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HAZMAT by truck: another vulnerability?

Jim Giermanski

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Abstract Tracking sensitive materials carried by truck has been and currently is subject to Federal law, demonstrated by the use of material safety data sheets, (MSDS) and placarding. However, in 2007 when *Implementing Recommendations of the 9/11 Commission Act of 2007* (IRCA) was passed which requires tracking tracing, and reporting of hazmat incidents. Yet, it seems that those responsible, particularly the Transportation Security Administration (TSA) have no new examples of these mandates. Furthermore, there seems to be little involvement of the **American Trucking Associations** (ATA) in promoting the requirements of the IRCA even though hazardous materials generation, storage, control, and transportation by truck are serious components of a hazmat vulnerability in the United States. Congress states that the transport of hazardous materials accounts for at least 18% of total freight tonnage, and there are more than 400,000 large trucks dedicated to its movement. The IRCA called for new information on costs and benefits of utilizing tracking technology for motor carriers transporting security-sensitive materials. Federal funding of $7,000,000 was appropriated for this purpose in each fiscal year 2008, 2009, and 2010. On May 27, 2008 the Transportation Security Administration released its *Report* complying to the IRCA's mandate. Although the *Report* of the HAZMAT Truck Security Pilot (HTSP) was to demonstrate "new information," it did not. Instead, it demonstrated the ignorance of TSA, and the U.S. Department of Transportation (USDOT) to understand supply chain tracking and security, and the technology currently available in the market. The Pilot was flawed in many aspects. Its major flaws included the definition of the supply chain, itself; the kinds of logistics data available, access to data, accuracy of data, and the communications system needed to monitor and control. The HTSP pilot was quite limited, and bore little resemblance to reality. In *every* case of the *Report's* recommendations, existing technology can obviate the need for unnecessary technology development to meet the recommendations. There is a clear need for another pilot project that involves a real supply chain, major motor carriers, the American Chemical Council (ACC),

J. Giermanski (✉)
Powers Global Holdings, Inc., Belmont, NC, USA
e-mail: powersintnlinc@bellsouth.net

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current available technology, current providers of that technology, and the active support of the ATA with sound government oversight to ensure that the laws it wrote are implemented and followed.

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Tracking sensitive materials carried by truck is supposed to be subject to Federal law. Yet, it seems that placarding and the use of material safety data sheets (MSDS) are the primary focus of the motor carrier industry. Title 49 of the United States Code of Federal Regulations (49CFR) also known as the Federal Motor Carriers Safety Regulations (FMCSR) requires the use hazardous materials placards when shipping hazardous materials cargo and dangerous goods in the United States. Canada, Mexico. MSDS documents travel with sensitive or hazardous materials describing how to handle the material, health effects, storage, disposal, and incident procedures. These are of particular use if a spill or other accident occurs. However, trying to find examples of motor carrier compliance with Federal guidelines with respect to tracking, tracing, reporting incidents, etc. is difficult and concerning since the law now requires the tracking and monitoring of sensitive materials by the trucking industry. What's even more troubling is the apparent disregard of hazardous materials serving as weapons of mass destruction (WMD) and the vulnerability they pose, especially while in transit. The following analysis will demonstrate the lack of security enhancement in trucking these materials, and the need for more work by the Transportation Security Administration (TSA) in complying with the law and developing through demonstrations and pilots systems and programs that will reduce the level of vulnerability this nation now faces. This analysis will include in a minor fashion the role of the **American Trucking Associations** (ATA), if any, in the trucking of hazardous materials.

The size and scope of the risk

Hazardous materials generation, storage, control, and transportation are serious components of any hazmat vulnerability in the United States. Section Two, Findings and Purposes, of the proposed H.R. 1013, *Hazardous Materials Cooperative Research Act of 2009* reveals to what extent hazardous material can pose a threat to this nation. This analysis is limited to only one aspect of the vulnerability, the movement or transport of sensitive materials over our highways. Section Two of H.R. 1013 states the following with respect to the size of the risk and the motor carriers' role.

Congress finds the following:

(1) *There are more than 1,000,000 shipments per day in the United States of materials identified as hazardous by the Department of Transportation. These shipments are estimated to total 2,100,000,000 tons of hazardous cargo per year and to comprise more than 18 percent of the total freight tonnage moved in the United States annually.*

(2) *...it is estimated that there are currently 400,000 large trucks... dedicated to the shipment of hazardous materials*.
(3) *More than a dozen Federal agencies have regulatory, enforcement, and operational responsibilities for ensuring the safety and security of hazardous materials shipments. In addition, a variety of State and local agencies have responsibility for developing and enforcing State-level regulations and for responding to incidents involving hazardous materials*.
(4) *Decisions regarding the packaging and routing of hazardous materials shipments, the development and implementation of procedures to ensure both the safety and security of such shipments, and the regulation of hazardous materials shipments are made by industry groups and government entities at a variety of levels and in all modal administrations of the Department of Transportation on a daily basis*.
(5) *...much of this research is program or mode-specific and as such is focused on addressing only the regulatory, inspection, enforcement, or operational needs of the group undertaking the research*.
(6) *There is a documented need for the establishment of a cooperative research program that will engage all modes and actors, both public and private, involved in the transportation of hazardous materials in conducting cross-cutting assessments of hazardous materials transportation issues that are national and multi-modal in scope and application*.

Given this situation, the question is what is the federal government doing to mitigate the vulnerability, and what is the role of the **American Trucking Associations** in research, pilot program development, or support of programs to minimize the potential risk. In reviewing the remarks of Robert Pentrancosta who testified on behalf of the ATA, May 14, 2009, one finds only six issues discussed. None related to the new Federal requirement to track and monitor hazardous materials carried by truck. In fact, his testimony was more historical in nature complaining about unnecessary obligations and costs placed on the trucking industry by State and Federal governments. No references were made to any laws or regulations in the years of 2001, 2003, 2006, 2007, and 2008. In the years of 2002, 2004, 2005, and 2009, Pentrancosta made eight references to issues unrelated to the carriage and monitoring of hazardous materials by motor carriers. However, the Federal Government has been quite busy in this regard.

Section 1554, **Motor Carrier Security-Sensitive Material Tracking**, of the *Implementing Recommendations of the 9/11 Commission Act of 2007* (IRCA) mandated that the Secretary of Transportation through the Administrator of the Transportation Security Administration *...shall develop a program to facilitate tracking of motor carrier shipments of security-sensitive materials and to equip vehicles used in such shipments with technology that provides—*

(A) *frequent or continuous communications;*
(B) *vehicle position location and tracking capabilities; and*
(C) *a feature that allows a driver of such vehicles to broadcast an emergency distress signal (p.549)*.

Additionally, the *Act* called for *any new information related to the costs and benefits of deploying, equipping, and utilizing tracking technology, including*

portable tracking technology, for motor carriers transporting security-sensitive materials not included in the hazardous material safety and security operational field test report released by the Federal Motor Carrier Safety Administration on November 11, 2004:... (p. 550). Appropriated funding was $7,000,000 for each fiscal year 2008, 2009, and 2010. In each year 3 million may be used for equipment.

On May 27, 2008 the Transportation Security Administration released its *Report* complying to the IRCA's mandate. The R*eport*, entitled *HAZMAT Truck Security Pilot (HTSP)* was produced by the TSA Office of Transportation Sector Network Management Highway and Motor Carrier Division. The *Report* described a project *...to demonstrate the feasibility of an eventual national truck-tracking center (TTC) capable of interfacing with carriers' tracking systems through a non-proprietary, universal interface*. TSA made two contract awards, one to the **Science Applications International Corporation, Inc**. (SAIC) which provided the analysis, and the other to **General Dynamics Advanced Information Systems** (GDAIS) that addressed the design and implementation of the truck tracking system. The results of the HTSP pilot "demonstrated a platform for the development of a program (emphasis added)"that would satisfy mandated requirements.

This pilot demonstrates the inability of TSA, in particular, and the U.S. Department of Transportation (USDOT), in general, to even understand first, the fundamentals of supply chain tracking and security, and second, what technology is currently available in the market precluding any need for "development" of a program. It is clear by virtue of the *Report*'s recommendations, that the pilot was limited, questionably crafted, and fundamentally flawed. In addition, the Congress has shown, again, its lack of commitment in addressing the HAZMAT vulnerability of trucking sensitive materials. Finally, there was the conspicuous absence of the ATA in any of its activities.

The supply chain

According to both IRCA and *The SAFE Port Act of 2006*, *The term, 'International Supply Chain' means the end-to-end process for shipping goods to from the United States, beginning at the point of origin (including manufacturer, supplier or vendor) through a point of distribution to destination* (pp. 491–492 of IRCA). One assumes that although the HTSP was domestic in character, the supply chain would continue to be defined from the shipper at origin to the consignee at destination. Unfortunately, the data flow revealed in the HTSP *Report* never included a consignee at destination. In other words, while sensitive HAZMAT material could manage their way through the chain, there was no conclusion to it. In a real supply chain one must know and be accountable for the proper contents that are loaded at origin and equally accountable in verifying at arrival the same cargo and quantity at destination. The logistics data must be complete and flow between shipper and consignee and to appropriate regulatory agencies until a safe arrival and verification at destination

Data begins with the identification of content. Usually, the shipper will have a pre-written bill of lading for the motor carrier to sign and accept. However, one cannot depend on the accuracy of the contents as listed on the bill of lading unless the driver actually watched the loading. If the conveyance or transport container were sealed at origin, before the motor carrier arrived, how does the motor carrier accurately know the

contents? The carrier must accept the word of the shipper, but whose word, a vetted and accountable person who verified the contents, or the person at the shipper's loading dock who may not know what is in the conveyance. The carrier cannot even placard the contents with surety unless it can verify the contents. Therefore, data flows must begin at origin, continue throughout the container's movement, and end at destination with the identity of the person at each end verifying the contents and its quantity, the minimum for proper placarding of the conveyance for its movement.

General Dynamics, one of the vendors, admits that there was a "…challenge of obtaining cargo data…" and recommended three options:

1. *entering cargo data directly into the tracking system data stream,*
2. *manually entering cargo data into a web application, and*
3. *interfacing with carrier dispatch systems to extract cargo data*.

All of these options can be satisfied today with current off-the-shelf technology. How could TSA be unaware of the technology's existence?

Limitations of the pilot

One can often find the limitations of a project or demonstration by examining its objectives, findings, and recommendations. Actually the HTSP pilot was quite limited, and bore little resemblance to reality given the absence of real supply chain functions. Its focus appeared to be on communications, while it claimed to ... *establish best practices and identify security enhancements in the trucking industry.* In fact, security enhancement in the trucking industry was not included in the objectives of the pilot. The pilot did little, if anything, to enhance security in the trucking of hazardous materials. HTSP objectives were:

- *Develop and demonstrate a centralized TTC* (truck tracking center)
- *Developed and demonstrated a non-proprietary universal interface system of set of protocols that will allow alerts and tracking information to be transmitted from all commercially available tracking systems to a prototype TTC*.
- *Evaluated the feasibility of utilizing the developed universal set of protocols or interface system to pass truck tracking information between a TTC and a 24-h Government intelligence operations center.*
- *Provided an independent analysis of the recommendations and validated the results of the objectives listed above*.

It is clear by the choice of vendors that communication was the objective. Unfortunately, communications is only one part of any security in moving hazardous materials. Even so, the recommendations of the *Report* also did little to support the communication's objectives.

Recommendations of the *report*

The HTSP listed eleven categories of recommendations. These categories revealed again what appeared to be an unawareness of off-the-shelf technology. In fact, the

private sector is now far ahead of what the HTSP demonstrated. This is born out in *Report*'s own words: *Motor carriers who participated in the HTSP Staged Event testing had mixed feeling overall about the usefulness of the HTSP system. Most were very satisfied with their current security equipment and technology use in performing operations*…. The private sector already has access to smart conveyances or transport containers that can do more than the HTSP has demonstrated.

In fact, the use of smart containers precludes the need for a driver's participation, and can communicate on their own. Additionally, the user or the third party international control center ("platforms") can communicate with the container, depending on the programming, sensors, and communications technology, in real-time or close to real-time. The very smart containers not only tell you electronically the contents of the container but also who supervised loading the cargo and who is accountable for the accuracy of the contents at origin; the time the container was sealed; when it left origin; its route; its internal environment; its progress; whether it deviated from its course; its arrival at destination; and who opened it and verified the cargo.

Each recommendation in the *Report* indicated positive steps that needed to be taken to improve the HTSP results and revealed the level of sophistication at which TSA worked. Recommendations covered:

- the need for interface of communications;
- the need for redesign of system architecture;
- the need to scrap and develop a reliable geo-fencing capability;
- the need to solve the problem of inconsistent alert signals which was directly linked to the role of the driver;
- the need to solve the flaw in vehicle-based communications as opposed to stand-alone, untethered transport container/trailer/tanker conveyance;
- the need to incorporate HTSP system's fit with other technologies and protocols;
- the need for cooperation on the regional level;
- the need to align technological applications to national incident management frameworks;
- the need to leverage the value of tracking and control to the lowering of insurance premiums,
- the need for tax incentives because of the extra security it would provide to our government; and
- the need to optimize the supply chain and information on loads, threats, and sequencing of response information.

In every case of recommendations contained in the *Report*, existing technology would accommodate and fulfill the recommendations. In fact, the pilot appeared to be so rudimentary, that it failed to show what can be done today.

Congressional oversight or lack thereof?

When one looks at the mandates from the IRCA, one would expect that given the money authorized for this project and the potential vulnerability of moving sensitive materials, more comprehensive pilots using up-to-date technologies should follow. To the contrary, a TSA insider stated that the money referenced in the IRCA was immediately

"re-programmed" away from HAZMAT tracking. So where is the money? What other projects or pilots are scheduled to meet the requirements of the law?

The obvious: a need for a realistic pilot

There is a need for a real-world pilot to evaluate a security response to a motor carrier HAZMAT incident involving a genuine supply chain. At the time of this writing there is a tentative agreement of a major U.S. motor carrier affiliated with the **American Chemical Council** to participate in a realistic supply chain project. There is also an agreement from a container/trailer security service provider to provide technology available today and recommended in the HTSP *Report*. The technology will include the chain-of-custody process from origin to destination. All communications would be real-time or close to real-time and automatically generated by a system contained in the "untethered" contain/trailer/tanker, not from the tractor or by the driver. While any HAZMAT cargo could be used in the pilot, it seems prudent to chose one of the 42 chemicals contained in Attachment C of the *ACC* (**American Chemical Counci**l) *Facility Security Prioritization Process*. These chemicals are contained in the Federal Bureau of Investigation's (FBI) listing of the "…potential for misuse in weapons of mass destruction (WMD)…(p.8)" and are most likely targeted for theft, diversion and use in WMD. Additionally, a new pilot would allow all communications to be coordinated by TSA and will link all designated, appropriate local, state, regional, and national entities having a need to be cognizant of the movement and any incident that may occur from shipper to consignee. All communication monitoring and reporting movement throughout the supply chain would be via satellite, internet, telephone, or cellular communication.

Finally, all alert information of unauthorized breaches into the transport container and spills would be automatically and initially transmitted by satellite communications that can inform appropriate local, state, regional and national centers of the description of cargo, origin and destination, its placard identification, its decontamination instructions, and its safe area parameters as contained in the *North American Emergency Guide Response Guidelines*. This is especially important if the driver is incapacitated or the conveyance is hijacked with incident.

The transport of hazardous materials is a genuine vulnerability. Its apparent "shelving" is a greater vulnerability. The claim, especially by the ATA that nothing has happened so far removes the need for action now is fundamentally flawed. Will it take an actual catastrophic event to occur before serious action by TSA is taken? Is there a more active role for the ATA to play? Perhaps, a shift from focusing on the costs and jurisdictional obligations to the real control of the supply chain in which hazardous materials move, will automatically solve the problems of jurisdictional controls and costs. It's time for both the TSA and ATA to do more, and for Congress to do its job in seeing that the law is followed!