Description of document:	Written responses or letters from the Department of Homeland Security (US Coast Guard [USCG]) to the following Members of Congress: Rep. Michael McCaul, Rep. Candice Miller, Rep. Peter King, Rep. Patrick Meehan, Rep. Susan Brooks, Rep. Jeffrey Duncan, and Rep. Richard Hudson, 2011-2012
Request date:	30-September-2013
Released date:	16-April-2014
Posted date:	08-June-2015
Source of document:	FOIA Officer The Privacy Office U.S. Department of Homeland Security 245 Murray Lane SW STOP-0655 Washington, D.C. 20528-0655 Fax: 202-343-4011 E-mail:foia@hq.dhs.gov Online FOIA Request Submission Form

U.S. Department of Homeland Security

United States Coast Guard

Commandant
United States Coast Guard

470 L'Enfant Plaza East, SW,
Room 7110
Washington, DC 20027
Staff Symbol: CG-0921
Phone: (202) 245-0520
Fax: (202) 245-0529

5720
FOIA 2014-0931

SENT VIA EMAIL

Re: FOIA 2014-0931

This is the final response to your Freedom of Information Act (FOIA) request to the Department of Homeland Security (DHS), dated September 30, 2013 and received by this office on February 2, 2014. You are seeking " a copy of each written response or letter from the Department of Homeland Security to any of the following Members of Congress in calendar years 2011, 2012 and 2013 to date: Rep. Michael McCaul, Rep. Candice Miller, Rep. Peter King, Rep. Patrick Meehan, Rep. Susan Brooks, Rep. Jeffrey Duncan, and Rep. Richard Hudson."

A search of the Enterprise Correspondence Tracking System (ECT) for documents within the U.S. Coast Guard responsive to your request produced a total of 37 pages. I have determined that all 37 pages of the records are releasable in their entirety.

Provisions of the FOIA allow us to recover part of the cost of complying with your request. In this instance, because the cost is below the $14 minimum, there is no charge 6 CFR § 5.11(d)(4).

If you need to contact our office concerning this request, please call 202-245-0520 and refer to FOIA 2014-0931.

Sincerely,

C. A. Blomme
Captain, U. S. Coast Guard
Chief, Congressional and Governmental Affairs

THE COMMANDANT OF THE UNITED STATES COAST GUARD
WASHINGTON, D.C. 20593-0001

MAR 1 0 2011

Dear Chairwoman Miller,

Thank you for your support for the Coast Guard's fiscal year 2012 budget proposal and for your very kind comments on the accomplishments of our front-line safety and security operations. I am deeply proud of the men and women of the United States Coast Guard and I will take great pleasure in passing along your compliments to them.

I am looking forward to meeting with you and to appearing before the Subcommittee next month. I look forward to discussing the issues you have raised in person, but, in the interim, I will attempt to allay your concerns. I am sending an identical letter to Chairman King.

First and foremost, I could not agree more with your view that we should maintain adequate levels of security throughout our ports. As Secretary Napolitano stated in her January 27th, 2011, State of the Nation's Homeland Security Address, "our most fundamental responsibility remains preventing terrorist attacks on the Homeland." I am committed to maintaining the Nation's ports, waterways, and coastal security.

I have made sustaining mission excellence my number one priority. I expanded on this priority in the fiscal year 2012 Posture Statement, the budget request, and the Commandant's Direction, which outlines my four-year strategic direction for the Service. I am committed to front-line operations. At the same time, gaps have developed over years of high operational and personnel tempos resulting from wear and tear on our assets, our support systems, and our people – fundamentals that underlie our readiness. Mission excellence requires both sustaining front line operations and achieving the readiness that allows these operations to be safe and effective.

As part of the Secretary's initiative to mature and strengthen the Homeland Security enterprise, I am thoroughly reviewing our maritime activities to incorporate the lessons of the past decade. As noted in the Quadrennial Homeland Security Review and Bottom-Up Review, we continue to mature in our resource allocation and execution oversight. My comments reflect this maturation.

As we have evolved our delivery of maritime security, we are now in a position to identify the optimal capabilities and structure with which to deliver and deploy our forces. Where we find an opportunity to exploit these improvements to garner efficiency, I intend to use any available resources to close the readiness gaps I mentioned above. In particular, I commenced a stem-to-stern review of our Deployable Specialized Forces and a few other select areas to ensure we are benefiting from our experience. Should efficiencies be found through these reviews, I will apply them to increase readiness.

I deeply appreciate your comments regarding the National Security Cutter program and the aging High Endurance Cutter fleet. The investments needed to sustain operations on the legacy cutters are indeed significant. Secretary Napolitano is a steadfast advocate for the Coast Guard on this account and has repeatedly called for construction of all eight National Security Cutters as soon as practicable.

Again, thank you for your continued support and oversight of the Coast Guard. I appreciate the time, effort, and concern you bestow on the Service. I look forward to close collaboration as we continue to mature the Coast Guard's execution of our maritime security mission.

Sincerely,

R. J. Papp, Jr.
Admiral, U. S. Coast Guard

The Honorable Candice Miller
House of Representatives
Subcommittee on Border and Maritime Security
Washington, DC 20515

THE COMMANDANT OF THE UNITED STATES COAST GUARD
WASHINGTON, D.C. 20593-0001

MAR 1 0 2011

Dear Chairman King,

Thank you for your support for the Coast Guard's fiscal year 2012 budget proposal and for your very kind comments on the accomplishments of our front-line safety and security operations. I am deeply proud of the men and women of the United States Coast Guard and I will take great pleasure in passing along your compliments to them.

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Sincerely,

R. J. Papp, Jr.
Admiral, U. S. Coast Guard

The Honorable Peter King
House of Representatives
Committee on Homeland Security
Washington, DC 20515

Office of Legislative Affairs
U.S. Department of Homeland Security
Washington, DC 20528

Homeland Security

AUG 11 2011

The Honorable Peter T. King
Chairman
Committee on Homeland Security
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

Thank you for your July 14, 2011 letter to Secretary Napolitano regarding the drawdown of the Strategic Petroleum Reserve and the Department of Homeland Security's (DHS) role in granting Jones Act waivers pursuant to 46 U.S.C. § 501. DHS considers each Jones Act waiver request in the context and factual situation in which it arises and ensures compliance with the Jones Act.

The Jones Act, 46 U.S.C. § 55102, states, "a vessel may not provide any part of the transportation of merchandise by water, or by land and water, between points in the United States to which the coastwise laws apply, either directly or via a foreign port," unless the vessel was built in and documented under the laws of the United States and owned by persons who are citizens of the United States. Such a vessel, after it has obtained a coastwise endorsement from the U.S. Coast Guard, is "coastwise-qualified." The coastwise laws generally apply to points in the territorial sea, which is defined as the belt, three nautical miles wide, seaward of the territorial-sea baseline, and to points located in internal waters, landward of the territorial-sea baseline.

The navigation laws, including the coastwise laws, can only be waived under the authority provided by 46 U.S.C. § 501, which in pertinent part provides that when "the head of an agency responsible for the administration of the navigation or vessel-inspection laws considers it necessary in the interest of national defense, the individual, following a determination by the Maritime Administrator, acting in the Administrator's capacity as Director, National Shipping Authority, of the non-availability of qualified United States flag capacity to meet national defense requirements, may waive compliance with those laws to the extent, in the manner, and on the terms the individual, in consultation with the Administrator, acting in that capacity, prescribes . . . ."

DHS has implemented a process that ensures compliance with the Jones Act and coordinates and communicates with the relevant government entities. Because we are acting in accordance with the provisions of 46 U.S.C. § 501(b), any determination to grant or deny each waiver request has been made in consultation with the Maritime Administration of the

Department of Transportation. DHS has also obtained the input of the Department of Defense and the Department of Energy. In each instance that a waiver has been granted, the Maritime Administration has made a determination of the non-availability of coastwise-qualified vessels. For each waiver granted to transport oil from the Strategic Petroleum Reserve, the Department of Defense and the Department of Energy both supported granting the waiver. DHS will continue operating in compliance with the Jones Act and will grant waivers, as necessary, consistent with the authority provided by 46 U.S.C. § 501.

I appreciate your commitment to homeland security and these important issues. Chairman Miller, who co-signed your letter, will receive a separate, identical response. Should you need additional assistance, please do not hesitate to contact me at (202) 447-5890.

Respectfully,

Nelson Peacock
Assistant Secretary
Office of Legislative Affairs

cc: The Honorable David T. Matsuda
Administrator
U.S. Maritime Administration

Assistant Secretary of Legislative Affairs
U.S. Department of Homeland Security
Washington, DC 20528

Homeland Security

May 14, 2012

The Honorable Peter King
U.S. House of Representatives
Washington, DC 20515

Dear Representative King:

Thank you for your recent letter regarding the Jones Act with respect to the Strategic Petroleum Reserve (SPR) and the recently enacted requirements imposed by Congress in section 172 of the *Consolidated and Further Continuing Appropriations Act*, 2012, Public Law 112-55, and section 529 of the *Consolidated Appropriations Act*, 2012, Public Law 112-74. These provisions address the transportation of oil distributed from SPR.

As you know, the Jones Act, Title 46, U.S.C. § 55102, states, in pertinent part, "a vessel may not provide any part of the transportation of merchandise by water, or by land and water, between points in the United States to which the coastwise laws apply, either directly or via a foreign port," unless the vessel was built in and documented under the laws of the United States and owned by persons who are citizens of the United States. Such a vessel, after it has obtained a coastwise endorsement from the U.S. Coast Guard, is "coastwise-qualified." The coastwise laws generally apply to points in the territorial sea, which is defined as the belt, three nautical miles wide, seaward of the territorial-sea baseline, and to points located in internal waters, landward of the territorial-sea baseline. The navigation laws, including the coastwise laws, may only be waived under the authority provided by 46 U.S.C. § 501 and in accordance with any requirements imposed by Congress.

The Department of Homeland Security assures you that it will comply with the Jones Act, will abide by the waiver statute, as well as any requirements imposed by Congress, and will coordinate and communicate with the entities concerned, as required by law.

Thank you again for your letter. I appreciate your commitment to homeland security and these important issues. The cosigners of your letter will receive a separate, identical response. Should you require additional information, please do not hesitate to contact me at (202) 447-5890.

Respectfully,

Nelson Peacock
Assistant Secretary for Legislative Affairs

cc: The Honorable Dana Gresham
Assistant Secretary for Governmental Affairs
U.S. Department of Transportation

The Honorable Jeff Lane
Assistant Secretary for Congressional & Intergovernmental Affairs
U.S. Department of Energy

U.S. Department of Homeland Security

United States Coast Guard

Commandant
United States Coast Guard

2100 Second St., SW
Washington, DC 20593-0001
Staff Symbol: CCG
Phone: (202) 372-4411
Fax: (202) 372-4960

5730
APR 18 2012

The Honorable Peter T. King
Chairman
Committee on Homeland Security
U.S. House of Representatives
Washington, DC 20515

Dear Chairman King:

Thank you for your letter regarding the President's Fiscal Year 2013 budget request for the U.S. Coast Guard. We appreciate your strong and continued support for the Coast Guard.

As you are aware, all federal agencies, including the branches of the military are facing budget constraints given the current fiscal environment and the limitations imposed by the Budget Control Act. The Department of Homeland Security is committed to sustaining core frontline operations and continuing mission-critical initiatives to meet the nation's homeland security needs.

In recognition of this, the Coast Guard's FY 2013 Budget strikes the optimal balance between current operations and investment in future capability to sustain the Coast Guard's ability to execute its missions, and address the most pressing operational requirements. The FY 2013 Budget provides funding to operate and maintain Coast Guard assets and sustain essential frontline operations. The budget request includes investment in new assets which are critical to ensure the Coast Guard remains capable of carrying out its missions today and well into the future.

The FY 2013 President's Budget fully funds the Coast Guard's highest capital priority, the sixth National Security Cutter (NSC), allowing the Coast Guard to replace its aged, obsolete High Endurance Cutter fleet as quickly as possible. The Budget supports the procurement of two Fast Response Cutters, funding for a Maritime Patrol Aircraft, four cutter boats, and makes a significant investment in the renovation and restoration of shore facilities. The Budget also provides funds to crew, operate and maintain two Maritime Patrol Aircraft, thirty 45-ft Response Boats-Medium, and two Fast Response Cutters acquired with prior year appropriations. The FY 2013 investments are critical to replacing and sustaining aging inservice assets and are key to maintaining future capability.

These investments are prioritized through strong resource and operational stewardship. Through a comprehensive internal review of operations and mission support structure, the Coast Guard has focused resources and forces where they are most needed. The FY 2013 budget proposes administrative and programmatic reductions to improve efficiency and service delivery, while continuing investment in Coast Guard activities that provide the highest return on investment.

The budget also proposes targeted decommissioning of legacy USCG assets in order to focus on long-term recapitalization priorities and frontline operational capacity. These assets planned for decommissioning are decades old and increasingly difficult to sustain and maintain operationally. They are being replaced by far more capable and advanced assets that provide greater reliability, endurance, sensors, and seakeeping to launch boats and helicopters over a greater range, maximizing the ability to conduct Coast Guard operations. The USCG will further mitigate any short-term gaps from decommissionings through the use of other cutters, including the continued use of coastal patrol boats and buoy tenders. In addition, in order to maximize fleet readiness and minimize future costs, the Coast Guard will conduct an engineering assessment and remove those vessels in the worst material condition first. FY 2012 funding provides the Coast Guard with the ability to bring on new assets for this transition.

Finally, the FY 2013 budget is forward looking, as the Coast Guard continuously identifies and prepares for emerging maritime threats facing the Service and the Nation. The FY 2013 Budget recognizes the criticality of the Arctic as a strategic national priority, given increasing presence and interest by other nations, the preponderance of natural resources available in this region, and increasing maritime commercial and recreational activity.

Thank you again for your continued support of the Department and the U.S. Coast Guard. We would be pleased to brief your staff about the schedule of proposed decommissionings and the next generation of assets that are coming online in FY 2013 and beyond. Should you wish to discuss this further, please do not hesitate to contact my House Liaison Office at (202) 225-4775.

Sincerely,

R. J. PAPP, JR.
Admiral, U.S. Coast Guard
Commandant

Assistant Secretary for Legislative Affairs
U.S. Department of Homeland Security
Washington, DC 20528

JUN 2 0 2011

Homeland Security

Pursuant to the requirements of 31 U.S.C. Section 720, the Department of Homeland Security (DHS) is submitting this written statement on actions taken regarding the Government Accountability Office (GAO) recommendations contained in its report, GAO-11-480, COAST GUARD: Opportunities Exist to Further Improve Acquisition Management Capabilities.

This letter provides a status update on efforts to implement the GAO recommendations contained in the report and is being provided to the following Members of Congress and the Director of OMB:

The Honorable Peter King
Chairman, Committee on Homeland Security

The Honorable Bennie G. Thompson
Ranking Member, Committee on Homeland Security

The Honorable Darrell Issa
Chairman, Committee on Oversight and Government Reform

The Honorable Elijah Cummings
Ranking Member, Committee on Oversight and Government Reform

The Honorable Joseph I. Lieberman
Chairman, Committee on Homeland Security and Governmental Affairs

The Honorable Susan M. Collins
Ranking Member, Committee on Homeland Security and Governmental Affairs

The Honorable Jacob Lew
Director, Office of Management and Budget

I appreciate your interest in the Department of Homeland Security. If I may be of further assistance, please contact me at (202) 447-5890.

Respectfully,

Nelson Peacock
Assistant Secretary
Office of Legislative Affairs

Pursuant to the requirements of 31 U.S.C. Section 720, the Department of Homeland Security (DHS) is submitting this written statement on actions taken regarding the Government Accountability Office (GAO) recommendations contained in its report, GAO-11-480, COAST GUARD: Opportunities Exist to Further Improve Acquisition Management Capabilities.

Recommendation: To provide Coast Guard program management staff with greater access to updated information about agreements in place with DOD to facilitate leveraging support for major acquisition programs, we recommend that the Commandant of the Coast Guard take steps to ensure all interagency agreements are captured in a database or other format and make this information readily accessible to program staff.

Response: Concur. The Coast Guard Acquisition Directorate is developing an electronic library within the Coast Guard's Intranet for housing and providing access to all inter-agency agreements—including with DOD and other agencies. That library will leverage related electronic repositories, such as the CG-9 Document Management System (DMS) and will enable full, searchable access to agreements by program and contracting staffs. It's anticipated that the electronic library will be established and online by the end of August 2011.

A screenshot of the DMS homepage is included below as an illustration of the envisioned interface for the interagency agreement library.

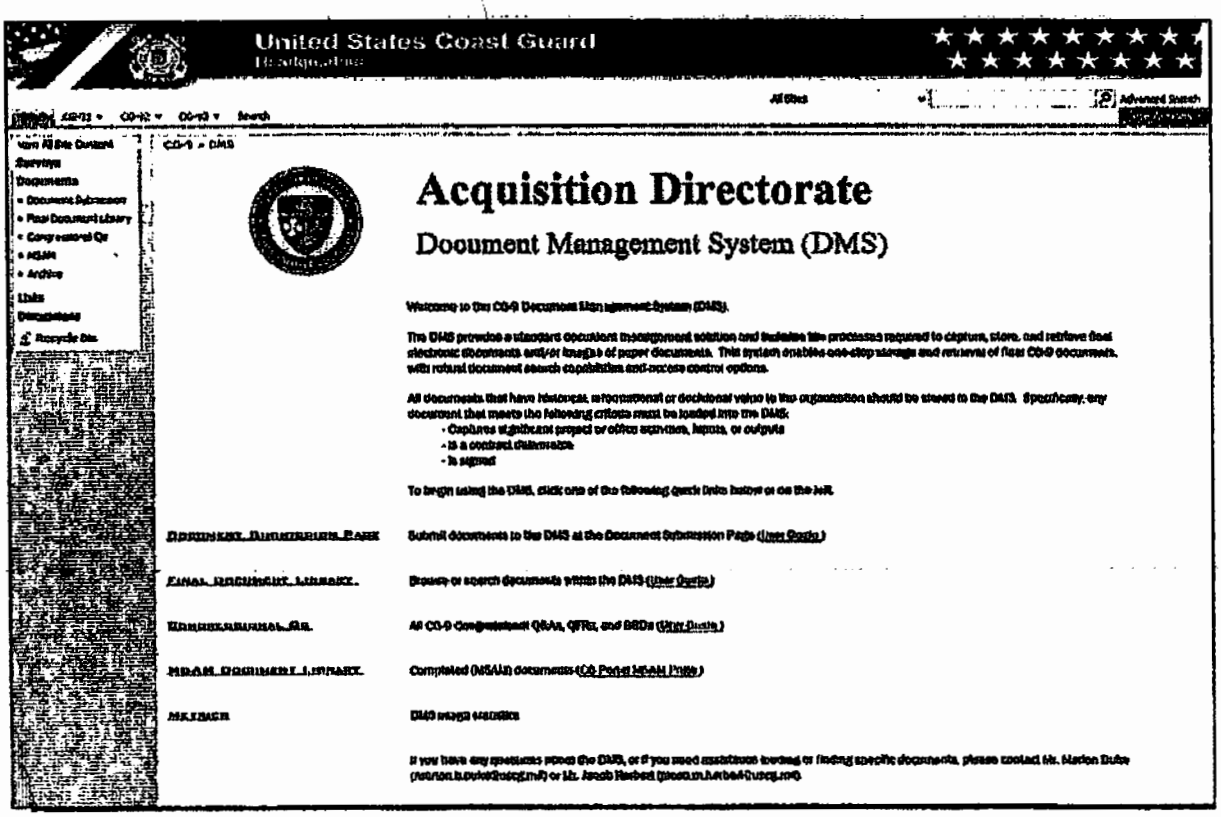

Fig. 1 – Screenshot of CG-9 Document Management System homepage

The interagency agreement library will be fully interactive, with easy-to-use electronic forms for uploading agreement documents into the system. Once documents are uploaded and indexed by the system, they will be fully searchable to provide ease of access for program and contracting staffs.

While the electronic library is being developed and tested, the Coast Guard is also gathering its existing interagency agreements. That effort is first focusing on the approximately 81 agreements identified in the GAO report. Once gathered, those documents will be uploaded and indexed into the electronic interagency agreement library.

Once those documents have been properly captured, a secondary effort will begin to further identify additional agreements across program and contracting staffs - including Chiefs of Contracting Offices within the Acquisition Directorate, across headquarters and in the field. As additional agreements are identified, they will also be indexed and housed in the electronic library.

The Coast Guard is also developing guidance for all contracting staffs, which will require that all new interagency agreements be properly uploaded into the electronic library, once it's online.

Once the electronic interagency agreement library is developed and online, the Coast Guard would be happy to provide a demonstration of that system to the GAO.

Assistant Secretary for Legislative Affairs
U.S. Department of Homeland Security
Washington, DC 20528

JAN 0 9 2012

Homeland Security

Pursuant to the requirements of 31 U.S.C. Section 720, the Department of Homeland Security (DHS) is submitting this written statement on actions taken regarding the Government Accountability Office (GAO) recommendations contained in its report, GAO-12-86, DEEPWATER HORIZON OIL SPILL: Actions Needed to Reduce Evolving but Uncertain Federal Financial Risks.

This letter provides a status update on efforts to implement the GAO recommendations contained in the report and is being provided to the following Members of Congress and the Director of OMB:

The Honorable Peter King
Chairman, Committee on Homeland Security

The Honorable Bennie G. Thompson
Ranking Member, Committee on Homeland Security

The Honorable Darrell Issa
Chairman, Committee on Oversight and Government Reform

The Honorable Elijah Cummings
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The Honorable Susan M. Collins
Ranking Member, Committee on Homeland Security and Governmental Affairs

The Honorable Jacob Lew, Director
Office of Management and Budget

I appreciate your interest in the Department of Homeland Security. If I may be of further assistance, please contact me at (202) 447-5890.

Respectfully,

Nelson Peacock
Assistant Secretary
Office of Legislative Affairs

Pursuant to the requirements of 31 U.S.C. Section 720, the Department of Homeland Security (DHS) is submitting this written statement on actions taken regarding the Government Accountability Office (GAO) recommendations contained in its report, GAO-12-86, DEEPWATER HORIZON OIL SPILL: Actions Needed to Reduce Evolving but Uncertain Federal Financial Risks.

Recommendation: In order to provide guidance for responding to a spill of national significance and build on lessons learned, we recommend that the Secretary of Homeland Security direct the Director of the Coast Guard's NPFC to finalize the revisions the Coast Guard is drafting to its *Claims Adjudication Division's Standard Operating Procedures* to include specific required steps for processing claims received in the event of a spill of national significance.

Response: Concur. The Coast Guard finalized the revisions of the *Claims Adjudication Division's Standard Operating Procedures* to in include specific steps for processing claims in the event of a spill of national significance as recommended by GAO. These Standard Operating Procedures were signed by the Director of the National Pollution Funds Center on October 31, 2011.

Assistant Secretary of Legislative Affairs
U.S. Department of Homeland Security
Washington, DC 20528

Homeland Security

May 25, 2012

Foreword

I am pleased to present the following report, "Preliminary Analysis of Emerging Biometric Capabilities for Coast Guard Operations," prepared by the DHS Science and Technology (S&T) Directorate and United States Coast Guard.

Section 807(d) of the *Coast Guard Authorization Act of 2010* (P.L. 111-281) directs the Secretary of Homeland Security to provide a study on the use by the Coast Guard and other departmental entities of the combination of biometric technologies to rapidly identify individuals for security purposes. Pursuant to requirements, this report is being provided to the following Members of Congress:

The Honorable John D. Rockefeller IV
Chairman, Senate Commerce, Science, and Transportation Committee

The Honorable Kay Bailey Hutchison
Ranking Member, Senate Commerce, Science, and Transportation Committee

The Honorable John L. Mica
Chairman, House Transportation and Infrastructure Committee

The Honorable Nick J. Rahall II
Ranking Member, House Transportation and Infrastructure Committee

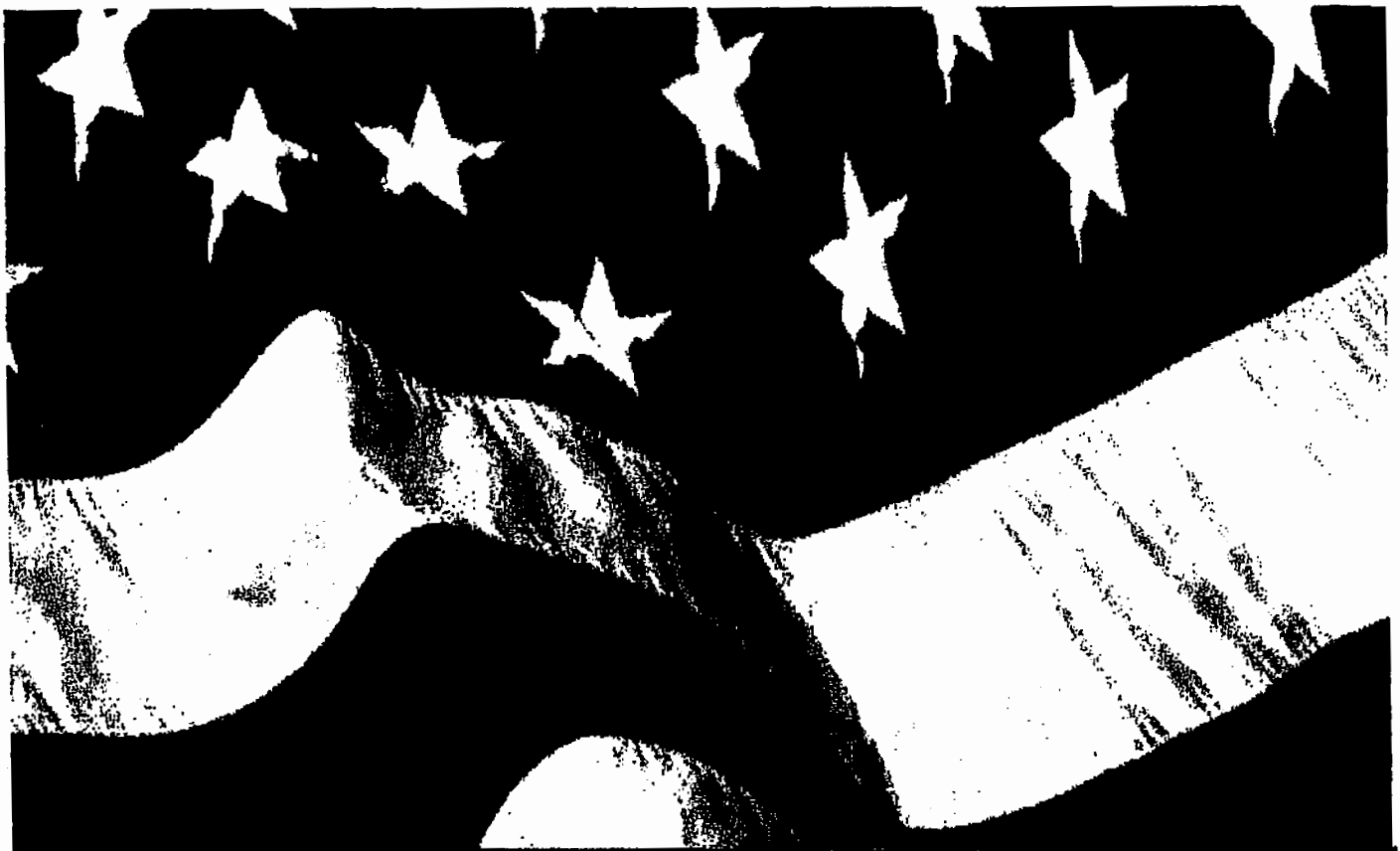
The Honorable Peter T. King
Chairman, House Committee on Homeland Security

The Honorable Bennie G. Thompson
Ranking Member, House Committee on Homeland Security

I appreciate your interest in the Department of Homeland Security, and I look forward to working with you on future homeland security, maritime safety, and stewardship issues. If I may be of further assistance, please contact the Office of Legislative Affairs at (202) 447-5890.

Respectfully,

Nelson Peacock
Assistant Secretary for Legislative Affairs



Preliminary Analysis of Emerging Biometric Capabilities for Coast Guard Operations

2011 Report to Congress

May 22, 2012

Homeland Security

United States Coast Guard

Executive Summary

Section 807 (d) of the *Coast Guard Authorization Act of 2010* (P.L. 111-281), directs the Secretary of Homeland Security (DHS) to conduct a study on the use by the Coast Guard and other departmental entities of the combination of biometric technologies to rapidly identify individuals for security purposes.

This report provides a summary of a site survey and preliminary analysis performed through the Iris/Face Technology Demonstration and Evaluation (IFTDE) project managed by the DHS Science and Technology (S&T) Directorate and co-funded by the US-VISIT Program. Performed at the request of the United States Coast Guard (USCG), this effort took place onboard the USCG Cutter FARALLON during patrol at sea in the Mona Pass between Puerto Rico and the Dominican Republic on October 7-8, 2010. Observations and data were collected under a protocol designed to assess the environment in which USCG crews perform biometric collection as a part of existing ***Alien Migrant Interdiction Operations*** (AMIO). Enough information was collected to allow future development of a test plan that could be tailored specifically to USCG CONOPS. This approach could be used to responsibly evaluate non intrusive emerging biometric technologies (e.g. iris and face recognition).

It is logistically challenging to conduct a field trial in the Mona Pass of sufficient length to build up a database large enough to enable an analysis on which optimal device recommendations can be confidently made. An evaluation of shipboard iris recognition would need to include the wide spectrum of conditions under which real interdiction takes place to enable determination of the conditions (e.g. sea state, time of day, weather conditions, etc.) that influence capture success for a given device. We suggest employing a two pronged testing approach: separating the tests into those that can be conducted in controlled test environments and those that can only be conducted at sea. This approach would employ less-expensive controlled testing to both qualify devices for use in the operational environment, and define conditions (such as sea state, ambient lighting conditions, etc.) in which iris and/or face image capture is not advisable. Other tests, particularly those which depend on interactions with real, subjects unfamiliar with biometric collection and the reactions and behavior of real operators will likely need to be conducted in operational testing.

Emerging Biometric Capabilities

Table of Contents

I. Legislative Language

This report responds to the language set forth in section 807(d) of the *Coast Guard Authorization Act of 2010* (P.L. 111-281), which directs the Secretary of Homeland Security to submit a study on the use by the Coast Guard and other departmental entities of the combination of biometric technologies to rapidly identify individuals for security purposes.

SEC. 807. MARITIME BIOMETRIC IDENTIFICATION.

(d) STUDY ON EMERGING BIOMETRIC CAPABILITIES

(1) STUDY REQUIRED.-The Secretary of Homeland Security shall submit to the Committees on Homeland Security and Transportation and Infrastructure of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a study on the use by the Coast Guard and other departmental entities of the combination of biometric technologies to rapidly identify individuals for security purposes. Such study shall focus on-

(A) increased accuracy of facial recognition;

(B) enhancement of existing iris recognition technology; and

(C) other emerging biometric technologies capable of assisting in confirming the identification of individuals.

(2) PURPOSE OF STUDY - The purpose of the study required by paragraph (1) is to facilitate the use of a combination biometrics, including facial and iris recognition, to provide a higher probability of success in identification than a single approach and to achieve transformational advances in the flexibility, authenticity, and overall capability of integrated biometric detectors. The operational goal of the study should be to provide the capability to non- intrusively collect biometrics in an accurate and expeditious manner to assist the Coast Guard and the Department of Homeland Security in fulfilling its mission to protect and support national security.

II. Background

Department of Homeland Security (DHS) personnel come into contact with countless individuals through daily immigration checks, law enforcement operations, vessel boardings, and the verification of transportation workers within our ports and maritime borders. Of particular concern to the Department is the difficulty to rapidly and non-intrusively identify persons as known or suspected terrorists, national security threats, aggravated felons, previous deportees, or violators of U.S. fiscal, immigration, and customs laws. Biometrics offer a capability to positively identify persons encountered and convey such information to DHS enforcement and security personnel (Figure 1).

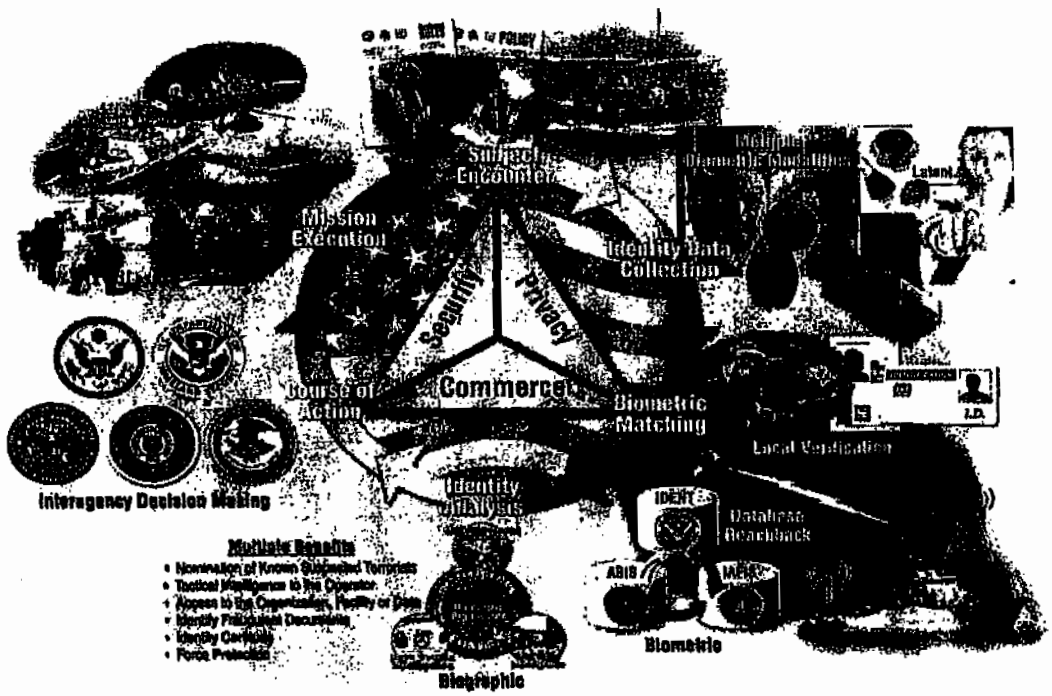


Figure 1. Maritime Biometrics Operational View

The motivation for consideration of iris and face biometrics in DHS applications is based on the need to rapidly capture an accurate biometric, and to execute a rapid identification. Furthermore, if these biometrics were captured in addition to fingerprints, it would permit improved processing in cases of fingerprint anomalies.

Iris recognition is the second most widely supported biometric, second only to fingerprints. In recent years, the number, diversity and capability of iris capture equipment has expanded significantly.

While the technology has made significant advancements, two primary technical challenges remain. First, cameras are not perfectly interoperable: some images captured on one camera may not be easily identifiable with images from another camera. Second, there is no universal definition of iris image quality; this inhibits robust biometrics equipment acquisition and well as biometric data collection processes.

Face recognition is another widely supported biometric that has been implemented in recent years with varying levels of success. In operations, such as visa and passport processing, where tight image quality controls are imposed, face recognition can be used for the detection of duplicate entries. However, when image quality is degraded, either by environment or subject non-cooperation, prior government studies (see page 8) have shown elevated error rates.

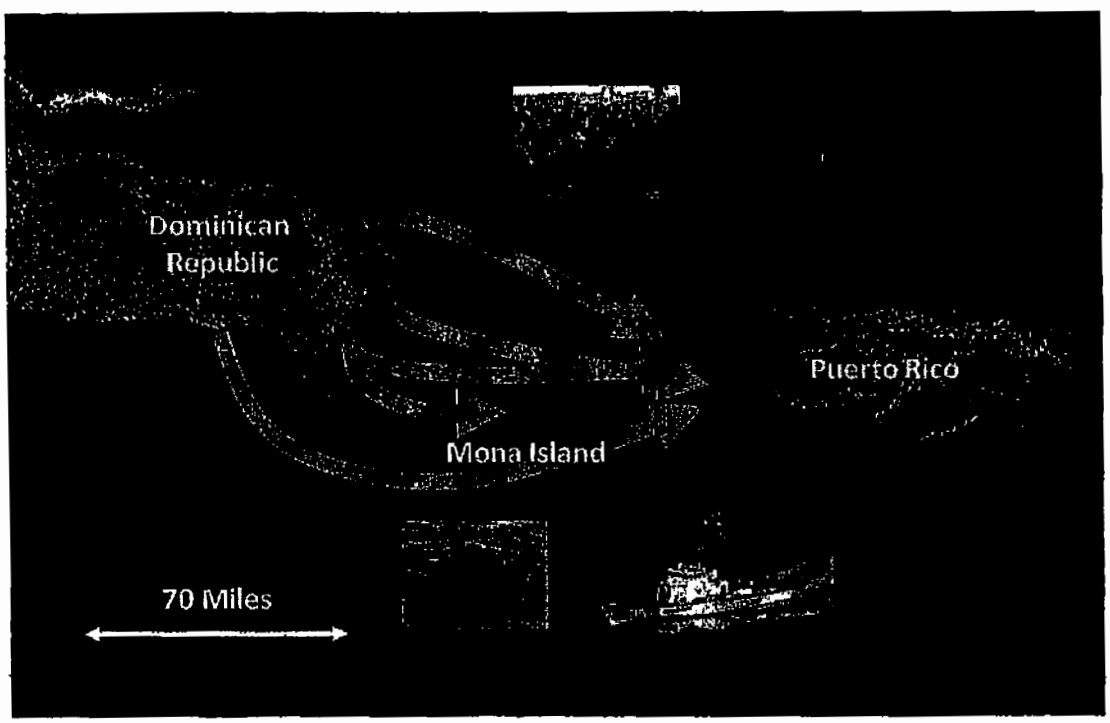
The Iris/Face Technology Demonstration and Evaluation (IFTDE) program, managed by the DHS Science and Technology (S&T) Directorate, is intended to assess the technical performance of mature commercial iris capture devices and their viability in operational use-cases. IFTDE is conducted against an evolving and expanding commercial marketplace of iris capture technologies. Irises can now be imaged at distances from 20 centimeters up to several meters from subjects moving or stopping only briefly. IFTDE requires cameras to support standard image formats that are suitable for storage in DHS' Automated Biometric Identification System (IDENT) in order to satisfy the interoperability and data sharing objectives of several Homeland Security Presidential Directives (HSPDs).

This report includes a site survey performed by the S&T-led IFTDE core team, on the Coast Guard cutter, USCGC FARALLON, over 24 hours while on patrol in the Mona Pass on October 7-8, 2010. Its purpose was to assess the environment in which US Coast Guard crews perform biometric collection as a part of ***Alien Migrant Interdiction Operations*** (AMIO) in order to help design comprehensive tests as permitted by resources in the future. Particular attention was given to the roles in which iris and improved face biometrics may be incorporated into the existing biometric collection process which uses fingerprints and low quality face images (not suitable for face recognition). Observations and measurements were carried out during the survey to provide a preliminary assessment of the environmental conditions that may affect a potential future comprehensive IFTDE effort.

III. Biometric Capabilities

Coast Guard Use of Biometrics in the Mona Pass

The Mona Pass is a seaway which lies between the Dominican Republic to the west, and Puerto Rico to the East (Figure 2). With only ~70-80 miles separating the two islands, these waters are commonly used by illegal migrants, migrant smugglers, and drug smugglers launching from the Dominican Republic to reach Puerto Rico. To enforce U.S. customs laws and support the national policy to promote safe, legal, and orderly migration, the US Coast Guard regularly patrols these waters, typically with 110 foot Island Class cutters. The Coast Guard encounters illegal migration and human trafficking most commonly on poorly constructed and overloaded homemade boats (yolas) often intended only for a one-way trip. Interdiction numbers in the Mona Pass have been tracked annually since the early 1980's. Historically, they vary from year to year from a few thousand to tens of thousands with increased activity correlated to events such as political turmoil and/or natural disasters. In 2004 and 2005, about 10,000 migrants per year were interdicted in the Mona Pass, attempting to illegally enter Puerto Rico. This constitutes nearly 40 percent of the total number of undocumented migrants encountered at sea by the Coast Guard in that period of time[1].



[1] *The Coast Guard Journal of Safety and Security at Sea: Proceedings of the Marine Safety and Security Council, 2009, vol. 66, p. 79*

Figure 2. Map of Mona Pass area which is regularly patrolled by the Coast Guard for illegal immigration activity. Mona Island is a U.S.-controlled Territory (nature preserve).

Fingerprint biometrics are currently collected & submitted to US-VISIT during Coast Guard Interdictions in the Mona Pass as a means to identify criminals. The Biometrics-at-Sea-System (BASS) program was initiated in 2006 with immediate success with the first interdiction using biometrics. Prior to the use of biometrics, prosecutions due to interdictions were infrequent, averaging about 1 prosecution per year with most illegal detainees simply returned to their appropriate country, most commonly the Dominican Republic. After deployment of BASS, approximately 90 migrants were prosecuted within the first 12 months. The drop in illegal activity in the Mona Pass since 2006 has been partially attributed to investigations and prosecutions enabled by using biometrics to matching individuals to criminal databases, and the ability to confidently monitor recidivism. Generally IDENT biometric match reports are automatically returned to the field for joint assessment by the Coast Guard and CBP Office of Border Patrol to determine disposition for prosecution or repatriation within 4 to 8 hours.

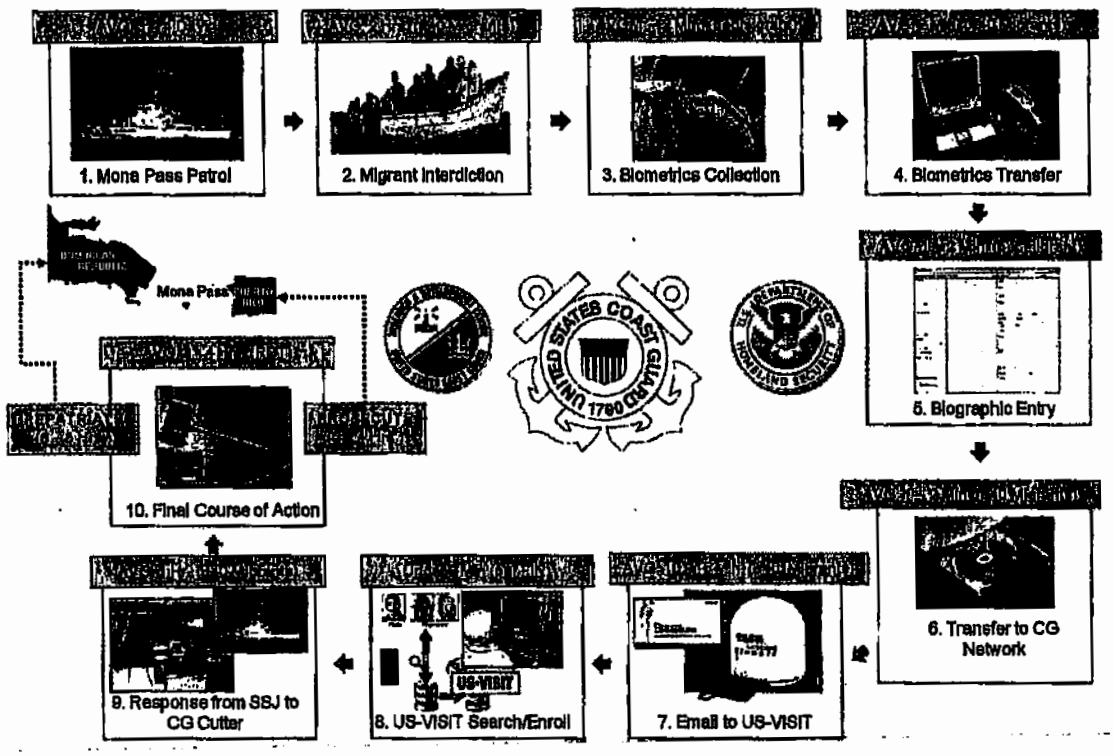


Figure 3. Current CONOPS for the use of biometrics in Coast Guard activities in the Mona Pass.

The BASS program is advancing fingerprint biometric capabilities that incorporate 10-print capture devices. The addition of 10-print collection would enable searches of the FBI IAFIS databases, in addition to The Department of Defense's (DoD) ABIS databases. Ten-print collection could bring increased accuracy in false match/false non-match rates, in addition to the increased probability of matching to latent prints records of interest which do not contain prints from fingers other than the index fingers currently used in the existing USCG BASS program.

Iris and face biometrics are of interest to the Coast Guard as these modalities may offer some attractive features to facilitate the Mona Pass interdiction CONOPS and alleviate sources of difficulty, intrusiveness, and inconvenience from their currently used fingerprint capture devices. The Iris and Face Technology Demonstration and Evaluation (IFTDE) program, co-sponsored by DHS S&T and US-VISIT Information Sharing and Technical Assistance branch is expected to evaluate the current state of iris and face biometric capture devices in a variety of DHS operational scenarios to apply to the USCG and other DHS missions.

The implementation of iris and face biometrics is not intended to replace the functionality of fingerprint biometrics, but rather to augment identification capabilities. The capture process for iris and face biometrics are similar to current processes to collect face photographs and arguably easier to collect than fingerprints. New applications can be realized considering the high accuracy and fast match speeds of the iris modality. Although relatively new, the iris modality is vetted in DHS sponsored NIST studies (i.e. Iris Exchange, *IREX,* studies: http://www.nist.gov/itl/iad/ig/irex.cfm) and significantly sized, and important iris and face databases are currently used by the DoD, Department of State, and other US Government agencies.

Current Fingerprint and Biometric Data Collection Procedure

During the site survey no AMIO interdictions occurred. However, USCG Officers along with other USCGC FARALLON crew members, reviewed the interdiction process verbally with the S&T IFTDE team, and demonstrated the current fingerprint collection and data handling procedure while docked. The following is an account of the procedure presented by the USCGC FARALLON crew and applies to operations only in the San Juan sector, which includes the Mona Pass. Differences are possible in other sectors. Note: videos that document the interdiction data collection and transfer process are also available.

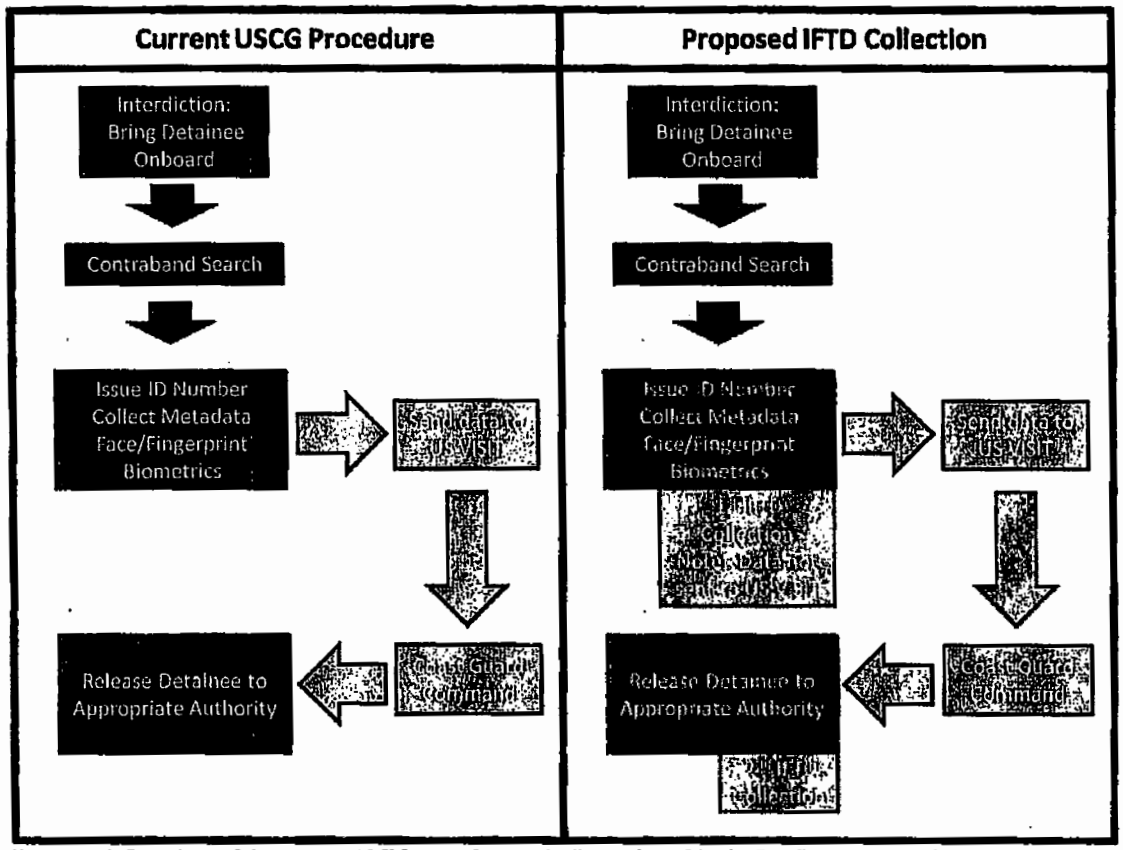


Figure 4. A flow chart of the current AMIO procedure typically conducted in the San Juan sector and the proposed modification to facilitate the IFTDE study. In the proposed scenario, iris and face data would be collected twice for each interdicted individual, once immediately after the normal fingerprint and face collection and once more just before being released from USCG custody. These data would not be transmitted in real time off the ship, and would not interfere with the established data transfer process.

Migrant Transfer onto Cutter, Contraband Search

Migrants/detainees from the interdicted vessel are brought onto the cutter, four persons at a time, searched for weapons and/or contraband, and then seated on the aft stern deck. After all the detainees are safely aboard the cutter and screened, each detainee is brought forward individually for law enforcement (biographic/biometric) processing. They are then seated and data collection is commenced: name, date of birth, and nationality are recorded in a handwritten log[2].

Detainees are issued temporary identification numbers on wristbands and fingerprints from both the left and right index fingerprints are captured by a silicon sensor, which typically requires the operator to apply the correct amount of pressure of the migrant's finger on the sensor. There is

[2] This exact process may be specific to the San Juan sector, and also may be modified depending on, for example, if an interdiction involves large numbers of detainees.

an on-device fingerprint quality assessment. If the quality assessment fails three times, the device gives the option to accept one of the three attempts. After the two fingerprints are collected, a face image is captured with the device. For nighttime interdictions, it was noted in interviews with the crew that the lights required for proper face image illumination often resulted in unacceptable eye blinking in the face image as well as temporary loss of night vision by crew and screened individuals.

After all detained individuals are processed, the biometric collection device is taken inside and the data is transferred onto a laptop, where the collected data is then converted into a standardized record using a Coast Guard data entry program. Each record is compressed to a size of ~75kB. These records are then transferred onto a secure mobile data storage unit, then onto the ship's local network where the individual records are e-mailed one-by-one using the cutter's low bandwidth communication capability to IDENT for searching. Although communication upgrades are in process, the current transfer typically takes between one to three hrs for approximately 50 individuals. The total time necessary to transmit, compare and receive findings back on the cutter may be up to 6 hours, in addition to any action orders from the Coast Guard. The subsequent actions may involve transfer of the migrant to a variety of other U.S. agencies, thus requiring chain of custody documentation.

USCG Cutter Environmental Conditions in Mona Pass relevant to Iris and Face Biometrics

The S&T IFTDE team took advantage of the time on the USCGC FARALLON to make both observational and limited quantitative measurements that provide a preliminary assessment of the operational environment which affects the operational capabilities of face and iris image capture devices.

Temperature/Humidity

The Mona Pass is a tropical environment with high humidity (~100 percent) and year round warm temperatures with lows in the mid 60s to low 70s and highs in the mid 80s to low 90s (degrees F). Rain is common between May and November; a relative dry season lasts typically from December to March. Condensation resulting from moving electronics equipment from indoor air-conditioned environments to warm, outdoor, high humidity environments may cause problems with inadequately conditioned electronics equipment. Current training and SOP instructions, which advocate taking capture equipment out of air conditioned spaces 20-30 minutes prior to data collection, should be adequate for any iris and face capture device as well.

Sea Spray

The operational environment on the fantail of a 110 foot cutter in a variety of sea states will include sea spray. Salt water spray is a corrosive agent; electronics and optical coatings can be damaged by sea spray. Any devices deployed in this environment must take sea spray into account.

Ambient Lighting

Baseline measurements (illuminance) were made of ambient light using a light meter during the site survey. This is relevant to iris biometrics because it influences iris image quality. The

cornea acts as a fish-eye mirror, reflecting approximately 3 percent of the incoming light. This reflection projects a demagnified image of the surrounding scene from the surface of the cornea which overlaps with the iris pattern. This image reflected off the cornea scales in brightness with the brightness of the surrounding scene. Depending on the brightness of the image reflected off the cornea it may pose a problem for iris biometrics as matching algorithms may not be able to distinguish the projected image scene from the actual iris pattern. Outdoor operations in daylight, for example, are particularly of concern. Mobile capture devices could mitigate this effect with combinations of filters and illuminators, and/or by shielding the background scene. However, shielding may require contact with the subject. The ambient lighting measured on the USCGC FARALLON was what one would expect in non-shaded environments (see Table 1). Devices designed for use outdoors should be able to accommodate this level of ambient lighting; however the ability of iris capture devices to control the corneal scene reflection remains to be formally evaluated.

With respect to face recognition, when image quality is degraded, either by environment or subject non-cooperation, prior government studies have shown elevated error rates. Particularly a German government study[3] documented the effect of diurnal lighting levels, and NIST studies have shown acute sensitivity to outdoor, directional, illumination and head-pose variation[4,5] . Moreover, the reliability of facial recognition technologies in Coast Guard operations is further affected by population-size effects. This is evident from a recent NIST evaluation that compared face and iris accuracy when recognizing individuals in populations of size 1.6M[6]. The study gives accuracy estimates for face recognition of operational detainee populations photographed indoors with dedicated standardized illumination, and iris recognition of different detainee populations photographed with recent and representative iris cameras equipped with active illumination. The IREX study showed that face recognition massively underperforms iris recognition. Given current DHS IDENT and FBI ABIS populations, or even regional partitions thereof, there is considerable likelihood of false positives. While these can be reduced by

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[3] Photograph-Based Searches - Final report, Bundeskriminalamt (German Federal Criminal Police Office). Face recognition as a search tool, Foto-Fahndung", Wiesbaden, 2007.
http://www.bka.de/nn_227948/SharedDocs/Downloads/EN/Publications/Other/photographBasedSearchesFinalReport.templateId=raw,property=publicationFile.pdf/photographBasedSearchesFinalReport.pdf

[4] *FRVT 2002: Evaluation Report*, P.J. Phillips, P. Grother, R.J Micheals, D.M. Blackburn, E Tabassi, and J.M. Bone, , March 2003. http://www.nist.gov/customcf/get_pdf.cfm?pub_id=50767
FRVT 2002: Overview and Summary, P.J. Phillips, P. Grother, R.J Micheals, D.M. Blackburn, E Tabassi, and J.M. Bone, *NIST Interagency Report 6965, March 2003*.
http://biometrics.nist.gov/cs_links/face/frvt/FRVT_2002_Overview_and_Summary.pdf
http://www.nist.gov/itl/iad/ig/frvt-docs.cfm

[5] *Multiple-Biometric Evaluation 2010, Report on the Evaluation of 2D Still-Image Face Recognition Algorithms*, Patrick J. Grother, George W. Quinn and P. Jonathon Phillips *NIST Interagency Report 7709, August 2010*,
http://face.nist.gov/mbe

[6] *IREX III Performance of Iris Identification Algorithms*, Patrick Grother, George W. Quinn, James Matey, M. Ngan, W. Salamon, G. Fiumara and C. Watson, NIST Interagency Report 7836, March 2012
IREX III Supplement: Failure Analysis, George W. Quinn, Patrick Grother NIST Interagency Report 7830, March 2012.
http://iris.nist.gov/irex

adopting a high operating matching threshold, this will elevate missed identification rates. In Coast Guard environments, iris recognition performance cannot be expected to be better than the performance described in the NIST study.

Table 1 In-Situ Ambient Illuminance Measurements

Location	Date/Time	Illuminance
USCGC FARALLON Fantail, Mona Pass (Overcast Skies)	Oct. 7, 2010, 16:00	13,700 – 15,270 lux
USCGC FARALLON Fantail, Mona Pass (Overcast, moderate rain)	Oct. 8 2010, 10:45	9,400 – 10,300 lux
Indoor Lab – Florescent Lights Annapolis Junction, MD	Jan 4, 2011, 14:05	224-512 lux
Outdoor- Shade Annapolis Junction, MD	Jan 4, 2011, 14:17	1420-4890 lux
Outdoor- no-shade Annapolis Junction, MD	Jan 4, 2011, 14:20	9800-17640 lux

Vessel Motion/Vibration Assessment

Each marine vessel moves and vibrates differently for a given sea condition. Factors such as the orientation of the vessel to the wave action, the weight distribution of the vessel, the hull shape, and the propulsion will determine the vessel motion in time with the waves. Higher frequency vibrations can be forced from mechanical sources on the cutter, such as the engine, ventilation system, and propeller motion. A Coast Guard CONOPS incorporating iris and face biometrics would likely involve an officer standing on the fantail while operating a mobile capture device applied to a seated migrant. The operation of iris and face recognition systems on a cutter in a variety of possible sea states could result in image blur induced by the ship's motion. To address this concern, the site survey included a preliminary assessment of the effect of vessel motion on image blur using an accelerometer, commercial camera images of high contrast scenes, and images acquired with a (face/iris) biometric collection device. The results are summarized below.

Accelerometer Data

A *Gulf Coast Data Concepts, LLC* X6-1A *3-axis* accelerometer was used to record the inertial environment aboard the USCGC FARALLON during the site survey. For the entire survey, plus some time on land before and after being onboard, measurements were recorded sampling at ~160 Hz with a +/-2g range. These data were taken to first quantify the vibration characteristics of the operational environment using time domain and frequency domain analysis (sensitive to frequencies less than the Nyquist sampled 80Hz). The results, which characterize both the presumed wave induced frequency and the mechanical vibrations of the USCGC FARALLON, are shown in Figure 6.

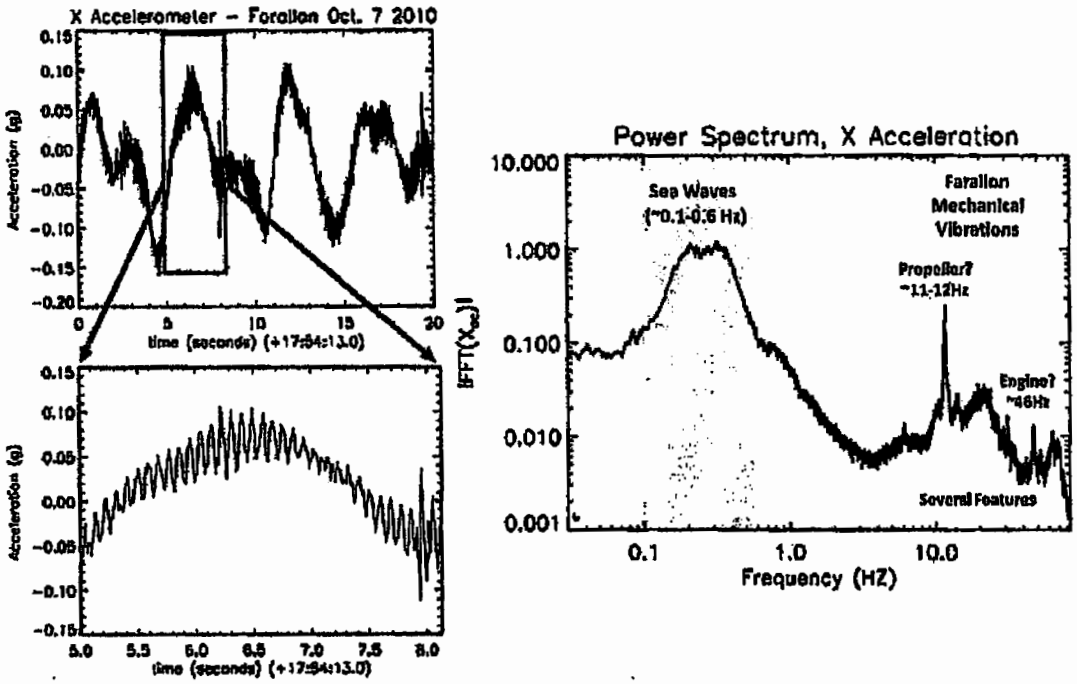

Figure 6. Time domain (left) and frequency domain (right) plots from accelerometer data taken during the site survey meant to preliminarily assess the vibration environment of an Island Class Coast Guard cutter at sea. The 3 axis accelerometer was recording at 160 Hz for the duration of the survey in the interior of the vessel (galley). The upper left plot shows a ~20 second sample taken while the USCGC FARALLON was motoring into ~4-6 foot waves illustrating a low frequency component, with a zoom-in below to illustrate the underlying higher frequency components. The power spectrum for a longer 5-minute sample shows the characteristic frequencies associated with the waves (1 oscillation per 2-5 seconds) and the higher frequency vibrations (5-60Hz) presumably associated with the mechanics of the USCGC FARALLON (vessel resonance and various vibration sources like the power plant, propeller, and the air conditioning mechanisms).

Image Motion Requirements

Camera and/or subject motion blurs information that is required for recognition. For biometric collection applications, there is some tolerance for motion blur – the magnitude of *acceptable* motion blur is predicated on the size of the object being imaged. In the case of iris identification millimeter to sub-millimeter scales sizes are typically used by matching algorithms. Although each device and/or capture may be different, typical exposure times for mobile iris capture devices are on the order of 10-50 ms. Putting the numbers together using 50ms exposure times, if the relative effective motion between the subject and the camera exceeds just ~1/4 inch/sec (or ~ 2/3 cm/sec) in the image plane, then images will be blurred significantly enough to degrade the information used in identification. This effective motion could have a number of sources including camera translation, tilt, and rotation relative to the object plane. In addition to these inter-exposure requirements, there are intra-exposure pointing requirements which depend on the field of view of the sensor (i.e. the operator needs to point the effective field of the device to include the iris/face during the exposure).

As a preliminary assessment of the interaction between a user and a handheld camera taking images on the open sea, a series of 20 images were taken of high contrast lettering on a box located on the fantail of the USCGC FARALLON while motoring into ~4 foot waves (Figure 7). The camera was left in auto-focus, auto-exposure mode considering that some handheld devices may have auto-focus capabilities. The resulting horizontal and vertical line width functions were then directly measured from the resulting images to assess blur magnitudes (Figure 8). The intra-image rotation and pointing variations were measured through the series of 20 captures. In this exercise, the cutter's motion does not significantly influence the inter-exposure motion blur for the majority of capture attempts (~85 percent). Although there is degeneracy with device translation versus tilt, the field of view requirements for iris and face biometric image collection, with regards to estimated pointing errors, were met for the majority of attempts.

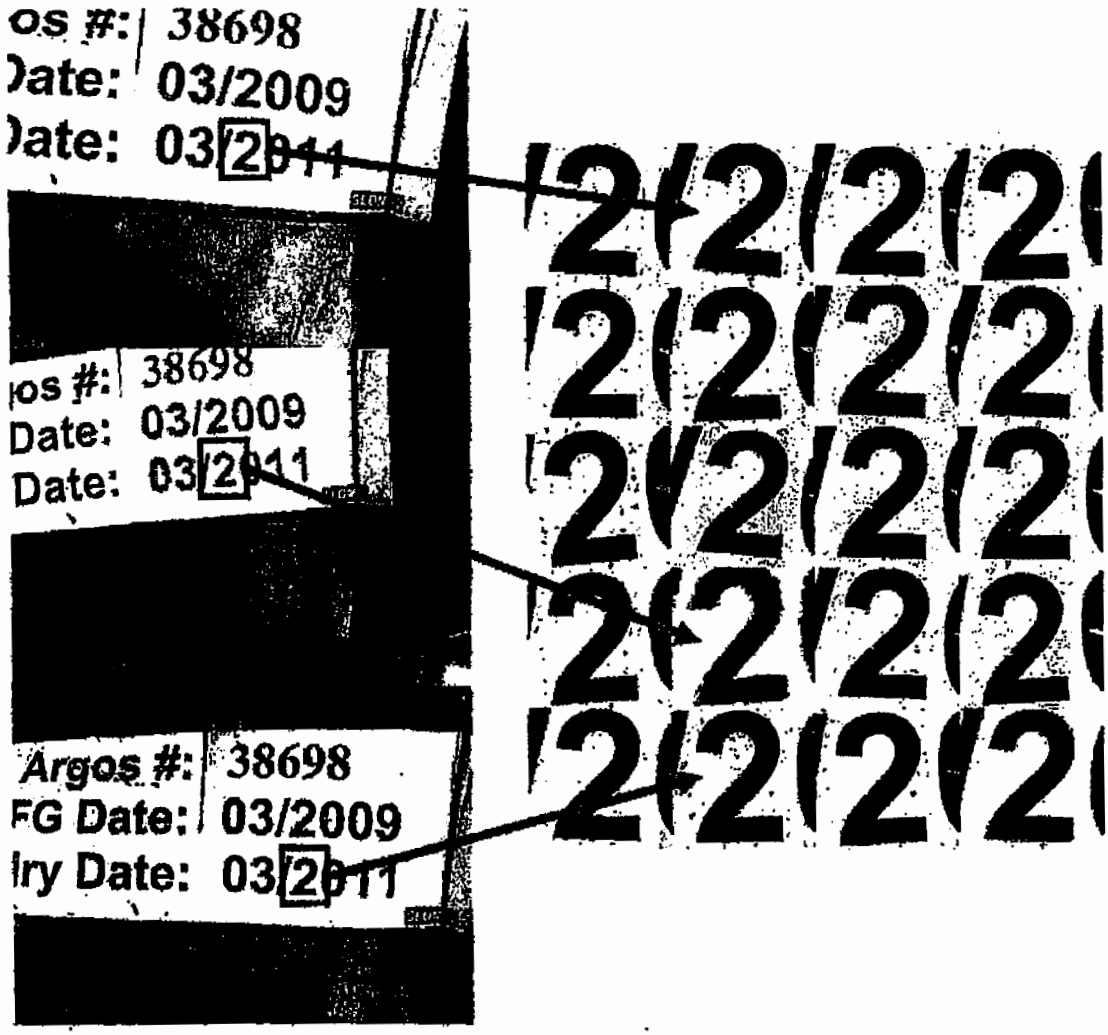

Figure 7. Samples from a series of commercial camera images taken of high contrast lettering on a portion of a box (left) which was located on the rear of the fantail of the USCGC FARALLON. A total of 20 exposures were taken sequentially while at sea motoring into ~4 foot waves (sea state 4) with a commercial camera. The height of the "2" in the lettering is 2.5 inches. The exposure times were ~16 msec taken at a standoff distance of ~1 meter. Although the vessel motion can degrade images, the majority of the images in the series are relatively sharp. The motion magnitude and direction during each of the exposures can be estimated by measuring the horizontal and vertical line spread functions from the high contrast edges on the lettering, with some error caused by the degeneracy in motion-blur and focus. The results of the analysis are shown in Figure 8.

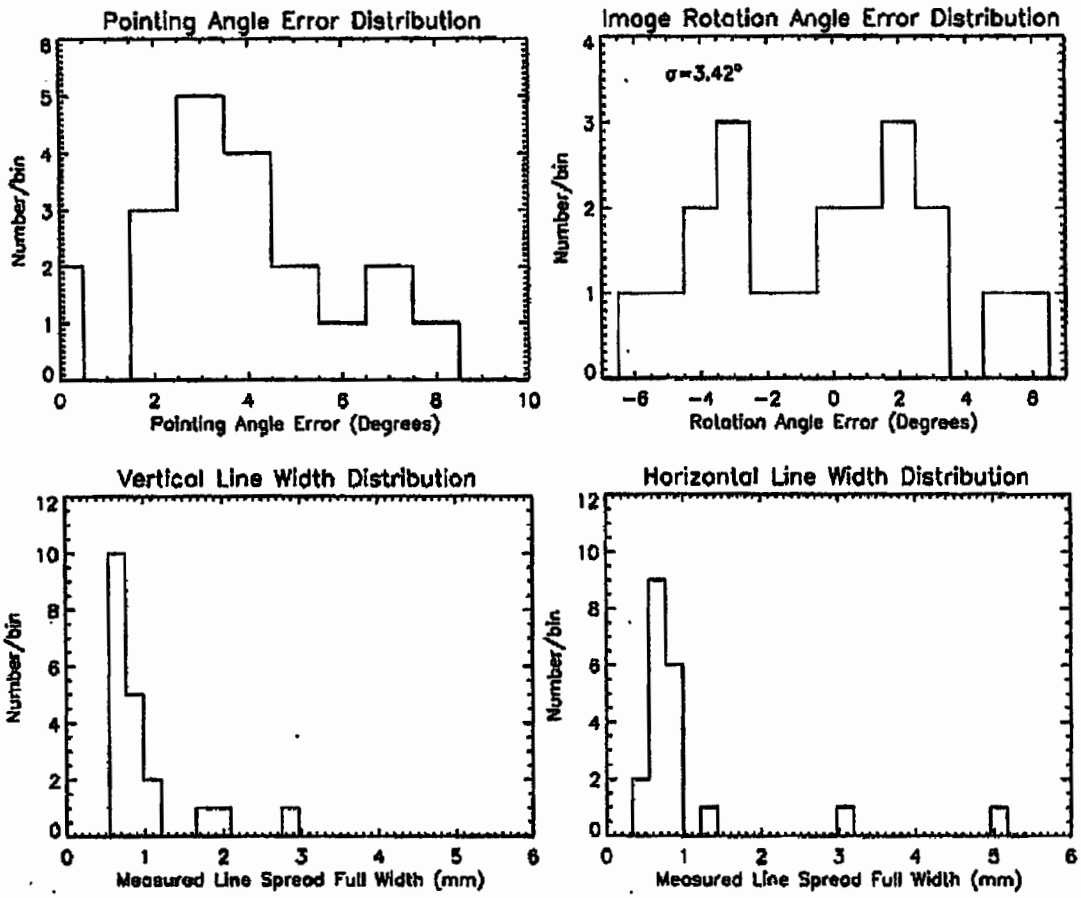

Figure 8. Analysis of the 20 image series from Figure 6. The upper left plot shows the intra image pointing error distribution (camera entrance aperture angular orientation versus target position), assuming no translation and a 1 meter standoff distance. For reference an angular tilt of ~3 degrees produces an effective image plane shift of ~1 inch at a standoff distance of 20 inches. This seems reasonably within the field of view buffer of devices. The upper right plot shows the intra-exposure image rotation distribution. For iris and face biometrics, even the 6 degree rotation from horizontal can be accommodated by most matching algorithms. The bottom left and right plots show the distributions of the measured horizontal and vertical line widths. If image plane motion (tilt or translation) occurs during an exposure, the line width will widen in the motion direction. Although the non-motion line widths are at or above the limit of acceptability for iris biometrics (~0.5 mm), the resulting distributions indicate that gross image motion occurs infrequently ~15 percent of the time for exposure times of ~10ms. The successful captures from the attempts with Camera X handheld iris capture device (Figure 9) supports this positive result.

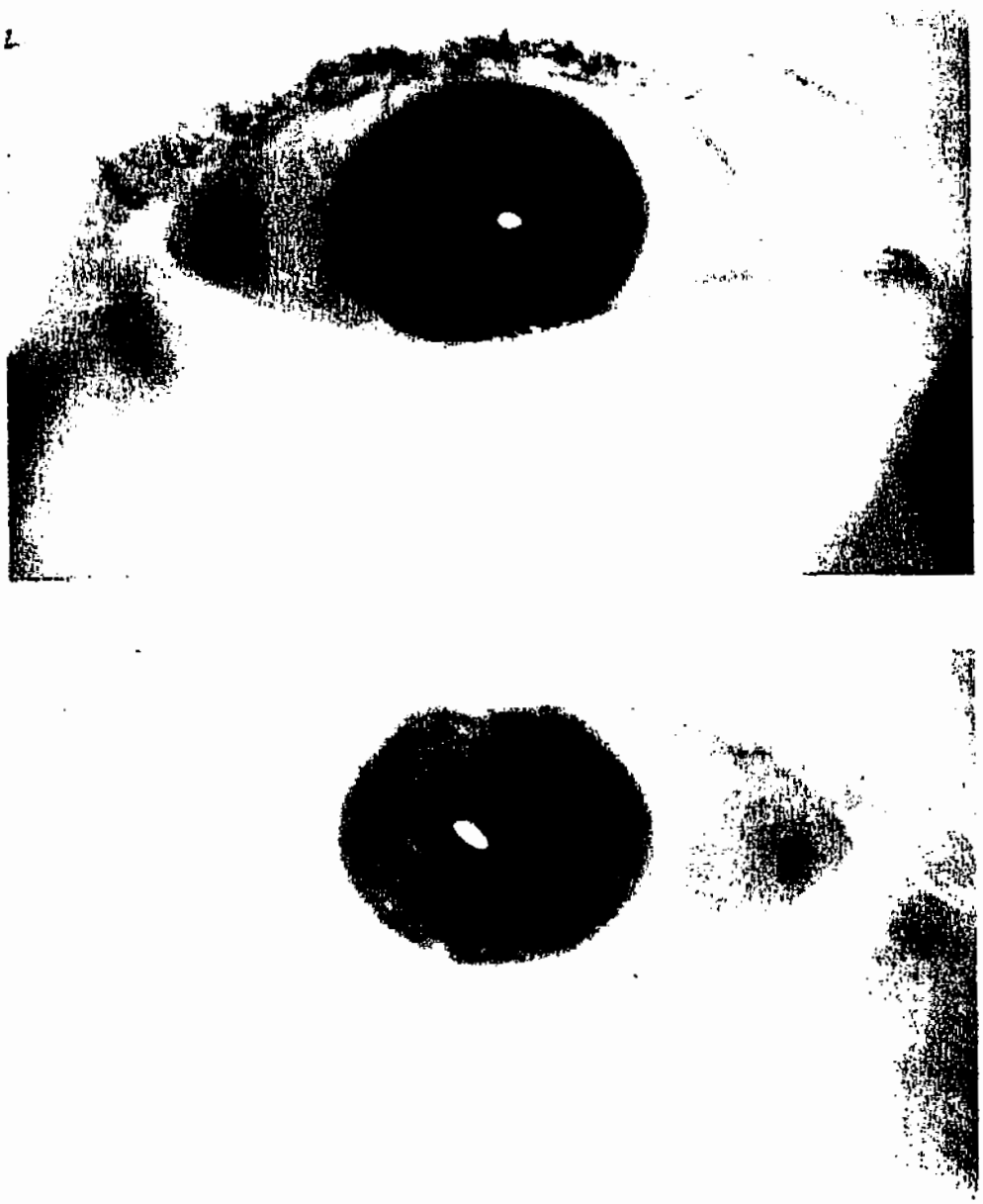

Figure 9. Examples of images taken with Camera X while at sea on the USCGC FARALLON. While some captures yield blurred images (bottom), multiple captures can yield at least some acceptable images for biometric identification (top). Camera X images were taken in the USCGC FARALLON's galley. Other images were taken on the bridge which yielded similar results. For the bottom iris image, the relative motion between the subject and Camera X was ~1.5mm, which may degrade matching accuracy with conventional iris matching algorithms.

Sample capture attempts

A mobile, handheld device (Camera X) was used during the site survey in both diagnostic capture mode and normal operational mode to assess the frequency that motion blur negatively affected image quality. A series of capture attempts were undertaken while indoors onboard the USCGC FARALLON during the sea state 4 conditions. Camera X has an on-board image quality assessment capability which acts as feedback for the failure-to-acquire rate. In a very small proof-of-concept test (8 attempted 2-eye captures yielding16 images), 4 images (25 percent) were deemed unacceptable for accurate matching (i.e., would likely result in a false non-match). Although there were failure captures predominantly due to the unstable platform caused by ship motion, the preliminary assessment is that even in fairly rough sea conditions, the iris capture device could successfully capture match quality images (not enrollment quality images) in most of the attempts. Example images of a good capture and a failed result are shown in Figure 9. When motoring in much calmer conditions in a sheltered harbor, the device provided image capture results similar to land-based collections. Despite our limited sample size, no poor quality images were returned after 10 capture attempts.

IV. Recommendations

It is clear that the Mona Pass Coast Guard operational environment is challenging for biometric evaluations– particularly for comprehensive tests that are performed during operations. An ideal evaluation would be comprehensive and would collect samples under all conditions encountered during actual interdiction events to determine which conditions (state, time of day, weather conditions, etc.) influence capture success. Ideal in-situ testing would also evaluate the interaction between the operator and the device(s) over a number of subject captures, requiring a number of operators (and thus interdictions with different staff) to assess. With iris biometrics delivering equal error rates of less than 1 percent, an evaluation requires sample sizes on the order of hundreds to thousands to develop a statistically significant comparison of different devices. An adequate sample size is logistically challenging to build due to the sporadic frequency of interdiction.

Another concern is that there are few combined iris and face capture devices that are ideally suited for this operational environment. Therefore, it may not be worthwhile to expend time and expense to evaluate devices that are not obviously ready for the operational environment of interest.

These issues can be addressed by separating the tests into those that can be conducted in controlled environments and those that can only be conducted in operational settings. Some tests, such as the impact of ship motion on the quality of images captured by a hand held device may be best conducted in simulation facilities. Such controlled testing could help qualify devices for use in the operational environment and define the conditions (such as temperature/humidity, sea spray, ambient lighting, and vessel motion/vibration assessment) necessary for successful iris and face image capture. It would also allow for formal evaluation of factors such as the ability of iris capture devices to control the corneal scene reflection that can

interfere with iris information in acquired images. Other tests, particularly those that depend on interactions with real subjects unfamiliar with biometric technology or the reactions of real operators, will likely need to be conducted in situ. Table 2 shows a possible break down of what may be confidently tested only *in-situ* and those tests more appropriate for a controlled environment.

S&T supports conducting a combination of controlled and field operational testing. This will help mitigate risks associated with conducting expensive and burdensome operational tests during Coast Guard patrols that yield little operational data due to the unpredictable and sporadic frequency of interdictions.

Table 2

Field Operational Testing	Controlled Environment Testing
The human factors interaction between Coast Guard operators, the capture devices, and the interdicted migrants in the operational field	Impact to image capture quality (failure to acquire rate, image quality degradation using MTF targets specifically designed for iris biometric capture devices) with handheld biometric capture devices as a function of simulated sea states (using a marine motion simulator facility)
Characteristics of the interdicted migrants' biometric information	Impact to imaged iris content from ambient lighting scenarios likely encountered at sea for all participating devices (controlled lighting lab)
Biometric matching performance comparisons of participating devices, with the (likely) caveat of small number statistics	Impact to image capture quality in sea spray environment, temperature and humidity variations (controlled environment lab)

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IREX III	*IREX III Performance of Iris Identification Algorithms*, Patrick Grother, George W. Quinn, James Matey, M. Ngan, W. Salamon, G. Flumara and C. Watson, NIST Interagency Report 7836, March 2012 *IREX III Supplement: Failure Analysis*, George W. Quinn, Patrick Grother NIST Interagency Report 7830, March 2012. http://iris.nist.gov/irex
MAINZ	*Photograph-Based Searches - Final report*, Bundeskriminalamt (German Federal Criminal Police Office). *Face recognition as a search tool, Foto-Fahndung", Wiesbaden, 2007.* http://www.bka.de/nn_227948/SharedDocs/Downloads/EN/Publications/Other/photographBasedSearchesFinalReport,templateId=raw,property=publicationFile.pdf/photographBasedSearchesFinalReport.pdf
MBE 2010	*Multiple-Biometric Evaluation 2010, Report on the Evaluation of 2D Still-Image Face Recognition Algorithms*, Patrick J. Grother, George W. Quinn and P. Jonathon Phillips *NIST Interagency Report 7709, August 2010*, http://face.nist.gov/mbe