COASTAL PILOTS
Advisory Notice

Australian Government
Australian Maritime Safety Authority

AIS Aids to Navigation

The Automatic Identification System (AIS) enables digital data exchange between AIS-equipped units including vessels, aircraft, shore stations and aids to navigation (AtoN).

AIS AtoN stations broadcast a nine digit maritime mobile service identity (MMSI), position and status information at least every 3 minutes. Broadcasts can originate from an AIS station located on an existing physical AtoN (Physical AIS AtoN), or from another location such as an AIS Base station.

When an AIS base station signal is broadcast to provide an AIS signal linked to an existing physical AtoN, this is called a 'Synthetic AIS AtoN'. When an AIS base station signal is broadcast to provide an AIS signal to a location in a waterway where there is no physical AtoN, this is called a 'Virtual AIS AtoN'.

AIS AtoN can enhance safety of navigation via one or more of the following means*:

- Providing a positive, all-weather means of identification of an AtoN;
- Complementing existing services (e.g. lights, RACONs, etc.);
- Transmitting accurate positions of floating AtoN;
- Indicating if a floating AtoN is off-position;
- Enabling rapid marking of new hazards using Virtual AIS AtoN;
- Enabling the establishment of AtoN in remote locations;
- Gathering real-time information on the 'state of health' of an AtoN.

*The list above is not exhaustive.

IMO Guidance

AIS AtoN are described using specific terms. It is important to understand what the various terms mean. In 2014, the International Maritime Organisation (IMO) issued MSC.1/Circ.1473 (Policy on use of AIS Aids to Navigation).

This circular defines AIS AtoN as follows:

AIS Aids to Navigation

An AIS AtoN is a digital aid to navigation promulgated by an authorized service provider using AIS Message 21 "Aids to navigation report" that is portrayed on devices or systems (e.g. Electronic Chart Display and Information System (ECDIS), radar, or Integrated Navigation System (INS)). An AIS AtoN can be implemented in two ways:

1. *Physical AIS AtoN: a Physical AIS AtoN is an AIS Message 21 representing an AtoN that physically exists; and*

2. *Virtual AIS AtoN: a Virtual AIS AtoN is transmitted as a Message 21 representing an AtoN that does not physically exist.*

Physical[1] AIS AtoN

Physical AIS AtoN refer to AtoN that actually exist – for example, a buoy or a beacon. Physical AIS AtoN transmit an AIS signal from the actual AtoN itself.

Some examples of Physical AIS AtoN in the Torres Strait include Herald Patches (approximate position 10o 30'(S) 142o 21' (E)) and Alert Patches North (approximate position 10o 28' (S) 142o 23' (E)).

Virtual AIS AtoN

A Virtual AIS AtoN is a digital representation of an AtoN that does not physically exist. Virtual AIS AtoN are transmitted by an authorised service provider. Virtual AIS AtoN are received by AIS units onboard in the same way a physical or synthetic AIS AtoN is received. The information is presented on the minimum keyboard display (MKD) and may also be displayed on navigational display systems such as ECDIS.

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[1] Physical AIS AtoN may be referred to as Real AIS AtoN in other technical documentation.

Virtual AIS AtoN can be used to inform the mariner about dangers to navigation in areas where extra caution may be necessary (e.g. Reeves Shoal, Pearn Rocks etc.), and can be used to mark areas to be avoided (e.g. OG Rock in Torres Strait). Virtual AIS AtoN may be used to display a specific location, line, area or other shape.

The information, including geographic position, provided by Virtual AIS AtoN may be fixed or may be changed over time (dynamic), depending on the intended purpose of a Virtual AIS AtoN. A Virtual AIS AtoN is used primarily where:

- there is a time critical consideration (e.g. new wrecks, newly discovered dangers and where Notices to Mariners information has yet to be included in the relevant nautical publications due to the update distribution timeline);

- it is difficult or economically unreasonable to establish an actual or Physical AIS AtoN due to environmental constraints (e.g. deep water, harsh sea conditions etc.);

- it is required to mark a shoal that changes with time due to current or weather effects; and/or

- the object or feature is impossible to maintain as charted because of changes that occur over time.

Synthetic AIS AtoN

Synthetic AIS AtoN are used primarily to augment an actual AtoN whose location is monitored by a service provider. The actual AtoN does not itself transmit an AIS signal. The AIS signal is transmitted remotely to reflect the required position. The AIS AtoN at Gannet Passage in Torres Strait is an example of a Synthetic AIS AtoN.

From the mariner's perspective, provided an AIS AtoN is displaying correctly on the ship's navigational display(s), the distinction between whether the AIS signal associated with a particular AtoN is being transmitted from the actual AtoN, or being transmitted remotely (but appearing at the same location as the actual AtoN), is irrelevant.

The important aspect is that the actual AtoN is being depicted correctly, as required, for the mariner to see both on the ship's navigational display(s) and through the wheelhouse window.

Spotting the Difference Between Physical (or Synthetic) and Virtual AIS AtoN
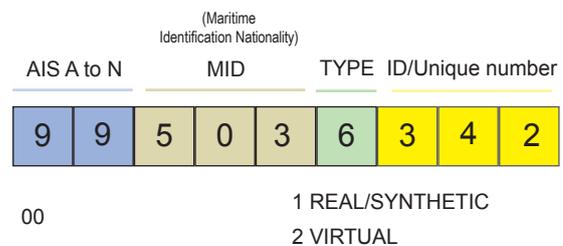
Each ship, coast radio station (fitted with Digital Selective Calling (DSC)) and AIS AtoN is allocated a unique 9 digit identification number (MMSI). The MMSI is permanently programmed into the equipment and is broadcast with each transmission.

All AIS AtoN MMSI numbers are of format 99, followed by a three-digit Maritime Identification Digit (MID), followed by a unique four-digit identifier.

There are some protocols to be aware of:

- **99**XXXXXXX indicates an AIS AtoN.

- The next 3 digits (after 99) represent the nationality of the administration. These digits are known as MID. The Australian MID is 503.

- The last four-digit unique identifier starts with a '1' for Physical (including Synthetic) AtoN stations (e.g. 99MID**1**XXX) or with a '6' for Virtual AtoN stations (e.g. 99MID**6**XXX).

- Examples
  - The number 1 in the 6th place is for Physical (including Synthetic) AIS AtoN
    - Alert Patches North is a 'Physical' AIS AtoN with MMSI 99503**1**033
    - Gannet Passage is a 'Synthetic" AIS AtoN with MMSI 99503**1**039
  - The number 6 in the 6th place represents a Virtual AIS AtoN
    - Reeves Shoal is a 'Virtual' AIS AtoN with MMSI 99503**6**057
    - Pearn Rocks is a 'Virtual' AIS AtoN with MMSI 99503**6**058

The protocol can be summarised in the following diagram:

AIS A to N		MID (Maritime Identification Nationality)			TYPE	ID/Unique number		
9	9	5	0	3	6	3	4	2

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1 REAL/SYNTHETIC
2 VIRTUAL

Errors and Actions

If, in a coastal pilot's opinion, the ship's onboard ECDIS or other navigational display is displaying an AIS AtoN information incorrectly, an SV-HH report should be made to AMSA. The following link provides access to a word, PDF or online SV-HH form for reporting purposes.

www.amsa.gov.au/vessels/ship-safety/incident-reporting/non-compliance/index.asp

The email address for submitting reports to AMSA is reports@amsa.gov.au.

If incorrect AIS AtoN information is being displayed on a pilot's Portable Pilot Unit (PPU), the PPU may require updating to the latest software / catalogue library. Advice of the error should also be reported to AMSA's Coastal Pilotage section via email to NSIDPilot@amsa.gov.au.

Presentation of Navigation-Related Information on Shipborne Navigational Displays

The IMO provided amended guidelines for the presentation of navigational-related symbols, as follows:

- **Physical AIS AtoN**

Physical AIS AtoN shall be presented as an 'open diamond'. The diamond shall be drawn using a thin solid line style (see Figure 1 below).
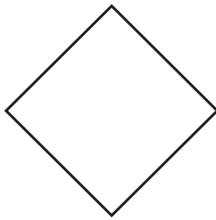

Figure 1

A sythetic AIS AtoN uses the same symbol.

- **Virtual AIS AtoN**

Virtual AIS AtoN shall be presented as an 'open diamond with crosshair centred at reported position'. The diamond shall be drawn using a thin dashed line style (see Figure 2 below).
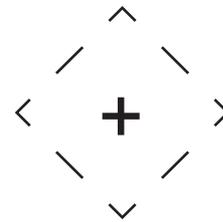

Figure 2

Further information about AIS AtoN symbology can be found in IMO SN.1/Circ.243/Rev.1: Amended Guidelines for the Presentation of Navigational-Related Symbols, Terms and Abbreviations (available via the IMO website).

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