



## How **biometrics** helps the seafarer and world trade

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**T**he International Labour Organization (ILO), a specialized agency of the United Nations, has launched a biometrics-based identity document programme that has a global impact.

The ILO Convention No. 185, *The Seafarers' Identity Documents Convention* (Revised), 2003 came into force on 9 February 2005, and is in the process of ratification or possible ratification by more than 60 countries. It represents the world's first legal instrument which allows for an internationally interoperable biometric identity system.

The ILO has worked very closely with ISO/IEC Joint technical committee ISO/IEC JTC 1, *Information technology*, subcommittee SC 37, *Biometrics*, to ensure an internationally agreed standards-based solution, leading to clarity of specifications, conformance statements, certification and ultimately to good interworking.

Over 90% of world trade is handled by the shipping industry, but the seafarers manning the ships (for an average of nine months per year on board) have often not been allowed shore leave in some countries in recent months due to tightened controls on access to maritime ports.

This has led to a crisis situation for countries that traditionally supply seafarers and for shipowners, who are facing increased costs linked to the heightened security in maritime ports.<sup>1)</sup>

The Seafarers' Identity Document (SID), which follows the Inter-

national Civil Aviation Organization (ICAO) guidelines on machine readable travel documents (ICAO Document 9303), enables port authority and border control officials to verify the seafarers' identity by comparing the seafarers' fingerprints to the biometric information on their SID, and also by comparing the seafarers' biometric information with details held on the Issuing Authority's database, 24 hours a day, seven days a week, 365 days a year.

The advanced physical security features on the SID and the real time verification of any suspect SID will help alleviate concerns regarding the counterfeiting of seafarers' documents. It will also facilitate the admission of seafarers for shore leave whilst a ship is in port and for transit, transfer and repatriation in accordance with the ILO Convention. In the case of transit, transfer to and from ship, or repatriation, a passport is required to supplement the SID.

### Deployment of the Seafarer's Identity Document

Over 1.2 million seafarers could be issued with the new SID over the next few years. This figure rises to over 2.1 million when counting other trades that are employed in the shipping industry (on cruise ships, for example).

Over 50% of the world's seafarers come from six of the world's developing countries, but many member states of the ILO have less than 2 000 seafarers. The need to equip all these member states with enrolment systems is essential, but extremely costly with respect to the size of the national seafarer population. This is one of the issues confronting the roll-out programme.

There are also a high number of access and transit points that require verification equipment. There are over 2 867 maritime ports, and the developed countries have many international airports, train stations, etc., that are used by seafarers wishing to either join or leave their ships.

1) See also ILO/IMO Code of Practice on Security in Ports, 2004.



The cost of roll-out may seem high compared to the size of the seafarer population, but when the importance and value of world trade is taken into account, the figures become insignificant.

### Weighing concerns against the benefits

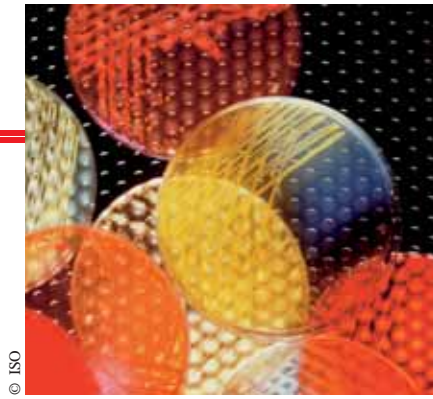
In considering the inclusion of a biometric identifier in the SID, the ILO had to take into account social and human rights issues, including privacy concerns, in what was in effect likely to be a mandatory international biometric identity document for seafarers. In arriving at its final determination, the ILO's tripartite constituents (governments, workers' representatives and employers' representatives) had to weigh these concerns against those regarding costs of implementation, particularly for developing countries from which most seafarers originate today.

The Convention also requires ILO member states to audit their production and issuance systems and to submit evaluation reports to the ILO, and for the ILO to publish a list of Member States that meet the minimum requirements of the Convention.

Throughout the entire process of development and adoption of Convention No.185, the ILO sought and obtained advice from the International Maritime Organization (IMO), ICAO and ISO/IEC JTC 1/SC 37. Convention No. 185 complements the IMO's Convention on Safety of Life at Sea, 1974 as amended (SOLAS) and the International Shipping and Port Security (ISPS) Code.

### Breaking new ground

When the ILO standardization began, ICAO was just moving to the adoption of chip-based technology, and ISO/IEC biometric standards were still in an early draft form. The style of the SID and the form of the machine-readable zone (MRZ) must conform to ICAO Document 9303, which was applicable at the time the Convention was adopted. As the ILO had fast-tracked the entire process around the development, adoption and implementation of Con-



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vention No.185, ISO and IEC agreed to allow the ILO to use their own two draft standards (ISO/IEC 19794-2 and ISO/IEC 19794-4) in advance of formal publishing. The biometric storage format described in ILO SID-0002 is thus based on draft ISO/IEC standards dated October 2003, but minor modifications were made in order to satisfy the requirements of storing two fingerprint templates on a two-dimensional PDF417 barcode.

In March 2004, the technical standard ILO SID-0002, *Finger minutiae-based biometric profile for the seafarers' identity documents*<sup>2)</sup>, was adopted by the ILO.

This technical standard is a requirement for ratifying member states and is intended to enable global interoperability of implemented systems.

### Testing and interworking

The ILO Biometric Testing Campaign was launched in June 2004 in order to develop a list of compliant biometric products (biometric comparison algorithm and sensor pairs from different vendors) and was completed at the end of November 2004. The purpose of the campaign was to ensure that a 2D barcode-based SID issued by one country would be verifiable in a different country where a biometric reader from a different vendor might be used. The ILO took measures to ensure that the biometric comparison algorithm and sensor vendors were assured anonymity, and worked with the vendors concerned to meet the ILO's performance requirements.

Ultimately, only two products out of an initial twenty achieved the ILO performance goal of 1% or better false reject rate at a 1% false accept rate, which was taken as an average of all possible combinations of enrol-

ment on one product and verification on the same or another product. (This is quite a stringent requirement for biometrics today.)

The results caused concern at the ILO, the ISO/IEC and in the USA, where government deployments relying on biometric standards for conformance and interoperability were already underway. Consequently, the US-based National Biometrics Security Project (NBSP) agreed to fund a study to investigate the interoperability issues on behalf of the ILO. A second phase of tests was performed off-line on the basis of data collected in order to resolve the interoperability problems. This second test resulted in another vendor being added to the ILO list of products.

The final list of products is considered to meet ILO's performance targets not only when each individual product is used by itself, but also when the products are working interoperably with each other.

The experimental procedures, results, and analysis are included in *ILO SID Biometric Testing Campaign Report – Part 1, 2004* and *ILO SID Biometric Testing Campaign Report – Addendum to Part 1*.<sup>3)</sup>

### Participating in ISO/IEC standards development

ILO has worked closely with ISO/IEC JTC 1 and several of its subcommittees in connection with the development of the ILO Seafarers' Identity Documents programme.

Initially, ILO received input from experts assigned by ISO/IEC JTC 1/SC 17, *Cards and personal identification*, ISO/IEC JTC 1/SC 31, *Automatic identification and data capture techniques*, and ISO/IEC JTC 1 SC 37, *Biometrics*. Subsequent advice has been provided to ILO by the expert assigned from SC 31, but the most profitable and extensive collaboration has been with SC 37.

2) See [www.ilo.org/public/english/dialogue/sector/papers/maritime/sid0002.pdf](http://www.ilo.org/public/english/dialogue/sector/papers/maritime/sid0002.pdf).

3) See [www.ilo.org/public/english/dialogue/sector/sectors/mariti/security.htm](http://www.ilo.org/public/english/dialogue/sector/sectors/mariti/security.htm).



ILO has established Category A Liaison status with ISO/IEC JTC 1/SC 37 and has contributed several documents towards the work of that group. The collaboration is divided into two broad areas. The first is biometric conformance and interoperability testing. The second is developing a profile for biometric verification and identification of seafarers.

In the first meeting between ISO/IEC experts and ILO, it was recognized that the only way a globally interoperable system of seafarers' identity documents could be supported was to ensure that standards were used and that products supplied were conformant to those standards.

The biometric standards available at that time, however, were still in draft mode, and so it was determined to be particularly important to ensure con-

formance of biometric products, but also to engage in a full set of performance and interoperability tests with those biometric products. A detailed set of requirements that incorporated the text of two of the draft SC 37 data interchange format standards (finger minutiae and finger image) was developed and published as ILO SID-0002. This document has been contributed for information to SC 37 as document SC 37 N-603.

The series of conformance, performance and interoperability tests which began in 2004 attempted to follow the draft outlines provided in the SC 37 performance testing standards in the ISO/IEC 19795 series. The first test report was provided for information to SC 37 as document SC 37 N-1276.

There were numerous issues specifically related to interoperability testing that were not fully covered in the first three parts of ISO/IEC 19795, and so a project to develop a fourth part specifically devoted to performance-based interoperability testing was initiated. Representatives of the ILO designated interoperability testing laboratory have been contributing to that project since it began so that the practical experience of the ILO can influence the standard.

The report on the ILO's second test, referred to earlier, was actually reviewed by a small group of experts assigned by SC 37 prior to its publication, and their feedback was incorporated into the final report which has now been contributed to SC 37 as document SC 37 N-1275.

There is currently a third round of ILO testing underway, and once again a group of SC 37 experts is expected to review the results prior to publication. ILO will then incorporate their feedback and produce a final report. After it has been approved by ILO, it will be contributed to SC 37 so that it can be used as a reference point in further developing interoperability testing standards.

The other major area of work is on ISO/IEC 24713-3, *Biometric Profiles for Interoperability and Data Interchange – Part 3: Biometric Based Verification and Identification of Seafarers*, designed to be backwards compatible with the existing ILO practice. It

also suggests ways in which technology could be upgraded, additional standards could be used, and improved best practices put in place, without breaking the backwards compatibility or the fundamental legal terms of ILO Convention No. 185, which governs the use of seafarers' identity documents. In that sense, it is a standard that attempts to provide the best possible profiling of existing standards within certain constraints and is therefore only possible through a close cooperation between ILO and ISO/IEC JTC 1/SC 37.

Thus far, ILO has made two major technical contributions towards this standard and expects to make more. Progress on the standard has been somewhat slow. It is perceived to have a much richer scope than the other standards in the ISO/IEC 24713 series, because there are detailed user requirements and therefore a lot of specifics can be determined that are currently left open or optional in the other parts.

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ILO anticipates working with ISO/IEC on this standard for some time. Once it is published, it might be a candidate to replace the technical requirements currently specified in ILO SID-0002 when a logical time for a review of Convention No. 185 presents itself. Currently, this is expected to be around 2010.

The significance of the ILO Convention 185 is far-reaching. The ILO has not only set the benchmark for international biometric-based interoperable identity management systems and their certification, but has also paved the way for many other professional identity document initiatives.

An International Standard for a biometric profile for seafarers, ISO/IEC 24713-3, is currently being developed, using process modelling tools. ISO/IEC 24713-3 is due to be published in 2008. ■

## About the author



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*This article reflects the opinions of the author and not necessarily those of the ILO.*