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U.S. Senate Committee on Finance

"Border Insecurity, Take Two: Fake ID's Foil the First Line of Defense"

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Executive Summary:

Digimarc is the leading supplier of government-issued citizen identity documents in North America. Our systems are used to enroll citizens and issue more than 2/3 of all U.S. driver licenses. We supply similar systems for production of the Mexican voter identification documents and driver licenses in several Canadian provinces.

Customs and Border Protection and law enforcement officers face extraordinary challenges as they try to authenticate the more than 200 forms of valid driver licenses circulating in the U.S. today through unaided visual inspection. This testimony discusses technological innovations that are available now and in use by several State governments and commercial entities to augment visual inspection of driver licenses. Such technologies, like digital watermarking, are already in broad distribution, and can be used to machine authenticate U.S. driver licenses, travel documents and other modern identification documents. Solutions, like those demonstrated today, could be leveraged by the Federal government to improve the security of our borders within 6 to 12 months.

Although many States are engaging in impressive innovation in driver license security, we will pay special attention today to a Department of Transportation pilot study conducted by Nebraska that is right on point with the concerns of the Committee. This pilot study, coupled with the investments that Nebraska has made in identification security, provides a useful case study to inform the national debate about the use of driver licenses for crossing our land borders with neighboring nations. A demonstration of readily available solutions that can machine validate identification documents is provided, as are a number of public policy recommendations that seek to contribute to implementing effective strategies to protect our homeland.

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Introduction:

Chairman Grassley and Ranking Member Baucus, I would like to thank you both, and your colleagues on the Finance Committee, for giving me an opportunity to appear before your Committee to provide a demonstration of technologies that can be deployed right now to help better secure our borders. The technologies I will describe are not some futuristic ideas being built in a lab but are currently in use and ready for full-scale deployment.

I am appearing before your Committee as an expert in the field of secure ID solutions. As an Executive Vice President at Digimarc Corporation, I have responsibility for product marketing, business development and product development for Digimarc's secure identification solutions. In my 10 years with Digimarc, I have held a number of executive management positions leading the development and successful deployment of digital watermarking and government-oriented document and ID security applications.

Digimarc Overview:

Digimarc has been in the business of supplying issuance systems for driver licenses and other government-issued credentials for nearly 50 years. Our company is the leading supplier of government-issued IDs in North America and also supplies similar products and services in more than 20 foreign countries including Mexico, Haiti, Russia and the United Kingdom. We are also a trusted supplier of a global system used by an international consortium of central banks to deter digital counterfeiting of banknotes.

Our company's systems issue more than 60 million identification documents annually, and are employed by 32 U.S. States and the District of Columbia, producing more than 2/3 of all driver licenses issued. We support the States with solutions that cover all aspects of ID issuance including applicant identity verification and enrollment, over-the-counter and centralized secure card production systems, design and manufacturing of the cards using advanced technologies and multiple security features, and inspection to authenticate the ID after it has been issued. To date, Digimarc provides centrally issued driver licenses to 12 States, comprising about 80% of all centrally issued IDs in the U.S.

Additionally, Digimarc pioneered a signal processing technology innovation known as "digital watermarking," which allows imperceptible digital information to be embedded in all forms of media content, including personal identification documents, financial instruments, photographs, movies, music and product packages. In identity documents digital watermarking is used to embed digital data within the structure of the document that is imperceptible to the human eye. It creates a machine-readable security feature that links together numerous elements of the document allowing machine authentication to readily identify counterfeit and fraudulent documents.

At the point of inspection digital watermarks can be easily detected and read by a number of commercially available devices, including document scanners, PDAs with built-in cameras, mobile phones and other digital devices. A quick scan by an authorized reading device, equipped with special software, analyzes the information embedded in the digital watermark as well as other information contained in security features present on the document. This enables the immediate detection of photo swapping, altered data or re-originated documents – the primary forms of counterfeiting.

U.S. Driver License Security Enhancements:

U.S. States began incorporating digital watermarking in their driver licenses in 2002 using a Digimarc product known as Digimarc® IDMarc™. Eighteen States have adopted this important security capability in their driver licenses, including key border States such as Washington, Michigan, Minnesota, Florida, Texas, and Vermont. In Michigan, for example, more than 75% of circulating licenses contain a digital watermark that could be authenticated at the U.S. / Canadian border. A number of other significant border States have also adopted digital watermarking, but they have chosen to keep their participation in this program confidential for security reasons. Examples of States in other areas of the country that have adopted digital watermarking include Iowa, Wyoming, Nebraska, New Jersey, Kansas, and Massachusetts.

Incorporated today in more than 35 million circulating driver licenses, digital watermarking is a covert, machine-readable feature that enables reliable cross-jurisdictional authentication of U.S. driver licenses. By the end of the year, 1 in every 3 issued driver licenses will include digital watermarks and this number is growing rapidly.

Digital watermarking complements other authentication techniques such as the pattern matching and multi-spectral analyses found in passport and travel document scanners. Digital watermarking technology is compatible with and can enhance the security of passports, smartcards and other travel documents such as the proposed PASS Card. Digimarc broadly licenses digital watermarking technologies to many other vendors for supply of digital watermarking enhanced solutions for a variety of security purposes.

Deployment of digital watermark reading is aligned with the published security strategies of the Department of Homeland Security and the Department of State, and is a recommended feature of the Document Security Alliance and an approved optional feature of the HSPD-12 PIV-2 standard, which calls for enhancing the identification and authentication of federal employees and contractors. Digital watermarks provide positive document authentication, age verification, cross-jurisdictional authentication, and forensic capabilities.

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Our Insecure Borders:

Until recently, inspectors at air travel ports of entry had relied solely on reading an OCR strip on the bottom of a passport to identity the document. Upgrades to these systems have introduced "full page" readers that now use pattern recognition and remote databases to validate the document and the card holder. Similar investments have not yet been made to enhance driver license inspection across the U.S. land borders. Features, like digital watermarking, exist today in driver licenses that could allow improvement in inspection of driver licenses to progress as has been the case for passports, yielding a substantial improvement in security and crossing lanes.

Since Sept. 11, 2001, the United States Government Accountability Office (GAO) has published a number of studies that have demonstrated how insecure our borders really are. In 2003, and also as described in today's testimony, GAO officials partnered with agents of the Office of Special Investigations to develop counterfeit documents. These were used by special agents to enter the United States from various ports of entry from the Western Hemisphere. In GAO's most recent series of tests, 17 of the 19 counterfeit driver licenses were produced by using off-the-shelf, commercially available graphics software, a computer, a scanner and a printer, and were successfully used to cross into the United States. Our hard-working border officials were unable to detect these fakes because they do not have all the tools they need to properly verify the authenticity of these types of documents.

Visual inspection of travel documents—the key method our inspectors have today – is inadequate for a number of reasons, including the fact that there are more than 200 valid U.S. driver license formats. Only specialists, with years of training, have the skill sets needed to conduct reasonable visual inspections, and even then, visual inspection alone is not adequate to catch digital counterfeits. Our border agents do not have the necessary training or tools to inspect these documents on a day-to-day basis at ports of entry. This is made more difficult by the demands that arise from timely processing of thousands of individuals every day. Machine-authentication of the digital watermark present in these documents would take the guess work out of determining which documents are valid and which are not.

As noted below, the positive results from the U.S. DoT / Nebraska digital watermarking pilot confirms that viability and applicability of digital watermarking on U.S. driver licenses to aid in quick, reliable machine authentication at the U.S. border.

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Leveraging State Investments in ID Security to Secure our Borders:

States have made and are making major investments in their driver licenses and issuance systems to promote transportation safety, protect their citizens from identity theft and fraud, and enhance their personal security and the security of the nation. As we know, the perpetrators in the Sept. 11 terrorist attacks obtained valid driver licenses under false identities. In any security system, criminals tend to look for weak points to exploit. In these cases, the documents were genuine driver licenses obtained fraudulently. The States and their suppliers are upgrading not only the documents but also the enrollment process and inspection processes to address all know weaknesses that could be exploited by criminals. According to the National Conference of State Legislatures, the States are expecting to invest billions of dollars as they continue to enhance the security of their driver licenses in compliance with federal standards being established to implement the REAL ID Act. These efforts will result in a citizen ID infrastructure that will deliver a high level of security in the enrollment, issuance and inspection processes. The States have established security processes that complement and extend many of the steps that are used for the current passport, or expected PASS card.

The processes and technologies being deployed by the States could also be used to strengthen the enrollment processes for Federal employee credentials and citizen credentials such as Passports, and can be used in conjunction with gaining citizenship certification from Department of State for State-issued REAL ID-compliant driver licenses. These improved enrollment processes include:

- Secure in-person photo capture to protect against fraudulent photo submittal and enable downstream biometric facial recognition
- Electronic scanning and archiving of documents enabling efficient enrollment, subsequent forensic investigation of documents, and electronic transmittal as part of adjudication process
- Electronic document authentication at point of enrollment using a variety of machine readable features including digital watermarking
- Electronic applicant verification against federal and third party databases such as Social Security
- Electronic verification of applicant data against State DMV and vital record databases
- Facial and/or fingerprint recognition, both 1-to-1 and 1-to-many, to verify identity against existing biometric records

- Use of trained driver license agency personnel who are experienced in fraudulent document recognition, work with enrollment processes on an ongoing basis, and have successfully passed thorough background checks

Leveraging Existing Technologies to Secure our Borders:

As described above, proven, cost-effective technologies are commercially available today that can enable border officials to machine authenticate U.S. driver licenses. These documents contain numerous security features such as digital watermarks, holograms, and special inks. There are software and hardware solutions available that can automatically inspect such security features and facilitate background checks via third party data bases. Digital watermarks are key in that they provide the only means in use today of trusted authentication of a driver license, and can be read using commercially available scanners and special software.

In addition to applicability in detecting and deterring ID counterfeiting, digital watermarks are a proven layer of security in global efforts to protect banknotes from digital counterfeiting. We have a multi-year contract with an international consortium of Central Banks in which we have developed and deployed, and are supporting and continuing to enhance a system to deter digital counterfeiting of currency using personal computers and digital reprographics. Work on the system began in 1997. Further details of the system are confidential for security reasons, yet it is important to note that digital watermarking is a proven and widely deployed security technology in such other anti-counterfeiting initiatives.

Digital watermark-based document authentication solutions are compatible with other travel document reading efforts including the ePassport efforts. This capacity to work with an ever-evolving set of security features is essential because it ensures that our government can stay ahead of terrorists and criminals who seek to use loopholes in our security systems to gain access to our country. Additionally, these technologies can be quickly deployed, within 6 to 12 months, and are efficient for the inspector to use so that citizens are not inconvenienced with long lines. And essential to success, digital watermarks do not compromise citizen privacy.

Summary of Nebraska ID Authentication Pilot Results:

Today, I will demonstrate a few examples of these technologies. But first, I would like to discuss what one State, Nebraska, has already done to raise the ID security bar by deploying innovative security solutions and processes. The experience of Nebraska, and similar experiences in several other States that have implemented driver license security innovations, can be leveraged by the

Federal government to help make our nation's borders more secure in a timely and cost effective way. Iowa, for instance, has deployed secure card materials, digital watermarking, and many other cutting edge solutions. The State employs fulltime investigators to attack license and identity fraud, and has deployed advanced readers to help officials detect counterfeits.

In 2003, Nebraska was one of the first States in the country to incorporate the digital watermarking feature into its licenses. Today, more than 60% of valid driver licenses in Nebraska are secured with digital watermarking, and Digimarc anticipates within two years all valid Nebraska licenses in circulation will be protected by IDMarc.

In 2005, the Nebraska Department of Motor Vehicles conducted a pilot under a grant from the U.S. Department of Transportation to demonstrate authentication of digitally watermarked driver licenses as a means to fight ID counterfeiting, reduce the purchase of age-restricted products, such as alcohol, and enhance traffic safety.

Digital watermark scanners were installed in a total of 18 point-of-sale sites, 30 office sites, and 35 law enforcement sites, and were used in "real time" for an average of 30 days The deployed readers continue to be used by the state, and in fact, this summer, Nebraska plans to put new Digimarc Document Inspector units into production at DMVs across the State. This will arm front-office operators with the tools to inspect and positively authenticate the millions of U.S. driver licenses secured with Digimarc IDMarc digital watermarking. Authentication will take place when Nebraska and other State driver licenses are presented as proof of identity to obtain a new or renewal driver license. This includes licenses from neighboring States such as Colorado, Iowa, Kansas and Wyoming – effectively removing the guesswork that can come with visually inspecting an out-of-state ID.

At the conclusion of the pilot, Digimarc staff interviewed the users regarding their experience with and response to the digital watermarking technology. Retailers, law enforcement and DMV operators were equipped with reader devices that allowed them to verify the information printed on a driver license—even an unfamiliar out-of-state driver license—against the information contained in the digital watermark. By doing so, they were able to determine if a driver license was valid or not and in the retail situations which, if any, age-controlled products the DL holder was old enough to purchase. The scanner/reader devices proved invaluable in instantly determining whether or not the license presented was authentic, as well as validating the age of the DL holder.

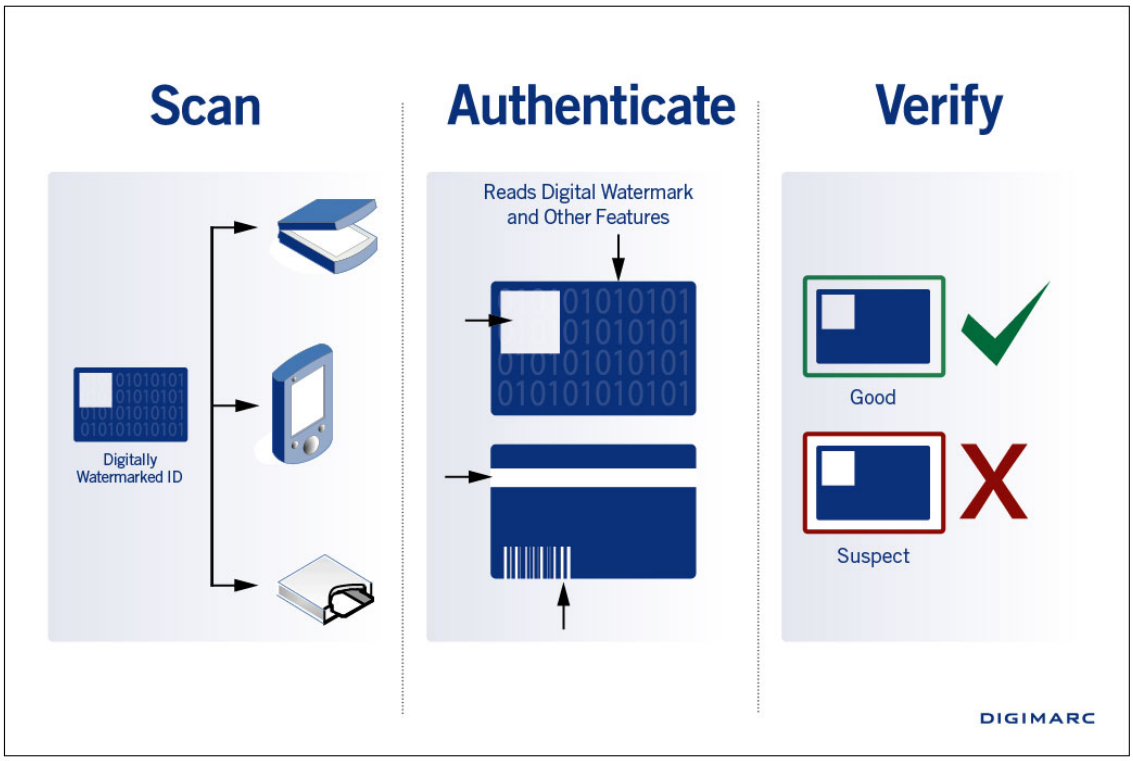
- 100% of retail participants said that a valid read from the watermark gave them confidence that the DL was authentic.

- 100% of law enforcement participants using a PDA reading device had confidence that a valid read from the watermark meant the DL was authentic.

- 100% of office staff surveyed reported that they believed the device was beneficial, that it gave them confidence that the scanned ID was authentic, and that they would use it in the future.

Digimarc Document Inspector Demo:

Authenticating documents like driver licenses and IDs can be done quickly and simply with a single device that scans both sides of the document simultaneously, and the Digimarc Document Inspector software that checks the validity of common ID security features, including the digital watermark.



I have two Nebraska driver licenses. The names and demographic data on each are the same. The cards visually appear to contain all the same security features. But the two photos are different. Thus one must be a fake.

I will start by inspecting one document by inserting it into the scanner. The software is very easy to use – the operator just hits the spacebar to initiate the scanning process.

In just a few seconds, the device scanned both sides of the document and the software processed the information, determining that the document is authentic for that document type and jurisdiction. The software contains a regularly updated document information library that is used for this automated validation process.

The software read the individual's demographic data from the document to display to the operator, which assists validation of the document and card holder. This entire process produced a valid rating in seconds, displaying "green" clearly on the screen so it's easy for the operator to see it passed inspection – enabling them to focus on the individual, rather than the document.

Now I'll scan the second document. To the human eye, this Nebraska license looks identical to the previous "valid" one I just scanned, and would pass any manual inspection by a border agent.

The scanning process was the same, only the result was a clear red indicator on the screen that the document is suspect. This counterfeit was made by swapping a photograph from a driver license produced in a different State, and placing it on this Nebraska license. The software was able to determine the mismatch and flag the document as suspicious for the operator to take action or conduct further investigation. In a typical border crossing scenario, this card holder would be sent to secondary inspection where an investigator could use the digital watermark and other features or databases to pursue the fraud.

Digital watermarks can also be read and authenticated on travel document scanners, like the kind used to read passports. Here, our software is able to draw on the pattern matching library of such a scanner and its multi-spectral light inspection authenticate the watermark and check additional security features visible only when illuminated in UV or IR light. This is a more expensive solution, but one that can validate not just driver licenses and IDs, but travel documents like passports and foreign ID cards.

For example, if I insert a genuine Massachusetts driver license first into the barcode/magnetic stripe reader device read data from the 2D barcode on the back of the document you'll see the individual's demographic data from the document display on the screen, but the document rating is "Pending". I can now scan the front of the document on the travel document reader and the software processes the information, determining that the security features are authentic for that document type and jurisdiction. In this example, the digital watermark and document design and format features for a Massachusetts driver license of this particular series year were all authentic. Like in the previous demonstration, the software contains a regularly updated document library that is used for this automated validation process.

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The Digimarc Document Inspector closes the loop on the secure ID lifecycle by providing an easy, reliable way to instantly authenticate IDs after issuance. Border inspectors can immediately validate the document using the digital watermark and other data and features present on the license. Visible features, like 2D barcodes and others, can be altered, but when linked to a second feature that is imperceptible to the human eye, counterfeiting becomes extremely difficult, if not impossible. After scanning, Document Inspector provides a quick pass/fail reading and keeps lines moving.

Digimarc Document Inspector is fast and easy-to-use. An operator can authenticate a document with confidence in just a few seconds. Our software is hardware independent, working seamlessly with a variety of best-of-breed hardware and software components, and provides a simple user interface to eliminate the guess work associated with visual inspection.

Document Inspector can validate a deep set of security features. Depending on options selected this includes an extensive database of U.S. driver license security features such as barcodes, magnetic stripes, document layout features in visible light (placement, size), and features in UV and IR light. The database is updated on a regular basis, and updates can be distributed in multiple ways.

Table 1 summarizes the Document Inspector features and benefits.

Table 1 Digimarc Document Inspector Features and Benefits

Features	Benefits
Extensive document database that is updated regularly	• Standardizes authentication practices • Gives agents more confidence • Keeps the knowledge base up to date without the need for additional training •
Fast, easy authentication results	• A clear red/green indicator of authentication evaluation • Multiple visual cues to the result • Ability to see the details if further investigation is necessary •
Standards-based technology	• Allows for integration with external systems • Keeps deployment/investment costs low • Provides clear technology path

In summary Digimarc Document Inspector is a document authentication solution that features:

- A system that offers fast document authentication to ensure citizens are not inconvenienced or slowed down by the process.

- Authentication of the most comprehensive set of security features used in driver licenses

Cost Estimates of Deploying Readily Available Technologies:

Digimarc does not have access to all of the government information, including technology integration, human resource, and third-party database expenses, to offer a precise estimate of what it would cost the Federal government to deploy these readily available technologies to help secure our borders. We respectfully suggest that the Committee request that the Congressional Budget Office or the Office of Management and Budget conduct such a study.

It is our understanding that the number of Northern and Southern land border points of entry are:

	Inbound Passenger Lanes	Inbound Cargo Lanes	Pedestrian Lanes	Total Lanes
Northern Land Border POEs	278	121	24	423
Southern Land Border POEs	224	72	86	382
Total	502	193	110	805

Our own rough estimate of the cost – based on our experience and market research studies – of deploying the necessary software and hardware in an estimated 805 lanes to cover all immigration land border lanes, including cargo and shoulder lanes is under $50 million. This would equip each lane to machine validate driver licenses and other common travel documents. Covering the Northern border lanes, assuming 423, the cost is approximately $26 million. If we wanted to add any type of remote database interface to this system such as cross referencing watch list databases or consolidating the number of transactions etc. we would add an additional $10 million to our baseline cost estimates.

These cost estimates do not include the cost to the States of deploying machine-readable security features, nor do they capture the expense to the States of improving a large number of their security programs such as their enrollment processes. But these requirements have already been mandated by the REAL ID Act and the States are already working out how to pay for compliance with this Act. In any case, if our cost estimates are roughly in the ball park, this would be a small price to pay to quickly improve the security of our borders.

Public Policy Recommendations:

We recommend that the Federal government promptly deploy capabilities to machine verify the authenticity of U.S. driver licenses at the border, including reading and authenticating the digital watermark. Over time, these readers could

be upgraded to accommodate enhancements being made to driver licenses and other identity documents from both the U.S. and Canada, and also other from other Western Hemisphere countries as deemed appropriate by the Department of Homeland Security and the Department of State. These technology solutions are scalable, having the capacity to integrate new technologies that will be developed in the future to ensure that criminals and terrorists are always challenged to defeat ever higher levels of security.

Every border crossing official must be able to do machine-readable verification of driver licenses, processing the covert machine readable features in documents that are presented at the border. In addition to putting stationary readers at all border crossing stations, mobile readers should also be deployed to ensure that agents can do rapid and secure screening of driver licenses and/or travel documents. This will help ensure that transit times are not unduly affected.

All of these technologies exist today and are proven, and could be deployed in 6 to 12 months if the funds were available. Even if the U.S. government implements new border crossing mandates in the future so that only passports are to be utilized for border crossing, a position which we disagree with as described below, such a deployment would provide additional security before that date and also could ensure the integrity of the proposed PASS cards.

The REAL ID law requires the States to add a machine-readable feature to their driver licenses. Given that digital watermarking has become a de facto standard for driver license authentication, we recommend that the Federal government require or encourage all States to adopt digital watermarking technology in addition to other appropriate machine-readable security features to comply with the requirements of this law so that national standard authentication will be realized.

We likewise urge Congress to help the States pay for REAL ID compliance. The REAL ID Act will help States meet the security challenges of the 21st century by ensuring that they deploy best-of-breed, end-to-end security systems. Given the cost—initial cost estimates by the National Conference of State Legislatures suggest that compliance will run between $9 and $13 billion--the Federal government should not impose a large unfunded mandate on the States to meet our national objective of protecting our homeland.

Finally, we recommend that Congress harmonize the Western Hemisphere Travel Initiative and the REAL ID Law. After two years of debate, the State Department and the Department of Homeland Security continue to grapple with the development of technical specifications for the proposed PASS card that is designed to implement WHTI without crippling cross-border commerce. In light of concerns with the ability of the government to have the structures in place to implement WHTI at the end of next year, the Senate recently passed amendments to the Immigration and Homeland Security appropriations bills that

would delay the implementation date for WHTI by 18 months. Senators expressed concern about the impact of this program on economically significant cross-border travel and tourism given the high per card cost of the credential to citizens and questions about whether citizens will know they have to obtain a new credential to cross a land border. Senators also expressed doubt as to whether these Departments will be able to set up a new program in an efficient and cost-effective manner. Given the uncertainty associated with the PASS program we advocate that Congress insist that willing States be allowed to issue REAL-ID compliant driver licenses that would be an alternative to the PASS card for WHTI compliance. We recognize that the Departments have no choice under current statutory law but to try to find a convenient solution that can be ready at the end of 2007, but Congress has the ability to authorize and fund an equally-secure, more-convenient alternative for millions of American citizens.

This approach would leverage the significant investments in ID security that the States have already, and will continue to make, in the coming years, and would require DHS to establish a common standard of technical standards to be applied to any credential used for land border crossing. This approach would also leverage the existing ID systems that the Canadian Provinces have already deployed. The opportunity for both the United States and Canada to develop a collaborative approach should not be missed.

Conclusion:

In conclusion, I would like to thank Chairman Grassley and Ranking Member Baucus for giving me the opportunity to appear before the Finance Committee on behalf of Digimarc Corporation. Speaking on behalf of the community of issuers that we serve, and the citizens of our nation, we want to express appreciation for this Committee's support of the work of the Government Accountability Office, and its inspectors in challenging our government agencies to do the best possible job they can to secure our borders.

The States have been pressing forward with important security upgrades within the limits of their budgets and mandates. More will need to be done as States drive to comply with the REAL ID law. It makes sense, therefore, for the Federal government to leverage these significant investments to help secure our borders, and at the same time, save tax payers money and time in obtaining identification credentials. Digimarc Corporation, along with other suppliers and the many of the issuers that we serve stand ready to do all we can to support the government's objective of enhancing the security of our homeland.