2D Barcodes & Biometrics: The Secure Combination on Seafarer ID Cards

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Project Overview

- DS 2D bar code used for world’s first biometric seafarer ID card by world’s second largest shipping registry;

- Liberian Registry: HQ in Vienna, VA, 500K active seafarers, 2,000 vessels in fleet;

- Purpose:
  - Improve Maritime Security by issuing low cost secure document with embedded biometric template for objective identity verification of cardholder
Actual Card Design

Republic of Liberia
Seaman's Identity Card
Last: ATLASOV
First: ROMAN, Y.
Sex: M

Date of Birth: 30MAY1971
Place of Birth: USBR, RUSSIA

Crew Number: 645259
Date of Expiration: 01MAR2007

Seaman's Book Number: 616850
Special Qualifications held: BAS TCHM TPM
License Grade Held: 3AEM

The Datastrip below contains a fingerprint template, a photo, and a list of Liberian Documents that have issued to the cardholder at the time of printing of this card.

This card remains the property of the Liberian Registry
Why a 2D Bar Code?
Durability

- Immune to electrical or magnetic interference
- Aggressive error correction: 2DSuperscript is fault tolerant with up to 50% error correction from destruction.
The data can be encrypted before the generation of the 2DSuperscript, resulting in FLEXIBILITY and a higher level of PRIVACY. Supports virtually any method of encryption.

Maria Smith
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mrNtrskljdoadh
Klsui37 shyr Syht
kkljasG?he8
ka7jqD=ksysE
Variable density
2x2 or 2x3

Variable error correction: The fault tolerance level of 2DSuperscript is adjustable from 25% to 50%.
2DSuperscript cannot be altered without rendering the encoded information useless.

Optionally the 2DSuperscript can be built unique to LISCR’s system. Also the entire bar code or portions of the data inside can be encrypted prior to generation.
Verification Equipment

**DSVerify2D**
- Hitachi SH4 processor;
- Win CE operating system;
- 1:1 fingerprint verification;
- High-resolution color display;
- Multiple 2D & 1D bar code decode Datastrip, PDF-417, Code 39;
- Optional OCR-B capability;
- PCMCIA, USB, IR, Serial and **Smart card Interfaces**;
- Wireless Capability (802.11);
- Contactless Card Reading (CAC-C);
- Scan all MRTD’s
Verification Equipment Use

- **Portable** document / fingerprint scanner
  - Wireless Capability;
  - Crew Identity Verified by Nautical Inspector or USCG;
  - Expanded Smart Card capabilities

- **Fixed** Card and fingerprint scanner attached to a notebook or regular computer for enrollment
**Partners**

**LISCR** - Liberia is the world’s premier open ship registry, renowned for quality, efficiency, safety and service.

![American and Liberian Flags](image)

**Datastrip** - is an innovative world leader in providing ICAO recognized 2D bar code software, hardware and mobile biometric verification devices.
Technology Partners

**Datacard** – The industry leader in high quality card issuance and production and card printers.

**Identix** - Identix is a multi-biometric security technology company and industry leader in fingerprint identification.
**ILO / IMO**

- International Labour Organization
- International Maritime Organization

- ILO annual conference, June 3-19, Geneva
  - Hot Topic: *Seafarer ID Cards*, the technologies to be used and how to implement them
Results of ILO

- Seafarer’s ID documents will include:
  - biometric template (fingerprint) to be stored in a 2D bar code
- Documents to be issued by country of nationality
- New ID will not substitute passport
- Neutral on who pays for cards
- Neutral on vendors for biometric and bar code
Liberian Identity Document

- Seaman’s Identification and Record Book
  - ID - Identifies the holder as a Seaman
  - Record of sea service
  - Evidence of special qualifications and training

- Issued based on holder’s national Passport
  - Passport must be kept by the vessel’s master

- Conforms to ILO Convention 108
  - All Liberian Documents centrally issued
Reasons to Change

- US requires biometric documents – October, 2004
- ILO Convention 108 to be updated
- Make the ID harder to counterfeit
- Provide the seafarer with useful Port ID
- No real standard / regulation in industry
Biometric Trial Objectives

- Establish Remote Enrollment and Distribution
- Provide Verification of Card Holder & Card
- Match Applicant Biometric against Previous Applicants
- Develop Best Practices

Combat Identity Fraud
- Competency
- Training & Service
- Insurance & Medical

Improve Security
- Deter Terrorism
- Immigration
International Stakeholders

- Flag State - Government of Liberia
- International Maritime Organization – UN
- International Labor Organization – UN
- ICAO
- Port State Governments – over 100 countries
  - United States of America – one port state government
    - Department of Homeland Security
      - Immigration (Bureau of Citizenship and Immigration Services)
      - TSA
    - US Coast Guard
  - State and local authorities
  - Port authorities
  - Other agencies Department of Justice – FBI, CIA
    - EU States, China,
- Crewing States, Vessel Owners, Labor Unions, Seafarers
Choosing the Issuing Authority

Crewing State – seafarer’s country
- Numerous authorities required for verification
  - Possibility of numerous biometric standards
- No clear solution to stateless persons
- Denial of right to work for “Retired” seafarers
- Crewing States unwilling to issue compliant SID
- Some States are not ICAO 9303 Compliant

Flag-State – country ship is registered in
- All Crewmembers holding uniform documents
- Single point for verification
  - Single reader for biometric data
- Current issuer of STCW documentation
  - Based on positive identification of the seafarer from Passport
Biometric ID Challenges

- Which biometric?
  - Fingerprint, Iris, Facial
- Collection and verification of data
- Storage and retrieval of data
  - Where to put the biometric (Book, card)
- Protection of human rights
- Cultural considerations
- Multiple agencies with competing ideas
- Cost and reliability
Biometric Details

- Two designated fingers scanned at enrollment station
- Minutia based fingerprint template created
- No record of fingerprint image is kept or transmitted
- Fingerprint image cannot be made from template
On Board Enrollment
Fingerprint Enrollment

- Applications submitted electronically via SEA System
Biometric Verification

• Seaman’s fingerprint scanned and compared against template stored on card
• No connection to a central database required, remote verification on ships
• Upon verification, will display photo and details encoded in Datastrip bar code
• Seaman’s documents linked with common crew “FIN” number
Biometric Identity Card Features

• Personal Information & Color photograph
• Liberian crew file number
• 2D Barcode Datastrip
  – Containing Photo, 2 fingerprint templates and list of special qualifications held (around 5 pages of text).
  – Aggressive Error Correction
• Tamper-proof security features
• Consideration of standards of:
  – ILO, IMO, ICAO
  – US Government (DOT, USCG, INS)
• Java Chip Smartcard Capable
  – Read-write capabilities
Actual Card Design

Republic of Liberia

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Data is transmitted for Processing
Solution Overview

Applicants → Enrollment
- Biometric Capture
  - Photograph
  - Data Capture

Enrollment → Recognition ID
- Only once, during enrollment
- One-to-many search
- Central database required
- Optional
  - Card Personalization
  - Barcode printing
  - Smart Card encoding
  - Lamination

Recognition ID → Issuance
- Off Line
- One to One

Issuance → Verification ID
- Card Production
- Verification ID

Thank You