

**MAINTENANCE REPAIR & OVERHAUL (MRO)
INFORMATION SYSTEM IMPLEMENTATION
IN AIROD SDN BHD**

BY

RIDHUAN BIN ALI

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Abstract

Many MRO (Maintenance Repair Overhaul) organizations have recognized the remarkable benefits that can be achieved with today's innovative business process automation applications. Despite a fiercely competitive MRO market environment, the industry offers growth opportunities for providers who can manage their service operations as a strategic line of business to generate the greatest possible revenue at the lowest possible cost by optimizing automation and increasing operational efficiencies. This research indicated that AIROD's overall current business process automation level was only at approximately 43.9 percent, with intention to further develop and automate up to 70.3 percent of the entire business process. Extensive macro analysis and benchmarking of established MROs suggested that AIROD has to strategize their business process automation. As the application system matures, it is increasingly important to investigate and understand the nature of system implementation. Although the current system is prevalent, existing research primarily addresses new challenges and technology. The idea of this paper is to describe the current system, our expectation and the suggested system to be implemented.

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1. Introduction

1.1 Background of the Study

The MRO (Maintenance Repair Overhaul) industry is always on the move and changing, and what worked yesterday might not work today. MRO companies are constantly seeking better ways to manage complexity, cut costs, and boost productivity. To introduce new efficiencies and reduce MRO costs, many companies are looking at best industry practices to develop strategies that will promise solid business results. The Aerospace MRO market is changing to a services-based business model, which demands seamless flow and exchange of information across a distributed environment to achieve near real time response.

AIROD stands for 'Aircraft Inspection, Repair & Overhaul Depot'. AIROD was established in 1976 as the first and only in-country facility to support the Royal Malaysian Air Force (RMAF) aircraft. In 1985, it was privatized as a joint venture company between National Aerospace & Defense Industries (NADI) and Lockheed Aircraft Systems International (LASI) of USA. Today, AIROD is a fully Malaysian owned company under the NADI group of companies and is a leading MRO facility in the region providing quality services to regional and global customers. AIROD is strategically located at the Sultan Abdul Aziz Shah (SAAS) Airport Complex northwest of the capital city of Kuala Lumpur. The company occupies a 77.4-acre site on the northeastern side of the runway. Their multi-million dollar facility is an internationally recognized aerospace maintenance and modification center. The

facility includes both narrow and wide body hangars, paint & strip hangar, support shops and engine test cells.

The management of Airod Sdn Bhd had instructed the Management Information System department (MIS) to undertake a study on the current system known as SOLO (Simplified Operational & Logistics On-Line) which has been in operation since 1993 as our main system to support the entire organization. The SOLO system was jointly developed between Airod's MIS department with American based company JPI Inc. which is also the IT provider for Lockheed Martin USA. Now, the system is likely too old in terms of technology, architecture, business process and no longer can support the current needs. There are other solutions which are definitely able to support Airod's entire operation.

A study has been conducted which involved many key players from various positions and departments. A series of questionnaires have been distributed as a method of getting the information and followed by an interview for better understanding of the entire situation. The analysis of the results based on the questionnaires and interview will be presented to get the best possible solution in terms of system and cost benefit to the organization.

1.2 Research Problem

SOLO is our own enterprise-wide information system which was developed to coordinate all the resources, information, and activities needed and to automate Airod business process. SOLO was deployed in 1993 where at that time Airod is very small and our business was totally concentrated to serve the Royal Malaysian Air Force (RMAF). The staff strength was about 500 employees. Today, Airod is not only serving the RMAF but also other commercial aircraft and international fleet. Total employees strength is 1250 and there are 6 bases throughout Malaysia which is located in Butterworth, Alor Setar, Kuantan, Kuala Lumpur, Subang and Kuching. The entire branches are connected each other via Secured IPVPN MPLS technology provided by Jaring.

SOLO system was developed using Oracle 7 as a back-end, the screens were created using SQL forms version 3 and the system is running on SCO Unix platform via TCP/IP connectivity. Oracle Corporation has announced that Oracle 7 is outdated and no longer supported by Oracle. All licensed users are therefore advised to upgrade their system. Other issues that drive the needs to change the system is because of limited development tools, outdated operating system and many new features are not available for the ease of the users. In term of the system itself, SOLO is no longer can serve users and business requirement where currently people are operating web-based transactions. Worst, JPI Inc is no longer in the business, and we don't have any reference about their where about. In short, The SOLO technology infrastructure was outdated and no longer can be upgraded due to "too big gaps" in the technology advancement or simply said 'system of yesterday'.

1.3 Research Objectives

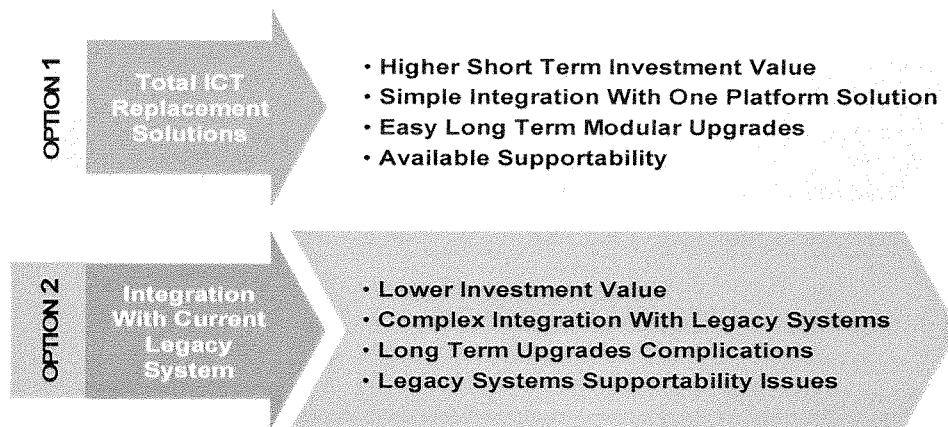
The need for information systems is usually related to organization planning and to the analysis of its performance vis-à-vis its competitors. The planning process for new IT applications begins with analysis of the organizational strategic plan which states the company overall mission, goals that follow from that mission, and broad steps necessary to reach the goals. The IT strategic plan must anchor to this 3 principles; it must be aligned with the company's strategic plan, it must provide for an IT architecture that enables users, applications, and databases to be seamlessly networked and integrated, and it must efficiently allocate Information Systems resources.

Developing an IT plan is the first step in the acquisition process. We have a limited amount of resources available and we must justify investing resources. Essentially, justifying IT investment includes 3 functions: assessing the cost, assessing the benefits, and comparing the two (cost-benefit analysis). The objectives of the research are:

- I. To optimize the usage of labor, tools and other resources.
- II. To come up with a recommendation to the management on the allocation of yearly budget for the MRO system and automation improvement.
- III. To come up on the Return of investment of MRO system.

1.4 Significance of the Study

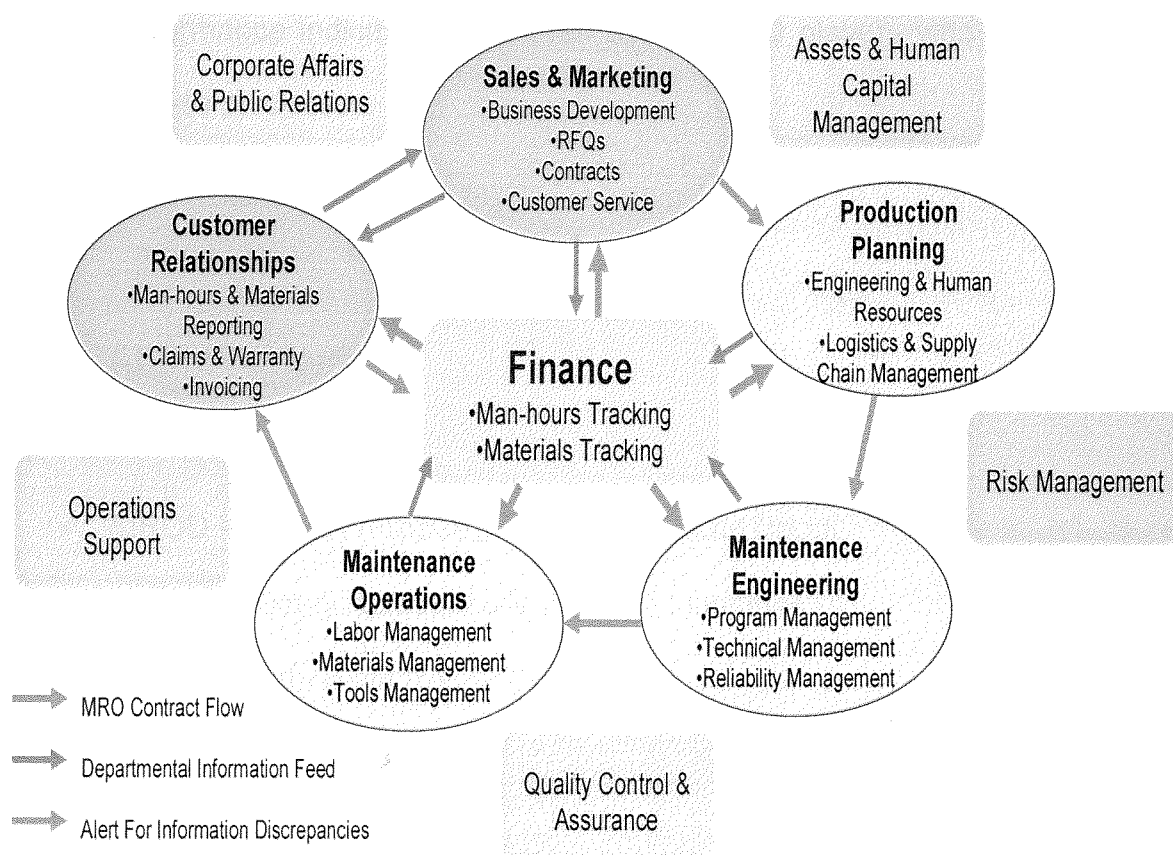
This research has generated two options for AIROD IT Investment Strategy over a period of 3 years. In Option 1, AIROD may opt for complete replacement of the current IT systems and infrastructures. In Option 2, AIROD may choose to integrate the new systems with the current legacy systems. This macro analysis shows that AIROD will need bigger amount of budget and longer period of implementation for Option 1 compared to Option 2.



Base on this research, both options have its own advantages and disadvantages in terms of investment costs, integration complexity and long term supportability. Option 1 requires higher investment but it provides seamless integration with only one platform and ensures long term supportability and easier future modular upgrades. Option 2 involves lower investment costs. However, future upgrade initiatives beyond 5 years may inflict additional costs. AIROD has to evaluate and re-examine the company's priorities and long term business strategies in order to determine which option will best fit the company's operational budget and growth strategies.

1.5 Hypothesis

For complex MRO organizations working on a global scale, an effective information sharing and exchange is best achieved by standardizing on a single ERP platform. This enables greater visibility into comprehensive spend management and allows companies to aggregate demand with their best suppliers, thus providing efficient sourcing and procurement management.



The diagram above illustrates the industry best practices in the aviation MRO macro business process flow through different business units within a typical MRO organization.

1.6 Importance of the Study

This research reveals that MROs that have implemented lean operations on average have successfully achieved improvements both in terms of increased performance in labor productivity, on time delivery, floor space utilization, capacity handling and also reduction of operational costs and time in the areas of inventory holding, warranty claims and procurement lead times. AIROD's investment should aim to achieve these performance indicators as proven by the MRO players who have automated their business processes.

1.7 Abbreviations

- AIROD – Aircraft Inspection Repair Overhaul Depot
- NADI – National Aerospace & Defense Industries
- MRO - Maintenance Repair Overhaul

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Appendix

- Part A: AIROD Business Process
- Part B: Current Enterprise Systems
- Part C: IT Developments