BS ISO/IEC 30140-4:2018

BSI Standards Publication

Information technology – Underwater Acoustic Sensor Network (UWASN)

Part 4: Interoperability

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 30140-4:2018

National foreword

This British Standard is the UK implementation of ISO/IEC 30140-4:2018.

The UK participation in its preparation was entrusted to Technical Committee IOT/1/-/2, Internet of Things - Interoperability.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2018
Published by BSI Standards Limited 2018

ISBN 978 0 580 93539 8

ICS 35.110

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2018.

Amendments/corrigenda issued since publication

Date	Text affected

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 30140-4:2018

ISO/IEC 30140-4

Edition 1.0 2018-07

INTERNATIONAL STANDARD

Information technology – Underwater Acoustic Sensor Network (UWASN) – Part 4: Interoperability

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 35.110

ISBN 978-2-8322-5913-9

Warning! Make sure that you obtained this publication from an authorized distributor.

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 30140-4:2018

CONTENTS

FOREWORD 3
INTRODUCTION 4
1 Scope 5
2 Normative references 5
3 Terms and definitions 5
4 Abbreviated terms 5
5 Interoperability in UWASN 6
5.1 Overview 6
5.1.1 Interoperability definition 6
5.1.2 Achieving interoperability 6
5.1.3 The need for interoperability 6
5.1.4 UWASN interoperability 6
5.2 Interoperability between the user and the UWA-GW 9
5.3 Interoperability between the UWA-GW and the UWA-FN 9
5.4 Interoperability between UWA-FNs 10
5.5 Interoperability between UWA-GWs 11
6 UWASN communication technology interoperability architecture point of view 11
7 UWASN communication technology interoperability architecture from service point of view 12
7.1 General 12
7.2 Example: Interoperability between heterogeneous networks 14
Bibliography 16

Figure 1 – Interoperability in UWASN 8
Figure 2 – Graphical representation of interoperable UWASN 8
Figure 3 – Interoperability of UWASN 9
Figure 4 – Generic standardized interface for interoperability in UWASNs 9
Figure 5 – Multiple interfaces on a UWA-GW to provide interoperability in UWASN 10
Figure 6 – Interoperability between fundamental networks 11
Figure 7 – Interoperability between UWA-GWs 11
Figure 8 – UWASN communication technology interoperability architecture point of view 12
Figure 9 – UWASN communication technology interoperability architecture a from service point of view 13
Figure 10 – Interoperability between heterogeneous networks 15

Table 1 – UWASN CTI-AP Entities 14
Table 2 – UWASN CTI-AP interoperability 14

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 30140-4:2018

INFORMATION TECHNOLOGY – UNDERWATER ACOUSTIC SENSOR NETWORK (UWASN) –

Part 4: Interoperability

FOREWORD

1) ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

2) The formal decisions or agreements of IEC and ISO on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees and ISO member bodies.

3) IEC, ISO and ISO/IEC publications have the form of recommendations for international use and are accepted by IEC National Committees and ISO member bodies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC, ISO and ISO/IEC publications is accurate, IEC or ISO cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

4) In order to promote international uniformity, IEC National Committees and ISO member bodies undertake to apply IEC, ISO and ISO/IEC publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any ISO, IEC or ISO/IEC publication and the corresponding national or regional publication should be clearly indicated in the latter.

5) ISO and IEC do not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. ISO or IEC are not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or ISO or its directors, employees, servants or agents including individual experts and members of their technical committees and IEC National Committees or ISO member bodies for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication of, use of, or reliance upon, this ISO/IEC publication or any other IEC, ISO or ISO/IEC publications.

8) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

9) Attention is drawn to the possibility that some of the elements of this ISO/IEC publication may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 30140-4 was prepared by subcommittee 41: Internet of Things and related technologies, of ISO/IEC joint technical committee 1: Information technology.

The list of all currently available parts of the ISO/IEC 30140 series, under the general title *Information technology – Underwater acoustic sensor network (UWASN)*, can be found on the IEC and ISO websites.

This International Standard has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the second title page.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A bilingual version of this publication may be issued at a later date.

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 30140-4:2018

INTRODUCTION

Water covers approximately 71 % of the surface of the Earth. Modern technologies introduce new methods to monitor the body of water, for example pollution monitoring and detection. Underwater data gathering techniques require exploring the water environment, which can be most effectively performed by underwater acoustic sensor networks (UWASNs). Applications developed for the UWASNs can record underwater climate, detect and control water pollution, monitor marine biology, discover natural resources, detect pipeline leakages, monitor and locate underwater intruders, perform strategic surveillance, and so on.

The ISO/IEC 30140 series provides general requirements, reference architecture (RA) including the entity models and high-level interface guidelines supporting interoperability among UWASNs in order to provide the essential UWASN construction information to help and guide architects, developers and implementers of UWASNs.

Additionally, the ISO/IEC 30140 series provides high-level functional models related to underwater sensor nodes and relationships among the nodes to construct architectural perspective of UWASNs. However, the ISO/IEC 30140 series is an application agnostic standard. Thus, the ISO/IEC 30140 series specifies neither any type of communication waveforms for use in UWASNs nor any underwater acoustic communication frequencies. Specifying communication waveforms and/or frequencies are the responsibility of architects, developers and implementers[1].

Acoustical data communication in sensor networks necessitates the introduction of acoustical signals that overlap biologically important frequency bands into the subject environment. These signals can conflict with regional, national, or international noise exposure regulations. Implementers of acoustical communication networks should consult the relevant regulatory agencies prior to designing and deployment of these systems to ensure compliance with regulations and avoid conflicts with the agencies.

The purpose of the ISO/IEC 30140 series is to provide general requirements, guidance and facilitation in order for the users of the ISO/IEC 30140 series to design and develop the target UWASNs for their applications and services.

The ISO/IEC 30140 series comprises four parts as shown below.

- Part 1 provides a general overview and requirements of the UWASN reference architecture.
- Part 2 provides reference architecture models for UWASN.
- Part 3 provides descriptions for the entities and interfaces of the UWASN reference architecture.
- Part 4 provides information on interoperability requirements among the entities within a UWASN and among various UWASNs.

[1] Architects, developers, and implementers need to be aware of the submarine emergency frequency band, near and below 12 kHz, and it is recommended to provide a provision for such submarine emergency band in their UWASN design and applications.

AVA Documents
Document Sharing Hub

Full document details: BS ISO/IEC 30140-4:2018