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NAVAL AVIATION LOGISTICS COMMAND
MANAGEMENT INFORMATION SYSTEM
(NALCOMIS), A USER PERSPECTIVE

THESIS

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THESIS

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Preface

The purpose of this research was to provide user input for NALCOMIS development decisions. The need for this research was confirmed by several individuals involved with the NALCOMIS program.

As an academic exercise, this thesis has provided me with the opportunity to develop a number of research and writing skills.

My thanks go out to those in the fleet who took the time to respond to the questionnaire. I would also like to acknowledge the keepers of my sanity, so fragile in this artificial world of academics. If it wasn't for Saturday morning cartoons, Hearts of Space music, and my blue and yellow Italian companion, this research would never have been completed.

Michael D. Disano

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Abstract

This study reevaluated and prioritized the functional information requirements of the Naval Aviation Logistics Command Management Information System (NALCOMIS). A survey of maintenance managers was used to gather information on the perceived importance of each functional requirement. Respondents identified the three least important and three most important of the NALCOMIS subsystems. Finally, respondents were asked to identify NALCOMIS subsystems currently duplicated by micro-computer programing at the local level.

The data gathered revealed that over 95% of all functional requirements were rated as important or better by at least half of the respondents. It also identified the three least important and the three most important NALCOMIS subsystems. Additionally, it revealed that all NALCOMIS subsystems are being duplicated to some extent at the local level.

The results of this study led to three recommendations for future study including case study analysis to further identify NALCOMIS functional requirements duplicated by micro-computer programming.

NAVAL AVIATION LOGISTICS COMMAND MANAGEMENT INFORMATION SYSTEM (NALCOMIS), A USER PERSPECTIVE

I. Introduction

Chapter Overview

This chapter contains an introduction to Naval aviation maintenance and the development and implementation of the Naval Aviation Logistics Command Management Information System (NALCOMIS). The general management issue, research objectives, and specific investigative questions are stated. In addition, the scope, limitations, and assumptions of the research are presented. Finally, an overview of the thesis structure is presented.

Background

Naval Aviation accounts for a significant portion of the Navy's manpower, expenditures, and national defense capabilities. Effective and efficient aviation maintenance management is an essential element in the achievement of Naval Aviation readiness and safety objectives.

The Naval Aviation Maintenance Plan (NAMP) was established to ensure attainment of readiness and safety objectives through optimum utilization of manpower, materials, and funding. It provides policy guidance, technical direction, and management systems for the administration of all programs affecting aviation maintenance (4:Sec II,24). The need for accurate management information was recognized by the NAMP and led to the introduction of the first formal management information system (MIS) within Naval Aviation, the Naval Aviation Maintenance and Material Management System (3-M) (4:Sec II,35).

As a result of technological advancement, today's aviation maintenance manager operates in an environment in which three times the number of personnel are required to support one third the number of aircraft, when compared to the 1950s (15:118). Parallel to this growth in equipment technology was the growth in complexity and magnitude of the aviation maintenance manager's responsibilities. Consequently, more accurate and timely information was needed to support decision making at all levels of management (11:2).

The Naval Aviation Logistics Command Management Information System (NALCOMIS) was designed to provide aviation maintenance managers with a real-time, integrated, and automated information source. This information was to be used in support of day-to-day maintenance and supply activities, as well as to communicate key summary information upline for analysis by top management (1:10).

The functional requirements of this system were established by first identifying key NAMP activities and then specifying the information required to support these activities (11:5). Development and implementation were limited to the support of the Supply Support Center (SSC), Intermediate Maintenance Activity (IMA), and Organizational Maintenance Activity (OMA).

NALCOMIS development and implementation progressed slowly. Consequently, in 1977 development was divided into three phases. Phase One, the NALCOMIS Repairable Management Module (NRMM), was developed and implemented as an interim solution to provide real-time management information (5). This limited capability system was for "short term use" (6). Phase Two was designed to automate source data entry of all maintenance and supply activities at the Intermediate Maintenance Activity (IMA) and Supply Support Center (SSC). Phase Three was identified as the integration of the Organizational Maintenance Activity (OMA) into this automated source data entry system (19).

Currently, Phase Two is undergoing initial testing at Naval Air Station, Norfolk. It will eventually be integrated with existing Phase One systems throughout the fleet. In 1987, after initial software construction began, Phase Three (OMA) development was temporarily suspended. This suspension was due to the shortage of program funding caused by the increased costs associated with implementation of Phase Two (19). Consequently, Commander Thomsen, NALCOMIS Deputy Project Manager, defined the need to identify potential system modifications that might reduce overall system costs. This could be done by evaluating, updating, and condensing the original functional requirements of NALCOMIS Phase Three (19).

Research Objective

The research objective of this thesis is to reevaluate and prioritize the functional requirements initially established during NALCOMIS Phase Three development. This research will be approached from a user perspective and is designed to provide the Program Manager with information on which to base system modification decisions.

Investigative Questions

In order to meet the research objective, data will be gathered from organizational maintenance managers aimed at answering the following investigative questions:

1. What is the perceived importance/usefulness of specific functional requirements?

2. What is the relative ranking of specific functional requirements?

3. What are the relationships between the

perceived importance/usefulness of functional requirements and the variables of rank, management position, designator, computer knowledge, and aircraft community?

4. Which functional requirements are being duplicated by micro-computer based methods?

Scope of Research

This research does not attempt to evaluate the ability of NALCOMIS software systems to satisfy the specific functional requirements. Instead, this research determines the extent that maintenance managers perceive specific functional requirements as being important in their decision making process. This research also identifies those functional requirements that are being duplicated by micro-computer based methods.

Limitations

The following limitation should be considered when reviewing the findings of this research. The individuals sampled were selected from a population of the primary organizational level NALCOMIS users. For the purpose of this research, the primary OMA users include Maintenance/Material Control Officers (MMCO) and Chief Petty Officers, Material Control Officers (MCO) and Chief Petty Officers, and Quality Assurance/Analysis Supervisors. Although this sample is viewed as representative of NALCOMIS

Phase Three users, it does not include every eventual user group.

Assumptions

The first assumption made was that individuals answered the survey questionnaire candidly and correctly. Ives and Olson identify two additional assumptions that are required when evaluating management information systems from a user perspective. These assumptions are applicable to this research and are listed below.

> 1. Users are assumed to have in-depth knowledge of information and its role in their business so they can articulate their information needs.
>
> 2. Users are assumed to know the types of information that are best for their important and frequently occurring decisions [10:590].

Thesis Overview

Chapter II will provide a review of existing literature on Naval Aviation Maintenance, NALCOMIS, and general information on MIS system design. In Chapter III, the research methodology is defined including a description of the survey instrument, data processing techniques, and data analysis techniques. Chapter IV summarizes the survey responses. Finally, Chapter V presents the conclusions and recommendations of this research.

II. Literature Review

Chapter Overview

This chapter will present details of the Naval Aviation Maintenance Program (NAMP) as they relate to the research topic. First the structure of Naval Aviation Maintenance will be presented, including an overview of the three levels of maintenance. Next, the command structure and responsibilities of the organizational level of maintenance will be detailed. This will be followed by a brief history and description of NALCOMIS development and implementation. Finally, a review of previous research conducted on NALCOMIS will be presented.

Naval Aviation Maintenance

The NAMP defines the command structure, repair responsibilities, and administrative requirements within Naval Aviation Maintenance. In order to balance mobility, repair capability, and optimum utilization of resources, aviation maintenance is divided into three specific levels. This concept is utilized to varying degrees within all services (4:Sec 1,4). A brief description of each maintenance level is presented below as paraphrased from the NAMP (4:Sec 1,8).

Organizational Level. This level involves on-equipment maintenance, inspection, servicing, and the removal and replacement of defective aircraft components. In general terms, organizational level maintenance is performed by the command with reporting custody of the aircraft. This level is associated with the term "squadron maintenance" and represents the lowest level of repair.

Intermediate Level. This level is characterized by off-equipment maintenance in support of organizational level users. Included in the intermediate level responsibility are the repair, testing, inspection, modification and check of aeronautical components/equipment and support equipment. Additional functions include the calibration of equipment and manufacture of unique parts. This level is performed by the Aircraft Intermediate Maintenance Departments (AIMD) located on shore stations and aircraft carriers.

Depot. This level involves the rework, overhaul, and rebuilding of major equipment assemblies and subassemblies. Additionally the depot level is the main element of engineering support to the lower levels of repair.

Organizational Structure

Figure 1 shows the command structure prescribed for the organizational level maintenance activity. Several minor

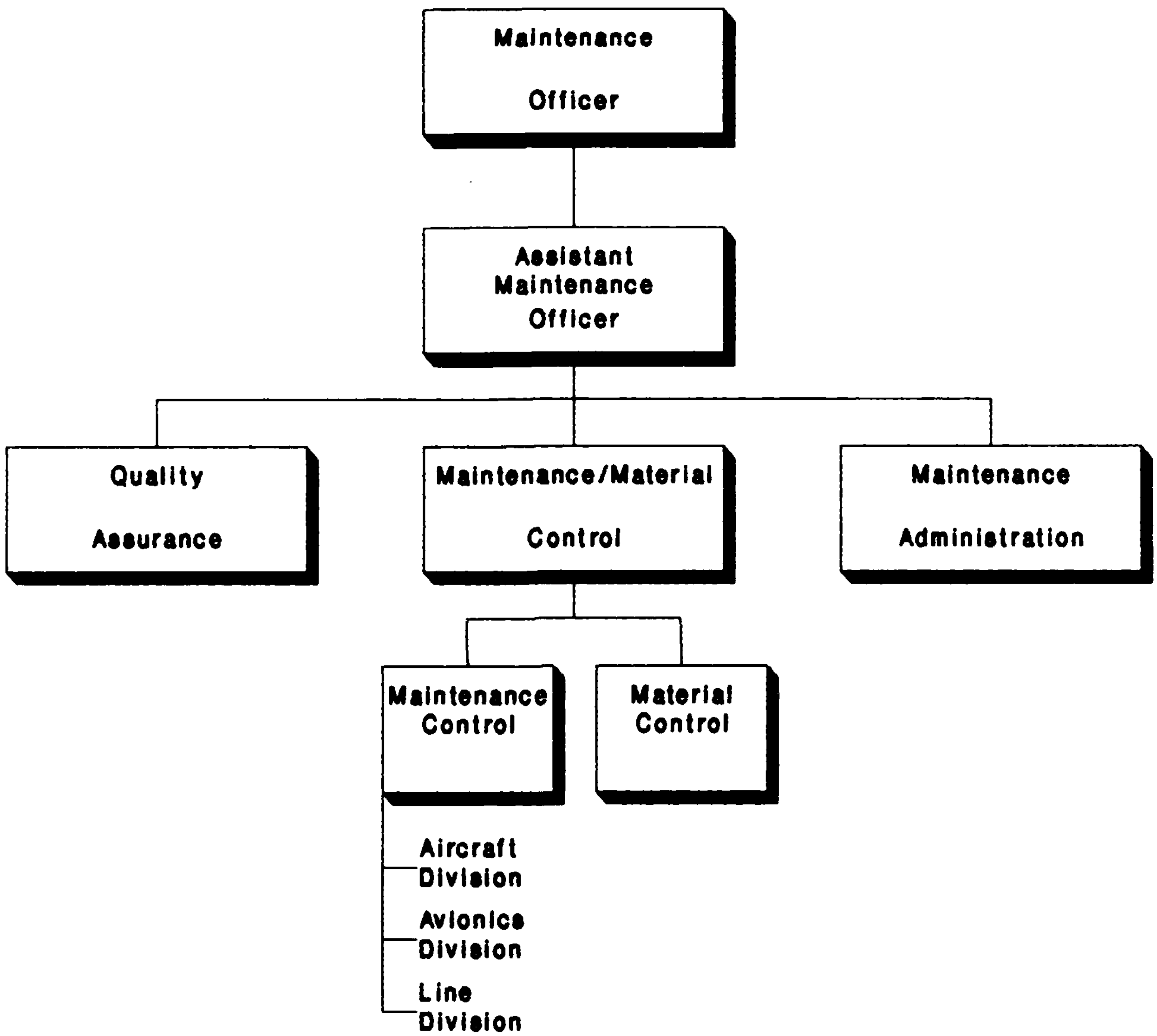

Figure 1. Navy Organizational Level Structure

alterations to this structure are possible depending on specific command missions and size. The roles of the Maintenance Officer, Maintenance/Material Control Officer, Material Control Officer, Quality Assurance Officer, and the production divisions are described below.

Maintenance Officer (MO). The Maintenance Officer is responsible to the Commanding Officer for the final accomplishment of the department's mission. The most noteworthy of these assignments include the following.

1. Ensure the accomplishment of training for all assigned personnel.

2. Ensure the efficient operation of he Maintenance Data Reporting (MDR) system.

3. Provide data analysis summaries to the Commanding Officer when requested.

4. Continuously review department operations to ensure that adequate planning and statement of future requirements are initiated [4:Sec 2,2].

Maintenance/Material Control Officer (MMCO). The MMCO is responsible for the overall production and material support elements of the maintenance department. Depending on command policy and size, an additional officer, the Maintenance Control Officer, may be assigned. Some of the key tasks of the MMCO are listed below.

1. Coordinate and monitor department work load.

2. Maintain liaison with all supporting activities.

3. Maintain technical directive control procedures for the department.

4. Review monthly Maintenance Data System (MDS) reports to ensure effective utilization of personnel, equipment, and facilities.

5. Monitor the Subsystem Capability Impact Reporting (SCIR) system and other reports as required [4:Sec 2,14].

Material Control Officer (MCO). The Material Control Officer acts as the point of contact between the organizational maintenance activity and the Supply Support Center (SSC). A few key Material Control responsibilities are listed below.

1. Ensure that requirements for parts and materials are properly forwarded to the SSC.

2. Expedite routing of received parts and materials to appropriate production work centers.

3. Maintain status control of all ordered material.

4. Ensure prompt removal and turn-in of defective repairable assets [4:Sec 2,15].

Quality Assurance/Analysis Officer (QAO). The QAO provides a staff function by inspecting, monitoring, and reviewing the entire maintenance effort. The analysis element of the QAO responsibility is to provide qualitative and quantitative information to the MO and Commanding Officer as requested or necessary (4:Sec 2,21). The squadron's data analyst coordinates this data service effort and is assigned to the Quality Assurance/Analysis division.

Production Divisions. Each production division consists of various work centers divided by job specialty. Production Division Officers (DO) and Branch Officers are assigned to coordinate all elements of division operations except directing work load. This responsibility is maintained by maintenance control. Actual assignment of Division Officers and Branch Officers is dependent upon command policy and manning levels (4:Sec 2,32).

NALCOMIS Overview

In the early seventies the Navy developed the Naval Aviation Maintenance and Material Management System (3M) in order to provide engineers, contractors and other logistical support personnel with information on historical fleet supply and maintenance problems (11:2). This system primarily provided information required by higher commands. This upline reporting was not necessarily useful at the organizational level. It relied on the hand manipulated source documents and reports generated by fleet commands. The information provided to the fleet squadron and intermediate level maintenance managers was probably best described in the NALCOMIS functional description;

> the information required by management on which to base decisions is rendered stagnant by outmoded data systems" [11:5].

NALCOMIS History. In 1973, the Chief of Naval Operations (CNO) directed a study to identify the problems of the 3M system and to identify potential remedies (11:7). As a result of this study, NALCOMIS was officially established as a project that would include implementation at ninety two operational sites (5). The system was described as follows.

> A modern and effective management information system which responds to the aircraft maintenance and material management requirements aboard aircraft carriers, amphibious aviation helicopter assault ships, Marine Air Groups (MAG), and air stations [12:5].

The specific benefits identified to come about as a result of NALCOMIS implementation were identified in a Chief of Naval Operations memorandum and are summarized below.

1. Reduce not operationally ready/maintenance by 2%
2. Reduce awaiting maintenance time by 5%
3. Reduce not operationally ready/supply by 3%
4. Reduce supply response time by 20%
5. Reduce I-level turnaround time by 20%
6. Reduce beyond capability of maintenance rate by 5%
7. Reduce Data Service Facility work by 2228 man-years [5].

NALCOMIS Design. NALCOMIS was envisioned as a system that would use a single information system to integrate the entire maintenance cycle, thus allowing managers at all levels to access various elements of repair data. The system was developed to enhance aircraft readiness and maintenance efficiency by providing the following minimum system features.

> 1. Provide a single, integrated, real time, automated MIS to support aviation maintenance and supply managers.
>
> 2. Automate source data entry.
>
> 3. Provide system generated schedules and reports.
>
> 4. Provide adequate data base support for upline reporting requirements of higher authority [11:4].

In 1977, the Module I Development Plan was approved with support limited to organizational, intermediate, and aviation supply managers (12). It should be noted that NALCOMIS was not designed to replace the 3M system but rather to enhance its capabilities. This user oriented design was divided into subsystems which provided the manager with information to assist in scheduling, controlling, and monitoring the following activities for the organizational level (1:12).

1. Flight Activity Subsystem. This subsystem includes the recording of aircraft flight utilization data on the Naval Aircraft Flight Record (NAVFLIRS). This subsystem provides various on-line inquiries and printed reports.

2. Maintenance Activity Subsystem. This subsystem performs fully automated processing of the Visual

Information Display System/Maintenance Action Form (VIDS/MAF). VIDS/MAFs will be tracked from initiation through the repair, inspection, and approval activities.

3. Configuration Status Accounting Subsystem. This subsystem establishes and maintains the configuration profile of aircraft, engines, components, support equipment and support equipment components. Configuration records will track the serial numbers and technical directive (TD) management information for each of the items.

4. Personnel Management Subsystem. This subsystem maintains specific personnel data for both military and civilian personnel assigned to an organization. The information was designed to provide assistance with personnel assignments, transfers, and special maintenance qualification tracking.

5. Asset Management Subsystem. This subsystem addresses the management of aircraft and equipment assigned to an organization. An inventory is maintained for all aircraft, specific equipment, and Individual Material Readiness List (IMRL) items.

6. Local/Upline Reporting Subsystem. This subsystem provides the capability to capture information accumulated by the other subsystems. Periodically, this subsystem combines and consolidates that data into detail and summary level management reports.

7. Technical Publications Subsystem. This subsystem tracks the location, change application, change history, and requisition status of all technical publications.

8. System Support Subsystem - This subsystem maintains control over the unique assignment of numbers for critical system documents or transactions such as requisitions and Maintenance Action Forms (MAF).

This system presents users with pre-formated screens for source data entry and the ability to produce a number of printed reports.

NALCOMIS Implementation. Initial development and implementation concentrated on constructing a complete system that would automate and integrate OMA, IMA, and Supply Support Center (SSC) activities. This system, NALCOMIS Standard Environment, was prototyped at Marine Air Group (MAG) 14, located at Marine Corps Air Station Cherry Point, North Carolina (1:14). This initial system suffered from several problems that forced further delays in NALCOMIS progress. In order to speed delivery of NALCOMIS capabilities to the fleet units, development and implementation were divided into three sequential phases. These phases are briefly described below.

1. Phase One - NALCOMIS Repairables Management Module (NRMM). Developed as an interim method of meeting

fleet requirements, NRMM was modeled after many characteristics of the Status Inventory Data Management System (SIDMS). SIDMS, developed locally by Atlantic Fleet IMA activities, was designed to provide on-line management information for order processing, production control, inventory control, and personnel management (2:27). NRMM was designed to incorporate and expand these capabilities for Navy wide use and is currently in place at most of the eventual NALCOMIS sites including OMAs.

2. Phase Two - Intermediate Maintenance Activity (IMA)/Supply Support Center (SSC). The development of Phase Two is highlighted by the automation of all source data entry forms. This system is designed to eliminate most paper processing forms within the IMA and SSC. The functions required by the SSC and IMA are integrated into one system sharing a common data base. This approach avoids redundancy of functions and related data between the organizations (1:13). An analysis was conducted to compare Phase Two benefits with existing Phase One capabilities at MAG-14, NAS Cecil Field, MCAS Beaufort, and NAS Oceana (12:4). As a result of this analysis, approval was granted to implement Phase Two at NAS Norfolk, with final approval dependent on prototype success (6). This prototype implementation is currently ongoing at NAS Norfolk.

3. Phase Three - Organizational Maintenance Activity (OMA). An extension of Phase Two, this phase is designed to include Organizational Maintenance Activity (OMA) production in the IMA/SSC host system. This will complete the system and finally automate and integrate the entire maintenance and supply operation (12:3). As stated previously, development of Phase Three capabilities has been postponed due to funding constraints.

Previous Research

This section will provide an overview of research and articles involving NALCOMIS implementation into Naval Aviation. A synopsis of several references will present the reader with a picture of NALCOMIS from differing perspectives including its effect on user personnel, comparison with existing management systems, and the review and implementation processes.

Several roles within organizational level maintenance may change as a result of NALCOMIS implementation. Boston discusses the changing role of the data analyst (2:11). Data analysts are assigned to most organizational, intermediate, and staff organizations in support of the 3M maintenance data system requirements. According to the Naval Aviation Maintenance Plan (NAMP), the data analyst is primarily responsible for providing managers with analytical reports and recommendations concerning aircraft material condition and utilization, maintenance work load and utilization, and failure trend analysis (4:Sec 2,4).

Boston states that under the 3M system the analyst was not productively used in the statistical or analytical role for which he was trained. He suggested that the majority of the analyst work load was based on collecting, screening, reviewing, and delivering the hand manipulated source documents (3:66). Boston asserts that NALCOMIS virtually eliminates this requirement by providing the maintenance manager and technician with the ability to input source data directly into computer terminals. As a result, a "majority of required reports can be provided with limited analyst intervention" (3:78). This presents a major objective of the overall system, i.e., reduction of the manpower required to present the maintenance manager with decision making information. The specific functional requirements within NALCOMIS that would provide this time savings were not discussed and at the time were probably not known.

The human element was discussed by Bayma in which he stated that

> too much attention has been directed to the technical aspects of computers and data processing and too little attention given to the user personnel's reactions and responses to NALCOMIS [1:5].

Organizational structure, formal and informal decision making, and communication within the organization would be affected by MIS implementation. He states that within Naval units there are no provisions to change the formal organizational structure to suit the characteristics of an MIS. Therefore, he asserted, the program manager must be sensitive to the potential impact of NALCOMIS on the informal structure of decision making (3:56).

Bayma focused on how automated information systems impacted the organizational structure of four Naval units involved in initial implementation of NALCOMIS-like prototypes. He claimed that in general the informal decision process shifted from centralization to a more transactional or partial delegation method. Production officers and supervisors were allowed to make more decisions with upline managers using the MIS for monitoring overall activity. The autocratic leader, however, may have stifled MIS success by using the new system to micro-manage to an extent never before possible (2:65).

Roach and Genovese asserted that NALCOMIS may not be serving the individuals it was designed for, i.e., squadron and intermediate level maintenance managers (15:116). They continued by stating that a management information system (MIS) by itself does not resolve problems; it merely identifies them. For the most part, problems which are identified are long-standing and are already known to the maintenance manager.

> The continuing evolution of automated MIS has expanded the role of the problem reviewers at the expense of problem resolvers, particularly since it is axiomatic that problems are much easier to review than to resolve [15:117].

The authors pointed out that there are many advantages to be gained from automated systems, but that all of these should be developed to improve readiness and not merely to "titillate the curiosity of managers and administrators" (15:117).

Rodenbarger reviewed potential duplication of supply oriented information products in his masters thesis. SUADPS was described as a "batch processing, magnetic tape oriented, supply and financial accounting system programmed in assembly language" (16:36). SUADPS-RT was identified as a real-time upgrade of the original SUADPS process. The author remarked that both SUADPS-RT and NALCOMIS are supported by hardware procured as a part of the Shipboard Non-Tactical ADP Program (SNAP).

Rodenbarger's analysis identified duplications and differences between SUADPS-RT and five supply oriented functional requirements (20 sub-functions) incorporated in NALCOMIS. The criteria used in the comparison were:

1. Direct duplication - functions that

matched directly. For example, both systems required the capability to display requisition status via query mode.

2. Functional duplication - functions that produced the same end result but by alternative methods. For example, both systems use different methods for tracking of IOU repairables.

3. Functional differences - functions provided in NALCOMIS only. For example, the maintenance manager can track components through the entire intermediate level repair cycle. The supply manager tracks only induction and completion [16:55].

Of the twenty NALCOMIS sub-functions pertaining to supply, nine were classified as direct duplications, six as functional duplications, and five as functional differences (16:57).

Rodenbarger concluded that the subsystems of NALCOMIS that pertain to supply should be eliminated and the functional requirements absorbed by SUADPS-RT (16:67).

Finally, Puffer prioritized the requirements based on inputs from personnel experienced in the use of the Status Inventory Data Management System (SIDMS-II). The author used a survey and several interviews to gain insight into the perceived importance of the various information products provided by SIDMS. Data collection was done solely at Naval Air Station, Norfolk Virginia and included an unspecified sample size (14:25). The information concluded to be most important to the maintenance manager is listed below.

1. Real time report generation.

2. Supply status and asset tracking.

3. Intermediate repair status and asset tracking.

4. Aircraft cannibalization decision aid [14:68].

All of these authors gave insight into proper structuring, design, and implementation of NALCOMIS. As stated in the next chapter, some of Puffer's ideas and methods will be adapted to meet the needs of this research.

III. Methodology

Chapter Overview

This chapter identifies the methods used to fulfill the research objective. Specifically, it defines the population and sample that was surveyed, describes the survey questionnaire used to collect data, and presents the data analysis techniques used to answer the research and investigative questions.

Population

The population to be surveyed included the primary organizational level users, i.e., Maintenance/Material Control Officers (MMCO) and Chief Petty Officers, Material Control Officers (MCO) and Chief Petty Officers, and Quality Assurance/Analysis supervisors. As mentioned in the Limitations section of Chapter I, this population does not include all NALCOMIS users. The population encompasses approximately 200 Naval Aviation squadrons and includes approximately 200 MMCO/CPOs, MCO/CPOs, and QA supervisors. Exact numbers within the population are subject to variances in job assignment and manning levels. Included in the population are male and female service members, ranging in rank from chief petty officer (E-7) to lieutenant commander (O-4). Individual Designators included senior petty officers, Aviation Maintenance Officers (AMO), Warrant Officers (WO), and Limited Duty Officers (LDO).

Sample

Data was collected from a stratified random sample of the above population. A sample size of 150 was selected in order to achieve a confidence and reliability level of 95% ± 5%. The computation formula used was reproduced from A Guide for the Development of the Attitude and Opinion Survey (7:11-14). The sample was selected through random number generation. First, fifty squadrons were randomly selected and questionnaires sent to the MMCO/CPO. This procedure was repeated for the MCO/CPOs and QA supervisors.

Survey Instrument

A survey questionnaire was used to collect data from which to answer the research and investigative questions. The questionnaire was specifically constructed for this research. However, some ideas including the rating scale were adapted from those used in a similar study by Puffer (14:44). In Nutt's evaluation of MIS design principles, he identified the various stages of the decision process which the information addresses (13:142). This concept was employed in order to prioritize overall subsystem importance.

The questionnaire was divided into three sections. Respondents were asked to:

1. Provide demographic data.

2. Rate individual functional requirements of each information subsystem on a five point scale ranging from very important to very unimportant.

3. Choose the three most important and the three least important information subsystem.

4. Identify any information subsystems or functional requirements currently being satisfied by other automated methods.

5. Provide general comments/recommendations on overall system characteristics, including perceptions about the advantages of automated systems like NALCOMIS.

The questionnaire was constructed with an emphasis on the elements of format, ordering of questions, and recording responses discussed by Sudman and Bradburn (18:21,208,148). Respondents were assured anonymity and were asked to respond on the survey itself. No computer answer forms were used. Cover letter design included stating the importance of the research, importance of the individual's response, and procedures for contacting the researcher (8:165-172). This effort was designed to produce an end product that would ensure maximum response.

The questionnaire was pretested for clarity, validity, and reliability on 15 aviation maintenance managers with backgrounds similar to the population. These individuals were assigned to the maintenance department of the Fighter/Airborne Early Warning Wing, Pacific Fleet. Minor revisions were made in both the form and content of the questionnaire as a result of this test. The questionnaire was reviewed by the NALCOMIS Deputy Program Manager and a representative of the Navy Management Systems Support Office prior to this pretest process. Finally, a cover letter was prepared in which this research was endorsed by the NALCOMIS Program Manager.

The questionnaire, cover letter, and return envelope were mailed to the selected sample. Questionnaires were sent to billet titles, not specific individuals. This was necessary due to frequent billet rotation, and the inability to determine the billet status of deployed individuals. A copy of the questionnaire and cover letter are included as Appendix A.

Data Processing

Responses to questions that used the Likert-type scale were coded into a computer data file and grouped by respondent. Responses to questions which identified functional requirements currently being satisfied were grouped by functional requirement and are summarized in Chapter IV. Any recommendations or comments on overall NALCOMIS characteristics were grouped by similar subject and are presented in Chapter IV.

Measurement

For the purpose of this research, the Likert-type scale was assumed to provide ordinal data with origin, as defined by Emory (9:90). This data was analyzed by employing parametric statistics. Although differing views exist as to whether this creates distortion of the data (6:89), this research did not attempt to solve that issue since statistical conclusions are on the conservative side.

Data Analysis

Data analysis was performed using a computer program developed from the Statistical Package for the Social Sciences (SPSS). The specific procedures used to analyze the investigative questions are listed below.

FREQUENCIES. This procedure gives a table of frequencies, percentages, and summary statistics for values of individual variables (17:314). It was used to generate frequency of response from the demographic variables of rank, designator, management position, and aircraft community. The next calculation determined the number of responses given in each category for each functional requirement. Finally, this procedure determined the frequency that specific information subsystems appeared in the lists of three most important and three least important requirements.

CROSSTABS. This procedure produces tables in which the frequency of occurrence for one variable is subdivided between the values of another variable (17:336). It was used to analyze the relationships listed in investigative question three. Tables were constructed for each functional requirement in which the frequency of response in each of the importance categories was subdivided by the values of rank, designator, management position, and aircraft community. Separate chi-square statistics were calculated to test for statistical independence between importance category and the values of the variables listed above. If the calculated significance level was less than .05, then the importance category of a specific functional requirement was likely to be dependent upon an individuals rank, designator, management position, or aircraft community (95% confidence).

T-TEST. This procedure compares two sample means to determine if they are significantly different (17:442). This procedure was used to determine if the mean response for a specific functional requirement was significantly different for men and women. If the computed probability was less than .05, the two means were likely to be different (95% confidence).

ONEWAY. This procedure uses an analysis of variance to compare mean values of importance ratings for a given functional requirement in the different categories of the independent variables of rank, designator, management position, and aircraft community. If the calculated significance level was less than .05, then the means were likely to be different (95% confidence). Options of ONEWAY were used to determine which categories of the independent variables accounted for the difference.

The remainder of this thesis presents the results that the questionnaire produced. First, Chapter IV presents a summary of demographics, question responses, and analysis of the research and investigative questions. In chapter V, this analysis is used to draw conclusions and make recommendations about the information requirements of NALCOMIS.

IV. Findings

Chapter Overview

This chapter presents and analyzes the data collected from the survey questionnaire. First, a summary of survey demographics is presented. Next, the responses for each functional requirement are detailed, thus addressing the first investigative question. This section also analyzes the relationships between importance ratings and the demographic variables listed in investigative question three. The second investigative question is answered by providing the relative ranking of each functional requirement and of the general NALCOMIS subsystems. Finally, a summary is presented of those NALCOMIS subsystems identified as being satisfied by existing automated systems and the methods used.

General Comments

The majority of survey responses were received within three weeks of mailing, with the last arriving after approximately three months. Seventy nine of the one hundred fifty questionnaires were returned. Three of the questionnaires were returned blank, leaving seventy six responses for data analysis. This response rate of just over fifty percent was lower than the average of sixty two percent experienced at the Air Force Institute of Technology.

Sample Demographics

A demographic profile of the respondents was provided by questionnaire items one through six. The results are presented in the following figures and discussion.

Figure 2 indicates that less than 4% of the valid responses were from female service members.

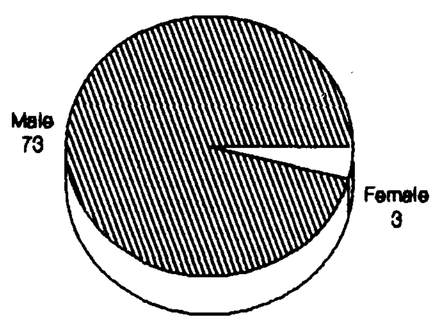

Figure 2. Sex

There is no information available on how many of the sample billets are filled by women. Therefore, no interpretation of whether this figure is representative of the population was made.

Figure 3 shows that respondents were dispersed fairly evenly among the various ranks. Lieutenants accounted for the largest portion of the sample with 25%. The three individuals listed in the Other category included one commander, one second class petty officer, and one third class petty officer.

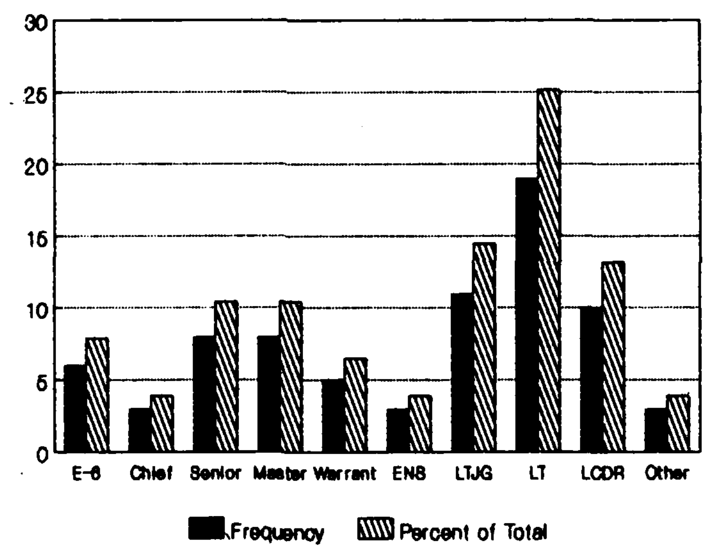

Figure 3. Rank of Respondents

Figure 4 shows that over 40% of the respondents were Aviation Maintenance Officers (AMO). The category for senior enlisted respondents was the second largest group, accounting for 27.6% of the sample. Eight petty officers and one pilot made up the Other category.

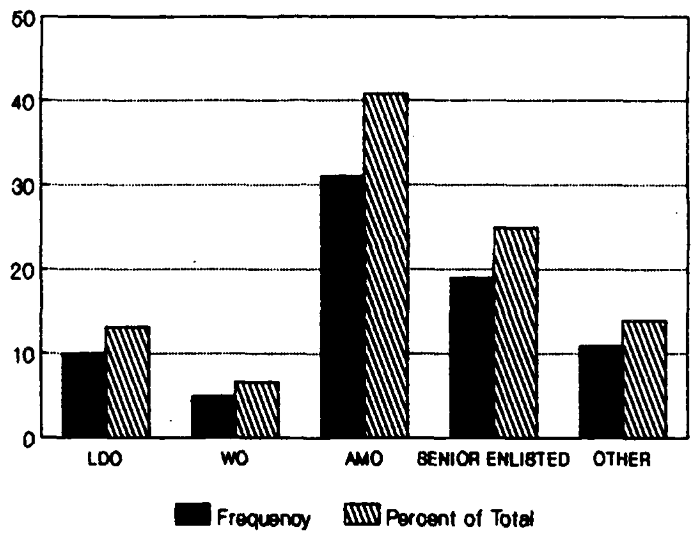

Figure 4. Personnel Designator

As Figure 5 shows, 39.5% of the respondents identified themselves as Maintenance Control Officers. Thirty-nine of the returned questionnaires were from maintenance control

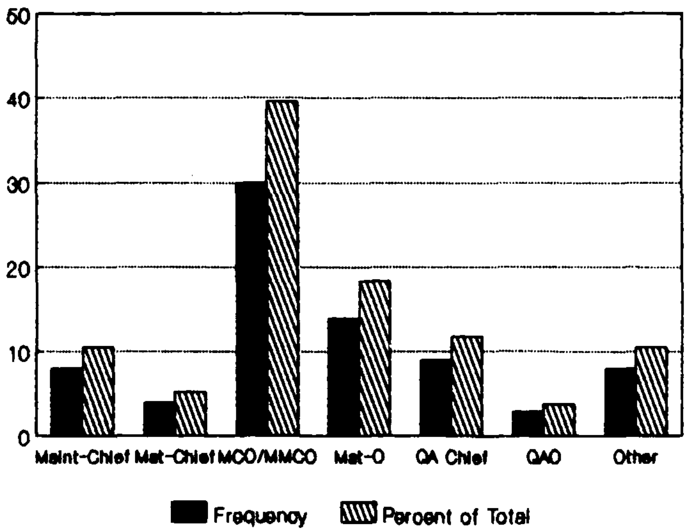

Figure 5. Management Position.

billets, including thirty maintenance control officers, eight maintenance control chiefs, and one logs and records clerk listed in the Other category.

In contrast, twenty questionnaires were returned from material control billets including the officers, chiefs, and two leading petty officers listed in the Other category. The thirteen responses from the quality assurance billets were the fewest of the three major groups. Three respondents identified themselves as quality assurance officers, nine as quality assurance chiefs, and one as the squadron data analyst. Four responses did not fall into any of the three major groups, i.e., two assistant maintenance officers and two maintenance officers. As stated in chapter three, fifty questionnaires were sent to billets in each of the three categories addressed above. By temporarily ignoring the four responses from outside the three major groups, a simple percent of response was calculated for each of these groups, i.e., 78% (39 of 50) for maintenance control billets, 40% (20 of 50) for material control billets, and 26% (13 of 50) for quality assurance billets.

Figure 6 identifies the aircraft communities represented by the sample.

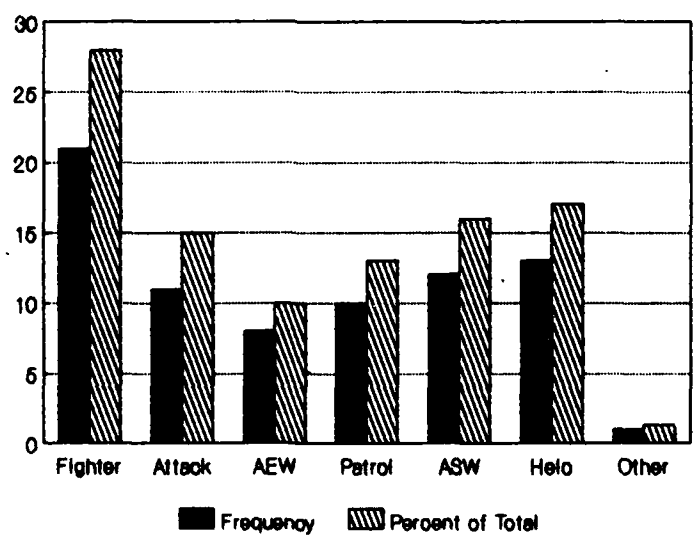

Figure 6. Aircraft Communities

The one response in the other category was from an EC-130 squadron. Response rates were calculated for each aircraft community. The fighter community returned twenty-one of twenty-six (80%) questionnaires for the best response rate. One of seventeen (5%) questionnaires mailed to squadrons falling in the other category were returned. All other communities were in the forty percent to sixty percent response range.

Figure 7 shows that over 89% of the respondents rated their computer knowledge at fair or better. The distribution of self rated computer skills appeared to be even across personnel designators and ranks.

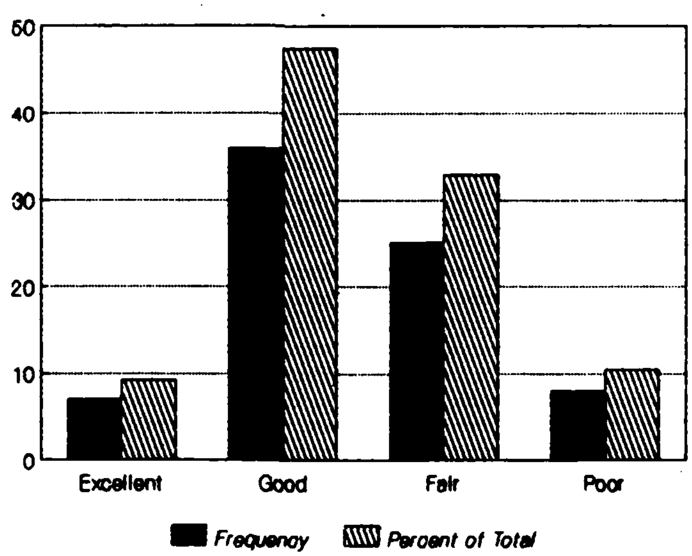

Figure 7. Self Rated Computer Knowledge

Data Analysis Techniques

In the following sections the data gathered by the survey questionnaire is summarized for each functional requirement. Three statistics were used to rate the importance of each functional requirement. First, the frequency of response in each importance category was calculated for each questionnaire item. The median value represents the importance category in which the fiftieth percentile of non-neutral responses occurs. Finally the mode value was calculated, indicating the value chosen most frequently. All neutral responses were excluded from statistical calculations.

Hypothesis Testing

The next analysis conducted was a comparison of the mean value for each question as given by the different subgroups associated with the variables of designator, rank, management position, aircraft community, and computer knowledge. This analysis tested the null hypothesis that the mean value was equal for all of the subgroups. The alternative hypothesis stated that at least two of the subgroup means were different. For example when testing the effect of rank on the response to a particular question, the null hypothesis stated that the mean response to the question was the same for ensigns, lieutenants, chiefs, etc.

The SPSS analysis of variance procedure ONEWAY calculated an F-statistic and associated probability that a difference in the subgroup mean values was statistically significant. Finally, the Scheffe multiple range test was used to identify the subgroups with different mean values. An alpha value of .05 was used for all hypothesis testing. The alpha value represents the probability of rejecting the null hypothesis when it is in fact true. In simpler terms this represents the chance that we will err when concluding a difference in subgroup means.

A complete breakdown of the responses to each questionnaire item is presented in Appendix B. This information is organized by NALCOMIS subsystems and in the order it appeared in the questionnaire.

The following tables and discussion concentrate on those functional requirements where differences existed between the demographic variable subgroups. First, a table is used to summarize response frequencies, median and mode values. Next, the differences in subgroup means are identified and possible explanations of the differences discussed. This analysis is provided under the subheading of the applicable NALCOMIS subsystem.

The purpose of this section is to present those functional requirements where there were differences of opinion. After this is accomplished, the analysis will shift to a broader scope whereby all the functional requirements will be categorized into the four levels of importance and therefore prioritized.

Flight Activity Subsystem. Table 1 shows the breakdown of responses for question seven of the questionnaire relating to flight activity inquiries. The median category selected was Important. The mode category, or most frequently chosen, was also Important. The analysis of variance revealed that two subgroup means were significantly different at a .001 level of significance. The junior grade lieutenants rated flight activity inquiries at a mean value of 1.27, between Critically Important and Important.

TABLE 1

FLIGHT ACTIVITY INQUIRIES

Category	Value	Frequency	Percent
Critically Important	1	23	31.5
Important	2	25	32.9
Somewhat Important	3	23	30.3
Not Important	4	2	2.6
Neutral	-	3	3.9

Median = 2   Mode = 2

The first class petty officers rated this functional requirement at a mean of 3.2 or between Somewhat Important and Not Important. No other differences existed for the variables of designator, management position, computer knowledge, or aircraft community.

The flight activity inquiries display flight information for a specific flight, entire life of an aircraft, or summary of monthly flight data. This functional requirement will primarily serve maintenance control and logs and records responsibilities in areas such as scheduled maintenance planning. Quality assurance monitoring and reporting responsibilities might also be served by this functional requirement. As a result of these possible uses, the relationships between management position and response were analyzed for both of the differing subgroups.

The eleven junior grade lieutenants included four maintenance control officers, six material control officers, and a quality assurance officer. The four identifying themselves as maintenance control officers rated flight activity inquiries as Critically Important. Of the six material control officers, four responded with Critically Important and two with Important. The quality assurance officer responded with Important.

The six first class petty officers included four material control representatives, a quality assurance representative, and a data analyst. Two of the material control representatives rated flight activity inquiries as Not Important. The other first class petty officers responded with Somewhat Important.

Although no first class petty officers were assigned to maintenance control billets, it appears that they disagreed with the junior grade lieutenants across all other billets. This tends to indicate that the differences in mean responses was due solely to rank and not management position. One possible explanation for this difference in mean values is the obvious difference in management roles between the officers and petty officers. It could be that this functional requirement is viewed as providing information that is more valuable to middle management than first line supervisors.

Table 2 shows that 40% of the respondents rated the aircraft utilization report (question 8) as Critically Important. The median category was Important. The modal category was Critically Important.

TABLE 2

AIRCRAFT UTILIZATION REPORT

Category	Value	Frequency	Percent
Critically Important	1	31	40.8
Important	2	24	31.6
Somewhat Important	3	16	21.1
Not Important	4	3	3.9
Neutral	-	2	2.6

Median = 2 Mode = 1

The mean response for junior grade lieutenants was 1.2 or between Critically Important and Important. The first class petty officer's mean response was 3.2 or less than Somewhat Important. This difference was significant to the .0005 level. Further analysis revealed no interaction from the other demographic variables. The explanation of management role given above for flight activity inquiries appears to be possible for the aircraft utilization report.

Maintenance Activity Subsystem. The perceived value of the aircraft status and operational capability inquiry (question 11) is shown in Table 3.

TABLE 3

AIRCRAFT STATUS AND OPERATIONAL CAPABILITY INQUIRY

Category	Value	Frequency	Percent
Critically Important	1	49	64.5
Important	2	18	23.7
Somewhat Important	3	9	11.8
Not Important	4	-	-
Neutral	-	-	-

Median = 1 Mode = 1

The median and modal responses were both Critically Important. Hypothesis testing revealed a significant difference in the mean responses for two of the designator subgroups. The Aviation Maintenance Officers (AMO) gave a mean response of 1.77. The senior enlisted personnel gave a mean response of 1.15. Both mean values fell between the categories of Critically Important and Important, with the AMOs rating the functional requirement closer to Important.

The perceived importance of the daily production report (question 16) is shown in Table 4. The median response was in the Important category. The mode was in the Somewhat Important category. Hypothesis testing revealed one

TABLE 4

DAILY PRODUCTION REPORT

Category	Value	Frequency	Percent
Critically Important	1	18	23.7
Important	2	24	31.6
Somewhat Important	3	28	36.8
Not Important	4	2	2.6
Neutral	-	4	5.3

Median = 2 Mode = 3

difference in mean values for the variable of self rated computer knowledge. Those individuals rating their computer knowledge as poor rated the daily production report with a mean value of 1.25. This value was significantly higher than both the subgroups of fair and good, which had mean values of 2.29 and 3.38 respectively.

The daily production report prints a listing of all VIDS/MAFS initiated, completed, and outstanding for a specific workday. One possible explanation of the above differences would be that those individuals with poor computer skills would feel more comfortable with printed reports. In contrast, individuals with more confidence in their own computer skills my be willing to avoid hard copy reports and rely more on the automated system.

Table 5 summarizes the responses concerning the Scheduled Removal Components (SRC) near due report (question 16). Both the median and modal values occurred in the Critically Important category. Hypothesis testing concluded a difference in the mean responses for senior chief and first class petty officers, 1.12 and 2.5 respectively.

TABLE 5

SCHEDULED REMOVAL COMPONENTS (SRC) NEAR DUE REPORT

Category	Value	Frequency	Percent
Critically Important	1	38	50.0
Important	2	32	42.1
Somewhat Important	3	5	6.6
Not Important	4	1	1.3
Neutral	-	-	-

Median = 1 Mode = 1

This report is a listing of all SRC items within 90% of their performance interval. It is primarily of use to maintenance control and of some use to quality assurance. The eight senior chiefs included three maintenance chiefs, two maintenance control officers, and three quality assurance chiefs. As stated previously, none of the first class petty officers were from maintenance control billets. Therefore it should be evident that the variable of management position interacted in this hypothesis test and is a logical explanation of the differences in mean response.

Configuration Status Accounting Subsystem. The engine serial number location inquiry (question 28) was rated as shown in Table 6. Both the median and modal values occurred in the category of Important. A significant difference in mean responses existed between subgroups of the designator variable. The mean response for Limited Duty Officers (LDO) was 1.7, significantly higher than the 2.48 value for Aviation Maintenance Officers (AMO).

TABLE 6

ENGINE SERIAL NUMBER LOCATION INQUIRY

Category	Value	Frequency	Percent
Critically Important	1	9	11.8
Important	2	35	46.1
Somewhat Important	3	25	32.9
Not Important	4	4	5.3
Neutral	-	3	3.9

Median = 2 Mode = 2

Further analysis revealed that this difference existed regardless of the management position, rank, or aircraft community of both AMO and LDO respondents. One possible explanation of this difference may be the total years in service of the respondents. Although not asked in the questionnaire, it is likely that the LDOs have more service than the AMOs, due to prior enlisted service.

Table 7 identifies the perceived importance of the configuration status accounting subsystem with respect to its potential for improving readiness. Both the median and modal values occurred in the category of Important.

TABLE 7

READINESS IMPROVEMENT POTENTIAL
CONFIGURATION STATUS ACCOUNTING SUBSYSTEM

Category	Value	Frequency	Percent
Critically Important	1	18	23.7
Important	2	34	44.7
Somewhat Important	3	23	30.3
Not Important	4	-	-
Neutral	-	1	1.3

Median = 2 Mode = 2

Hypothesis testing showed a significant difference between the mean response of first class petty officers and ensigns, subgroups of the rank variable. All three ensigns in the sample, two maintenance control officers and a material control officer, rated this question as Critically Important. In contrast, all of the first class petty officers responded in the category of Somewhat Important.

In general terms the configuration status accounting subsystem provides component tracking, aircraft and engine configuration compliance information, and technical directive tracking. All of these functions fall mainly under the responsibility of maintenance control. As discussed previously, the most probable explanation of this difference lies in the fact that no first class petty officers in the sample were from maintenance control billets.

Personnel Management Subsystem. The responses concerning the civilian allowance inquiry (question 29) are summarized in Table 8. The median and modal values occurred in the category of Somewhat Important. The seventeen responses in the Neutral category were the most in this category for any of the questions. The mean responses for warrant officers and senior enlisted personnel were significantly different at 1.66 and 3.28 respectively.

TABLE 8

CIVILIAN ALLOWANCE INQUIRY

Category	Value	Frequency	Percent
Critically Important	1	4	5.3
Important	2	13	17.1
Somewhat Important	3	24	31.6
Not Important	4	18	23.7
Neutral	-	17	22.4

Median = 3 Mode = 3

One possible explanation of this difference may be previous experience in dealing with civilian employee management. This information was not collected in the survey, so no firm conclusions can be drawn.

Asset Management Subsystem. Table 9 is a breakdown of responses concerning the aviators equipment inquiry (question 46). The mean and modal values occurred in the important category. A significant difference existed between the mean response of four aircraft communities. The fighter community mean of 2.86 was significantly lower than the mean responses of the helicopter (1.75), attack (1.77), and patrol (1.8) communities. This difference occurred throughout the various management positions and rank. No meaningful explanation of this difference could be drawn from the data available.

TABLE 9

AVIATOR EQUIPMENT INQUIRY

Category	Value	Frequency	Percent
Critically Important	1	14	18.4
Important	2	33	43.4
Somewhat Important	3	23	30.3
Not Important	4	3	3.9
Neutral	-	3	3.9

Median = 2 Mode = 2

Functional Requirement Rating

This section will use the median and modal values to separate the NALCOMIS functional requirements into the appropriate importance category. This will provide the relative ranking of the functional requirements, thus addressing the second investigative question.

The following Tables were constructed by including any functional requirement with a median or modal value in the given category. If only one of these measures occurred in the category it is noted in the measure column. Demographic subgroup mean differences are also noted.

Table 10 identifies those functional requirements that had the median or modal value occur in the category of Critically Important. Recall that the modal value represents the response category chosen most frequently. The median value indicates that at least half of the individuals responded in a category of equal or greater importance than the median category.

Seven of the fifteen functional requirements in the Maintenance Activity Subsystem fell into this category. This figure of nearly fifty percent is significantly higher than for any other subsystem. Additionally, five of these seven had the median value in this category, indicating that at least half of the respondents rated them as Critically

TABLE 10

CRITICALLY IMPORTANT FUNCTIONAL REQUIREMENTS

Functional Requirement/Subsystem	Measure	Differences
Flight Activity Subsystem		
1. Aircraft utilization report	Mode	
Maintenance Activity Subsystem		
2. Aircraft status and operational capability inquiry		AMO and LDO
3. Discrepancy status inquiry		
4. Material requirements status inquiry/report		
5. Inspection requirements inquiry	Mode	
6. Special inspections near due inquiry/report		
7. Installed explosive safety device scheduled removal report	Mode	
8. Scheduled removal components (SRC) near due report		E-6 and E-8
Local/Upline Reporting Subsystem		
9. Aircraft accounting report feeder	Mode	
10. Aircraft material readiness report feeder	Mode	

Important. None of the functional requirements from the Configuration Status Accounting, Personnel Management, or Asset Management subsystems fell into this category.

In total, ten of the fifty-five (18%) functional requirements had the largest response in the Critically Important category. Only five of fifty five (9%) were rated as Critically Important by at least half of the respondents.

Table 11 lists those items that had the median or modal response occur in the category of Important. The entire Configuration Status Accounting Subsystem is included in this category. This indicates that the category of Important was the most frequently chosen for all of the functional requirements in this subsystem. It also indicates that at least half of the respondents rated the individual functional requirements of this subsystem as Important or better. Similarly, an overwhelming majority of functional requirements from the Asset Management, Personnel Management,and Technical Publications subsystems had median and mode values in this category.

In total, forty-seven of fifty-five (85%) functional requirements were rated as Important or better by at least half of the respondents. When the five functional

TABLE 11

IMPORTANT FUNCTIONAL REQUIREMENTS

Functional Requirement/Subsystem	Measure	Difference
Flight Activity Subsystem		
1. Flight activity inquiries		LTJG and E-6
2. Aircraft utilization report	Median	LTJG and E-6
Maintenance Activity Subsystem		
3. Workload inquiry		
4. Mass status inquiry		
5. VIDS/MAF inquiry		
6. Daily production report	Median	
7. Support action inquiry	Median	
8. Inspection requirements inquiry	Median	
9. Installed explosive safety device scheduled removal report	Median	
10. Phase inspections near due		
11. IOU inquiry		
12. Turn-in data inquiry		
Configuration Status Accounting Subsystem		
13. Component location inquiry		
14. Engine serial number location inquiry		LDO and AMO
15. Aircraft or engine configuration report		
16. Technical directive inquiry		
17. Engine technical directive inquiry		
18. Aircraft technical directive inquiry		

Functional Requirement/Subsystem	Measure	Difference
Personnel Management Subsystem		
19. Military allowance inquiry		
20. Temporary additional duty (TAD) allowance inquiry	Median	
21. Special maintenance qualification by work center		
22. Special maintenance qualification by SMQ		
23. Personnel distribution by work center		
24. Personnel projection reports		
Asset Management Subsystem		
25. IMRL part number data inquiry		
26. IMRL requisition inquiry		
27. Aircraft transfer order (ATO) number inquiry		
28. Aviator equipment inquiry		Fighter and Helo Attack, Patrol
Local/Upline Reporting Subsystem		
29. Engine transaction report (ETR) history inquiry		
30. Aircraft record a card inquiry		
31. XRAY inquiry		
32. ETR feeder report		
33. Aircraft accounting report feeder	Median	
34. End of quarter report feeder		
35. Spintac report feeder		
36. Aircraft material readiness report feeder	Median	
37. XRAY report feeder		
38. Mission capability and utilization trend monthly summary		
39. Flight activity trend monthly summary		
40. Maintenance manhour/flight hour monthly summary		
41. Cannibalization summary		
42. Corrosion control report		
43. High five work unit code report		
44. Awaiting maintenance reason code summary	Median	
Technical Publications Subsystem		
45. Technical publication location inquiry	Median	
46. Technical publication requisition inquiry		
47. Technical publication history inquiry		

requirements with the median response in the Critically Important category are added, fifty-two of fifty-five (95%) were rated as Important or better by at least half of the respondents.

Finally, Table 12 lists those items that had the median or modal value fall in the category of Somewhat Important. Every subsystem is represented in this category except the Configuration Status Accounting Subsystem.

In total, eight of fifty-five (15%) functional requirements had the largest response in the Somewhat Important category. Only three of fifty-five (5%) functional requirements were rated as Somewhat Important or worse by at least half of the respondents.

TABLE 12

SOMEWHAT IMPORTANT FUNCTIONAL REQUIREMENTS

Functional Requirement/Subsystem	Measure	Difference
Flight Activity Subsystem		
1. Flight activity report		
Maintenance Activity Subsystem		
2. Daily production report	Mode	Poor and Good, Fair
3. Support action inquiry	Mode	
Personnel Management Subsystem		
4. Civilian allowance inquiry		Warrants and Senior Enlisted
5. Temporary Additional Duty (TAD) allowance inquiry	Mode	
Asset Management Subsystem		
6. BUNO/MODEX inquiry by organizational code		
Local/Upline Reporting Subsystem		
7. Awaiting maintenance reason code summary	Mode	
Technical Publications Subsystem		
8. Technical publication location inquiry	Mode	

NALCOMIS Subsystem Rating

Section three of the questionnaire was designed to identify the three most important subsystems and three least important subsystem. Figure 8 identifies the frequencies with which subsystems were chosen as one of the three least important subsystems.

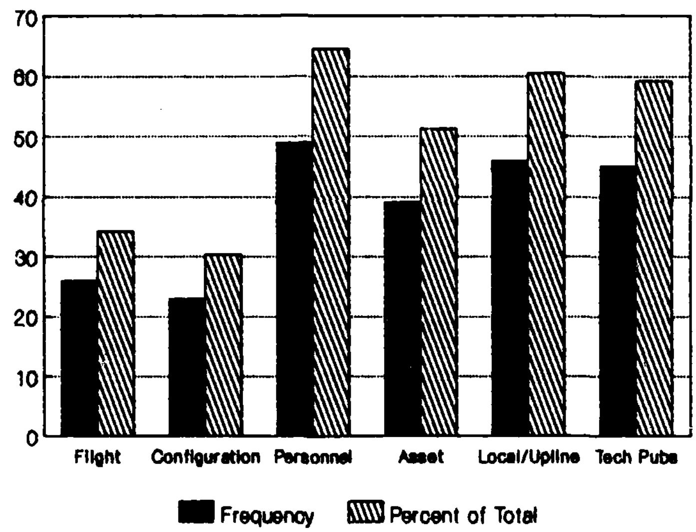

Figure 8. Least Important Subsystems

The frequency and percent figures represent the number of respondents that rated a specific subsystem as one of their three least important subsystems. The percentages do not sum to 100% because each respondent selected three subsystems. The percent figure represents a percentage of seventy-six, the sample size.

As the figure shows, the Personnel Management (64%), Asset Management (51%), Local/Upline Reporting (60%), and Technical Publications (59%) subsystems were rated as one of the three least important by over half of the respondents. The Maintenance Activity Subsystem was the only subsystem not appearing in this list.

Recall from the previous section that none of the functional requirements from the Personnel Management, Asset Management, or Technical Publications subsystems appeared in the list of Critically Important. In contrast, the Local/Upline Reporting subsystem had two functional requirements in which the modal value fell in the category of Critically Important, i.e., the Aircraft Accounting and Aircraft Material Readiness report feeders. This type of cross comparison between the subsystem ratings and that of the individual functional requirements was limited by the fact that there was little differentiation between the functional requirements.

Questions 10, 26, 33, 41, 47, 53, and 57 asked respondents to rate the importance of each subsystem in terms of potential for improving readiness. Again, these questions did little to differentiate the subsystems. The median and modal responses were in the category of Important for every subsystem except the Flight Activity Subsystem. The Flight Activity Subsystem had a median and modal response in the category of Somewhat Important. Thirty-four percent of the respondents rated this subsystem as one of the three least important, the third lowest percentage of all the subsystems. However, its potential to improve readiness was rated as the lowest of all the subsystems. This could suggest that a subsystem can be an important subsystem without being as important for improving readiness.

Figure 9 identifies those subsystems rated as one of the three most important subsystems.

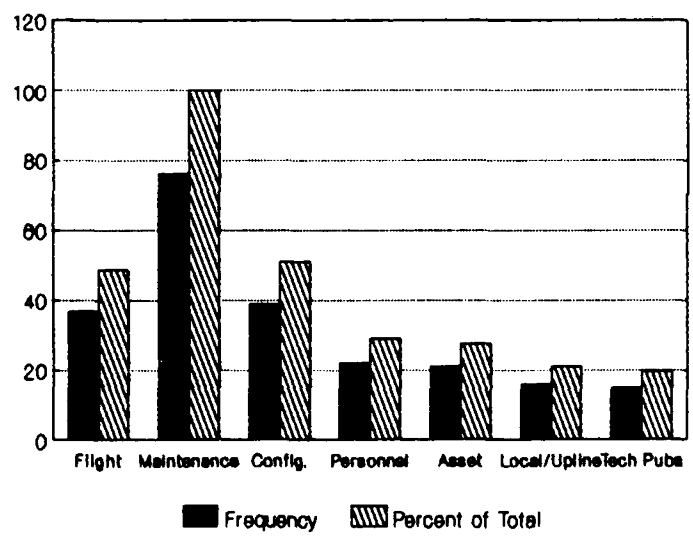

Figure 9. Most Important Subsystems

All respondents rated the Maintenance Activity Subsystem as one of the three most important subsystems. This is supported by the fact that forty-seven percent of the individual functional requirements in this subsystem appeared in the list of Critically Important (table 10). The Configuration Management Subsystem (51%) was the only other subsystem rated as one of the three most important by over half of the respondents. Forty-eight percent of the respondents rated the Flight Activity Subsystem as one of the three most important subsystems.

As these figures show, the Personnel Management, Asset Management, Local/Upline Reporting, and Technical Publications subsystems were rated as least important twice as often as most important. The Flight Activity and Configuration Management subsystems were rated as most important more frequently than least important, yet with a smaller majority. There was total agreement on the Maintenance Activity Subsystem.

Several cross-tabulations were made to analyze the effect the demographic variable subgroups had on selection of the most important and least important subsystems. There proved to be no significant correlation between any of the subgroups and the frequency with which subsystems appeared in either list.

Locally Automated Subsystems

Question 60 asked respondents to identify any NALCOMIS subsystem for which any local automated methods were being used. Respondents were instructed to select as many subsystems as appropriate. They were also asked to briefly describe the method used in the automation.

Thirty-five individuals identified at least one subsystem as being satisfied by local automation procedures. Figure 10 identifies the locally automated subsystems.

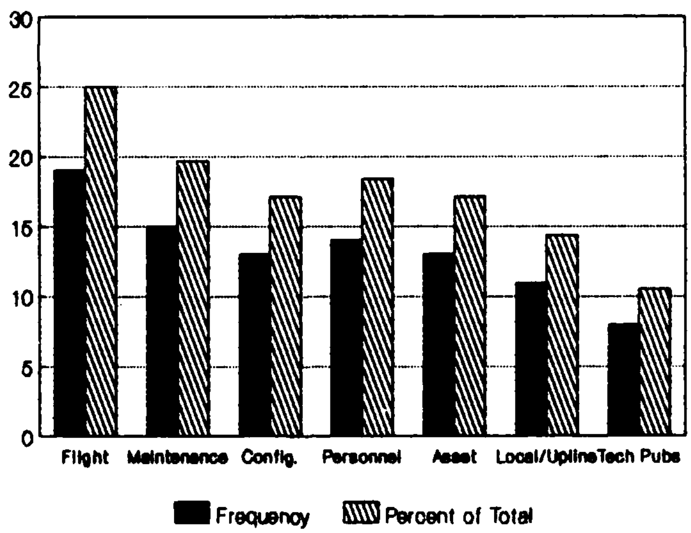

Figure 10. Locally Automated Subsystems

The frequency figure represents the number of individuals who identified a specific subsystem. The percent figure represents the percent of respondents.

These figures indicate that all of the NALCOMIS subsystems are automated at the local level. What is not shown is the extent that the functions of the various subsystems are duplicated at the local level. The descriptions of the methods used in local automation did not give enough information to make this determination. The descriptions did include information on the general automation techniques used and some of the specific applications.

Data Base Management Systems (DBMS). Several brand name DBMS packages were identified. Applications included much of the equipment tracking of the Asset Management Subsystem. Many aspects of the IMRL requirements were identified as being accomplished by a local DBMS. Aspects of the Flight Activity and Maintenance Activity subsystems were also addressed by DBMS applications. Flight data and inspection information input allowed for most of the inspection requirement management included in the Maintenance Activity Subsystem as well as flight activity reports and inquiries. The Configuration Management Subsystem DBMS applications included aircraft and engine technical directive tracking and management. Less specific

DBMS applications were identified for every other NALCOMIS subsystem.

Spreadsheet. Spreadsheet applications were identified for many aspects of the Maintenance Activity, Flight Activity, and Configuration Management subsystems. The spreadsheet appeared to be a comparable alternative to address many of the applications mentioned above in the DBMS section.

Word Processors. Several individuals identified applications in which much of the existing report generation requirements were automated by commercial word processing software. Most of these applications involved manual input of the subject matter into a pre-formated template. In most cases this was not direct recall from an existing data base like most of the NALCOMIS report generators.

Computer Hardware. The majority of local automation techniques identified utilized existing squadron owned Zenith and XEROX computers. Local data processing facilities were also identified as providing automation support.

V. Summary and Recommendations

The objective of this research was to reevaluate and prioritize the functional requirements initially established during NALCOMIS Phase Three development. It was designed to provide the Program Manager with information from which to base any system modification decisions. This research was approached from a user perspective by surveying individuals from maintenance control, material control, and quality assurance billets.

Investigative Questions Reviewed

Four investigative questions were stated in this thesis. This section will restate each investigative question and present the answers this research has provided.

1. What is the perceived importance/usefulness of specific functional requirements?

The information provided by tables 10, 11, and 12 as well as the information in Appendix B. provide the answer to this question. Over ninety-five percent of the functional requirements were rated as important or better by over half of all respondents. This appears to indicate that an overwhelming majority of the functional requirements are needed in the NALCOMIS Phase Three system. However, only nine percent of the functional requirements were rated as Critically Important by over half of the respondents.

Six of the seven NALCOMIS subsystems were rated as Important in terms of their potential for improving readiness.

2. What is the relative ranking of specific functional requirements?

Tables 10, 11, and 12 provide the relative ranking of the NALCOMIS functional requirements. As noted in the previous chapter, the data collected did not provide detailed differentiation between the individual functional requirements. However, as Figures 8 and 9 have shown, there was significant agreement among respondents on the three least important and three most important subsystems. This information is probably the most applicable to any system modification decisions. Since each subsystem represents a somewhat autonomous function, it appears more logical to eliminate a subsystem than to systematically eliminate functional requirements from each subsystem.

3. What are the relationships between the perceived importance/usefulness of functional requirements and the variables of rank, management position, designator, computer knowledge, and aircraft community?

Nine of fifty-five functional requirements were rated at significantly different levels by subgroups of the above demographic variables. Possible explanations of these differences of opinion were presented in Chapter 4.

Four of these differences were between first class petty officers and other members of the rank subgroups. In all four cases, the first class petty officers rated the functional requirement as less important than the other ranks. The lack of maintenance control representation and different management perspective was a proposed explanation of the first class petty officer's responses.

4. Which functional requirements are currently being satisfied by other automated methods, including microcomputer systems?

Respondents identified existing automated methods for each of the NALCOMIS subsystems. The extent that these local methods duplicate planned NALCOMIS operations was not determined. However, existing micro-computer assets are certainly filling several roles that are currently planned for NALCOMIS Phase Three.

Recommendation for Future Study

As stated in the first chapter, high system costs are the primary limiting factor in NALCOMIS implementation. By conducting further research to identify micro-based alternatives, NALCOMIS scope and costs could be reduced. This area of future study offers the Program Office and system developers the greatest opportunity for system flexibility. By further identifying current fleet automation capabilities, any reductions in system scope decisions would become more obvious. The following specific recommendations are made.

1. The NALCOMIS Program Office should utilize and sponsor future graduate level research to expand on this topic. Students at the Naval Postgraduate School are required to complete a thesis and routinely rely on outside commands for suggested topics.

2. The Program Office should request fleet and wing level assistance in further identifying locally automated subsystems. This effort, accomplished with NAVMASSO and AIR-411 oversight, should determine the extent that NALCOMIS functions are duplicated. This will identify potential for reducing the scope of Phase Three development.

3. Conduct case studies on local automation techniques identified through fleet/program office dialogue. First, the best of these local techniques should be isolated. An analysis should follow to determine the extent that these techniques satisfy fleet requirements and the upline

reporting implications. Finally, fleet wide use of these selected local systems could be sanctioned.

Appendix A: Survey Instrument

General Information

1. PURPOSE - The purpose of this questionnaire is to gain insight into the perceived importance/usefulness of the management information provided by the Naval Aviation Logistics Command Management Information System (NALCOMIS). Specifically, this data is being collected in support of research aimed at updating and prioritizing the information requirements of organizational level NALCOMIS.

2. PRIVACY STATEMENT - The information that you provide will be held in strict confidence. Results of the research will be presented in terms of group averages that describe the typical response to various questions.

3. NALCOMIS OVERVIEW - NALCOMIS for Organizational Maintenance Activities (OMA) was designed to provide on-line, real-time computer processing of all maintenance and supply information in support of aircraft mission capability. To accomplish this automation, the user interacts with a central data base through Key Video Display Terminals (KVDT). Four types of screens are used in this interaction: DATA ENTRY, UPDATE/DELETE, INQUIRY, and REPORT GENERATION. The INQUIRY and REPORT GENERATION screens are the primary sources of management information provided to the OMA maintenance manager.

4. FORMAT - This questionnaire is divided into three sections. In **SECTION 1** you are asked to provide personal background information to help in identifying the typical respondent. In **SECTION 2**, the major subsystems of NALCOMIS are described and a summary of the INQUIRY and REPORT GENERATION screens is provided. You are then asked to rate the information provided in terms of its importance/usefulness to you as a maintenance manager. In **SECTION 3** you are asked to identify any subsystem currently automated by local or other methods and to provide general comments on NALCOMIS development.

Once you have completed the questionnaire, please return it in the envelope that has been provided.

THANK YOU FOR YOUR COOPERATION AND TIME

SECTION 1

BACKGROUND INFORMATION

This section of the questionnaire contains several questions dealing with personal characteristics and background. Please circle the appropriate letter.

1. Your are:

   a. Female
   b. Male

2. Your current rank/rate is:

   a. First Class
   b. Chief
   c. Senior Chief
   d. Master Chief
   e. Ensign
   f. LTJG
   g. LT
   h. LCDR
   i. other (specify) ____________

3. Your type aircraft is:

   please specify (for example: F-14) ____________

4. Your designator/rate is:

   a. Limited Duty Officer
   b. Warrant Officer
   c. Aviation Maintenance Officer
   d. Senior Enlisted (please specify rating) ____________
   e. Other (please specify) ____________

5. Your billet is:

   a. Maintenance Control Chief
   b. Material Control Chief
   c. Maintenance Control Officer
   d. Material Control Officer
   e. Quality Assurance Chief
   f. Other (please specify) ____________

6. You would rate your computer knowledge as:

   a. Excellent
   b. Good
   c. Fair
   d. Poor
   e. None

SECTION 2

INFORMATION RATING

This section of the questionnaire is aimed at identifying your thoughts on the importance/usefulness of various sources of management information provided by NALCOMIS. First, a brief description of each subsystem's function is provided. Next, you are asked to rate several items in terms of their importance/usefulness to you as a maintenance manager using the following scale.

A. Critically important, extremely useful
B. Important, of considerable use
C. Somewhat important, of some use
D. Not important, of no use
E. Neutral, I have no opinion

A. **Flight Activity Subsystem.** This subsystem includes the recording of aircraft flight utilization data on the Naval Aircraft Flight Record (NAVFLIRS). Upon data entry, this subsystem provides various on-line inquiries and printed reports. Please rate the following items using the scale provided above.

7. Flight activity inquiries - display flight activity data for a specific flight, entire life of an aircraft, or summary of monthly flight data.

A B C D E

8. Aircraft utilization report - generates a printed report summarized by aircraft flying hours, landing data, engine data, afterburner data, propeller data, and miscellaneous equipment data.

A B C D E

9. Flight activity report - generates a printed report of all valid information broken down by total mission requirement (TMR) for a user specified aircraft and time frame.

A B C D E

10. In terms of potential for improving readiness, how important is the management information provided by this subsystem?

A B C D E

A. CRITICALLY IMPORTANT   C. SOMEWHAT IMPORTANT   E. NEUTRAL
B. IMPORTANT   D. NOT IMPORTANT

B. **Maintenance Activity Subsystem.** This subsystem provides the capability to perform fully automated processing of the Visual Information Display System/Maintenance Action Form (VIDS/MAF). VIDS/MAFs will be tracked from initiation through the repair, inspection, and approval activities. Please rate the following sources of management information provided by this subsystem.

11. Aircraft status and operational capability inquiry - displays the current status and operational capability of all aircraft.

A B C D E

12. Discrepancy status inquiry - displays a list of outstanding discrepancies for a specific aircraft or engine.

A B C D E

13. Workload inquiry - displays a list of outstanding MAFs for a selected work center.

A B C D E

14. Mass status inquiry - displays a list of outstanding MAFs with a given job status by aircraft.

A B C D E

15. VIDS/MAF inquiry - displays a specific VIDS/MAF.

A B C D E

16. Daily production report - prints a listing of all MAFs initiated, completed, and outstanding for a specific workday.

A B C D E

17. Support action inquiry - displays all SAFs approved by a work center for a user selected time period.

A B C D E

18. Material requirements status inquiry or report - displays or prints detailed information on material requirements status for a specific MAF or entire organization.

A B C D E

A. CRITICALLY IMPORTANT C. SOMEWHAT IMPORTANT E. NEUTRAL
B. IMPORTANT D. NOT IMPORTANT

19. Inspection requirements inquiry - displays the current inspection requirements schedule for an aircraft or engine.

A B C D E

20. Special inspections near due report or inquiry - prints or displays all aircraft or engine special inspections that are within 90% or 3 days of their performance interval.

A B C D E

21. Installed explosive safety device scheduled removal report - prints a listing of all explosive safety devices and their required removal dates.

A B C D E

22. Scheduled Removal Components (SRC) near due report - prints a listing all SRC items within 90% of their performance interval.

A B C D E

23. Phase inspections near due - displays all aircraft phase inspections that are within 90% of their performance interval.

A B C D E

24. IOU inquiry - displays information related to components that have had turn-in MAF approval but not yet inducted into IMA repair.

A B C D E

25. Turn-in data inquiry - displays the turn-in data recorded on a selected MAF.

A B C D E

26. In terms of potential for improving readiness, how important is the management information provided by this subsystem?

A B C D E

A. CRITICALLY IMPORTANT   C. SOMEWHAT IMPORTANT   E. NEUTRAL
B. IMPORTANT   D. NOT IMPORTANT

C. Configuration Status Accounting Subsystem. This subsystem provides the capability to establish and maintain the configuration profile of aircraft, engines, components, support equipment and support equipment components. Configuration records will track the serial numbers and technical directive (TD) management information for each of the items. Please rate the following sources of management information provided by this subsystem.

27. Component location inquiry - displays information identifying the engine or aircraft on which a user specified component is located.

A B C D E

28. Engine serial number location inquiry - identifies a specific aircraft on which an engine is located.

A B C D E

29. Aircraft or engine configuration reports - prints a listing of configuration information including aircraft components, engines, engine components, and engine modules.

A B C D E

30. Technical directive inquiry - displays information on the current status of a selected technical directive.

A B C D E

31. Engine technical directive inquiry - displays current engine technical directive data applicable to a specific engine serial number.

A B C D E

32. Aircraft technical directive inquiry - displays current technical directive information for a specific aircraft or series of aircraft with the same type equipment code.

A B C D E

33. In terms of potential for improving readiness, how important is the management information provided by this subsystem?

A B C D E

A. CRITICALLY IMPORTANT C. SOMEWHAT IMPORTANT E. NEUTRAL
B. IMPORTANT D. NOT IMPORTANT

D. **Personnel Management Subsystem.** This subsystem includes the functions necessary to collect and maintain specific personnel data for both military and civilian personnel assigned to an organization. The information was designed to provide assistance with personnel assignments, transfers, and special maintenance qualification tracking. Please rate the following sources of management information provided by this subsystem.

34. Military allowance inquiry - displays an organization's authorized allowance and manning levels for military personnel summarized by rate.

A B C D E

35. Civilian allowance inquiry - displays an organization's authorized allowance levels for civilian personnel summarized by pay grade and work center.

A B C D E

36. *Temporary* Additional Duty (TAD) allowance inquiry - displays an organizations TAD allowance and manning levels summarized by rate, grade, and TAD organization code.

A B C D E

37. Special Maintenance Qualification (SMQ) by work center - displays a selected work center's personnel and all of their specific SMQs (CDI,QAR,etc.).

A B C D E

38. Special maintenance qualification by SMQ - identifies all personnel within an organization with a specific SMQ.

A B C D E

39. Personnel distribution by work center report - prints a listing of all personnel by work center.

A B C D E

40. Personnel projection reports - prints a six month projection of personnel gains or losses.

A B C D E

A. CRITICALLY IMPORTANT   C. SOMEWHAT IMPORTANT   E. NEUTRAL
B. IMPORTANT   D. NOT IMPORTANT

41. In terms of potential for improving readiness, how important is the management information provided by this subsystem?

A B C D E

E. **Asset Management Subsystem.** This subsystem addresses the management of aircraft and equipment assigned to an organization. All aircraft, specific equipment, and Individual Material Readiness List (IMRL) items are inventoried and the readiness status determined and recorded. Please rate the following sources of management information provided by this subsystem.

42. IMRL part number data inquiry - displays information on a specific IMRL item number summarized by serial number, on-hand quantity, subcustody organization, and subcustody work center.

A B C D E

43. IMRL requisition inquiry - displays current status on all outstanding IMRL requisitions by document number.

A B C D E

44. Aircraft Transfer Order (ATO) number inquiry by organization code - displays all active ATOs for receipts and transfers.

A B C D E

45. BUNO/MODEX inquiry by organization code - displays the bureau number and its corresponding modex for all aircraft assigned to an organization.

A B C D E

46. Aviator equipment inquiry - displays all aviator equipment assigned to a specific aircrew member or identified as spares.

A B C D E

47. In terms of potential for improving readiness, how important is the management information provided by this subsystem?

A B C D E

A. CRITICALLY IMPORTANT C. SOMEWHAT IMPORTANT E. NEUTRAL
B. IMPORTANT D. NOT IMPORTANT

F. **Local/Upline Reporting Subsystem.** This subsystem provides the capability to capture information accumulated by the other subsystems. Periodically, this subsystem combines and consolidates that data into detail and summary level management reports. Please rate the following sources of management information provided by this subsystem.

48. Engine Transaction Report (ETR) history inquiry - displays ETRs that have been created/updated, as selected by TEC and engine serial number.

A B C D E

49. Aircraft record A card inquiry - displays a specific record A card.

A B C D E

50. XRAY inquiry - displays detailed information about a specific XRAY.

A B C D E

51. Feeder reports - generates feeder information for the following reports (rate separately).

a. ETR	A B C D E
b. Aircraft accounting report	A B C D E
c. End Of Quarter (EOQ)	A B C D E
d. SPINTAC reports	A B C D E
e. Aircraft Material Readiness Report (AMRR)	A B C D E
f. XRAY	A B C D E

52. Monthly summaries - generates the following monthly statistics and reports (rate separately).

a. Mission capability and utilization trend	A B C D E
b. Flight activity trend	A B C D E
c. Maintenance man hour / flight hour	A B C D E
d. Cannibalization summary	A B C D E

A. CRITICALLY IMPORTANT C. SOMEWHAT IMPORTANT E. NEUTRAL
B. IMPORTANT D. NOT IMPORTANT

e. Corrosion control report A B C D E

f. High five work unit code report A B C D E

g. Awaiting maintenance reason code summary A B C D E

53. In terms of potential for improving readiness, how important is the management information provided by this subsystem?

A B C D E

G. Technical Publications Subsystem. This subsystem tracks the location, change application, change history, and requisition status of all technical publications. Please rate the following sources of management information provided by this subsystem.

54. Technical publication location inquiry - displays the locations of all copies of a given technical publication.

A B C D E

55. Technical publication requisition inquiry - provides a list of all outstanding technical publication requisitions summarized by quantity ordered and received.

A B C D E

56. Technical publication history inquiry - displays change history for each technical publication copy including change receipt and incorporation dates.

A B C D E

57. In terms of potential for improving readiness, how important is the management information provided by this subsystem?

A B C D E

SECTION 3

GENERAL COMMENTS

This section of the questionnaire is designed to identify general comments on NALCOMIS. First you are asked to identify the three most important, and three least important of the NALCOMIS subsystems. Next you are asked to identify any local computer based systems that duplicate management information described in section 2 of this questionnaire. Finally, you are asked to provide general comments regarding NALCOMIS development.

58. Please select the three subsystems that are the most important in terms of the management information they provide.
   a. Flight activity
   b. Maintenance activity
   c. Configuration Status accounting
   d. Personnel management
   e. Asset management
   f. Local/upline reporting
   g. Technical publications

59. Please select the three subsystems that are the least important in terms of the management information they provide.
   a. Flight activity
   b. Maintenance activity
   c. Configuration Status accounting
   d. Personnel management
   e. Asset management
   f. Local/upline reporting
   g. Technical publications

60. Please identify the NALCOMIS subsystems for which any local methods of automation exist (circle as many as appropriate).
   a. Flight activity
   b. Maintenance activity
   c. Configuration Status accounting
   d. Personnel management
   e. Asset management
   f. Local/upline reporting
   g. Technical publications

Briefly describe the methods used in this automation.

____

____

____

____

____

61. In your opinion, what are the major advantages to automation provided by a system like NALCOMIS?

Appendix B: Questionnaire Responses

1. Sex

Category	Frequency	Percent	Cumulative %
Male	73	96.1	96.1
Female	3	3.9	100.0

2. Rank

Category	Frequency	Percent	Cumulative %
First Class	6	7.9	7.9
Chief	3	3.9	11.8
Senior Chief	8	10.5	22.4
Master Chief	8	10.5	32.9
Ensign	3	3.9	36.8
Lieutenant (JG)	11	14.5	51.3
Lieutenant	19	25.0	76.3
Lieutenant Commander	10	13.2	89.5
Other	8	10.5	100.0

3. Aircraft Community

Category	Frequency	Percent	Cumulative %
Fighter (F-14,F-5)	21	27.6	27.6
Attack (A-6,A-7,F/A-18)	11	14.5	42.1
Airborne Warning (E-2)	8	10.5	52.6
Patrol (P-3)	10	13.2	65.8
Anti-Submarine (S-3)	12	15.8	81.6
Helicopter (H-3,SH-2,H-46)	13	17.1	98.7
Other	1	1.3	100.0

4. Officer Designator/Enlisted Rate

Category	Frequency	Percent	Cumulative %
Limited Duty Officer	10	13.2	13.2
Warrant Officer	5	6.6	19.7
Aviation Maint. Officer	31	40.8	60.5
Senior Enlisted	21	27.6	88.1
Other	9	11.9	100.0

5. Management Position

Category	Frequency	Percent	Cumulative %
Maintenance Chief	8	10.5	10.5
Material Control Chief	4	5.3	15.8
Maintenance Control Officer	30	39.5	55.3
Material Control Officer	14	18.4	73.7
Quality Assurance Chief	9	11.8	85.5
Quality Assurance Officer	3	3.9	89.4
Other	8	10.6	100.0

6. Self Rated Computer Knowledge

Category	Frequency	Percent	Cumulative %
Excellent	7	9.2	9.2
Good	36	47.4	56.6
Fair	25	32.9	89.5
Poor	8	10.5	100.0

7. Flight Activity Inquiries

Category	Value	Frequency	Percent
Critically Important	1	23	31.5
Important	2	25	32.9
Somewhat Important	3	23	30.3
Not Important	4	2	2.6
Neutral	-	3	3.9

Median = 2 Mode = 2

8. Aircraft Utilization Report

Category	Value	Frequency	Percent
Critically Important	1	31	40.8
Important	2	24	31.6
Somewhat Important	3	16	21.1
Not Important	4	3	3.9
Neutral	-	2	2.6

Median = 2 Mode = 1

9. Flight Activity Report

Category	Value	Frequency	Percent
Critically Important	1	2	2.6
Important	2	22	28.9
Somewhat Important	3	34	44.7
Not Important	4	9	11.8
Neutral	-	9	11.8

Median = 3 Mode = 3

10. Readiness Improvement Potential Flight Activity Subsystem

Category	Value	Frequency	Percent
Critically Important	1	14	18.4
Important	2	22	28.9
Somewhat Important	3	35	46.1
Not Important	4	2	2.6
Neutral	-	3	3.9

Median = 3 Mode = 3

11. Aircraft Status and Operational Capability Inquiry

Category	Value	Frequency	Percent
Critically Important	1	49	64.5
Important	2	18	23.7
Somewhat Important	3	9	11.8
Not Important	4	-	-
Neutral	-	-	-

Median = 1 Mode = 1

12. Discrepancy Status Inquiry

Category	Value	Frequency	Percent
Critically Important	1	47	61.8
Important	2	24	31.6
Somewhat Important	3	4	5.3
Not Important	4	-	-
Neutral	-	1	1.3

Median = 1 Mode = 1

13. Workload Inquiry

Category	Value	Frequency	Percent
Critically Important	1	23	30.3
Important	2	37	48.7
Somewhat Important	3	13	17.1
Not Important	4	1	1.3
Neutral	-	2	2.6

Median = 2 Mode = 2

14. Mass Status Inquiry

Category	Value	Frequency	Percent
Critically Important	1	15	19.7
Important	2	47	61.8
Somewhat Important	3	11	14.5
Not Important	4	1	1.3
Neutral	-	2	2.6

Median = 2 Mode = 2

15. VIDS/MAF Inquiry

Category	Value	Frequency	Percent
Critically Important	1	24	31.6
Important	2	29	38.2
Somewhat Important	3	19	25.0
Not Important	4	-	-
Neutral	-	4	5.3

Median = 2 Mode = 2

16. Daily Production Report

Category	Value	Frequency	Percent
Critically Important	1	18	23.7
Important	2	24	31.6
Somewhat Important	3	28	36.8
Not Important	4	2	2.6
Neutral	-	4	5.3

Median = 2 Mode = 3

17. Support Action Inquiry

Category	Value	Frequency	Percent
Critically Important	1	6	7.9
Important	2	29	38.2
Somewhat Important	3	30	39.5
Not Important	4	5	6.6
Neutral	-	6	7.9

Median = 2 Mode = 3

18. Material Requirements Status Inquiry/Report

Category	Value	Frequency	Percent
Critically Important	1	43	56.6
Important	2	24	31.6
Somewhat Important	3	8	10.5
Not Important	4	1	1.3
Neutral	-	-	-

Median = 1 Mode = 1

19. Inspection Requirements Inquiry

Category	Value	Frequency	Percent
Critically Important	1	37	48.7
Important	2	28	36.8
Somewhat Important	3	10	13.2
Not Important	4	1	1.3
Neutral	-	-	-

Median = 2 Mode = 1

20. Special Inspections Near Due Inquiry/Report

Category	Value	Frequency	Percent
Critically Important	1	40	52.6
Important	2	29	38.2
Somewhat Important	3	6	7.9
Not Important	4	1	1.3
Neutral	-	-	-

Median = 1 Mode = 1

21. Installed Explosive Safety Device Scheduled Removal Report

Category	Value	Frequency	Percent
Critically Important	1	35	46.1
Important	2	29	38.2
Somewhat Important	3	11	14.5
Not Important	4	-	-
Neutral	-	1	1.3

Median = 2 Mode = 1

22. Scheduled Removal Components (SRC) Near Due Report

Category	Value	Frequency	Percent
Critically Important	1	38	50.0
Important	2	32	42.1
Somewhat Important	3	5	6.6
Not Important	4	1	1.3
Neutral	-	-	-

Median = 1 Mode = 1

23. Phase Inspections Near Due

Category	Value	Frequency	Percent
Critically Important	1	29	38.2
Important	2	34	44.7
Somewhat Important	3	11	14.5
Not Important	4	2	2.6
Neutral	-	-	-

Median = 2 Mode = 2

24. IOU Inquiry

Category	Value	Frequency	Percent
Critically Important	1	11	14.5
Important	2	34	44.7
Somewhat Important	3	22	28.9
Not Important	4	5	6.6
Neutral	-	4	5.3

Median = 2 Mode = 2

25. Turn-in Data Inquiry

Category	Value	Frequency	Percent
Critically Important	1	11	14.5
Important	2	34	44.7
Somewhat Important	3	25	32.9
Not Important	4	5	6.6
Neutral	-	1	1.3

Median = 2 Mode = 2

26. Readiness Improvement Potential Maintenance Activity Subsystem

Category	Value	Frequency	Percent
Critically Important	1	33	43.4
Important	2	35	46.1
Somewhat Important	3	5	6.6
Not Important	4	1	1.3
Neutral	-	2	2.6

Median = 2 Mode = 2

27. Component Location Inquiry

Category	Value	Frequency	Percent
Critically Important	1	13	17.1
Important	2	35	46.1
Somewhat Important	3	20	26.3
Not Important	4	3	3.9
Neutral	-	5	6.6

Median = 2 Mode = 2

28. Engine Serial Number Location Inquiry

Category	Value	Frequency	Percent
Critically Important	1	9	11.8
Important	2	35	46.1
Somewhat Important	3	25	32.9
Not Important	4	4	5.3
Neutral	-	3	3.9

Median = 2 Mode = 2

29. Aircraft or Engine Configuration Report

Category	Value	Frequency	Percent
Critically Important	1	24	31.6
Important	2	28	36.8
Somewhat Important	3	19	25.0
Not Important	4	1	1.3
Neutral	-	4	5.3

Median = 2 Mode = 2

30. Technical Directive Inquiry

Category	Value	Frequency	Percent
Critically Important	1	22	28.9
Important	2	36	47.4
Somewhat Important	3	16	21.1
Not Important	4	-	-
Neutral	-	2	2.6

Median = 2 Mode = 2

31. Engine Technical Directive Inquiry

Category	Value	Frequency	Percent
Critically Important	1	21	27.6
Important	2	38	50.0
Somewhat Important	3	14	18.4
Not Important	4	1	1.3
Neutral	-	2	2.6

Median = 2 Mode = 2

32. Aircraft Technical Directive Inquiry

Category	Value	Frequency	Percent
Critically Important	1	18	23.7
Important	2	35	46.1
Somewhat Important	3	18	23.7
Not Important	4	2	2.6
Neutral	-	3	3.9

Median = 2 Mode = 2

33. Readiness Improvement Potential Configuration Status Accounting Subsystem

Category	Value	Frequency	Percent
Critically Important	1	18	23.7
Important	2	34	44.7
Somewhat Important	3	23	30.3
Not Important	4	-	-
Neutral	-	1	1.3

Median = 2 Mode = 2

34. Military Allowance Inquiry

Category	Value	Frequency	Percent
Critically Important	1	13	17.1
Important	2	31	40.8
Somewhat Important	3	22	28.9
Not Important	4	2	2.6
Neutral	-	8	10.5

Median = 2 Mode = 2

35. Civilian Allowance Inquiry

Category	Value	Frequency	Percent
Critically Important	1	4	5.3
Important	2	13	17.1
Somewhat Important	3	24	31.6
Not Important	4	18	23.7
Neutral	-	17	22.4

Median = 3 Mode = 3

36. Temporary Additional Duty (TAD) Allowance Inquiry

Category	Value	Frequency	Percent
Critically Important	1	12	15.8
Important	2	25	32.9
Somewhat Important	3	27	35.5
Not Important	4	5	6.6
Neutral	-	7	9.2

Median = 2 Mode = 3

37. Special Maintenance Qualification by Work Center

Category	Value	Frequency	Percent
Critically Important	1	16	21.1
Important	2	38	50.0
Somewhat Important	3	17	22.4
Not Important	4	2	2.6
Neutral	-	3	3.9

Median = 2 Mode = 2

38. Special Maintenance Qualification by SMQ

Category	Value	Frequency	Percent
Critically Important	1	17	22.4
Important	2	31	40.8
Somewhat Important	3	23	30.3
Not Important	4	2	2.6
Neutral	-	3	3.9

Median = 2 Mode = 2

39. Personnel Distribution by Work Center

Category	Value	Frequency	Percent
Critically Important	1	17	22.4
Important	2	35	46.1
Somewhat Important	3	19	25.0
Not Important	4	1	1.3
Neutral	-	4	5.3

Median = 2 Mode = 2

40. Personnel Projection Reports

Category	Value	Frequency	Percent
Critically Important	1	23	30.3
Important	2	32	42.1
Somewhat Important	3	15	19.7
Not Important	4	2	2.6
Neutral	-	4	5.3

Median = 2 Mode = 2

41. Readiness Improvement Potential Personnel Management Subsystem

Category	Value	Frequency	Percent
Critically Important	1	10	13.2
Important	2	29	38.2
Somewhat Important	3	27	35.5
Not Important	4	2	2.6
Neutral	-	8	10.5

Median = 2 Mode = 2

42. IMRL Part Number Data Inquiry

Category	Value	Frequency	Percent
Critically Important	1	27	35.5
Important	2	29	38.2
Somewhat Important	3	16	21.1
Not Important	4	1	1.3
Neutral	-	3	3.9

Median = 2 Mode = 2

43. IMRL Requisition Inquiry

Category	Value	Frequency	Percent
Critically Important	1	20	26.3
Important	2	34	44.7
Somewhat Important	3	17	22.4
Not Important	4	1	1.3
Neutral	-	4	5.3

Median = 2 Mode = 2

44. Aircraft Transfer Order (ATO) Number Inquiry

Category	Value	Frequency	Percent
Critically Important	1	7	9.2
Important	2	27	35.5
Somewhat Important	3	21	27.6
Not Important	4	12	15.8
Neutral	-	9	11.8

Median = 2 Mode = 2

45. BUNO/MODEX Inquiry by Organizational Code

Category	Value	Frequency	Percent
Critically Important	1	4	5.3
Important	2	19	25.0
Somewhat Important	3	27	35.5
Not Important	4	17	22.4
Neutral	-	9	11.8

Median = 3 Mode = 3

46. Aviator Equipment Inquiry

Category	Value	Frequency	Percent
Critically Important	1	14	18.4
Important	2	33	43.4
Somewhat Important	3	23	30.3
Not Important	4	3	3.9
Neutral	-	3	3.9

Median = 2 Mode = 2

47. Readiness Improvement Potential Asset Management Subsystem

Category	Value	Frequency	Percent
Critically Important	1	9	11.8
Important	2	34	44.7
Somewhat Important	3	25	32.9
Not Important	4	3	3.9
Neutral	-	5	6.6

Median = 2 Mode = 2

48. Engine Transaction Report (ETR) History Inquiry

Category	Value	Frequency	Percent
Critically Important	1	14	18.4
Important	2	37	48.7
Somewhat Important	3	17	22.4
Not Important	4	3	3.9
Neutral	-	5	6.6

Median = 2 Mode = 2

49. Aircraft Record A Card Inquiry

Category	Value	Frequency	Percent
Critically Important	1	19	25.0
Important	2	34	44.7
Somewhat Important	3	16	21.1
Not Important	4	3	3.9
Neutral	-	4	5.3

Median = 2 Mode = 2

50. XRAY Inquiry

Category	Value	Frequency	Percent
Critically Important	1	18	23.7
Important	2	34	44.7
Somewhat Important	3	19	25.0
Not Important	4	1	1.3
Neutral	-	4	5.3

Median = 2 Mode = 2

51. ETR Feeder Report

Category	Value	Frequency	Percent
Critically Important	1	22	28.9
Important	2	33	43.4
Somewhat Important	3	17	22.4
Not Important	4	1	1.3
Neutral	-	3	3.9

Median = 2 Mode = 2

52. Aircraft Accounting Report Feeder

Category	Value	Frequency	Percent
Critically Important	1	26	34.2
Important	2	26	34.2
Somewhat Important	3	18	23.7
Not Important	4	1	1.3
Neutral	-	5	6.6

Median = 2 Mode = 1

53. End of Quarter Report Feeder

Category	Value	Frequency	Percent
Critically Important	1	26	34.2
Important	2	33	43.4
Somewhat Important	3	13	17.1
Not Important	4	1	1.3
Neutral	-	3	3.9

Median = 2 Mode = 2

54. Spintac Report Feeder

Category	Value	Frequency	Percent
Critically Important	1	21	27.6
Important	2	29	38.2
Somewhat Important	3	16	21.1
Not Important	4	7	9.2
Neutral	-	3	3.9

Median = 2 Mode = 2

55. Aircraft Material Readiness Report Feeder

Category	Value	Frequency	Percent
Critically Important	1	35	46.1
Important	2	22	28.9
Somewhat Important	3	14	18.4
Not Important	4	-	-
Neutral	-	5	6.6

Median = 2 Mode = 1

56. XRAY Report Feeder

Category	Value	Frequency	Percent
Critically Important	1	24	31.6
Important	2	32	42.1
Somewhat Important	3	15	19.7
Not Important	4	2	2.6
Neutral	-	3	3.9

Median = 2 Mode = 2

57. Mission Capability and Utilization Trend Monthly Summary

Category	Value	Frequency	Percent
Critically Important	1	27	35.5
Important	2	35	46.1
Somewhat Important	3	10	13.2
Not Important	4	-	-
Neutral	-	4	5.3

Median = 2 Mode = 2

58. Flight Activity Trend Monthly Summary

Category	Value	Frequency	Percent
Critically Important	1	16	21.1
Important	2	37	48.7
Somewhat Important	3	17	22.4
Not Important	4	-	-
Neutral	-	6	7.9

Median = 2 Mode = 2

59. Maintenance Manhour/Flight Hour Monthly Summary

Category	Value	Frequency	Percent
Critically Important	1	20	26.3
Important	2	38	50.0
Somewhat Important	3	13	17.1
Not Important	4	1	1.3
Neutral	-	4	5.3

Median = 2 Mode = 2

60. Cannibalization Summary

Category	Value	Frequency	Percent
Critically Important	1	19	25.0
Important	2	34	44.7
Somewhat Important	3	18	23.7
Not Important	4	1	1.3
Neutral	-	4	5.3

Median = 2 Mode = 2

61. Corrosion Control Report

Category	Value	Frequency	Percent
Critically Important	1	23	30.3
Important	2	27	35.5
Somewhat Important	3	21	27.6
Not Important	4	-	-
Neutral	-	5	6.6

Median = 2 Mode = 2

62. High Five Work Unit Code Report

Category	Value	Frequency	Percent
Critically Important	1	16	21.1
Important	2	30	39.5
Somewhat Important	3	22	28.9
Not Important	4	2	2.6
Neutral	-	6	7.9

Median = 2 Mode = 2

63. Awaiting Maintenance Reason Code Summary

Category	Value	Frequency	Percent
Critically Important	1	18	23.7
Important	2	22	28.9
Somewhat Important	3	29	38.2
Not Important	4	-	-
Neutral	-	7	9.2

Median = 2 Mode = 3

64. Readiness Improvement Potential Local/Upline Reporting Subsystem

Category	Value	Frequency	Percent
Critically Important	1	19	25.0
Important	2	33	43.4
Somewhat Important	3	19	25.0
Not Important	4	1	1.3
Neutral	-	4	5.3

Median = 2 Mode = 2

65. Technical Publication Location Inquiry

Category	Value	Frequency	Percent
Critically Important	1	17	22.4
Important	2	26	34.2
Somewhat Important	3	28	36.8
Not Important	4	2	2.6
Neutral	-	3	3.9

Median = 2 Mode = 3

66. Technical Publication Requisition Inquiry

Category	Value	Frequency	Percent
Critically Important	1	17	22.4
Important	2	31	40.8
Somewhat Important	3	25	32.9
Not Important	4	2	2.6
Neutral	-	1	1.3

Median = 2 Mode = 2

67. Technical Publication History Inquiry

Category	Value	Frequency	Percent
Critically Important	1	25	32.9
Important	2	26	34.2
Somewhat Important	3	20	26.3
Not Important	4	2	2.6
Neutral	-	3	3.9

Median = 2 Mode = 2

68. Readiness Improvement Potential Technical Publications Subsystem

Category	Value	Frequency	Percent
Critically Important	1	16	21.1
Important	2	27	35.5
Somewhat Important	3	27	35.5
Not Important	4	3	3.9
Neutral	-	3	3.9

Median = 2 Mode = 2

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This study reevaluated and prioritized the functional information requirements of the Naval Aviation Logistics Command Management Information System (NALCOMIS). A survey of maintenance managers was used to gather information on the perceived importance of each functional requirement. Respondents identified the three least important and three most important of the NALCOMIS subsystems. Finally, respondents were asked to identify NALCOMIS subsystems currently duplicated by micro-computer programing at the local level.

The data gathered revealed that over 95% of all functional requirements were rated as important or better by at least half of the respondents. It also identified the three least important and the three most important NALCOMIS subsystems. Additionally, it revealed that all NALCOMIS subsystems are being duplicated to some extent at the local level.

The results of this study led to three recommendations for future study including case study analysis to further identify NALCOMIS functional requirements duplicated by micro-computer programing.