



APPAREL RESEARCH NETWORK (ARN) PROGRAM

Ft. Bliss Central Issue Facility (CIF) Local Tariff

Final Technical Report

Contract Number SP0103-02-D-0018 / Delivery Order 0014

ARN Integrated Retail Module (IRM) System at Ft. Bliss

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Preface

This Final Technical Report (FTR) covers project work accomplished for the Apparel Research Network (ARN)/Customer Driven Uniform Manufacture (CDUM) of the Defense Logistics Agency (DLA), in conformance with the AdvanTech, Inc. Delivery Order 0014 during the period May 4, 2005 – February 28, 2007.

The overall project activities for this STP are as follows:

- Implement all network infrastructure components of the ARN Virtual Item Manager-Integrated Retail Module (VIM-IRM) at Fort Bliss including the ARN Local Area Network (LAN) and Radio Frequency (RF) wireless communication, ARN Server and associated workstations, High Speed Internet communications, Issue Scan Forms, electronic document storage, and hand held wireless (RF) terminals.
- Implement the Issue Scan Forms and electronic document storage as Phase 1 of ARN VIM-IRM at the Central Issue Facility (CIF).

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1.0 EXECUTIVE SUMMARY

1.1 Overview

This project report covers the implementation of the ARN Fully Automated Supply Chain Management solution at the U. S. Army Central Issue Facility (CIF), Ft. Bliss, Texas for automation of the issue of Organizational Clothing & Equipment (OCIE) and source data capture of issue and other operational data that is manually entered by the CIF staff into the U. S. Army Installation Support Module (ISM). The ARN Virtual Item Manager-Integrated Retail Module (ARN VIM-IRM implementation and ongoing support included: (1) the ARN VIM-IRM web based inventory management application; (2) both a wired and wireless ARN Local Area Network outside the Ft. Bliss firewall; (3) scan form processing, and electronic forms filing and management; and (5); legacy system interface development.

The implementation of VIM-IRM was initially a research effort to demonstrate the capability to establish an environment where VIM-IRM was integrated through the ARN-LAN to provide simultaneous automated support to a Central Issue Facility for issue to deploying soldiers, a Central Initial Issue Point (CIIP) for issue to recruits, and a 3D Whole Body Scanner for obtaining body measurements of soldiers and translation of the same into sizing information for issue of clothing items and for building a local tariff. Implement all components of the ARN VIM-IRM at Fort Bliss to provide the CIIP with all VIM-IRM functionality

- The U.S. Army Training and Doctrine Command (TRADOC) planned to create another Central Initial Issue Point (CIIP) at Fort Bliss. The projections were that approximately 3,000 recruits, both male and female, would be trained per year. Since the Apparel Research Network's VIM-IRM was the system used for supply chain management (SCM) at eight recruit training centers (RTCs), five Army, two Marine, and one Air Force RTC, it was therefore compatible with the SCM requirements of the new CIIP planned for Fort Bliss. As with the other training centers, DSCP would forward position inventory at Fort Bliss with the sale occurring when the uniform items were issued to the recruits. TRADOC cancelled plans to stand up the new CIIP at Fort Bliss, thereby cancelling the need for VIM-IRM functionality typically used to support a CIIP.
- The USFIT Program, U.S. Army Natick, a separate ARMY initiative outside of ARN, installed and implemented a 3D Whole Body Scanner, initially to obtain the physical body measurements from a sample number of soldiers (initially male only). These body measurements and manual body measurements were used by USFIT to validate the scan process. Following this initial validation process VIM-IRM was to be integrated with the USFIT 3D Whole Body Scanner, for production of Scan Forms and initiation of the issue process. USFIT decision was to move the body

scanner to another location for scanning of another Army population, thus cancelling the integration with ARN-IRM.

ARN and AdvanTech, Inc. conducted a phased approach in implementing the VIM-IRM at the Fort Bliss CIF. The first phase was the creation of the Issue Scan Forms, scanning/recording of the data into IRM, and electronic storage of the scan documents as an issue record for each soldier.

Following successful application of the ARN-IRM at the Recruit Training Centers (RTCs), it was recognized that similar research at a CIF could improve source data automation, asset management, and the issuing process associated with Organizational Clothing and Individual Equipment (OCIE).

During site visits made to a number of CIF's and Fort Bliss, it was apparent through discussions that the U.S. Army tariff was inadequate for future requirements planning, new product implementation and inventory management.

The main goals of the ARN research initiative at the CIF, Ft. Bliss was: 1) establish base-line information for future contracting and manufacture of uniforms; 2) identify the correct uniform sizes required to reduce stock levels and increase efficiency; and, 3) enhance operations and the effectiveness for the OCIE supply chain, and reduce costs in the overall process.

ARN's emphasis at the CIF was to research and optimize the OCIE supply chain. A concurrent research effort was to implement the base foundation capabilities for the ARN systems for integration of this project into the Apparel Research Network (ARN) Supply Chain Management (SCM) initiatives.

The major focus of the project was to initiate and complete the pilot installation of ARN-IRM. The principal tasks of the project were:

- Requirements Analysis, Site Assessment/Report, Install ARN LAN.
- ARN VIM-IRM Issue Processing Implementation – CIF.
- Post GO-Live Support.
- Project Management,
- Monthly Reports and Meetings.

1.2 Technical Approach

Using data from the Soldier Check-in process, and final issue data from the issue scan forms, a fully integrated application was implemented to gather, organize, validate and automate the OCIE issue process.

At the CIF, Ft. Bliss, AdvanTech expanded the automated data collection and entry technologies that had been successfully implemented at the CIF, Ft. Carson, CO, five (5) U.S. Army Initial Issue Facilities, 2 United States Marine Corps Recruit Depots and the Air Force Clothing Initial Issue Flight.

The ARN-developed Integrated Retail Module (IRM) includes the automated data entry functions: issues, returns, exchanges, receipts, stock movements, physical inventory, requirements planning, and electronic document storage. The figure below shows the interaction of these functions:

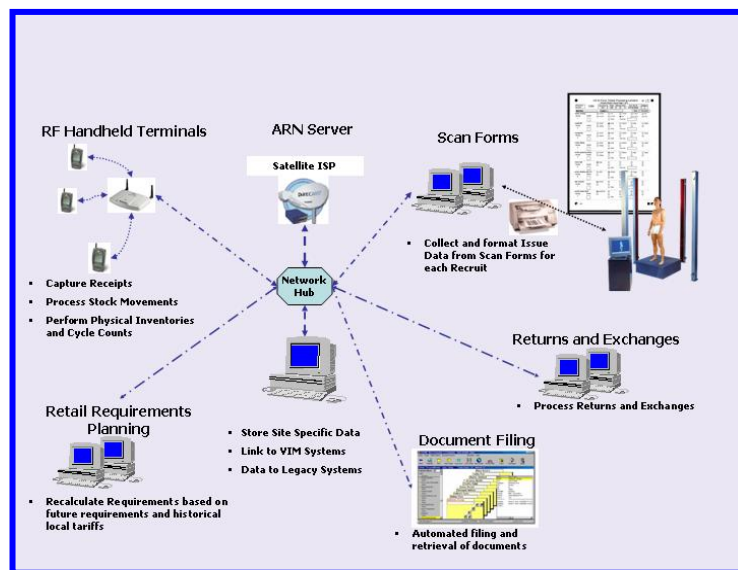


Figure 1 - ARN-IRM Integrated Components

The primary focus and Phase 1 of the ARN-IRM implementation at the CIF, Ft. Bliss, as shown in Figure 2, was the issue function. The issue scan form was set up in the IRM Control Panel to represent the OCIE items issued to Soldiers at the CIF, and to conform to the sequence of issues on the issue line.

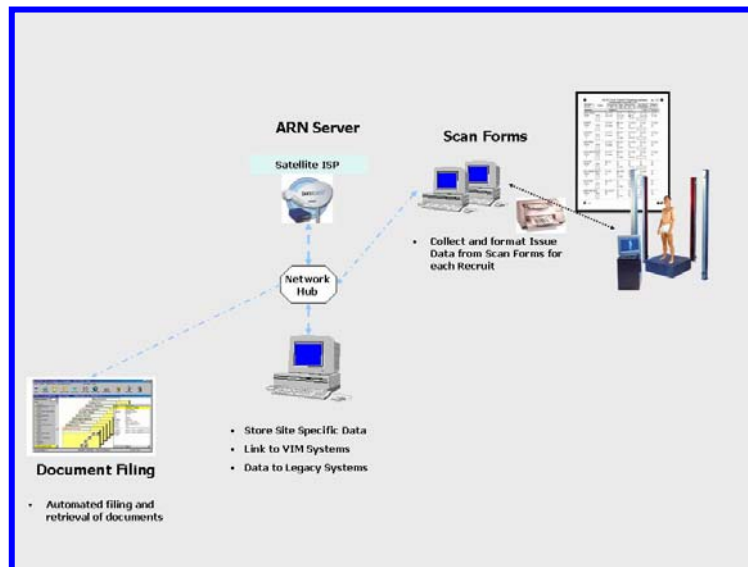


Figure 2 - Initial Fort Bliss CIF ARN Components

Scan forms detail the items each soldier received based on their “Menu of items.” These Menus are normally specific to the type of assignment for each soldier. Scan forms were tailored to permit classifying of OCIE items as “new” versus “used.”

The anticipated benefits center on improving inventory accuracy, ease of use and faster processing of soldiers through the issue stations, faster and more efficient forms scanning.. These enhancements and technology integration have ensured that Soldier issues are accurately and quickly recorded, and combined with transfer of Property Book updates from ISM to ARN-IRM gives DSCP Item Managers better asset visibility and production requirements data.

ARN VIM-IRM functions as a front-end data capture vehicle. There was no automated interface between ARN-IRM and the U.S. Army legacy system, the Installation Support Module (ISM) during the implementation and initial operation of ARN-IRM at the CIF, Ft. Bliss. Modernized ISM was developed during 2003 - 2005. It was implemented at Ft. Bliss in 2006.

A joint effort between ARN and U.S. Army ISM project to create a database to database exchange of essential data between the two systems was initiated in March 2006, and a test of the interface was successfully conducted on 21 July 2006 at the CIF, Ft. Carson. When development and implementation of the interface is completed at the CIF, Ft. Carson, it will be exported to the CIF, Ft. Bliss. The CIF staff will then be able to scan issue data from the issue scan forms into ARN-IRM. The issue data will automatically transfer directly to ISM to update the soldiers’ Clothing Record.

1.3 Summary of Highlights/Results

ARN VIM-IRM was successfully implemented, fulfilling the deliverables and attaining valuable results. Implementation of ARN VIM-IRM Phase 1 at the CIF, Fort Bliss provided source data automation for all issue data. This data was made immediately available to the ARMY legacy system, ISM. With this implementation a complete set of issue data is automatically created and retained.

This short term project was completed in February 2007 after the capabilities of the ARN systems were successfully demonstrated following the implementation of the ARN VIM-IRM systems. Subsequently, decisions were made to move both the body scanner and IRM equipment to different locations. As a result, the interface to the Army legacy ISM system was not completed.

The results of this successful short term project for implementation and investigation of ARN VIM-IRM capabilities are detailed in section 9 of this report. Summary highlights of the successful implementation of the ARN VIM-IRM capabilities at the CIF, Fort Bliss included the following:

- A fully operational ARN VIM-IRM Issue Processing System with a supporting local area network using wireless RF technology was implemented;
- Automated capture of source data was achieved for all issue data with issue information immediately available to the ARMY ISM system;
- Faster, more efficient processes for accurately capturing and recording of garment and footwear issues and soldier transactions were implemented; and,
- Scan Form database results were archived to the AAVS DataMart for future evaluation of demographics (e.g., age, gender, ethnic and geographic factors) impacts on contracting requirements;

2.0 Introduction

Fort Bliss is located outside of El Paso, Texas. The Central Issue Facility (CIF) at Fort Bliss maintains approximately \$21 million of organizational clothing items in their two bulk warehouses and on the issue line. Approximately \$39.5 million of inventory is in possession of soldiers in the field. The current legacy system, Installation Support Module (ISM), serves as the data entry point for all issues, exchanges, returns, receipts and disposal transactions. ISM also stores all official clothing records. Currently, CIF personnel enter the data manually. The Army's Improved ISM was implemented and activated during 2006.

Current records indicate that Fort Bliss issues approximately \$4 million in organizational clothing items per month, and since most of the troops from Fort Bliss are being deployed to Iraq, most of the inventory in possession of the soldiers is likely to remain in Iraq when the soldiers return home.

The CIF at Fort Bliss stocks approximately 163 different types of items. Sixty-seven of these items are not sized. Of the remaining 96 multi-sized items, 8 are footwear. The remaining items include coats, trousers, headwear, gloves/mittens, body armor and other personal clothing items.

The Apparel Research Network (ARN)-developed Virtual Item Manager (VIM) - Integrated Retail Module (IRM) was implemented at the CIF, Ft. Bliss. The IRM functionality currently includes the following data entry functions: issues, returns, exchanges, receipts, stock movements, physical inventory, requirements planning, and electronic document storage.

ARN has implemented the issue processing, receipt processing, and physical inventory portions of VIM-IRM system at Fort Carson, CO for the primary purpose of recording issues on Scan Forms, and replacing manual data entry with automated data collection.

The Phase 1 issue functions of ARN-IRM were implemented at the CIF, Ft. Bliss. Similar to the process at Fort Carson, soldiers are processed at a Check-in area, and then the sizes of OCIE issued at sequential issue stations at Ft. Bliss are entered on the Scan Forms as they are received. The soldiers are routed to the Checkout counter and their issue reconciled with the issue form. The form is then scanned into VIM-IRM, and the form is then used for entry of issues into ISM until the IRM – ISM interface is completed.

The implementation also included the hiring and training of a Customer Services Engineer (CSE) to support the CIF in operation of the ARN-IRM system. Also included in the plan is the installation and testing of network access points (NAPs) for test transmission of asset data from locations within the CIF.

A wireless network was installed between Building 1113, Bulk Warehouse, and Building 1107, and within the CIF Buildings 1107 and 1108 to support data transfer testing and data transfer from remote parts of the building to the ARN Server

This Final Technical Report is being submitted to relate the development and implementation of the VIM-IRM functions and improvements in issue function.

2.1 Operations & Processing Before ARN Implementation.

The major functional elements at the Ft. Bliss CIF in Building 1107/1108 include Reception, Turn-in and Classification (including exchanges and changes in stock category), Issue, Warehousing, Receiving, and Property Book/Functional Administrator.

2.1.1. OCIE Returns/Exchanges, Issues, Receipts, Inventory Count, Category Changes.

The Reception area is the first stop for individuals coming to the CIF. There they obtain paperwork that is used to satisfy the purpose of their visit to the CIF, be that issue, turn-in or exchange. Prior to implementation of VIM-IRM, "Menus" were accessed in ISM for those individuals going to the Issue area. The Menus identify the items that conform to a soldier's MOS or unit requirement. The soldiers then went to the Issue stations to obtain their OCIE issue. Following the OCIE issue, individuals went to the Checkout counters where clerks checked the completeness of the issue, and manually entered data into ISM to create or update the official Clothing Record.

2.2 Information Systems

2.2.1 Installation Support Module (ISM).

ISM is the U. S. Army legacy system currently supporting all CIFs. Issues, Returns & Exchanges, Receipts, Menu Adjustments, Category Changes, and Inventory Counts are all entered manually, and determination of order quantities and order processing is completed manually. The data is transmitted immediately to the ISM Server at the local DOIM, and further transmitted to the ISM System at Ft. Huachuca on a near real time basis.

2.2.2 ARN-IRM & ISM Interface Requirements.

A prototype interface between ARN VIM-IRM and ISM has been developed and tested at the CIF, Ft. Carson so that source data from ARN VIM-IRM can be automatically provided to ISM. The development effort created a database to database exchange of data between the two systems, and which can be implemented at the CIF, Ft. Bliss at the appropriate time to replace the manual data entry process.

2.3 Project Approach

AdvanTech, Inc. implemented ARN VIM-IRM, concentrating on the issue functions and automating the data entry process for issue data, implementing the scan forms for various menus and modifying those scan forms to capture “new” versus “used” items issued to the soldiers. It integrated the data from the Soldier Check-in process into VIM-IRM to create the desired demographic data

2.4 Short Term Project (STP) Objectives

The purpose of this Short Term Project (STP) was to research the application of source data automation, in the form of VIM-IRM. The main objectives of this ARN research initiative at the CIF, Ft. Bliss were to:

- Implement essential components of the ARN VIM-IRM at the Fort Bliss CIF to provide issue processing functionality;
- Implement VIM-Wholesale-Local to support the issue process for U.S. Army-owned inventory at the CIF;
- Implement bi-directional linkage to ARMY legacy systems;
- Gain visibility of all ARMY-owned assets for both new and used organizational items managed at the Fort Bliss CIF;
- Implement the Scan Forms for the CIF’s various menus and modify those Scan Forms to capture “new” versus “used” items issued to the soldiers; and,
- At the end of this project, Fort Bliss will have the necessary integrated tools to better manage their organizational clothing and recruit clothing assets.

2.5 Scope of the Project

The following activities comprised the scope of this project:

- Initial Data Gathering and Assessment Report Generation. The initial stage of the project was thorough data gathering and assessment followed by documentation of current functions as well as proposed or desired operational changes. An assessment of the information system linkages to the ARMY legacy systems was made to determine the exact information these systems need. An Assessment Report and Implementation Plan was prepared.
- Site Surveys to Determine the Network Architecture and Configuration. A detailed site survey was performed to determine the size of the local network, configuration of wireless access points, and available high speed internet connection options. The results of this survey were included in the Assessment Report.
- Installation of the Networking Hardware. The computers, software, and wireless network components were ordered and hot-staged at AdvanTech, Inc., and shipped to the CIF for installation after the initial test. The Network Access Points (NAPs) and network switches were installed in the CIF. A wire contractor ran cable from the NAPs/switches to the ARN-IRM Server.
- Implementation of an automated solution for capturing all the relevant data. AdvanTech Inc. implemented and integrated all the data capturing technologies as part of the VIM-IRM. This included the ability to classify all issues as either “new” or “used.”
- User training. User training and documentation (on-line and hard copy) was provided as part of the implementation and operation.
- Post Go-Live Support. AdvanTech, Inc. personnel provided on-going support and monitoring to ensure all data was being accurately processed in a timely manner, and that system operation is consistent. This also included network administration and remote off-site backup during the term on the project.

3.0 Implementation Schedule & Project Activities

The following Gantt chart provides an overview of the time-line for all implementation activities to be accomplished.

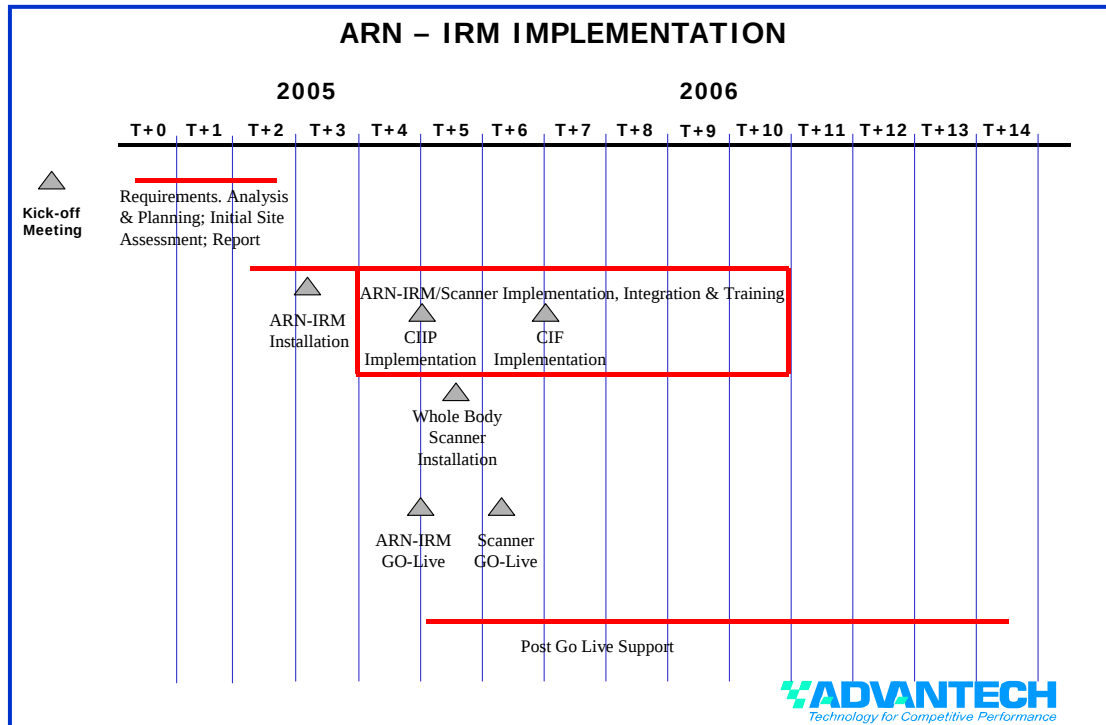


Figure 3 - Timeline

The kickoff meeting was held 23 May 2005, followed by ongoing requirements analysis, acquisition of system components, installation and preparation of the network, hardware, and software. All components were shipped in July 2005 and the system was operational the latter part of July and the early part of August 2005.

The new CSE was hired and on board during July 2005 and was a vital part of system Go-live in August 2005.

3.1 Implementation Steps, Responsibilities & Schedule

The chart below summarizes the key steps of this project and relative timeline for completion with each column indicating an additional month.

TASK	DESCRIPTION	T + 0	T + 1	T + 2	T + 3	T + 4	T + 5	T + 6	T + 7	T + 8	T + 9	T + 10	T + 11
5.1	Requirements Analysis, Site Assessment/ Report, Install ARN LAN												
5.2	ARN VIM-IRM Issue Processing Implementation – CIF												
5.3	ARN VIM-IRM Systems Implementation – CIIP*												
5.4	Post Go-Live Support												
5.5	Project Management												
5.6	Management Reporting												

* Note - Task 5.3 shown in the above table was cancelled per program management direction.

3.2 The Initial Data Gathering and Assessment Report Generation

The initial stage was data gathering and assessment. This documented the current functions as well as proposed or desired operational changes. There was also an assessment of the information system linkages to the ARMY legacy systems to determine the exact information these systems will need to obtain. The assessment detailed the final results and was recorded in the Implementation Plan.

3.3 Site Surveys to Determine the Network Architecture and Configuration

A detailed site survey was performed to determine the size of the local network, configuration of the wireless access points and available high speed internet connection options. The site survey also included a review and evaluation of local operations and recommended changes to those operations.

3.4 Installation of the Networking Hardware

AdvanTech was responsible for and completed the ordering, hot-staging, network wiring, access point installation, operating system, and software installation of the ARN-LAN network.

3.5 Implement Automated Solution for Capturing All the Relevant Data

AdvanTech implemented and integrated all the data capturing technologies as part of VIM-IRM. This included the ability to classify all issues as either “new” or “used.” Also all necessary manual data linkages to and from the ARMY legacy system was provided.

3.6 User Training

All user training and documentation (on-line and hard copy) was provided.

3.7 Post Go-Live support

AdvanTech personnel provided on-going support and monitoring to ensure that data was being accurately processed in a timely manner. This also included network administration and remote off-site backup during the term of this STP.

4.0 Implementation Infrastructure

This section contains the essential elements for establishing the ARN – IRM at the Ft. Bliss CIF and the relative order for the sequence of implementation activities. The elements are necessary to provide the capability for the CIF to capture the aforementioned data by automated processes and to build the local tariff database and share that data with ARMY.

The Ft Bliss CIF is a high-volume, high-traffic OCIE operation which supports Ft Bliss operations plus troop deployments to Afghanistan and Iraq. The ISMs system requires manual entry of all issues made to soldiers and other customers. The ARN VIM-IRM provided automated data entry, facilitating the soldier flow through the issue line and check out processes, increased the inventory accuracy of items issued, and captured sizing data to develop a an accurate local Ft Bliss tariff to help tailor the CIF inventory, providing the vehicle to maximize the size mix of the inventory.

4.1 Establish ARN Local Area Network

A Local Area Network (LAN) was established to control and connect all functionality of ARN VIM-IRM at CIF, Ft. Bliss. The ARN Local Area Network was connected to the ARN Single Server via the Virtual Private Network (VPN) protocols, that are now available as part of the Windows 2003 operating system, permitting AdvanTech, Inc. to communicate remotely to load software and to load files and databases needed when the system goes live. FTP protocols and PCAnywhere were used as back-ups for the VPN for remote connectivity for any troubleshooting, help and administrative support requirements.

4.1.1 Network Requirements

The ARN Integrated Retail Module (ARN IRM) software package was installed on systems outside of the primary Ft. Bliss secure network. This necessitated the setup of a small local area network dedicated to support of the ARN initiative at Ft. Bliss. This network connected the various workstations and other hardware associated with the accounting for OCIE issues.

AdvanTech, Inc. installed and maintained this network. This local area network used industry-standard 100-Base-T Ethernet interfaces and connects to the Internet via an Integrated Services Digital Network (ISDN) line to a commercial Internet Service Provider (ISP). A firewall system is employed to protect the local area network from unauthorized intrusion or disruption. The data flows out to the ARN Asset Visibility System (AAVS) and other databases over the Internet, and AdvanTech established

remote VPN access to the local area network for administration and troubleshooting purposes.

4.1.2 Overarching Architecture

The detailed diagram below shows the proposed architecture of the data flows within the ARN Network.

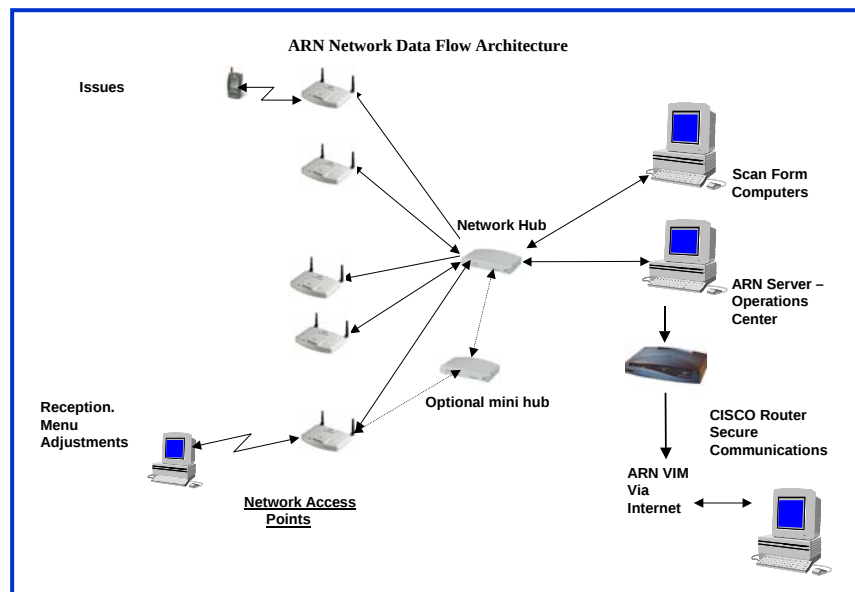


Figure 4 - ARN Network Data Flow Architecture

4.1.3 Communications and Internet Service Provider

Communications with the ARN LAN is required to establish the VPN link and to perform system administrator functions. From lessons learned at other ARN sites, standard telephone dial-up service linkage has proven unreliable and too slow to support large data transfers and to perform system administration functions. ISDN service was obtained from Time-Warner "Roadrunner" Communications Services, El Paso, TX to establish reliable communications and connectivity.

4.1.4 Network Configuration

Network components and linkages were established in the CIF, Buildings 1107 & 1108 as shown in the following table. Cable was run between the network switches and from the network switches to the various workstations, to the network bridge links the buildings into the wireless network, and to the hub that is linked to the network access

points for use in wireless communications with various mobile devices as the ARN system functions were fully implemented.

Fort Bliss, TX Central Issue Facility Network Configuration- Bldg 1107 & 1108		
Description	Ethernet Cable	Electric Outlets
Server to 24 Port Network Switch	1	1
24 Port Network Switch to Router (2 Cables)	1	
24 Port Network Switch to 24 Port Network Switch	1	
Network Switch to Network Bridge	1	
24 Port Network Switch to Hub	1	
Hub (w/power over Ethernet) to four Wireless Network Access Points (NAPs)	4	1
Network Switch to 2 Work Stations Check In Area (1 Cable for Each Work Station)	2	2
Network Switch to 3 Work Stations with Form Scanner Check Out Area (1 Cable for Each Work Station)	3	3
Network Switch to 2 Workstations at 3D Body Scanner (1 Cable for Each Work Station)	2	2
TOTAL	16	

4.1.5 ARN-IRM System at the Check-in Area

ARN-IRM was set up to receive soldier flow from the Check-in Area of the CIF. Scan Forms are now produced by ARN-IRM from soldier rosters provided by the Reception Station. The Scan Form is used to initiate the issue process.

4.1.6 ARN VIM-IRM Wireless Network, & Cable Runs in CIF Buildings

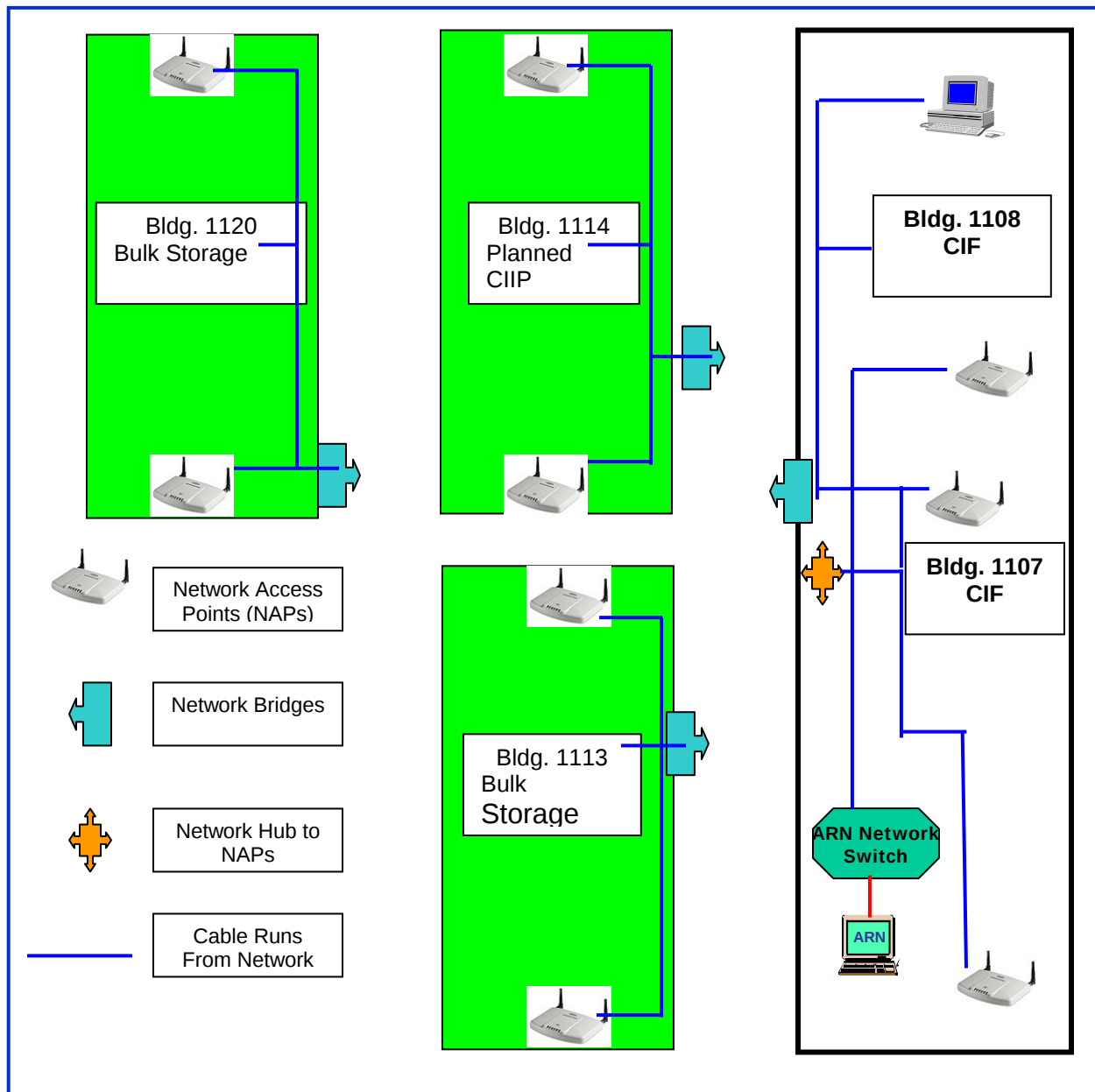


Figure 5 – ARN VIM-IRM Systems Architecture / Component Location

AdvanTech acquired necessary network components described above and a local networking contractor installed the cabling. AdvanTech network specialists worked with the contractor to install system components to create the ARN LAN within the Ft. Bliss CIF to support communications requirements for the ARN software and hardware components.

4.2 Implement ARN - IRM Functionality

4.2.1 Overview

The Internet Based system provides the CIF users with an on-line, real-time integrated application that will provide current stock positions almost immediately (near real-time) after the transactions (Receipts, Issues and Adjustments) are transmitted.

4.2.2 Implementation

Access to ARN-IRM was made available through three workstations attached to the ARN LAN server with appropriate log-ins and passwords. The workstation located nearest the ISM Check-in workstation at the Ft. Bliss CIF Reception Area is the primary access to the ARN-IRM. A second workstation was available to be installed in the Reception Area when traffic loads could not be handled with one workstation.

AdvanTech instituted a phased approach in implementing the VIM-IRM at the Fort Bliss CIF. The first phase was the creation of the Issue Scan Forms, scanning/recording of the data into IRM, and electronic storage of the scan documents as an issue record for each soldier. The figure below shows the interaction of these functions:

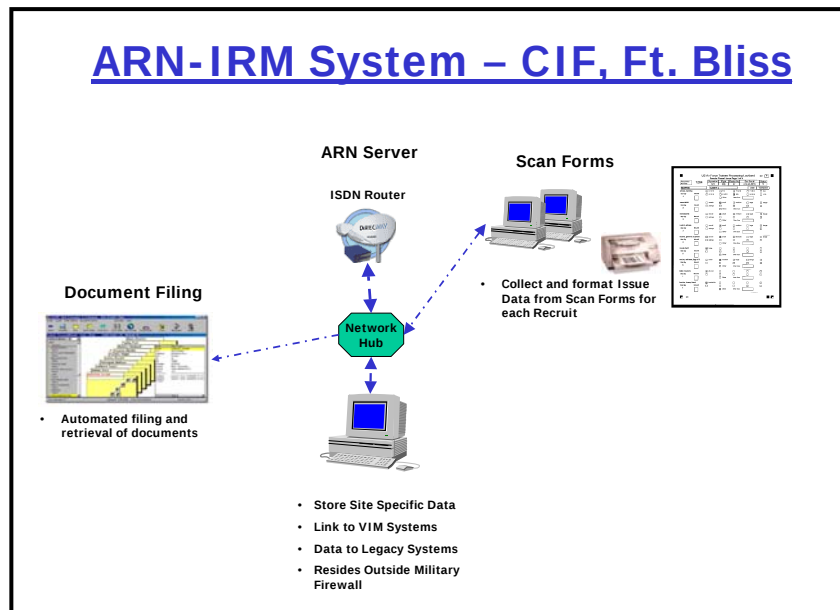


Figure 6 – ARN VIM-IRM Functional Activities Interaction

Scan forms were implemented to detail the items Soldiers were supposed to receive based on the "menu of items." These menus are normally specific to the type of assignment for each soldier. All Scan Forms developed for use were capable of classifying "new" versus "used" items.

5.2 Workflow Management – Customer Service Engineer

AdvanTech, Inc. hired a Customer Service Engineer (CSE) to operate the VIM-IRM. This individual was trained in the operation of the systems and provided on-site support to all customer needs to ensure effective operation and performance of the systems.

5.2.1 Normal Workday for the CSE.

The Table below shows the basic workflow of a normal workday for the CSE and is a high level overview of the issue process which is described in this section of the report:

Time	Function
0730	Ensure scan forms for Units on daily schedule are ready for use.
0800	Begin to process ARN-IRM scan forms at Check-out station, enter Next Day's soldiers, make changes to menus when CIF reports changes to ISMs.
1600	Scan forms and check-in process of next day's soldiers should be completed.

The doors of the CIF open at 0700. The USFIT program selected a targeted population of available soldiers to process through the 3D Whole Body Scanner based on the needs of the data collection required by the USFIT project. At 0730, the remaining soldiers proceed directly to the ISM Check-in station and begin the issue process.

Pre-printed Scan Forms were made available to pass out to each soldier immediately after the soldier passed the IRM Check-in station. The CSE ensured that these forms were pre-printed the day prior.

Between 0800 and 0900 on a typical workday, the CSE processed Scan Forms at the Check-out Station, in conjunction with entering the Next Day's soldiers from the roster provided by the Ft. Bliss Reception Center. Although initial conversations and agreements were to receive the rosters two days in advance in electronic spreadsheet format, in practice, the rosters normally arrived in hard copy the day prior.

Depending on the day of the week, by approximately 1300, the processing load has slowed to where the CSE would concentrate on entering the Next Day's soldiers, and preparing the Scan Forms for the next day's work load. On Tuesdays, the processing load was steady and continuous the entire workday.

5.2.2 Other CSE Responsibilities.

the Customer Service Engineer has made sure that the IRM scan-forms were printed and ready for use. In the event the Customer Service Engineer was working, AdvanTech personnel are able to remotely generate the blank forms or make arrangements to have a back up on-site. Other CSE functions:

- Menu Revisions
- Catalog Revisions
- Monthly Reports
- Hardware And Network maintenance
- User training on how to properly fill out a scan form
- Assist in the check out process including data entry into ISM

5.2.3 CSE Performance

CSE performance was monitored by AdvanTech, Inc. on a daily and monthly basis using various reports and audit trails. Listed below are some of the tools that were implemented in order to ensure the CSE operated the system and processed the data in a timely fashion. The tools used to measure performance were:

- Use of the daily Transaction Logs including data generated from the 3D Body scanner;
- A Sign-in and Sign-out function as part of the AdvanTech Timesheet System; and,
- Use of statistics comparing number of issues in ISM vs. number of issues in ARN-IRM.

5.3 OCIE Issues Dataflow

The issue dataflow for OCIE is essentially the same as the issue dataflow for recruits and is detailed here, as it would be implemented at the Ft. Bliss CIF.

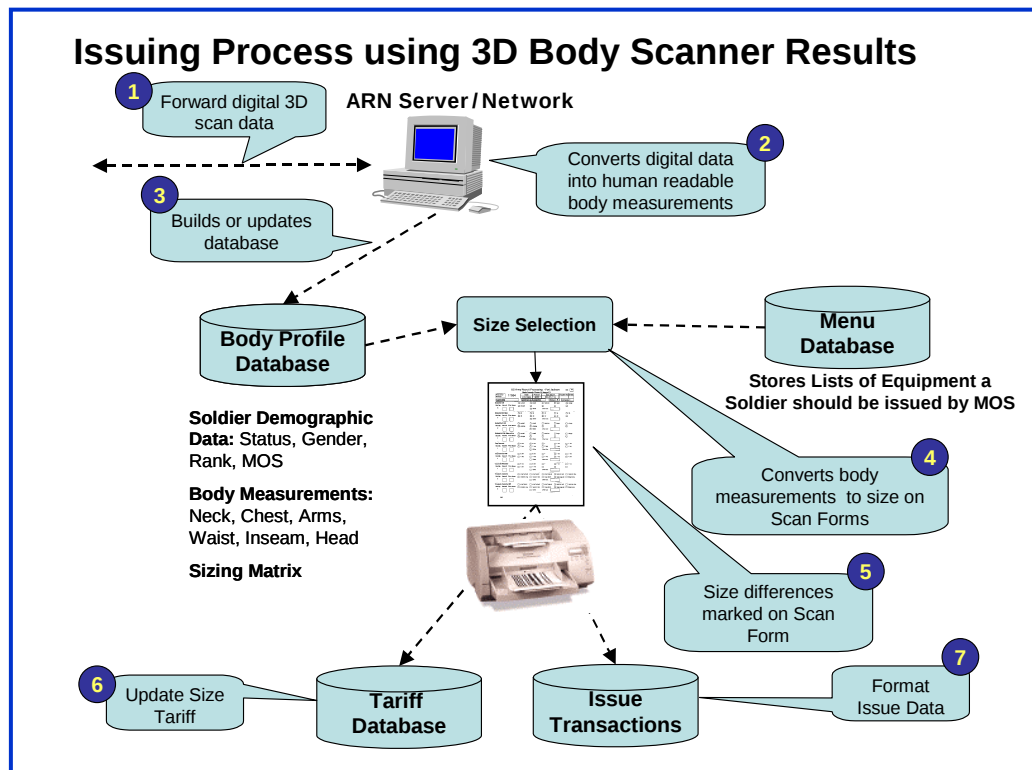


Figure 8 – Issuing Process Using 3-D Body Scanner Results

The Improved ISMs will be activated during the same period as the ARN-IRM system is producing Scan Forms. The CIF plans to revalidate the menus and items contained in the menus. The CSE revalidated and changed the ARN-IRM menus as the CIF makes and reports changes.

Comparison between the ISMs and ARN-IRM menus reflects 222 menus at Ft Bliss. This number, and in some cases the items on the menus, changed as the CIF revalidated the menus in the Improved ISMs.

5.3.1 Scan Form Development

Forms development was facilitated by the new ARN SQL software configuration and focused on configuring individual Scan Forms for each type of menu. The forms were also capable of quickly documenting whether the items being issued are new or used.

AdvanTech, Inc. began the implementation of the VIM-IRM scan forms to replace the CIF legacy system forms and printouts, which expedited the issue process and the capture of issue data. Changes in the Modernized ISM required a revalidation of various data, such as LINs and menus which was completed in early August.

Normally, a “new” item is still in its original protective wrapping while a “used” item is not. This additional piece of data was incorporated into the transaction tables that store the historical issue data.

Once the Scan Forms were configured, they were incorporated into VIM-IRM. They were installed and tested on the workstations designed to print the actual Scan Form as well as those workstations designated to perform the physical optical scanning process.

The ARN-IRM system has the flexibility to order the items on the Scan Forms, by Issue Station, a feature not provided by the ISMs or the Improved ISMs. When a soldier processes through the issue line, CIF personnel mark the ISM menu form with the size and quantity issued. This data is hand-entered into the ISMs, in a batch process, after the soldiers have completed the check out process.

CIF personnel indicated a strong desire to quickly replace the ISMs menu issue list with the ARN-IRM Scan Forms to reduce the time a soldier spends in the issue line. After soldiers complete the issue process, they turn in the marked Scan Forms to the CSE at the ARN-IRM Check out station. The Scan Forms are scanned and produce two copies of an Interim Receipt. The soldier signs one copy of the Interim Receipt and returns it to the CSE and maintains the second copy for a personal record. The CSE provides the Scan Forms and Interim Receipt to the ISMs check out personnel, who use the Scan Forms to enter size and quantity data into ISMs.

Scan Form Statistics: The following table is an example of the statistics that can be interpreted from the data that is gathered into VIM-IRM database as result of using the Scan Form for issues at the CIF, Ft. Bliss. The first time fill rate and other statistics were made available to the CIF Supervisor to use to gauge operating efficiency.

Date Processed	Scan Forms Processed	Total Lines Process	Units to be Issued	Units Actually Issued	First Time Fill Rate %	Dollar Issued
1/3/2006	45	1,418	1,671	1,564	93.60%	\$73,612.04
1/4/2006	163	7,432	11,010	6,111	55.50%	\$408,437.55
1/5/2006	111	3,156	3,854	3,643	94.53%	\$163,114.18
1/6/2006	96	2,833	3,459	3,279	94.80%	\$143,662.75
1/9/2006	104	3,260	4,089	3,735	91.34%	\$174,511.52
1/10/2006	244	11,264	16,687	9,355	56.06%	\$597,591.58
1/11/2006	80	1,665	2,211	2,113	95.57%	\$88,276.83
1/12/2006	97	1,819	2,414	2,297	95.15%	\$88,785.91
1/13/2006	39	846	1,147	1,043	90.93%	\$32,492.61

Date Processed	Scan Forms Processed	Total Lines Process	Units to be Issued	Units Actually Issued	First Time Fill Rate %	Dollar Issued
1/14/2006	170	3,442	4,122	4,116	99.85%	\$126,368.81
1/17/2006	235	8,035	10,738	9,731	90.62%	\$452,890.04
1/18/2006	275	12,147	18,289	10,656	58.26%	\$652,074.17
1/19/2006	102	3,141	3,676	3,412	92.82%	\$159,857.53
1/20/2006	32	514	612	598	97.71%	\$22,333.27
1/23/2006	87	2,752	3,663	3,347	91.37%	\$155,793.16
1/24/2006	202	9,587	14,312	7,314	51.10%	\$556,060.19
1/25/2006	54	1,810	2,207	1,962	88.90%	\$98,752.10
1/26/2006	19	519	599	569	94.99%	\$23,571.34
1/27/2006	112	1,262	2,091	1,955	93.50%	\$70,460.24
1/30/2006	34	1,030	1,214	1,130	93.08%	\$53,221.30
1/31/2006	193	8,396	11,813	6,346	53.72%	\$422,014.01
2/1/2006	89	2,702	3,232	3,014	93.25%	\$137,467.63
2/2/2006	13	378	452	424	93.81%	\$19,320.97

A sample of the scan forms produced by the new ARN SQL software configuration is shown on the following pages:

Sample Scan Form – Page 1

Name BONA, ROBERT		SSN 123-45-4567				54	
BOOT, INTER C/W	1	☐ 10R	☐ 912XW	☐ 10N	Other	☐	☐ NEW
Std	1						
CF	0	CW/212	☐ 10W	☐ 10XW	☐	☐	☐
MITTEN INSERT	2	☐ M	☐ L	☐	Other	☐	☐ NEW
Std	1						
CF	0	CW/037	☐	☐	☐	☐	☐
MITTEN SHELL	3	☐ M	☐ L	☐	Other	☐	☐ NEW
Std	1						
CF	0	CW/038	☐	☐	☐	☐	☐
BOOT, INTER C/W	4	☐ 10R	☐ 912XW	☐ 10N	Other	☐	☐ NEW
Std	1						
CF	0	CW/212	☐ 10W	☐ 10XW	☐	☐	☐
DRAWERS C/W, POL	5	☐ S	☐ M	☐ L	Other	☐	☐ NEW
Std	3						
CF	0	CW/807	☐ XL	☐ XXL	☐	☐	☐
UNDERSHIRT C/W, P	6	☐ S	☐ M	☐ L	Other	☐	☐ NEW
Std	3						
CF	0	CW/808	☐ XL	☐ XXL	☐	☐	☐
OVERALL C/W	7	☐ MSR	☐ LSR	☐ LL	Other	☐	☐ NEW
Std	1						
CF	0	CW/812	☐ XLSR	☐ XLL	☐	☐	☐
SHIRT C/W	8	☐ XS	☐ S	☐ M	Other	☐	☐ NEW
Std	1						
CF	0	CW/813	☐ L	☐ XL	☐	☐	☐
CAP, DSRT	9	☐ 7	☐ 718	☐ 714	Other	☐	☐ NEW
Std	1						
CF	0	DCt/200	☐ 738	☐ 712	☐	☐	☐
COAT, CAMOUFLGE I	10	☐ MS	☐ MR	☐ ML	Other	☐	☐ NEW
Std	2						
CF	0	DCt/201	☐ LR	☐ LL	☐	☐	☐
FIELD JKT, DSRT	11	☐ MS	☐ MR	☐ ML	Other	☐	☐ NEW
Std	1						
CF	0	DCt/202	☐ LR	☐ LL	☐	☐	☐
TROUSERS, CAMO F	12	☐ MS	☐ MR	☐ ML	Other	☐	☐ NEW
Std	2						
CF	0	DCt/206	☐ LR	☐ LL	☐	☐	☐
BOOT, H/W DSRT	13	☐ 10R	☐ 10XN	☐ 10N	Other	☐	☐ NEW
Std	1						
CF	0	DCt/207	☐ 10W	☐ 10XW	☐	☐	☐
DRAWERS C/W, POL	14	☐ S	☐ M	☐ L	Other	☐	☐ NEW
Std	1						
CF	0	DCt/807	☐ XL	☐ XXL	☐	☐	☐
UNDERSHIRT C/W, P	15	☐ S	☐ M	☐ L	Other	☐	☐ NEW
Std	1						
CF	0	DCt/808	☐ XL	☐ XXL	☐	☐	☐


DC6

CIF - Fort Bliss

Unit WQXXA1

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Figure 9 – Scan Form Illustration (Page 1)

Sample Scan Form – Page 2

Name BONA, ROBERT		SSN 123-45-4567				54	
CAP. DSRT							
☐	Std	1	16	☐	7	☐	718
☐	CF	0	DCI/200	☐	738	☐	712
						☐	714
						Other	☐
						☐	NEW
COAT. CAMOUFLAGE I							
☐	Std	4	17	☐	MS	☐	MR
☐	CF	0	DCI/201	☐	LR	☐	LL
						☐	ML
						Other	☐
						☐	NEW
FIELD JKT. DSRT							
☐	Std	1	18	☐	MS	☐	MR
☐	CF	0	DCI/202	☐	LR	☐	LL
						☐	ML
						Other	☐
						☐	NEW
COVER. HELMET DS							
☐	Std	1	19	☐	XSS	☐	ML
☐	CF	0	DCI/204	☐		☐	XL
						Other	☐
						☐	NEW
HAT. CAMO DSRT BO							
☐	Std	1	20	☐	7	☐	718
☐	CF	0	DCI/205	☐	738	☐	712
						☐	714
						Other	☐
						☐	NEW
TROUSERS. CAMO F							
☐	Std	4	21	☐	MS	☐	MR
☐	CF	0	DCI/206	☐	LR	☐	LL
						☐	ML
						Other	☐
						☐	NEW
BOOT. HAW DSRT							
☐	Std	2	22	☐	10R	☐	10XN
☐	CF	0	DCI/207	☐	10W	☐	10XW
						☐	10N
						Other	☐
						☐	NEW
☐	Std	0	99	☐		☐	
☐	CF	0	0	/99999	☐	☐	
						Other	☐
						☐	NEW
☐	Std	0	99	☐		☐	
☐	CF	0	0	/99999	☐	☐	
						Other	☐
						☐	NEW
☐	Std	0	99	☐		☐	
☐	CF	0	0	/99999	☐	☐	
						Other	☐
						☐	NEW
☐	Std	0	99	☐		☐	
☐	CF	0	0	/99999	☐	☐	
						Other	☐
						☐	NEW
☐	Std	0	99	☐		☐	
☐	CF	0	0	/99999	☐	☐	
						Other	☐
						☐	NEW

I acknowledge receipt of the items listed hereon. I am aware of my responsibility to maintain these items in serviceable condition and that I may be held pecuniarily liable for any items which are lost or damaged due to my negligence or misconduct.

ILO DA 3645 Signature _____ Date _____

☐ 0 CIF - Fort Bliss Unit 6/29/2005 Page 2 of 2 ☐ ☐

Figure 10 – Scan Form Illustration (Page 2)

The following chart, Fort Bliss Scan Form Activity, uses February 2006 activity to show issue sheets scanned during the month. The difference between sheets created and sheets scanned is the sheets that have to be deleted due to errors made by inexperienced individuals (soldiers added to the issue line at peak periods) on the issue line.

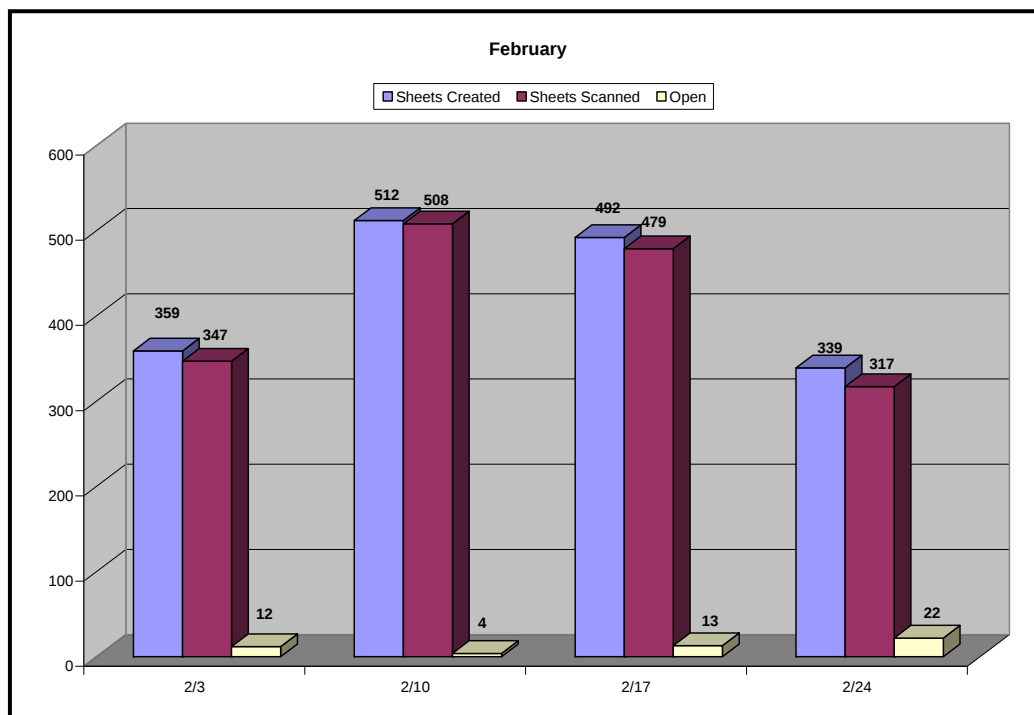


Figure 11 – Scan Form Activity Illustration February 2006

Since implementation of VIM-IRM and the scan forms in August 2005, the processing efficiency has improved significantly as more personnel were trained. Processing efficiency increased from 40 percent in September 2005 to 97 percent in February 2006.

5.3.2 Reception and Initiation of the Issue Process

The management of the issue process and capture of issue data is completely automated from the time the soldier arrives for check-in at the Reception Desk until the soldier departs with his issue through the checkout counters.

Two days prior to the ARN-IRM check in process for each soldier, a hard copy soldier roster is sent to the CIF by the Reception Station. The AdvanTech Customer Service Engineer (CSE) enters the soldier roster into ARN-IRM to initiate the OCIE check-in and

issue process. During Phase 1 of this Project, the Scan Forms for each soldier were produced as the soldier data was entered into the ARM-IRM system. The CIF operators sign the soldiers into ISM.

IRM Scan Forms were produced independent of the 3D Whole Body Scanner based on ISM Menus loaded into ARN-IRM. Scan Forms were printed for all soldiers whether they went through the 3D Body Scanner or not.

Soldier identification data (SSN, unit), existing ISM Clothing Records for Ft. Bliss soldiers, and basic “menus” were obtained from ISM and placed/replaced in ARN-IRM on a “as-required” basis. The foregoing data was accessed through an ARN-IRM Check-in workstation at the Reception Desk when a soldier arrived for an issue. Reception selects a “menu” for individual soldiers, based on their UIC/MOS. Depending on the status of the soldier, one of the following occurs:

- Full Issue: create an Issue record for the soldier if necessary, select menu for soldier's new unit, and process as a full issue of OCIE.
- Intra-Post Transfer: create an Issue record for the soldier if necessary or access Issue record in ARN-IRM (as received from ISM), select menu for soldier's new unit, transfer “carry forwards” from old record, replace old record, and identify partial issue if any.
- Inter-post transfer: create an Issue record for the soldier if necessary, since ISM does not yet provide visibility (new web-based enhanced ISM will) of the clothing record and the “Carry Forward” items from another installation. The soldier may or may not have paper showing “Carry Forward” items. If paper is available Reception accepts “Carry Forward” figures and enters in the new Ft. Bliss Issue record in ARN-IRM for the individual.

At check-in each soldier receives the appropriate Scan Form and then proceeds through the issue line. The items on the Scan Form, per the desire of the CIF Supervisor, will be in sequence with the Issue Stations. As the items are issued the size of each sized item is checked or written on the Scan Form.

As the soldiers proceed through the issue line, the quantities issued and the sizes are noted on the new Scan Form. At the end of the issue process, each soldier proceeds to one of the ARN-IRM Checkout stations. The completed Scan Forms are scanned by the CSE into the VIM-IRM system. The data is then posted to the appropriate data tables and transferred to the ARN server. An ARN forms scanner scan the Scan Form and the issue data is transferred immediately to the ARN Issue record for the soldier. The VIM-IRM system then generates an Interim Receipt. The soldier signs one copy of the Interim Report and keeps the second copy for a personal record. At the completion of

the OCIE issue, the CSE provides all Scan Forms and Interim Receipts to the ISMs checkout personnel.

The ISM operator now enters the data into the ISM system using the VIM-IRM Scan Form as the source document. The issue data is then immediately available for forwarding to ISM.

The issue data in addition to being the basis for replenishment actions is also the basis for the creation of the local tariff for the Ft. Bliss CIF, which may then also become of a part of the Army tariff database.

5.4 OCIE Menu Adjustments

Menus are now adjusted in ARN-IRM by the CSE to ensure that they are synchronized with the menus that are periodically created or modified by local commanders, and that are also entered into ISMs.

6.0 Integration of Scan Forms

6.1 Overview

The Scan Form application is used to capture issues made to soldiers at the Ft. Bliss CIF. The system scan forms previously illustrated (see Figures 10 and 11) were designed to be used to capture detailed issues.

To accurately capture the issue data and subsequently decrement stock levels, the Scan Form application was programmed to track issues made to soldiers by capturing the name, social security number (SSN), unit, stock number, quantity issued and date issued as an individual issue file. This data is used to decrement each line item of supply issued to a particular soldier on a specific day and thus provides an audit trail of transactions.

It is important to note that the SSNs are encrypted in the ARN VIM-IRM systems. Further, this encrypted information is maintained locally to ensure security of personal information and individual privacy.

7.0 Ft. Bliss CIF Roles and Responsibilities

The key roles and responsibilities of the CIF personnel are to maintain operation of the ARN Integrated Retail Module and the related local (wholesale local) inventory management capabilities in cooperation with the AdvanTech, Inc. CSE.

One of the key steps in the integrated processing of the soldiers is the timely and accurate provision of Menus from ISM. This information is used to prepare the AutoData Scan Forms that are subsequently used to record the soldier issues.

Accomplishment of system operation and inventory management responsibilities – including policies and procedures – was thoroughly covered during system implementation, training and post go-live support activities.

8.0 Training and Support

Prior to go-live, training was conducted for key personnel on the various components of the system. Key personnel were identified by name in coordination with the CIF supervisor. Training was primarily hands-on, one on one instruction.

8.1 Follow-On Training and Help Desk Support

At approximately six weeks after go-live a follow-on one-week training visit was scheduled, and refresher training on conducted all functionality.

After go-live, CIF personnel were given access to the QLM Help Desk, by telephone or email, to request assistance.

9.0 Results Achieved

ARN VIM-IRM was successfully implemented, fulfilling the deliverables and attaining valuable results. Implementation of ARN VIM-IRM Phase 1 at the CIF, Fort Bliss provided source data automation for all issue data. This data was made immediately available to the ARMY legacy system, ISM. With this implementation a complete set of issue data is automatically created and retained.

Additional benefits for the CIF include:

- Ensured that issues for garment items and footgear were accurately captured and recorded without degrading the performance required of the CIF in support of the soldier issues.
- Implemented a faster and more efficient mechanism of capturing soldier issue transactions.
- Implemented an audit trail to ensure soldier issue transactions are properly recorded/captured.
- The Scan Form database results were archived to the AAVS DataMart and can be evaluated to look at differences between age, gender, ethnic and geographic factors.
- Implemented a fully functional ARN LAN network using Wireless RF technology.
- Implemented a fully operational VIM-IRM Issue Processing System for the CIF, Fort Bliss.
- Provided on-going on-site support, operator training and program modifications after go-live for the CIF.
- Provided management reports and participated in progress meetings as requested and/or directed by the Program Manager;
- The AdvanTech CSE reviewed all the menus in ISM and in VIM-IRM, removed those that were obsolete, updated/validated menus in both systems to ensure current, usable menus, and improved efficiency of the issue process.
- The AdvanTech CSE employed VIM-IRM to structure the issue forms to conform to the sequence of issues along the issue line, and modified the

structure as necessary to meet operational requirements, thereby improving efficiency and providing responsive support to CIF Management.

10.0 APPENDICES

The following appendices are provided as supplementary information for this report:

- Appendix A – Definition of Terms & Acronyms
- Appendix B – Project Personnel

Appendix A – Definition of Terms & Acronyms

The following acronyms are used in this report and are provided to provide clarity of understanding for the reader.

- ◆ **ARN** – Apparel Research Network made up of selected industry and academic partners working together to develop innovative solutions for the Apparel industries support of military departments.
- ◆ **ASTRA** - ARN Supply-chain Transaction Repository Audit.
- ◆ **C&T** – Clothing and Textiles Division of the Defense Supply Center Philadelphia.
- ◆ **CIF** – Central Issue Facility
- ◆ **DOS** – Day Of Supply.
- ◆ **DSCP – Defense Supply Center Philadelphia** - DSCP controls the procurement and distribution of Medical, Subsistence (i.e., food), and Clothing and Textiles commodities to Defense Logistics Agency (DLA) depots and stock record accounts, worldwide.
- ◆ **ESOC – Emergency Supply Operations Center** – This refers to orders that are processed through the Emergency Supply Operations Center at DSCP. ESOC orders processed for different sites are now handled via contractor support as part of regular maintenance support for customers using the ARN VIM/Wholesale Local systems.
- ◆ **HHT** – Hand-Held Terminal
- ◆ **MCRD-PI** – Marine Corps Recruit Depot – Parris Island
- ◆ **MILSTRIP** – Military Standard Replenishment System
- ◆ **NAP** – Network Access Point
- ◆ **NSN** – National Stock Number
- ◆ **OCIE** – Organizational Clothing & Equipment
- ◆ **OL** – Operating Level

- ◆ **OST** – Order Ship Time
- ◆ **QDR** – Quality Deficiency Report. These are used to track items that are outside acceptable standards for issue to recruits. These reports provide for communication with DSCP Item Managers regarding problems of quality that are encountered.
- ◆ **QLM[®]** – Quality Logistics Management[™] – Material Management inventory system supporting acquisition, issues and distribution and predictive forecasting.
- ◆ **QLM[®]/Local** – The QLM[®] software implemented as a “wholesale local” inventory management system supporting acquisition, distribution and predictive forecasting at Ft. Leonard Wood as a prototype for future sites. The system provides a “local” capability to manage wholesale inventory assets located at the CIIP including receipt and inventory adjustment processing.
- ◆ **RIC** – Routing Identifier Code – Refers to a code used in SAMMS for identification of location where materials are to be shipped.
- ◆ **RTC** – Recruit Training Center (includes Army CIIPs) – These are the facilities operated by the different departments of the military where new recruits are inducted for basic training.
- ◆ **SAMMS** – Standard Accounting and Material Management System - This system is used by the Defense Logistics Agency, Defense Procurement Support Center.
- ◆ **SSN** – Social Security Number – nine (9) digit number to identify a recruit
- ◆ **SWX** – Human Solutions’ scan, body measurement extraction and and size prediction software ScanWorX
- ◆ **System Change Requests (SCRs)** – SCRs refer to the process and procedures that are used to track requested revisions to systems software as enhancements are requested or operational “software bugs” are identified during testing or use in production. These are tracked and managed through a system used to record: System Change Request title/description; detail/describe changes requested; points-of-contact; authority for approval/denial of SCR; programming assignments; and tracking of disposition resulting (acceptance/rejection) of requested change(s) to program(s).

- ◆ **VB** – Visual Basic
- ◆ **VIM** – The Virtual Item Manager (VIM) system incorporates operational data extracted from the SAMMS Clothing & Textile (C&T) server as the basis for the operational and decision support capabilities provided in a single source of information for Item Managers at the retail (Recruit Training Centers) and wholesale (DSCP) level.
- ◆ **VIM/WL** – VIM Wholesale Local

Appendix B – Project Personnel

The following personnel were involved in various phases or tasks for this project. Each of these individuals played key roles and worked closely together in achieving the desired results from the integration of the 3D Whole Body Scanners to ARN VIM – IRM system and evaluation of the results. The Project Team members are grateful for the contribution and support of the personnel at Fort Jackson, South Carolina, who contributed their support to this research effort.

Robert E. Bona – AdvanTech Systems Design Engineer

Dennis A. Brekhus – AdvanTech Assistant Project Manager

William Harrison – Supervisor, CIF, Ft. Bliss

Bernie Johns – ARN Project Support

Frankie M. Mason – AdvanTech Network Systems Administrator

Robert J. Padilla – Advantech Senior Trainer

Richard A. Perrin – AdvanTech Project Manager

Patty Schafer – Customer Services Engineer

Julie Tsao – ARN Project Manager, DLA

Debra L. Wassel – AdvanTech Technical Support