13.

the fact that very few individuals have so far taken advantage of this [anonymous] system suggests, however, that the administrative burden is not something that most users of the highway would tolerate in order to protect the privacy of their movements.<sup>27</sup>

The administrative burdens placed on individuals seeking anonymous accounts are considerable in the Highway 407 scenario. It includes visiting a single location – which is not near the metropolitan area where many highway users live – during business hours to initially set up the account. The unpopularity of the option could also be due to individuals recognizing that it does not provide meaningful anonymity because the process involves giving personal information, at the very minimum in the form of a credit card number. There is a kind of panopticism in this, one that may make the public feel

[i]t is a matter of ‘they know everything about us,’ without any very definite reference for the ‘they’ or the ‘everything.’ This abstract understanding is unfortunate because it encourages a passive fatalism about the control of technology, as well as a diffuse and corrosive distrust of the institutions of society.<sup>28</sup>

### **Future concerns: secondary uses and the war on terrorism**

*“Perhaps these secondary uses of ITS data are actually part of the systems’ intended functionality, in which case that fact should be openly confirmed and debated.”<sup>29</sup>*

– Agre, 1995

---

<sup>27</sup> *People, supra*, note 12 at 163.

<sup>28</sup> *Agre on ITS, supra*, note 3 at 134. Agre also provides a discussion on the problem posed by the ontology of computer system design. Agre says any system created to contend with human activity will involve the creation of categories and relationships to characterize the subjects of the system; people and things. To carry this out, systems need a representational scheme. This scheme will allow system administrators to “capture” the activity of the subjects. In short, “a computer can only compute with what it can represent, and it can only represent what it can capture.” *Agre on ITS, supra*, note 3 at 135. Therefore, capturing personally identifying information in the form of unique identifiers is the natural default of computer system design. This is why “design alternatives” are characterized as restrictions on system design. As such, “it is not an exaggeration to say, then, that privacy invasion is an inherent tendency of the conventional practices of computer system design.” *Agre on ITS, supra*, note 3 at 131.

<sup>29</sup> *Agre on ITS, supra*, note 3 at 131.

The privacy community should be concerned about the possible future uses of driver pattern information, specifically the use of ITS technology in the fight against terrorism. ITS America recently published a report outlining the potential for ITS technology to prevent, detect and respond to terrorist attacks.<sup>30</sup> This includes “[p]roviding surveillance and analysis for public transportation, including identification of and effective rapid response to threatening or high risk passenger behavior.”<sup>31</sup> Currently, in the case of Highway 407, information is not pro-actively shared with law enforcement.<sup>32</sup> Canada’s transportation authority, however, is seeking to balance the issue of security with the need for free-flow of trade with the U.S. As such, they are working with the U.S. in the area of interoperability of security protocol and will likely adopt initiatives originating from the U.S.<sup>33</sup>

### **Conclusion and next steps**

*“A debate about Intelligent Transportation Systems (ITS) is not simply a debate about technology. It is, rather, a debate about the future interactions between technologies and institutions that our choices today will set in motion.”*<sup>34</sup>

- Agre, 1995

*“People want to drive on highways, not spyways.”*<sup>35</sup>

---

<sup>30</sup> ITS America, *Homeland Security and ITS: Using Intelligent Transportation Systems to Improve and Support Homeland Security*, online:

<[http://www.itsa.org/resources.nsf/Files/PPRA\\_Security\\_Final/\\$file/PPRA\\_Security\\_Final.pdf](http://www.itsa.org/resources.nsf/Files/PPRA_Security_Final/$file/PPRA_Security_Final.pdf)>

<sup>31</sup> *Ibid*, at 3.

<sup>32</sup> *Albers interview*, *supra* note 13. Albers says 407 International Inc. only supplies personal information when it has to, such as when it is subject to a subpoena. They have already been served a number of warrants and have complied with them. Albers feels it is unlikely that the company will volunteer personal information to participate in surveillance efforts in the name of national security.

<sup>33</sup> See *Enabling Secure Trade Forum*, Transport Canada, <<http://www.its-sti.gc.ca/en/enabling-secure-trade.htm>>

<sup>34</sup> *Agre on ITS*, *supra*, note 3 at 129.

<sup>35</sup> Bob Mitchell, “Highway 407 toll feared a threat to privacy” *Toronto Star* (19 March 1995) A6, (CBCA Fulltext).

- Ontario Information and Privacy Commissioner Tom Wright, 1995

When Highway 407 began offering anonymous accounts it was extolled as “the only highway of its kind that provides its customers with a way to travel their toll road without compromising their privacy.”<sup>36</sup> However, despite everyone’s best efforts, the toll road company did what it wanted. The anonymous account option contemplated in consultation with the privacy community does not currently exist.

In order to combat vanishing anonymity on the 407 in Toronto, Canada, we intend to expose to the public the shift in policy direction against an anonymous driving option. By offering to the public an effective post-mortem of the anonymous driving option and engaging in negotiation with the company, government, and the privacy community, it is hoped that the anonymous option first recommended by the IPC in 1998 will be re-affirmed and adopted. As a parallel activity, we also intend to target standard setting bodies. These bodies will be mapping the future of ITS technology and we intend to provide a coordinated voice on behalf of the privacy community in the development of best practices. If these next steps fail, we will consider launching a joint privacy complaint with Australia’s Baker & McKenzie Cyberspace Law and Policy Centre, arguing that the failure to provide an anonymous driving option is a violation of federal privacy legislation in both jurisdictions.

---

<sup>36</sup> *IPC Report, supra*, note 15 at 3.