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WORKING PAPER

TECHNICAL ADVISORY GROUP ON MACHINE READABLE TRAVEL DOCUMENTS (TAG/MRTD)

TWENTIETH MEETING

Montréal, 7 to 9 September 2011

Agenda Item 6: Other business
Agenda Item 6.1 Seafarers' Identity Documents Convention

SEAFARERS' IDENTITY DOCUMENTS CONVENTION (REVISED), 2003 (NO. 185) – HARMONISATION AND COLLABORATION WITH ICAO

(Presented by the International Labour Office (ILO))

1. INTRODUCTION

1.1 The International Labour Organization (ILO), established in 1919, is a Specialized Agency of the United Nations (UN). It is a tripartite organization, in which representatives of governments, employers and workers take part with equal status. In June 2003, the ILO adopted the *Seafarers' Identity Documents Convention* (Revised), 2003 (No. 185). This revision of the earlier Convention of 1958 was provided as a rapid response to security concerns at ports following the events of 11 September 2001 as part of a joint series of international documents developed by ILO and the International Maritime Organization (IMO). The Convention specifies a standard for the physical features, content and both issuance and verification procedures surrounding a new seafarers' identity document that is to replace the wide assortment of documents used under the previous ILO Convention No. 108. This document is to be used by seafarers when they seek access to ports for shore leave or when crossing international borders during transit to and from their ships. It is not in itself a travel document, since it must be used in conjunction with a passport when crossing borders in transit to and from a ship, but it does identify an individual as a seafarer and thus, in principle, entitled to a visa waiver or equivalent facility for purposes of shore leave.

1.2 There are currently 20 States for which Convention No. 185 is legally binding and a further 59 States for which the older Convention No. 108 is legally binding. Many other States provide equivalent treatment for seafarers either through bilateral agreements or through common practice without requiring reciprocation. The facility for visa free shore leave for seafarers is not only a historical practice but is binding law in 79 States and existing practice in many more. A major concern for those interested in border and immigration issues is that since only 20 States have ratified Convention No. 185, most of the world still requires no detailed standard for the documents used to identify seafarers and grant them

shore leave. The reasons for the lack of quicker ratification of Convention No. 185 are complex, but mostly revolve around issues of the technical difficulty and expense involved in implementing the Convention. The primary goal of this document is therefore to consider practical and technical means which may be used as part of the collaboration between the ILO and the International Civil Aviation Organization (ICAO) to simplify the technical complexity of implementation and encourage additional countries to ratify Convention No. 185. This will in turn significantly improve the quality and reliability of seafarers' identity documents and of the security of ports and of border crossings where seafarers are present.

2. MATTERS FOR CONSIDERATION

2.1 This working paper describes the background and history of ILO Convention No. 185, including the involvement of ICAO from the early stages of development of the Convention. It then provides a summary of the key requirements of Convention No. 185 including the following areas:

a) The requirement to provide facilitation to the movement of seafarers for purposes of shore leave, transfer, transit and repatriation;

b) The physical layout of the document and the reliance on ICAO Document 9303 Part 1, Volume 1 and ICAO Document 9303 Part 3, Volume 1;

c) The biometric data used to verify the seafarer and the work done on ISO/IEC 24713-3 in looking towards a future amendment to Convention No. 185; and

d) The measures in place to ensure a reliable and secure document issuance process, including independent external audits with international review and a "white list" of countries which fully comply with the requirements of the Convention.

2.2 The paper then describes the areas where cooperation between ILO and ISO may be beneficial. Specifically this includes the following:

a) The modification of the existing text within ICAO Document 9303 which relates to the ILO SID to require "I" as the first letter in the Machine Readable Zone (MRZ) rather than "P", with "S" as the mandatory second letter in the MRZ;

b) The potential introduction of a chip enabled SID, where the chip would follow the format described in ICAO Document 9303 Part 1, Volume 2, as described in Attachment D of this document; and

c) The potential for ILO Member States to use the ICAO PKD to support the exchange of certificates required for verification of the data contained both in chip enabled SIDs and in SIDs which contain a digitally signed two dimensional barcode.

2.3 These areas are brought for consideration at the 20th meeting of the ICAO TAG/MRTD so that a way forward between ILO and ICAO can be defined

3. ACTIONS

3.1 If ICAO agrees that it is technically feasible to use the ICAO PKD to support the distribution of keys defined in the CBEFF patron format listed above, then a discussion should take place at the TAG / MRTD meeting in September, 2011 as to whether ICAO and ILO, as sister UN organizations, both see benefit in sharing the services of the existing ICAO PKD. Several issues would need to be resolved administratively to make this possible. These include the following:

Should the ePassport issuing authority and the SID issuing authority within the same state each have their own Country Signing Certificate Authority (CSCA) or should they each use different Document Signer Key Pairs with the Document Signer Certificates signed by the same Country Signing Certificate Authority Key Pair?

If there is only a single CSCA for each state then does the primary responsibility of maintaining that CSCA and interacting with the ICAO PKD fall upon the ePassport issuing authority or upon the SID issuing authority or is it up to each country to determine that for itself? Note that in some countries, both documents may be issued by the same agency but in others they will not be. Also note that some countries which currently do not participate in the ICAO PKD for ePassports may wish to participate in it for SIDs.

Will the cost of participation in the ICAO PKD fall upon the ePassport issuing authority or the SID issuing authority or will it be up to each country to decide which agency is the primary registrant with the ICAO PKD and thus is responsible for paying the annual fees?

Currently the International Labour Office believes that this sharing of the ICAO PKD is technically feasible and that only a single CSCA should exist for each country, but it should be up to the government of that country to decide whether its ePassport issuing agency or SID issuing agency will have primary responsibility for managing the CSCA and paying the fees for participation in the ICAO PKD. The views of the participants at the ICAO TAG / MRTD meeting will be most welcome on this topic.

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Appendix A

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1. BACKGROUND AND HISTORY

1.1 ILO and Seafarers

The International Labour Organization, established in 1919, is a Specialized Agency of the United Nations (UN). It is a tripartite organization in which representatives of governments, employers and workers take part with equal status. It adopts international labour conventions, which create binding obligations for all ILO Member countries that ratify them. Since 1926, the ILO has adopted a sophisticated "supervisory system" for checking that countries are properly implementing the conventions that they have ratified. The ILO conventions cover all areas of working life, but from the very beginning special importance has been placed on the maritime sector. Seafarers are a labour group that is vital to world commerce, since over 90% of all trade is conducted by sea. Often they endure lengthy periods at sea as their vessels transit from one country to another. It is not uncommon for such voyages to last six months to a year, and seafarers frequently do not know when they first join the vessel where their voyages will take them.

Under these conditions it is impractical for seafarers to obtain all the necessary visas that would allow them to temporarily debark from their vessels in every foreign country that they might visit before they set out on these long trips. For both humanitarian purposes and to meet the logistic requirements of the industry, the ILO addressed this situation in 1958 by adopting the Seafarers' Identity Documents Convention (No. 108). This convention requires ratifying countries to permit the entry into their territory of seafarers holding a valid seafarer's identity document (SID) issued in accordance with the convention, when entry is requested for temporary shore leave or for other professional purposes such as joining ship or for transit. Convention No. 108 met with wide acceptance and its practices are still followed in almost all countries around the globe.

1.2 Development of a Revised Convention

In the wake of the terrorist attacks of 11 September 2001, there was a strong desire among many nations to try and improve the security of all key infrastructures, including that of ships and ports. The International Maritime Organization (IMO) undertook the task of improving security in these areas through the development of the International Ship and Port Facility Security (ISPS) Code. During this process it became apparent that proper identification of those in ports and on board ships was a key component to ensuring a secure environment and so the IMO requested the ILO to consider updating its Seafarers' Identity Document Convention to address this issue.

The 1958 Convention No. 108 sets out few standards that give a proper assurance that the SIDs issued under it are authentic or that their holders are legitimate seafarers. Also no uniformity is required with respect to the size or form of the document. This lack of uniformity can make it difficult for the authorities in the countries of entry, presented with diverse national SIDs, to immediately find the information they need to see. In addition, under Convention No. 108, countries can issue SIDs, not just to their own nationals, but also to foreign seafarers serving on ships registered in their territory or to foreign seafarers registered at employment offices in their territory, thus reducing even further the reliability of the SID issued to those seafarers. There are no requirements for SIDs to include modern security features and there is no means (other than visual inspection of the photograph (or signature) on the document) to verify that the individual presenting the document is the seafarer to whom it was originally issued. There are also no international requirements or even guidelines on the security or quality of the issuance process. The goal in revising the Convention was to address all of these issues in a single update.

The revision process began with submissions from several ILO members on the subject of improving the security of seafarers' identity documents and of the process for verifying that individuals presenting the

documents were legitimate. These were considered at a special tripartite meeting held in Geneva on 9 and 10 May 2002. Topics presented included the benefits of a standardized design for a machine readable SID, the advantages of including biometric data to facilitate verification of the document holder, the necessity of some type of oversight or audit system to ensure proper practices in document issuance and the importance of ensuring that appropriate privacy and data protection measures were taken to protect seafarers. Several references were made to ICAO and ISO standards, although the details were unclear at that time. The official report of this meeting is included as Attachment A-1 to this document.

In the following month, an informal special sitting on Improved Security of Seafarers' Identity Documents took place within the framework of the first meeting of the Tripartite Subgroup of the High-level Tripartite Working Group on Maritime Labour Standards on 25 June 2002. The report on that sitting is included as Attachment A-2 to this document. A questionnaire was reviewed and refined which was to be sent to all ILO Members in July, 2002. The goal was to receive feedback so that a draft document could be prepared for formal review and adoption by the International Labour Conference at its meeting in 2003. An important point which was raised during this meeting was that although ICAO had existing standards for machine readable travel documents, it was still reviewing the issue of a globally interoperable biometric and this was unlikely to be completed until the end of 2003, after the revised convention had been finalized and adopted. ISO was also working on standards for storing biometric data, but these were not likely to be final until 2004 at the earliest.

The next informal special sitting was held on 17 October 2002 within the framework of the second Meeting of the High-level Tripartite Working Group on Maritime Labour Standards. The report of this sitting is included as Attachment A-3 to this document. During this sitting, it became obvious that there were significant concerns about the cost of implementing a biometric enabled seafarers' identity document, especially among developing nations and among nations with small numbers of seafarers. It was also at this meeting that the International Labour Office (the Office) recommended that the number and magnitude of the changes being considered would best be served by developing an entirely new Intenational Labour Convention rather than simply developing a Protocol to add details to the existing ILO Convention No. 108.

Two further informal special sittings were held on 4 and 5 February within the framework of the second Meeting of the Tripartite Subgroup of the High-level Tripartite Working Group on Maritime Labour Standards. As there was some disagreement over the form of the document (smart card or paper based machine readable document) and over the details of the biometric data to be stored, the Office had invited ICAO to participate in this meeting. The report of this meeting is included as Attachment A-4 to this document. The ICAO representative was very helpful during this meeting and gave a presentation on ICAO Document 9303 and machine readable travel documents (MRTDs). She indicated that ICAO was currently considering which biometric modality (face, fingerprint or iris) and which data storage media (two-dimensional bar codes, magnetic strip, contacted integrated circuits or optical memory) should be retained as the standard for MRTDs. Unfortunately, she explained that this decision would not be taken until the meeting of the ICAO Technical Advisory Group on Machine Readable Travel Documents (TAG / MRTD) in May, 2003, which would be too late for inclusion in a document to be adopted at the 2003 session of the International Labour Conference. The ICAO representative did, however, indicate that facial recognition was the most likely choice for the globally interoperable biometric and that the TAG / MRTD had offered its assistance to the maritime sector in the implementation of a machine readable seafarers' identity document.

The representative of the United States then provided information about relevant international groups working on biometrics, database interoperability and similar issues relevant to the implementation of a more secure seafarers' identity document. This representative strongly advised that fingerprint was the leading biometric in law and practice of several countries. The ICAO representative provided information

about the ICAO air crew card, which was considered to be similar in purpose and function to the seafarers' identity document. She was also asked about the expected outcome of the TAG / MRTD meeting in May, 2003 but she indicated that it was not possible to give a clear indication of the expected recommendations in advance of the meeting. A debate ensued among the participants. At the conclusion, the government group and the shipowners' group indicated that they were both in favour of following the ICAO standards but the seafarers' group opposed this. Once again, the ICAO representative was asked when a standard would be available with the latest recommendations of the TAG / MRTD to be determined at the meeting in May, 2003 and what those recommendations might be. Once again, she indicated that the recommendations could not be predicted in advance and that the outcome from the May meeting would, in any case, only be a working document and not a formal standard. An important feature of the draft revised convention was designed to address this issue, in that the convention would specify that the seafarers' identity document must contain biometric data but leave the details of the specific modality and data format to a supplementary document to be developed at a later date. This was deemed to be acceptable by all the participants.

During and after these preparatory meetings a final draft document was developed which contained a proposed text for the new convention. Then, during the 91st Session of the International Labour Conference, from June 4rd to June 16th, 2003 the technical committee established by the Conference, which was composed of 54 Government members, 21 Employer members and 40 Worker members, reviewed and modified the draft to produce a final text for adoption by the International Labour Conference. The discussion was vigorous and thorough, with the highlights captured in the Provisional Record Parts I and II which are found in Attachments A-5 and A-6 to this document. A representative of ICAO was invited to speak at this technical committee and he was now able to explain the details of the recommendations which had been made by the TAG /MRTD at its meeting in May, 2003. He noted that the recommended biometric for global interoperability was facial recognition with the face to be stored as a compressed image. He also noted that the interoperable storage medium for electronic travel documents was to be a high capacity contactless integrated circuit chip. These and other clarifications were deemed to be most helpful to the technical committee, but the debate proved that there was already too much momentum towards a fingerprint based solution, especially in the United States, and so it was decided that a fingerprint biometric was to be the mechanism for verifying seafarers' identity. The committee had also moved fairly far down the path towards using a two dimensional bar code as the storage medium, since it had been listed as a potential extended storage mechanism in ICAO Document 9303, was very cheap to produce, and had the additional advantage that it alleviated certain concerns of the seafarers by having very limited storage capacity and being impossible to add data to without reissuing the SID. The committee was aware that following ICAO standards was critical for the SID to be easily integrated into the existing infrastructure at borders, so they did include the requirement that "The materials used, dimensions and placement of data shall conform to the International Civil Aviation Organization (ICAO) specifications as contained in Document 9303 Part 3 (2nd edition, 2002) or Document 9303 Part 1 (5th edition, 2003)". In order to clarify that the SID was not intended to be a travel document as defined by ICAO Document 9303, but simply an identity document that used the ICAO Document 9303 standards to achieve interoperability in its machine readable zone, the committee included a requirement that the following phrases be printed on every SID:

(a) This document is a seafarers' identity document for the purpose of the Seafarers' Identity Documents Convention (Revised), 2003, of the International Labour Organization.

(b) This document is a stand-alone document and not a passport.

The committee also understood that specific standards for interoperable biometric data did not yet exist in 2003 and so they specified that the SID was to contain a "Biometric template based on a fingerprint printed as numbers in a bar code conforming to a standard to be developed". I

After all the debate and discussion, a final version of the text was produced and it was adopted by the International Labour Conference at its 91st Session on June 19th, 2003. This was the **ILO Seafarers' Identity Documents Convention (Revised), 2003 (No. 185).** Its full text is included in Attachment B to this document. In a resolution adopted by the International Labour Conference at the same time as the Convention, it was decided that the ILO Director-General should be requested to take urgent measures for the development by the appropriate institutions of the "global interoperable standard" for the biometric template referred to in the Convention, "particularly in cooperation with the International Civil Aviation Organization" (see Attachment A 6 below at page 20/109).

1.3 Technical Support to Supplement Convention No. 185

Shortly after Convention No. 185 was adopted, the ILO invited representatives from ICAO and from ISO/IEC JTC-1 SC 17, SC 31 and SC 37 to come to a special meeting to discuss the development of the standard for the biometric. ICAO was invited in accordance with the resolution referred to above. ISO was invited as another "appropriate institution" mentioned in the resolution: SC 17 was the standards subcommittee responsible for "Cards and personal identification". SC 31 was the standards subcommittee responsible for "Automatic identification and data capture techniques", which included the ISO standards for two dimensional bar codes. SC 37 was invited because it was the standards subcommittee responsible for biometrics. These representatives provided a lot of useful technical feedback and SC 31 recommended some existing standards to cover the two dimensional bar code, including a strong recommendation that the PDF 417 symbology be used. SC 17 provided useful counsel on the importance of interoperability testing and ICAO supported this as there was a lot of interoperability testing being done to support the new chip enabled ePassports. Finally, SC 17 particularly supported interoperability testing in the area of biometrics as the standards for biometric data interchange formats were not yet fully developed and there was no international experience in using these standards to support interoperability.

After this meeting, ISO formally gave permission for the ILO to reproduce one of the draft standards (at the Committee Draft phase) that was under development in SC 37 as the basis for the fingerprint template data to be stored in the two dimensional bar code. Since this standard was still an early draft, the ILO added significant supplementary information to it, as well as references to and explanatory information about other relevant standards. This was published as technical report "ILO SID-0002 – The standard for the biometric template required by the Convention". Interestingly, although the technical committee of the ILC had decided that the biometric should be a fingerprint template encoded in a two dimensional bar code, it had not determined which type of fingerprint template should be used and ISO was simultaneously developing two independent fingerprint template standards; ISO/IEC 19794-2, which was based on fingerprint minutiae and ISO/IEC 19794-3, which was based on fingerprint pattern spectral data. Both were still in draft form and the ISO representatives who spoke with ILO could not conclusively recommend one over the other. Therefore, ILO SID-001 was prepared using the draft of ISO/IEC 19794-3 and ILO SID-002 was prepared using the draft of ISO/IEC 19794-2. Then ILO considered both options at the 289th Session of the Governing Body in March, 2004 and decided to use the fingerprint minutiae template, since it seemed to be preferred by several governments, thus adopting ILO SID-0002 and rejecting ILO SID-0001.

Next, following the advice from both ISO and ICAO, ILO organized a conformance, performance and interoperability test for biometric devices using the draft ISO/IEC 19794-2 standard and the supplementary information contained in ILO SID-0002. This tested biometric enrolment and verification using the standardized data format and the specific operational practices contained in ILO SID-0002. Each product consisted of a fingerprint sensor combined with a single enrolment and verification algorithm, so that the effects of both hardware and software were considered. The initial round of testing took place in 2004, with nine products submitted. After some interactions with the vendors, and refinements to their products, seven of these were found to be conformant to the standard and were tested

with real seafarers on board a vessel for a period of six weeks. After this test, only two of the products were able to meet the ILO performance and interoperability goal in an interoperable manner. This goal required each product to achieve a generalized false reject rate (GFRR) of 1.0% or less at a match threshold corresponding to a generalized false accept rate (GFAR) of 1.0% both when templates created for seafarers by that product were verified by every other interoperable product and when that product was used to verify seafarers' template created by each interoperable product.

This result was disappointing, but it indicated that the warning about interoperability provided by ICAO and ISO, especially when using such early draft standards, was definitely worth spending some time and effort to address. The ILO proceeded to conduct further rounds of interoperability testing in 2005, 2006 and 2008. It also worked with ISO/IEC JTC-1 SC 37, providing feedback from the interoperability testing to help refine the standard and eventually to help define the standard ISO/IEC 19795-4:2008 on Interoperability Performance Testing. As the ISO standards were refined and more manufacturers paid more attention to standards compliance, the interoperable performance of fingerprint systems using standardized minutiae templates improved significantly. Eventually, after the 2008 tests, a total of 12 biometric products were found to be fully conformant to ILO SID-0002 and the standards it referenced and to be capable of achieving full interoperable performance of GFRR below 1.0% at a corresponding GFAR of 1.0%. This type of repeated testing with conformance and interoperability improving over time is quite similar in concept to the testing which ICAO performed to improve interoperability among ePassports and ePassport readers. In this case, however, the overall state of interoperability was greatly helped by later testing programs set up in Europe and in the US, which also tested products for interoperability using standardized minutiae templates. The ILO tests were the first of this kind, but the NIST MINEX tests were the most comprehensive and it is the net result of all these tests which have helped the biometrics industry to achieve acceptable interoperable performance.

Finally, after the first two rounds of testing in 2004 and 2005, ILO revised the text of ILO SID-0002 to include additional guidance information to try and resolve certain interoperability issues which had been found during the testing. This revised version of ILO SID-0002 was adopted by the ILO Governing Body at its 294th Session in November, 2005. The revised text is included as Attachment C to this document.

2. KEY REQUIREMENTS OF CONVENTION No. 185

2.1 Facilitation of Seafarers' Movement

The main purpose of the Seafarers' Identity Documents Convention, both the original Convention No. 108 and the newer Convention No. 185, is to provide seafarers with the ability to enjoy shore leave when the vessels on which they are employed are in port and to facilitate their movements across international borders for purposes of transit, transfer or repatriation. The former is essential for the seafarers, who often spend long periods of from six months to a year on a single vessel and who need access on shore to perform basic necessities of life such as communicating with family members, receiving medical or dental services and attending a place of worship. Seafarers have enjoyed the right of shore leave throughout recorded history and it remains the general practice in almost every country in the world. Shore leave has never required a seafarer to have a visa, unless it was an expedited visa which could be arranged by the shipowner, such as the crew list visa formerly used by seafarers to enter the US or the ETA which nationals of many countries can currently use to enter Australia. The ability to have expedited border crossings for transit, transfer and repatriation is primarily a benefit to shipowners. Over 90% of the world's cargo is transported by sea and it is vital for shipowners to be able to properly crew these vessels.

Currently there are 20 countries for which Convention No. 185 is legally binding and a further 59 countries for which the older Convention No. 108 is legally binding, as shown in the tables below,

ensuring that visa free shore leave and facilitated movement for transit, transfer or repatriation are available for seafarers. The vast majority of the remaining countries, however, offer these privileges to seafarers in practice, even if it is not currently a legally binding requirement. One key requirement of Convention No. 185 was therefore to ensure that the existing support for facilitated movement of seafarers remains, even as the system of seafarers' identity documents moves to a new, more secure regime. This is expressed in Article 6 of Convention No. 185, as shown in Attachment B.

Table 1 – Current Ratifications of Convention No. 185

Country	Ratification date	Status
Albania	11:10:2007	ratified
Azerbaijan	17:07:2006	ratified
Bahamas	14:12:2006	ratified
Bosnia and Herzegovina	18:01:2010	ratified
Brazil	21:01:2010	ratified
France	27:04:2004	ratified
Hungary	30:03:2005	ratified
Indonesia	16:07:2008	ratified
Jordan	09:08:2004	ratified
Kazakhstan	17:05:2010	ratified
Republic of Korea	04:04:2007	ratified
Lithuania	14:08:2006	Declaration of provisional Application
Madagascar	06:06:2007	ratified
Republic of Moldova	28:08:2006	ratified
Nigeria	19:08:2004	ratified
Pakistan	21:12:2006	ratified
Russian Federation	26:02:2010	ratified
Spain	26:05:2011	ratified
Vanuatu	28:07:2006	ratified
Yemen	06:10:2008	ratified

Table 2 – Current Ratifications of Convention No. 108

Country	Ratification date	Status
Algeria	13:08:1991	ratified
Angola	04:06:1976	ratified

Antigua and Barbuda	02:02:1983	ratified
Azerbaijan	19:05:1992	denounced on 17:07:2006
Barbados	08:05:1967	ratified
Belarus	28:02:1994	ratified
Belize	15:12:1983	ratified
Brazil	05:11:1963	denounced on 21:01:2010
Bulgaria	26:01:1977	ratified
Cameroon	29:11:1982	ratified
Canada	31:05:1967	ratified
Cuba	30:12:1975	ratified
Czech Republic	06:08:1996	ratified
Denmark	26:10:1970	ratified
Djibouti	03:08:1978	ratified
Dominica	28:02:1983	ratified
Estonia	11:12:1996	ratified
Fiji	19:04:1974	ratified
Finland	26:10:1970	ratified
France	08:06:1967	denounced on 27:04:2004
Ghana	19:02:1960	ratified
Greece	09:10:1963	ratified
Grenada	09:07:1979	ratified
Guatemala	28:11:1960	ratified
Guinea-Bissau	21:02:1977	ratified
Guyana	08:06:1966	ratified
Honduras	20:06:1960	ratified
Iceland	26:10:1970	ratified
India	17:01:2005	ratified
the Islamic Republic of Iran	13:03:1967	ratified
Iraq	23:09:1986	ratified
Ireland	17:06:1961	ratified
Italy	12:08:1963	ratified
Kyrgyzstan	31:03:1992	ratified
Latvia	08:03:1993	ratified

Liberia	08:07:1981	ratified
Lithuania	19:11:1997	ratified
Luxembourg	15:02:1991	ratified
Malta	04:01:1965	ratified
Mauritius	02:12:1969	ratified
Mexico	11:09:1961	ratified
Republic of Moldova	23:03:2000	denounced on 28:08:2006
Morocco	15:10:2001	ratified
Norway	26:10:1970	ratified
Panama	19:06:1970	ratified
Poland	15:03:1993	ratified
Portugal	03:08:1967	ratified
Romania	20:09:1976	ratified
Russian Federation	04:11:1969	denounced on 26:02:2010
Saint Lucia	14:05:1980	ratified
Saint Vincent and the Grenadines	21:10:1998	ratified
Seychelles	06:02:1978	ratified
Slovenia	30:01:2003	ratified
Solomon Islands	06:08:1985	ratified
Spain	05:05:1971	ratified
Sri Lanka	24:11:1995	ratified
Sweden	26:10:1970	ratified
Tajikistan	26:11:1993	ratified
Tanzania Tanganyika	26:11:1962	ratified
Tunisia	26:10:1959	ratified
Turkey	07:02:2005	ratified
Ukraine	17:06:1970	ratified
United Kingdom	18:02:1964	ratified
Uruguay	28:06:1973	ratified

2.2 Content and Form of the Seafarer's Identity Document

A significant issue with the seafarers' identity documents issued under ILO Convention No. 108 was that the convention had no detailed specifications for the content and form of the SID, except that it had to contain the following basic information:

(a) name and title of the issuing authority

(b) date and place of issue

(c) statement that the document is a seafarer's identity document for the purpose of this Convention

(d) full name of the seafarer

(e) date and place of birth of the seafarer

(f) nationality of the seafarer

(g) identifying physical characteristics of the seafarer

(h) photograph of the seafarer

(i) signature of the seafarer or, if unable to sign, a thumbprint

The SID could be combined with a passport or issued as a separate identity document and could even be issued to foreign nationals serving as seafarers on board vessels registered in a particular country. Many different types and styles of documents were issued under Convention No. 108, making it very difficult for authorities at borders and at port authorities to determine if a particular SID was a legitimate document. There were also no specific requirements relating to security features and no means to link the seafarer to their document, except for visual comparison of a photograph, which was easy to substitute in a document with minimal or no security features.

A key requirement of Convention No. 108 was therefore to ensure that all SIDs had a harmonized content and form, allowing them to be easily recognized by border and port authorities, and that they should have some minimum mandatory security features.

In order to facilitate interoperability with existing border control infrastructure, cooperation was sought from ICAO, as described earlier in this document. Based on this advice and on input from all the tripartite constituents, it was agreed that the new SID should be fully compatible with travel documents as defined in ICAO Document 9303. This would provide a consistent format to enable the documents to be recognized and to make them easier to authenticate as well as compatibility with the existing machine readable document readers deployed already deployed at borders. This is described in Annex I of Convention No. 185 which includes the detailed specifications of the data to be contained in an SID and includes the following requirement:

> *The materials used, dimensions and placement of data shall conform to the International Civil Aviation Organization (ICAO) specifications as contained in Document 9303 Part 3 (2nd edition, 2002) or Document 9303 Part 1 (5th edition, 2003).*

The most up to date versions of ICAO Document 9303 Part 1 and Part 3 that were available in 2003 were referenced in the text of the Convention. Both parts were required because different governments wanted

to issue the new SID as either a credit card sized identity document or as a larger full passport page sized document, and it was therefore necessary to include both parts of ICAO Document 9303 in order to support the card layout and machine readable zone for both sizes of SID.

Another important improvement made by defining the content and form of the Seafarers' Identity Document was that it allowed the data provided on the SID to be constrained. This was intended to eliminate the difficulties caused in authenticating an SID when it could be provided as a stand alone document, as part of a seafarers' passport or even combined with medical information or job qualifications as part of a "seaman's book". This is why Annex I also contains the following statement:

Data to be entered on the data page(s) of the seafarers' identity document shall be restricted to:

I. Issuing authority:

II. Telephone number(s), email and web site of the authority:

III. Date and place of issue:

------ Digital or original photograph of seafarer ---------

(a) Full name of seafarer:

(b) Sex:

(c) Date and place of birth:

(d) Nationality:

(e) Any special physical characteristics of seafarer that may assist identification:

(f) Signature:

(g) Date of expiry:

(h) Type or designation of document:

(i) Unique document number:

(j) Personal identification number (optional):

(k) Biometric template based on a fingerprint printed as numbers in a bar code conforming to a standard to be developed:

(l) A machine-readable zone conforming to ICAO specifications in Document 9303 specified above.

IV. Official seal or stamp of the issuing authority.

Finally, it was important to ensure that governments actually applied some physical security features to the document to make it resistant to forgery and easier to authenticate. Since it was considered inappropriate for Convention No. 185 to give precise examples of the required security features in a

publicly accessible document, there are instead a set of mandatory requirements which should ensure that there is a minimum level of security and, of course, governments are encouraged to go beyond this. Specifically, the text of Convention No. 185 includes the following requirements:

> *The seafarers' identity document shall be designed in a simple manner, be made of durable material, with special regard to conditions at sea and be machine-readable. The materials used shall:*
>
> *(a) prevent tampering with the document or falsification, as far as possible, and enable easy detection of alterations; and*
>
> *(b) be generally accessible to governments at the lowest cost consistent with reliably achieving the purpose set out in (a) above.*
>
> *The seafarers' identity document, whose form and content are set out below, shall consist of good-quality materials which, as far as practicable, having regard to considerations such as cost, are not easily accessible to the general public.*
>
> *The data page(s) of the document indicated in bold below shall be protected by a laminate or overlay, or by applying an imaging technology and substrate material that provide an equivalent resistance to substitution of the portrait and other biographical data.*
>
> *Other security features shall include at least one of the following features:*
>
> *Watermarks, ultraviolet security features, use of special inks, special colour designs, perforated images, holograms, laser engraving, micro-printing, and heat-sealed lamination.*

2.3 Biometric Data to Verify Seafarers

One very important goal of Convention No. 185 was to improve security by making it possible to reliably verify that the bearer of the SID was the same seafarer to whom the document was issued. Since the SID grants its bearer a visa waiver for purposes of shore leave and gives them a legitimate reason to access secure port facilities when boarding or debarking their vessel, it is vital to ensure that they are not an imposter. To support this goal, the SID is required to contain a biometric to allow for seafarer verification. Section 8 of Article 3 of Convention No. 185 describes the specific requirements for the biometric, as listed below:

> *8. Notwithstanding paragraph 7 above, a template or other representation of a biometric of the holder which meets the specification provided for in Annex I shall also be required for inclusion in the seafarers' identity document, provided that the following preconditions are satisfied:*
>
> *(a) the biometric can be captured without any invasion of privacy of the persons concerned, discomfort to them, risk to their health or offence against their dignity;*
>
> *(b) the biometric shall itself be visible on the document and it shall not be possible to reconstitute it from the template or other representation;*
>
> *(c) the equipment needed for the provision and verification of the biometric is user-friendly and is generally accessible to governments at low cost;*

(d) the equipment for the verification of the biometric can be conveniently and reliably operated in ports and in other places, including on board ship, where verification of identity is normally carried out by the competent authorities; and

(e) the system in which the biometric is to be used (including the equipment, technologies and procedures for use) provides results that are uniform and reliable for the authentication of identity.

The most difficult technical requirements to satisfy are (b), (d) and (e). Requirement (b) eliminates image based biometrics yet also requires that the template itself somehow be visible on the document. This is why a two dimensional barcode was selected as the storage medium for the biometric template, since it produces a template which is visible, even if it is not easily decipherable by the human eye. Requirement (b) also mandated that it should not be possible to reconstitute the full biometric characteristic from the template or other representation. Fingerprint minutiae templates satisfy this requirement because they cannot be used to generate the original fingerprint image, only a simulated image which will match at certain minutiae points but will be clearly distinguishable from the original fingerprint image by any fingerprint expert. Iris templates could also have been used, but iris recognition technology was not considered convenient and affordable enough to satisfy requirements (c) and (d).

In order to ensure that (d) could be satisfied, the ILO conducted a six week trial of various fingerprint technologies on board a ship. Most of the sensors and algorithms tested were able to satisfy requirement (d), but requirement (e) proved to be more difficult, especially when the systems were used interoperably, with fingerprint templates generated by one system being verified by another. This is why the ILO decided to create a list of products found to be compliant, supported by an ongoing series of biometric interoperability tests, as described in Section 1.3 of this document. Thanks to these tests and the subsequent improvements made to the text of the standard ISO/IEC 19794-2 and to the text of the document ILO SID-0002, interoperable performance has become uniform and reliable provided that only biometric products listed in the compliant products list are used.

When preparing ILO SID-0002, the ILO had to consider not only what supplementary information to provide to support the implementation of the draft standard ISO/IEC 19794-2, but also how to define the specific data format to be encoded on the two dimensional barcode. The ISO standard provided details on how to encode the positions of individual fingerprint minutiae, but the encoding for all of the header information and supplementary data such as the demographic information contained on the SID had to be developed. There were also issues with the amount of information which could be contained in the two dimensional barcode, as the symbol density which can be easily printed with lower cost printers and read with lower cost readers limits the total information printable in the area allocated to barcodes in ICAO Document 9303 Part 3 (2nd edition, 2002) and Document 9303 Part 1 (5th edition, 2003). Based on advice from ISO/IEC JTC-1 SC 31 and on some practical experiments, the maximum reasonable amount of data appeared to be no more than six to seven hundred bytes.

Due to this data limitation, the data format defined in ILO SID-0002 was carefully constructed to use the minimum amount of extraneous information and to limit the size of the fingerprint data. Since the primary purpose of the biometric template was to allow verification of the seafarer, a single fingerprint should be sufficient, but since there needs to be a backup in case a finger is cut or damaged, two fingerprint minutiae templates were to be included in the data format. To accommodate this within the limited space available, the number of minutiae recorded for each finger was limited to a maximum of fifty-two. A particular process for fingerprint enrolment was defined to try and obtain consistency in which fingerprints were enrolled and encoded on the SID. The normal default was to encode the left and right index fingers, so that one finger from each hand was included. The process also included a specific order of alternate fingerprints to use if one or both of the default fingerprints could not be enrolled, as well as a

method of encoding the data when no fingerprints or only one fingerprint could be enrolled even after all ten fingerprints had been tried. This is a highly unusual exception, but was observed to occur for one seafarer when the six week trial was conducted on board a ship, so the data format and enrolment process needed to support this.

ILO SID-0002 also included a detailed verification process. This was considered necessary to ensure that authorities had instructions on how to conduct fingerprint verification and to ensure that the performance and interoperability testing of products could be conducted with specific processes that would match the enrolment and verification processes to be used in normal operations.

After significant effort in developing all of the information to supplement and add to the base ISO standards, ILO has conducted extensive testing using the specific enrolment and verification processes defined in ILO SID-0002. This has clearly shown that the two fingerprint minutiae record encoded in a two dimensional barcode as defined in ILO SID-0002 can be used to reliably and accurately verify seafarers in normal operational environments.

In order to formalize all of the knowledge that was gained during the interoperability testing and in the collaboration between ILO and ISO/IEC JTC-1 SC 37, it was agreed that ISO should develop a new standard on "Biometric Verification and Identification of Seafarers". This standard was to profile the final and amended version of ISO/IEC 19794-2 and other relevant standards and to explain how to use them in proper context for the biometric verification and identification of seafarers bearing SIDs issued under ILO Convention No. 185. This standard was developed over a period of five years by SC 37 and was finally published as ISO/IEC 24713-3:2009. It contained technical updates due to the changes in some of the base standards and their amendments and also offered some potential technical improvements based on new developments in some other standards such as the Common Biometric Exchange Formats Framework (CBEFF). At a special tripartite meeting in Geneva in September, 2010 the majority of participants agreed with almost all of the technical recommendations of this standard. Subsequently, the ILO Governing Body at its 309th Session in November, 2010 instructed the International Labour office to follow up with the recommendations of that special tripartite meeting. This indicates that changes can be made by the ILO, if there is a clear benefit to seafarers and if the security and reliability of the SID and the biometric data it contains is enhanced.

2.4 Measures to Ensure a Reliable and Secure Document Issuance System

One of the most important changes from Convention No. 108 to Convention No. 185 was a large number of requirements included specifically to ensure that the document issuance system used to create SIDs was both reliable and secure so that SIDs issued under Convention No. 185 can be treated as trusted documents when they are presented by seafarers. This includes the national electronic database and focal point defined in Article 4 of the Convention and the quality control of the issuance process and procedures defined in Article 5 of the Convention. It is remarkable to consider that slightly more than half of the entire text and Annexes of Convention No. 185 are dedicated to this single issue of quality control. It reflects the importance assigned to ensuring a reliable and secure document issuance system when Convention No. 185 was being developed.

2.4.1 Electronic Database and National Focal Point

Article 4 of Convention No. 185 requires each ILO Member State which issues SIDs under the Convention to create a national electronic database containing the records of each SID which it has issued, suspended or withdrawn. This is not the standard database which is part of all modern document issuance systems, but is a separate database which contains only specific data and is to be used in responding to enquiries from immigration and other competent authorities of all ILO Members (not just

those which have ratified Convention No. 185). The database is to contain only the following information, as defined in Annex II of the Convention.

Section 1

1. *Issuing authority named on the identity document.*

2. *Full name of seafarer as written on the identity document.*

3. *Unique document number of the identity document.*

4. *Date of expiry or suspension or withdrawal of the identity document.*

Section 2

5. *Biometric template appearing on the identity document.*

6. *Photograph.*

7. *Details of all inquiries made concerning the seafarers' identity document.*

Paragraph 4 of Article 4 then goes on to state:

> *Each Member shall designate a permanent focal point for responding to inquiries, from the immigration or other competent authorities of all Members of the Organization, concerning the authenticity and validity of the seafarers' identity document issued by its authority. Details of the permanent focal point shall be communicated to the International Labour Office, and the Office shall maintain a list which shall be communicated to all Members of the Organization.*

Now that a sufficient number of ratifications of Convention No. 185 has been achieved, the International Labour Office is in the process of gathering the information on each ratifying Members' focal point so that the list mentioned above can be created and communicated to all ILO Members.

Article 4 requires that all of the information stored in the national electronic database be at all times available immediately to immigration and other competent authorities in all ILO Members. This can be done either through an automated electronic system or a manual process using the focal point of the issuing Member. The Convention also requires that appropriate data protection and privacy standards are adhered to and that the information should not be exchanged for any purpose other than the verification of the SID.

This system effectively makes a subset of data from the issuing authority available to authenticate documents and the bearers of those documents. If a document has been forged then it will not have a corresponding entry in the national electronic database. If it is a legitimate document but with altered data, then this will be obvious when the data from the national electronic database is checked. If the document has expired or been withdrawn, this will also be obvious as soon as the national electronic database is queried. Of course, the process of contacting an individual focal point or using an electronic method to check data from a specific issuing state is not something that can be conveniently undertaken for every SID which is seen at a port or border crossing, but it is an excellent tool when reason for suspicion exists and should be incorporated into secondary processing for seafarers carrying an SID.

Ultimately the International Labour Office is seeking to develop a single electronic point of contact to be made available in the form of a global focal point coordination centre. This would eliminate the complexity of trying to contact different focal points for different seafarers and would allow a single automated check on the validity of every SID seen at a port or border authority.

2.4.2 Issuance Processes and Procedures

Being able to verify that an individual is actually the seafarer to whom an SID was legitimately issued (using the fingerprint biometric) and being able to verify that an SID is valid and had not been lost or stolen or had data altered since it was issued (using the national electronic database and the focal point) are both very important requirements for a secure and reliable document issuance system. There is one other key area which needs to be protected, however, and that is the issuance process itself. Every effort must be expended to ensure that documents are issued properly and only to legitimate seafarers who are entitled to an SID.

Convention No. 185 introduced several requirements to ensure that the issuance processes and procedures could be trusted. One significant improvement over Convention No. 108 was to restrict the issuance of SIDs by each Member State to only its own nationals or permanent residents. This was intended to improve the quality of identity proofing conducted as part of the issuance process and to eliminate the practice of flag states issuing SIDs for all of the crew serving on board vessels registered with the shipping registry in that state. This issue is dealt with in Article 2 of Convention No. 185.

Article 5 of the Convention goes into more detail with respect to specific requirements for issuance processes and procedures (explicitly defined in Annex III of the Convention) and the quality controls required to ensure that these processes and procedures are properly carried out by each issuance authority. Attachment B to this document contains the full text of Convention No. 185, which includes the mandatory issuance process requirements in Article 5 and Annex III, but a short summary of the highlights is given in the list below.

1. All materials used in production must be protected and controlled, with secure transport from the producer to the issuing authority.

2. Blank SIDs must be protected, controlled, identified and tracked during the production and delivery processes.

3. Completed and voided SIDs, including those used as specimens, must be protected, controlled, identified and tracked.

4. All personnel involved with the issuance process must meet standards of reliability, trustworthiness and loyalty required by their positions.

5. The division of responsibilities among authorized officials is designed to prevent the issuance of unauthorized SIDs (i.e. split responsibility in the issuance process).

6. An SID may only be issued when the applicant has provided proof of identity, proof of residency and proof that they are a seafarer.

7. All applicants must be checked to ensure that they do not already possess an SID and to ensure they do not present any threat to national security.

8. The data, including photograph, signature and biometric information, gathered from the applicant correspond to the applicant and are linked to that application throughout the issuance and delivery of the SID.

9. The national electronic database must be updated promptly when an SID is suspended or withdrawn.

10. The national electronic database must be secure, protected against information loss, and separate from any other databases. The information it contains must be available at all times for query through the national focal point.

11. Processes and procedures are in place to ensure the necessary security through the quality control of procedures and periodic evaluations, including the monitoring of processes, to ensure that required performance standards are me.

12. Periodic reviews are carried out to ensure the reliability of the issuance system and of the procedures and their conformity with the requirements of Convention No. 185.

More details are provided in the recommended procedures and practices in Part B of Annex III, but these mandatory requirements alone provide for many of the best practices in document issuance and certainly ensure that the issuance system meets reasonable standards of security and reliability. Unlike other document issuance systems where governments are free to adapt policies and procedures depending on their local practice, Convention No. 185, in this mandatory part of Annex III, gives these key requirements for a secure document issuance system the force of international law and of national law in those countries which have ratified the Convention. Requirements 11 and 12 are particularly novel, in that they force each issuing state to have quality control procedures in place for their document issuance system and to conduct periodic reviews to ensure that all necessary requirements are being fulfilled. This is a significant step and was one of the key requirements that was pushed for by certain governments during the drafting of the Convention, as being one of the best ways of ensuring a reliable international system of issuing documents.

2.4.3 Independent Audits and System of International Oversight

The final, and perhaps the most critical, element in ensuring that the SIDs issued under Convention No. 185 can be trusted by border and port authorities when they are presented by seafarers, is provided for in paragraphs 4 to 9 of the relevant article of Convention No. 185, namely Article 5, which reads as follows:

1. Minimum requirements concerning processes and procedures for the issue of seafarers' identity documents, including quality-control procedures, are set out in Annex III to this Convention. These minimum requirements establish mandatory results that must be achieved by each Member in the administration of its system for issuance of seafarers' identity documents

2. Processes and procedures shall be in place to ensure the necessary security for:

(a) the production and delivery of blank seafarers' identity documents;

(b) the custody, handling and accountability for blank and completed seafarers' identity documents;

(c) the processing of applications, the completion of the blank seafarers' identity documents into personalized seafarers' identity documents by the authority and unit responsible for issuing them and the delivery of the seafarers' identity documents;

(d) the operation and maintenance of the database; and

(e) the quality control of procedures and periodic evaluations.

3. Subject to paragraph 2 above, Annex III may be amended in the manner provided for in Article 8, taking account of the need to give Members sufficient time to make any necessary revisions to their processes and procedures.

4. Each Member shall carry out an independent evaluation of the administration of its system for issuing seafarers' identity documents, including quality-control procedures, at least every five years. Reports on such evaluations, subject to the removal of any confidential material, shall be provided to the Director-General of the International Labour Office with a copy to the representative organizations of shipowners and seafarers in the Member concerned. This reporting requirement shall be without prejudice to the obligations of Members under article 22 of the Constitution of the International Labour Organisation.

5. The International Labour Office shall make these evaluation reports available to Members. Any disclosure, other than those authorized by this Convention, shall require the consent of the reporting Member.

6. The Governing Body of the International Labour Office, acting on the basis of all relevant information in accordance with arrangements made by it, shall approve a list of Members which fully meet the minimum requirements referred to in paragraph 1 above.

7. The list must be available to Members of the Organization at all times and be updated as appropriate information is received. In particular, Members shall be promptly notified where the inclusion of any Member on the list is contested on solid grounds in the framework of the procedures referred to in paragraph 8.

8. In accordance with procedures established by the Governing Body, provision shall be made for Members which have been or may be excluded from the list, as well as interested governments of ratifying Members and representative shipowners' and seafarers' organizations, to make their views known to the Governing Body, in accordance with the arrangements referred to above and to have any disagreements fairly and impartially settled in a timely manner.

9. The recognition of seafarers' identity documents issued by a Member is subject to its compliance with the minimum requirements referred to in paragraph 1 above.

The practical outcome of this reporting requirement is that every ILO Member which has ratified Convention No. 185 needs to have an independent evaluation of its SID issuance system conducted at least every five years. The report of the independent evaluator is then submitted to the International Labour Office, which will make it available to other ratifying Members. Based on the independent evaluator’s report, the Governing Body of the ILO takes a decision on whether or not to include the Member on a list of ratifying Members which fully meet the requirements of Annex III. This list must be available all Members of the ILO and not just to the ratifying Members. There is also a method for other ratifying Members to dispute the inclusion of a particular Member on the list and there is a process for dispute resolution and appeals. This means that if a particular ratifying country does not have an SID

issuance system which is secure and reliable, as defined in Annex III, then they will not be included in the list of Members which fully meet the requirements. In accordance with Paragraph 9 of Article 5, their SIDs are not then required to be recognized by any other Member. Similarly, if cases of fraudulent issuance are detected or some Member is found to be a source of fraudulent seafarers, then any other Member can bring this before the Governing Body and have the Member removed from the list because their system is no longer considered to be in compliance with the requirements. This creates a system of independent international review of the issuance system of each state producing SIDs under Convention No. 185 and is, as far as is currently known, a unique aspect of the security of the issuance process for this document.

The specific processes and procedures to create the list of Members which fully meet the minimum requirements are set out in the Arrangements reproduced in Attachment D to this document and it explains how the tripartite bodies for review of the evaluation reports will work with a view to making recommendations concerning the inclusion of Members in the list, as well as appeals by ratifying Members against their exclusion from the list or against the inclusion of another Member on it. Since there are now a sufficient number of countries which have ratified Convention No. 185, the International Labour Office is currently appointing the members of these review bodies in preparation for the production of the first version of the list.

3. FUTURE DEVELOPMENTS AND POTENTIAL AREAS OF COOPERATION

Although there are significant enhancements which have been incorporated into the SIDs and the issuance processes and procedures required in ILO Convention No. 185, there remain three areas where the ILO believes that cooperation with ICAO could further enhance the reliability and acceptability of Seafarers Identity Documents. These are primarily related to the changes that have taken place since 2003 and which now are contained in ICAO Document 9303 Part 1 (6th edition, 2006) and Document 9303 Part 3 (3rd edition, 2008).

3.1 Clarification that the SID is not a travel document

In Section IV of ICAO Document 9303 Part 1 Volume 1 (6th edition, 2006) there is a note m) on page IV-18 which reads:

> *In documents other than passports, e.g. United Nations laissez passer, seafarer's identity document or refugee travel document, the official title of the document shall be indicated instead of "Passport". However, the first character of the document code should be P.*

In Section V of ICAO Document 9303 Part 3 Volume 1 (3rd edition, 2008) there is a note k) on page V-10 which reads:

> *The first character shall be A, C or I. The second character shall be at the discretion of the issuing State or organization except that V shall not be used, and C shall not be used after A except in the crew member certificate. The designation 'IP' shall be used for a passport card.*

This is confusing for organizations issuing SIDs under Convention No. 185 as some of them use a credit card sized document with the three line MRZ defined in ICAO Document 9303 Part 3 and some use a passport page sized document using the two line MRZ defined in ICAO Document 9303 Part 1. This results in some SIDs having P as the first letter in the MRZ and some having I. It is particularly confusing in the case of the larger sized SIDs which have a P as the first character in the MRZ because most document readers assume that this represents a passport data page.

The ILO has very deliberately tried to avoid any confusion between a SID, which is an identity document indicating that its bearer is a seafarer and thus entitled to certain privileges guaranteed to seafarers under international law, and a passport, which is a travel document that is used for determining identity and nationality at borders, but does not necessarily convey specific privileges to the bearer. In fact, in many cases an SID will be used in conjunction with a passport. This is why Convention No. 185 specifically requires that every SID contain the following statement in the visible zone:

(a) this document is a seafarers' identity document for the purpose of the Seafarers' Identity Documents Convention (Revised), 2003, of the International Labour Organization; and

(b) this document is a stand-alone document and not a passport.

It would help to resolve any remaining confusion in this area if ICAO would consider modifying the text of both ICAO Document 9303 Part 1 and Part 3 to include a note which is consistent in its treatment of the SID. A suggested text for a note in the appropriate place in both documents might be as follows:

The ILO Seafarers' Identity Document shall have I as the first character and S as the second character.

This would provide harmonization between Parts 1 and 3 and help to avoid any confusion that the SID is intended to be used as a passport, which was the case for some SIDs under the previous Convention No. 108 but is not in line with the purpose of Convention No. 185. The International Labour Office now seeks the opinions of those present at the ICAO TAG / MRTD meeting on whether or not they agree that this change would help to avoid confusion and would be willing to effect such a change in ICAO Document 9303.

3.2 Addition of Digital Signatures and the ICAO PKD

One potential security feature that was considered as part of Convention No. 185, but which was determined to be too difficult to properly implement at the time, was the inclusion of a digital signature to allow the contents of the two dimensional barcode to be properly authenticated. The advantages of using digital signatures for authenticating data are quite significant, which is why ICAO has made it mandatory for all ePassports. Unlike physical security features, the difficulty of breaking the security and forging the signature can be determined mathematically. Also, automated authentication can be quite simple with the use of a well designed public key infrastructure. ILO faced two problems, however, which prevented this feature from being implemented as part of the original design of the two dimensional barcode data structure defined in ILO SID-0002. The first was the extremely limited space available in the barcode, making it difficult to include a properly encoded digital signature block along with the biometric data as part of a standards compliant Common Biometric Exchange File Format (CBEFF) structure. The second was the difficulty of setting up an appropriate key management and exchange system to ensure the secure exchange of certificates to allow the digital signatures to be verified.

During the process of developing ISO/IEC 24713-3:2009, ISO also realized that using a digital signature would add significantly to the security of the SID. They were able to develop an extremely compact CBEFF Patron Format which is officially designated under its ASN.1 object identifier {iso registration-authority cbeff(19785) biometric-organization(0) jtc1-sc37(257) patron-format(1) sid(9)}. This includes a CBEFF security block which uses the SHA-256 algorithm for hashing and the ECDSA algorithm for signing but results in a total CBEFF data object which is only 79 bytes larger than the Biometric Data Block itself. By eliminating most of the demographic information currently duplicated from the MRZ into the two dimensional barcode, it is possible to support a digitally signed BDB consisting of a two finger

minutiae template within the same number of bytes used in the current SID. This resolves the problem of insufficient space in the two dimensional barcode.

The existence of the ICAO PKD may be the solution to the second issue. It appears that ECDSA and SHA-256 are supported algorithms within ICAO Document 9303 Part 1 Volume 2 (6th edition, 2006) and within ICAO Document 9303 Part 3 Volume 2 (3rd edition, 2008). It therefore appears that exchange of the public keys required to verify the digital signature on an SID could be supported through the ICAO PKD. Since many of the places where SIDs need to be verified are at border points where the document readers are already receiving updates from the ICAO PKD, this would also streamline the efficiency of key distribution. If the ILO was to update Convention No. 185 to include a requirement for a digital signature and if ILO Members which had ratified Convention No. 185 were to use the ICAO PKD for key distribution, it would provide a new source of organizations seeking to use the PKD and thus share costs. It would also help to expand the types of documents supported by the ICAO PKD. It appears that this would benefit both ILO and ICAO.

Of course the ILO does not have technical experts with sufficient familiarity with the ICAO PKD to provide complete certainty that the hashing and digital signatures defined in ISO/IEC 24713-3:2009 are fully compliant with the current architecture of the ICAO PKD. ILO would therefore request that the ICAO TAG / MRTD review the CBEFF patron format defined below, which is copied from ISO/IEC 24713-3:2009 and determine whether or not the exchange of keys to verify the digitally signed hash could be supported by the ICAO PKD.

CBEFF patron format for the SID

B.1 Patron

ISO/IEC JTC 1/SC 37

B.2 Patron identifier

257 (0101Hex). This has been allocated by the Registration Authority for ISO/IEC 19785-2.

B.3 Patron format name

ISO/IEC JTC 1/SC 37 Patron format for Seafarers Identity Document

B.4 Patron format identifier

9 (0009 Hex). This has been registered in accordance with ISO/IEC 19785-2.

B.5 ASN.1 object identifier for this patron format

{iso registration-authority cbeff(19785) biometric-organization(0) jtc1-sc37(257) patron-format(1) sid(9)}

or, in XML value notation,

1.1.19785.0.257.1.9

B.6 Domain of use

This Annex contains the definition of a minimum patron format for simple BIR structures that has been designed for use with seafarers' identity documents, but may be of general utility in domains of use that wish to minimise the overhead of the SBH in order to reduce storage or transfer bandwidth and processing costs at the expense of information content, that are able to accept some loss of byte alignment, and that need to support INTEGRITY with no ENCRYPTION. A suitable CBEFF Security Block is defined in Annex C.

B.7 Version identifier

This patron format specification has a version identifier of (major 0, minor 0).

B.8 CBEFF version

This specification conforms to CBEFF version (major 2, minor 0).

B.9 General

This clause defines a minimum conforming patron format. The formal specification of this Patron Format is provided using the ASN.1 notation (see ISO/IEC 8824-1) together with the specification of the ASN.1 Packed Encoding Rules (ISO/IEC 8825-2).

The Patron format for seafarers' identity documents is formally defined as the ASN.1 PER-unaligned encoding rules applied to the SID-format type specified in B.10.1

An example of the encoding produced by an assignment of abstract values for this patron format, showing the size and encoding of each field of the SBH, is given in table B.1. The size of the SBH is three bytes if

a) the BDB format is standardized by SC 37, with a format type value less than 64; and

b) the BDB length is less than 2048 bytes.

The size can be greater if these constraints are not satisfied.

NOTE The data format selected for use in the two dimensional barcodes in SIDs and described in this standard ensures that these constraints are satisfied.

Table B.1— SID Patron format SBH (3 bytes)

Format owner is SC 37?	Format type is <64?	Format type value	Reserved	Length of BDB is less than 2048 bytes?	Length of BDB

one bit set to zero if Format owner is SC 37	one bit set to zero if Format type is less than 64	6 bits will be longer if format type is 64 or greater (which is not possible in this version of the profile)	4 bits pads the SBH to exactly 3 bytes for this version of the profile	one bit set to zero if the BDB Length is less than 2048 bytes	11 bits will be longer if BDB Length is 2048 bytes or greater (which is not possible in this version of the profile)

B.10 Bit oriented patron format specification and conformance statement

The detailed specification of the patron format and the list of mandatory and optional data elements are described in the following clauses.

B.10.1 Specification

The following notation is specified in ISO/IEC 8824-1. The data type shall be encoded in accordance with the UNALIGNED version of BASIC-PER (see ISO/IEC 8825-1).

```
CBEFF-SID-PATRON-FORMAT {iso standard 24713 sid (3) modules(0) patron-format(0)}
        -- This module is 1.0.24713.3.0.0 for entry into the module database
DEFINITIONS
AUTOMATIC TAGS ::=
BEGIN

IMPORTS SID-Security-Block FROM SID-SECURITY-BLOCK {iso standard 24713  sid (3)
modules(0) security-block(1)};

SID-format ::= SEQUENCE {
      /* This patron format contains only mandatory data elements and uses bit-
      level encoding for optimal use of encoding space.*/
      /* This patron format supports only the abstract values NO ENCRYPTION and
      INTEGRITY, which are encoded as zero length fields.*/
      /* This patron format supports only the security block
         {iso registration-authority cbeff(19785) biometric-organization(0) jtc1-
      sc37(257) SB-formats(2) sid(3)} specified in Annex C*/

      bdb-format  SEQUENCE {
                        owner       INTEGER (0..65535) DEFAULT 257,
                              -- 257 is the biometric organization identifier of
      ISO/IEC JTC 1/SC 37.  Encodes in 1 bit if 257.
                        type        INTEGER (0..63, ..., 64..65535)},
                              -- Encodes in 7 bits for CBEFF identifiers less than
      64.

      reserved    BIT STRING (SIZE (4))('0000'B),
                              -- Encodes in 4 bits, all set to zero in this
version

      sb-format  SEQUENCE {
                        owner       INTEGER (257)       /* Null encoding*/,
                        type        INTEGER (3)  /*Null encoding*/ },
```

```
        bdb         OCTET STRING (SIZE(0..2047, ..., 2048 .. MAX)),
                                -- Encodes in 12 bits plus the length of the BDB
        sb          SID-Security-Block }

END
```

B.11 Patron format conformance statement

The following tables provide the list of mandatory elements for this patron format.

B.11.1 Identifying information

Required Information	Patron format reference
Patron name	See B.1
Patron identifier	See B.2
Patron format name	See B.3
Patron format identifier	See B.4
Patron format ASN.1 object identifier	See B.5
Domain of use description	See B.6
Patron format version	See B.7
CBEFF version	See B.8

B.11.2 CBEFF-defined data elements and abstract values

CBEFF data element name	Mandatory/ optional	Patron format field name	Abstract values specified?	Encodings specified?
CBEFF_BDB_format_owner	Mandatory	owner	Yes	Yes
CBEFF_BDB_format_type	Mandatory	type	Yes	Yes
CBEFF_BDB_encryption_options	Mandatory	zero length field	Yes	Yes
CBEFF_BIR_integrity_options	Mandatory	zero length field	Yes	Yes
CBEFF_SB_format_owner	Mandatory	zero length field	Yes	Yes
CBEFF_SB_format_type	Mandatory	zero length field	Yes	Yes

B.11.3 Patron defined data elements and abstract values

Patron format data element name	Mandatory/ optional	Patron format field name	Abstract values specified?	Encodings specified?
None	n/a	n/a	n/a	n/a

CBEFF security block for the SID

C.1 Introduction

This Security Block (SB) is designed for use in a Seafarers' Identity Document, but it could be more widely used for other documents with limited storage for biometric data. It provides integrity and source

authentication by implementing digital signatures. It accomplishes a minimal size by making use of the Elliptic Curve Digital Signature Standard (ECDSA) and a binary encoding of the resulting signature and an algorithm identifier. It specifies the algorithm identifiers and encoding rules for ECDSA digital signatures when using SHA-256 as the hashing algorithm. The reference documents for these algorithms are the draft Federal Information Processing Standard (FIPS) "Draft Secure Hash Standard" [1], the draft FIPS "Draft Digital Signature Standard" [2], and X9.62-2005, "Public Key Cryptography for the Financial Services Industry: The Elliptic Curve Digital Signature Standard (ECDSA)" [8]. The SB contains:

(a) the three character country code (see ISO/IEC 7501-1) of the issuing authority for the card, encoded in ASCII (3 bytes);

(b) a nine digit identification encoding the document number which is unique among all documents issued by the SID issuing authority for that country, encoded in ASCII (9 bytes);

NOTE The combination of items a) and b) forms a globally unique document identity number for a particular SID which can be used to look up, using secure out-of-band mechanisms, all the parameters, particularly the public key of the issuing authority that was used to create a particular SID, needed to validate the digital signature contained in the Security Block. The details of these out-of-band mechanisms are not in the Scope of this part of ISO/IEC 24713, and will be determined by individual bilateral agreements between verification authorities and SID issuing authorities or between verification, authorities, issuing authorities and a central focal point coordination centre controlled by the ILO as described in Clause 6.8.3. It is expected that this information will be obtained regularly, and will be cached as necessary for offline verification of SIDs.

(c) the digital signature (64 bytes)

Signature algorithms are always used in conjunction with a one-way hash function. In this security block, the CBEFF BIR to be signed (the SBH and the BDB), is processed by the SHA-256 hash function, creating an output value of length 256 bits (32 bytes). This output value is then formatted for signing by the ECDSA algorithm. When signing, the ECDSA algorithm generates two values commonly referred to as r and s. To create a signature value, they are concatenated as follows:

signature = r, s

This binary signature value becomes the Signature Field.

Each of the components of the signature (r and s) are equal in size to the key length (32 bytes or 256 bits).

Thus: SHA-256 with elliptic key encoding with a key length of 256 bits gives a hash size of 32 bytes and a signature size of 64 bytes.

More detail on how digital signatures are generated can be found in [2].

C.2 SB owner

ISO/IEC JTC 1/SC 37

C.3 SB owner identifier

257 (0101Hex). This has been allocated by the Registration Authority for ISO/IEC 19785-2.

C.4 SB format name

ISO/IEC JTC 1/SC 37 security block format for Seafarers Identity Document

C.5 SB format identifier

3 (0003 Hex). This has been registered in accordance with ISO/IEC 19785-2.

C.6 ASN.1 object identifier for this SB format

{iso registration-authority cbeff(19785) biometric-organization(0) jtc1-sc37(257) sb-format(1) sid(3)}

or, in XML value notation,

1.1.19785.0.257.1.3

C.7 Version identifier

This security block format specification has a version identifier of (major 0, minor 0).

C.8 SB specification

```
SID-SECURITY-BLOCK {iso standard 24713  sid (3) modules(0) security-block(1)}
-- This module is 24713.3.0.1 for entry into the module database
DEFINITIONS
AUTOMATIC TAGS ::=
BEGIN

SID-Security-Block ::= SEQUENCE {
      sid-issuing-authority  IA5String (SIZE(3)),
                             -- This is the ISO/IEC 7501-1 3-digit Country Code
      of the issuing authority
      unique-document-number IA5String (SIZE(9)),
                             -- Unique for this issuing authority.  Used to
      determine security algorithm parameters by out-of-band means
      signature-r            OCTET STRING (SIZE(32)) ,
      signature-s            OCTET STRING (SIZE(32))
                             -- The content of the signature is specified in C.1
      -- }
      END
```

C.9 Size of the SB encoding

sid-issuing-authority	3 bytes
unique-document-number	9 bytes
signature-r	32 bytes
signature-s	32 bytes

The total is 76 bytes

Note that the sid-issuing-authority and unique-document-number.are needed to recover the public key of the issuing authority for that particular SID or, more typically, for a series of SIDs that includes the SID currently being verified.

3.3 SID with a Contactless CHIP

It is unfortunate that the timing of the development and adoption of Convention No. 185 was slightly ahead of the changes made to ICAO Document 9303 to support the development of ePassports and so the technology paths taken by the two sets of documents have been different. It would certainly help with interoperability at the border crossings and ports where both eMRTDs and SIDs are seen if they were both able to be verified using the same infrastructure. Requiring that SIDs issued under Convention No. 185 be machine readable documents with an MRZ that followed the latest version of Document 9303 Part 1 or Part 3 which was available at the time Convention No. 185 was adopted was intended to ensure interoperability and ease of use of SIDs at border crossing points. It certainly helps, since any MRZ reader can read and interpret the MRZ on an SID which is compliant to ILO Convention No. 185, but there are still difficulties. If the ILO adds a digital signature to the SID and if ICAO agrees to let the ICAO PKD be used for both types of documents, this would be a step in the right direction. Ultimately, however, the greatest convenience for the seafarers in using their SIDs and for the border and port authorities in verifying them, would come from allowing the SID to be completely interoperable with eMRTDs by allowing it to have a contactless integrated circuit containing an LDS formatted in accordance with ICAO Document 9303 Part 1 Volume 2 (6th edition, 2006) or with ICAO Document 9303 Part 3 Volume 2 (3rd edition, 2008).

The possibility of allowing an SID to contain a contactless chip as a storage device for the biometric data was suggested in ISO/IEC 24713-3, but that standard did not specify the details of the Logical Data Structure for such a contactless chip. Given the existence of the existing work on the LDS for contactless chips conducted by ICAO and ISO through ISO/IEC JTC-1 SC 17, this would probably have seemed like unnecessary duplication. There was also no guarantee that the International Labour Organization would be willing to amend Convention No. 185 to allow such a major modification as the addition of a contactless chip. During the special tripartite consultation meeting in September, 2010, however, the concept of adding an optional contactless chip into Convention No. 185 was discussed. This would not prejudice against ILO Members who had recently deployed new SID issuance systems based on the existing Convention No. 185, but would allow states choosing to deploy or update their SID issuance systems in the future to be able to create an SID which was fully interoperable with the modern system of electronic travel documents. There was significant discussion about this point, but in the end, the consensus of the consultation meeting was that such an amendment to Convention No. 185 would probably be acceptable provided that the contactless chip only contained information that was already included in some form in the SID, such as the fingerprint templates rather than fingerprint images, and provided that there was no mandatory requirement but only an optional recommendation to include the contactless chip. The seafarers were also very adamant that this change was only worthwhile if it would lead to increased acceptance of SIDs issued under Convention No. 185 for the purposes of shore leave.

It is therefore a matter of significant interest as to whether or not the members of the ICAO TAG / MRTD think that the ideas outlined above have merit and would lead to increased acceptance of SIDs issued under Convention No. 185 for the purposes of shore leave. If such an amendment did take place then there would be no specific ILO document covering the LDS. There would simply be a reference to follow the most up to date version of either ICAO Document 9303 Part 1 Volume 2 or ICAO Document 9303 Part 3 Volume 2, depending on whether a full page or credit card sized SID was being issued. The only specification would be that the SID contactless chip shall always be write protected after issuance, shall be protected during reading by basic access control and shall only contain Data Group 1, Data Group 2, EF.COM, EF.SOD and one other Data Group to contain the two finger minutiae template. This could be

either Data Group 3, except that this would break the usual rule of only having a fingerprint template if Data Group 3 also contains a fingerprint image. Alternately, it could be in Data Group 13, which would simply contain an exact copy of the CBEFF patron format described previously as the proposed new barcode contents from ISO/IEC 24713-3. Data Group 13 would then simply be used as "Optional Details" to contain a copy of the barcode data.

If the ICAO TAG / MRTD would be in favour of such an amendment to harmonize the technologies used in SIDs and in eMRTDs then the International Labour Office would like to know which data group the TAG / MRTD would recommend using to contain the two finger minutiae template. Prior to approaching the ILO Governing Body to begin the process of amending Convention No. 185 to support an SID with a contactless chip, the Office would also like a commitment from the ICAO Secretariat and the ICAO TAG / MRTD that they would be willing to support an amendment to ICAO Document 9303 Part 1 and Part 3 to resolve the confusion in the first letter of the MRZ (as discussed in Section 3.1 of this document) and also to include a note somewhere in Volume 2 of each part which explains that an ILO SID can be compliant to this part if it contains a contactless chip. The following text is one possibility:

"An ILO Seafarers' Identity Document issued under ILO Convention No. 185 can also be considered compliant to this document if it follows the requirements of Volume 1 in its physical form and layout and if it contains a contactless integrated circuit which is compliant to Volume 2 and which contains only Data Group 1, Data Group 2, EF.COM, EF.SOD and Data Group {4 or 13} containing a two fingerprint minutiae template as a specific secondary biometric to be used only by those states which have ratified that Convention."

If both ICAO and ILO agree that amending Convention No. 185 and ICAO Document 9303 in this fashion would be beneficial, then it will represent a significant new area of cooperation between the two organizations in the area of identity documents and it will allow a significant improvement in the usability of SIDs at ports and at border crossings, helping to further facilitate and secure international trade by sea.

— END —