

**FACILITATION (FAL) DIVISION — TWELFTH SESSION****Cairo, Egypt, 22 March to 2 April 2004****Agenda Item 7: Other facilitation matters****SEAFARERS' IDENTITY DOCUMENT CONVENTION, 2003  
(NO. 185)**

(Presented by the International Labour Office (ILO))

1. When it adopted the Seafarers' Identity Document Convention (No. 185) in June 2003, the International Labour Conference also adopted a resolution calling for the development of a global interoperable biometric template in conformity with the provisions of the Convention. This Convention revised an earlier ILO Convention concerning Seafarers' Identity Document, 1958 (No. 108). Concerns about the security of the documents issued under the previous Convention had arisen following the tragic September 11th, 2001 events and the ILO decided to respond to requests from Member States to improve seafarers' identification globally.

2. Since the adoption of the Convention, the International Labour Office has held, on the issue of biometric template, two informal meetings of technical specialists, in which ICAO and ISO were represented or informed of their outcome. It has also proceeded to develop specifications for the interoperable biometric template through the preparation of the appropriate technical reports. The Governing Body of the ILO has approved a plan, currently under execution, which should lead to the adoption of the technical specifications for the interoperable biometric template mentioned above.

3. The attached document GB.289/7, which outlines the progress made towards the development of this biometric template as well as its supporting bar code, is being submitted to the Governing Body of the ILO at its 289th Session (11-26 March 2004) for a decision on the selection of the type of fingerprint biometric template, i.e. either "pattern" or "minutiae" based. However, the technical reports relating to the types of finger print templates will be available for consultation by interested participants to the 12th Session of the Facilitation Division.

4. These papers and reports are submitted for your information in the context of the cooperation between ICAO and ILO. It is recalled that the Seafarers' Identity Document Convention, 2003 (No. 185) requires that documents issued under the Convention comply with ICAO Document 9303 Part 3 (2nd edition, 2002) or Part 1 (5th edition, 2003).

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<sup>1</sup> Appendix provided in French and Spanish by the International Labour Office (ILO)

5. The 289th Session of the Governing Body of the ILO will end its work on 26 March 2004. By that time the 12th Session of the Facilitation Division will have already started. A representative of the ILO will therefore attend the later part of that meeting and provide the appropriate information on the outcome of the deliberations of the Governing Body of the ILO on the development of the biometric template for the seafarers' identity document.

6. The ILO would like to express its appreciation for the continuing cooperation of ICAO and its Secretariat on this issue. It requests ICAO to take note of the progress achieved with regards to the Seafarers' Identity Document Convention, 2003 (No. 185) in so far as it embodies the relevant ICAO standards and to take any action as it may consider appropriate.

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## APPENDIX



INTERNATIONAL LABOUR OFFICE

GB.289/7

289th Session

Geneva, March 2004

## Governing Body

### SEVENTH ITEM ON THE AGENDA

#### **Follow-up to the Seafarers' Identity Documents Convention (Revised), 2003 (No. 185)**

1. At its 288th Session in November 2003, the Governing Body discussed a paper prepared by the Office on the follow-up to the Seafarers' Identity Documents Convention (Revised), 2003 (No. 185), and to the related resolutions adopted by the International Labour Conference in June 2003. In that paper<sup>2</sup>, the Office referred to urgent action that was needed on two aspects which might influence the decision of governments relating to the early ratification of the Convention. One of those aspects was the development of a global interoperable standard for the "biometric template based on a fingerprint printed as numbers in a bar code" that is required by the Convention. The Governing Body last November approved a plan that had been proposed by the Office following an informal meeting in September 2003 of Government experts, representatives of Shipowners and Seafarers, and relevant international organizations. In accordance with the plan, the Office has made arrangements for the "fast-track" preparation of a technical report containing the global interoperable standard concerned, which is reproduced in the appendices to the present paper. For the reasons given below, it is presented in two alternative versions, Appendix I, Finger *pattern*-based biometric profile for seafarers' identity documents, and Appendix II, Finger *minutiae*-based biometric profile for seafarers' identity documents.
2. The technical report contains the global interoperable standard required by the Convention. By following the standard in the technical report, all countries issuing the seafarers' identity document (SID) will be able to derive the same template from a seafarer's fingerprints and to embody the template in a bar code printed on the SID. Further, all countries visited by the seafarer will be able to read correctly the bar code so as to verify that the seafarer is indeed the holder of the SID. The Office can make this statement concerning interoperability with a high degree of certainty because of: (a) the quality of the technical report; (b) the expertise of the persons overseeing the preparation of the report; and (c) the evident appropriateness of the various steps to be taken under the standard.

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<sup>2</sup> GB.288/3/2.

3. Concerning the quality of the report, the enterprise that prepared it was highly recommended by a Government representative involved in the development of the present standard. The co-authors have both carried out various functions in the government concerned that are related to identity documents and biometrics. Their enterprise offers independent technical consultation in authentication technologies and is closely involved in international standards development for biometric systems, including the preparation of standards for endorsement by the International Organization for Standardization (ISO). In fact, the technical report has been prepared in such a way as to facilitate a proposal for ISO endorsement of the new standard in due course.
4. With respect to the oversight, the technical report takes into account the guidance and comments that were provided by numerous expert Government representatives before and during the preparation of the report and by ISO experts. The Office is very grateful, in particular, for the careful review of the drafts of the report that was kindly made by those technical experts.
5. The appropriateness of the various steps to be taken under the standard can be seen by the clear references in the technical report to the bases on which they were established. These bases are, in the first place, the overriding preconditions set out in the Convention itself, which are carefully analyzed in section 5.1 of each of the versions of the technical report in the appendices to this paper. Other such bases are the technical standards of the International Civil Aviation Organization (ICAO), which are to be followed in accordance with the Convention, as well as the relevant technical standards prepared or at an advanced stage of preparation in the framework of the ISO. The creativity of the technical report therefore essentially resides in its assembly into a uniform whole of various components consisting of technical procedures that are already in existence and that are clearly the best suited to perform the functions required by the standard.
6. There is, however, one aspect on which there was a strong divergence of opinion among the experts consulted. It concerns the way in which the series of numbers in the template to be represented in the bar code is derived from the image of a fingerprint. There are two methods, which are both the subject of standards being finalized in the framework of the ISO: the *pattern*-based method, where the template is determined by the geometrical patterns made by the ridges on the finger; and the *minutiae*-based method, where the template is determined by the number and positions of the minutiae (breaks and points of bifurcation) that are found in those ridges. In view of the divergence of opinion, in December 2003, the Office sent a request for information (RFI) on the subject to the governments of all ILO member States as well as a questionnaire to enterprises known to be suppliers of relevant technology or devices. As of 11 February 2004, of the responses to the RFI received from governments, 28 responded to the specific question concerning the technology. Twelve have expressed a preference for *minutiae*-based templates (including two major labour-supplying countries), 13 have stated no technology preference, and three have stated a preference for the *pattern*-based method.
7. Because of the division of opinion, the technical report to this paper is submitted in two alternative versions: one (ILO SID-0001) incorporates the *pattern*-based technology (Appendix I) and the other (ILO SID-0002), the *minutiae*-based technology (Appendix II). In section 5.1.4 of each version, an explanation is given as to why the *pattern*-based was selected in preference to the *minutiae*-based (ILO SID-0001) or why the *minutiae*-based was selected in preference to the *pattern*-based (ILO SID-0002). For the reasons given below, it seems clear that the *pattern*-based method, which was in fact the one that had been recommended by the September 2003 meeting, referred to in paragraph 1 above, would better meet the requirements of the Convention. The *minutiae*-based method has the advantages of both greater familiarity to the governments using the standard and a greater potential for integration with other national systems using fingerprint technology, particularly with respect to the investigation of crimes.

8. From a technical point of view, both methods are well suited to an interoperable and efficient verification that the holder of the identity document is the seafarer to whom it was issued. However, there is a measure of uncertainty concerning one function that would need to be performed if the *minutiae*-based method were selected for the SID, as only a limited amount of information can be stored in the SID bar code. Experts generally agree that the information should relate to two fingerprints (so that if one finger is not available at the time of verification or the image from it is not sufficiently clear, reference can be made to the other fingerprint). The information obtained by following existing standards will always fit into the bar code if the *pattern*-based method is used. On the other hand, there will be cases where the number of minutiae on the fingers concerned will produce information exceeding the bar code capacity, where the *minutiae*-based method is followed. The simple solution is, in those cases, to reduce the number of minutiae to be taken into account and the annexed version ILO SID-0002 establishes an appropriate way of doing this (see section 5.1.3, second paragraph). However, because this "truncation" has not been the subject of a tested standard, one could not at this stage be sure that it would always result in the same template.
9. Indeed, more generally, at this point the *pattern*-based method offers greater reliability. In the case of both methods, the international standards are still in draft form (though at an advanced stage). Products complying with the *pattern*-based draft standard have been formally tested by independent third parties, while products claiming compliance with the *minutiae*-based draft standard have not. As indicated in responses to the questionnaire sent to vendors, once the international standard has been finalized and their client-base demands product compliance with the standard, the vendors of *minutiae*-based products could be expected to make corresponding changes to their products. However, as in the case of any technology update of this kind, independent testing of *minutiae*-based products (including the effects of the truncation needed for the SID template) will be required to ensure that the changes have not degraded performance of the individual products or introduced unanticipated system vulnerabilities.
10. Article 3, paragraph 8(c), of the Convention requires that "the equipment needed for the provision and verification of the biometric ... is generally accessible to governments at low cost". Here, the *pattern*-based method appears to be slightly preferable, as it would work efficiently with an image of lower resolution than that required for the other method. Less expensive equipment could thus be used for acquiring the fingerprint image during the processes for the issuance of the SID and subsequent verification of the holder's identity. However, one government response indicated that the more expensive, optical sensors should be used for this purpose (though not required by the *pattern*-based biometric method) because in its opinion such equipment would be more durable in maritime environments. Another factor that could affect the cost of equipment arises from the fact that, while there are a number of known consultants, systems integrators and other equipment manufacturers that use the *pattern*-based technology, there are many more known suppliers of the *minutiae*-based technology with their own consultants, systems integrators, and other equipment manufacturers. However, prior to formal independent testing of products to demonstrate compliance with (and feasibility of) the draft international standard, purchasers of *minutiae*-based equipment may have to depend upon a restricted number of vendors (perhaps a single vendor).
11. There is a definite weakness with the *minutiae*-based method in relation to the requirement that "it shall not be possible to reconstitute [the biometric] from the template" (Article 3, paragraph 8(b)). There are publications concerning methods for developing artefacts that could counterfeit evidence of a person's fingerprint with the aid of the *minutiae*-based template. No similar publications have been identified in the case of the *pattern*-based method.
12. A government with *minutiae*-based systems should have no particular difficulty in using a *pattern*-based programme to produce and verify the fingerprint template (just as several

completely different programmes can effectively run on the same computer). However, a *pattern*-based template could not be used for any search in databases in which fingerprints are only stored as *minutiae*-based templates, which may, in particular, be the case with national databases for criminal investigations. The use of the template for any purpose other than the verification of the seafarers' identity, however, is not in line with the intentions behind the Convention as reflected in several provisions, for example, paragraph 7 of Article 4: "Members shall ensure that the personal data on the electronic database shall not be used for any purpose other than verification of the seafarers' identity document".

13. Without prejudice therefore to the merits of the *minutiae*-based method from a general point of view, the Office concludes that the *pattern*-based method should be selected as the solution that better meets the requirements and intentions of the seafarers' identity documents Convention. In this connection, it should be noted that the aim of the Convention is not to put in place the best possible solution. Indeed, it was specifically decided not to embody the most effective solution of using a biometric image stored on a microchip. The aim is essentially to have a relatively inexpensive and acceptable biometric solution, adequate for use over the first five or more years of the Convention's life, that will effectively complement other personal data required by the Convention, such as signature and photograph, and to have this unprecedented solution in operation as a matter of urgency. Although the standard set out in the technical report still needs to be the subject of testing in a certification laboratory<sup>3</sup>, it is suggested that the Governing Body could now give its approval. In this way, potential ratifying Members will have a clear idea of the requirements in this respect. Any necessary adjustment of minor details could be made later.

**14. In the light of the above, the Governing Body may wish:**

- a) *to select the pattern-based option, as recommended by the Office, and approve document ILO SID-0001 (in Appendix I to this paper) as embodying the standard for the fingerprint template required under (k) of Annex I of the Seafarers' Identity Documents Convention (Revised), 2003 (No. 185); or*
- b) *to select the minutiae-based option and approve document ILO SID-0002 (in Appendix II to this paper), as embodying the standard for the fingerprint template required under (k) of Annex I of the Seafarers' Identity Documents Convention (Revised), 2003 (No. 185).*

Geneva, 24 February 2004.

Point for decision: Paragraph 14.

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<sup>3</sup> GB.288/3/2, para. 8.