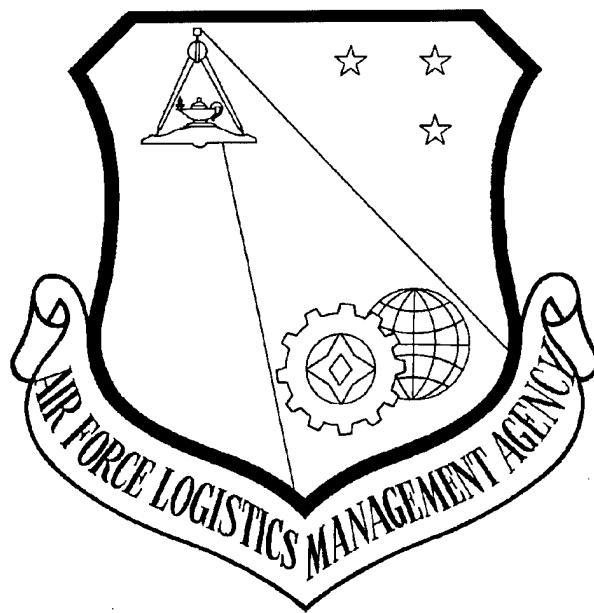




Aerospace Maintenance And Regeneration Center (AMARC) Supply Study

**AFLMA FINAL REPORT LS199726900
SMSgt Bernard N. Smith, Jr.**

Team Members:

**Mr. Bill Burrell
Capt Chris Melcher
Dr. Doug Blazer**

**Capt Ed Tatge
MSgt Robert Nicholson
Ms. Gale Jarnagin**

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13. ABSTRACT (Maximum 200 Words) There is tremendous potential at AMARC to improve the efficiency and effectiveness of their operations by reengineering their computer processes. AMARC's justification for maintaining a standard base supply system (SBSS) host account is 30 years old and the reasons for the host account versus a satellite account are now in question. The second problem is the Air Force may be buying and repairing assets maintained at AMARC because there is no automated way to allow inventory managers (either wholesale or retail) visibility of items at AMARC to satisfy other Air Force needs or preclude buys of new items. The conclusions of this study are: 1. The AMARC SBSS must remain a host account (at the current RPS manning levels) due to the unique AMARC Edits and Analysis program. The SBSS doesn't allow program bank differences between satellite and host accounts. 2. The Air Force lacks data system visibility of assets stored at AMARC. 3. To preclude needless buys, the Air Force needs an automated process to generate and access the list of parts stored at AMARC. 4. The Air Force needs an automated process to determine if AMARC is a source for MICAP and other requirements.				
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EXECUTIVE SUMMARY

The Aerospace Maintenance And Regeneration Center (AMARC) is a HQ AFMC facility providing a single point of operation for regeneration, reclamation, storage, and disposal of aircraft and aircraft parts for DoD. This study addresses two problems at AMARC.

Problems: There is tremendous potential at AMARC to improve the efficiency and effectiveness of their operations by reengineering their computer processes. Specifically, there are two potential areas of opportunity.

The first problem is AMARC's justification for maintaining a standard base supply system (SBSS) host account. The reasons for the host account versus a satellite account are now questionable because they are 30 years old.

The second problem is the Air Force may be buying and repairing assets maintained at AMARC. Currently, there is no automated, systemic way to allow Air Force inventory managers (either wholesale or retail) visibility of items in AMARC to satisfy other Air Force needs or preclude buys of new items. Visibility of all aircraft and assets would be invaluable to AFMC when procuring spare parts, to planners when determining future requirements, and to base stock control personnel to resolve mission capability (MICAP) conditions.

Objectives: Determine the most appropriate supply computer support concept for AMARC/LGS (host or satellite account), and the effect on remote processing station (RPS) manning. Further, determine the most appropriate way to improve visibility of AMARC parts data.

Analysis/Results: AMARC has a program unique to all Standard Base Supply System (SBSS) accounts, NGV206A, AMARC Edit Analysis Program. The program edits nine specific SBSS inputs looking for AMARC unique data. Since program banks cannot currently be exclusively assigned to individual satellite accounts, *AMARC will have to remain a host account.* The new SBSS replacement, the Integrated Logistics System – Supply (ILS-S), does not contain the unique functions of NGV206A.

During a reclamation project, an AFMC project manager generates a save-list. The save-list is a match of any Air Force requirements to parts available in a reclamation project. It takes several systems to manually create and combine magnetic tapes and much manual coordination of many amended paper copies to form the save-list.

There is no system in place to account for all assets on the aircraft, largely because there is no method to determine the asset position. The aircraft are not inventoried upon arrival, so there is no parts list for each aircraft. Currently, there is no parts list for any mission design series (MDS). A parts list per MDS would be a valuable tool in determining potential asset availability at AMARC. The D003A inventory (assets reclaimed, warehoused assets from other reclamation efforts, and tail numbers of stored aircraft) is not visible to the Air Force beyond AMARC.

After this study began, AMARC contracted with Lockheed-Martin to convert the data existing in the D003A Asset Control System database and all stored aircraft data to a Commercial Off-the-Shelf (COTS) database program called MAXIMO. The COTS software will maintain the D003A inventory, schedule periodic maintenance for flyaway aircraft, and indicate which aircraft have had parts removed. Unfortunately, MAXIMO has no interface to Air Force systems for visibility of the assets.

The Air Force Audit Agency (AFAA) reports provide a conservative estimate of the value of all assets at AMARC at \$40 billion. If increased visibility recycled as little as 0.01 percent of the \$40 billion AMARC inventory into the Air Force inventory, the \$4 million saved would easily pay for any enhancements and/or changes to the current retail supply, wholesale supply, and sourcing systems.

Recommendations:

Problem One:

1. Retain AMARC's SBSS supply account as a host account. (OPR: AFMC/LGS)
2. Program the modernized retail supply system to allow different versions of mainframe software (program banks) between satellite and host accounts. (OPR: SSG/LGS)

Problem Two:

3. Short term:
 - As an interim, enhance the AMARC web site by developing tables of potential and actual inventory and link them to the AMARC site. (OPR: AFMC/LGS, AMARC/LGS)
 - Automate the save-list generation process using faster, more accurate computer technologies. (OPR: AFMC/LGS)
4. Long term:
 - Program the modernized retail supply system to store balances for AMARC assets and differentiate between actual and potential quantities. (OPR: SSG/LGS)
 - Modify both sides of RAMPS reporting (SBSS and AFMC Stock Control System) to differentiate between AMARC potential and actual balances, as well as AMARC actual (unknown serviceability) and SBSS actual balances. (OPR: SSG/LGS, AFMC/LGI)

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CHAPTER 1

INTRODUCTION

INTRODUCTION

The Aerospace Maintenance and Regeneration Center (AMARC) Supply Division, through Headquarters Air Force Material Command (HQ AFMC) asked AFLMA to study their supply operations and resolve some specific issues impacting AMARC.

PROBLEMS

Problem One:

AMARC's justification for maintaining a standard base supply system (SBSS) host account is 30 years old and the reasons for the host account versus a satellite account are now questionable. Determine whether AMARC requires an "01" host account and the associated manpower cost of operating a remote processing station (RPS) as a host account versus a satellite account.

Problem Two:

The Air Force may be buying and repairing assets that may be available at AMARC. Currently, there is no automated, systemic way to allow Air Force inventory managers (either wholesale or retail) visibility of items in AMARC to satisfy other Air Force needs or preclude buys of new items. AMARC maintains an inventory of reclaimed assets, warehoused assets from other reclamation efforts, and a list of stored aircraft by tail number in the D003A Asset Control System. Aircraft are not inventoried upon arrival, so there is no parts list for each aircraft. Currently, there is no parts list for a mission design series (MDS), much less a single aircraft. A parts list per MDS would be a valuable tool in determining potential asset availability at AMARC. The D003A inventory (reclaimed assets, warehoused assets from other reclamation efforts, and tail numbers of stored aircraft) is not visible to Air Force base and wholesale level supply requirement managers beyond AMARC.

Visibility of all aircraft and assets would be invaluable to AFMC when procuring spare parts, to planners when determining future requirements, and to base stock controllers in resolving mission capability (MICAP) conditions. The HQ USAF/ILS has recognized this and formed an integrated process team (IPT) to determine proper levels and methods of visibility. The team members include AFMC, Air Force Audit Agency (AFAA), AMARC, and HQ USAF/ILS planners. We need to determine the best way to provide AMARC asset visibility.

OBJECTIVES

1. Determine the most appropriate supply computer support concept for AMARC (host or satellite account) and the effect on RPS manning.
2. Determine the most appropriate way to improve visibility of AMARC parts data.
3. Determine a method to provide an automated potential inventory list of parts for AFMC system program directors (SPD), item managers (IM), and base mission capable (MICAP) monitors.

METHODOLOGY

This study of AMARC/LGS is based on descriptive analysis and visual observation of their operations.

1. Investigate the existing AMARC supply account.
2. Explore methods for improved visibility of data currently stored in the D003A Asset Control System.
3. Discuss the feasibility, design, and implementation of an automated parts list for each MDS.

BACKGROUND

AMARC:

AMARC is an AFMC facility providing a single point of operation for regeneration, reclamation, storage, and disposal of aircraft and aircraft parts for the Department of Defense (DoD). AMARC/LG consists of two divisions, the Supply Division (LGS) and the Logistics Support Division (LGL). AMARC/LGS operates in a manner similar to most SBSS accounts. Although they are small, about 50 personnel, AMARC/LGS has its own stock record account number (SRAN). AMARC/LGL is a combination of traditional Transportation (LGT) functions (packing, crating, and shipping) and a unique storage function—the Special Assets Storage Branch (LGLM). LGLM stores and accounts for all the manufacture tooling used on the production line when various weapon systems were originally built and all aircraft spares associated with the stored aircraft (not accounted for in the SBSS).

These “not accounted for in the SBSS” assets consist of over 5,200 aircraft stored in the Arizona desert and at least 50,000 items that have been removed from aircraft during other reclamation efforts (maintained in a warehouse with no SBSS accountability). The 50,000 items were removed to gain access to specific parts for reclamation, cannot be re-attached to the aircraft because of missing parts, and are still considered part of the individual aircraft available for reclamation.

The aircraft and the non-SBSS accountable assets were maintained in a D003A system. Recently, AMARC contracted with Lockheed-Martin to convert the D003A database and corresponding data to a commercial-off-the-shelf (COTS) database program named

MAXIMO. The COTS software will maintain:

- The inventory of reclaimed assets (called negative inventory) by national stock number (NSN) as well as parts pulled off aircraft and stored separate from the aircraft. The system keeps a record of which aircraft the part came from.
- The inventory of stored aircraft (tail number and parking locations—not a parts inventory of each aircraft).
- A periodic maintenance schedule for aircraft that the system program directors (SPDs) designate as inviolate (no parts to be removed).

While the actual value of the inventory is subject to debate, the current estimate is over \$40 billion. An AFAA report, project 97053003, describes the problems with determining the value of the stored assets at AMARC. The report states AFMC required AMARC personnel to use values recorded in Technical Order 00-25-30, Unit Cost of Aircraft, Guided Missiles, and Engines, 15 May 1983, rather than values in the Equipment Inventory, Multiple Status and Utilization Reporting System (EIMSURS) to value aircraft transferred into the aircraft disposal account. AFAA found \$27 million in differences between the technical order and EIMSURS. For example, 10 C-141 aircraft were transferred to AMARC during FY 1997. The EIMSURS value for C-141s was \$7.4 million per aircraft while the technical order value was \$6.3 million per aircraft, resulting in a total difference for the transfer of \$11 million. This condition occurred because AMARC personnel were not aware that EIMSURS was used for chief financial officer reporting purposes (AFAA could not provide any information on the source of EIMSURS cost data or why it was better than the technical order).

Even with the new MAXIMO software, none of these AFMC assets are visible via automated means to any agency outside of AMARC. That is, there are no interfaces to Air Force retail or wholesale supply accounts and systems.

Reclamation:

In Fiscal Year (FY) 1998, AMARC reclaimed over \$844 million in aircraft parts for the Air Force. Reclamation is the process of reclaiming serviceable and/or economically repairable components and material from excess or surplus property to satisfy valid Air Force requirements. As a result of reclamation, serviceable and economically repairable items are returned to the proper supply activity and the residue is processed as disposable property. (Residue - the parts that are not unserviceable and not economically repairable.)

Reclamation is to be used in place of procurement or repair whenever measurable savings will result. Reclamation is also to be used whenever it will provide the fastest means of satisfying a critical requirement or when there is no other known source of supply, regardless of savings. The type of reclamation differs according to the quantity of an end item to be reclaimed and the degree of management control exercised. AFMCR 65-31 governs programmed, nonprogrammed, aircraft engine and equipment and recoverable spares reclamation. AFMCR 65-9 governs the removal of parts during in-processing at the AMARC and priority removal.

The reclamation process involves three groups or agencies--the SPDs and end item managers, the wholesale IMSs and base inventory managers, and AMARC.

1. AMARC responsibilities are:
 - To provide storage, regeneration, reclamation, and disposal of aircraft and aircraft parts for every branch of service.
 - Remove parts and assemblies from stored aircraft in support of customer's requirements.
 - Withdraw aircraft from storage and prepare them for flyaway to the customer.
2. SPDs and end item/assembly managers are responsible for:
 - Ensuring those inventory management specialists (IMS) who manage parts or assemblies are aware of end items available for reclamation when aircraft, missiles, or engines are determined to be excess and designated for reclamation.
 - Consolidating and distributing reclamation save-lists—a list of all requirements (not on-hand balances) for each reclaimed MDS matched to the potential obligation of funds (whether a repair of an existing asset or the buy of a new asset). Save-lists should contain all data necessary to permit the reclaiming activity to accomplish reclamation and shipping, provided shipping instructions are not sent by another means.
 - Preparing and distributing any changes/additions/deletions to the save-lists.
3. IMS's for component parts and/or assemblies are responsible for:
 - Determining requirements for parts when end items or assemblies become available for reclamation.
 - Advising the SPD or end item managers of those requirements.
 - IMS's or base supply activities should only request reclamation when it is economical and the parts are required to maintain authorized levels.

Note: There is no one specifically assigned responsibility for inventory management and control at AMARC. The AMARC supply account cannot be held to the same standards of inventory control as a normal retail supply account – because the actual inventory and the condition of those assets are in question. It is noted that AMARC has no written responsibility to inventory arriving aircraft and maintain inventory responsibility for those individual aircraft parts.

All Air Force reclamation must be based on the following criteria:

1. A justifiable requirement must exist.
2. Removal must be economical. If it is not economical, the requirement must be based on an extreme urgency or lack of any other known supply source.
3. Base funded items required locally may be reclaimed by base activities when the parts can be economically removed and restored to a serviceable condition by the reclaiming activity.
4. Resources must be available for the timely repair of reclaimed unserviceable items.

Programmed Reclamation:

Programmed reclamation occurs when a large number of end items, usually five or more, are declared excess and available for reclamation. The process of weapon system reclamation is

activated when HQ USAF/PES assigns end item(s) to a reclamation project (declares the end item excess) and transmits a message to HQ AFMC announcing the project. HQ AFMC assigns a reclamation project control number, a reclamation program manager (RPM), and initiates action to query the Recoverable Consumption Item Requirements System (D041) for a list of all requirements to identify potential recoverable NSNs from the weapon system (MDS). A D041 system output tape is generated and sent to each Air Logistics Center (ALC) for processing, followed by a message indicating a system tape has been produced. Each ALC generates a similar tape on the Economic Order Quantity (EOQ) Buy Budget Computation (D062) System for a list requirements (potential expendable NSNs) for the project's MDS. The two tapes are merged in the Defense Material Utilization and Disposition Programs (D067) System to produce a master requirement list (potential reclamation candidate list) of both repairable and expendable NSNs. HQ AFMC distributes the candidate lists to the individual IMS's/Equipment Specialists (ES) at each ALC for their review and identification of reclamation requirements. The IMS's/ES's identify any item they need (to offset a buy) on AFMC Form 110, Reclamation Requisition. The reclamation candidates from AFMC Form 110 are consolidated into a programmed save-list at HQ AFMC (the save-list is a list of items that the Air Force either needs now or projects a need for in the future through a buy or repair effort). AMARC receives the final save-list from HQ AFMC as their reclamation tasking (see Figure 1-1).

Changes in requirements will be made in save-list amendments prepared and distributed in the same manner as the AFMC Form 110.

Most programmed reclamation occurs at AMARC. However, it may occur at other locations, particularly overseas when the end items cannot be economically returned to AMARC.

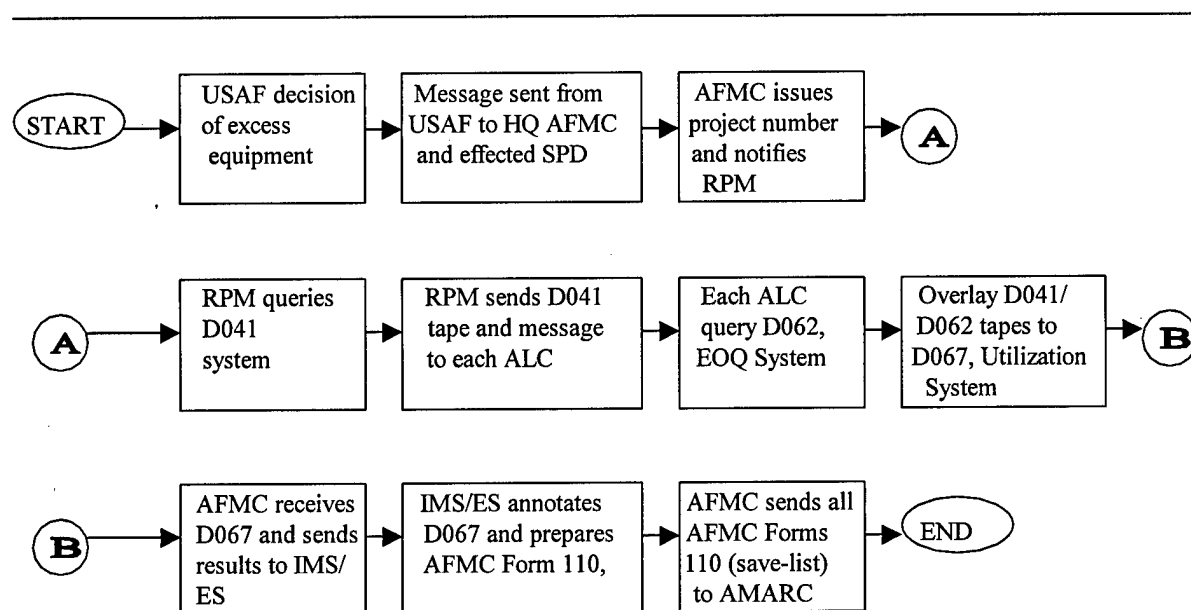


Figure 1-1, Programmed Save-list

Nonprogrammed Reclamation:

Nonprogrammed reclamation differs from programmed reclamation in that only a small number of end items are involved, usually five or less. The most significant use for nonprogrammed reclamation is for crash-damaged aircraft. Reclamation usually is completed on site rather than at AMARC.

The process is activated when the SPD at the ALC contacts the RPM at HQ AFMC and requests assignment of a nonprogrammed reclamation control number. The RPM inputs a D041 system query, triggering the nonprogrammed reclamation process. A nonprogrammed save-list is developed in the same manner as the programmed reclamation save-list with the exception the save-list requirements are annotated on AFMC Form 111, Reclamation Save-list, rather than AFMC Form 110. The weapon system prime ALC consolidates all the lists and then sends the final package to the reclaiming activity (see Figure 1-2).

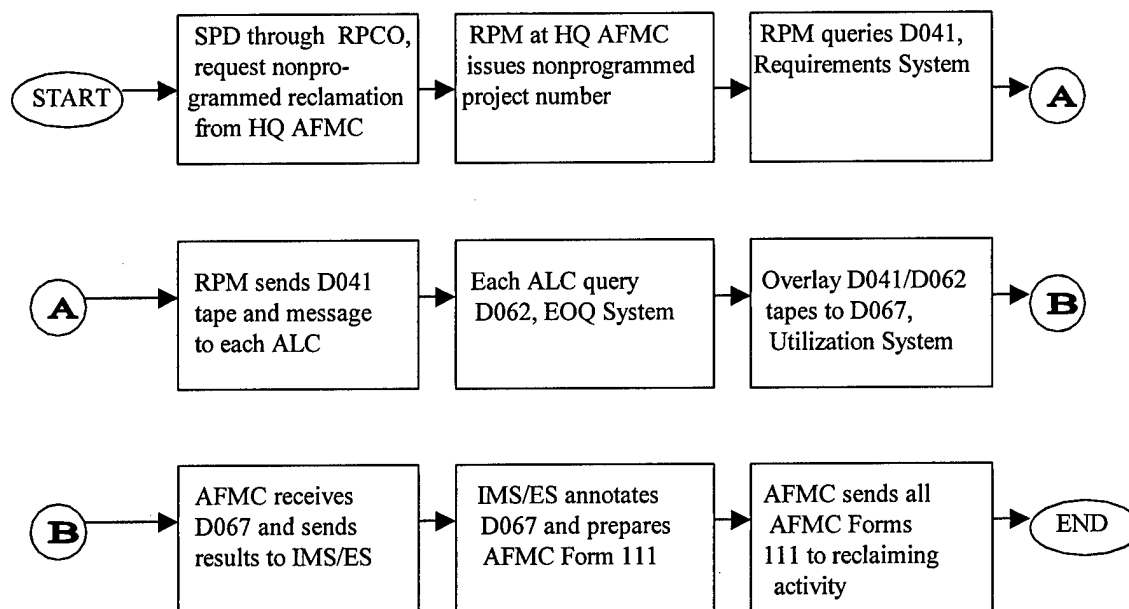


Figure 1-2, Nonprogrammed Save-list

Removal of Parts from Aircraft Arriving at AMARC:

Upon notification of aircraft scheduled for transfer to AMARC, the RPM assigns a project number and requests each ALC to prepare an AFMC Form 110 for save-list items.

All save-list items are removed from incoming aircraft up to the amount needed and that cannot be satisfied from an active programmed reclamation effort on-going at AMARC.

Other Reclamation:

Priority reclamation for aircraft parts and authorized removals from storage aircraft are terms applied to specific reclamation efforts within HQ AFMC. Details are provided in AFMCR 65-31. Priority reclamation requirements are normally submitted on a line item basis and reflect an immediate need. Authorization to approve priority removal of items in the storage account at AMARC is delegated to the aircraft SPD at the ALC. All other logistics support actions must be taken before resorting to removal of the item from AMARC.

Items will not be removed from aircraft when the cost of removal, processing, accountability, and reporting exceeds the item cost unless directed by technical order or regulations to be removed as a safeguard to the basic aircraft. An example of such items would include, but not be limited to, explosives, chemicals, and batteries.

A priority part may be recovered from any aircraft at AMARC to fill urgent requirements that cannot be met from other sources in a timely manner. The requests must be routed through the airframe SPD for approval before submission to AMARC. Removal submission requirements and timelines fall into the following two categories:

1. Category A. Assets needed for support of valid priority 1 requisitions will be requested by telephone to AMARC. MICAP requirements may also be telephoned into AMARC, but will be confirmed by message as soon as possible. AMARC must initiate action immediately; however, the location, recovery, and shipment of an acceptable asset requires 10 days for assured delivery.
2. Category B. Assets needed for support of all other valid requirements that cannot be met by programmed reclamation may be submitted by mail. Don't use Category B requests when routine scheduled reclamation will suffice. AMARC must schedule these requests to assure delivery within 60 days.

The asset is shipped to the requesting base with the priority need in status "R"(reclaimed). The serviceability is unknown, because AMARC does not have the ability to bench check all possible reclaimed assets before shipping.

Potential for Improvement:

It is important to understand the current reclamation process to see the need for improvement. AFMC, through each of the reclamation processes, works in conjunction with the different ALCs to generate save-lists. The save-lists are designed to preclude procuring assets available via reclamation.

Save-list generation uses the old technology of generating magnetic tapes—which then have to be transferred from system to system. The unreliable nature of tapes and the potential for compatibility problems between systems would be enough to warrant a change. Plus the time involved in transferring the *physical* tape from place to place as well as transferring the *information* from tape to machine and back. The same amounts of data can be transferred from machine to machine in seconds with today's technology and at a significantly higher confidence in data integrity.

A manual review of paper copies is another process for improvement. Currently, many different people view the same paper copies and all changes are manually combined into a master document. The IMS/ES could be reviewing electronic copies of a machine generated

parts list instead. It would be much easier to combine electronic copies from each ALC to a single document than regenerating a paper copy from several other paper copies. Again, data integrity becomes an issue with the manual generation of the save-list for AMARC.

AMARC has a new computer system that has no electronic interface with *any* other computer system, much less one involved in the reclamation process. AFMC and the ALCs are blind when it comes to identifying the asset position at AMARC. AMARC has no electronic means to automate a single process of the reclamation effort—other than data storage. The automated data storage is limited to *only* the assets (NSNs) already pulled from the AMARC inventory (end items) and tail numbers of aircraft at AMARC.

Summary:

The current reclamation process uses old technology and as a result is highly manual, takes weeks and months to do what a computer can do in seconds, and does not provide needed visibility (an automated interface) to all potential users of the assets. The Air Force needs a quicker, more accurate and effective way to identify what assets are available and to reclaim them.

CHAPTER 2

ANALYSIS OF AMARC SUPPLY

OVERVIEW

This chapter is divided into two sections. In the first section, we analyze Problem One and in the second section we analyze Problem Two.

Problem One

Determine the justification for AMARC's "01" account status and the effect it will have on RPS manning.

AMARC is a relatively small supply account. Today AMARC maintains a host "01" supply account. AMARC's justification for maintaining a host account is 30 years old and the reasons for the account are now questionable. Considerable improvements have been made to SBSS software and hardware since the original account justification.

Background:

According to AFMAN 23-110, Vol 2, Part 2, Chapter 1, host account justification is usually based upon transaction count and the mission supported (see table 2-1). The AMARC mission does not support a wing, they do not have a satellite activity, no flying mission, a very small retail activity, and they support a wholesale activity. Keeping these in mind, AMARC really does not fit into any of the existing categories of accounts:

- Class I - has a high volume of transactions supporting diverse activities critical to wartime commitment (that is, multiple wings and weapons systems, range operations, special operations, etc.).
- Class II - supports one of the following three: 1) a single wing, 2) dual wings, numbered Air Force activities, major command activities, or 3) a multiple array of complex category II and category III satellite accounts and significant wartime commitments.
- Class III - supports a single wing without complex tenant activities or significant satellite accounts.
- Class IV - supports a wing with a small flying or nonflying program.
- Class V - supports both a depot wholesale operation and a flying or nonflying retail operation.
(Personnel are divided as follows: 350 whole sale and 360 retail)

AMARC falls far below the minimum transaction requirements for a host account. They average 20K transactions per month. An average host account in the Air Force has 100,000 transactions per month, while a Class V account should average more than 800,000 transactions per month. Most Guard and Reserve bases operate as satellite accounts and average 55,000 transactions per month with a single person in their RPS.

	Personnel	Monthly Transactions	Annual SMAG Sales	Item Records
Class I	>350	175,000	> \$20 Million	> 80,000
Class II	270-350	90,000-190,000	\$13-\$22 Million	50,000-90,000
Class III	225-300	50,000-120,000	\$10-\$18 Million	30,000-60,000
Class IV	<225	<75,000	< \$15 Million	< 50,000
Class V	710	>800,000	>\$90 Million	>400,000

Table 2-1, SBSS Account Classifications

AMARC uses three separate SBSS gangs (accounts) while performing their reclamation mission. These systems are the SBSS account (gang 1), a special tooling inventory account (gang 2), and a Navy accounting system (gang 3).

The SBSS account is used daily and accounts for the 20K monthly transactions at AMARC. Whether a host or a satellite, AMARC requires an account for their normal supply transactions.

The special tooling account is rarely used. When a weapon system is retired, any special tooling required to reactivate the weapon system production is sent to AMARC and stored. The tooling account merely tracks all special tooling at AMARC.

The Navy account is almost dormant due to a lack of demand.

SBSS Account:

As a satellite, AMARC would have to conform to the schedules and timing of the host account. Satellite accounts require fewer RPS personnel, typically one, to operate efficiently. Although a satellite would require fewer personnel to operate, flexibility is lost due to enforced host account scheduling.

Workload for the current host AMARC SBSS requires two personnel. A trained individual must be in the RPS the entire time it is in operation as a host account. A satellite account does not require a person in attendance the *entire* time the RPS is functioning, but a single individual is assigned to print reports and perform very basic RPS functions.

A satellite requires fewer man-hours to operate. During the crossover from in-line to end-of-day processing, the host account is responsible for the database dumps and integrity checks. As the system processes the mandatory reports for the host, all satellite data is automatically processed and sent to the satellite electronically. The satellite will no longer have to perform dumps, data integrity checks, or process a daily schedule for the mandatory reports. The satellite will only be responsible for processing their daily transactions and locally required reports. The RPS operator will be needed when the host account operators cannot be contacted or a priority job must be processed and cannot wait for the host account's operators to process it.

In summary, AMARC meets all the criteria to be a satellite account except for one factor. The primary factor for maintaining their host/satellite account status is the mainframe programs. A host account uses the mainframe program banks loaded for the host. Unfortunately, a satellite account *must* use the same programs as the host—no exceptions. The program banks attached to the host account give the Air Force the flexibility to have a test base and a normal operating base loaded on the same mainframe, but each host account is operating via its own bank of programs. Since satellites are dependent on the host account, they must also use the same program bank as their host.

AMARC has a program unique to all SBSS accounts, NGV206A, AMARC Edit Analysis Program. The program edits nine SBSS inputs (see Appendix A) looking for specific data. The AMARC Edit Analysis Program looks for data in specific columns of the input and performs unique updates to transaction histories and due-out details on the AMARC SBSS (see Appendix B). These updates would cause confusion, and possibly harm, at a normal SBSS account when the financial updates are applied. AMARC requires these specific edits for Depot Maintenance Activity Group (DMAG) updates, since AMARC is part of the AFMC depot system.

Summary:

AMARC/LGS currently has two personnel assigned to the RPS. This is optimal for AMARC host account operations. A savings for one position could be realized if AMARC were converted to a satellite account. However, unless program banks can be exclusively assigned to individual satellite accounts in the future, *AMARC will have to remain a host account*. The new Integrated Logistics System – Supply (ILS-S) requirements have been base-lined. The unique functions of NGV206A are not included in the ILS-S base-line list. HQ Standard Systems Group (SSG) personnel must consider two points:

1. ILS-S requirements must include the unique program requirements of AMARC.
2. Modernized supply systems should allow a different bank of programs between host and satellite accounts.

Due to the specific edits required at AMARC via NGV206A and the SBSS program bank restrictions, AMARC must remain a host account at the current manning levels. Both AMARC and HQ SSG personnel concur with this conclusion. While evaluating the unique program, as ILS-S is base-lined, SSG and AFMC should determine if it is possible to allow specific programs to effect only satellite accounts. If satellite accounts can have unique programs under ILS-S, there is no reason AMARC would have to be a “host” account under ILS-S.

Problem Two

The Air Force may be buying and repairing assets it already has at AMARC, because AMARC's D003A Asset Control System provides no automated, systemic method to provide parts visibility. We need to determine the best way to provide inventory asset visibility.

Background:

Part of the mission of AMARC is to store aircraft and remove parts to support active aircraft. AMARC uses the D003A Asset Control System to store data pertinent to their reclamation efforts. The system has no interfaces to any other Air Force systems (SBSS, D035, etc.), so the stored parts are largely invisible to bases and AFMC IMs. Improved visibility is needed to preclude new buys and to provide priority fills to support Air Force MICAPS and other mission needs. Visibility to AFMC and the base inventory manager is the primary issue.

D003A Asset Control System:

The AMARC asset control system has no automated asset visibility outside of AMARC. The system tracks only withdrawals from AMARC (often referred to as "negative inventory"). The focus of "negative inventory" is itemizing and accounting for the items (NSNs) withdrawn from end items still held at AMARC. There is no system in place to account for all assets on the aircraft, largely because there is no method to determine the asset position. All assets remain on the aircraft until a priority request is filled or in conjunction with programmed reclamation.

After this study began, AMARC contracted with Lockheed-Martin to convert the D003A database and all stored aircraft data to a COTS database program called MAXIMO. The COTS software will maintain their inventory of stored aircraft, schedule periodic maintenance, and indicate which aircraft have had parts removed. MAXIMO will also include in the single database all warehoused parts previously removed from aircraft for other reclamation efforts. Unfortunately, the COTS system, MAXIMO, has no interface to Air Force systems for visibility of the databased assets. So, the \$40 billion in assets remains mostly invisible to both wholesale and retail supply accounts.

Analysis:

To provide automated visibility, we suggest a list of *possible* stock numbers associated with each mission design series (MDS) be generated. The table could be generated from the D041 Recoverable Requirements Computation System, application and indenture files, ALC Bills of Materiel, and/or the SBSS SRD consumption records. So, a *potential* on-hand inventory list could be generated by multiplying the number of end items (by MDS, block of aircraft, etc.) by the indenture file for that aircraft and quantity per application (QPA).

For example, an A-10 has a QPA of 3 for a widget-whozit. Each A-10 would show three potential widget-whozits per tail number. If a specific tail number has had two withdrawn, which shows in the negative inventory database, the number of potential widget-whozits would be one for that tail number.

If the potential inventory list was generated and matched to each tail number and MDS combination, it would be a simple process to subtract the items already reclaimed (from the negative inventory database). A database of potential assets could be generated for each aircraft to provide an automated picture of asset position. AFMC parts managers could then have an automated procedure to check for "potential" asset availability when they find themselves in a buy position.

The data in the "negative inventory" database is a list of all assets already withdrawn due to a need. The negative inventory is a list of known (not potential) inventory. The data could be sorted by tail number and linked to an MDS to reduce the potential inventory (since it has already been removed from the aircraft).

Options

Option one:

One option to provide visibility is to post the lists – potential and negative inventory tables – on a website with all weapons systems listed, the applicable SRD for each MDS, the tail numbers, and the total numbers of aircraft in each status (accessible, inaccessible, etc.). Linking the MAXIMO database to the website would provide data close to real time. The web site would allow visibility and access to asset data at the appropriate levels.

It is important to note that AFMC has full control over the assets at AMARC. *Visibility* of these assets to retail accounts could be valuable. A retail account should never be allowed to direct a shipment of an AMARC asset without prior approval of the AFMC SPD. The SPD has the overall responsibility for that Air Force asset position and should be aware of any Air Force inventory changes.

Providing an email address of the SPD for each weapon system would also allow personnel at the unit level to send queries about the possibility of shipping parts for MICAP directly to the SPD and keep AFMC in the loop for reclamation actions. The SPD could then forward the request to AMARC. Email could be an option for a more automated process when requesting priority consideration for parts reclamation.

Option one would be primarily an interim and 'manual' process. An item or base inventory manager needing a part would query the list via the web, but they would still have to submit a request to AMARC to determine the availability of the asset.

Option Two:

Ideally, an automated system is needed. A second option is to place the potential inventory and actual (negative) inventory balances (on either retail SBSS or D035K records). The retail system would then use the Recoverable Assembly Management Process System (RAMPS) to report both inventory balances to the Stock Control System (D035), which will make the asset data visible to all AFMC requirements systems (e.g., EXPRESS and D041).

A detail could be created that is specific to AMARC (say, a 236-AMARC-DETAIL) much as we have a 235-detail specific to a unique outfit at Tinker AFB (the Communications-Computer Systems Project Materiel Managers). The detail would be loaded under each stock number, with a balance, and a warehouse location. The balance would reflect the QPA of the

aircraft, but would be decremented by any negative inventory balances. The warehouse location would be the individual aircraft pad number, unless it has been warehoused (pulled from the aircraft and shipped). The detail would have to have a code to reflect whether it is a potential balance (on the aircraft and identified from the indentured lists) or an actual balance (already pulled from the aircraft). The details would then be RAMPS reported by the balances and the inventory code (potential or actual).

RAMPS would have to be modified to differentiate potential and actual inventory and also to differentiate AMARC actual from any other SBSS account's actual inventory. Potential inventory would reflect the possibility of an asset and would mainly be used to preclude buys and repairs (for relatively routine needs). Actual inventory would be used to preclude buys and as a last resort for high priority (MICAP) requirements. We say last resort since the serviceability of the asset is unknown.

Placing the balances on the SBSS would also make the assets visible to all retail SBSS accounts via the MICAP Asset Sourcing System (MASS). MASS allows the MICAP monitors at each base to locate an Air Force lateral source for any asset. MASS connects to a mainframe computer via the SBSS and "sources" other SBSS accounts by NSN.

When a user inputs an NSN into MASS, they can initiate "sourcing". During the sourcing process, queries pass from the user's SBSS to all SBSS systems and return asset positions at each location. The asset position of each base is reflected as not loaded, serviceable balance (in stock), supply point detail quantities, due-in from maintenance (DIFM) detail balances, in-place readiness spares package (IRSP) detail amounts, mobility readiness spares package (MRSP) detail balances, and bench stock authorizations.

The ability to query detail balances on the SBSS provides an opportunity to make the AMARC assets visible on a global scale. Each "potential" spare would be visible via the detail, by tail number and/or location, in AMARC's SBSS and accessed via MASS.

Option two is the ideal, automated format needed for both base and item inventory managers. Business rules would need to be established to differentiate between actual and potential inventory balances at AMARC. Other business rules would need to be established to differentiate between the SBSS actual balances (where the condition is known) and the AMARC actual balances (unknown condition).

Summary:

As an interim solution, a website could be developed to depict each mission design series (MDS) maintained at AMARC (A-10, C-130E, etc.) as well as the total number of aircraft maintained for each MDS. The website could be linked to the MAXIMO database to allow visibility of the stored aircraft as well as the parts already pulled. The website could include:

1. A table with the standard reporting designator (SRD) used with each MDS.
2. A table of possible stock numbers associated with each MDS. The table could be populated from the D041 Recoverable Requirements Computation System application and indenture file and/or the standard base supply system (SBSS) SRD consumption records.

The permanent solution, global visibility of AMARC assets, can be accomplished by loading details on the retail computer system (the SBSS, D035C, or the modernized retail supply system). The various NSNs for each MDS could be loaded on an SBSS detail.

1. The detail would store balances (as well as tail number, location, and MDS) for AMARC assets and differentiate between actual and potential quantities.
2. Program MASS to query the new AMARC details and display the actual and potential balances from the new details, similar to the way the balances are displayed for other SBSS details (IRSP, MRSP, supply point, etc.).
3. SSG would have to modify the D28, Daily RAMPS Report, to report the detail balances to wholesale supply systems—differentiating between actual and potential balances.
4. RAMPS would have to be modified to differentiate between AMARC potential and actual balances, as well as AMARC actual and other SBSS actual balances.
5. There will be some costs associated with implementing both the interim and long-term, permanent solution. However, the changes are cost beneficial. If increased visibility recycled as little as 0.01 percent of the \$40 billion AMARC inventory into the Air Force inventory, the \$4 million saved would easily pay for any enhancements and/or changes to the current supply retail/wholesale/sourcing systems.

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CHAPTER 3

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS:

1. The AMARC SBSS must remain a host account (at the current RPS manning levels) due to the unique AMARC Edits and Analysis program. The SBSS doesn't allow program bank differences between satellite and host accounts.
2. The Air Force lacks data system visibility of assets stored at AMARC.
3. To preclude needless buys, the Air Force needs an automated process to generate and access the list of parts stored at AMARC.
4. The Air Force needs an automated process to determine if AMARC is a source for MICAP and other requirements.

RECOMMENDATIONS:

Problem One:

1. Retain AMARC's SBSS supply account as a host account. (OPR: AFMC/LGS)
2. Program ILS-S to allow different versions of mainframe software (program banks) between satellite and host accounts. (OPR: SSG/LGS)

Problem Two:

3. Short term:
 - As an interim, enhance the AMARC web site by developing the tables of potential and actual inventory and link them to the AMARC site. (OPR: AFMC/LGS, AMARC/LGS)
 - Automate the save-list generation process. The systems should generate files to FTP to each other using faster, more accurate save-list generation technologies (get away from magnetic tapes). The review process could be accomplished electronically and transmitted via email. (OPR: AFMC/LGS)
4. Long term:
 - Program SBSS/ILS-S to store balances (as well as tail number, location, and MDS) for AMARC assets and differentiate between actual and potential quantities. Also program MASS to query the new AMARC details and display the actual and potential balances from the new details, similar to the way the balances are displayed for other SBSS details (IRSP, MRSP, supply point, etc.). (OPR: SSG/LGS)
 - Modify both sides of RAMPS reporting (SBSS and AFMC Stock Control System) to differentiate between AMARC potential and actual balances, as well as AMARC actual and other SBSS actual balances. (OPR: SSG/LGS, AFMC/LGI)

DISTRIBUTION: Refer to attached Standard Form 298.

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APPENDIX A

AMARC SBSS Input Edits

INPUT	TITLE	EDITS
DIT	Due-In/Due-Out Update	Activity code, mark-for
FCI	Equipment/In-Use Detail Load/Change/Delete	Action code, issue indicator
FIL	New Item Record Load	System designator (SD), force activity designator (FAD), excess exception code (EEX), stock number, ERRCD, nomenclature
ISU	Issue Request	SD, activity code, mark-for, FAD, organization code, shop code, stock number, ERRCD
MSI	Issue Request (from a spares kit)	SD, activity code, mark-for, demand code
REC	Receipt	SD, supplemental address, material condition code, routing identifier
SPR	Special Requisition/Due-In Detail Update	SD, EEX, supplemental address, material condition code
TIN	Turn-In	SD, activity code, mark-for, organization code
WPR	Wash Post Request	Activity code, mark-for

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APPENDIX B

AMARC Edit Logic

for
blank
DIT – activity code not equal to B, E, R, S, or X will **reject**, first five positions of mark-
equal blank will **reject**; first two positions of the supplemental address equal
will **reject**

FIL – FAD equal to space will **reject**, EEX not equal to 'S' will **reject**, ERRCD not
coded as XD_ will **reject**, position 15-16 of nomenclature not equal to 'ZZ' will
reject, position 17-19 of nomenclature not equal to blank will **reject**

ISU – SD equal to A4 will **reject**, many organization/shop code and mark-for edit
combinations will **reject**; first seven spaces of the mark-for equal spaces will
reject

MSI – activity code not equal to 'S' will **reject**, input demand code equal 'R' will **reject**

REC – first position of the supplemental address not equal 'Y' will **reject**

SPR – SD equal to A4 will **reject**

TIN – SD equal A4 and activity/organization code equal C924 will **reject**, many specific
edits on the mark-for will **reject**

WPR – activity code not equal to 'R' will **reject**, many edits on the mark-for will **reject**

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BIBLIOGRAPHY

1. Department of the Air Force. USAF Supply Manual. Air Force Manual 23-110, Volume II, Part Two, Chapter 2, Chief of Supply (COS) Organization. Washington HQ USAF, 1 Jan 1999.
2. Department of the Air Force. USAF Supply Manual. Air Force Manual 23-110, Volume II, Part Two, Chapter 13, Turn-in Procedures. Washington HQ USAF, 1 Jan 1999.
3. Department of the Air Force. USAF Supply Manual. Air Force Manual 23-110, Volume II, Part Two, Chapter 19, Stock Control. Washington HQ USAF, 1 Jan 1999.
4. Department of the Air Force. USAF Supply Manual. Air Force Manual 23-110, Volume VI, Chapter 6, Reclamation. Washington HQ USAF, 1 Jan 1999.
5. United States General Accounting Office / National Security and International Affairs Division GAO/NSIAD-98-7 Audit B-276828, DEFENSE INVENTORY – Management of Surplus Usable Aircraft Parts Can Be Improved, Washington GAO, 2 October 1997.
6. AFLCR 65-31, Reclamation of USAF Property, Chapter 2, Programmed Reclamation of Aircraft, 11 Dec 1989.
7. AFLCR 65-9, Removal of Parts from Aircraft Arriving or in Storage at the Aerospace Maintenance and Regeneration Center Property, paragraph 5, Priority Removals from Aircraft in Storage, 17 Sep 1986.