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Management of
Automatic Data Processing
(ADP)
System Documentation
in
the Department of Defense

by

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ABSTRACT

One aspect of management of ADP (Automated Data Processing) in the Federal Government is system documentation. "Good system documentation is the backbone to the success of any automated system, for only through complete and thorough documentation can the user fully understand and utilize a system's capability." [Kaplan89, page 29]. The system reviewed is the Naval Air Logistics Command Management Information System (NALCOMIS). The review is approached from the user's aspect. The review of this system involves the level of ability required for the user to understand and properly use the functionality provided by the system, the documentation requirements, and the problems associated with the user's interface to the system. Many problems exist with computer manuals that contained an inappropriate level of technical detail, style, format, and content [Kaplan89, page 30]. This review will demonstrate the positive and negative aspects of the user documentation and recommendations or suggestions to improve the documentation for the user's benefit.

SYSTEM INTRODUCTION

NALCOMIS was on-line and functioning in August 1990, the system is approximately two years old. This review is based on the Phase II system which is implemented at the Intermediate Maintenance Activities (IMA) and Supply Support Centers (SSC). Specifically reviewed was the Cecil Field Aviation Intermediate Maintenance Detachment (AIMD).

NALCOMIS provides the capability to manage Naval aviation maintenance and material requirements, providing detailed processes to enter, collect, process, store, review, report and interface data required by the organization. These processes are in support of engine, component, and support equipment repair, material requisitions, repairable stock management, awaiting parts management, direct support material control, supply file maintenance, personnel assignment and deployment, subcustody of equipment, and utilization of resources at the IMA/SSC levels. These functions are integrated into one system sharing a common data base to avoid redundancy of functions and related data between the organizations, improving overall communication and response time associated with material readiness [NAVMASS089, page 3].

SYSTEM FUNCTIONS AND DOCUMENTATION

The user interface displays a series of menu driven screens and conversations that allow manipulation of the NALCOMIS data. It is interactive on-line processing, requiring initial log-in and password to enter the system. Initially a series of menu's will guide the user to the subsystem and functional areas within the subsystem desired, controlling the user's access to conversations. The more experienced user can go directly to the conversation desired using the appropriate conversation code to access the conversation. The user is only allowed to perform conversations that are authorized through the user's password.

To the novice user, this system is quite complicated. Even though it is menu driven the user must know where to go and how to get there before entering the system. The system is not self-descriptive. There is an on-line help menu that describes the fields and the kind of information that goes into each field. The on-line help is an on-line description of available options or explanations of how the system works. This can provide a fast and convenient form of help for users stuck in a specific situation or data entry field. [Mischo89, page 32].

One of the biggest drawbacks of this on-line help system is that it doesn't tell the user where to get the information required or where the information goes once it is added to the

system. "On-line documentation can be both more immediately responsive and more frustrating. This is especially true of help screens, which often answer the wrong question." [Bills89, page 34]. The information found using the on-line help is very similar to what is found in the User Manuals. It refers to other manuals and documents unrelated to the system for codes needed to complete the data entry.

Effective on-line help information is difficult to get except for the simplest problems. As with printed documentation, the key seems to be proper indexing properly presented to the user. "Since the on-line option implies immediate answers, the time needed to get to and work through on-line help indexes may be less acceptable to the user than time spent on manuals." [Bills89, page 34]. In the NALCOMIS system, the help function is very easy to use. An 'H' is placed in the Action Code block on the menu screen and the screen's function will be described. If help is desired for a particular field on the screen, the menu choice is put in the selection block and 'H' is entered in the Action Code block. On-line help is handy to the novice user who knows very little about the system. It does not help the more experienced user that is trying to determine why the system will not accept a valid code or why it will not validate on a field necessary to continue. A context sensitive help screen describes the screen it is linked to and all the options possible for that screen. "If the problem is with the mechanics of the specific

screen, this information is good and handy. However, if the question is "Why didn't this search work?", the help screen seems incredibly unresponsive." [Bills89, page 34].

"A manual with a clear and immediately apparent organization, a good index, and complete instructions help the user get into and around the application faster and more easily." [Bills89, page 34]. There are several written manuals accompanying the NALCOMIS system. These manuals are constantly updated whenever a software change or "patch" is made. The User Manuals describe the system, screen by screen and field by field. There is a table of contents to show the order of the descriptions. The manuals are written in user friendly terms and are easy to understand. They are organized in the order of the screens displayed. "The surest way documentation can fail is with a poorly written index. A good index can make badly written documentation at least usable. A bad index can make well-written documentation a source of frustration." [Bills89, page 34]. NALCOMIS manual's biggest downfall is the lack of an index. The manuals are big and bulky and difficult to use to obtain a quick answer to a question. The lack of an index or glossary for a quick look-up of the user's question make the manual's unwieldy. These manuals are not distributed to every terminal, therefore not used frequently. Documentation has to be clear, available, and easy to assimilate in order to assure confidence in a system. Production Control and the System Administrator refer to the user

manuals occasionally when needed.

The Conversation manual is used extensively to solve problems by the System Administrator. The conversation manual consists of detailed descriptions of the conversations used to manipulate the data. Each conversation is described in modular form by name, code, type, description, action, mailbox messages created, hardcopy notice created and system interface. It describes the screens and reports affected by each conversation. An example screen is displayed with the code lengths and types described, the purpose of the screen and the valid entries. This helps the user to debug the system when codes will not validate or the system doesn't perform as expected.

"Most manuals help the user get started (often with difficulty) providing an introduction to the functions, an overview of elementary operations and a warning against errors. Few manuals stay apace of users as they gain knowledge of the system, or need shortcuts, advanced features or available customization." [Mischo89, page 31]. In an interview with the systems administrator, her chief complaint about the documentation is that the level of information available through the manuals is insufficient. She is not sure whether the documenters did not include the information needed because it's too technical, they don't think the user needs the information or they are unaware the information is needed. "Too often the

presentation obscures the information, it is inaccessible, or it is even missing." [Mischo89, page 32]. An example given by the system administrator was a of a report output. Only through hours of experimentation, changing information in the data base and printing reports was she able to discover which columns or sections of information affected the results of other columns of data. The derivation of information especially for reports is not included in the manuals.

Other problems with the system includes validations. While traversing through the screens the system will not let the user continue until certain fields are validated. There is no documentation explaining why these particular fields need to be validated and why it doesn't validate if certain combinations of codes are used. An example quoted by the System Administrator was the use of a modular part number instead of the individual part number. The System rejected the code only giving a message that the number was not on file. It took intense research to discover that the part desired had a separate identification code. This was the number required. The documentation assumed the user knew this information and did not spell it out anywhere. Vendor supplied documentation is limited to the "how" of system operation and rarely addresses the "why". As a result vendor documentation fails where the user needs it the most. [Mischo89, page 34].

When the System Administrator encounters a bug in the system, that she can not fix or resolve through the documentation, NAVMASSO (Navy Management Systems Support Office) is contacted via telephone or message, through the chain of command, as to the problem. They will come back with a resolution or if it cannot be resolved without a software change will develop a "work around" for the user until a software "patch" is developed. This source of information to the user is slow and bureaucratic. System complaints go through the Commander, Naval Air Atlantic (COMNAVAIRLANT), who controls all sites utilizing NALCOMIS on the East Coast, to NAVMASSO and resolutions are sent back through the same channels. This method of communication has positive and negative aspects. On the positive side, if one site has a problem the solution is distributed to all sites at the same time eliminating duplication of effort. On the negative side, the response is slow, the system problems are handled on a priority basis, but the process to fix a problem or crisis can be extremely long.

The Systems Administrator receives the new documentation for a "work around" and develops a step by step guide on the procedures needed to use the "work around". She distributes these instructions to all work centers that may need to know the procedures of that particular "work around". This works very effectively and with these detailed step by step instructions, anyone familiar with the system can make the corrections.

Unfortunately there is not more documentation in this format. There is a process to make recommendations to the system developers and documentation writers on format, usability and nice to have's, but this process takes time and is done in order of priority.

When new software patches are installed, the system is brought down until installation is complete. For the annual major patches, a team is sent to the site in order to train the users on the system changes. For minor patches documentation is sent to the user with the updated revisions. "Software changes that don't get reflected in the documentation or that exist as "add in" pages are difficult to use. The information needed must be available in the manual." [Mischo89, page 33].

Other than the annual update training there is not a formal training schedule for the novice user to learn the system. The novice user is trained on the job, on a one to one basis with an experienced user until he/she understands the system. Only after he is very familiar and understands the system will he be given a password to enter the system interactively and be able to make changes to the data.

A tutorial manual is a step by step task oriented walk-through of how the application runs written with the assumption users know nothing about the application. For a novice just

learning the job, the tutorial is the most essential piece of documentation [Mischo89, page 33]. NALCOMIS does not have a tutorial or step by step guide to explain the system to the novice user. This is the largest drawback of the documentation for this system. The training is "seat of the pants" trial and error, the training packages that are available are usually just for corrections to problems that have been reworked and replaced with a software "patch".

"When small work groups are affected by poor documentation they can pool informal knowledge and learn by trial and error." [Mischo89, page 31]. The System Administrator described weekly meetings incorporating all the work centers and Supply Support Center supervisors involved with NALCOMIS to work out problems, discrepancies and any bugs in the system locally. Desk Top guides or quick reference materials with alphabetical listings and short descriptions of all commands are non-existent. The development of locally used reference manuals and desk top guides would make the system easier to use and would save the system administrator a lot of time and energy spent answering other less experienced workers questions.

RECOMMENDATIONS

Effective documentation is composed of both style and content. There are many writing styles for documentation. Overall, the documentation for NALCOMIS is very good. Each screen is described and each field is explained. The manuals use examples, actual screens, and the explanations are easy to understand. The manuals are bulky, an easy fix would be to add section dividers which would enable an easier access to each section of each manual. Other negative aspects include not enough information in the manuals to answer complicated questions and the lack of step by step procedures or instructions which would make the documentation more usable. "Searching for instructions not in the manual is frustrating and discourages further use of the documentation." [Mischo89, page 34]. A solution to the problem is to develop guides at the local level, where each site's procedures are a little different. The vendor-supplied documentation doesn't always meet local requirements.

The needs of two kinds of users should be addressed. The initial user, the person who has to learn the system from scratch needs a beginning-to-end simple-to-complex explanation of the functions and pitfalls. The experienced user is focused on a specific task or tasks. Trained by the vendor (NAVMASSO) or another staff member, he now needs a description of routine

functions and a source of help only when unusual problems arise. [Bills89, page 34].

Quick references and desk top guides would help to put the more useable information at the fingertips of the user. A local experienced user should be assigned to develop these guides at the local level.

A PC based tutorial would help the novice user to become familiar with the system before he/she was required to interact with the database. This could also be in the form of a "training manual for first-time users that begins with an overview of the system. In this overview, its various components are identified and a step-by-step approach to using the system is provided." [Matthews89, page 36]. This set of exercises will help the user master frequently encountered situations and transactions. This step by step tutorial/training manual could have actual working examples and solutions to each system process. The system should be organized so that only certain processes are performed by certain people, the work-center user would only attempt the tutorials needed for his job, where as the Production Control user may go through examples of all screens used in production control. This would give the user some hands on experience with built in solutions and the ability to learn the system without destroying important data. Some recommendations for a tutorial for the novice user include tutorial guides, videotapes and PC

based tutorials that are self-instructional with each lesson or chapter building on the previous one. "The tutorials should present introductory instructions only and make no attempt to comprehensively cover all system features." [Anderson89, page 36].

The last recommendation would be to incorporate into the NALCOMIS data base the information taken from other instructions and documentation to derive the codes necessary to use the NALCOMIS system. At the present time the help screens will refer the user to an instruction or directive to locate the correct code. If these codes and descriptions were located in the data base, it would save the user a lot of time and enhance the value of the system.

SUMMARY

The objectives of NALCOMIS is to track repairables, monitor time spent ordering, repairing and total time to fix parts. The system is set to track parts through the life of that part, storing information in order to determine exactly what and where the part is at any point and time. The system accomplishes this goal. It is a well planned system. The system documentation is suitable for the needs of the system, but not necessarily the needs of the user. "User documentation must focus on the users, helping them to overcome their apprehension and resistance to the new and the strange. It should build their confidence in their ability to use the system easily and efficiently by providing them with easy-to-follow instructions." [Webb91, page 41]. As with any system there are always improvements that can be made. The documentation in this system can also be improved. The main goal is to keep the system functioning properly. Improving and updating documentation should be considered at the same time, the system will run smoother and the user's will be more satisfied.

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