Improvments the role of maritime intellegence gathering for supporting Indonesia naval operation

Libra Dian P.Y[1]

ABSTRACT

Technological advances have significantly improved the capabilities of maritime reconnaissance elements. Aircraft are commonly used as surveillance asset which are commonly referred to as Maritime Patrol and Reconnaissance Aircraft (MPRA). In peacetime, air reconnaissance elements are used for aerial photography to support widely range of users both civil and military. Indonesia as the largest archipelagic nation needs to secure the integrity of its territorial by sea power using a fleet of Indonesian warships (KRI) and aircraft owned by the Navy by means of a well-planned and coordinated maritime operation. The CN 235 MPRA aircraft is manufactured by PT DI and is a twin-engine medium-range aircraft that has been developed from its predecessor. The methodology used in this research is a descriptive-analysis approach using qualitative analysis. The subject of this research is 800 Squadron 800 (CN 235 MPA) from Air Wing II (Puspenerbal). The results of the study found that the pattern of operations conducted by the Indonesian Navy was considered to be ineffective and insufficient to answer the challenges of an ever developing strategic environment in the region. The availability of airframes and the Operational Readiness of the MPRA aircraft to support the MPR role in sufficient quantities has yet to reach its full potential. However, the presence of CN 235 MPRA with its many capabilities can be expected to provide a technological bridge to cover the airframe availability gap.

1. Foreword.

Aircraft are used for surveillance are often referred to as Maritime Patrol and Reconnaissance Aircraft (MPRA). In peacetime, the element of air reconnaissance can be used for aerial photography for many purposes, both civil and military. Aerial photography took place for the first time in 1909 when the Wright brothers took their flying exhibition to Italy where passengers could photography a military base near Rome. Exploitation of aerial photography for operational purposes occurred during World War I (1914-1918) because the military realized the importance of surveillance aerial photography as a source of strategic intelligence and lead to the development of aircraft equipped with aerial cameras.[2]

Entering the cold war era, following the end of World War II, many countries and commercial companies developed aircraft technology that could be to used to collect intelligence imagery through the modernization and development of aerial photography techniques. In support of this capability, maritime aircraft are ideally supported by mobile photo laboratories to process and print aerial photographs. Presentation of aerial imagery is also supported by imagery analysts and specialists computer systems to interpret the imagery I into intelligence information that can be used as a basis for planning operations.[3]

Indonesia as the largest archipelagic nation needs to secure its territorial waters by using the sea power generated by a fleet of warships (KRI) and the aircraft operated by the Navy. In determining the need for aircraft for the tactical reconnaissance role, various studies and a series of trials are required to select

---

[1]Student Officer of Dikreg 57th Class Sekolah Staf dan Komando TNI angkatan Laut Indonesian Navy Command and Staff College. JL. Ciledug Raya Cipulir-Kebayoran Lama-Jakarta Selatan. Libradian46@gmail.com.
[2]https://Wright brother Accessed on 22 April 2019, at 20.18 WIB.

[3]https://www.bbc.com/indonesia/vert_fut/2016/04/160413_vert_fut_pesawat_ww2, Accessed 22 April 2019 at 21.33 WIB

the best type of aircraft to support the Navy's primary tasking.[4] In 2009, as part of a modernization effort to improve its maritime air patrol capabilities, the Indonesian Navy collaborated with PT. Dirgantara Indonesia (DI) for the purchase and development of the CN 235 MPRA (Maritime Patrol Reconnaissance Aircraft) aircraft. By 2014, 3 examples of the CN 235 MPA aircraft were commissioned into the 800 squadron Navy Flight Centre (Puspenerbal) as a new maritime patrol and reconnaissance aircraft.[5]

The CN 235 MPRA aircraft is a twin-engine medium-range aircraft which is a significant improvement on its predecessor. The aircraft is equipped with a sophisticated reconnaissance system, and can also carry a number of different missiles. In January 2018 another CN 235 MPRA aircraft from PT. DI was delivered to the Navy, in this case for Puspenerbal to strengthen 800 squadron of Air Wing II Puspenerbal for maritime air patrols.[6] Airborne maritime surveillance is a very important supporting tool to improve combat capability of warships and a major component in maritime operations, particularly in the detection, identification and classification of targets at sea.

The CN 235-MPRA aircraft is a medium sized aircraft that has an operational requirement (Opsreq) and equipped with AMASCOS (Airborne Maritime Surveillance & Control System). This is a mission system designed for maritime air observation. The core of AMASCOS is the TCS (Tactical Command System) which is an integrated sensor system controlled by a sophisticated control and management system.

2. Methodology.

The methodology used in this research is descriptive-analysis method using a qualitative approach. Research using qualitative paradigms is defined as a research process conducted in order to understand human or social problems by creating a holistic and complex word picture, containing detailed views obtained from various information sources, and carried out under scientific conditions. Primary data collection is done by field observations and in-depth interviews with several Subject Matter Experts (SME). Secondary data was obtained from various sources such as documents, books and journals. The providers and the data and information are the research subjects in this study. Data obtained from the research subjects was documented in the form of transcripts, raw data submission or field observation notes. The research subjects in this study are from 800 Squadron (CN 235 MPRA) Air Wing II Puspenerbal. Primary data was obtained in the form of qualitatively assessed, written interviews with research subjects, relevant SME including the Commander of Air Wing II Puspenerbal, Commander of 800 Squadron, The Flight Commanders of Flight I and II, CN 235 MPRA aircrew, 800 Squadron Wing Air II Puspenerbal and the supporting documentation and field notes ascertaining to the introduction of the type.

Data analysis is a technique of how to carry out an analysis of the data, with the aim of processing the data to answer the formulated problem. The different stages of data analysis carried out in qualitative research are:

a. Domain Analysis, which obtains a general and overall picture of the object of the research. In this analysis the information obtained is not exhaustive, not in depth, but has defined the areas and categories for study.

b. Taxonomic Analysis, which is an analysis of the overall data collected based on a predetermined domain. The domain determined by researchers can be broken down into more detail and greater depth through this analysis. The results of taxonomic analysis can be presented in the form of box diagrams, line and node diagrams and outlines.

c. Conventional Analysis, which is looking for specific characteristics in each internal structure by contrasting between elements. Conducted through observation and selected interviews with contrasting questions.

d. Analysis of Cultural Themes, which is looks for relationships between domains and the parent subject and then can be expressed in the research theme or title.[7]

e. The NVivo software conducts a qualitative data analysis that can be used to help store and organize data and is designed for qualitative researchers who work using text-based and / or multimedia-based information. The data can then be categorized / reduced as desired by the researcher. Finally the data can be displayed in an easy-to-use visualization that can adjusted as required by the researcher to help conclude the results of the data analysis

To test the validity of the data obtained to ensure that tit is fit for the purpose of this study, the researcher used a triangulation technique. Data triangulation is a data checking technique that utilizes something other than the source data for checking and comparing data. The triangulation method used in this study is triangulation by means of comparing and checking the degree of accuracy and data consistency.[8]

3. Indonesian naval pattern of air operations.

The Conduct of Operations (CONOPS) of the Indonesian Navy (TNI AL) air operations is the result of a doctrinal guidance from the TNI Headquarters. While the use of air assets will be under the control of each respective Fleet organisation as the delegated commander under the TNI Headquarters control. Furthermore, each Fleet will continue to report on the results of air operations to the Indonesian Navy Headquarters. At present the degree of air operations is still not considered to have reached its full potential as there are only a limited number

---

[4] Buku Taktik Penerbangan Laut Wing Udara II

[5] Puspenerbal, Kajian Pesud CN235-200 MPRA, 2008. p.5

[6] https://jakartagreater.com/melihat-jeroan-pesawat-cn-235-mpa, Accessed 22 April 2019 at 22.39 WIB

[7] Sugiyono (2010).Metode Penelitian Kuantitatif Kualitatif dan R&D. Bandung : Alfabeta, p 255-264.

[8] Moleong, L, J. (2012). Metodologi Penelitian Kualitatif. Remaja Rosdakarya. Bandung.

of aircraft available. Given the huge geographical area of national maritime responsibility, the role of maritime surveillance and tactical air surveillance has a major role in the provision of intelligence data and information within the context of security. Any additional tasks such as Search and Rescue (SAR) and tactical transport to support the warship activities are elements to support operations necessary to maintain security and uphold the territorial sovereignty of Indonesia.

4. Specification.

Figure 1: CN 235 MPRA made by PT DI.

Source: xxxxxxxxxxxx.

Table 1: Surveillance capability CN 235 MPRA.

MODEL	FUNCTION	DISTANCE	ANTENA ROTATION	EXPLANATION
LR	DETECT SURFACE VESSEL UP TO MAX DISTANCE	3.5-180 NM	6	DETECTION OF SMALL TARGET SHOULD CALM SEA CONDITION
ST	OPTIMIZE TARGET DETECTION OF SMALL TARGET	3.8-180 NM	30	IT'S NOT AFFECT SEA CONDITION
SR	EFFECTIVELY FIND THE TARGET AT CLOSE RANGE	0.145-18 NM	6	IT'S NOT AFFECT SEA CONDITION

Source: xxxxxxxxxxxx.

To support security in Indonesian archipelago waters, the Air Force operates three Boeing B737 surveillance aircraft. The three aircraft were purchased in 1981 from the United States and have strengthened the Air Force 5 Squadron, Indonesian Air Force (TNI-AU) at the Hasanudin Air Base, Makassar.[9] Simultaneously, the Navy also operates CN 235 MPRA surveillance aircraft made by PT Dirgantara Indonesia (PT DI). The CN 235 MPRA aircraft itself is actually the result of collaboration between the Spanish CASA now Airbus Military with PT DI. The two aircraft manufacturers then chose to develop their own version of the CN 235 MPRA as the maritime version differed from the other production aircraft. In Spain, CASSA developed CN 235 MPRA Persuader aircraft, while in Indonesia, PT DI developed CN 235 MPRA.

---

[9] Penerangan Boeing 737 Surveilance, Dispen TNI AU diakses 23 juni 2019, pkl 20.00 https://tni-au.mil.id/berita/tni-au-terirna-pesawat-boeing-737-500

4.1. Indonesia naval aviation centre.

Indonesia Naval Aviation Centre which has now been upgraded from Navy Aviation Services, Indonesia Navy in 2009 is one part of Central Executive Section lead by a Commander First Admiral in rank. fostering personnel and air element readiness. Not only as a combat unit, but also participates in various operational tasks carried out by the Marine Corps and provides tactical logistics and personnel transport facilities for the sea and air base systems. In order to carrying out the task:

a. Tactical Air Reconnaissance. (C4ISTAR)
b. Anti-Surface Warfare (ASuW)
c. Anti-Submarine Warfare. (ASW)
d. Tactical Troops helicopter insertion
e. Fast Logistics Support.
f. Maritime Patrol.
g. Sea Combat Operation.
h. As well as the implementation of the Naval Aviation material component of the Integrated Fleet Weapon System in the context of upholding sovereignty and maritime.

This unit is in charge of providing aviation support to naval operations, for combat operations, SAR operations and Humanitarian Assistance and Disaster Relief operations (HADR). They are also responsible for providing aviation support to maritime security tasking in the monitoring of vessels, especially in the Indonesian Archipelago Sea Lines of Communication (SLOC), Environmental pollution monitoring from the contamination of hazardous materials, prevention of smuggling and the theft of maritime natural resources are also important missions undertaken by Puspenerbal in cooperation with other airborne elements from the TNI -AU and the National Police. One of the most recent well-known actions by the Puspenerbal was the evacuation of earthquake victims from the Jogjakarta area. Helicopter types such as NBO-105 and NBell-412 were used. Puspenerbal air power currently consists of rotary wing aircraft (helicopters) such as the NBell 412, NBG-105 and NAS Super Puma, Colibri and Panther AS 565 MBe as well as fixed wing aircraft such as for the CASA NC-212 for tactical transport and the CN- 235 MPRA, NC-212 Patmar, and Nomad, for maritime patrol.

4.2. CN 235 MPRA Air Operation with 800 Sqn.

The process involved in the construction of a maritime air patrol is quite in depth and consisted of the following stages:

a. Pre action Phase. The maritime air patrol stage begins with the pre-action phase by aircraft sending notification of an Air Move Departure (AMD) to the operating base and the other elements carrying out the operation. Supporting aircraft will be controlled by the implementation of the Air Join Procedure (AJP) to ensure these elements are coordinated. After implementing the Air Join Procedure (AJP), the controlling element reports Air Move Arrival (AMA) to the base of origin.

b. Operation Phase. This begins with the flight from the originating base to the Area of Operations (AO). After arriving in the AO, the aircraft investigates any detected tracks using the following operating methods:

1. Detection. The CN 235 MPRA aircraft in has a typical Initial Detection Range (IDR) using the fitted surveillance radar of 180 Nm. The detection and identification sensors fitted to the CN 235 MPRA aircraft consist of a surveillance radar, FUR and AIS.

2. Classification. The next step in track building is object classification by the following means:

   (a) Electronically: By using the Inverse Synthetic Aperture Radar (ISAR) method which is able to display the target echo in the form of a vessel type and vessel size silhouette, which can be combined with the Automatic Identification System (AIS) to provide track data.

   (b) Visually: The Forward Looking Infra-Red (FLIR) system which can identify targets with a maximum detection range of 20 nm at an altitude of 8000 feet.

3. Documentation. If documentation is needed about the target, then the image is taken through a FUR camera by snapshot or video recording, adjusted for data requirements. The CN 235 MPRA aircraft is also equipped with a backup hand held camera which has a geo-referencing capability.

4. Reporting. Following the documentation process, the track is reported by sending the results of detection, classification and identification processes in real-time through the Data-link system to the supporting airbase and other operational elements..

c. Search Phase A search is a systematic investigation of a designated area to a predefined degree of certainty with the intention of locating any unknown contacts in the area.

4.3. CN 235 MPRA Aircraft Operational Requirements.

To determine the Indonesian Navy's MPRA requirements to support operations within the Indonesian archipelago, the following factors have to be taken into considers:

a. Factors to consider:

1) Area : 3.3 million nm^2

2) Width (W) using radar = 2 CDr, where C is coefficient and approximately around 75% (75), then:

W $\quad$ = 2CDr

$\quad\quad\quad$ = 2 x 0.75 x 100 m

$\quad\quad\quad$ = 150 Nm

3) Track spacing (S) = 150 nm.

4) Employment Cycle using the method 30 : 30 : 30, (30% operational, 30% standby and 30% maintenance.)

5) Calculation using formula A = VxNxSxT, where:

A = Area.

V = Aircraft velocity .

N = The number of airframes required.

S = Track spacing.

T = Endurance

6) Aircraft specification.

CN-235 MPA speed= 200 Knot, giving an endurance of 11 hours.

b. Therefore the number of Class CN-235 MPRA airframes required for to provide the sufficient tactical reconnaissance and maritime surveillance are as follows:

CN-235 MPRA

A = VxNxSxT

N = A/VxSxT

N = (3.300.000/200) x 150 x11 = 10 aircraft.

However, with reference to the rules of operational tempo, the number of airframes required to maintain the maritime security and uphold the sovereignty of th wiNdonesian archipelago, The Indonesian Navy must have at least 30 CN 235 MPRA aircraft to support Naval operations.

John M. Collins has put forward the theory of Defense Management.[10] In military organizations a planning system is required to manage battle situations needed and win the battle. In the Defense planning process as stated by Collins, is that the consequences of determining a military strategy must be supported by the resources needed. When faced with the available resources this will be an adjustment process. If there is a mismatch between the objectives and the strategy with the resources available, then a risk to the operational effectiveness of the project arises. In this case, the objectives need to be reviewed and a revision must be made of the strategy, resources or both.[11]

Based on this theory by John Collins, it is necessary to adjust to the demands upon the existing numbers of aircraft, as it is difficult to be truly efficient given the low number of airframes. However, following the ethos great naval doctrine writer; AT Mahan, it can be said that , it is necessary to define a maritime-oriented Indonesian nation so that it realizes the importance of sufficient maritime defense equipment to protect national interests at sea.

Operations conducted within Indonesia have been prepared in accordance with the requirements and challenges that have been identified by the TNI Headquarters based upon information from Navy intelligence as preliminary data used for the planning of operations. However, in order to enhance the role of CN 235 MPRA aircraft due consideration must be given to the present Defence budget allocation and consequently, operations must be constrained to fall within current budgetary means.

4.4. Upgrading Surveillance Capability.

Following discussions with the commander of 800 Squadron, Wing II Puspenerbal. The value of the data link system was discussed. Improvement to the real time data link capabilities of the CN 235 MPRA aircraft would allow data collected by the various airborne sensors to be seen simultaneously by Indonesian warships , Puskodal, Dispamal Main Control Room and PIO (Operational Information Center) in Puspenerbal[12]

---

[10] John M. Collins, S. Defense Planning A Critique, West View Press, Boulder Colorado, 1982, p.3-1

[11] Ibid

[12] Hasil wawancara dengan Komandan skuadron 800 Wing Udara II Mayor Laut (P) Sahid Hamdani pada tanggal 22 Mei 2019.

Figure 2: System EnerLinksIII.
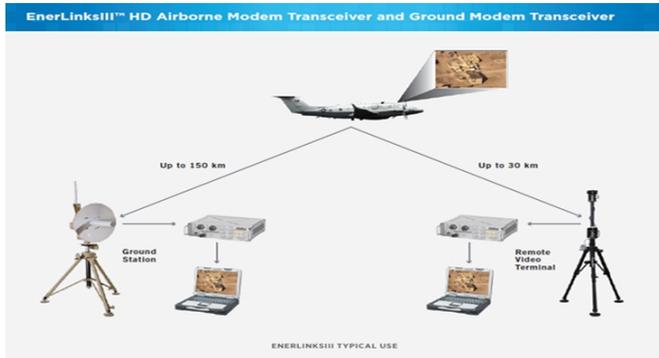
Source: xxxxxxxxxxxx.

EnerLink III Video Data Link is a data transmission intended to allow aircraft to communicate with ground elements using high-bandwidth downlink telemetry data and moderate-bandwidth uplink and data control. The EnerLinksIII system consists of aircraft and the land segments. EnerLinksIII allows users on land to view videos produced by CN 235 MPRA aircraft whilst on maritime air patrols. The equipment is divided into two Ground Modem Transceivers (GMT) and an Airborne Modem Transceivers (AMT). The AMT digitizes and compresses video whilst maintaining data quality. The GMT receives radio signals produced by AMT using digital communication techniques to recover multiplex data generated by AMT. Data is distributed to PC-based application: EnerViewTM. The EnerView ground system and can display videos received in real time and archive all received data. By this means Indonesian warships, Puskodal, Dispamal Main Control Room and Puspenerbal Operations Information Center can analyse the transmitted data sent by a CN 235 MPRA aircraft and processed for intelligence value so that it can be used as a decision making aid for senior leaders.

Based on data processing using Nvivo software tools and from interviews with SME while conducting research, the collection of intelligence data is a vital role of maritime defence and requires careful Human Resource (HR) management to achieve this aim.

The requirements of the maritime surveillance capability must be conducted competently to allow the achievement of stated operational objectives. However, the operating cycles described above cannot function efficiently without a high quality, and fully trained human component. Maritime surveillance operations rely upon sophisticated equipment that requires superior human resources management in order to provide a high quality, trained and professional workforce to support operations.

Conclusions

The success of the MPRA operating cycle will depend very much on the Fleet in the conduct of these operations, as 800 Sqn is in charge of CN 235 MPRA aircraft operate as an extension of Puspenerbal but ultimately depend on Koarmada operations staff for the deployment of its air power.

Given the limited number of airframes available to conduct operations, and the large area of responsibility, a substantial increase in airframe numbers are required to address the capability shortfall currently experienced.

However, and increase in airframes has an associated cost in HR management. A large number of highly trained and capable personnel are required in order to realize the full potential of MRPA operations and to ensure the maintenance of Indonesian sovereignty.

References

Buku Taktik Penerbangan Laut Wing Udara II

Creswell, J. W. (2013). Research Design: Pendekatan Kualitatif, kuantitatif, dan Mixed. Edisi Ketiga. Pustaka Pelajar. Yogyakarta.

John M. Collins, S. Defense Planning A Critique, West View Press, Boulder Colorado, 1982, p.3-1

Keputusan Kasal No: Perkasal/35A//2009 tanggal 13 Mei 2009 tentang pokok-pokok organisasi dan prosedur Pusat Penerbangan TNI Angkatan Laut

Moleong, L, J. (2012). Metodologi Penelitian Kualitatif. Remaja Rosdakarya. Bandung.

Puspenerbal, Kajian Pesud CN235-200 MPA, 2008

Sujarweni, V. Wiratna (2014).Metodologi Penelitian. Yogyakarta : Pustaka Baru

Sugiyono (2010).Metode Penelitian Kuantitatif Kualitatif dan R&D. Bandung : Alfabeta https://jakartagreater.com/melihat-jeroan-pesawat-cn-235-mpa, Accssed 22 April 2019 at 22.39 WIB

https://tni-au.mil.id/berita/tni-au-terirna-pesawat-boeing-737-500,Penerangan Boeing 737 Surveiiance, Dispen TNI AU Accessed 23 June 2019, at 20.00 WIB

https://Wright brother di Accessed 22 April 2019 at 20.18 WIB

https://www.bbc.com/indonesia/vert_fut/2016/04/160413_vert_fut_pesawat_ww2, Accessed 22 April 2019 at 21.33 WIB

https://www.qsrinternational.com/nvivo/what-is-nvivo. Accessed 07 April 2019 at 20.14 WIB.