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# Year 24 Final Report

**Grant Number: DTRT12-G-UTC01**

**Project Title:**

## Security & Privacy Breaches in ETPS: Problem Survey & Case Study of I-90

**Project Number:**

UMAR24-27

**Project End Date:**

5/31/15

**Submission Date:**

152/31/15

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The New England University Transportation Center is a consortium of 5 universities funded by the U.S. Department of Transportation, University Transportation Centers Program. Members of the consortium are MIT, the University of Connecticut, the University of Maine, the University of Massachusetts, and Harvard University. MIT is the lead university.

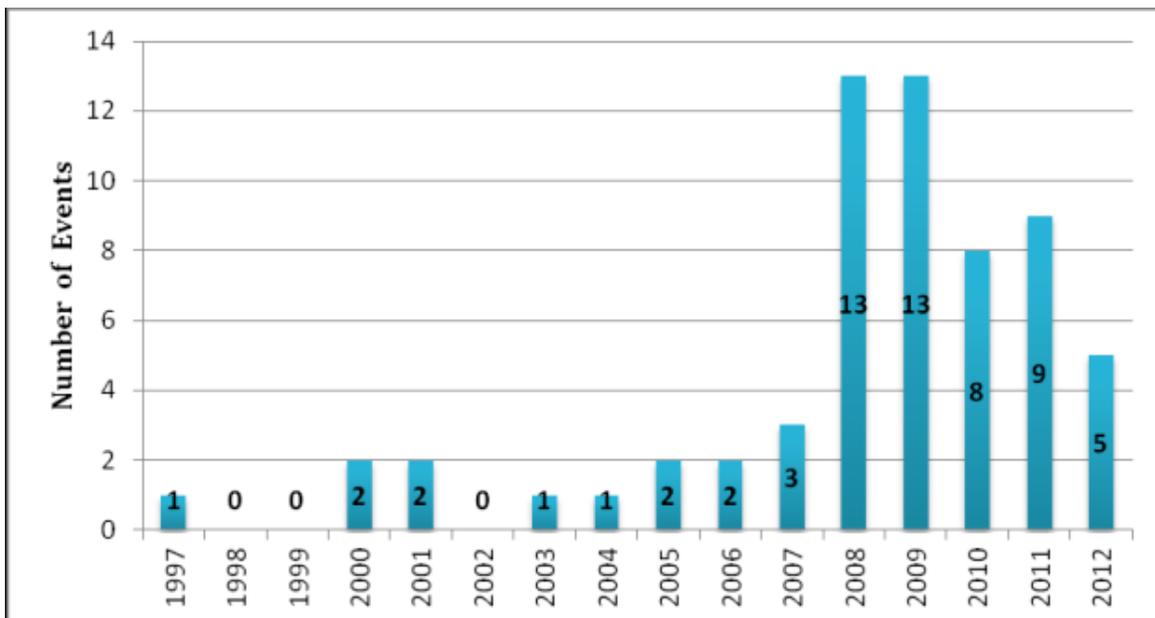
### Brief description of project:

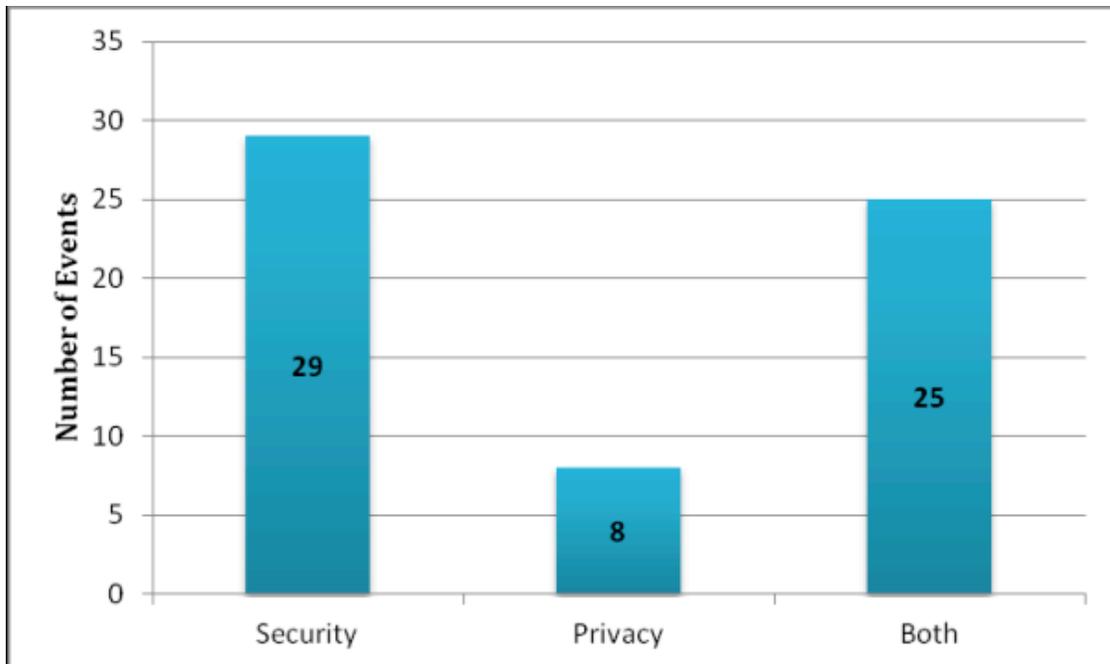
This study gathered news reports of security and privacy breach violations in electronic transportation payment systems, ETPS, over a sixteen-year period from the year 1997 until 2012. This research also constructed a computer simulation using VISSIM traffic software of a 12 miles stretch of the I-90 Massachusetts Turnpike ticketing tolling system. Working closely with MassDOT, Massachusetts Department of Transportation, April 2013 data was acquired that facilitated the simulation construction. This facilitated the analyses of the impacts of adopting protective measures on transponders.

### Methodology

This research has a twofold approach. First, investigators will determine the extent and severity of the ETPS security and privacy breaches via an online survey reporting breach events occurring worldwide over the last ten years. Secondly, researchers will investigate one case study, the ETPS on the I-90 Massachusetts Turnpike. Plaza traffic during the peak rush hour will be simulated using VISSIM traffic software for a range of values for added payment transaction time.

Students utilized the 4 computer stations and traffic simulation software located in the *Intelligent Transportation Laboratory* within the UMass Dartmouth Physics Department. The reported number of breaches surged in 2010 and 2011, most of them security breaches rather than privacy breaches. Of the 5 identified security attribute types, Integrity was the most frequently breached. When a system has Integrity, it assures that the identity of the user communicating with the system is not bogus.





### **Conclusions:**

Both undergraduate and graduate students have gained knowledge in ETPS as well as in IT and website development.

Education of ETPS breach attributes is lacking in the professional community. Only recently have experts defined breach types and their attributes. By providing agencies access to the database, awareness of the problem will increase and possibly stimulate discussion about possible protective measures and solutions. Running simulations of tolling facilities with various lane configurations, patterns and with various buffer zone sizes, adds to the knowledge and understanding of traffic flow through electronic toll collection plazas and determine best design practices

Other electronic payment systems other than transportation will benefit by stimulating discussion about possible protective measures and solutions similar to those adopted by ETPS. By creating a database of news articles reporting breaches, University Transportation Programs can begin to include awareness and “lessons-learned” in their curriculum. Transportation Agencies are demanding a workforce that is trained in Information Technology that includes skills that protect electronic payment systems from both security and privacy breaches.

Further use of ETPS will create more efficient operations at toll plazas, parking areas and other electronic transportation facilities.