

ICOM

IC-M603/IC-M505 VHF

DSC with UTIF-AIS option

- Instruction Manual -



TABLE OF CONTENTS

I.	Presentation of AIS.....	3
A.	Introduction.....	3
B.	Ships under an obligation to transmit in AIS	3
C.	Description of the AIS system.....	3
D.	Dynamic information.....	4
E.	Static information	4
F.	Dynamic and static AIS information	4
G.	Display	5
H.	Connections.....	7
II.	Using the IC-M505 and ICM603 with UTIF-AIS.....	7
A.	Principle for using an ICOM VHF radio with the UTIF-AIS option	7
B.	Activation of the AIS.....	7
C.	Activation of scanning on the IC-M603 with UTIF-AIS Option	8
D.	Explanation of basic operation	8
E.	Advanced operation (*)	9
F.	Operation of the IC-M505 with UTIF-AIS Option.....	9

I. Introduction to AIS

A. Introduction

Designed as a navigation aid in busy waters the AIS (Automatic Identification System) was created over twenty years ago by the Swede, Håkan Lans.

B. Ships under an obligation to transmit in AIS

The IMO (International Maritime Organisation) was responsible for making it compulsory to have equipment to generate AIS signals in SOLAS (Safety of Life at Sea) vessels.

Vessels of 300 tonnes and over making international voyages must be equipped with AIS, as well as cargo vessels of 500 tonnes and over not intended for international voyages.

Vessels meeting the above criteria, built after 1 July 2002, must be equipped with an approved AIS system.

C. Description of the AIS system

The role of AIS is to transmit and receive nautical information such as speed, course and changes in course. Misunderstandings between vessels are thus avoided and VHF channels less overloaded.

Whilst radar provides basic information on the obstacles of a course, AIS provides additional data on the navigation of nearby boats (if equipped with AIS transceivers). AIS provides very accurate data such as speed and actual course of boats, as well as other data such as vessel identification, size and sometimes, their destination.

AIS is based on digital radio communication where various transceivers share transmission time.

The system is theoretically limited to 75 boats: however, when a large number of boats are sailing in the same zone, the AIS system automatically reduces its receive action radius to give greater importance to the strongest signals retrieved, that is to say, the boats that are nearest.

To avoid risks linked to a transmission channel breakdown, the AIS system functions in parallel on two frequencies in a frequency band dedicated to maritime traffic. These frequencies are set by default to 161.975 MHz maritime channel ASI2 (Automatic Ships Identification) and 162.025 MHz maritime channel ASI1.

The data transmitted is time-staggered on the two channels in order to reduce refreshment time. This information is classified in two categories: dynamic and static types of information.

D. Dynamic information

This data is vital since it is relative to the "real time" movement of the boat. The dynamic information sent by AIS signals is as follows:

MMSI :	Vessel identifier
ROT (Rate Of Turn):	Rotation speed
Navigation status:	In port, manoeuvring, under sail
Latitude:	1/10,000 th minute resolution
Longitude::	1/10,000 th minute resolution
SOG (Speed Over Ground)	Actual speed in 1/10ths of a knot
COG (Course Over Ground):	1/10,000 th minute resolution
True Heading (Gyro Compass):	Course in degrees
UTC Time for Creation of a Report:	Hours, minutes and seconds

The refreshment time for this information may range from a few minutes to two seconds, depending on the speed and manoeuvre being undertaken by the boat.

E. Static information

Every six minutes, additional static information is sent relative to the boat and its current journey; for example, the name of the vessel, the onboard GPS position, the destination port, etc.

F. Dynamic and static AIS information

All the static and dynamic data provides detailed knowledge of the data of nearby ships.

Figure 1: AIS data for a ship as displayed in Plotter software on a PC

Ship information

Ship mmsi	233921000	Lookup
Ship name	CITY OF PARIS	
Call sign	MZMT2	☐ Flag
IMO number	9174775	
Registration	United Kingdom	
Status	under way	
Destination	LIVORNO	
Eta at dest.	May19 22:00	
Latitude	42° 1.795N	
Longitude	7°54.741E	
Heading	040°	My photo
Course	40.0°	Search photo
Speed	15.3kts	
Length	100m (forward 22m)	
Beam	20m (port 12m)	
Draught	5.3m	
Type	Cargo ship [A]	
Range	48.2nm (retreating)	
Bearing	216°T	
Datetime	2007-05-19 10:55:30	

☐ Plot ship
☐ Never
☒ Cond.
☐ Always

☐ Label ship
☐ Never
☒ Cond.
☐ Always

Auto lookup
 Edit
 OK

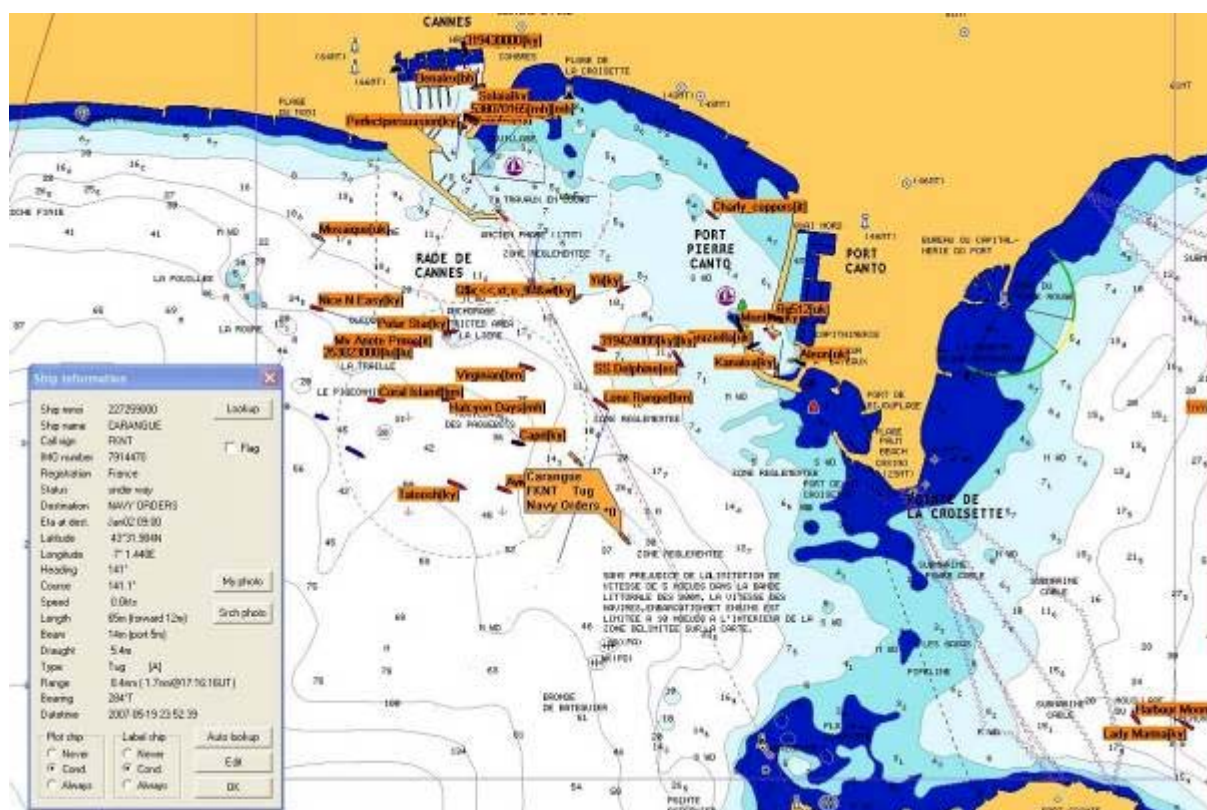
G. Display

Figure 2: List of vessels decoded and displayed in Plotter software on a PC

Ship name	name	callsign	latitude	longitude	destination	course	speed	dimensions	ship type	(message time)	range to
235749000	ALTITUDE	NCAM7	43°55.275N	7° 7.899E		89.5°	0.0kt	6x 0x 0.0m	Vessel:pirate	(20050531 090143)	5.5 *
235232000	ROSAIQUE	SNH32	43°51.750N	7° 8.181E	PEACEGOODWILL	114.0°	8.5kt	0x 0x 3.0m	Vessel:pirate	(20050531 090715)	5.1 *
319314000	FLOWZY	SCN93	43°52.071N	7° 4.013E	GOLFE-JUAN	275.0°	0.1kt	48x 0x 0.0m	Vessel:pirate	(20050531 095913)	2.9 *
319080000	319080000[CVM]	unknown	43°55.261N	7° 7.775E		0.0°	0.0kt	0x 0x 0.0m	unspecified	(20050531 090104)	5.4 *
310137000	20520000	SCN85	43°55.255N	7° 7.883E		226.0°	0.0kt	44x 8x 1.3m	Vessel:pirate	(20050531 090646)	5.5 *
319890000	ARZVI	SC105	43°52.930N	7° 0.980E	ST MARTIN	225.0°	0.0kt	32x 8x 1.2m	Vessel:pirate	(20050531 090635)	0.3 *
319991000	ALTA	2DB04	43°52.631N	7° 1.308E	LA HAYOUE	93.0°	0.0kt	38x20x 2.6m	Vessel:pirate	(20050531 090109)	0.1 *
319415000	SEVEN BINS	200D6	43°52.750N	7° 0.930E	CANNES PORT	0.1°	0.0kt	42x 8x 1.2m	Vessel:pirate	(20050531 090533)	0.2 *
319775000	SARAH	200E	43°52.880N	7° 0.952E	NOT DEFINED	174.3°	0.1kt	60x12x 3.7m	Vessel:pirate	(20050531 090633)	0.3 *
319910000	FORTUNATE SUN	SC999	43°55.215N	7° 7.041E	ANTHES TYCA	363.0°	0.0kt	54x13x 3.0m	Vessel:pirate	(20050531 095904)	5.4 *
319001000	TALLA	SCN56	43°52.431N	7° 1.026E	CANNES	365.3°	0.0kt	47x 9x 2.9m	unspecified	(20050531 090704)	0.5 *
247134000	247134000[IT]	unknown	43°55.925N	7° 10.204E	unknown	41.0°	11.5kt	0x 0x 0.0m	unspecified	(20050531 090718)	34.4 *
319221000	TITAN	unknown	43°55.506N	7° 4.388E		56.8°	0.1kt	80x11x 4.2m	Passenger	(20050531 090646)	3.8 *
319960000	N/A	SC15	43°55.235N	7° 7.723E	unknown	0.0°	0.0kt	126x25x 5.7m	Other ship	(20050531 090712)	5.4 *
310181000	VIRGINIAN	2CAL7	43°55.150N	7° 7.790E	FERRIC RIVIERA	29.0°	0.0kt	70x 7x 3.3m	unspecified	(20050531 090717)	5.4 *
319785000	OCTOBER ROSE	SC1A5	43°52.894N	7° 0.958E	CANNES	340.0°	0.0kt	88x 8x 4.0m	Vessel:pirate	(20050531 090705)	0.3 *
319974000	N/Y DREAM	SC117	43°52.771N	7° 0.895E	CANNES	154.1°	0.0kt	80x13x 3.2m	Vessel:pirate	(20050531 090714)	0.2 *
319985000	CAPRI	SC104	43°55.200N	7° 7.030E		264.0°	0.0kt	0x 0x 0.0m	unspecified	(20050531 090716)	5.4 *
306606000	LADY ENGBERG	P08N	43°50.917N	6°54.345E	MORISCO	260.9°	0.1kt	36x 6x 1.5m	Vessel:pirate	(20050531 090717)	3.9 *
308762000	CELESTA II	C08M9	43°52.306N	7° 0.547E	CANNES	unk.	unk.	88x16x 4.0m	Passenger	(20050531 090720)	0.6 *
307674000	RAJA	JOY1333	43°52.090N	7° 0.940E	CANNES	133.0°	0.0kt	36x13x10.0m	Vessel:pirate	(20050531 090723)	0.3 *
356742000	REV FLAMENCO	3KA09	43°41.379N	7°17.352E	NICE	31.0°	5.4kt	143x2x3 6.6m	Passenger	(20050531 090705)	14.6 *
303471000	SV ENDEAVOR	WCE5063	43°14.335N	7°24.479E	PORT LA NOUVELLE	54.0°	7.3kt	40x13x 6.0m	Other ship	(20050531 090453)	24.7 *
319306000	ILLUSION	SCM20	43°55.010N	7° 8.080E	SETEMER	42.0°	0.1kt	80x 8x 3.2m	Vessel:pirate	(20050531 090318)	5.5 *
247078500	247078500[IT]	unknown	42°56.610N	7°31.520E		269.0°	14.1kt	0x 0x 0.0m	unspecified	(20050531 090010)	42.3 *
319869000	319869000[RV]	unknown	43°55.256N	7° 7.895E		189.5°	0.1kt	0x 0x 0.0m	unspecified	(20050531 095945)	5.5 *

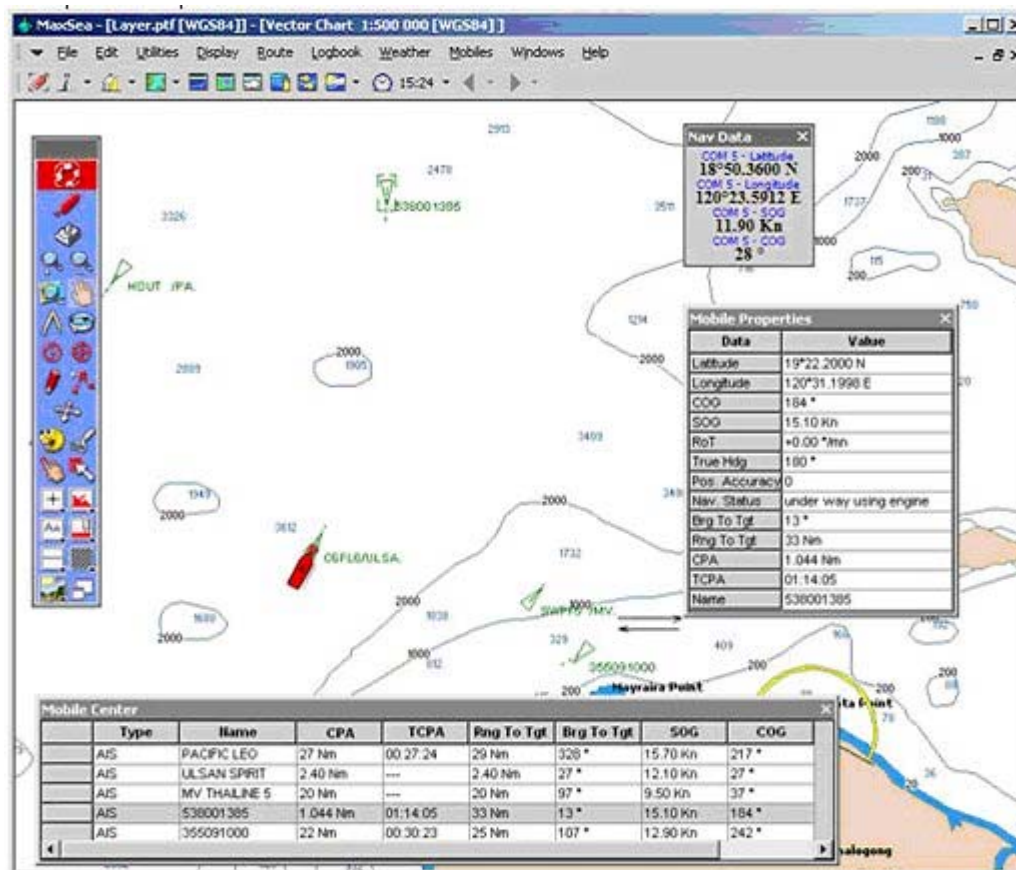
Or as for ARPA targets in the form of differentiated icons with labels, collision vectors and other pertinent data, displayed directly on a map.

Figure 3: graphic representation of vessels displayed in Plotter software on a PC



There are a number of compatible onboard mapping systems available which include PCplotter, Shipplotter, Sw&N, Maxsea, etc.

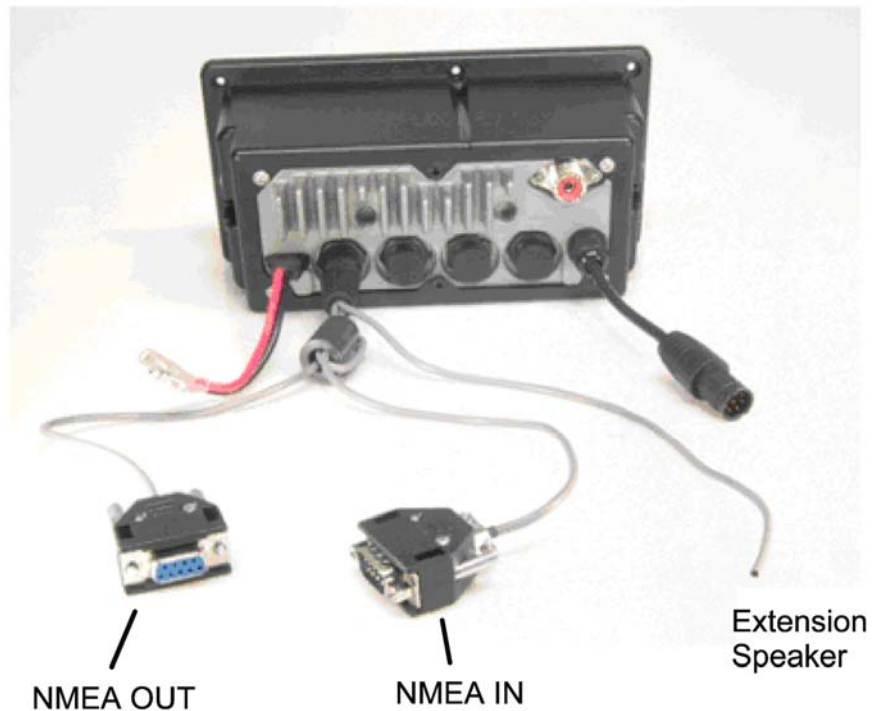
Figure 4: Representation of AIS targets displayed in Plotter software on a PC



Mobile Center								
	Type	Name	CPA	TCPA	Rng To Tgt	Brg To Tgt	SOG	COG
	AIS	PACIFIC LEO	27 Nm	00:27:24	29 Nm	328°	15.70 Kn	217°
	AIS	ULSAN SPIRIT	2.40 Nm	---	2.40 Nm	27°	12.10 Kn	27°
	AIS	MV THALINE 5	20 Nm	---	20 Nm	97°	9.50 Kn	37°
	AIS	538001385	1.044 Nm	01:14:05	33 Nm	13°	15.10 Kn	184°
	AIS	355091000	22 Nm	00:30:23	25 Nm	107°	12.90 Kn	242°

H. AIS connection to IC-M603 and IC-M505 with UTIF-AIS option

Figure 6: input/output connectors on IC-M603 with UTIF-AIS option



Connections to the 9 pin serial lead are as follows :

Pin 2 NMEA OUT	Pin 2 NMEA IN
Pin 5 –Ground	Pin 5 Ground

II. Using the Icom AIS

A. Principle for using an ICOM VHF radio with UTIF-AIS option

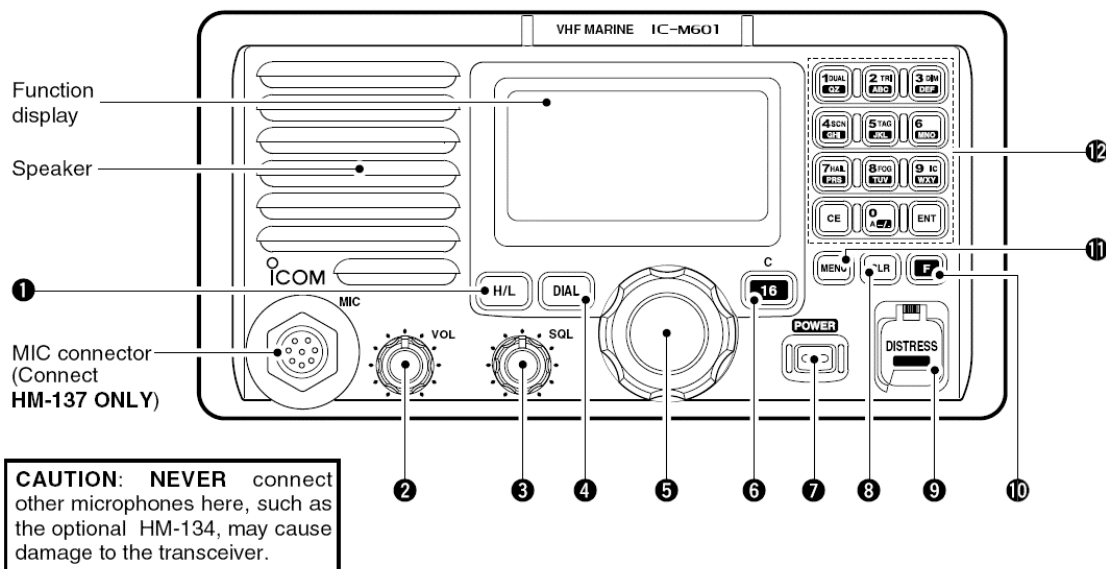
VHF reception simply needs to be activated manually on one or other of the AIS channels or by simultaneously scanning both AIS channels shown on the display as A1 & A2.

B. Activation of the AIS

On a normal set of channels, the two AIS channels (AIS 1 & AIS 2) are marked by default with a TAG (see the VHF radio user manual to understand the role of the tag in scanning), which means they will be scanned when the scan function is activated. This is the easiest method of AIS implementation. You will thus continue to listen in to your favourite channels while AIS information is being regularly transmitted to the NMEA output and your application.

C. Activation of scanning on the IC-M603

Figure 7: Front panel of the IC-M603



This is very easy to activate, requiring two steps:

1°) Briefly press the **[F]** key, identified by the number **10** on the above view.

2°) Briefly press the **4 SCN GHI** SCN/GHI key on the keypad.

D. Explanation of basic operation

The VHF radio, when in scanning mode for all the tagged channels, will stop when it encounters a busy channel and then start scanning again when the channel is free.

With each passage on the AIS channels, data will be transmitted to the navigation equipment to enable AIS targets to be displayed.

An audible sound is emitted each time a raster is received, this is normal.

Briefly pressing **[F]** and the **4 SCN GHI** SCN/GHI again stops scanning.

This is the easiest method of use and it is sufficiently efficient to enable AIS monitoring in the majority of cases.

During VHF transmission phases or in active receive mode (audio open) for other channels, AIS data is not updated but this will occur when scanning restarts.

E. Advanced operation (*)

In particular conditions (no visibility, very dense traffic, imminent danger of collision, etc.), if the skipper considers it pertinent for his safety not to scan any other channel and only use AIS channel reception, he has three options to obtain maximum information refreshment:

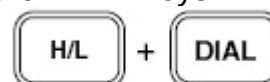
1) Stop scanning and only scan one or other of the AIS channels, chosen manually with the channel selection button.

Channel 70 is always scanned – it is possible to set up double or triple scanning to listen in to channel 16 and preferential channel.

2) Only scan the two AIS channels by eliminating the tags of all other channels.

Channel 70 is always scanned.

3) Quit the normal range of international channels and switch over to the AIS range by pressing and holding down the H/L then DIAL keys:



(AIS is then displayed at the top of the screen); the two AIS channels & channel 16 are now the only channels available in this mode.

Then launch scanning (as in normal mode).

Channel 70 is always scanned.

() Advanced operation is an added safety measure permitted by the potential of this equipment; it is not necessary to use it during normal operation.*

F. **NB. Operation on the IC-M505.**

The principle of operation on the IC-M505 is the same as the IC-M603, using the SCAN button for scanning tagged channels and holding down H/L and pressing DIAL to toggle between the 3 available channel groups, INT international (standard group for the UK), USA for frequencies used in American waters and AIS (being A1, A2 & Ch 16).

Channel 70 is always scanned.

NB. Notes on good practice.

When scanning several channels including the A1 & A2 channels reception of AIS data will only be received whilst scanning across the AIS channels, if a large number of channels are tagged or there is a lot of voice activity on the tagged channels in your scan, the amount of AIS data received will be reduced. Try to limit your scan channels to a minimum to improve the AIS data retrieval rate. Using Priority scan will monitor Ch 16 in-between every channel scanned in the TAG group, in busy areas this type of scan will reduce the amount of AIS data received.

Warning: the use of a navigation aid does not release the skipper from the necessary vigilance in respect of the safety of equipment and people.

ICOM UK Ltd
Sea St, Herne Bay, Kent. CT6 8LD
Tel. : + 44 (0)1227 741741 - Fax : + 44 (0)1227 741742
Web : [http:// www.icomuk.co.uk](http://www.icomuk.co.uk) - email : info@icomuk.co.uk