

Concept of Military Asset Management System (MAMs) in Indonesian National Armed Forces

Zairullah Azhar^{1*}, Wahyu Sri Setiani², Khevinadya Ramadhani Runtu³, Y. H. Yogaswara⁴

^{1,2,3,4}Weaponry Technology Department, Faculty of Defense Technology, Republic of Indonesia Defense University, Indonesia

*Corresponding author E-mail: zairullah.azhar@tp.idu.ac.id¹

Received Nov. 11, 2022

Revised Dec. 1, 2022

Accepted Dec. 1, 2022

Abstract

The Internet of Things (IoT) is a very fast-growing technology and has a huge impact on our daily life, including military performance. In the military, IoT known as the Internet of Military Things (IoMT) or Internet of Battlefield Things (IoBT) has the function create network communication to increase readiness in the military and can apply to all aspects of military asset management and uses the interconnection, real-time, and intelligent innovation of the IoT technology to build a military asset management system. The research purpose is to analyze the Military Asset Management System (MAMs) in Indonesian National Armed Forces. The research applies a qualitative research methodology. The literature review method and the interviews were used to obtain data and analyze to describe or explain the phenomenon of problems with the Maintenance, Repair, and Overhaul (MRO) and Military Asset Management system (MAMs) in supporting the operation of the Alutsista Indonesian National Armed Forces. The research result shows that the integration of asset management in the Indonesian National Armed Forces is still not centralized, which it means needs more time to collect material asset data and of course, will impact the readiness of the military. In this case, Complex Aerial Mission Simulation (CAMS) can be a reference for Indonesian National Armed Forces to develop a Military Asset Management System (MAMs).

© The Author 2022.
Published by ARDA.

Keywords: Military Asset Management Systems (MAMs), Internet of Things (IoT), Complex Aerial Mission Simulation (CAMS)

1. Introduction

Indonesia as a country with a strategic location is an attraction for other countries with various interests. The influence of the strategic environment, both nationally, regionally, and globally, makes Indonesia must always alert to threats that may occur. This situation of course must be a concern, especially in the defense sector.

Uncertainty of threats that may occur, makes the defense sector must always be ready to deal with them. The readiness and effectiveness of the armed forces are highly dependent on the state of its equipment in terms of availability and reliability [1] One thing that particularly challenging in the defense environment is readiness management because it's related to the complexity of the weapons systems and large mixed military fleets. Efficient fleet maintenance management requires the ability to manage the flow of information between forces to reach readiness.

In case to prepare the readiness of the military force, we can take advantage of the use of the Internet of Things (IoT). IoT is a concept where an object can the ability in terms of communicating via a network, such as a process of transferring data without any communication process carried out between humans (humans to humans) or between humans to system devices such as computers or a controller. Although this concept was

This work is licensed under a [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/) (https://creativecommons.org/licenses/by/4.0/) that allows others to share and adapt the material for any purpose (even commercially), in any medium with an acknowledgement of the work's authorship and initial publication in this journal.



less popular until 1999, IoT has been in development for decades. the internet of Things or often called IoT is an idea where all objects in the real world can communicate with each other as part of an integrated system using the internet network. IoT devices consist of sensors as data collection media, internet connections as communication media, and servers as information collectors received by sensors and for analysis.

Internet of Things technology builds the work process of a system that can be wider, the range of reach is also wider, and the data processing and data analysis of a system is also getting better. This IoT technology supports the work of the system as a whole including components or elements in terms of facilitating the process of data information flow. In the military, IoT is known as the Internet of Military Things (IoMT) or the Internet of Battlefield Things (IoBT). The purpose of IoMT and IoBT is to create network communication. Internet of Military Things (IoMT) dan Internet of Battlefield Things (IoBT) technology is applied to all aspects of military asset management and uses the interconnection, real-time, and intelligent innovation of the IoT technology to build a military asset management system.

According to the PAS-551 [2] standard on asset management from the British Standards Institute, asset management is defined as: “systematic and coordinated activities and practices through which an organization optimally and sustainably manages its assets and asset systems, their associated performance, risks and expenditures over their life cycles to achieve its organizational strategic plan”. Based on this definition, of course in the military, asset management has an important role to develop a list of all the organization’s assets and verify this list with what is in the field.

Various countries have utilized the Internet of Military Things (IoMT) and the Internet of Battlefield Things (IoBT) in asset management systems. One of them is The French military through the Dassault system developed Complex Aerial Mission Simulation (CAMS)[3]. CAMS is a Dassault-made tool developed for industrial purposes to technical optimization for industrial roadmap choices, operational requirement analysis for export contracts, and product robust and intuitive feedback on studies. CAMS is a technical and operational simulation tool, that focuses on the mission level and deals with the main mission phases. It's designed to study the global efficiency of an aerial combat system, within credible operational context survivability, lethality, and effectiveness. CAMS will influence the decision-making related to logistics and deployment, also CAMS is used to find out what the best weapons will choose for shooting enemy fighter aircraft. The benefit of CAMS definitely would increase the readiness of the defense force[4]. CAMS can calculate both the readiness of the material used in war and the strategy and use of weapons that have been calculated and simulated in detail. CAMS can also serve as Military Asset Management for the French Army. CAMS can also serve as Military Asset Management for the French Army.

Based on current conditions in Indonesia. The use of IoT technology in the military field is still not felt enough. Especially on the Asset Management System. With the use of technology that has been used in various countries. Indonesia can take advantage of IoT technology in an asset management system for defense equipment. In this research, references in developing a Military Asset Management System (MAMs) only focus on CAMS that have been developed by Dassault Systems. This research was conducted to describe the conceptual design related to the asset management scheme within the Indonesian National Armed Forces and provide an overview of how the Military Asset Management System is implemented in the Indonesian National Armed Forces.

2. Research method

The research was conducted by applying a qualitative research methodology. Qualitative research refers to analysis that produces findings obtained through data collected by various means, including interviews, observations, documents or archives, and tests [5]

The literature review method and the interviews were used to obtain data and analyze to describe or explain the phenomenon of problems with the Maintenance, Repair, and Overhaul (MRO) and Military Asset Management system (MAMs) in supporting the operation of the Alutsista Indonesian National Armed Forces.

Interviews were applied to obtain information directly. In this study, the informants interviewed by the researchers are The Director of DGT of Dassault Aviation. The informant will be asked for their opinion regarding the Complex Aerial Mission Simulation (CAMS). Furthermore, other informants will be asked for their opinion regarding the Maintenance, Repair, and Overhaul (MRO) and Military Asset Management system (MAMs) in the Indonesian National Armed Forces, representative of the Indonesian Army, the Indonesian Navy, and the Indonesian Air Force.

Meanwhile, literature studies were applied referring to the Maintenance, Repair, and Overhaul (MRO) system in the Indonesian National Armed Forces. Literature studies are carried out by reviewing previous research journals and then reviewing and discussing them.

The results and discussion were obtained by collecting various data from references to the results of interviews and relevant journal reviews. Furthermore, the concept implementation of the Military Asset Management System (MAMs) was made, and then the MAMs can help the Indonesian National Armed Force in carrying out its operational duties.

3. Results and discussion

Military Asset Management System (MAMs) is needed to calculate and analyses what military strength is if one day there is a war. The command operation can find out how many materials are ready to use and not suitable for use in real time. Military Asset Management Systems (MAMs) are directly related to Inventory Management, MRO Management, and Predictive Maintenance Analysis. The diagram of Military Asset Management can be seen below in Figure 1.

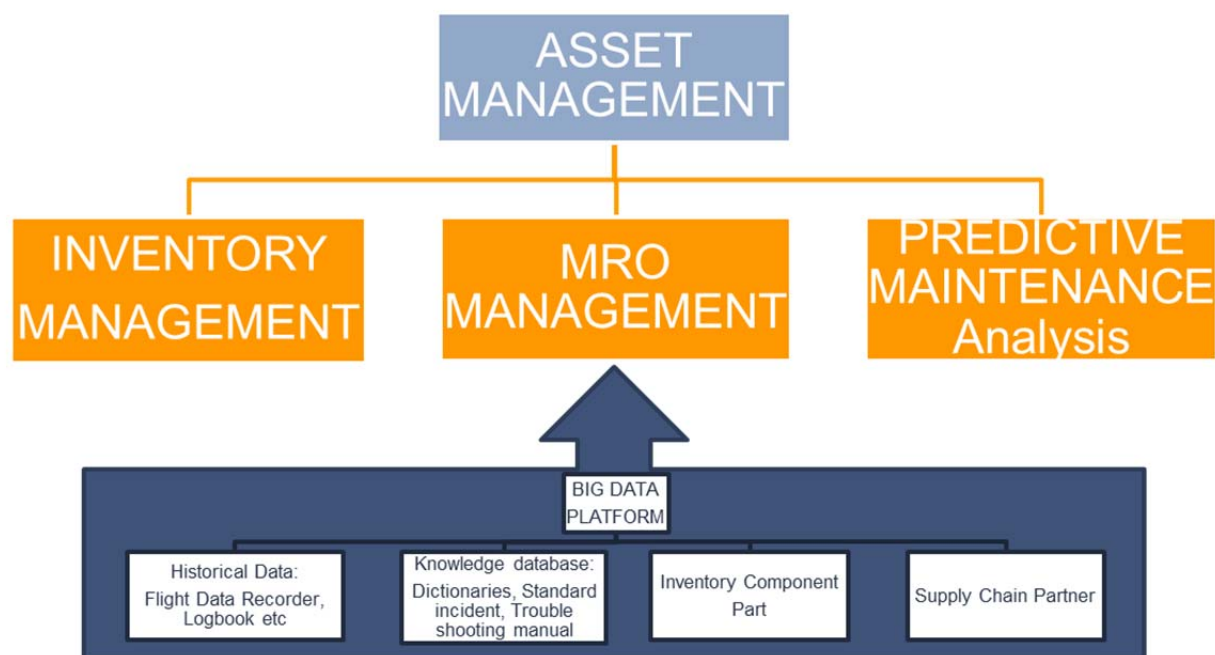


Figure 1. Diagram Military Asset Management

In the current condition of the Indonesian National Armed Forces, Asset management is still not centralized, so it takes time to collect material asset data. This can hinder the analysis of military strength. Military Asset Management Systems (MAMs) are needed that are integrated between units and can be monitored in real time. Not only material assets that are ready to be used, but can monitor assets that are under maintenance.

The Maintenance System is carried out in each Force. The material maintenance system in the Indonesian Army is arranged in stages and tiers based on the level of material maintenance and the level of the implementing unit for the material maintenance task. Material maintenance as maintenance and prevention or organic maintenance is carried out by the unit using the material. Furthermore, maintenance at the field level is carried out by the maintenance unit at the military regiment Command (Korem) level, namely the Field Workshop (Benglap). Maintenance at the regional level is the responsibility of the Regional Workshop (Bengrah) which is the maintenance unit at the Kodam level. The highest level of maintenance, namely maintenance at the central level, is carried out by the Central workshop and equipment (Bengpuspal) [6].

In the Navy, maintenance is carried out in stages. Where is the organic level maintenance (harnik) which is supported by the ability of the crew, materials, and equipment on board. Maintenance of the medium level (harmen) of this stage of difficulty requires the ability of experts, materials, and equipment on board so that it must be supported by the Warship Maintenance and Repair Facility (Fasharkan). Maintenance at the Depot Level (hardepo) with difficulty levels increasingly requires the assistance of foreign workers, spare parts, and materials that are not supported by the Warship Maintenance and Repair Facility (Fasharkan) so it needs to be

carried out by the Shipyard and in increasing operational capabilities in the context of Extending the Service Life based on the results of the study. Enhanced capabilities include modernization (when the ship is in the program's life cycle period) and Life of Use (when the ship has exceeded its life cycle). This maintenance phase is carried out by the Warship Maintenance and Repair Facility (Fasharkan), National shipyard (Galkapnas), and Maritime Service Industry (Injasmar) [7].

The Material Maintenance System in the Indonesian Air Force is carried out by the Air Force Material Maintenance Command (Koharmatau). The Koharmatau has the task of preparing and carrying out the maintenance of the Indonesian Air Force Alutsista to support operations and training activities. In carrying out its duties and functions, the Koharmatau has maintenance depots as implementing units, namely the Maintenance Depot (Depohar) 10, Depohar 20, Depohar 30, Depohar 40, Depohar 50, Depohar 60, and Depohar 70. Depohar functions as the implementing unit for the Koharmatau or is directly domiciled under the Commander of the Koharmatau. Each of these Depohars is tasked with carrying out corrective and restorative maintenance, material production, and supplying the level of supplies for weapons, guided missiles, ammunition/explosives as well as carrying out the demolition of weapons and ammunition/explosives. In carrying out its duties, Maintenance Depot (Depohar) is assisted by several maintenance units including the Maintenance Unit [8].

Current conditions, Material data that is in a condition of maintenance and care is still in written form. Not yet in the form of an integrated system with each other. To improve this, the implementation of the Military Asset Management System (MAMs) is very important. Data related to material maintenance and care is input by the Maintenance and Maintenance Implementing Unit, both at the organic, middle, and upper levels. The module diagram concept of the Military Asset Management System can be seen below in Figure 2.

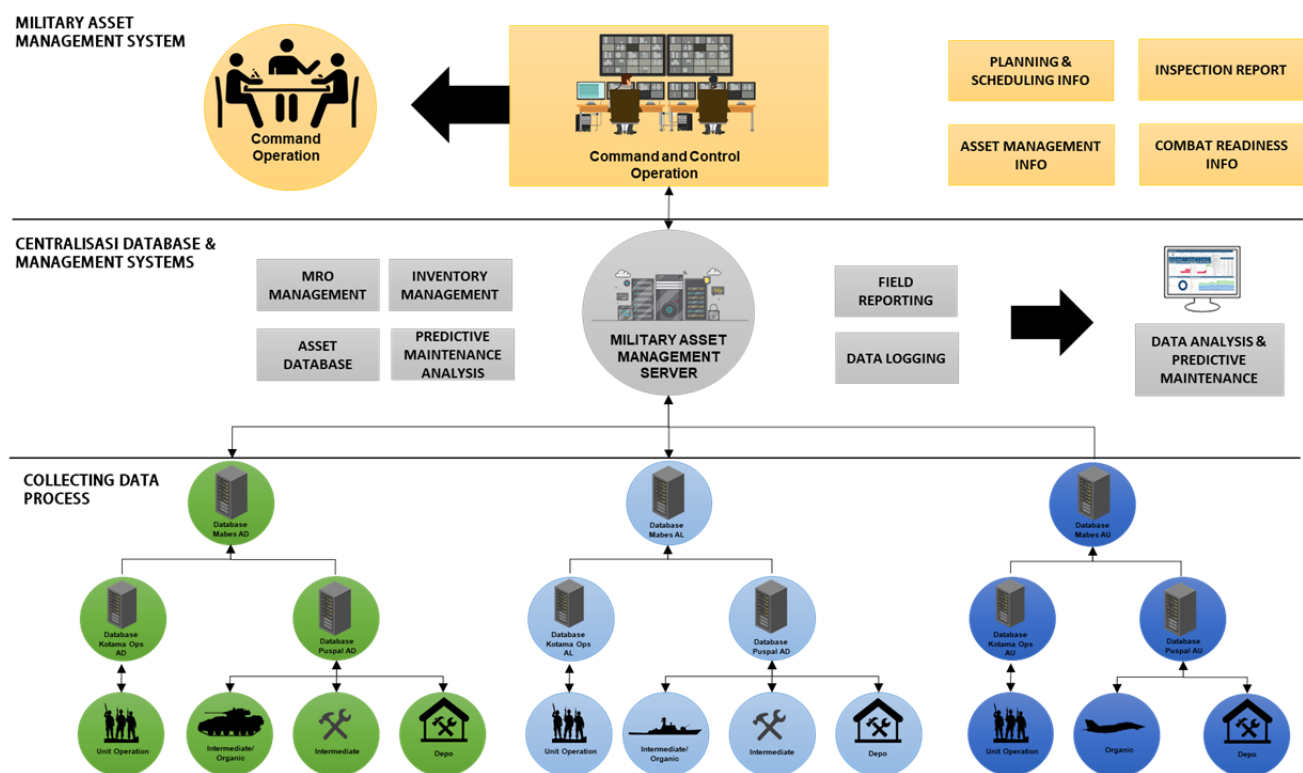


Figure 2. Concept Military Asset Management System

Data retrieval is carried out in each Force where maintenance data are taken from organic, intermediate, and depot units. It is centralized in the Maintenance Command Database. As for asset management data, it is taken from the operation unit and centralized in the Main Command database. Data that has been centralized on the maintenance and operation command is centralized back to the Headquarters Database of each Force. Furthermore, it is centralized in the Server of the Military Asset Management System.

In the Centralized Database and Management System, there is some information such as MRO Management, Asset Database, Inventory Management, and Predictive Maintenance Analysis. The input data is in the form of field reports and data logging so that the data can be monitored. The Military Asset Management Server is

located at the TNI Headquarters and the data is protected because the data contains strategic data, so we need a good data security system so as not to get hacked.

Data that has been centralized in the Military Asset Management System can be directly monitored in real-time so that if a strength analysis is needed at any time, it can be done quickly and accurately because the data used is real-time data. So, the Military Asset Management System (MAMs), can help the Indonesian National Armed Forces in carrying out its operational duties.

4. Conclusions

The integration of asset management in the Indonesian National Armed Forces is still not centralized, which means needs more time to collect material asset data and of course, will impact the readiness of the military. Military Asset Management System (MAMs) is an integrated system both in the Indonesian Navy, Indonesian Army, and Indonesian Air Force which contains data on Assets in the form of Weapons, Tanks, Planes, Ships, and other platforms. Also, Military Asset Management System contains the conditions for the platform and this is only used internally to prepare strength readiness. The equipment asset management system under the IoT technology has the advantages of a large amount of information, comprehensive interoperability, and high data processing efficiency. The real-time query of data, real-time reports, and performance evaluation automatically generate a comprehensive and dynamic monitoring system for the military. In this case, Complex Aerial Mission Simulation (CAMS) can be a reference for Indonesian National Armed Forces to develop a Military Asset Management System (MAMs).

Acknowledgments

The author would like to thank the Committee of the overseas study program 2022 from the Defense Technology Faculty of the Republic of Indonesia Defense for their facilitation in team formation, data search, and encouragement to publish this paper.

Declaration of competing interest

The authors declare that they have no any known financial or non-financial competing interests in any material discussed in this paper.

References

- [1] P. Perera, S. Nanayakkara, and A. Perera, "Application of Proper Asset Management Methodology and Technology in Defence Sector of Sri Lanka", International Conference on advances in Computer Science, Electronics and Communication Technologies, pp. 33–41, 2014.
- [2] British Standards Institute, *British Standards Institution's Publicly Available Specification for the optimised management of physical assets*, The Institution of Asset Management, United Kingdom, 2011.
- [3] Joel Rode, "Tactical Preparation Mission System," Dassault System, France, 2022.
- [4] Faculty of Defense Technology, "Results of Overseas Study Program," Republic of Indonesian Defense University, Jakarta, 2022.
- [5] Anselm Strauss, Juliet Corbin, *Dasar Dasar Penelitian Kualitatif*, Pustaka Pelajar, Yogyakarta, 2003.
- [6] U. Santoso, R. Widodo Putro, and S. Munthe, "The System Strategy of Material Maintenance Directorate Equipment Army (Ditpalad) In the Modernization Defense Equipment of Indonesian National Army (TNI AD)," *Jurnal Strategi Pertahanan Darat*, Vol. 6, No. 1, pp. 91–110, 2020.
- [7] G. Ketut, H. Desember, I. Nengah Putra A, and D. Dar, "The Strategy of Maintenance, Repair and Overhaul (MRO) for the Indonesian Navy Ships to Support the Readiness of Sea Operations in Fasharkan Lantamal V Surabaya," *Jurnal Teknologi Daya Gerak*, Vol. 3, No. 2, pp. 96–114, 2020.
- [8] M. Kemalsyah, D. A. Dadang, and P. Strategi Pertahanan Udara Fakultas Strategi Pertahanan, "The Influence of Soldiers Professionalism and Maintenance Facilities on Operational Readiness of Fighter Missile in the 65 Maintenance Unit 60 Maintenance Depot Madiun", *Jurnal Strategi Pertahanan Udara*, Vol. 6, No. 1, pp. 1–20, 2020.