

ISO/IEC 30142:2020-06 (E)

Information technology - Underwater acoustic sensor network (UWASN) - Network management system overview and requirements

Contents	Page
FOREWORD.....	5
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	7
4 Abbreviated terms	8
5 U-NMS overview.....	8
5.1 General.....	8
5.2 Problem statements	9
5.3 Description of the U-NMS	10
5.4 Purpose and advantages of the U-NMS	10
6 Functions of the U-NMS.....	11
6.1 Overview.....	11
6.2 U-NMS fault management.....	11
6.3 U-NMS configuration management.....	12
6.4 U-NMS account management.....	14
6.5 U-NMS performance management	14
6.5.1 General	14
6.5.2 The challenges in performance management.....	14
6.5.3 Functions of performance management	15
6.6 U-NMS security management.....	16
6.7 U-NMS constrained management.....	17
6.7.1 General	17
6.7.2 Constrained network management.....	17
6.7.3 Constrained device management.....	18
7 U-NMS components.....	19
7.1 Management station.....	19
7.2 U-NMS agent	20
7.2.1 General	20
7.2.2 Types of agents.....	21
7.2.3 Elements of agent.....	22
7.2.4 Underwater Management Information Base (u-MIB).....	22
7.3 Managed elements.....	23
7.4 Management protocol	24
8 Requirements of U-NMS.....	25
8.1 U-NMS general requirements.....	25
8.2 U-NMS functional requirements	25
8.3 U-NMS constrained requirements.....	27

9	Model for underwater network management.....	28
9.1	FCAPSC modelling for the U-NMS	28
9.2	U-NMS architectural model	28
9.3	U-NMS specific architecture.....	29
Annex A	(informative) U-NMS use cases.....	31
A.1	General.....	31
A.2	Environmental management use case.....	31
A.2.1	Description	31
A.2.2	Actors.....	32
A.2.3	Potential requirements.....	32
A.2.4	Environmental monitoring and management use case diagram	32
A.3	Underwater pipeline management use case	35
A.3.1	General	35
A.3.2	Actors.....	35
A.3.3	Potential requirements.....	35
A.3.4	Pipeline leakage detection and management use case diagram.....	36
A.4	Underwater natural resource management use case	37
A.5	Underwater fish farm management use case.....	37
A.6	Harbour security management use case	38
	Bibliography.....	39
	Figure 1 – Stack of layers in a U-NMS	9
	Figure 2 – Functions of the U-NMS	11
	Figure 3 – Fault management in the U-NMS.....	12
	Figure 4 – Configuration management in the U-NMS.....	13
	Figure 5 – Account management in U-NMS.....	14
	Figure 6 – Performance management in U-NMS	15
	Figure 7 – Security management in U-NMS.....	16
	Figure 8 – Constrained network management in U-NMS	18
	Figure 9 – Constrained device management in U-NMS	19
	Figure 10 – Management station.....	20
	Figure 11 – U-NMS agent architecture	21
	Figure 12 – Components of Agent.....	22
	Figure 13 – u-MIB in different devices.....	23
	Figure 14 – Managed elements	23
	Figure 15 – Management protocol in U-NMS system.....	24
	Figure 16 – FCAPSC modelling for the U-NMS	28
	Figure 17 – U-NMS architectural model.....	29
	Figure 18 – U-NMS specific architecture	30
	Figure A.1 – Environmental management use case.....	31
	Figure A.2 – Environmental management use case diagram	33
	Figure A.3 – Use case for network management station.....	34
	Figure A.4 – Use case for agents in environmental management	34

Figure A.5 – Underwater pipeline management use case 35

Figure A.6 – Underwater pipeline leakage management use case 36

Figure A.7 – Underwater natural resource management use case 37

Figure A.8 – Underwater fish farm management use case..... 37

Figure A.9 – Harbour security management use case 38

Table 1 – Types of agents in different devices of U-NMS 21

Table 2 – General requirements of U-NMS..... 25

Table 3 – Functional requirements of U-NMS 26

Table 4 – Constrained requirements of the U-NMS 27

Table A.1 – Potential U-NMS requirements of environmental monitoring application 32

Table A.2 – Potential U-NMS requirements of pipeline monitoring application 36