

**IALA World-Wide Academy**

**Model Course**

**For**

**Aids to Navigation**

**Level 2 – Technician**

**AIS-AtoN Operations**

**Module 8**

**Elements 8.1-8.5 (L2.8.1-5)**

**Edition 1.0**

**DRAFT working paper for EEP20**

**October 2012**

***AISM***Association Internationale de Signalisation Maritime ***IALA***

International Association of Marine Aids to Navigation and Lighthouse Authorities

10, rue des Gaudines

78100 Saint Germain en Laye, France

Telephone: +33 1 34 51 70 01 Fax: +33 1 34 51 82 05

e-mail: [contact@iala-aism.org](mailto:contact@iala-aism.org) Internet: [www.iala-aism.org](http://www.iala-aism.org)

DOCUMENT REVISIONS

Revisions to the IALA Document are to be noted in the table prior to the issue of a revised document.

|  |  |  |
| --- | --- | --- |
| **Date** | **Page / Section Revised** | **Requirement for Revision** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

FOREWORD

The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) recognises that training in all aspects of Aids to Navigation (AtoN) service delivery, from inception through installation and maintenance to replacement or removal at the end of a planned life-cycle, is critical to the consistent provision of that AtoN service.

Taking into account that under the SOLAS Convention, Chapter 5, Regulation 13, paragraph 2; Contracting Governments, mindful of their obligations published by the International Maritime Organisation, undertake to consider the international recommendations and guidelines when establishing aids to navigation, including recommendations on training and qualification of AtoN technicians, IALA has adopted Recommendation E-141 on Standards for Training and Certification of AtoN personnel.

IALA Committees working closely with the IALA World Wide Academy have developed a series of model courses for AtoN personnel having E-141 Level 2 technician functions. This model course on AIS-AtoN Operations should be read in conjunction with the Training Overview Document IALA WWA.L2.0 which contains standard guidance for the conduct of all Level 2 model courses

This model course is intended to provide national members and other appropriate authorities charged with the provision of AtoN services with specific guidance on the training of AtoN technicians in AIS-AtoN Operations. Assistance in implementing this and other model courses may be obtained from the IALA World Wide Academy at the following address:

The Dean

IALA World Wide Academy Tel: (+) 33 1 34 51 70 01

10 rue des Gaudines, 78100 Fax: (+) 33 1 34 51 82 05

Saint Germain-en-Laye e-mail: [contact@iala-aism.org](mailto:contact@iala-aism.org)

France Internet: [www.iala-aism.org](http://www.iala-aism.org)

TABLE OF CONTENTS

DOCUMENT REVISIONS 2

FOREWORD 3

TABLE OF CONTENTS 4

1 PART A - COURSE OVERVIEW 5

1.1 Scope 5

1.2 Objective 5

1.3 Course Outline 5

1.4 Table of Teaching Modules 5

1.5 Specific Course Related Teaching Aids 5

1.6 References 5

2 PART B - TEACHING MODULES 6

2.1 Module 1 – Purpose & Principles of AIS 6

2.2 Module 2 – AIS-AtoN Base Station 7

2.3 Module 3 – AIS-AtoN and repeaters 8

2.4 Module 4 – Installation, configuration, MMSI & Slot Management 8

2.5 Module 5 – Maintenance and Testing 9

# PART A - COURSE OVERVIEW

## Scope

This course is intended to provide technicians with the theoretical training necessary to have a basic understanding of the principles of operation of AIS-AtoN.

This introductory course is intended to be supported by further training modules on theoretical aspects of AIS-AtoN Operations. Details of these supporting model courses can be found in the Level 2 Technician training overview document IALA WWA L2.0.

## Objective

Upon successful completion of this course, participants will have acquired sufficient knowledge and skill to understand the principles of operation of AIS within their organisations.

## Course Outline

This course is intended to cover the knowledge required for a technician to understand the principles of operation of AIS-AtoN. The complete course comprises 5 classroom modules, each of which deals with a specific subject covering aspects of AIS-AtoN operations. Each module begins by stating its scope and aims, and then provides a teaching syllabus.

## Table of Teaching Modules

|  |  |  |
| --- | --- | --- |
| **Module Title** | **Time in hours** | **Overview** |
| Purpose & Principles of AIS | 4 | Description of the purpose of AIS as an aid to navigation and to shipping and how it works. |
| AIS-AtoN Base Station and repeaters | 1.5 | This module describes the purpose of an AIS base station and an overview of its operation. |
| AIS-AtoN and repeaters | 1.0 | This module provides an overview of the purpose of repeaters as part of the AIS AtoN functions |
| Installation, configuration, MMSI & Slot Management | 3.0 | This module will provide a satisfactory understanding to enable the technician to install, configure and commission an AIS-AtoN |
| Maintenance and Testing | 2.0 | An overview of the maintenance and testing requirements for an AIS AtoN. |
| Evaluation | 1.0 |  |
| **Total Hours:** | **12.5** | Two days |

## Specific Course Related Teaching Aids

1. This course involves classroom instruction only. Classrooms should be equipped with blackboards, whiteboards, and overhead projectors to enable presentation of the subject matter.
2. Examples of AIS units and programming units / PCs should be to hand to enable the student to gain practical application and programming skills during the course.

## References

In addition to any specific references required by the Competent Authority, the following material is relevant to this course:

* IALA NAVGUIDE
* IALA Recommendation A-123 The Provision of Shore Based Automatic Identification System (AIS)
* IALA Recommendation A-124 Automatic Identification System (AIS) Shore Station and Networking Aspect relating to the AIS Service
* IALA Recommendation A-126 The Use of the Automatic Identification System (AIS) in Marine Aids to Navigation Services
* IALA Recommendation O-143 Virtual Aids to Navigation
* IALA Guideline 1028 The Automatic Identification System (AIS) Volume 1, Part I Operational Issues
* IALA Guideline 1028 The Automatic Identification System (AIS) Volume 1, Part II Technical Issues
* IALA Guideline 1050 The Management and Monitoring of AIS Information
* IALA Guideline 1059 The Comparison of AIS Stations
* IALA Guideline 1062 The Establishment of AIS as an AtoN
* IALA Guideline 1082 An Overview of AIS
* IALA Guideline 1084 Authorisation of AIS AtoN
* ITU Recommendation ITU-R M.1371 (latest edition) Technical characteristics for an automatic identification system using time-division multiple access in the VHF maritime mobile band
* Technical documentation from AIS manufacturers

# PART B - TEACHING MODULES

## Module 1 – Purpose & Principles of AIS

### Scope

This module describes the purpose of AIS as an aid to navigation and to shipping.

### Learning Objective

To gain a basic understanding of the purpose of AIS in shipping safety and as an aid to navigation.

### Syllabus

Lesson 1 Purpose of AIS & AIS-AtoN

* Principles of operation
* Overview of an AIS system
* Positive identification
* Limited Range
* Trackable
  + Satellite
  + Terrestrial
* Mandated carriage >300grt

Lesson 2 Principles of Operation

* Component parts
  + VHF Transceiver
  + Minimum keyboard display (MKD)
  + GNSS Receiver
  + AIS Processor
  + Antennas
* User interfaces
  + MKD
  + ECDIS
  + Radar Display
* VHF bands
  + VHF Channels for AIS Use
  + Licensing and MMSI
* TDMA Principles
  + Concepts of Time Slots of Different Stations
  + Slot Synchronisation to Avoid Conflict in Messages
  + Methods of Access for Stations
  + RATDMA
  + FATDMA
  + SOTDMA

Lesson 3 AIS types

* AIS AtoN
  + Type 1
  + Type 2
  + Type 3
* Class A
* Class B
* Base Station
* Repeaters
* AIS SART

Lesson 4 AIS & AIS-AtoN Messages

* IALA Recommendations A-126 and A-124
* Dynamic Voyage Information
* Static Voyage Information
* AIS AtoN Information
* Other Messages
* AIS Management Information

## Module 2 – AIS Base Station and Repeaters

### Scope

This module describes the purpose of an AIS base station and an overview of its operation.

### Learning Objective

To gain a satisfactory understanding of the purpose and operation of an AIS base station.

### Syllabus

Lesson 1 Purpose of an AIS Base Station

* Collection of AIS data for Vessel Traffic Monitoring
* Verification of AIS-AtoN performance
* Transmission of Virtual AtoN

Lesson 2 Shore Based Infrastructure

* Component parts of an AIS Base Station

Lesson 2 AIS Channel Management

* Slot reservation

Lesson 3 VTS / Local Authority Interaction

* The Base Station Network
  + Control of network
  + Access and authority to access

Lesson 4 Base Station Messages

* Message 4 – Base Station Report
* Message 20 – Data Link Management Message (Slot Reservation)
* Message 22 – Channel Management

## Module 3 – AIS-AtoN

### Scope

This module provides an overview of the purpose of AIS as an AtoN.

### Learning Objective

To gain a satisfactory understanding of the purposes of AIS as and AtoN.

### Syllabus

Lesson 1 Purpose of AIS AtoN

* Electronic display
  + ECDIS
  + Radar
* Remote monitoring of AtoN status
* Message 21 – AtoN report

Lesson 2 ?

## Module 4 – Installation, configuration, MMSI & Slot Management

### Scope

This module provides an overview of the installation and configuration of AIS base station, repeaters and AIS-AtoN.

### Learning Objective

To gain a satisfactory understanding to enable the technician to install, configure and commission an AIS-AtoN.

### Syllabus

### Lesson 1 AIS AtoN Installation

* Antenna location
  + GNSS receiver location
  + VHF Antenna
* Power supply
* Watertight integrity
* Maintenance accessibility

### Lesson 2 AIS Configuration

* Identification
  + MMSI
  + Name
* AIS AtoN programming
  + FATDMA / RATDMA
  + Position – Surveyed or GNSS
    - Guard radius
    - Off position
  + AtoN type
  + AtoN Status configuration
* Base Station Programming
  + Surveyed position
  + Slot configuration
    - For itself
    - For other nearby stations
  + Transmission interval (for Type 1)

Lesson 3 Practical programming

* Practical programming of a sample AIS AtoN
* Tracking of serial numbers, configuration data and software version.

## Module 5 – Maintenance and Testing

### Scope

This module provides an overview of the maintenance and testing requirements for an AIS AtoN.

### Learning Objective

To gain a basic understanding to enable the technician to maintain and test an AIS AtoN.

### Syllabus

### Lesson 1 AIS Maintenance

* Visual inspection
* Cable and connection security and deterioration
* Damage and security of mounting
* Power supply

### Lesson 2 AIS Testing

* Enhanced AIS Receiver
  + Signal Strength
  + Slot usage
  + Message content
* Base station information