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**DEVELOPMENT OF GUIDANCE TO ESTABLISH A FRAMEWORK FOR DATA
DISTRIBUTION AND GLOBAL IP-BASED CONNECTIVITY BETWEEN SHORE-BASED
FACILITIES AND SHIPS FOR ECDIS S-100 PRODUCTS AND OPERATIONAL
GUIDANCE FOR ROUTE EXCHANGE**

**Harmonized connectivity architecture for S-100 ECDIS implementation
using SECOM and MCP**

Submitted by IALA

SUMMARY

Executive summary: This document proposes to use SECOM and the Maritime Connectivity Platform (MCP) as the reference technological solutions for communication, identity, trust, and service discovery/registry functions within the global IP-based S-100 connectivity framework and encourages effective cooperation among IMO, WMO, IHO, IEC and IALA on harmonization, testbeds, training, and capacity-building for administrations and service providers.

*Strategic direction, 2
if applicable:*

Output: 2.12

Action to be taken: Paragraph 15

Related documents: NCSR 12/20 and resolution MSC.530(106)/Rev.1

Introduction

1 The Sub-Committee on Navigation, Communications and Search and Rescue, at its twelfth session (NCSR 12), developed a draft guidance to establish a framework for data distribution and global IP-based connectivity for shore-based facilities and ships supporting ECDIS S-100 products, and established a correspondence group to progress this work intersessionally.

2 While allowing for the use of different technologies capable of supporting secure and standardized real-time exchange of S-100 data, the draft guidance refers to SECOM (IEC 63173-2) and the Maritime Connectivity Platform (MCP) as examples of such

technologies which, when used together, are capable of meeting the requirements specified in the draft guidance.

3 This document is submitted to express IALA's support for the ongoing work at IMO concerning the development of a global IP-based connectivity framework for S-100 products and it proposes, in particular, the use of SECOM and MCP, as one of the examples for communication, identity, trust, and service discovery/registry functions within the S-100 framework. Many technical standards of MCP have been developed under IALA's intergovernmental role as a technical standardization body.

Background

4 The IHO S-100 Universal Hydrographic Data Model was designated to overcome the limitations of the IHO S-57 standard and provide a flexible, future-proof basis for interoperable maritime data. In the connectivity layer, MCP plays a comparable role, whereby it supplies a coherent and internationally governed mechanism for identity, trust and service discovery, supporting the implementation of SECOM as referenced in resolution MSC.530(106)/Rev.1 on *Performance standards for electronic chart display and information system (ECDIS)*. While S-100 standardizes the data formats, SECOM and MCP standardize a secure data exchange.

5 IALA, as the international standardization body for marine aids to navigation, maintains a coherent suite of guidelines (see paragraph 10) that together define the technical architecture of MCP, including the management of secure identities, public key infrastructure (PKI) and the Maritime Service Registry. These guidelines form a ready and interoperable basis for the architectural building blocks that have been developed and tested over several years.

General information

6 IALA fully supports the architecture and the goal-based approach of the draft guidance. The draft guidance accommodates multiple communication technologies and emphasizes functions (discovery, identity, authorization, integrity, confidentiality and non-repudiation) rather than prescribing a single vendor or deployment model. This is consistent with the e-navigation approach and with the way IALA has structured its technical service specifications for maritime services.

7 IALA has a long history in creating standards and guidelines for marine AtoN authorities as well as for industry. IALA's work is focused on AtoNs but also on other technical and digitalization aspects. IALA has been involved in the development of the MCP architecture and, in doing so, also has supported the development of SECOM by IEC. IALA is also the domain coordinator of the S-200 series of product specifications.

8 IALA would like to highlight the following information:

- .1 to make digitalization as harmonized and interoperable as possible, there is a need to agree on a standardized connectivity architecture for the S-100 products;
- .2 despite the availability of different technologies to support ship-to-shore and shore-to-ship communications, IALA, being one of the domain coordinators for S-100 product specifications, supports the use of SECOM and the MCP architecture; and

- .3 IALA has approved guidelines on the MCP and SECOM architecture and provides technical service specifications for a range of maritime services in the context of e-navigation such as VTS and AtoN, including bidirectional route exchange.

9 SECOM and MCP can be regarded as the minimum common set of requirements for interoperability. Bidirectional secure communication between ship and shore systems is a significant part of the S-100 framework. Therefore, establishing a common basis is indispensable to ensure compatibility across independently developed solutions. S-100 has also been agreed through international organizations as the common standard specifically to ensure compatibility. In the same way, SECOM and MCP serve a parallel role in the connectivity layer, providing the technical foundations necessary for secure and interoperable communications and service discovery.

10 Technical standards of the MCP concept/standard has been developed under IALA with a specific maritime remit.

11 SECOM and MCP do not introduce new or untested technologies. Rather, they are a coherent framework built on widely deployed internet technologies such as PKI, and RESTful application programming interfaces (APIs) that have already proven their reliability and scalability in the global public internet. This pragmatic approach reduces the risk of fragmentation and enables a smooth transition for industry stakeholders, who can integrate SECOM and MCP into existing systems without reinventing core technical mechanisms.

12 A useful analogy is that of electrical sockets and plugs. SECOM and MCP define the shape of the socket and plug so that any device, regardless of its manufacturer, can be connected to the power grid, provided it follows the agreed interface. What runs inside the device (the actual technology and implementation) remains entirely at the discretion of the manufacturer. In the same way, SECOM and MCP define the interoperability layer, but they do not restrict the industry from implementing their own IP-based solutions, nor do they limit participation to specific stakeholders. These are open standards, designed precisely to allow diverse actors to build compatible and innovative solutions that can operate within a harmonized global framework.

Information on IALA guidelines for MCP

13 IALA guidelines (e.g. G1128, G1183, G1191, G1143/G1164 and G1161) define the key building blocks of MCP, including unique identifiers (i.e. Maritime Resource Names (MRN)), trust and authentication mechanisms (i.e. Maritime Identity Registry (MIR), serving also as a PKI), service registries and discovery, and uniform documentation for conformance (i.e. Maritime Service Registry (MSR)). Together, these provide Administrations and service providers with a tested and internationally governed foundation for deploying S-100-based services at scale.

Proposal

14 IALA proposes that the NCSR Sub-Committee, when finalizing the draft guidance, recommends the use of SECOM and MCP as the reference technological solution for secure communication, identity, trust, and service discovery/registry functions. MCP should be noted as a bearer-agnostic solution, capable of supporting IP over diverse transport links, including mobile and satellite. IALA requests effective cooperation among IMO, WMO, IHO, IEC and IALA on harmonization, testbeds, training, and capacity-building for administrations and service providers.

Action requested of the Sub-Committee

15 The Sub-Committee is invited to note the information provided in this document and consider the proposals specified in paragraph 14.
