

MARINE DATA COMMUNICATION & NETWORKING

Course pre-requisites:

This course has been designed with in mind professional or leisure craft sailors, Trawler skippers, Naval officers, NMCI Students willing to learn more about the specifics of troubleshooting Marine Computing devices. No particular diploma is required to join this course, however a certain amount of experience in operating computers is preferable. A personal laptop with dual core processor, min 4 gigabytes of memory and 250 gigabytes of disk would be an asset to get the maximum of this course. (Recommended: Basic Apple Macbook Pro. 13 with i5 or i7 default configuration, VMWare fusion or equivalent i.e. Virtual Box – Apple Mac are the only hardware able to run natively the three major OS available linux, Mac-OS or MS Windows). In doubt feel free to contact course lecturer or the National Maritime College of Ireland (NMCI) for more information.

Course supported by: **NMCI, iMERC, CIT, CHMarine, Raymarine, Kestrel Communications, PolarNavy, TRANSAS Marine,**

Synopsis*:

1- Hardware:

Personal Computers & integrated systems
Power (ship power - unstable, 24V etc.) & UPS switches
Cabling
Principle boat/ship systems: engine (control, monitoring & alarm), navigation (key elements)
Common connection hardware
Correct network connection configurations - dual redundancy, parallel over serial network connections, hubs etc.

2- Software:

Understanding software licensing (Open Source vs Proprietary, shareware, freeware)
Operating Systems
Visualisation – build your own lab
Microsoft based software (MaxSea, ScanNav, Ship AIS, Transas...)
Mac OS-X based software (Mac ENC, Polar Nav, Transas iSailor)
Linux based software (Polar Nav, AIS Dispatcher...)

3- Data Network:

Describe how networks function
Identifying major components
Functions of the major network components
Basics of TCP/IP (subnet, IP class, public IP etc)
Command line (SSH, SFTP, Telnet still in use on some iridium systems)

Installation Issues:

- 🔧 Toolkit (from crimping tools, how to build your own)
- 🔧 Installation Health and Safety (harness, helmet, dos and donts)
- 🔧 Cable running & ducting
- 🔧 Limitation of wireless in commercial vessels (**Faraday**)
- 🔧 Do's & don'ts of equipment interconnection (buffering / isolation / crosstalk etc.)
- 🔧 equipment ventilation (Heating / Cooling)
- 🔧 Equipment & cable shielding
- 🔧 Physical robustness (shock absorption, vibration etc.)
- 🔧 Waterproofing
- 🔧 Fire & explosion retardant/prevention requirements (ATEX etc)
- 🔧 Lightning & surge protection (Think the more static it gives out the more chances to get stuck, snow creates static)

For more [information](#) call NMCI: +353 21 4970609 or email services@nmci.ie



Protocols:

- 🔗 TCP/IP IPV4 & IPV6
- 🔗 RS232 & RS422
- 🔗 NMEA 0183 (NMEA 2000?)
- 🔗 Bluetooth (PAN - port personal area network)
- 🔗 PPP, EAP and the IEEE 802.1X standard
- 🔗 Proprietary systems e.g. Raymarine SeaTalk protocol etc...

Radio & marine data networking:

- 📡 Satellite communications
- 📡 Connecting AIS device
- 📡 Connecting Radar device
- 📡 Network connectivity at sea - sat comms, HF/DL, mobile (3G etc.)
- 📡 RF environment - interference
- 📡 WIFI & Bluetooth
- 📡 Antennas

(* The agenda of this course is subject to change to match time & delivery.

OBJECTIVES: At the end of the course a student should be able to build a computer from bare components, install an operating system of his choice on it, configure it. He / she will be able to build / crimp from parts a network cable, connect the computer to the Internet, install a navigation system of his / her choice, including charts .