



CN235-220

MARITIME PATROL AIRCRAFT

COMPANY COMMITMENT

Using state-of-the-art technology, PT Dirgantara Indonesia (Persero) is committed to develop aircraft that meet customer requirements while adhering to stringent international safety and design standards.



CN235-220 MPA (MARITIME PATROL AIRCRAFT)

The establishment of an Exclusive Economic Zone (EEZ) has resulted in substantial economic benefits. Most maritime countries are taking advantage of this option offered by the United Nations (UN) to lay claim to their offshore EEZ. UN's recognition of these claims imposes certain obligations upon the claimant nations, including the maintenance of law and order, preservation of the environment for future generations, provisions of navigation aids as well as search and rescue operation services.

PT Dirgantara Indonesia (Persero), with its CN235-220 Maritime Patrol Aircraft (MPA) offers a turnkey service for such EEZ protection, as well as other multi-mission capabilities. The company's high-technology systems are reinforced by a number of experience in international aircraft projects such as Indonesian Air Force, Indonesian Navy, Turkish Navy, Turkish Coast Guard and Korea Coast Guard.

The CN235-220 Platform with fully equipped MPA system and enhancement off basic aircraft avionics sub system which enable it to perform mission operations during day and night in adverse/extreme weather conditions.

The MPA perform the following missions in sea environment:

- Exclusive Economic Zone (EEZ) Control :
The MPA allows the surface surveillance and EEZ patrol around operational base area, acting independently or in co-operation with other aircraft or surface units.
- Anti Surface Warfare (ASuW) :
The MPA allows the detection, localization of surface targets. The MPA allows electronic intelligent gathering, to detect hostile electronic emission.
- Search and Rescue (SAR) :
Search operations carrying out SAR Kits releasing (if available).
- Anti Submarine Warfare (ASW) :
The MPA allows the detection and localization of Submarine.

SUPERIOR FEATURES

The CN235-220 MPA light medium aircraft has an excellent mission flexibility, with proven design philosophy and state of the art of technology. The aircraft is featuring high cantilever wing, powered by twin turboprop wing mounted engines, with pressurized cabin and retractable tricycle landing gear.

CN235-220 has various superiorities, such as:

- Short Take-Off & Landing (STOL) performance
- Efficient twin GE CT7-9C turboprop engines with 1750 SHP
- Wide body concept
- Take-off and landing on paved and unpaved runway capability
- Easy loading and unloading operation through rear ramp door
- High versatility mission & quick change configuration
- Advanced flight deck technology
- Robust and high reliability
- Easy maintenance
- Low operating cost





DIMENSIONS & WEIGHTS

Dimensions

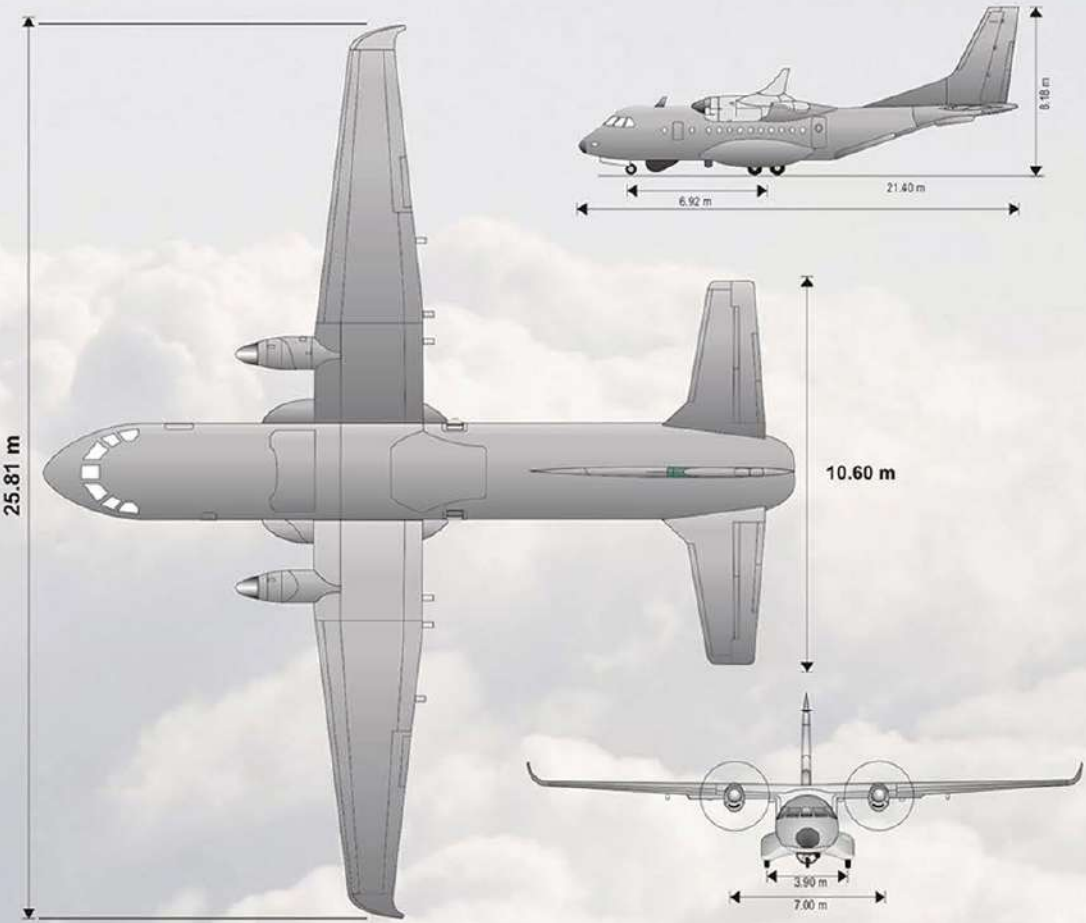
- Span (overall) 84.68 ft 25.81 m
- Length (overall) 70.21 ft 21.40 m
- Wing Area 657.44 ft² 61.00 m²
- Height (overall) 26.84 ft 8.18 m

Cabin

- Cabin Length 31.65 ft 9.65 m
- Cabin Height 6.04 ft 1.84 m
- Cabin Volume 1,479 ft³ 41.88 m³
- Cabin Width 2.36 ft 0.72 m

Weights

- Maximum Ramp Weight 16,550 kg 36,485 lbs
- Maximum Take-Off Weight 16,500 kg 36,375 lbs
- Maximum Landing Weight 16,500 kg 36,375 lbs
- Maximum Zero Fuel Weight 15,400 kg 33,950 lbs
- Maximum Fuel Capacity 4,200 kg 9,259 lbs



PERFORMANCE CAPABILITIES

PERFORMANCE DATA

The CN235-220 MPA provides the following typical performance

Take-off Distance (MTOW, ISA, SL)

- | | | |
|--|-------|----------|
| • Take-off Ground Run | 762 m | 2,500 ft |
| • All Engine Operative Take-Off Distance | 988 m | 3,240 ft |

Landing Distance (MLW, ISA, SL)

- | | | |
|---|---------|----------|
| • Landing Distance with Reverse Power | 914 m | 3,000 ft |
| • Landing Roll with Reverse Power | 491 m | 1,610 ft |
| • Landing Distance with Ground Idle Power | 1,049 m | 3,442 ft |
| • Landing Roll with Ground Idle Power | 570 m | 1,870 ft |

Cruise Speed

- | | |
|------------------|----------|
| • Maximum Cruise | 227 KTAS |
| • Loiter Speed | 161 KTAS |

Fuel Flow

- | | |
|---------------------|----------|
| • Maximum Cruise | 484 kg/h |
| • Long Range Cruise | 381 kg/h |
| • Maximum Endurance | 314 kg/h |

Climb Performance

The following data are given for I.S.A. conditions, at MTOW (16,500 kg)

- | | | |
|---|---------|-----------|
| • Max. Rate of Climb, S.L | 1,420 | ft/min |
| • Service Ceiling : All Engines Operative | 7,620 m | 25,000 ft |

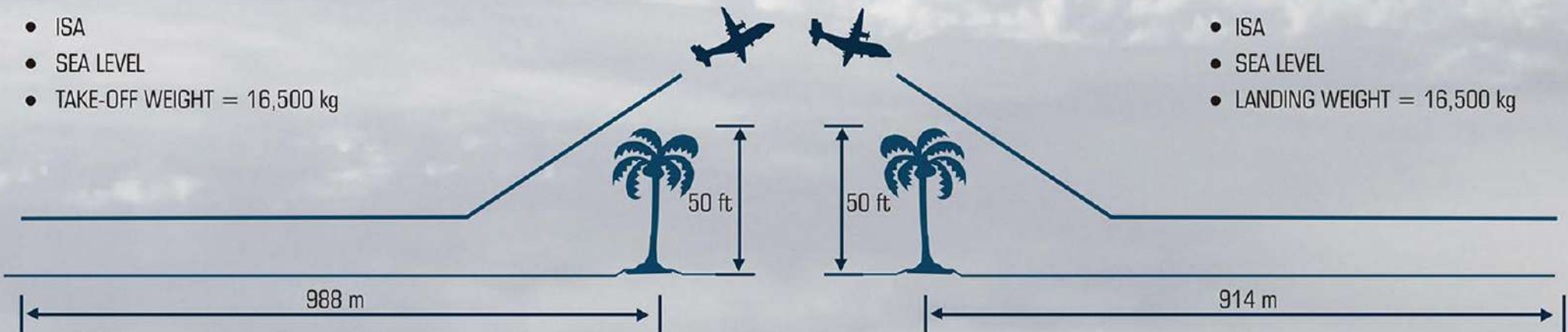


PERFORMANCE CAPABILITIES



The CN235-220 multi-mission platform has proven to be a success in forward base operations on unpaved runway conditions.

- ISA
- SEA LEVEL
- TAKE-OFF WEIGHT = 16,500 kg



- ISA
- SEA LEVEL
- LANDING WEIGHT = 16,500 kg



SYSTEM AVIONICS AND AFCS

COCKPIT

The advanced flight deck is designed to provide a quiet, ergonomically efficient working environment enhanced by the installation of an integrated alerting system.

The Electronic Flight Instrument System (EFIS) comprises a primary display and Navigation display & one cockpit display. EFIS is installed to display mission system information for each pilot side. Weather information can be superimposed on both navigation displays. Primary flight and navigation information can be switched from one display to the other display. As a back up of Navigation data, one Electronics Standby Instrument (ESI) is installed on the center instrument panel to present standby attitude, standby airspeed & standby attitude data.

The Automatic Flight Control System [AFCS] provides flight director and autopilot function. It reduces crew workload and fatigue and allows the crew to operate with maximum efficiency.

SYSTEMS AND TECHNICAL ASPECT

INTERIOR CONCEPT

- To meet the mission goals, the Aircraft Platform is fitted with the intended MPA ANTI SURFACE WARFARE (ASuW) Mission System that organised into 2 (two) consoles, which enable the simultaneous sensor operating, and tactical situation sum-up. The comfortable interior arrangement allows several flight crew and mission operator to operate the Maritime Patrol Aircraft.

The personnel composing the team of the mission are:

- ▶ Pilot,
- ▶ Co-pilot,
- ▶ TACCO (Tactical Coordinator), who handle the mission on the zone of operation and shall be in charge of tactical assessment, and responsible for the management and operation of the Radar, FLIR/TV and IR/UV sub-system and the interpretation, classification of Radar detections.

Electronic Warfare Operator (EWO), who is responsible for the management and operation of the ESM sub-system including Self Protection System (Radar Warning Function RWF).

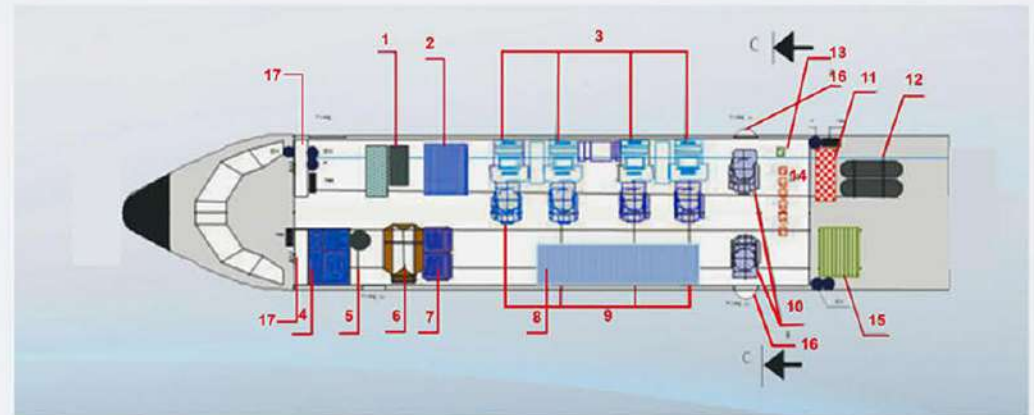
- ▶ Two observers on stations who are responsible to :
Perform visual observation through the bubble windows,
Take picture of faulty vessels,
- ▶ Drop SAR kits (if available).
take picture of faulty vessels,
drop SAR kits (if available).

- To perform Anti Submarine Warfare (ASW), the MPA with the comfortable interior arrangement allows several flight crew and mission to operate the MPA ASW. Mission System that organised into 4 (four) consoles, enables the simultaneous sensor operation, and tactical situation sum-up.

The personnel composing the team of this mission are:

- ▶ Pilot,
- ▶ Co-pilot,
- ▶ TACCO (Tactical Coordinator), who handle the mission on the zone of operation and shall be in charge of tactical assessment, and responsible for the management and operation of the Radar and FLIR/TV sub-system and the interpretation, classification of Radar detections.

- ▶ Electronic Warfare Operator (EWO), who is responsible for the management and operation of the ESM sub-system including Self Protection System (Radar Warning Function RWF).
- ▶ Acoustic Situation Operator (ASO), who is responsible for the management and operation of the Acoustic sub-system.
- ▶ Two observers on stations whose tasks include :
 - Perform visual observation through the bubble windows,
 - Take picture of faulty vessels,
 - Drop and load sonobuoys
 - Drop SAR kits (if available).



INTERIOR ARRANGEMENT

1. GALLEY/WARDROBE	7. DOUBLE SEAT STDLH	13. SMOKE MARKER LAUNCHER
2. MISSION AVIONICS RACK-1	8. MISSION AVIONICS RACK-2	14. SONOBUOY LAUNCHER
3. TACCO CONSOLE	9. OPERATOR SEAT FOR TACCO	15. SONOBUOY RACK
4. LAVATORY	10. OBSERVER SEAT	16. OBSERVATION WINDOWS
5. CREW LIFE RAFT	11. SMOKE MARKER RACK	17. AVIONIC RACK
6. FOLDING TABLE	12. SAR RAFT	

MISSION CAPABILITIES



As a multi role, MPA offers intelligence, surveillance, reconnaissance mission capabilities including :

- Border & ZEE Patrol
- Illegal Fishery Control
- Marine Pollution Control
- Maritime/ Environmental Protection
- Anti Smuggling Control
- Immigration Control
- Search and Rescue

The MPA mission capabilities can be enhanced as Anti Surface and Anti Submarine Warfare.

MISSION SYSTEM CONFIGURATION

Maritime Patrol mission for Indonesia's EEZ has already been completed with a high degree of success by both the Indonesian Air Force and Navy. Optional enhanced Anti-Submarine equipment includes video cameras equipped with stabilized viewing capabilities.

MAIN EQUIPMENT

Tactical Integration System

Search Radar

IFF Interrogator

AIS

EO/IR

ESM

Acoustic System

DATALINK/SATCOM

Support Equipment

Observer Stations

Handheld Camera

Lavatory + Galley

Sonobuoy Rack & Launcher

Rest Area

Bubble Windows

Consoles



MISSION SYSTEM

INTEGRATED MISSION SYSTEMS

TACTICAL INTEGRATION SYSTEM (TIS)

To reduce operator work load and assist in real time decision making. The MPA is equipped with a Tactical Integrator System (TIS). The TIS Integrates data from a variety of systems such as Search Radar, ESM, FLIR, IFF Interrogator, together with navigation and mission specific data. This integrated data is then displayed in a user-friendly format.

Utilizing a MIL-STD-1553B data bus, the TIS incorporates standardized controls and data links for all sensors, as well as built-in systems growth capability. Computer windowing display capability, together with integrated sensor control, which is a critical factor for the best Man-Machine Interfacing.

SEARCH RADAR

The primary sensor supporting the MPAS's multi-mission capabilities is the aircraft's Search Radar. The CN235's selected search radar is a high performance search radar capable of detecting small maritime targets even in rough sea conditions. This capability is supported by its advanced signal processing and signal forming features.

Radar Features :

- Pulse to pulse integration
- Threat assessment
- SAR, ISAR capability
- GMTI
- Track while scan

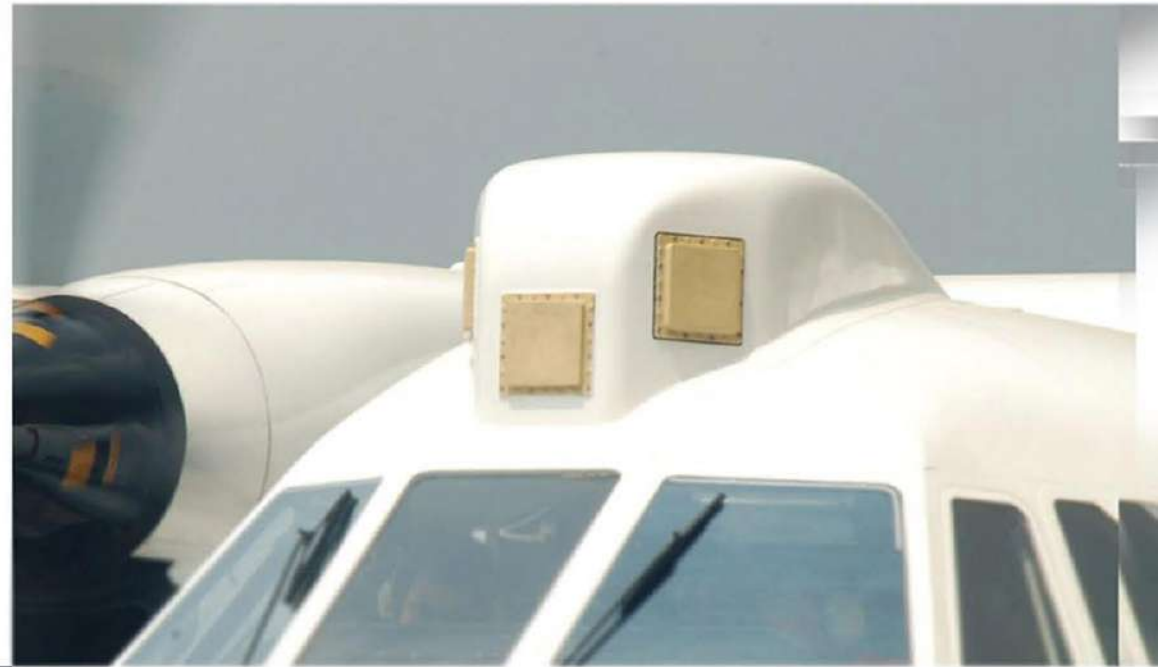
IDENTIFICATION FRIEND OR FOE (IFF) INTERROGATOR

The IFF Interrogator enables the radar operator to establish the "friend/foe" status of aircraft or surface vessels either as individual target or squadrons, using real time radar display. The IFF Interrogator and Search Radar Antennas are fully integrated, thereby providing the MPA with a directional location capability from another aircraft IFF transponder emissions. This IFF Interrogator system can reply and process data in modes 1, 2, 3/A and C. The system detects responding transponders as far as the Search Radar's horizon in 180 of azimuth.



ELECTRONIC SUPPORT MEASURES (ESM)

When CN235-220 MPA is deployed in a dense radar signal or emitter environment, the passive electronic warfare system or ESM effectively supports the mission. The system automatically receives and processes signals in a standard frequency range of 2 to 18 GHz, expandable to 0.5 to 18 GHz when identifying potential threats and intercepted signals. ESM sensitivity provides a horizon wide detection coverage for radar signals with a 360° field of view. The ESM data is shown to the operator on alphanumeric and graphic tactical displays. The processed information is logged and recorded in the data repository of the TIS.



FORWARD LOOKING INFRA RED (FLIR)

CN235-220 MPA can be equipped with a Forward Looking Infra Red (FLIR) providing both day and night identification capability. FLIR gives 360° azimuth coverage and 0° to 180° coverage in elevation. FLIR provides the operator with the capability to find, track, and identify targets anytime, day or night. System enhancement, such as automatic search, target detection and tracking reduce air crew workload and improve mission performance. Automatic FLIR target pointing on the tactical situation display of TIS is an example of operational flexibility. TIS transmits the data enabling the FLIR to sight its target. Control and pointing of FLIR is provided from a simple, accurate and easy-to-use joystick located at the operator's station.



SELF PROTECTION SYSTEM

The Self Protection System (SPS) functional requirement is fulfilled by the EW System (EWS), that consists of :

- One ESM and situational awareness with priority for radar warning
- One passive Missile Warning System (MWS)
- One EW Management System (including the cockpit threat display)
- One Advanced Counter Measure Dispensing System (ACMDS)

The SPS has the capability to dispense chaffs, flares and other expandables in an appropriate time against radar infrared threats.

In the SPS, all the threat data detected by RWF and/or MWS is sent to the EWMU which performs the threat evaluation process to select the threat.

If any sort of counter measure is required to defeat the threat, the ACMDS utilizes available threat data form the EWMU and navigation data.



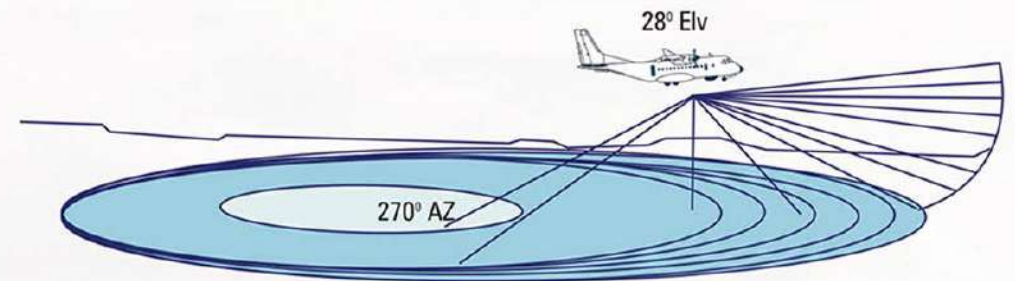
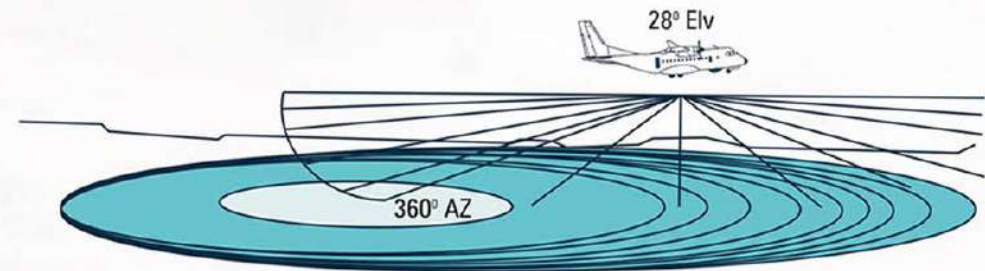
BUBBLE WINDOWS

Two bubble windows are installed one on each side of the fuselage between frame 26 and 27. The lower part of the bubble window is located in a level of height of the vision of an observer in seating position.

RADAR PERFORMANCE

Belly Radar Performance

- Operating altitude up to 18,000 ft
- Radar detection range up to 200 nm
- Look up capability maximum tilt up : 4° , down : -29°
- Radar coverage : 360 azimuth
- 2-Axis antenna stabilization



MISSION CAPABILITIES

ANTI-SURFACE VESSEL MISSION

Maritime patrol mission includes :

- Overt mission
- Covert mission

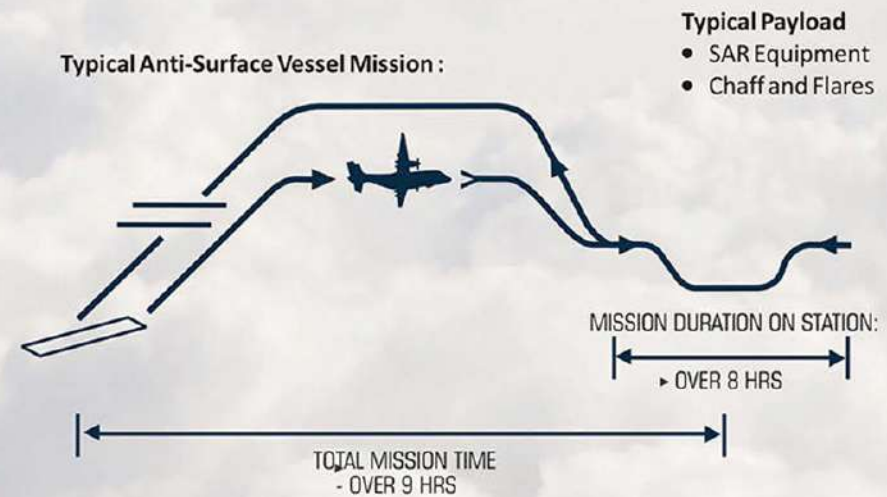
Erratic maneuvering for :

- Target location & ID
- Search area patterns
- Variable starting points

Maritime Patrol Coordinated Operations Strike Guidance

The CN235MPA is capable in gathering information and coordinating its flow via other aircrafts, surface vessels or fixes ground stations while maintaining a safe stand-off distance from potential surface threats is an extremely important and valuable option to mission commanders. It is suitable for :

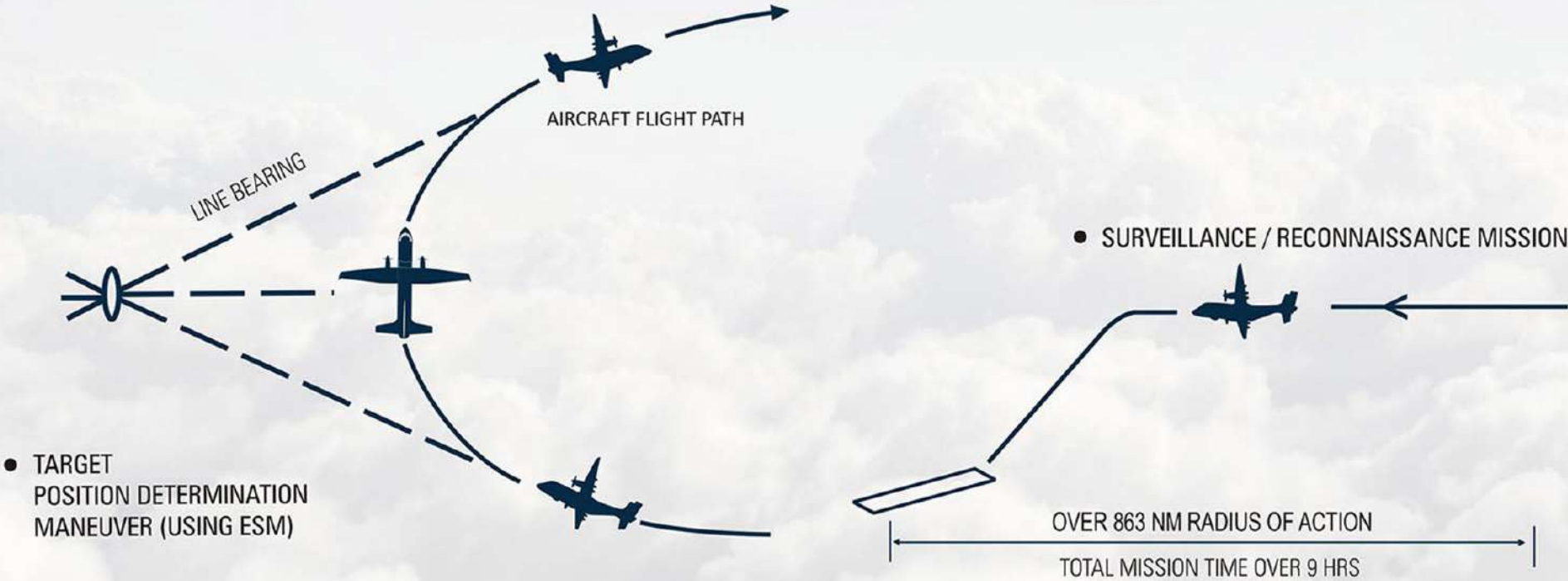
- Unpredictable patrol profile
- Unpredictable aircraft speed and maneuver
- Radar utilization



MISSION CAPABILITIES

MARITIME SURVEILLANCE AND RECONNAISSANCE

In supporting EEZ Intelligence gathering operations, the CN235-220 MPA will provide a hard copy data for assessing the nature of suspected illegal activities.



MISSION CAPABILITIES

SEARCH AND RESCUE (SAR) MISSION

Search and Rescue is subset of Maritime Patrol activities for locating distressed vessels. Aircrafts or persons are the mission objective. The CN235-220 is a cost effective and stable platform with superior low level handling and excellent overall aircraft visibility. Large wrap around cockpit windscreens and dual rear mounted 180 bubble windows are standard in the CN235-220 MPA.

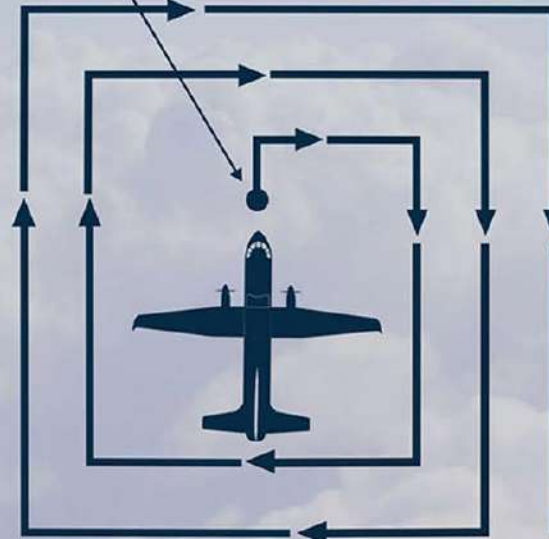
Principal of Utilization:

- Victims are almost stationary
- Direction & speed of victim's movement

Type Search Pattern
-Expanding Square

VICTIM'S LAST REPORTED POSITION

AIRPLANE altitude defined by :
- Weather Conditions
- Overall visibility



Typical Search and Rescue (SAR) Mission



Typical Payload :

- SAR kits
- Life rafts
- Markers

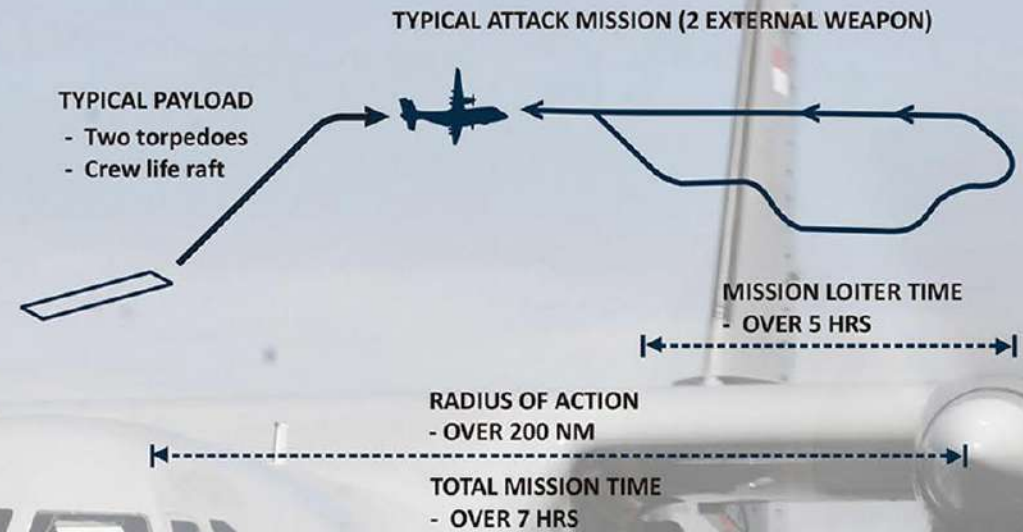
DISTANCE TO SAR INCIDENT:
- OVER 100 NM

MISSION CAPABILITIES

ATTACK MISSION

Air-to-Surface-Missile Strike

CN235-220 MPA is capable of carrying offensive weapons such as air launched anti-ship missiles (air-to-surface missiles). The missiles active radar guidance system provides all weather, over-the horizon capabilities. The missiles high survivability and lethality are further enhanced by its low-level cruise trajectory, indirect-to-target flight path, counter-counter measures and a high-explosive penetrating warhead. The MPA's Search Radar or ESM provides the missile with adequate target bearing data to easily locate its designated target. Optional enhanced Anti-Submarine capability equipment include video cameras equipped with stabilized viewing capabilities.

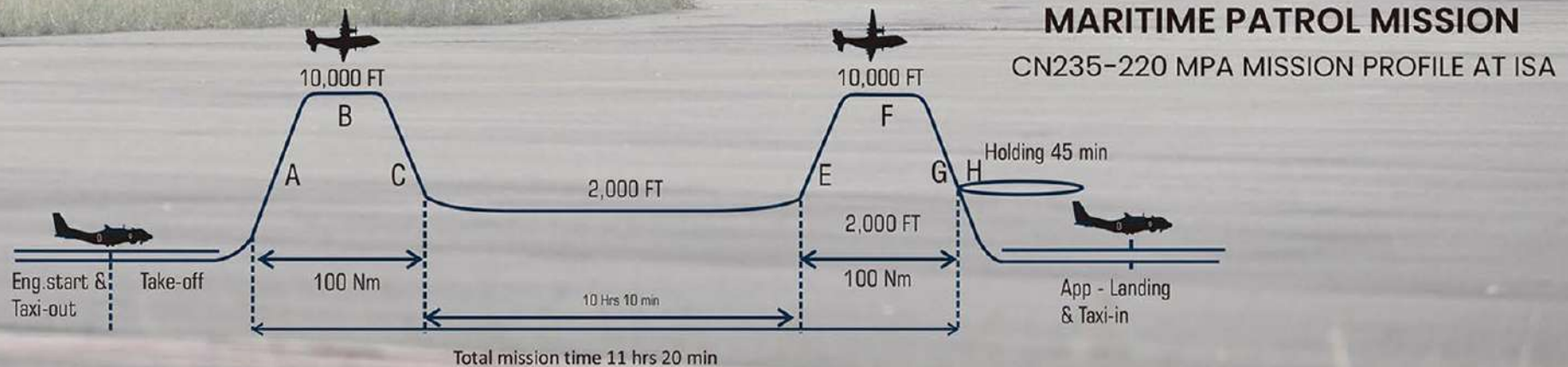


PERFORMANCE CAPABILITIES

MISSION PERFORMANCE & SCENARIOS

CN235-220 MPA is designed to perform multi-mission tasks including low-to-mid altitude airborne surveillance ensuring maritime security of EEZ territorial water. The MPA Platform has maximum flexibility of EEZ management and control requirements, including:

- Law enforcement
- Marine environment control
- Marine shipping control
- Disaster relief
- Fisheries control





PT DIRGANTARA INDONESIA (PERSERO)

Jl. Pajajaran No. 154 Bandung, 40174, Indonesia

Website : www.indonesian-aerospace.com

Product Profile CN235-220 | November, 2020