

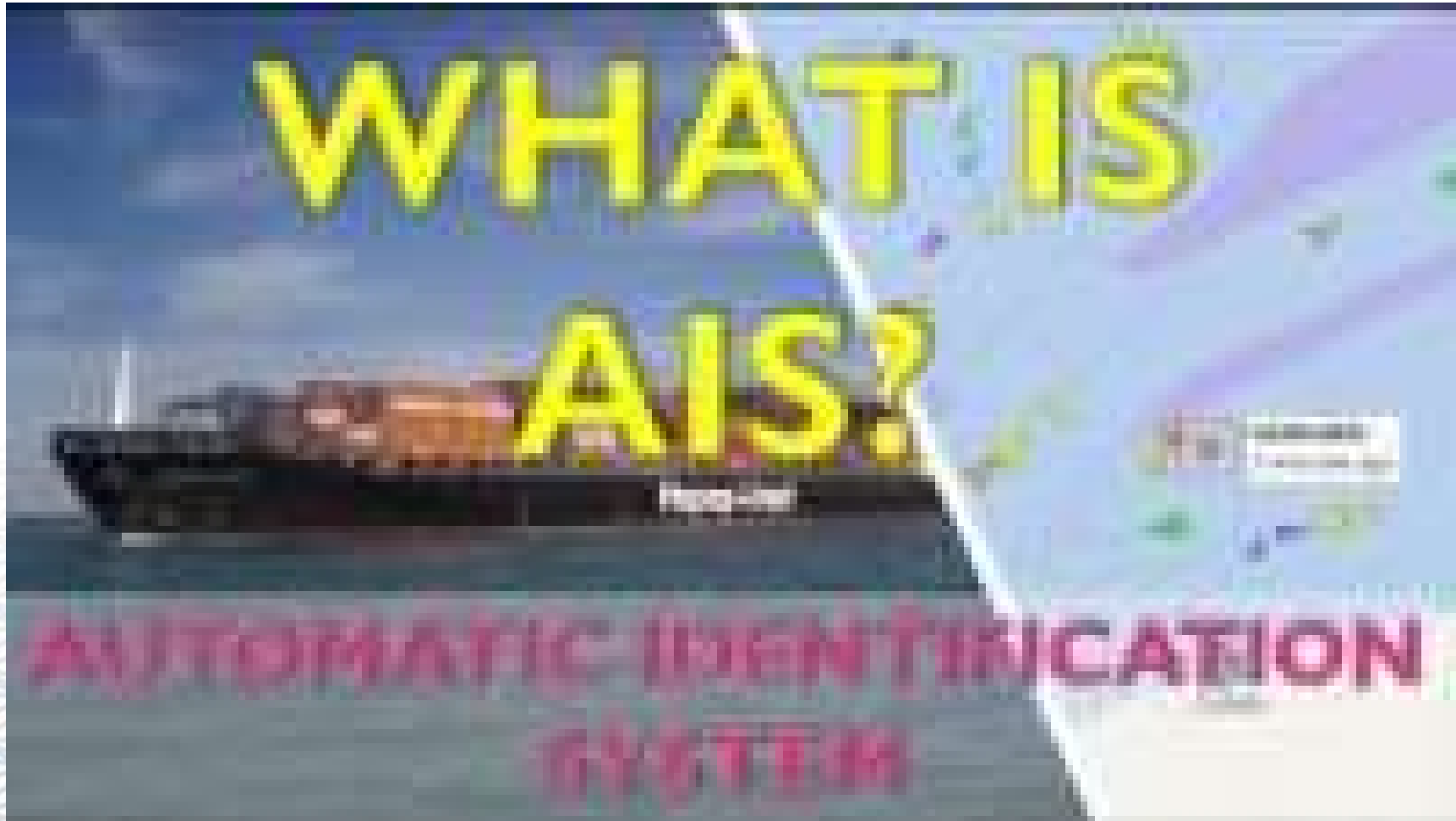
Session 3A



DSC & AIS, Emerging
Technologies including
Satellite comms, Instruments
and Electrical Battery
Systems



AIS Introduction



AIS - Automatic Identification System



AIS



What is AIS and how does it work?

Data packets transmitted on 2 special VHF channels

Class A on vessels > 300t – 12.5W transceiver

**Class B on smaller vessels – 2W transceiver OR
receiver only**



AIS



How to make it work?

Connected to GPS, instruments & VHF antenna

AIS information overlaid on plotter or pc



AIS



Video : Simrad plotter



12nm

N-UP

(RM)

Loc

NAV

Local Time

04:44:45

Csr Pos

23°36'.345S

153°59'.792E

182°M

4.992nm

COG

217°M

SOG

6.9kt

VMG Wpt

6.9kt

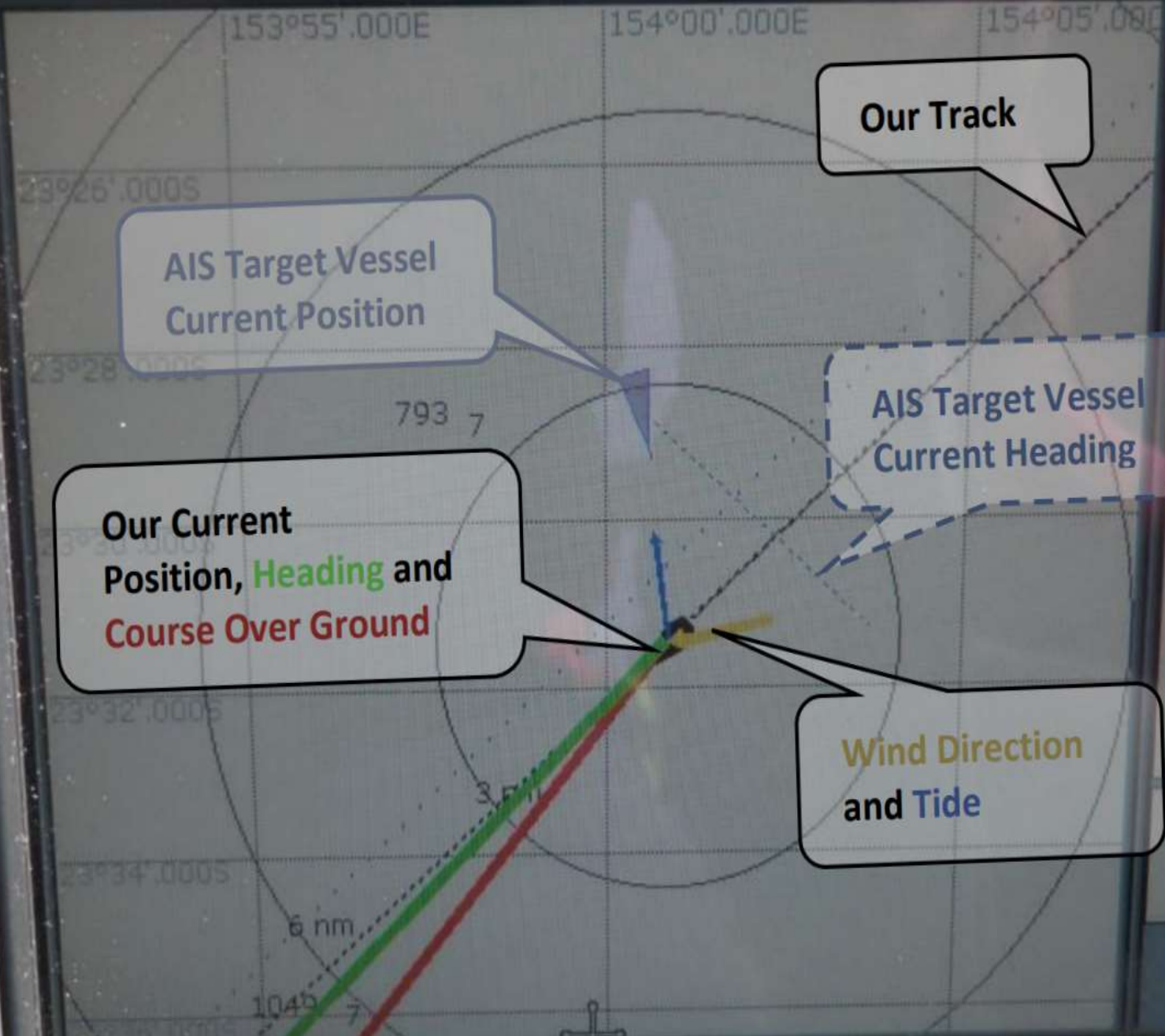
Our Track

AIS Target Vessel
Current Position

AIS Target Vessel
Current Heading

Our Current
Position, **Heading** and
Course Over Ground

Wind Direction
and Tide



FIND SHIP CURSOR

GOTO...

AIS OPTIONS...

NAVIGATION OPTIONS...

PRESENTATION...

24nm

N-UP

(RM)

Loc

NAV

Local Time

04:44:10

Csr Pos

AIS Target Info: MIMOSA DREAM

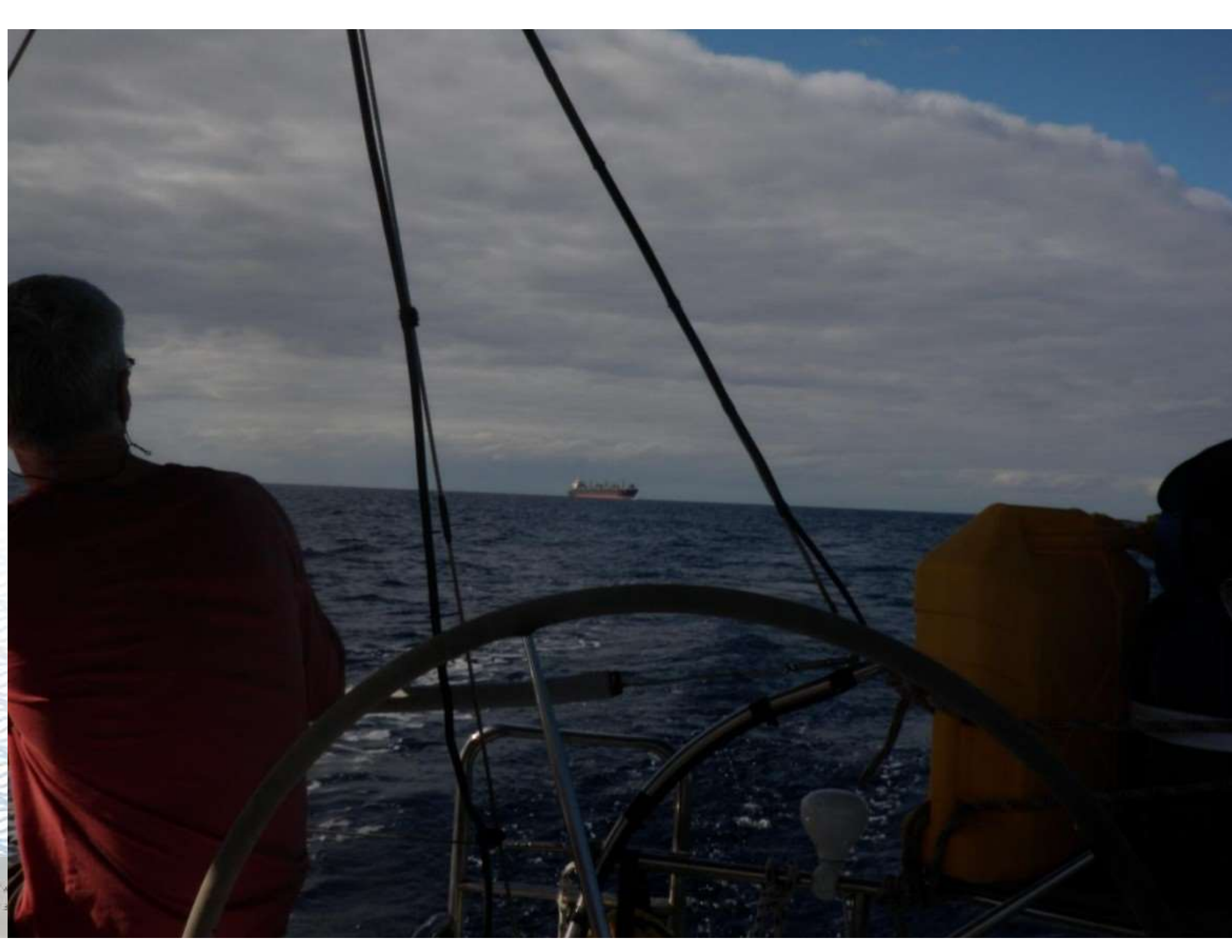
Position	23°28'.586S 154°00'.469E
Heading	157°M
ROT	+000°/min S
MMSI	548289000
Call sign	DYUD
IMO No	9140566
Length	656ft
Beam	105ft
Draught	8.4m

COG	167°M
SOG	11.4kt
CPA	1.889nm
TCPA	00h14m16s
Last seen	31/07/2014 04:44:02
Dest	AUGEX
ETA	03/08 22:00:00
Status	Under Way Using Engine
Vessel	Other

Closest Point of Approach (CPA)

Time to Closest Point of Approach (TCPA)

ADD TO BUDDY LIST



AIS - Automatic Identification System Summary



All SOLAS ships have AIS transponders

Many smaller and recreational vessels use AIS

Becoming mandated by Australian Sailing

Can get receive only equipment – not recommended

Aid to Navigation

Collision avoidance

Note VHF performance, range and LOS limits.

QUESTIONS?



AIS / DSC MOB



AIS / DSC MOB



DSC - Digital Selective Calling



DSC



What is DSC and how does it work?

A “Paging” system on VHF 70

DSC initiates a call, sending boat id, lat/long, type of distress and the channel for voice comms.

Short digital message from one station to one or many



DSC



To make DSC work, you need:

GPS connection to DSC radio! (or internal GPS)

MMSI = 503xxxxxx ... 9 digits unique to your radio

- from AMSA (or 8503xxxxx for hand held radios)

Don't be in the 90%



DSC



DSC Message types:

Distress (Mayday)

All Ships – Urgency (Pan Pan)

Individual DSC call* (boat to boat)

Group DSC call* (boat to group of boats)

Location DSC request* (boat to boat)

***you should practice these on your boat**



DSC



Video : DSC Distress - Mayday

Video : DSC All Ships Urgency – Pan Pan

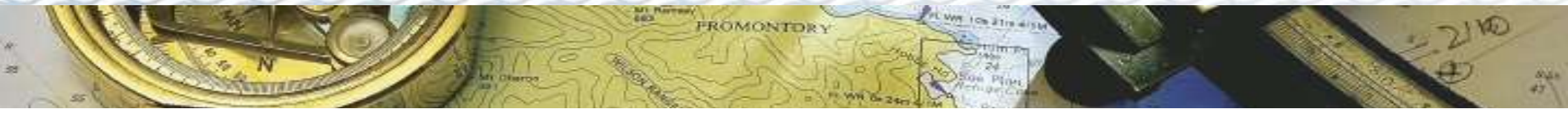
Look up instructions for your DSC radio !



DSC – Group Call



If activated in error, what would you do?



DSC – Urgency (Pan Pan) Call

WARNING

The DSC calls you are about to see should NOT be attempted unless you really have a situation on-board your boat.

**YachtCom
& SailCom**

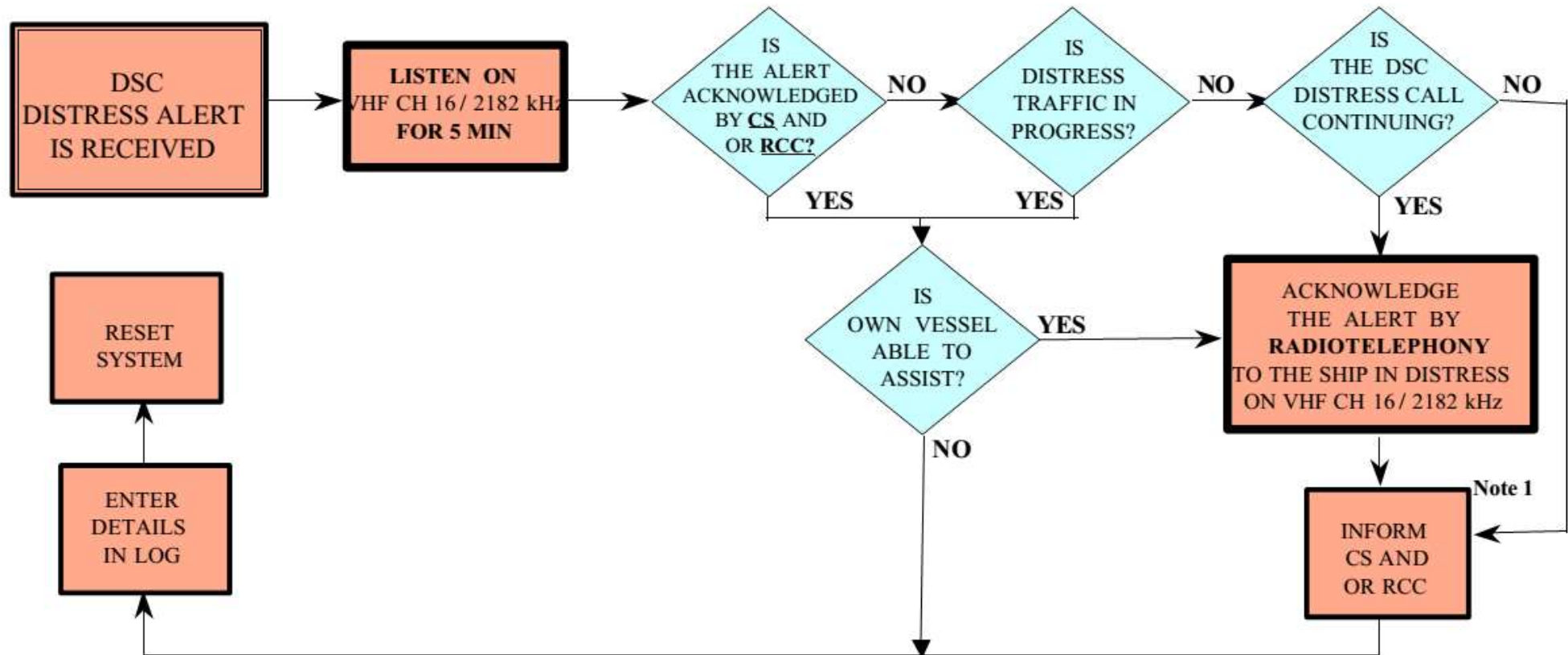


www.yachtcom.co.uk



Response to DSC Distress Call

ACTIONS BY SHIPS UPON RECEPTION OF VHF / MF DSC DISTRESS ALERT



REMARKS:

Note 1 : Appropriate or relevant RCC and/or Coast Station shall be informed accordingly. If further DSC alerts are received from the same source and the ship in distress is beyond doubt in the vicinity, a DSC acknowledgement may, after consultation with an RCC or Coast Station, be sent to terminate the call.

CS = Coast Station

RCC = Rescue Co-ordination Center

DSC



Video : Individual Call (Icom)

Look up instructions for your DSC radio !



DSC – Individual Call



DSC - Digital Selective Calling Summary



Available on HF and VHF

AS Special Regulations require

- From 1/7/2013 all new HF and VHF to be DSC capable
- DSC capable radios must be programmed & operational

Note that to make DSC operational:

- Need MMSI (*free from AMSA*)
- Need GPS connection

Consider DSC as initiating a call transmitting position, boat identification and class of distress message.



DSC & AIS



QUESTIONS ?



Emerging Technologies and recommended for Offshore racing and Sailing



- Navigation Systems
- Instrument and Autopilot Systems
- Satellite communications system
- Electrical and Battery Systems



Navigation Systems



Options include:

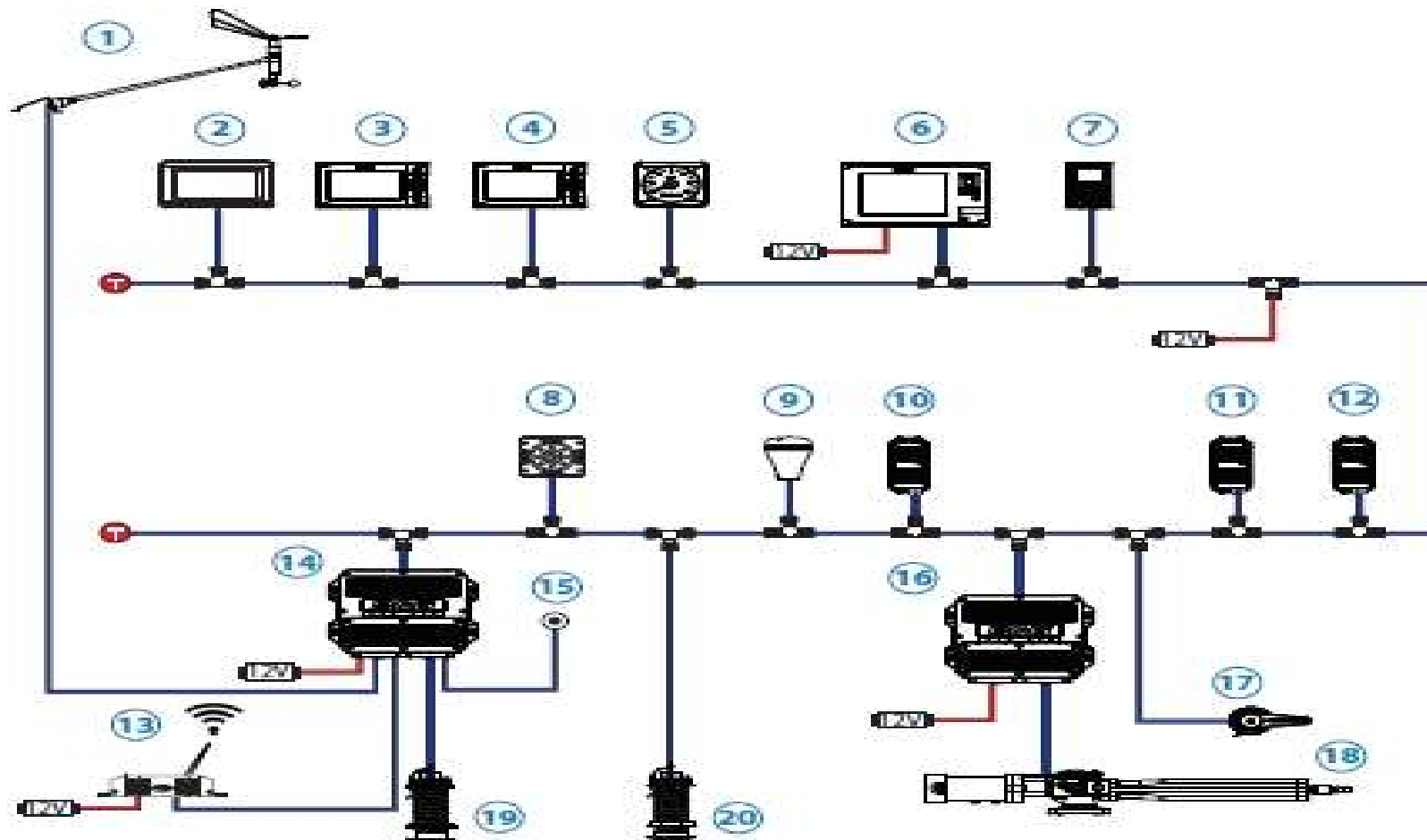
- Computer with navigation software, ie Expedition*
Recommend a fanless SSD computer, USB monitor
Expedition is a one stop shop; charts, routing, notes, AIS, radar, competitor tracking, etc
- Electronic chart types Cmap, Navionics, ENC's
- Spare systems for redundancy, ie notebook, chart plotter, Ipad, phone **AND** GPS, Compass, connectors, cables ?
- Independent chart plotter, ie B&G, Raymarine etc



Instruments and Autopilot Systems

H5000 system example

An example of a typical H5000 system. At the centre of the system is the Central Processor Unit (CPU). All sensor information is fed back to the CPU and can be easily controlled and configured via the Graphic Display or webserver.



Instruments and Autopilot Systems



- High quality and reliable, known brands such as B&G, Raymarine, Garmin
- Displayed and easily read from the Helm (Mast Repeaters) and the Nav Station
- Well maintained and excellent condition – Mast Head Unit is a key component
- Setup and calibrated – critical for Autohelm (when operating in TWA mode)
- Compatibility – Modern systems use a NMEA2000 network backbone (which makes for easier plug and play installation and troubleshooting)
- Beware of older systems using NMEA0183, they are harder to setup and require physical connections for input and output from each unit.



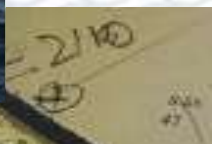
Instruments and Autopilot Systems



Autopilot Drives



- Two main types, Electric Direct Linear Drive and Hydraulic Rams
- Recommend you use a high reliable/quality unit as you will be relying on this device. Consider taking a spare unit.
- Select a Drive one size above the recommended size to ensure the unit has the power and torque to drive the yacht in heavy seas
- The Drive does not need to be the same brand as the Autopilot controller as most systems use the same interfaces, ie clutch solenoid and reversing motor connections



Autopilot Drive Types



- Two main types, Electric Direct Linear Drive and Hydraulic Rams
- Recommend you use a high reliable/quality unit as you will be relying on this device. Consider taking a spare unit.
- Select a Drive one size above the recommended size to ensure the unit has the power and torque to drive the yacht in heavy seas
- The Drive does not need to be the same brand as the Autopilot controller as most systems use the same interfaces, ie clutch solenoid and reversing motor connections



Autopilot Drive Types



Satellite Communication Options



- **Starlink** – Low Earth Orbit (LEO) Satellites, Games changer, cheap to install, excellent coverage and fast speed. Starlink Mini recommended for yachts
- **Other LEO providers** like OneWeb, Amazon, Iridium, Telesat, and LeoSat are expected to enter the Australian market in the coming years.
- **Iridium Network** – Use either Iridium Phone permanently connected to the yachts house batteries with external antenna. Or use Iridium Go or Exec hardware using a smart phone. Mediumm cost, slow internet speed but cheaper to run.
- **Inmarsat** – using Geostationary satellites, excellent coverage but expensive hardware and running costs – not recommended for yatchs



Satellite Communication Options



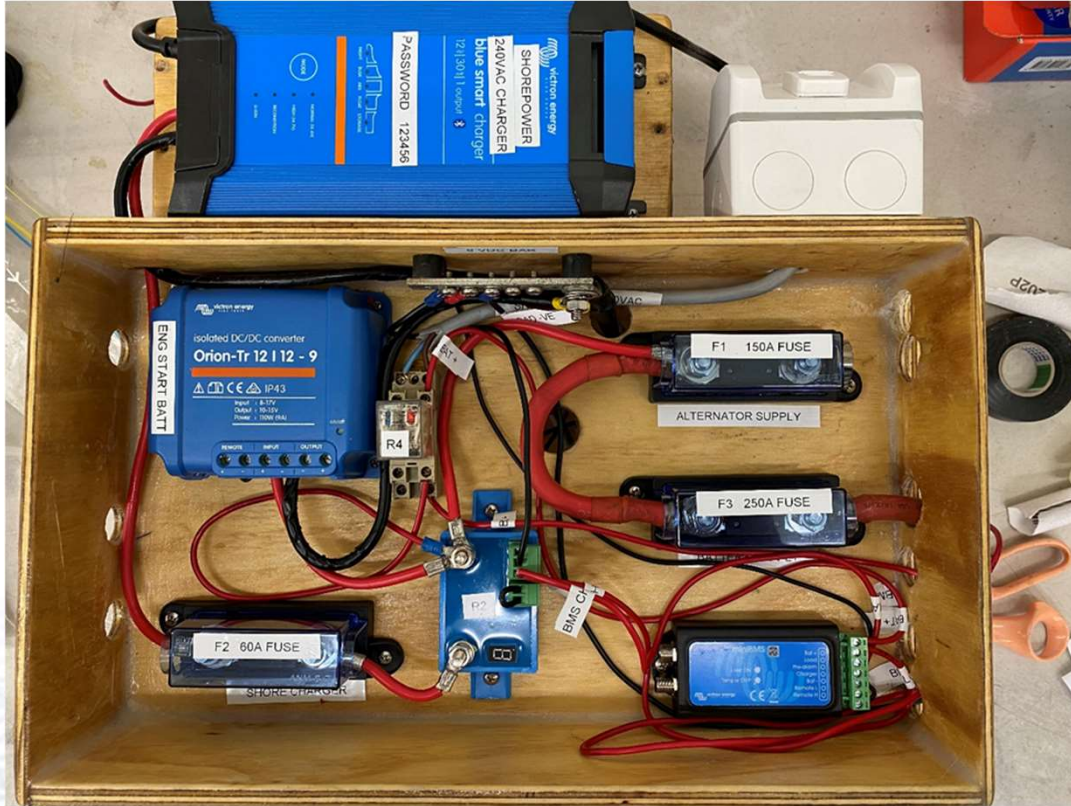
Electrical and Battery Systems



- Determine your total load including all devices which will be turned on and used, include fridge, auto-helm, computer etc. We used between 8 to 10 amps
- How old are your batteries ?
- How old is your engine, is it reliable ?
- How old is your alternator, carry a spare?
- You need a Battery monitor with a shunt (measure current in/out of batteries)
- What type of alternator do you have and what is the amp hour rating ? We recommend 120 amp plus, over 200amp recommended (tip take your old alternator as a spare)
- What is the condition and size of your wiring ? ie Can it handle the extra current ? Recommend tinned copper wiring and stranded for large cable sizes.



Example – Lithium Victron



Battery Options



- Battery options AGM, Gel, Firefly, LiFePO4 – need at least 250amp hours per day of usable power. This will require a minimum of 500amp hour of AGM, or 300amp hour of LiFePO4. LiFePO4 is a superior battery system for charging and will achieve a much high SOC in a much shorter period.
- LiFePO4 will require a Battery Management System hardware
- Example of a recommended brand of hardware for both battery and BMS is Victron.
- Two types of LiFePO4 batteries are “Drop in” type (ie with an in built BMS) or raw type LiFePO4 battery (ie Victron)
- Consider LiFePO4 diagnostics capability, ie Bluetooth monitoring



Other power generation options



- Existing engine or dedicated generator with high output alternator(s)
- Wind generator – noisy and struggles in high wind and no wind situations
- Solar Panels – require many panels and only effective in midday conditions, low number of hours near the equator so may not be effective for an Osaka race
- Hydro-generator – attached to the transom and uses a propeller in the water to generator power – Very effective (40A at 12 kts) but relies on movement boat. This is our recommended solution (to save on diesel fuel usage).



QUESTIONS ?

