

Supply Management



"Without supplies, neither a general nor a soldier is good for anything."

Clearchus of Sparta

(About 400 BC)

The Problem

The basic challenge for supply management is to provide Soldiers with the necessary support while also minimizing wasteful practices.

The Army requires all varieties of equipment, from complete weapons systems, to individual items, and repair parts. It is the job of Quartermaster personnel to provide this material to the Soldiers.

Yet supplies cost money, and the Army cannot afford to waste money. If the Army allows waste it is not only a betrayal of the taxpayers' trust, but it limits the money available for needed supplies.

Sources of Avoidable Costs

Negligent loss or damage of government property is the most obvious cause of waste. This can range from carelessly allowing theft of government property, damage to equipment through improper operation, or just simply losing items. Every Soldier is trained from the beginning of his/her to treat government property in a responsible manner.



Yet excessive inventory is another cause of waste in the government. Unnecessary supplies in storage ties up money that might be used for other purposes. It also costs money for warehousing. When items in storage exceed their shelf life or become obsolete, the government loses that investment. Tactically, excessive inventory limits the movement of the units.

**The history of the Army
supply**

**function is that of
giving the Soldiers what
they need,
while controlling the
avoidable costs.**

Accountability and Responsibility

There is a difference between accountability and responsibility.

Accountability involves the duty to maintain accurate records for government property. This might be unit property (usually tracked using a property book) or a warehouse or some other supply activity (usually tracked using a stock record account).

Responsibility is the duty to safeguard government property within one's control. This might be supervisory responsibility, such as a company commander. It might include personal responsibility for the individual Soldier and his/her individual equipment.

Either role can involve financial liability in the event of negligence.

Financial Liability

The best way to keep a Soldier interested in protecting government property is to hold that individual responsible. If the property is missing the individual needs to provide an acceptable explanation or pay for the item.



Throughout its history the Army has used the prospect of losing money to keep its personnel interested in protecting government property. Often rules could be very strict.



FINANCIAL LIABILITY
INVESTIGATIONS
OF PROPERTY LOSS

AIRBORNE



Washington's Army

Financial liability began as early as the American Revolution when the Continental Army became concerned about the loss of tools.

In 1776 George Washington's General Orders stated that officers would pay for the loss of tools. Enlisted personnel might have the cost deducted from their pay and be "punished according to the nature of the offense."



AllPortraits

Property Book vs Stock Record

Essentially the Army has two forms of property accountability: the unit property book and the stock record account.

The property book records the non-expendable property assigned to a unit or organization. It might include items ranging from vehicles to computers. Quantities seldom change unless the item is lost or damaged, or unless there is a new issue. Usually a company commander is responsible for the property in his/her company, but the commander can direct subordinates to sign for property.

Within the Army we have different types of supply activities. These are organizations that store and issue different types of supplies, usually working out of a warehouse or a field storage site. These supplies can range include individual clothing, repair parts, or just about anything else. New items arrive, go to the shelves, and then are issued out. The quantity is expected to fluctuate. The Army uses the stock record account tells the user is on hand compared to what should be on hand based on the number of demands.

Evolution of the Army Supply System

Early Army

Soldiers during the early years of the Army frequently suffered from a faulty or non-existent supply system. Most Americans are familiar with the stories of the Revolutionary War Soldiers who fought without proper uniforms or equipment, frequently without shoes.

After the Revolution, Congress abolished the position of Quartermaster General, reasoning it was a wartime only position. When Congress did try to re-establish the office just before the War of 1812, it was too late to create an effective supply system. Again the Soldiers suffered.

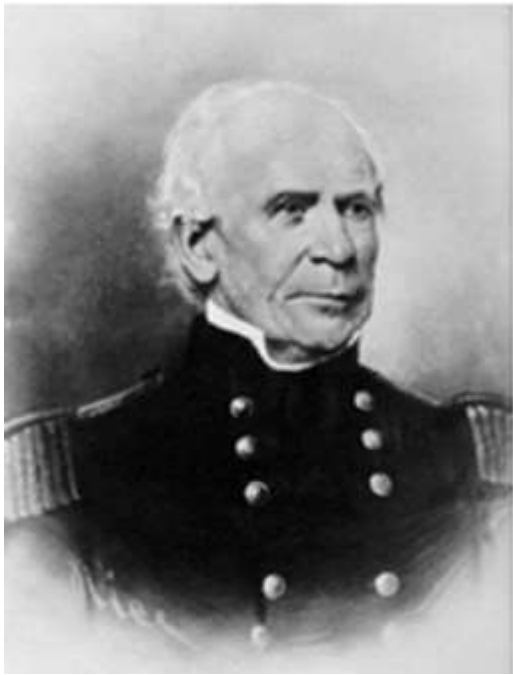


After the war, Congress tried two Quartermaster Generals, one for the Northern Department and one for the Southern Department.

Finally in 1818 Congress created a single Quartermaster Department for the entire Army, with one Quartermaster General.

Thomas Jesup

Father of the Quartermaster Corps



From 1818 to 1860 Thomas Jesup served as the Quartermaster General. During the War of 1812 he was an Infantry officer, so he understood the meaning of bad support. During his lengthy tenure he created an effective supply organization. His work included the ever present paperwork that accompanied all property transactions.

Jesup established two principles that remain relevant to all Quartermasters. The work of the Quartermaster is first a military function. The work must be oriented toward supporting victory. His second principle was that all Quartermasters are accountable stewards of government money and property. Except at the cost of compromising military operations, this is a duty of the Quartermaster Soldiers and civilians.

Nineteenth Century

Jesup's initiatives established the foundations for success during the rest of the century, although with some difficulties. The rapid mobilization of the Civil War created chaos for the first months, until order could be re-established. In time the Quartermasters became quite effective at supporting massive armies; but the expertise quickly disappeared as the Army transitioned to the Indian Wars. Then in 1898, a minor war with Spain over the future of Cuba proved to be a major embarrassment for Army logisticians.

From 1818 to 1912 the Army employed a Quartermaster Department rather than a Quartermaster Corps. As a department it relied upon government civilians and contractors to do much of the work later performed by Soldiers. Also the Quartermaster Department did not purchase food items.



Quartermaster Corps



In 1912 the Quartermaster Department became the Quartermaster Corps. Up to this time the Quartermaster Department consisted of relatively few military personnel. Most of the actual labor of logistical work was performed by government civilians or contractors. The Quartermaster hired and paid the workforce.

With the conversion to a Quartermaster Corps, the Army could organize units of Soldiers to perform this work, including operating supply points. At the same time, the Quartermaster Corps also became responsible for purchasing and delivering subsistence.

Like other Soldiers within the Army, Quartermaster Soldiers were becoming more professional. The school in Philadelphia became the beginning of what is now the Quartermaster School. The job of supplying Soldiers was no longer something just learned on the job.

World War I



By the close of World War I the Quartermaster Corps was supporting over three million soldiers, with almost two million overseas by the war's conclusion.

The challenges were unprecedented. For the first time the United States needed to sustain a massive, modern Army in a friendly foreign nation over an extended period of time. Quartermasters had to learn how to deliver the right supplies, in the right quantities, to the right place. Introduction of trucks eased the transportation problems, but it also created a demand for repair parts. The Quartermaster Corps learned to operate depots and a supply system that extended from the Atlantic Ocean to eastern France. Most of the work came from Quartermasters who had recently joined the Army.

Of course there were mistakes and shortages, but overall, the American soldier of World War I received the means to perform his job.



World War II



In terms of quantities supplied, World War II presented the greatest challenge to logisticians. This time the Army consisted of 8 million Soldiers who all needed modern supplies. Because the war extended across the world, Soldiers needed equipment for every conceivable climate. New equipment, including motor vehicles, required a system to manage repair parts.

Shortages of raw materials created by the war forced logisticians to minimize waste.

Despite these challenges, the system worked. Of course it was not perfect, but the American Soldier received the supplies he needed, and the logistical systems improved throughout the war.



Beginnings of Modernization

The combination of wartime shortages and new technologies caused the Quartermaster Corps to look for new ways to manage supplies. Logisticians simply needed better ways to track the millions of transactions handled daily.



At the depot level the Army introduced Electronic Accounting Machines (EAM). These were not quite computers; but they could add and subtract to perform many of the basic functions. Once employed these EAM's provided the data to make better decisions at the national level. These were huge machines that relied upon punch cards.

Stock numbers were introduced during World War II as a means of providing definitive identification for each item.



The Army also improved its methods for determining how much supplies should be stored.

Reorganization 1962



Until 1962 the Quartermaster General was responsible for all the national level management decisions for any troop-support types of supplies. His office decided what to buy, how much to buy, where to store the material, and everything else. The Chief of Ordnance did the same thing for weapons; the Chief Signal Officer managed radios and communications equipment, etc.

The Secretary of Defense thought this system was very inefficient. He directed that the Army's wholesale logistical functions be consolidated into a single command, known as Army Materiel Command. From now on this single agency managed all of the wholesale logistics for the Army.

At the same time the Secretary of Defense directed the creation of the Defense Supply Agency to purchase items common to all the services. In 1977 it became the Defense Logistics Agency.

Today these two organizations do the wholesale supply management for the Army.



Stock Records

Purpose

To operate any type of supply activity it is necessary to keep track of your issues and receipts so you know what you should have on hand. You can compare this to the actual inventory to learn if you are having any losses or unexplained overages, and then take appropriate corrective action.



Stock records also let you know when the balance on-hand drops to the point where you need to re-order that item.

Stock records serve another important function. They allow the unit to keep a record of the number of demands over a given period of time. That information is used to determine the amount kept on the shelf. The goal is to keep enough supplies to support the mission, but not to create excess supplies that cost money and create storage problems.

Techniques have evolved, but the essential purposes have remained the same.

Before World War II Army warehouses used a card system to track supplies manually.

World War II

Changes began during World War II. The Army needed to determine how much of an item should be on hand. Therefore the concept of stockage levels based on demand history developed. That is you can make your best guess about what will be needed based on past demands.



There was one problem. With all the activations of new units and reshuffling of units during the war, it was impossible to make predictions of future demand based merely on the number of issues of a particular item. Consequently the Army developed a distinction between initial issues and replacement issues. Stockage levels were to be based only on replacement issues because replacements were the best predictors of future demand.

Today we still make the distinction between recurring and non-recurring demands.

Calculations

Methods of making calculations were quite simple. The requisition objective was equal to the number of replacement (recurring) demands over the last 90 days.

The reorder point was two-thirds of the requisition objective.

The requisition objective and the reorder point were both defined as the number on hand plus the number due in.

Suppose you had 30 demands over the last 90 days. Your requisition objective would be 30 and the reorder point 20. When the number on hand plus the number due in dropped to less than 20, you re-order enough items to bring the number on hand plus due in to 30.

All the calculations were done manually.

The image shows a detailed manual calculation form used for stock accounting. It includes a 'SUMMARY OF DEMANDS' table at the bottom, which is a grid with columns for 'ITEM', 'QTY', 'DATE', 'REORDER POINT', and 'REQUISITION OBJECTIVE'. The form also contains several tables for tracking inventory levels and calculating reorder points. The tables are organized into sections for 'STOCK ACCOUNTING RECORD' and 'SUMMARY OF DEMANDS'. The form is filled with handwritten data, showing the progression of inventory levels and the calculation of reorder points over a 90-day period.

Army Field Stock Control System

Changes came during the Korean War era. Army studies concluded that 85 percent of the demands could be filled by 15 percent of the line items. Therefore it became more efficient for forward support units to fill 85 percent of the customer demands from supplies on hand.

Increasing this number even a little created a disproportionate demand on the supply system. To meet 90 percent of the customer demands, a unit would need to stock 50 percent of the items within the Army inventory.

Of course the system contained exceptions, but the goal remained to fill about 85 percent of the customer requests.

Recorder Point and Requisitioning Objective Table
15-day Operating Level, 5-day Safety Level

This was a little more complicated than the World War II method, but it was designed to save money by determining the best quantities to keep on hand.

Endless Paperwork

Before the computer, every action required a different form, and often two forms for one transaction.

INVENTORY ADJUSTMENT RECORD (DA FORM 1300-4, 1-72)

This form is used to record inventory adjustments. It includes fields for item number, description, quantity, and unit. The form is divided into sections for 'Inventory Adjustment' and 'Inventory Control'.

COMPUTATION CARD
This information is based on this form. It is not the user's record. It is a general guide only.

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REORDER POINT RECORD (DA FORM 1300-4, 1-72)

This form is used to record reorder points. It includes fields for item number, description, quantity, and unit. The form is divided into sections for 'Inventory Adjustment' and 'Inventory Control'.

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Today

As the capabilities of computers have increased, the Army can develop more sophisticated methods of managing its stock levels.

Dollar cost banding considers factors such as price or essentiality code to find the best way to support unit readiness while controlling costs. Lower value items can be stocked in greater quantities because they will not have the same inventory costs as more expensive items.

In other situations either a “Days Of Supply” or an “Economic Order Quantity” methodology is authorized.

Property Book

Unit Property



Any military unit needs a wide variety of equipment.



The Army maintains records of property designated as non-expendable. Good record keeping ensures that the organization has what it needs, but does not carry unauthorized supplies.



More importantly good records assign responsibility to an individual. Typically this is the company commander, who will further direct the responsible individual to also sign for the property.



At least since the Civil War, the commander had the assistance of an NCO. During the 19th century this was the Quartermaster sergeant. Today it is the supply sergeant.



Before the Property Book

Before the property book the post Quartermaster issued supplies from his stock using a memorandum of receipt. This served the same function, but it was more awkward.

Receipts were maintained in the Quartermaster's office file.

Periodically the post Quartermaster issued reports to the Office of the Quartermaster General listing what was on hand or on a memorandum of receipt.

Property Book

After World War II the Army replaced the memorandum system with the property book. Literally this was some form of a binder with one card for each line item and separate cards for multiple stock numbers.

The card recorded changing balances, along with the voucher number that supported the change. Each entry in the property book required keeping a copy of the relevant voucher in the files. The process could be labor intensive.

As the manual system matured, most property books were maintained at the battalion level, often with an experienced warrant officer as the property book officer.

Quantity on requisition to bring on hand up to operating allowance.

DA FORM 14-110 (1 OCT 51) (REV 48)
MAY 48 EDITION
COMPANY (Unit) PROPERTY RECORD

ORGANIZATION AND STATION
CO. "A" 5th Engineer Combat Bn

DATE	REQUISITION NO. (Voucher No.)	QUANTITY	REMARKS	REMARKS	REMARKS	REMARKS	REMARKS	REMARKS	REMARKS
10-26-51	36	2							
10-26-51	56	2							
11-25-51	63	4							
11-25-51	45	4							
12-1-51	80	4							
12-1-51	69	1							
12-16-51	72	1							
12-25-51	34	1							
1-10-52	Per unit inventory								
1-25-52	Change in allowance								
1-26-52	68	2							
2-5-52	60	2							

Change reports indicating change in on hand accounts

Quantity missing or unserviceable for which R/S is submitted.

Change report reflecting change in allowance.

Quantity authorized by T/ONE, T/A, ROL, and special DA Authorizations.

Quantity of items authorized to be on hand or on requisition.

SUPPLY STAFF
Engineer

DATE
1-10-52

REMARKS
Rule, tape, steel, pallpost, 3 flat side case, inside and outside, depth and height measuring, English 72-inch, 16cha and 30cha graduation.

Change in allowance.

Obtained from appropriate list of reportable items published in DA-711-43-sec-1-

Sets, Kits, and Outfits

[illegible][illegible]

Accounting for non-expendable components required different procedures. Each set, kit, or outfit consisted of component items that were specified in a supply catalog, technical manual, or other applicable publication.

Some components were expendable, others were non-expendable. The property book officer recorded shortages of non-expendable items on a shortage annex. All this amounted to more paperwork.

Automation

Why Automation

Since the 1950s the story of supply management has been dominated by the increasing use of computers and automation.

Computers could save large amounts of labor, especially in managing supplies at the depot level.

Computers could provide better information, leading to better supply management practices. The reports and calculations produced by even the first generation computers led to improved visibility over supplies. Later generations of computers have accelerated the delivery times and have provided total asset visibility. All of this contributes to lower stockage levels and cost savings.

Electronic Accounting Machines

Before the first computers American businesses employed Electronic Accounting Machines beginning in the 1930s. These were huge machines using hard wiring to perform basic functions. They could do simple calculations such as addition and subtraction, but not complicated calculations. Thus they were not true computers.



Impressed by the success of Electronic Accounting Machines, the Quartermaster General brought in similar machines, often using reservists with business experience.

They proved to be a huge success. These machines could aggregate data about the on hand balances from any depots quickly, and provide current information. The Quartermaster Corps could make better decisions about what to buy.

Punch Cards



The Electronic Accounting Machines and early generations of computers could only accept data using punch cards. There were no keyboards, disk drives, or monitors.

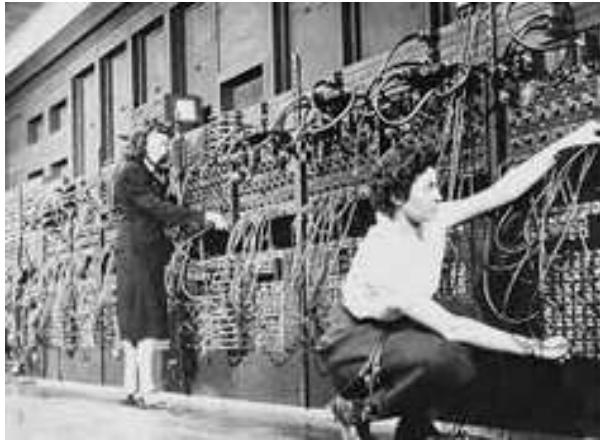
Each punch card had 80 columns, and a combination of holes within each column indicated a particular number or upper case letter. That was it.

Output came in the form of more punch cards or a printout (80 columns of course).

To get the most from these 80 columns, early programs relied heavily on abbreviations and special codes. Even today we can see the legacy of this 80 column system in some of the supply transactions.

ENIAC

(Electronic Numeric Integrator And Computer)



True computers were developed in World War II by the Ordnance Department. The calculations for shooting from a moving platform to a moving target in three dimensions (that is shooting at a fighter aircraft from a

bomber) were just too complicated for a human to perform.

This became the ENIAC. It was a 30-ton machine with 18,000 vacuum tubes, thousands of miles of wiring, and a whopping 200-digit memory. When one vacuum tube broke, the entire process stopped. Reprogramming for a different equation required adjusting the circuitry.

ENIAC was a huge success. It performed the mathematics necessary for the hydrogen bomb.

Other computers followed. Although enormous and expensive, they were getting smaller. Newer versions could be re-programmed simply by using punch cards.

Grace Hooper



One of the greatest contributors to the growing field of computer science was a Navy officer named Grace Hooper. Over the course of her career she demonstrated that computers could do more than just calculations. She developed the first compiler, and a Common Business-Oriented Language (COBAL) which revolutionized the ways computers were used. She continued to receive successive Congressional waivers about her age due to her extreme usefulness, eventually retiring as a rear admiral (one star).

One of her best known legacies came purely by accident. For some reason the computer just wasn't working, so she examined the wiring and found a moth creating a short circuit. This was the first computer "bug."

Afterwards, any malfunction could simply be called a bug.



1st computer "bug"

1950s and 1960s



With the success of ENIAC other computers followed, first by the Navy and then businesses. Technology improved.

The Quartermaster Corps replaced its Electronic Accounting Machines with real computers at the depot level. The Quartermaster Inventory Control Center at the Richmond Depot used computers at the national level. Later computers were used in Vietnam at the depot level. Automation provided more efficient inventory management with fewer workers.

Computers of that generation would not be recognizable as computers today. They were massive, about the size of a large room. The thousands of miles of circuitry made the calculations slow by today's standards. Punch card remained the standard means of feeding data to the computer.

For all their physical size, the memory capacity of these machines could be measured in Kilobytes



MILSTRIP

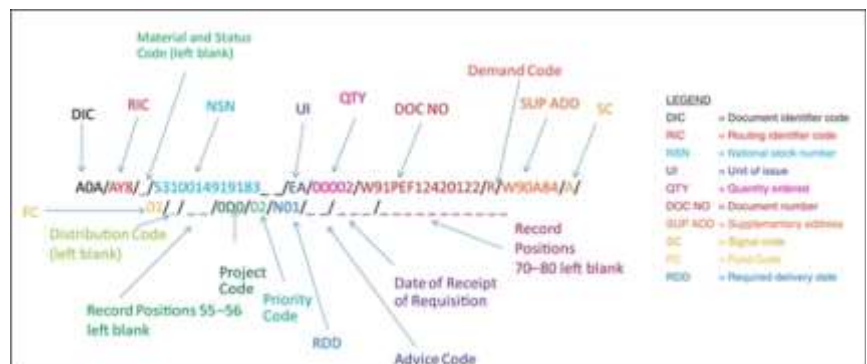
(Military Standard Requisitioning and Issue Procedures)

In 1962 the Defense Supply Agency developed a standard 80-column format for supply transactions throughout DOD.

The standardized format for supply transactions eliminated much confusion. The format worked well with newly automated depot systems. As automation moved to the division level, the MILSTRIP format followed.

MILSTRIP also introduced a single priority system for use throughout the military.

MILSTRIP used an 80-column format designed for the punch cards of that era. Even though the punch card has long since disappeared, the 80-character MILSTRIP format has persisted into the 21st century.



DLOGS

Division Logistics System

Automation finally reached the user level in 1973 with the Division Logistics System. This system replaced the paper procedures for property book and repair parts within a division.



Computers remained the same huge machines as before. A single computer required an entire van, with other vans for the supporting functions. There was one computer per division to perform all the personnel, finance, maintenance management, repair parts, and property book functions; and it operated on a very slow cycle.

Supply transactions were only processed on a once daily cycle. The company commander received an up-to-date printout of his hand receipt only once a month.

The system was a huge improvement. It worked with fewer people and gave the division commander visibility over his organization.

DAS3

Distributed Automated Service Support System

Improvement came in 1981 with the Decentralized Automated Support System (DAS3).

This system still used a large mainframe; but it had multiple terminals that allowed Soldiers to work from different locations. A monochrome monitor allowed for real-time interaction with the computer.



Age of the Personal Computer

Real change came with the arrival of the integrated circuit (or microchip).

The change came by impressing the circuitry into a silicon wafer. These were much smaller in size and could be produced cheaply. They became practical by the mid-1980s.

The faster processing time allowed for disk drives, keyboards, and monitors, which all gave real time interaction with the computers.

The modem allowed communication between computers, which eventually developed into the World Wide Web.

Suddenly the whole world of computers changed, and it has kept changing. All of the peripheral devices have become faster and more capable. The monochrome monitors or the one megabyte-floppy drives were once considered technical wonders; now they are relics.



TACCS

Army experimentation with personal computers began in the mid-1980s and culminated with the fielding of the Tactical Army CSS (Combat Service Support) Computer System, better known as TACCS.



This was an off-the-shelf version of a personal computer that was selected especially for its ability to withstand rough treatment. A rugged container added to the durability under field conditions. It could be used in garrison or while on maneuvers.

This proved to be just the beginning for personal computers in Army logistics. As computer technology improved, the Army improved with the times.

Software

Maintaining the software has been a constant challenge. New capabilities require new software; but the new software must be compatible with older systems. During the time it takes to develop new software, the technology keeps changing.

There is always a new acronym for each new program or software.

SAILS

ULLS

PBUSE

SPBS-R

SARSS

DLOGS

Recent Trends

Inventory Reduction

(Stock Record Accounts)

The Army has always recognized the need for balancing the cost of large inventories against the need for readiness, especially with repair parts. Yet over the last few decades the emphasis has shifted dramatically toward reducing inventory levels, especially in direct support units.



Inventories can be costly. All these supplies use up large amounts of cash, and many items will become obsolete while still on the shelf. Storage and management also require money. Quantities of supplies hinder the mobility of support units. As equipment becomes more sophisticated, the cost of large inventories increases.

Today the paradigm is to limit the supplies on hand and to trust the distribution system to deliver inventory in a timely manner.

Tools to reduce inventory

Fortunately modern information technology has provided us with the tools to help us lower inventory levels.

Velocity management is the constant improvement of delivery times, whether at the processing or the shipping end of the transaction. Shorter delivery times allow the unit to keep smaller quantities on the shelf.

Total Asset Visibility allows the inventory managers to understand the status of a particular item throughout the globe. Who has the item? Who may have excess quantities? With such information, managers will be able to make better purchasing and distribution decisions. Ideally they may be able to fulfill some demands by cross leveling in theater instead of processing the requisition all the way through CONUS.

Better tracking of demand history, when combined with command emphasis, will help to remove items that are not needed from the authorized stockage lists.

Inventory and Tracking

Not too long ago supply specialists identified items by physically examining the packaging, hoping to find the NSN or the nomenclature. At best this was time consuming, in other cases you could not find the identification data.



Then by the 1980s private industry experimented with labels of bar codes that could be interpreted through an optical scanner. Work of the supply specialist became easier as the Army adopted this technology.

The RF/ID is a small chip that transmits data to a receiver. It contains far more information than the bar code. The Army made its first tentative introduction of the RF/ID in 1996, while the technology was still maturing. By 2007 the Department of Defense began using RF/ID technology to track assets across the supply chain. As of 2016 the full potential of this technology is still emerging.



GCSS-Army

Beginning in the late 1990s Army logisticians and information management specialists envisioned new automation systems that would integrate different systems instead of the “stovepiped” systems that existed at the time. This became the genesis of the Global Combat Support Systems – Army, which would become a family of systems all connected. For example, the new technology connects supply transactions with financial management systems.

Fielding began in 2014 and as of 2016 it is moving toward completion.

“The battle is
fought and decided
by the
quartermasters
before the shooting
begins.”

Erwin Rommel

Some things never change.