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Border-Crossing Documentation

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Introduction. This article discusses issues involved with the design and development of an ID card that could serve both as a driving license and as a border-crossing document acceptable for transit of the Canada – U.S. land border. This topic is of interest because of two recent U.S. federal laws. One law, known as the Western Hemisphere Travel Initiative (WHTI), changed the documentation requirements applicable to travelers entering the U.S. via the land borders. Whereas driving licenses have in the past been sufficient ID for some travelers, by June 2009 each traveler must carry either a passport or an alternative document that denotes citizenship and identity. Any such alternative must meet the approval of the U.S. Department of Homeland Security (DHS). DHS has an interest in limiting the number of alternatives, so that inspection agents need be familiar with a smaller set of documents than at present. The second law, known as the Real ID Act, establishes new standards applicable to any state-issued ID document that is to be used for a federal purpose (e.g., boarding a domestic airplane flight, entering a federal facility). State-issued driving licenses and ID cards are by far the most common form of ID now used within the U.S. for such purposes, so states are beginning to modify their licensing processes in order to comply with the Act prior to the May 2008 deadline.

Both laws are an outgrowth of the events of 9/11. The *9/11 Commission Report* highlighted weaknesses in the status quo related to driving licenses, ID cards, and border-crossing documents. It contained the following recommendations:[1]

- No person seeking to enter the U.S. should be exempt from the requirement to carry a biometric passport (or an equivalent document that securely verifies identity).
- The federal government should establish standards for the issuance of birth certificates and for ID documents such as driving licenses.
- A biometric screening system should be deployed at the nation's borders, capable of monitoring the entry and exit of travelers.

Also an outgrowth of 9/11, the *Security and Prosperity Partnership of North America* is an initiative launched by Mexico, Canada, and the U.S. in March 2005. Through this initiative, the three countries will strive to develop robust continent-wide security standards and streamlined risk-based border processes. The initiative identifies tasks such as:[2]

- Development of standards for low-cost border-crossing documents that offer secure proof of nationality and traveler status.
- Development of recommendations for the use of biometrics for traveler screening.
- Development of a strategy to coordinate background checks, credential recognition, and document security standards.

WHTI and Real ID have provoked controversy, with many states and citizens critical of the new mandates. Some groups, though, have promoted the concept of a "two-for-one" solution – i.e., they advocate for the development of state-issued driving licenses that comply with the Real ID Act and that also serve as secure border-crossing documents. These groups hope that the easy cross-border mobility that Canadians and Americans now enjoy can be perpetuated by developing low-cost, dual-function licenses. In late 2005, the State of Michigan expressed an interest in developing such licenses, but that interest has not yet resulted in a specific program.

Travel Document Standards. A dual function license seemingly would need to comply with both the standards applicable to travel documents and those applicable to driving licenses. Turning first to international travel documents, a United Nations affiliate organization called the International Civil Aviation Organization (ICAO) establishes standards for such documents. 189 nations have contracted to comply with the standards, in an effort to achieve global interoperability of documents. There is strong motivation to comply, in that many nations (including the U.S. and Canada) will not usually admit a traveler who carries a non-standard document. The ICAO has established standards applicable to the traditional passport book, as well as to two different sizes of passport card.[3] ICAO's "TD-1" specification is applicable to a credit-card sized passport card. The specification establishes attributes such as card dimensions, mandatory data to be included on the card (e.g., name, date of birth, etc.), and the general location of that data within certain zones of the card. A facial image is the mandatory biometric identifier, and the card must contain a machine-readable zone (MRZ). The MRZ contains a uniform set of data items, imprinted using a font that is designed for optical character recognition (OCR), and located in a specific place on the card. The MRZ is thus legible both to people and to OCR scanners. The TD-1 specification allows for optional document content, such as embedded micro-chips and additional printed data fields. Table 1 shows some of the relevant characteristics of a TD-1 passport card, in comparison to other types of cards that will be discussed below.

As one option for compliance with the WHTI, the U.S. State Department has announced its intention to issue a card-style passport.[4] The card will enable U.S. citizens to re-enter the country after visits to Canada (as well as Mexico, Bermuda, and the Caribbean) by either land or sea. The card will have many characteristics consistent with the ICAO TD-1 specification, including a standard MRZ and facial image. The card will also contain a radio-frequency technology (RFID) chip that is able to transmit only the unique number that is encoded within a given card. The unique number will serve as the locator for the card holder's data record within a secure database maintained by DHS. The RFID chip will implement "vicinity read"

Table 1. Comparison of Mandatory Elements

Data elements	TD-1 passport card	AAMVA license	Real ID license
Family and given names	F	F	√
Date of birth	F	F	√
Document type	F	F	
Date of issue		F	
Date of expiry	F	F	
Document number	F	F	√
Document discriminator		F	
Facial image	F	F	√
Signature	F	F	√
Address		F	√
Vehicle classifications		F & R	
Endorsements		F & R	
Restrictions		F & R	
Sex	F	F	√
Height		F	
Eye color		F	
Nationality	F		
Issuing state	F	F	
MRZ, 3 rows	R		
PDF417 barcode		R	
Machine readable element			√

F = front side, R = reverse side, √ = required

The appearance and content of driving licenses has varied considerably, given the large number of issuing jurisdictions. Recently, the states/provinces have moved in the direction of implementing common license formats, and in 2005 the AAMVA published a specification for the design and content of driving licenses and ID cards.[5] Although few (if any) states/provinces now meet the specification, and nothing yet compels them to do so, we will use it as a basis for comparison within this article. It serves as a useful description of the collective needs of the states/provinces, and what's more, given the goal of limiting the set of documents that inspection agents must confront, DHS is likely to require a uniform design for all licenses intended for use as border cards.

The AAMVA specification identifies the characteristics of a compliant driving license, including physical dimensions, mandatory and optional data elements, zones within which those elements must be portrayed, security features, a standard biometric (again, a facial image), and the type and location of allowable machine-readable elements (i.e., bar codes and magnetic stripes). Table 1 reveals that the mandatory elements of an AAMVA license are far more numerous than those of a passport card.

Of course, the states/provinces have also become accustomed to production of ID cards similar in design to driving licenses, because of the many non-drivers that find it useful to carry a valid piece of identification. The AAMVA specification thus describes the characteristics both of driving licenses and of ID cards. To allow immediate recognition of each kind of card, a standard red band must be present across the top of the front side of a driving license, and a green band must be present on an ID card. The AAMVA has also opted for licenses that provide an immediate visual cue as to the driver's age: licenses/IDs for drivers under the age of 21 have a vertically-oriented front side (i.e., text is oriented for readability when the long axis of the card is vertical to the reader), and other licenses/IDs have a horizontally-oriented front side.

Machine-readable elements have differed widely among the jurisdictions, given the variety of available technologies (e.g., 1-D barcodes, 2-D barcodes, magnetic stripes) and the lack of standardization of the content and format of the encoded data. The AAMVA specification dictates the use of a PDF417 2-D barcode containing prescribed data elements in a specific, unencrypted format. The barcode must be located in the top portion of the reverse side of the license. The specification allows for the inclusion of optional machine-readable elements elsewhere upon the reverse side.

Requirements of Real ID. Table 1 likewise reveals the content of a license/ID as mandated by the Real ID Act, and it is evident, when one considers only the data elements present on the card, that the Act is less comprehensive than the AAMVA standard. The controversy surrounding implementation of the Act is related to other aspects of compliance. First, the Act requires that a state validate and digitally scan the foundational documents used to prove eligibility for a license (birth certificates, social security cards, etc.). Second, a state must also determine the legality of the applicant's residence status within the U.S., a task that involves reviewing federal database records particular to the applicant. Finally, a state must produce a license/ID that incorporates security features

technology, meaning that RFID transceivers located as far as 20 feet away will be able to retrieve the unique number. Vicinity-read technology is now deployed at the Canada – U.S. border to support the NEXUS trusted-traveler program.

Prior to issuance of an international travel document, a nation must make a determination that an applicant is eligible to hold the document, which involves validating the applicant's identity, citizenship, and legal good standing. For the new passport card, the U.S. State Department will perform this process, known as "adjudication," in a manner identical to that now used for traditional passport books.

Driving License Standards. The issuance of driving licenses has historically been a function of the individual states and provinces, with a given state's license also being valid for temporary use in other jurisdictions. For a variety of reasons (e.g., accurate knowledge regarding a driver's history, usefulness of the driving license as an ID outside the home state), the states have found it necessary to cooperate in the administration of driving licenses, and one mechanism of cooperation is the American Association of Motor Vehicle Administrators (AAMVA), a nonprofit organization maintained collectively by the states and provinces.

consistent with the Act's requirements. States have argued that these procedural issues make timely compliance impossible. Each state seemingly will have to develop new information system capabilities (e.g., to store scanned document images, investigate document validity, and investigate residence status), design and procure new card stock, and re-enroll all licensed drivers. The states estimate the overall cost of compliance as approximately $11 billion.[6]

Controversy also surrounds the issue of personal privacy. Some people argue that a license compliant with the Real ID Act is essentially equivalent to a national ID card. Pending legislation in Montana seeks to prevent that state from complying with the Act, and personal privacy is among the concerns of the bill's authors.

It is the overlap between the requirements of Real ID and WHTI that has led some groups to promote the concept of a dual-function card. If a state must determine residency status, which can be done only by querying federal databases, and if the query establishes that an applicant is of a specific nationality, then the resulting license, displaying nationality, apparently meets the requirements of the WHTI.

Concept for Combined Driving License / Border Card. We present here some opinions about the design, content, and issuance process for a card that comes close to meeting both the ICAO TD-1 standard for a travel document and the AAMVA standard for a driving license. Figure 1 shows one conceivable arrangement of the front and reverse sides of such a card, with all mandatory data elements (as listed in Table 1) accounted for. Unfortunately, our analysis concludes that for reasons associated with the *format* of those data elements, perfect consistency with both standards cannot be achieved. Aspects of the example design are discussed below, with points of inconsistency noted:

- The AAMVA and TD-1 standards specify identical nominal physical dimensions, which are those of a standard credit card.
- The red band comprises "Zone 1" of the card under both standards. The data content, size, and color of the zone as shown is consistent with both standards.
- On the front of the card, the location and size of the zones containing the facial image, signature, and text data are consistent with both standards. A facial image can be displayed that meets both standards.
- The data elements shown on the front of the card can't be formatted in a manner that meets both standards at once. The two standards differ with respect to the display of dates. The TD-1 standard requires that a month be identified with a 3- or 4-letter abbreviation (as shown here in the "Date of Birth" field), while the AAMVA standard uses the "mm/dd/yy" convention ("dd/mm/yy" in Canada). There are also differences in the labels used to identify data elements – e.g., AAMVA uses the acronym "DOB" to label the field referred to as "Date of Birth" by TD-1).
- The arrangement of the data elements on the front of the card is important. The TD-1 standard requires that information about the *cardholder* be present in one zone, and information about the *document* be present in another. Fortunately, such a requirement does not violate AAMVA's specification. We have placed cardholder data in the top half of the text zone, concluding with the line of information that identifies eye color. It is arguable as to whether certain AAMVA-required data (e.g., a restriction that corrective lenses be worn, an endorsement allowing operation of a motorcycle) constitute information about the document or about the cardholder. Each standard allows for the presence of optional data elements, which makes it possible to include the many additional elements required by the AAMVA. We believe that standardization of the arrangement and the format of data elements would support DHS's goal of facilitating the job of the inspection agent.
- On the reverse of the card, the machine-readable elements required by the two standards can coexist, with the MRZ located at the bottom and the PDF417 barcode above. There is room for the remaining AAMVA-required data elements, as displayed, as well as certain mandatory security features that are not visible to the naked eye. Unfortunately, it appears unlikely that a third machine-readable element can be accommodated. This is likely to be problematic for jurisdictions (such as British Columbia) that today use both a barcode and a magnetic stripe. The magnetic stripe would have to be located across the full width of the card, at roughly the same location as the barcode shown in

Figure 1. Example Dual-Function Card

Front

Reverse

our figure, and there is apparently too little room to place the barcode lower on the card.

Thought must also be given to the process through which a dual-purpose card might be issued. The federal government reserves the right to issue international travel documents and to adjudicate U.S. citizenship. Cognizant of this issue, some proponents advocate for inclusion of federal agencies within the issuance process. The following process is an example of how state and federal agencies could interact:

- An applicant for a state driving license has the option, at added expense, to procure a dual-function card. If the option is pursued, all application materials collected by the state (e.g., digital facial image, scanned foundation documents, etc.) are transmitted to DHS, together with a processing fee. Upon successful completion of the adjudication and vetting process, DHS creates a federal data record for the applicant, assigns a unique federal ID number, transmits that number to state authorities, and gives permission to issue a dual-function card.

The example card in Figure 1 presumes that such a process has taken place. It contains the term "Border Card" in the heading, shows "USA" within the "Nationality" data field, and includes three lines of data within the MRZ. A card intended to serve solely as a driving license would omit the term "Border Card," show a nationality value of "XXX," and show three lines of null characters in the MRZ.

To meet the TD-1 standard, the first row of an MRZ must include a nine-digit document number in the sixth through the fourteenth character positions (i.e., the value 012345678 in our figure). If this field were used to depict the unique federal ID number mentioned earlier, then a scan of the card at the border could be used to retrieve the federal database record for the cardholder. The TD-1 standard also allows for optional information in the final fifteen character positions of the first row. In Figure 1, we inserted "WA" to represent Washington State, followed by a twelve-character alphanumeric string in the format used for Washington driving license numbers.

Dual-function licenses could also be designed to interact with the RFID technology that has been deployed by Canada and the U.S. at land ports of entry. The blank card stock used throughout the nation for dual-function cards could be procured with embedded chips, each card with a unique RFID code. After approval of card issuance by the federal authorities, the state could respond by submitting the unique code embedded within the applicant's card.

If Canada and the U.S. were to implement similar card designs and issuance processes, and if the two nations were to negotiate an arrangement allowing for sharing of some data regarding the people holding dual-function cards, then citizens of both countries could benefit from the convenience of carrying the cards. Such a goal seems achievable, given that Canada and the U.S. today cooperatively implement the NEXUS program, which involves joint maintenance of a shared database identifying the persons enrolled.

Conclusion. This article is perhaps best viewed as a conceptual exercise. There are joint working groups of U.S. and Canadian officials tackling the task of developing low-cost border-crossing documents, and their vision of the product and the issuance process is undoubtedly different than the one we have presented. Their vision is unfortunately not yet public. Our purpose here is to help stakeholders understand some of the issues and constraints involved with the development of a combined driving license / border card. Such a card will not be implemented unless it meets the needs not only of regional stakeholders, but also of federal authorities, and some of those needs have been discussed:

- Reliance upon existing document standards to the greatest extent possible, and reconciliation of conflicting standards.
- Uniformity of document design across the continent.
- Operability with existing infrastructure deployed at the border (e.g., RFID and OCR document readers).
- Incorporation of federal authorities in the issuance process.
- Sharing of cardholder data by federal, provincial, and state authorities on each side of the border, consistent with the privacy statutes of all jurisdictions involved.

Endnotes

1. See pp. 388-390 of the *9/11 Commission Report*, which can be retrieved from:
   http://www.9-11commission.gov/report/911Report.pdf
2. See p. 49 of the *Security Annex* of the *Security and Prosperity Partnership of North America: Report to Leaders*, August 2006. The document can be retrieved from:
   http://www.spp.gov/2006_report_to_leaders/security_annex.pdf?dName=2006_report_to_leaders
3. The specification is ICAO Document 9303, *Machine Readable Travel Documents: Part 3 — Size 1 and Size 2 Machine Readable Official Travel Documents*, 2002. It can be retrieved from:
   http://hasbrouck.org/documents/ICAO9303-pt3.pdf
4. See U.S. Department of State public notice 5558, titled *Card Format Passport; Changes to Passport Fee Schedule*, found on page 60928 of the Federal Register, Vol. 71, No. 200. The notice can be retrieved from:
   http://frwebgate.access.gpo.gov/cgi-bin/getpage.cgi?dbname=2006_register&position=all&page=60928
5. The specification is AAMVA's report titled *Personal Identification — AAMVA International Specification — DL/ID Card Design*, March 2005. It can be retrieved from:
   http://www.aamva.org/aamva/DocumentDisplay.aspx?id={66260AD6-64B9-45E9-A253-B8AA32241BE0}
6. See p. 3 of *The Real ID Act: National Impact Analysis*, September 2006. It can be retrieved from:
   http://www.aamva.org/aamva/DocumentDisplay.aspx?id={055B37F6-E619-4ACE-AAEC-10CC9F79CB1A}