



MARITIME DOMAIN AWARENESS (MDA) COURSES CATALOGUE



UNODC

Global Maritime Crime Programme

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The UNODC Global Maritime Crime Programme (GMCP) supports United Nations Member States through a comprehensive strengthening of criminal justice to combat maritime crime. In 2020, the Programme began providing training in Maritime Domain Awareness (MDA). This includes the detection of breaches of laws and regulations related to:

- Safe navigation
- Marine resources
- Marine and coastal habitat
- Piracy
- Smuggling of contraband and people
- Terrorism
- Unauthorized use of radio spectrum

Maritime law enforcement agencies are provided with a comprehensive training on how to identify and tackle breaches of the above mentioned laws and regulations, so as to increase the likelihood of successful law enforcement operations. The training reinforces the framework of Conventions and Treaties of the International Maritime Organization, International Telecommunication Union and Office of Legal Affairs, as well as those of the United Nations Office on Drugs and Crime (UNODC).

There are eight training courses which address different technology, regulations and practices:

MDA Foundation Courses

- *Foundation Course Stage 1 – Use of Maritime Domain & Patterns of Life at Sea*
- *Foundation Course Stage 2 – Regulating & Organization of the Maritime Domain*
- *Foundation Course Stage 3 – Illegal acts at sea & tools to detect them*

MDA Analytical Courses

- *Basic Course – Towards a Comprehensive Maritime Surface Picture*
- *Intermediate Course – Strengthening Dark Targeting Capability*
- *Advanced Course – Countering Detection Evasion*

MDA Specialised Courses

- *Specialised Training – Collection of Soft MDA and HUMINT*
- *Specialised Training – Radar Analysis*

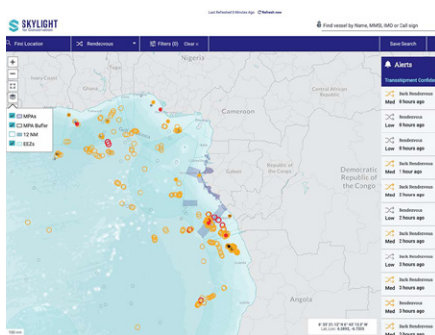
The eight training courses address both human and machine interpretation of intelligence gained through surveillance and monitoring assets (terrestrial, airborne and satellite). The courses also cover Internet of things and Artificial Intelligence to simultaneously test multiple data sets to determine anomalies through interpretation of behavioural patterns.

FOUNDATION COURSE STAGE 1

USE OF MARITIME DOMAIN & PATTERNS OF LIFE AT SEA

Considers the use of the maritime domain in the context of local trades, fishing activities or offshore mineral extraction and factors affecting the day-to-day activities of vessels transiting coastal waters, use of ports and their impact on the Coastal State. This course includes the composition of the domain centric to the Coastal State concerned and how that affects the vessels using it.

It then includes an outline of how commerce affects the domain and conversely how the socioeconomic activities will impact on commerce in the area. It then gives an overview to management and oversight of the coastal space and why this is important to situational awareness within the maritime domain. Lastly the stakeholders of the Coastal State are considered and how they will influence the behaviour of vessels.



TRAINING LOCATIONS

To be communicated.

COURSE STRUCTURE

The training course will include a mixture of classroom training and practical exercises, as well as an on-site visit relevant to the curriculum.

COURSE REQUIREMENTS

Course participants are required to have a good knowledge of English.

COURSE LENGTH

4 days

COURSE CURRICULUM

1. Use of the maritime domain

- The cohort need an outline understanding of what kind of vessels populate the domain and how they are operated. Such vessels should include commercial ships, fishing vessels, motor and sailing yachts, work boats, special vessels, naval and blue force vessels.

2. Composition of the Coastal State maritime domain

- An outline understanding of how the composition of the local maritime domain affects the vessels that remain within it, pass through or harvest from. It is necessary to determine what influences normal behaviour so as to be able to recognise patterns of abnormal behaviour.

3. Importance of the maritime domain for commerce

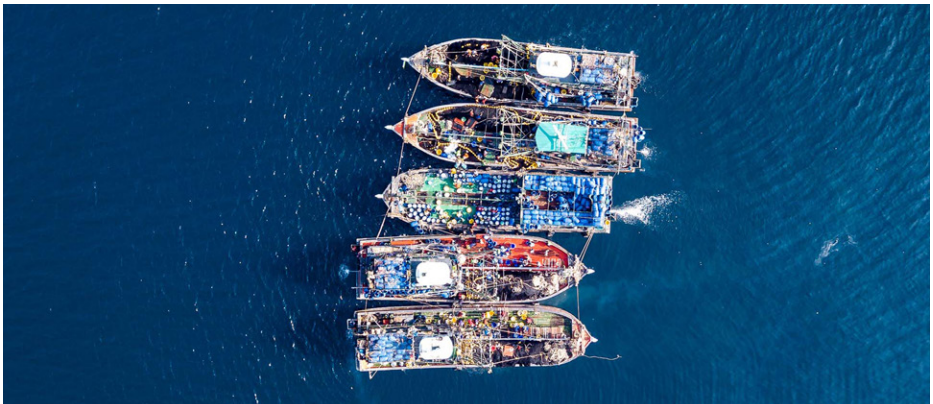
- The cohort should understand the need for commerce and have a basic understanding of the players in the context of their own communities.

4. Management and oversight of the coastal maritime space

- It is necessary to have basic knowledge as to the roles of the different agencies operating as well as their areas of responsibility.

5. Stakeholders of the Coastal State maritime domain

- Other than the aforementioned parties there are a number of stakeholders that are either directly or indirectly affected by the domain. An outline knowledge is provided on stakeholders in the context of trade and commerce of the Coastal State. This would include vessel traffic service operators, pilots, harbour master, port or terminal workers and of course crew and passengers aboard the vessels.



FOUNDATION COURSE STAGE 2

REGULATING & ORGANIZATION OF THE MARITIME DOMAIN

This course deals with organising the maritime domain and includes an outline of international instruments that provide regulations which, when breached, give the right to carry out enforcement and prosecution. Instruments covered are those that affect the behaviour of vessels which could include UNCLOS, SOLAS, MARPOL, Ballast Water Convention, International Health regulations, Collision Regulations, Dangerous Goods, and those affecting communications.

This stage includes weather and ocean dynamics that affect vessels and how they relate to regulations and the consequence of not abiding to regulations can result in maritime casualties and pollution. The course then addresses the responsibility or portrayal of the vessels in various circumstances and considers the dynamics of the ocean and weather and how they affect the behaviour of vessels including tides currents, sea state, tropical revolving storms and reduce visibility. Finally, this course also outlines the cause and consequences of maritime casualties and pollution.



TRAINING LOCATIONS

To be communicated.

COURSE STRUCTURE

The training course will include a mixture of classroom training and practical exercises, as well as an on-site visit relevant to the curriculum.

COURSE REQUIREMENTS

Course participants are required to have a good knowledge of English. Furthermore, participants should have completed Foundation course stage 2

COURSE LENGTH

4 days

COURSE CURRICULUM

1. Use of the maritime domain

- The cohort need an outline understanding of what kind of vessels populate the domain and how they are operated. Such vessels should include commercial vessels, fishing vessels, motor and sailing yachts, work boats, special vessels, naval and blue force vessels.

2. Regulating the maritime domain

- It is necessary for the cohort to have awareness of regulations from a national and international perspective.

3. Key regulations and their impact on the domain

- It is necessary for cohort to understand the origin of regulations and the topics they cover. The cohort need to have a basic understanding of how regulations might impact on where a vessel can navigate, areas they have to avoid and as such might account for differences of routes by different types of vessels.

4. Rules affecting behaviour of vessels

- Basic information on the COLREGS and how they affect the responsibility of vessels, the portrayal of vessels using a combination of shapes and lights, and how an individual ship's behaviour is influenced by its status and interaction with other vessels.

5. Dynamics of the oceans and weather and its affects

- The cohort should have basic appreciation that resultant forces on the hull change with the seasons, weather, sea state and the visibility (affecting safe speed) and so day to day similar vessel will show different patterns.

6. Causes and consequences of maritime casualties and pollution

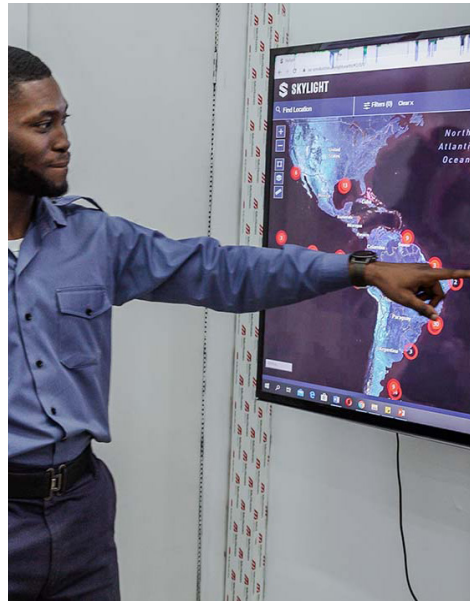
- A basic understanding that many maritime events such as casualties, search and rescue, groundings or lost vessels are due to poor situational awareness by ships crews of the effects of weather, traffic, sea state and visibility.

FOUNDATION COURSE STAGE 3

ILLEGAL ACTS AT SEA & TOOLS TO DETECT THEM

This course considers illegal acts that might happen at sea concentrating on those that are important to the Coastal State. It covers communication technology and why it is important to have a basic knowledge of the spectrum used and the differences between what is considered legal and illegal. It introduces cooperative monitoring and distress alert technologies as well as their limitations such as Automated Identification System (AIS) and the different variants of it, vessel monitoring systems, long range identification and tracking, ship security alert system. It also addresses Global Maritime Distress Safety Systems (GMDSS), explaining why these are important to understanding how we can track and communicate to vessels in the area.

This part then introduces the value of Human Intelligence (HUMINT) collection and Soft MDA reporting and explains how the citizen can be intrinsic to gathering Maritime Domain Awareness information and how that information can be used to give situational awareness in the overall common operating picture. It then outlines surveillance sensors available, their limitations and why the fusion of data sources is important to situational awareness. Finally, this stage addresses restrictions and limitations of third-party open sources subscribed to vessel movement services when used for Maritime Domain Awareness.



TRAINING LOCATIONS

To be communicated.

COURSE STRUCTURE

The training course will include a mixture of classroom training and practical exercises, as well as an on-site visit relevant to the curriculum.

COURSE REQUIREMENTS

Course participants are required to have a good knowledge of English. Furthermore, participants should have completed Foundation course stage 1

COURSE LENGTH

4 days

COURSE CURRICULUM

1. Overview of illegal acts at sea

- The cohort need to have a basic knowledge of the types of crime that may affect their Coastal State and the impact on it .

2. Communication technology used at sea

- A basic knowledge of communications used at sea such as the maritime channels used for operations within the agency of which members of the cohort belong.

3. Value of HUMINT collection and Soft-MDA reporting

- A basic introduction to the value of HUMINT collection, (the questioning of witnesses or suspects) and the collation of HUMINT Soft MDA reports (reporting by witness of an event sensed by sight or sound) can be vital on its own or when combined with tech MDA.

4. Cooperative monitoring and distress alert technologies

- A basic knowledge of the cooperative monitoring and distress alert technologies used by the coastal state and those used globally.

5. Surveillance sensors, fusion and situational awareness

- Basic knowledge on the availability of real time surveillance systems in use by the Coastal State such as coastal, airborne, ship or drone radar and electro-optical surveillance and whether the data is provided for fusion in a common operating picture, and if it is shared with regional fusion centres.

6. Third-party open-source and subscribed vessel movement services

- A basic introduction is needed of the different types of open source or subscribed regional shared vessel tracking services.



MDA Analytical Courses

1. BASIC COURSE

TOWARDS A COMPREHENSIVE MARITIME SURFACE PICTURE

This introductory course to Maritime Domain Awareness is designed to familiarise maritime law enforcement agencies personnel with the patterns of life at sea and maritime threats. Furthermore, this course will address services for terrestrial and satellite monitoring of vessels combined with terrestrial surveillance systems and inform of the limitations and vulnerabilities of the systems.



TRAINING LOCATIONS

To be communicated.

COURSE STRUCTURE

The training course will include a mixture of classroom training and practical exercises, as well as an on-site visit relevant to the curriculum.

COURSE REQUIREMENTS

Course participants are required to have a good knowledge of English.

COURSE LENGTH

4 days

COURSE CURRICULUM

1. Understanding of Maritime Domain Awareness.

2. Understanding the pattern of life at sea:

- Normal behavior of different types of vessels;
- Signaling and identification devices used;
- Convention on the International Regulations for Preventing Collisions at Sea (COLREGS);
- Behavior of maritime traffic in various geographic scenarios;
- Legitimate transfers at sea;
- Influence of international regulations;
- Detrimental effect of commerce on risk.

3. Exchange of information:

- Influence of regulatory bodies;
- Using daylight and night-time signaling;
- Between ships and maritime services and the need of nautical publications;

4. Soft MDA and how to engage the participation of the citizen:

- Need for Soft MDA;
- Motivation of citizens to participate;
- Required procedures and mechanisms.

5. Understanding maritime threats:

- IUU Fishing;
- Smuggling of contraband, arms and drugs;
- Smuggling and trafficking of people;
- Terrorism;
- Piracy;
- Noxious substance pollution and effect of alien species and hull coatings;

- Contravening the Convention on the International Regulations for Preventing Collisions at Sea, (COLREGS);
- Misuse of the radio spectrum.

6. Data sharing and access to data:

- Introduction to Internet of Things, Artificial Intelligence and risk engines;
- Use of SAR (Search and Rescue) services;
- Intelligence available through Big Data;
- Mandatory and voluntary ship reporting systems;
- Pilot, port and vessel traffic information services.

7. Understanding the use, vulnerabilities and limitations of RF monitoring services:

- VMS/MTU;
- VDES including AIS;
- e-Navigation;
- LRIT;
- SSAS;
- Voice Reporting.

8. Understanding the use, vulnerabilities and limitations of terrestrial surveillance systems:

- Radar;
- Radio Direction Finding;
- Optical imaging;
- Fibre optic pressure and acoustic sensors.

9. Fusion of monitoring services and surveillance systems.

2. INTERMEDIATE COURSE

STRENGTHENING DARK TARGETING CAPABILITY

This course is designed to introduce or refresh understanding of the use, benefits, limitations and vulnerabilities of airborne manned and unmanned aircraft (drones) as well as satellite borne synthetic aperture radar and optical imaging techniques. It also addresses the combination of these different surveillance types and teaches observers how to determine anomalies using vectorial drift and velocity plotting to help an observer to better understand how to recognise an illegal activity.



TRAINING LOCATIONS

To be communicated.

COURSE STRUCTURE

The training course will include a mixture of classroom training and practical exercises, as well as an on-site visit relevant to the curriculum.

COURSE REQUIREMENTS

Course participants are required to have a good knowledge of English.

Furthermore, participants must have also completed the GMCP Maritime Domain Awareness Basic Course: Towards a Comprehensive Maritime Surface Picture.

COURSE LENGTH

4 days

COURSE CURRICULUM

1. Recap of the Basic course.

2. Use of airborne assets:

- Mitigation of vulnerabilities and limitations of coastal surveillance;
- Tasking for investigation of suspicious vessels or those going RF dark;
- Asset capability;
- Suitability for different MDA missions.

3. Benefits and limitations of synthetic aperture radar (SAR) and optical imaging:

- SAR sensors and constraints of orbit and service;
- SAR imaging examples of pollution, traffic and velocity characteristics;
- Consequence of tasking swath on resolution and coverage area;
- Optical sensors and constraints of orbit and service;
- Comparison of SAR and Optical sensor for identification of vessel/class;
- Comparison of pros and cons of Optical and SAR imagery.

4. Fusion of RF monitoring data (VDES/AIS LRIT, VMS etc.) with satellite imagery:

- Identification of targets detected by satellite optical or SAR imaging;
- Overcoming target capture time reference difference between systems;
- Identifying dark vessel through historic traffic analysis;
- Fusion of different sensor and monitoring sources;
- Regulation concerning use of AIS and LRIT on AIS - Legitimate denial.

5. Detection of anomalies by vector plotting

- How to use plotting aids and recognise illegal or unsafe practices;
- Understanding different AIS message content and data vulnerabilities;
- Demonstration of velocity analysis to resolve anomalies or deception.

6. Machine learning and use of Artificial Intelligence (AI):

- Use of AI algorithms to resolve thousands simultaneous data sets;
- Data used by AI to flag anomalies;
- Use and capability of geofencing.

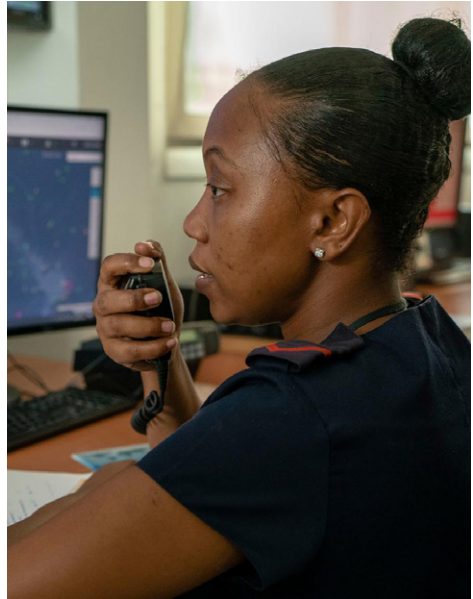
7. Evasion of detection:

- Spoofing methods used to provide false position, status or ID;
- Going dark to avoid detection;
- Detection of the position and ID of vessels spoofing or going dark.

3. ADVANCED COURSE

COUNTERING DETECTION EVASION

This course is designed to introduce the use, benefits and limitations of Radio Frequency spectrum surveillance by satellites. The course will identify how the use of this technology either alone or in combination with other services will counter spoofing and detect dark vessels. It will also address how radio regulations in combination with surveillance can detect and mitigate illegal use of radio spectrum.



TRAINING LOCATIONS

To be communicated.

COURSE STRUCTURE

The training course will include a mixture of classroom training and practical exercises, as well as an on-site visit relevant to the curriculum.

COURSE REQUIREMENTS

Course participants are required to have a good knowledge of English.

Furthermore, participants must have also completed the GMCP Maritime Domain Awareness Intermediate Course: Strengthening Dark Targeting Capability.

COURSE LENGTH

4 days

COURSE CURRICULUM

1. Recap of the Intermediate course.

2. Use of RF surveillance by satellite platforms:

- Benefit of RF surveillance and consequences of illegal use of spectrum;
- Flight formation, orbit characteristics and spectrum sensing capability;
- Tasking of flight formation to detect vessels using different spectrum;
- Value of spectrum efficiency mapping.

3. Value and limitation of spectrum:

- Usage of VHF, UHF, LTE and LTE MCV services;
- Radar for navigation, surveillance and ordinance tracking.

4. Tasking spectrum surveillance in regard to spectrum limitations:

- Resolution and attenuation limitations of X and S band radar;
- Limitations of terrestrial and satellites (LEO, MEO GEO) communications.

5. Spectrum important for RF surveillance:

- Commercial ship communication fit;
- Fishing vessel communication fit;
- Small craft communication fit;
Difference between Class A and B AIS and AMRD.

6. RF detection of dark vessels by satellite (not using AIS, LRIT or VMS):

- Smart understanding of which spectrum can still be detected;
- Demonstration of position detection using another RF spectrum.

7. Illegal use of spectrum:

- Countering spoofed "offset" position information;
- Countering ghost ships deception caused by AIS simulators;
- Risking endangerment by using a spectrum that does not comply with international regulations;
- Assignment and improper use of spectrum by ships and coastal states;
- Forbidden use of radio spectrum;
- Examples of Local VHF channel assignment for radio stations.

8. Future RF surveillance to identify targets:

- RF scatter patterns relation to ship structure.

9. Fusion of spectrum data with imaging sensors and monitoring systems:

- Collaborative tracking between RF sensors and SAR or optical images;
- Tasking RF sensors to test integrity and accuracy of AIS, LRIT or VMS;
- Collaborative tracking between RF sensors and AIS, LRIT and VMS;
- Extension to GEO receiver footprint or temporary segment replacement.

SPECIALISED TRAINING

COLLECTION OF SOFT MDA AND HUMINT

This course introduces the need for HUMINT (Human Intelligence) sourced Soft MDA reporting and then focusses on enabling the citizen at sea, within maritime infrastructures or those with sight of the sea to provide vital information on uncharacteristic or suspicious events in the maritime domain.

It also addresses the preparation for as well as processes and techniques used for HUMINT collection from a source, be it a witness or suspect. This part addresses the motivation of a source as well as interaction and questioning techniques with them and recognition of deceit. It then addresses the need for and methods of corroborating unverified reports. The course also explains why map-tracking and geo-tracking techniques are important and how to interpret different styles of reporting so that HUMINT sourced events can be correlated with technical MDA, tracked and portrayed within the same system.



TRAINING LOCATIONS

To be communicated.

COURSE STRUCTURE

The training course will include a mixture of classroom training and practical exercises, as well as an on-site visit relevant to the curriculum.

COURSE REQUIREMENTS

Course participants are required to have a good knowledge of English.

COURSE LENGTH

4 days

COURSE CURRICULUM

1. Understanding the pattern of life at sea
2. Introduction to the need for soft MDA/HUMINT
3. Maritime crime
4. HUMINT and HUMINT collection
5. HUMINT and soft MDA reporting
6. HUMINT investigation preparation
7. HUMINT questioning/interrogation techniques
8. Detecting HUMINT deceit or soft MDA spoofing
9. Methods of corroborating unverified reports
10. MAP tracking or geo-tracking
11. Motivation for voluntary soft MDA reporting
12. Voluntary soft MDA reporting/HUMINT cooperation
13. Portrayal of resolved soft MDA and HUMINT data

MDA Specialised Courses

SPECIALISED TRAINING

RADAR ANALYSIS TRAINING COURSE

The radar analysis course provides in-depth training on the use of terrestrial radar to monitor, detect, identify, track, challenge, and record all detected waterborne vessels and low-flying aircraft transiting the respective area of operation. The course develops skills to detect anomalies and analyse irregular patterns of activity including effective report writing and recording of such activity. The training course is delivered using radar simulator software to present multiple scenarios for radar analysis.

COURSE CURRICULUM

Basic Course

- Introduction to Maritime Domain Awareness (MDA) and Maritime Security
- Organizational Briefing
- Introduction and Familiarization on Radar Station equipment and MDA operation
- Introduction to Written and Oral Reports
- Ship Recognition

Advanced Course

- Maritime Domain Awareness (MDA) and Maritime Security (Discussion and Practical Exercises)
- Radar Station equipment and MDA operation (Discussion on Best Practices and Case Studies, Practical Exercises, and Data Correlation)
- Practical Exercises on Written Reports



TRAINING LOCATIONS

Basic Course: MDA School

Advance Course: MDA School and Radar Station

COURSE STRUCTURE

- a. The Basic training course will include a mixture of classroom training and practical exercises.
- b. The Advanced training course will include a mixture of classroom training, practical exercises, and on-site training at a Radar Station.

COURSE REQUIREMENTS

Basic Course:

- Students must have a good knowledge of English
- Officers and Enlisted Personnel
- Must be rated as Radarman, Radioman, Data Processor, Electronics Technician, Quartermaster

Advanced Course:

- Prerequisite is Basic Course

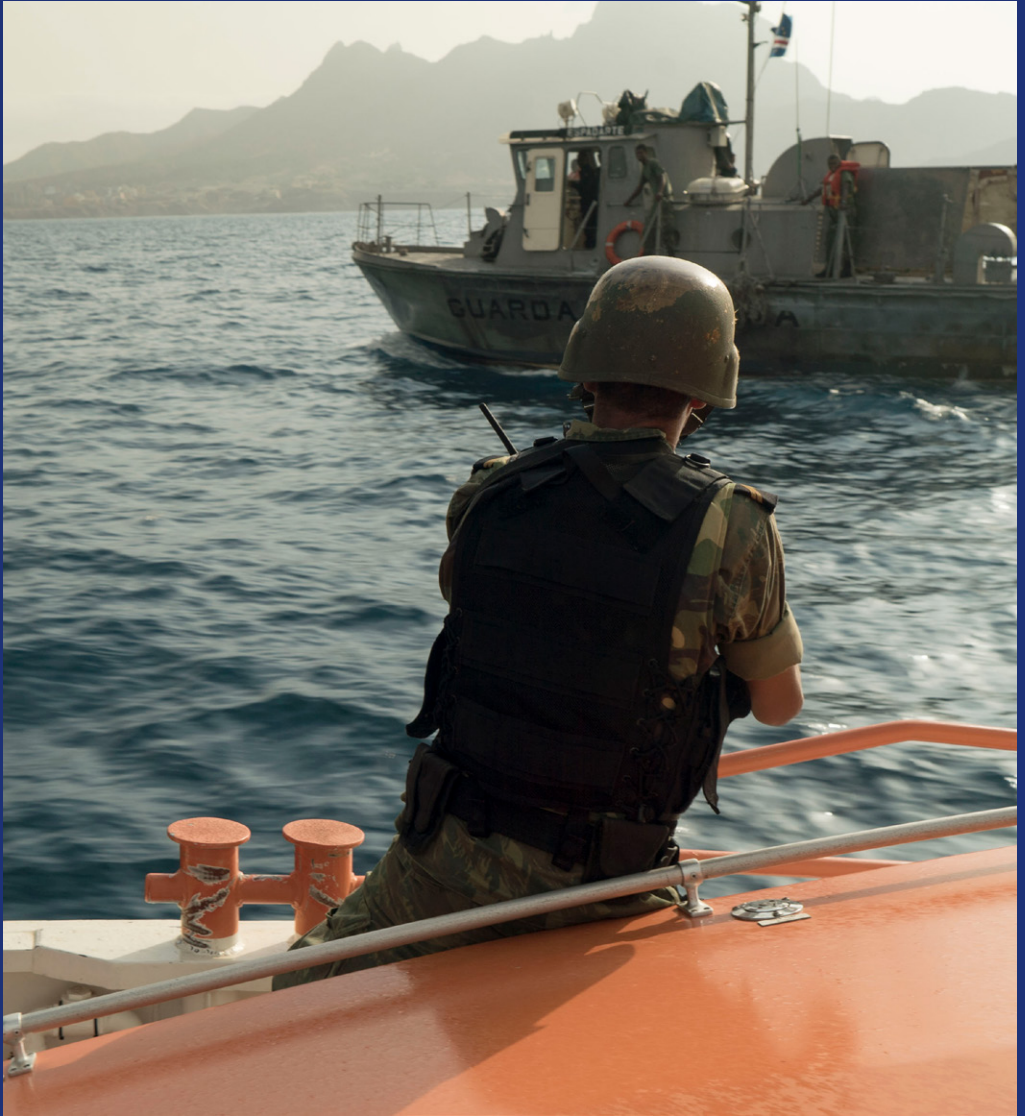
COURSE LENGTH

Basic Course: Two weeks

Advanced Course: Two weeks

NUMBER OF STUDENTS

20



If you would like to learn more about what UNODC is doing to support states to combat maritime crime, please visit: <https://www.unodc.org/unodc/en/piracy/index.html>

Sign up for our bi-weekly GMCP news update on our website.
Follow us on Twitter: [@UNODC_MCP](https://twitter.com/UNODC_MCP)

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